Mobilising labour.
A spatial analysis of railway infrastructure, commuting flows and rural-urban relations in Belgium, 1846-1961

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For my family and friends, without whom every traveller is lost
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My insights gained during the train adventure are documented in the following pages. As most doctoral students, I hope it can spark further research. For now, however, I sincerely thank Hilde Greefs, Bénédicte Grosjean, Carlos Lopez-Galviz, Tim Soens and Thomas Vanoutrive, the members of my jury, for reading it. As history is a science of debate, it is time to let the debate begin.

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English summary

In contemporary debates on sustainable environments, it is common to intertwine transport policies, mobility flows and urbanisation patterns. In historical research, by contrast, only the firsts steps have been taken. Although mobility and migration history, urban history, transport history and historical geography all address aspects of transport, mobility and urbanisation, the lingering disciplinary divides are bridged in this doctoral research by inquiring how the novel practice of national governments to plan railway networks top-down in the nineteenth century affected labour mobility and urban morphology. Belgium was chosen as case-study because of its double pioneering role in railway policies: not only was its government the first to build and fund a coherent public railway network, but Belgian policy makers were also the first to support railway commuting on a national scale. It was reasoned that the problem of overcrowded cities in the nineteenth century could be curbed by using transport technology to solve the friction of distance in a home-work split. After all, gaining access to a territory-covering railway network enabled rural households to remain in their villages whilst being connected to industrial and urban labour markets. Ernest Mahaim confirmed the success of this railway policy by claiming that taking the train to work was a phenomenon of societal importance that could no longer be ignored in Belgium at the onset of the twentieth century.

Nevertheless, a spatial analysis of commuting and population data on a national scale for the years 1846 to 1961 questions a straightforward relation between gained railway access and commuting. Rather, the empirical maps are consistent with the finding in migration research that while the constrains and opportunities for labour mobility are structural, the decision to move is always a selective one. Moreover, William Cronon identified commodity markets as the linchpin around which nineteenth-century transformations of rural-urban landscapes revolved. Both insights introduced labour markets, livelihoods and a transport-cum-mobility lens into the doctoral research to examine entangled railway policies, mobility flows and rural agency. In particular, to grasp relations between network and space, it was asked if the policies making the home-work split an affordable alternative for labour migration was all rural households needed to integrate railway commuting in their livelihoods. The empirical analysis yielded a negative answer. A much greater incentive to become mobile for rural households proved to be the spatial model that state engineers and politicians embedded in the design and the organisation of railway infrastructure, aimed at spurring economic growth via the stimulation of trade. The march of mechanised production and market exchange in the era of steam and steel not only led to a progressive concentration of major labour markets in industrial sites and cities, but increased the demand for seasonal and temporal wage workers too. Mobility levels thus rose to unprecedented levels in the long nineteenth century due to shifting labour markets, in
geography and temporality, combined with the determination of rural households to secure their access to a plot of arable land in the countryside.

This double-sided effect of transport infrastructure still influences contemporary mobility and urban morphology. Indeed, although access to arable land is no longer part of a household’s livelihood, commodity markets only gained in momentum, thus adding to the geographical link between labour markets and transport infrastructure. This implies that commuting has to be understood both from a realisation of location preferences and as an economic imperative. Maintaining such a finding is important because it critically questions the idea that post-war democratisation of the private automobile is at the root of urban sprawl. Moreover, recognising commuting as an economic imperative leads to an increased awareness that not all workers are mobile by definition, reducing the likelihood that mobility injustice will become a structural part of policies aimed at creating sustainable environments.

Nederlandstalige samenvatting

Het is gebruikelijk in hedendaagse debatten over duurzame omgevingen om vervoersbeleid, mobiliteitststromen en verstedelijkingspatronen met elkaar te verweven. In historisch onderzoek daarentegen zijn enkel de eerste stappen gezet. Niettegenstaande mobiliteits- en migratiegeschiedenis, stadsgeschiedenis, transportgeschiedenis en historische geografie allemaal aspecten van vervoer, mobiliteit en verstedelijking aan bod laten komen, zijn er de disciplinaire verschillen die in dit doctoraatsonderzoek worden overbrugd door te vragen hoe de top-down planning van spoorwegnetwerken, als nieuwe praktijk van nationale regeringen in de negentiende eeuw, de arbeidsmobiliteit en de stedelijke morfologie beïnvloedde. België werd als casestudy gekozen omwille van zijn dubbele pioniersrol in het spoorwegbeleid: de Belgische regering was niet alleen de eerste die een openbaar spoorwegnetwerk ontwierp en financierde, maar zij waren ook de eersten die het woon-werkverkeer per spoor op nationale schaal mogelijk maakten. De negentiende-eeuwse beleidsmarkers redeneerden dat het probleem van overvolle steden kon worden ingedamd door transporttechnologie te gebruiken om de frictie van afstand in woon-werkverkeer op te lossen. Immers, de toegang tot een nationaal spoorwegnet gaf landelijke huishoudens de mogelijkheid om in hun dorp te blijven wonen terwijl ze verbonden waren met de industriële en stedelijke arbeidsmarkten. Ernest Mahaim bevestigde het succes van dit spoorwegbeleid door te stellen dat spoorwegpendel een fenomeen van maatschappelijk belang was geworden in België aan het begin van de twintigste eeuw.

Een ruimtelijke analyse van woon-werkverkeer en bevolkingsspreiding op een nationale schaal voor de jaren 1846 tot 1961 zet echter vraagtekens bij een rechtstreeks verband tussen het
verkrijgen van spoortoegang en pendel. De empirische kaarten komen eerder overeen met de vaststelling in migratieonderzoek dat de beslissing om een afstand te overbruggen altijd selectief is ondanks de structurele bepaling van de beperkingen en mogelijkheden voor arbeidsmobilitéit. Daarnaast werden goederenmarkten door William Cronon geïdentificeerd als de spil waarrond de transformaties van.rurale en stedelijke landschappen in de negentiende eeuw draaiden. Beide inzichten introduceerden arbeidsmarkten, levensonderhoud en een transport-cum-mobiliteit lens om een verstrengeld spoorwegbeleid, mobiliteitsstromen en rurale agency te onderzoeken. Met name werd de vraag gesteld of een beleid dat pendel een betaalbaar alternatief maakte voor arbeidsmigratie volstond voor landelijke huishoudens om het woon-werkverkeer per spoor deel te maken van hun levensonderhoud. De empirische analyse resulteerde in een ontkening. Het ruimtelijke model gericht op het realiseren van economische groei door handel te stimuleren en dat door staatsingenieurs en politici in de lay-out en organisatie van de spoorweg infrastructuur werd ingebed, bleek veel belangrijker te zijn om de mobiliteit van landelijke huishoudens te verklaren. De verspreiding van gemechaniseerde productie en marktruil in de lange negentiende eeuw vertaalde zich niet alleen in een voortschrijdende concentratie van werkgelegenheid in steden en industriële sites, maar ook in een toenemende vraag naar seizoenarbeiders en tijdelijke werkrachten. Het mobiliteitsniveau steeg dus tot een ongekend niveau door verschuivende arbeidsmarkten, zowel geografisch als temporeel, in combinatie met de vastberadenheid van landelijke huishoudens om hun toegang tot een stuk landbouwgrond op het platteland veilig te stellen.

Dit tweezijdige effect van transportinfrastructuur beïnvloedt nog steeds de hedendaagse mobiliteit en stedelijke morfologie. Hoewel toegang tot landbouwgrond geen betekenis meer heeft in het levensonderhoud van een huishouden, hebben goederenmarkten alleen aan kracht gewonnen. Deze versterkte geografische link tussen arbeidsmarkten en transportinfrastructuur impliceert dat het pendel fenomeen niet enkel begrepen kan worden vanuit locatie voorkeuren, maar ook als economische imperatief. Het handhaven van dergelijke vaststelling is belangrijk omdat het de idee dat de naoorlogse democratisering van de auto aan de basis ligt van stedelijk wildgroei kritisch bevraagd. Bovendien leidt het erkennen van pendel als economische noodzaak tot een verhoogd bewustzijn dat niet alle werknemers mobiel zijn per definitie waardoor de kans vermindert dat mobiliteitsonrechtvaardigheid structureel deel wordt van beleidsmaatregelen die gericht zijn op het tot stand brengen van duurzame omgevingen.
introduction
INTRODUCTION

“The rich man in his castle and the poor man at his gate cannot have a ‘real’ relationship understood only in theoretical terms; relying on a classification of their relationship through the tropes of class or capitalism perpetually confines explanation to the abstract realm of the academic construct. It privileges the academic standpoint, and not the (literal and metaphorical) standpoint of the subjects we claim to understand”

Leif, “Space”, 2013, 402

1 A study of the past to enrich the future

1.1 The birth of a railway world

The change in nineteenth-century transport infrastructure occupied the mind of English writer Herbert George Wells around 1900, when he was anticipating the societal transformations that awaited mankind in the century ahead. In his thoughts, the nineteenth century “if it needs a symbol, almost inevitably have as that symbol a steam engine running upon a railway” with a population redistribution at its side characterised by “an unusual growth of great cities and a slight tendency to depopulation in the country”. Railway technology linked to expanding cities resulted for him in “a more general proposition, namely, that the general distribution of a population in a country must always be directly dependent on transport facilities”. The birth of a railway world not only inspired the writings of Herbert George Wells, but it had likewise caught the interest of Ernest Mahaim. To expose the societal effects of railway commuting whilst comprehending how transport networks and urban growth interacted, the Belgian sociologists and reformer conducted an in-depth study of cheap railway subscriptions used by Belgian wage workers during the first decennia of the twentieth century. Among others, he asked a miner who lived in East-Flanders why he preferred railway commuting over residential migration. The miner answered he had lived in the industrial basin of Hainaut for twelve years, but he was now happy to take the train to work, even though it took him almost three hours one way to cover the distance of the home-work split. Commuting gave him a double advantage: he escaped the

1 Wells, Anticipations, 1903, (first quote) 2, (second quote) 20.
3 Mahaim, Abonnements d’ouvriers, 1910.
fights that took place every Sunday between Flemings and Walloons in Maurage and he had his friends and parents around him in Geraardsbergen.4

While Ernest Mahaim admitted that “[i]n Germany, in England, in France, in Austria, so-called workmen’s trains exist with specially cheap fares”, he continued that “nowhere is the regular transport of workmen so relatively large, so cheap, and so intensive as in Belgium”.5 Today, he would have been stunned to discover that personal mobility constituted a basic right of all European citizens.6 In contrast, the instrumental use of public transport infrastructure in the planning model called transit-oriented development, would have been familiar to him. This planning model aims at addressing the unsustainable nature of contemporary urban sprawl by creating metaphorical “urban beads on a string”, whereby these urban beads coincide with access points to public transport networks as these are the places where planning practices densify diverse urban land uses within a walkable circle.7 During the era of steam and steel, governments also instrumentalised transport infrastructure by charging state engineers “with the duty of organising the nation, or better, of fundamentally reshaping his ‘natural soil’, the territory, and adapting it to the new needs of a modern society”. To fulfil this duty, engineers started to meticulously plan territory-covering transport networks to restructure space top-down and, as a consequence, trigger envisioned societal transformations. Nineteenth-century governments thus amplified the sociotechnical nature of transport infrastructure.8 Yet, the spatial planning disciplines increasingly focusing on car mobility during the twentieth century, lost sight of the transport policies that intentionally embedded spatial models in both the design and organisation of railway infrastructure during the nineteenth century.9

4 Mahaim, Abonnements d’ouvriers, 1910, 140.
5 Mahaim, “Cheap railway tickets”, 1906, 536.
It is, therefore, an exciting experiment to imagine that nineteenth-century reformers and twenty-first-century spatial planners sit at ease with each other around a table while optimising the ability of railway infrastructure to influence urban morphology. Or, to use the words of Janet Polasky: “The environmental crisis forced planners at the twenty-first century to recognize what the pioneering nineteenth-century reformers knew, that the land use/housing policies and transportation questions were inextricably intertwined”. Moreover, bringing practitioners of spatial planning from different centuries around a table is a thought experiment worth pursuing to demonstrate that the “construction of the problem using a particular discourse favours particular solutions”, with Thomas Vanoutrive convincingly making his argument for the topic of congestion pricing. The mindset of nineteenth-century engineers is bound to uncover taken-for-granted ‘facts’ in the discourse of twenty-first-century planners, as both groups value transport networks as spatial engineering tools, yet, the outcomes they envision depend on diametrically opposed vectors of spatial change. Indeed, while trains were instrumentalised in nineteenth-century Belgium as instruments of decentralisation with the explicit intent to root households in the countryside, in the spatial disciplines of current society trains are instruments of concentration that aim to free the countryside from human habitation.

1.2 An encounter between nineteenth-century engineers and twenty-first-century planners

Edward L. Glaeser and Matthew E. Kahn’s statement that “[s]uburbia, edge cities and sprawl are all the natural, inexorable, result of the technological dominance of the automobile” would, in all likelihood, have amused Ernest Mahaim. One can almost hear him say that creating “a respectable working class residing outside a reconfigured urban space” was precisely what the Belgian policy makers had in mind when launching their railway policies in 1869 to make daily mobility between city and countryside feasible for wage workers. At the moment politicians debated these railway policies in parliament, combustion engines still had to make their appearance in the creative minds of men. Hence, claiming that urban sprawl “ultimately has

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12 (quote) Glaeser and Kahn, “Sprawl and urban growth”, 2004, 2481. Though the statement is a bold one, the idea that the democratisation of private car ownership after the Second World War has triggered the urbanisation of the countryside is widespread. See: De Block, “Planning rural-urban landscapes”, 2014; Pooley, “Landscapes without the car”, 2010; Bruegmann, “Sprawl and accessibility”, 2008; Burchell, Downs, McCann and Mukherji, Sprawl costs, 2005.
**Map 1** visualises the network of railways and light railways network as well as the stations active in Belgium in 1910.

- 1910 active railway stations
- 1910 railway network
- 1910 light railway network
- cities and industrial axes
- East cantons

Sources: historical railways and annual reports NMBS and NMVB

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only one root cause: the automobile” would have raised curiosity in nineteenth century and early twentieth century Belgium. In contrast, the elaborated network of railways and light railways shown on map 1 knitting villages, towns and cities together in Belgium in 1910, would probably have raised the enthusiasm of twenty-first-century planners. One can almost see them taking a pencil and draw circles that correspond with a 15-minute walk around the ubiquitous access points of the railway network that covered the nation. This behaviour would have puzzled Ernest Mahaim anew, as it was at odds with the spatial model that motivated railway planning in the nineteenth century, namely a hybrid landscape in which a “marriage between town and country [ensured] the intricate interplay between urban and rural”.16

This 15-minute rule, twenty-first-century planners would love to explain, symbolises the ideal of a compact city emerging from the “[m]assive suburbanisation after World War II […], just as the Garden City was a reaction to the overcrowded cities of the nineteenth century”.7 The time-space compression delivered by the technical features of a car while car ownership came within financial reach of an average European household in the postwar period, stimulated a dynamic of both massive and spread-out suburbanisation.8 Addressing the damage this car-driven suburbanisation caused the environment, requires a debunking of “the entrenched belief that low-density, auto-oriented development is the only viable and acceptable pattern for suburban living”.9 Hence, transit-oriented development proposes a densification of urban land uses within a symbolic 15-minute circle, with “regard for the location of transit [and] the basic principles for developing around transit”.10 Restricting urban development to surfaces that are both limited and part of a performative transport network delivers sustainable environments by establishing “the countryside as ‘counterbalance’ for the city” whilst preserving the basic right of mobility.11

15 For the visualisation of the railways and light railways on my maps, I have gratefully used the work of other people depicting the materialisation of the Belgian railway network over time. Here, the project “Geosystrans” (1999-2003) of the Institut de Géographie de l’Université Catholique de Louvain (Louvain-la-Neuve) deserves a special mention. By adding opening and closing years to the different line segments, it is possible to depict the lay-out of the railway network for any year in Belgium’s history up to 1961. A similar GIS layer was created for the access points of the railway network, i.e. railway stations, halts and stops, with www.historicraildata.eu as main source. The network of light railways has only been digitised for the year 1910, whereby the website of Wim Kusee (www.kusee.nl) represented a delightful source of information.
17 Westerink e.a., “Sustainability trade-offs”, 2013, 474.
21 Westerink e.a., “Sustainability trade-offs”, 2013, 475.
Nineteenth-century policy makers would certainly nod in agreement about the usefulness of a performative railway network to endow the population with mobility, yet, their eyebrows would have frowned when they were told that the goal of these transport networks was to create “a clear distinction between the city and the countryside in physical appearance and land-use functions”. In their experience, instrumentalising the railway network to make wage workers mobile on a daily basis served the opposite goal, namely to disperse the unrivalled population concentration in urban cores without hampering industrial growth. Or, as Ernest Mahaim phrased it in 1906, the gathering of ever more wage workers by large-scale production processes in a single place made it “a feature of modern industry that labour is becoming more mobile”. While the industrialisation dynamic let the flows of labour mobility rise through all of Europe, the geographical scale of these flows varied from country to country. For instance, in London, Paris, Berlin, Glasgow or Vienna commuting was mainly confined to the boundaries of the city and its suburbs. In contrast, the government of the first nation to industrialise on the European continent was more ambitious. They wanted to establish a nationwide rural-urban continuum. To this end, a territory-covering railway network was designed that connected even the most remote village in the countryside with the growing urban and industrial labour markets, thus deploying the ability of transport technology to deal with the friction of distance so that rural households could remain in the countryside whilst having access to industrial and urban employment. Or, far from creating a compact city, the nineteenth-century railway policies of the Belgian government aimed at dissolving the “old opposition between cities and countryside”.

1.3 Rural households take a seat at the table
As Greet De Block and Janet Polasky exposed, “the Belgian government harnessed the modern technology par excellence, combining rails, steam and state management, to safeguard the country as well as to facilitate a modern dynamic”. The resulting commuting flows merged

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22 Westerink e.a., “Sustainability trade-offs”, 2013, 475.
27 For an interesting comparison of the two spatial models with Britain and Belgium, the first two countries to industrialise, as case studies: see Polasky, Reforming urban labour, 2010; Polasky, “Transplanting and rooting workers”, 2001.
28 Auguste Beernaert as quoted by De Block and Polasky, “Rural-urban continuum”, 2011, 312.
29 De Block and Polasky, “Rural-urban continuum”, 2011, 313.
city and countryside in a continuum, as they rendered “a unique territorial balance between city and countryside by transforming agricultural labourers and farmers into industrial workers without forcing them to leave their ancestral villages”. The historical data that Greet De Block and Janet Polasky investigated thus link the activation of railway technology as tool of dispersal changed livelihoods for rural households caused by an industrial world replacing an agrarian society. Arguably, merging city and countryside in a continuum gives the households who lived in the countryside long before railway networks materialised in the landscape, a place at the discussion table. Hence, it becomes possible to ask these rural households whether dissolving the friction of distance made them mobile? After all, it was this feature that guided the spatial model embedded in the railway network to give rural households the opportunity to combine the higher wages of industrial or urban employment with a vegetable garden at home. Or whether other factors in a rural household’s livelihood were at work in their location preferences and thus instrumental in making the home-work split a feature of industrial and urban labour markets? As rural households rarely bothered to entrust their thoughts to a piece of paper, a historian has to be resourceful in finding data that give a voice to these households as well as being aware that, in all likelihood, the recording of the data has been done by an intermediary, which entails the risk of adding a biased meaning in the data. However, before these issues are addressed in the methodology part, William Cronon’s theory on the transformative power railway infrastructure derives from market exchange has to be discussed first, because it pulls an economic lens from under the dust and mobilises it to question explanations holding “post-war private car ownership responsible for ordinary, messy landscapes”.

2 The urban bias in understanding space relationally

2.1 City and hinterland reshape each other

In her argumentation for a relational definition of place, Laura May defined locations as “urban in the sense that they are affected by economic processes that are centred in the city and radiate over space”. Some thirty years earlier, American environmental historian William Cronon too linked economics and urbanisation dynamics when he identified commodity markets as the

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32 See for example Bek, No bicycle, no bus, no job, 2022, 30.
34 May, Suburban place-making, 2020, 4.
linchpin around which nineteenth-century transformations of the landscape revolved. In the 530 pages following this statement, Chicago and its rural hinterland served as example to make the argument crystal clear. The trains that materialised in the landscape during the era of steam and steel boosted an upward spiral of trading flows that was to alter in a decisive way both the rural and urban world, with commodity flows sitting at the core of this transformation. William Cronon considered these flows, which provided the urban dweller with food, clothing and shelter, to represent the most basic relationships “between an urban market and the natural systems that supply it”. Hence, towns and farms “seemed to spring magically into being when railroads appeared in their vicinity” whilst in fact the inhabitants of these locations merely responded to the locomotive’s whistle “opening a corridor between two worlds that would remake each other” in general and created “the most spectacular country fair the world had ever seen” between Chicago and its fertile hinterland in particular.

While debates on railway infrastructure and economic growth are a long-standing feature of academic debates, the novelty of William Cronon’s contribution lay in foregrounding the mutual constitutive feature of rural-urban relations. Indeed, in Nature’s metropolis: Chicago and the Great West the rural hinterland’s capacity to trigger spatial change in the urban core is convincingly demonstrated without, however, depriving the urban core from its capacity to reshape the countryside. This mutual constitutive rural-urban dynamic commercialised the rural hinterland so that heightened production volumes flowed into the city, which in turn prompted the city to adapt its logistic distribution system. Or, to use the words of William Cronon: “The city and its merchants changed forever the way prairie farmers could sell their crops. At the same time, the farmers and their crops fundamentally altered Chicago’s markets”. For example, to dispatch the crops farmers cultivated in the rural hinterland to markets all over the world, the physical goods had to be make interchangeable thus asking for a reconceptualization of these commodities as “abstract, homogeneous, liquid”. How this commodification process modified the market amenities of a city, is masterfully illustrated by the journey a grain sack underwent on the grain market of Chicago.

Before railway technology entered the world, the farmer was the hallmark upon which the quality of a sack of grain was decided. This system of ownership rights demanded that grain

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39 See footnote 31 for literature on transport infrastructure and economic growth.
remained in its transport sack until the buyer had set the price and the grain sack had reached its final destination. The change came with railway infrastructure bringing market opportunities and the prospect of economic gain to the outskirts of Chicago’s rural hinterland. This motivated farmers to raise their scale of production to the extent that Chicago’s grain market became overflooded with ‘a golden stream’. The sheer size of this golden stream made controlling the quality of grain based on the existing system of ownership rights inoperable. The solution was sought in the commodification of grain, which involved the invention of a steam-powered grain elevator to handle huge volumes of grain on the one hand and a grading system to set the price on the other. The coerced renewal of the distribution process during the 1850s gave Chicago the amenities “to handle more grain more quickly than any other city in the world”.

2.2 Erasing reciprocal rural-urban relations in urbanisation theories

Reciprocal relations between urban core and rural hinterland regulated by market exchange existed long before the era of steam and steel. Indeed, recent historical research confirmed that town-countryside relations were a decisive factor in the eleventh-century revival of towns in Western Europe. These historians, however, were preceded by Henri Pirenne, who attached “a singular importance to trade as the catalyst for urbanisation and the transition to economic modernity”. According to this eminent Belgian historian of medieval history, the reopening of Mediterranean trade routes that breached Europe’s isolation in the eleventh century had made towns viable again. As Gary Fields accurately stressed, favouring long-distance trade as the lifeblood of cities produced “an image of the city as an entrepot of trade”. In their book The making of urban Europe 1000-1994, Paul M. Hohenberg and Lynn Hollen Lees foreground the concept of city systems that fuses the theory of Henri Pirenne on the urban network with Walter

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47 Thoen and Vanhaute, “Pirenne and economic and social theory”, 2011, 335-336. It is worth noting that Henri Pirenne (1862-1935) developed his theory of medieval cities at a time when the accelerated growth of cities had the attention of his contemporaries.
48 Fields, “City systems, urban history and economic modernity”, 1999, 104.
Christaller’s model of urban hierarchy. The latter was a German geographer who developed his central place theory in the 1930s, whereby the influence a city exerts on its surroundings determines its ranking in the urban hierarchy. For Paul M. Hohenberg and Lynn Hollen Lees, each city is part of a system of cities because urban dwellers depend on other cities for trading purposes while rural dwellers depend on the city for the services the urban core provides to its hinterland. To emphasise the functionality of cities as gateways merging long-distance trade and city-hinterland relations, Giovanni Favero, Michael-W. Serruys and Miki Sugiura referred to the system of cities as a dual network system. Similar, Greet De Block stressed that “the essential characteristic of cities is their fundamental interdependence and interaction with their immediate and broader territorial surroundings as well as with other nodes of the network”. In the so-called metropolitan thesis, the coherence of a territory resembles a metaphorical “chain, almost a feudal chain of vassalage, wherein one city may stand tributary to a bigger centre and yet be the metropolis of a sizable region of its own”.

In all these approaches of the urban landscape, the countryside has its space, yet the city dominates, thereby veiling what William Cronon’s research illuminated, namely the role rural hinterlands play in reshaping urban cores and the dependency of urban dwellers on rural regions to fulfil the basic necessities of life. Denying the countryside its own economic agency rendered them invisible in urbanisation theories, whereby a key step in retracing the erasure of reciprocal rural-urban relations can be found in the work of Fernand Braudel. This esteemed historian of the French Annales agreed with Henri Pirenne that market exchange was the fuel that kept the engine of urban growth going, yet, while long-distance trade was at the core of this engine in the reasoning of Henri Pirenne, Fernand Braudel favoured rural-urban relations. By letting the “vitality of the countryside” breathe life into the urban renaissance of medieval Europe the “fundamental problem” of towns “with respect to their rural brethren” emerged, namely that “the town has to secure a source of sustenance from agriculture [that] requires the town to dominate its rural environs so as to ensure its material livelihood”. As one of many historians,

49 Favero, Serruys and Sugiura, Urban logistic network, 2019, 5-6; De Block, Engineering the territory, 2011, 21-25; Fields, “City systems, urban history and economic modernity”, 1999, 117-123.
51 Favero, Serruys and Sugiura, Urban logistic network, 2019, 5. Some twenty years earlier, Pim Kooij likewise called the model of city systems that Paul Hohenberg and Lynn Hollen Lees proposed a dual urban model (Kooij, “Het stedensysteem in België”, 1992, 515). This is noteworthy as it elucidates the rising popularity of a relational network as defining urbanisation dynamics.
52 De Block, Engineering the territory, 2011, 23.
Fernand Braudel solved this problem for locations with high population density by making money and market exchange the glue that linked rural and urban areas together.\textsuperscript{56} The effectiveness of this glue to give urban cores control over rural hinterlands lay in the economic mechanisms of either surplus extraction or market participation. Surplus extraction \textit{pushed} rural dwellers into meeting urban demand whereas the prospect of improving their living conditions \textit{pulled} rural dwellers in meeting urban demand via market participation.\textsuperscript{57} Either way, as Fernand Braudel aptly uncovered, claiming that the market economy was the way forward reversed the dependency relationship between city and countryside, in which the countryside is the natural system producing food, clothing and shelter on which urban dwellers rely.

In other words, foregrounding market exchange as the principle that structures rural-urban relations, gave the urban core its dominance with two important and related consequences. Firstly, rural regions lost their status of making an urban economy \textit{de facto} possible, as “it is from the land that the whole of society derives its nourishment”.\textsuperscript{58} Secondly, the paradigm shift in urban research had to validate the “unspoken assumption that the rural economy was driven by a more advanced and innovative urban economy, to which it could only react or adapt”.\textsuperscript{59} In his book about the Great West’s contribution to Chicago’s growth, William Cronon argues that the moment “human beings organise their economy around market exchange [the] ways people value the products of the soil, and decide how much it costs to get these products to market” streamline the urban landscape.\textsuperscript{60} He builds his argument by starting with the American boosters of the nineteenth century who struggled with “how the western landscape would be absorbed into a commercial system revolving around a small number of urban centres”.\textsuperscript{61} Hereby, cities were approached as “stars or planets, with gravitational fields that attracted people and trade like miniature solar systems [with the] strongest advocate of this ‘gravitational’ theory of cities [having written a] remarkable essay [that] in many ways anticipated the model of urban growth -central place theory- that has dominated twentieth-century thought about this subject”.\textsuperscript{62} In the mindset of the nineteenth-century American boosters, “[m]aking a landscape ‘accessible’ meant linking it to a market, which meant fostering regular exchange between city and country”.\textsuperscript{63} It was this understanding of landscape transformations with market exchange as intermediary that, according to William Cronon,

\textsuperscript{56} Fields, “City systems, urban history and economic modernity”, 13, 1999, 108.
\textsuperscript{57} Stabel, “A comment on the notion of economic change”, 2011, 114-116.
\textsuperscript{58} Vaggi and Groenewegen, \textit{History of economic thought}, 2003, 48.
\textsuperscript{59} Scott, \textit{The city-state in Europe}, 2012, 3.
linked central place theory to the “rigorous mathematical description of the spatial relationships and economic linkages between city and country” that German gentleman farmer Johann Heinrich von Thünen published in his *The isolated state* some hundred years earlier.64

Johann Heinrich von Thünen calculated the ideal-typical distribution of farming activities with market exchange and distance as structuring rationales in a geography that followed the abstract assumptions of homogeneity, hence the name isolated state. He conceptualised a single city with the market as amenity located amidst an endless fertile plain designated to cultivate agricultural products. The distance from the urban core determined the land rent so that Johann Heinrich von Thünen’s calculations delivered a spatial pattern that excelled in symmetry, being a city centre surrounded by a series of concentric zones. Even the German gentleman farmer commented on the perfect symmetry of the isolated state by admitting that “this abstract thought experiment departed from reality in several important ways”.65 Nonetheless, by ignoring the heterogeneity of the actual world in general and the economic principles of a rural region in an agrarian society in particular, a theoretical understanding entered the world that, next to offering intellectuals “abstract principles [with] strikingly concrete geographical consequences”, turned “a natural landscape into a spatial economy”.66 In this spatial economy, to repeat the words of Laura May, locations outside the urban core became urban through the radiation over space of the economic processes happening in the urban core.67

By making market exchange the principle that organises the countryside with distance in relation to transport cost the variable determining the use of land, Johann Heinrich von Thünen not only agreed with the economic supremacy of the urban core, but simultaneously furthered the belief that transport costs delineate the monetary value of land. This conceptualised relation between distance, transport cost and land value landed in a “fundamental assumption of all spatial economic theories”, i.e. that “locations with good accessibility are more attractive and have higher market value than peripheral locations”.68 The introduction in urbanisation theories of transport infrastructure as structural layer in the organisation of a territory was the next logical step. Moreover, the firmly established theories on a dominant urban core, on the rural region meeting urban demand and on market exchange as the economic principle that knits all these places together, almost automatically formulated the widespread assumption in studies

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investigating transport infrastructure as spatial tool that giving a place access to transport networks blesses the connected place with economic growth.\textsuperscript{69}

2.3 The geographical reach of market opportunities

Erasing the economic agency of rural regions in urbanisation theories thus gave free reign to the rise of an urban bias by making market exchange and money, typical assets of an urban economy, the bedrock of spatial transformations. To be sure, recent historical research on commercial circuits existing outside the urban core, have validated Henri Pirenne’s claim that “cities do not owe their origin to market places, because markets also developed outside of the towns”.\textsuperscript{70} Moreover, rural markets holding their ground as exchange node in the circulation of goods in the less urbanised regions of an agrarian society, like medieval Europe, demonstrate that the countryside was far less depended on cities than the urbanisation theories posits.\textsuperscript{71} Nonetheless, the urban bias was powered by the upward spiral of urbanisation, industrialisation and transport infrastructure that the era of steam and steel unleashed.\textsuperscript{72} This upward spiral attracted the interest of researchers who sought to comprehend transport infrastructure’s ability to structure space.\textsuperscript{73} Accordingly, this strand of literature posited that a cascade of events was set in motion the moment a place had access to railway infrastructure. The gained railway access injected the place with economic growth by bringing distant market opportunities within the reach of local inhabitants, whereby the ensuing boost in economic activities triggered an expansion of local labour markets, which in turn raised the attractiveness of the place for making a living, thus becoming a preferred destination for labour migrants with an exogenous growth of the population in its wake. In other words, transport infrastructure derives its ability to transform space from market exchange, on the one hand, while expanding transport networks integrate ever more places in urban networks thereby enhancing the dynamic of market exchange, on the other hand.

Even if researchers showed an interest in the countryside, the viability of a rural economy was invariably measured through the lens of market exchange. Ian Gregory and Robert M.

\textsuperscript{69} For a discussion of the literature related to this statement: see Chapter 2: 1 Introduction and Chapter 2: 2 Migration theories and transport infrastructure.


\textsuperscript{71} Stabel, “Markt en hinterland”, 1992, 352.


Schwartz illustrate this statement when examining the railway network to clarify altered space in Welsh parishes. Although the parishes were located in the countryside, Ian Gregory and Robert M. Schwartz deployed market exchange as sole variable for explaining the variations in a parish’s population level, which served in their study as an indicator of economic activity as “detailed information on the rural economy was not yet available”. They nevertheless went against the grain by stating that an extended geographical reach of market opportunities related to railway access not only revitalised the local economy, but might as well result in a population loss, thus indicating a decline in local economic activity. Already in 1982, Bayly Ellen Marks argued that the equation of improved market access with a revival of rural economies betrays an urban bias in rural-urban relations. Her empirical results exposed that the penetration of Baltimore’s market tentacles in Saint Mary’s County between 1790 and 1840 meant at best a mixed blessing for the households having a home in the rural hinterland. Thirty years later, Tim Soens, Eline Van Onacker and Kristof Dombrecht restated the argument by questioning the dominance of the urban core in medieval research. They wondered why the countryside was denied its agency in metropolis-hinterland relations, even in an era when most people lived outside the walls of a city and gained a living by working in the fields. They agreed that “geographic proximity, transport infrastructure and urban demand” unquestionably had affected a rural region’s economic organisation. Notwithstanding, they refuted the element of economic determination by elucidating both the absence of a “direct link between urban demand and rural specialisation” and the variations in regional patterns that the connection with the urban world produced. Accordingly, they advised researchers to keep an open mind for the specificity of a rural region in inquiries of town-countryside relations.

Yet, instead of taking this advice to heart, research seeking to grasp the structuring impact of transport infrastructure become even more focused on the urban core. For instance, Jeremy Atack, Fred Bateman, Michael Haines and Robert A. Margo restricted their empirical analysis of railway access and economic growth in the American Midwest to locations of at least 2,500 inhabitants, because this number made a location urban in their eyes. Similarly, Christophe Mimeur, François Queyroi, Arnaud Banos and Thomas Thévenin excluded locations with less than 2,500 inhabitants from the empirical analysis based on the argument that “cities of smaller

75 Marks, “Rural response to urban penetration”, 1982.
76 Soens, Onacker and Dombrecht, “Metropolis and hinterland?”, 2012.
77 Soens, Onacker and Dombrecht, “Metropolis and hinterland?”, 2012, 86.
78 Soens, Onacker and Dombrecht, “Metropolis and hinterland?”, 2012, 84.
sizes are more likely to have an erratic size evolution and several missing values”.\textsuperscript{80} They took the phenomenological examination of urban morphology related to railway development one step further by taking the planned nature of the French railway network into account, whereby accessibility measures were used to answer two questions: were the mobility flows state engineers embedded in the design of the railway infrastructure realised as planned and was railway access successful in redistributing the population over the French territory? Their empirical research covering the years from 1860 till 1910 showed that railway development effectively aligned with the planned flows of circulation, but that the expectation of population growth triggered by direct railway access failed to materialise in the data. Instead, they observed “a stronger population growth because the areas that get a better access \textit{always had a better growth than those that would never gain access}”.\textsuperscript{81} The self-amplifying dynamic of the urban network suggested by this observation, becomes outspoken if the sociotechnical production of transport infrastructure is taken into consideration.

\textbf{2.4 The planned vector of economic growth in transport infrastructure}

Road constructions in the medieval and early modern period rested on isolated initiatives taken by private persons, institutions or public authorities to meet local or regional needs.\textsuperscript{82} In the nineteenth century, in contrast, policy makers were inspired by the idea that mankind could control its own destiny by gathering the scientific knowledge it needed to uncover the laws that ruled the universe and, subsequently, put these laws to use to realise the desired transformation of society.\textsuperscript{83} With this goal in mind, engineers and politicians began to coherently plan, construct, manage and nationalise transport networks to stimulate a well-thought-out circulation of goods and people.\textsuperscript{84} Discovering the laws that made a nation prosperous occupied the minds of economic theorists too.\textsuperscript{85} As a result, classical political economy saw the day of light as a “social science with clear policy aims. Its analytical tools were designed to explain the working of the market and production mechanisms, thereby gaining insights for improving the conditions of citizens, and possibly mankind”.\textsuperscript{86} The new economic paradigm not only went hand in glove with the awakening of an interventionist state in the latter half of the eighteenth century, but simultaneously gave the government a legitimate interest in intervening in

\textsuperscript{80} Mimeur e.a., “Effect of transportation infrastructure”, 2018, 71.
\textsuperscript{81} [original italics] Mimeur e.a., “Effect of transportation infrastructure”, 2018, 73.
\textsuperscript{83} Boomkens, \textit{Erfenissen van de Verlichting}, 2011, 31-33.
\textsuperscript{84} De Block, \textit{Engineering the territory}, 2011, 31.
\textsuperscript{85} Vaggi and Groenewegen, \textit{History of economic thought}, 2003, 16.
\textsuperscript{86} Vaggi and Groenewegen, \textit{History of economic thought}, 2003, 7.
economic affairs. In addition, *An enquiry into the nature and causes of the wealth of nations* (1776) by Adam Smith planted the seed that was to replace land as source of all wealth with urban demand as engine of economic growth.

According to Istvan Hont, Adam Smith “substantially re-conceived the relationship between city and country: instead of an efficient surplus-producing agriculture supporting and expanding urban population, he envisaged the lead role in the growth trajectory being taken by urban manufacturing. The output of finished goods from factories and workshops would trigger demand in the countryside which could only be satisfied by trading agricultural surplus in exchange.” In other words, Adam Smith affirmed that rural environments were dependent on urban cores, which was, as Fernand Braudel has explained, the discourse cities and towns needed to secure an influx of agricultural produce to make live in an urban location simply possible. At the same time, as the quote of Istvan Hont elucidates, the economic justification of Adam Smith went one step further: it downturned the factor of coerced market participation by claiming that rural dwellers wanted to produce for urban markets as they were driven by a desire to buy urban-produced goods. As the accelerated dynamic of urbanisation, industrialisation and transport development in the nineteenth century aligned with Adam Smith’s theory, the urban bias in urbanisation theories became full circle. In this circle, rural regions almost immediately lost their agency while over time Jon Shaw and James D. Sideway had to remind their colleagues that movement entails more than bridging physical distance. These geographers aptly remarked that flows of goods and people are “byproducts of a means by which society chooses to trade and interact”. Just how crucial this remark on choice is for understanding the urbanisation dynamics of the past two centuries, is demonstrated by zooming in on the transport planning practices of European governments in the nineteenth century.

The promise of an engineerable society and the societal goal of a prosperous nation made market exchange the economic rationale that guided the materialisation of rapidly expanding transport networks. Engineers and politicians carefully selected those locations that in their eyes benefitted the maturation of a market economy and deployed the efficiency of the transport technology to deal with the friction of distance by optimising a transport infrastructure’s connectivity, both in design as in organisation. Selecting the amenities a place already possessed or where the potential for developing the desired amenities was high, turned the abstract principle of planning a transport network’s connectivity into a territory-bound activity that

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engineered space. As a rule, large-scale production sites and cities had the preference of being connected by a national railway network whilst towns and villages were integrated in the transport network in the later stages of railway development. The sequence has its importance every place was equally eligible to be connected in theory given that railway networks had to be developed from scratch in the nineteenth century. Whereas connecting large-scale production sites and cities as logistic hubs agreed with the societal goal of pursuing economic growth, the selected amenities variegated from country to country. Belgian state engineers Pierre Simons and Gustave De Ridder, for instance, made industrial growth poles the instruments of national prosperity, the state representatives of the Nordic countries focussed on the extraction of natural resources while the railway infrastructure in Western America made the fertile hinterland of Chicago more productive.

This link between railway development and the amenities of a place was also touched upon in empirical research on the structuring role of railway infrastructure. For example, when Ian Gregory and Robert M. Schwartz wanted to comprehend how railway development in Britain influenced the economy of a rural region with Wales as case study and were little surprised that “the regions of greater economic importance in the north (slate and lead mining) and the south (coal mining and metallurgy) obtained rail service early on, while inland, agrarian regions joined the railway later”. By asking whether railroads induced or rather followed economic growth in the American Midwest from 1850 till 1860, Jeremy Atack, Fred Bateman, Michael Haines and Robert A. Margo likewise revealed that direct access to the railway network and local urban growth went hand in glove. Like their British colleagues, they reasoned that it revealed “a more general phenomenon: railroads were built not randomly but purposely. Railroad promoters and investors did not lay out their lines blindly but sought locations where the chances of success – profitability – were greatest.” However, as Greet De Block pointed out, discovering that transport infrastructure and economic growth are two sides of a common boundary, changed little in approaching infrastructure “purely technologically, without looking into the design of the (often public) systems and the flows these networks were planned to generate”.

Importantly, embedding the rationale of economic growth in the design as well as the organisation of transport infrastructure boosted the ancient partnership between cities,

92 De Block, “Designing the nation”, 2011, 716.
95 Atack e.a., “Urbanisation and population growth”, 2010, 184.
96 De Block, Engineering the territory, 2011, 25.
transport infrastructure and market exchange. The strength of this tripartite is illustrated by Giovanni Favero, Michael-W. Serruys and Miki Sugiura who named its building blocks ‘siblings’.\textsuperscript{97} Urban planners Michael Neuman and Sheri Smith, in turn, underlined the importance of transport infrastructure for the well-being of city dwellers by evoking the powerful proverb that ‘all roads lead to Rome’.\textsuperscript{98} Moreover, they inextricably linked the “transformative power of infrastructure” to urban space by stating, firstly, that cities without transport infrastructure are non-existent and, secondly, that the dependency of cities on infrastructure “to sustain growth” urges urban space to develop transport infrastructure.\textsuperscript{99}

Relating this transformative dynamic of urban space to the novel practice of planning territory-covering transport networks top-down explains why urban growth accelerated in the nineteenth century, whereby the societal goal of spurring economic growth by stimulating urban demand made towns and cities synchronically the cause and consequence of transformed and transforming landscapes.

In sum, nineteenth-century state engineers and politicians unlocked the potential of cities to become “staging posts in the perpetual flux of infrastructurally mediated flow, movement and exchange” by incorporating a spatial model that was conducive to economic growth in the design and organisation of transport infrastructure.\textsuperscript{100} The neglect of this economic rationale in transport development, inserted an urban bias in research on how network and space relate. As will be shown in this dissertation, overcoming this urban bias by giving rural regions and rural households the agency they exerted opens up new lines of enquiry to comprehend entangled transport policies, mobility flows and urban morphology. This research validates the argument by placing livelihood and reciprocal rural-urban relations alongside transport technology in an investigation of the national rural-urban continuum that Belgian decision makers had in mind to address the “chaotic swelling of the big city” from 1869 onwards.\textsuperscript{101}

3 Establishing a rural-urban continuum by creating a mobile labour force

3.1 The home-work split in European transport policies

In his chapter on The probable diffusion of great cities, Herbert George Well commented that improving mobility flows might be a trivial matter in itself, but its consequences certainly are

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\textsuperscript{97} Favero, Serruys and Sugiura, Urban logistic network, 2019, 2.
\textsuperscript{98} Neuman and Smith, “City planning and infrastructure”, 2010, 21, 34.
\textsuperscript{99} Neuman and Smith, “City planning and infrastructure”, 2010, 22.
\textsuperscript{100} (quote) Graham and Marvin, Splintering urbanism, 2001, 8.
\textsuperscript{101} [own translation] Smets, De tuinwijkgedachte in België, 1976, 68.
\end{flushleft}
not.\textsuperscript{102} He continued by linking the nineteenth-century advent of railway infrastructure to the “extraordinary expansion, shifting and internal redistribution of population that has been so conspicuous during the last hundred years”.\textsuperscript{103} Quantitative studies of demographic data confirm his description of urban growth in the Western world during the nineteenth century.\textsuperscript{104} Trade and transport development went hand in glove in Herbert George Wells’ opinion on population redistribution while Adna Ferrin Weber added industrialisation to the explanatory framework, thus putting the spotlight on territorial specialisation, the geographical division of labour and the decline of agricultural livelihoods.\textsuperscript{105} In current interpretations of nineteenth-century population patterns, trade as explanatory variable has become invisible while the main stage is occupied by industrial development triggering a “massive flow of people from rural areas to towns and cities”.\textsuperscript{106} The need for a concentrated labour force in large-scale production sites was met by unprecedented flows of labour migration, which synchronically transformed urban cores into a “disenchanting cocktail of slum formation, poverty, congestion, alcoholism, family abandonment and unemployment”.\textsuperscript{107} The solution of nineteenth-century reformers to disperse the labour force outside the urban core whilst staying connected, was picked up by engineers and state representatives who devised an additional transport policy to reorganise space in the latter half the nineteenth century.\textsuperscript{108} The dream of a redeveloped urban core that appealed to the urban middle-class and elite without having to constrain mechanised production as motor of economic growth, landed in a transport policy that made the home-work split a basic ingredient of urban landscapes.\textsuperscript{109} Indeed, by introducing commuting as affordable alternative for labour migration, a dispersed labour force outside the urban core became feasible.

Geographical scale matters here. Whereas the European railway policies to deal with the friction of distance to spur economic growth operated on a national scale, the “ideal of suburban living” to ease the societal problems that policy makers associated with the congestion of urban

\textsuperscript{102} Wells, \textit{Anticipations}, 1903, 20-39.
\textsuperscript{103} Wells, \textit{Anticipations}, 1903, 20.
\textsuperscript{109} Schepers e.a., “Organising the work-home split”, 2020, 103-104.
cores encompassed the regional scale at most. In contrast, as the imagined dialogue between Ernest Mahaim and twenty-first century planners revealed, Belgium was the odd duke out: its government activated the entire railway infrastructure to support nationwide commuting flows.

3.2 Belgium’s rural-urban continuum

The ambition of the Belgian government to establish a rural-urban continuum during the heyday of railway technology by facilitating labour mobility on a national scale was indeed exceptional. Inquiries into the entanglement of transport policies, mobility flows and urban morphology usually approach transport infrastructure as “one of the means of solving problems that were characteristically urban”. In these studies, it is acknowledged that railway lines “blurred the distinction between local, urban, suburban and regional traffic, which, in turn, opened up the country to (sub)urban residents”. Nevertheless, when it comes to the geography of a homework split, the gravity pull of the urban core first and foremost delineates the ability of transport technology to deal with the friction of distance. Emphasising core-periphery relations aligns with geographical models that traditionally deploy centralities to analyse urban landscapes. Hence, the narrative of a progressive industrialisation draining the countryside in the nineteenth century whereby migration flows reversed direction at the turn of the twentieth century when transport development reduced “the cost of land and housing” for urban dwellers by breaching “the physical boundaries which limited the land market”. Without denying the validity of the theory to illuminate reconfigured population patterns in Europe during the past two centuries, it nevertheless underestimates the facilitation of commuting flows between core labour markets and villages further afield by a “quasi-isotropic network of rails”. It is this spatial effect the government of the first nation to industrialise on the European continent aimed.

The first step in preserving the historical distribution of the population over villages, towns and cities was taken in 1869 when the Belgian government voted a law that give wage workers

110 (quote) López, Cities, railways, modernities, 2019, 2; Seltzer and Wadsworth, “Public transportation and commuting”, 2024; Divall and Bond (eds.), Suburbanising the masses, 2003/2018; Nilsen, Railways and the Western European capitals, 2008.
111 To be complete, the American government also conducted a transport policy that was geared at keeping rural households in the countryside while giving them access to urban and industrial labour markets. They, however, made the road network their spatial instrument (Weber, “State highway networks”, 2005, 723-725).
112 (quote) López, Cities, railways, modernities, 2019, 2.
113 López, Cities, railways, modernities, 2019, 2.
access to the railway infrastructure." While subsequent developments in the railway policy unlocked even the most remote place in the countryside for rural households, the Housing Act of 1889 stimulated home ownership among wage workers. A mobile labour force and home ownership thus were the basic ingredients of a “rural-urban landscape planning avant-la-lettre embedded in nineteenth-century railway policy”. This nineteenth-century alliance between transport and housing policy to establish an urban society in harmony with and spread across the countryside likewise guided the urbanisation dynamics after the Second World War according to Michael Ryckewaert and Katrin Theunis. Similar, Bruno Meeus and Pascal De Decker underlined that “since the first housing and welfare laws were introduced at the end of the nineteenth century, successive Belgian governments have never challenged the fundamental two pillars of Belgium’s housing policy: the strategic stimulation of home ownership on the one hand and of commuting instead of residential moving on the other”. In other words, both the uniqueness of promoting railway commuting on a national scale in the last decades of the nineteenth century and the longevity of the conducted railway policies enhances the suitability of Belgium as case study to inquire the spatial patterns of urban growth from the perspective of rural households.

4 A methodology that gives rural households a voice

4.1 Being aware of the biased nature of statistical data

This dissertation predominantly uses statistical data to uncover the location preferences linked to the livelihoods of rural households living in the Belgian countryside during the heyday of railway technology. Especially, the study Ernest Mahaim conducted in the first decennia of the twentieth century on the societal effect of cheap railway subscriptions for wage workers and the national censuses that Belgian officials composed between the mid-nineteenth and the mid-twentieth century delivered the quantitative data that were used to create maps with the Geographic-Information-System software. The resulting spatial patterns are assumed to depict

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120 De Block, “Planning rural-urban landscapes”, 2014, 546.
123 Additional sources are discussed in the respective chapter.
124 The creation of maps with GIS software was greatly facilitated by the digitised format of the census data provided by Sven Vrielinck as contact person of LOKSTAT, i.e. the ‘Historical database of Belgian municipalities, Ghent University, Quetelet Center’ (https://www.lokstat.ugent.be).
an unbiased picture of the society under scrutiny as long as cartographic and geographic principles are respected during the making of the empirical maps.\(^{125}\) The expectation of a statistical analysis generating neutral scientific knowledge is built on the idea that numbers give an objective representation of societal facts. Readers in the 1980s of René Leboutte and Rashidi Obotela already knew that “modern statistics is more than just counting: it is a tool of power and knowledge in the service of the citizen, the State and science”.\(^{126}\) Or, as Kaat Louckx repeated almost thirty years later, instead of producing an objective replica of society, statistical data create a subjective representation that first and foremost exposes the mental framework of the persons who define the variables.\(^{127}\)

The peculiarities of the statistical method only endorse a subjective representation of society.\(^{128}\) Firstly, deciding what to count implies a mechanism of exclusion that imposes a distinction “between individuals who belong and individuals who do not”.\(^{129}\) Secondly, once there is agreement on what to count, a societal phenomenon with its various manifestations has to be captured in one unambiguous number, thus reducing a heterogeneous reality once more.\(^{130}\) Although this translation of societal phenomena in quantitative data is ostensibly technical in nature, the end result hides a multifaceted reality, in the present as well as in the past.\(^{131}\) For contemporaries of the society on the scientific dissection table, the nuanced reality veiled by the statistical number is still known so it can be taken into account in the statistical analysis. The risk lies in current research that takes the number for granted. For example, generating sufficient livelihood in the long nineteenth century entailed combining different jobs most at the time. The national census, however, conceals this practice by recording one occupation per person, with the mentioning of a secondary professional activity at best.\(^{132}\) Thirdly, answering a question presupposes an understanding of what is being asked.\(^{133}\) Accordingly, the categories statisticians invented to cast reality in quantifiable facts were introduced in society during the collection of data, where they took on a broader meaning and became concepts in their own right.\(^{134}\) The introduction of the monetary criterion to decide if a person was professional active in 1856

\(^{125}\) For the cartographic and geographic principles: see Thomas, “De derde dimensie in cartografie”, 2000.
\(^{132}\) Demasure, Sociaal-economische streekstudie, 2011, 22.
illustrates the mechanism. The first time the monetary criterion was used, almost 50 percent of the population was without an occupation and this in a period when unemployment benefits were still unknown. In 1880, the monetary criterium continued to yield ambiguous outcomes: unpaid housewives with a paid secondary occupation, employed women with unpaid domestic work and persons combining a range of income sources were mixed in one number. Furthermore, categories were readily adapted by policy makers to render the information they were interested in. It is therefore significant that in the industrial census of 1910 the journey to work was considered as knowable by recording the occupation without paying attention to transport vehicle or distance travelled whereas in the population census of 1961 the variables of interest were reversed: this time, the transport vehicle and the travel time occupied the pages whilst professional activities were absent.

Once historians started to approach quantitative data as social constructions instead of objective representations, the value of the census as historical source multiplied. Indeed, the avalanche of quantitative data that state officials collected for composing the national censuses not only delivered empirical data to examine historical transformations in the material world of the nineteenth and twentieth century, but it simultaneously gave historians the statistical labels and classification schemes that contemporaries considered of value for observing and analysing their society. To be sure, awareness of the biased nature of statistical data still has a high regard for the statistical analysis as methodology to render valuable scientific insights, but it urges the researcher to disentangle quantitative data from the meanings policy makers imbued them with by using the exclusion mechanism, reduced heterogeneity and imposed classification schemes to unveil the biases. In this dissertation, this call is answered by exposing the attitudes of rural households towards the economic upheaval that reshaped their world on a structural basis and introduced commuting to their livelihoods. In each chapter, a specific method is used to answer the related research question. Yet, the overall method of giving rural households a voice encompasses a longitudinal analysis of empirical maps that visualise basic relationships in statistical numbers combined with a search for selective answers to structural change.

136 The city council of Ghent was the first government agency to pay unemployment benefits in 1900, causing quite a stir in Europe. (Vanheemsche, “Een werkloze bediende smeekt om hulp”, 2018, 440).
4.2 Back to basics: a spatial analysis of historical development

In *The uses of space in early modern history* Paul Stock makes the suggestion that “thinking about space is fundamental to the study of the past; it encompasses crucial questions about materiality, perception, and agency”.\(^{140}\) He continues arguing that the usage of spatial concepts in historical investigations directs the attention to the mutually constitutive nature of “matter and meaning”.\(^{141}\) Highlighting space as rationale in “shaping historical practices, because it enables and constrains action” therefore allows for counterbalancing an overemphasis on “how social and intellectual elites construct physical and representational spaces that reflect their priorities”.\(^{142}\) For Jerram Leif space too “offers a way of understanding relationships that opens up the particular and the peculiar, but while offering tools to link the particular to wider processes that tend to be analysed in taxonomic categories like class, race, gender, sexuality, state, expertise or law”.\(^{143}\) A longitudinal analysis to expose an alternative gaze on spatialised practices through maps that display basic relationships between recorded reality and statistical meaning, allows to put these statements to test. In chapter two, for example, it is argued that the population level of a municipality informs on the location preferences of rural households.\(^{144}\) If the patterns on these maps, which link basic quantitative meaning to geographical features such as the lay-out of the railway network or the surface of a rural region, disaccord with mainstream theories on societal transformations, either partially or entirely, then the empirically established discrepancies pushes the historian in a search for additional sources with the agency of rural households as guideline.

To retrace the discrepancies in displayed spatial patterns and mainstream theories on urban growth, the nineteenth-century novelty of imposing coherently planned transport networks on the landscape top-down is of interest.\(^{145}\) As argued earlier, merging political goals and scientific knowledge to engineer societal progress through a reorganisation of space, materialised in an unrivalled expansion of transport infrastructure during the nineteenth century.\(^{146}\) The exposure of intentionally built transport infrastructure not only debunks the idea that technological determinism or a self-organisation principle drives transport development, but the discourses that legitimise the mobilisation of transport networks by governments to engineer society likewise enlighten the mainstream assumptions in urbanisation theories.\(^{147}\)

\(^{140}\) Stock, “Uses of space”, 2015, 5.  
\(^{141}\) Stock, “Uses of space”, 2015, 8.  
\(^{142}\) Stock, “Uses of space”, 2015, 8.  
\(^{143}\) Leif, “Space”, 2013, 402.  
\(^{144}\) See Chapter 2: 3.2 What the population level of a municipality can tell about ordinary people.  
\(^{145}\) See 1.1 The birth of a railway world.  
\(^{146}\) See 2.4 The planned vector of economic growth in transport infrastructure.  
\(^{147}\) See for example Vanoutrive, De Block and Van Damme, “Nature’s order?”, 2018.
Moreover, considering transport infrastructure as key variable to grasp urban morphology unavoidably foregrounds the analytical concepts of network and relational space. Hereby, Joris Beckers reminded his readers that “[g]eographical attention to flows and networks and the relational turn in thinking spaces is already a couple of years behind us”. In these years, accessibility gained prominence as network concept for analysing the geographical interplay between transport development and the distribution of human activities. The associated shift from mobility-oriented to accessibility-based planning practices redirected the focus from a person’s ability to move between places to organised relations between places. Accordingly, in accessibility studies, the attention was directed to the destinations people want to reach, the effort it takes to reach a destination and how the hierarchy of a destination on the transport network influences the degree of accessibility. With transport infrastructure and destinations outweighing mobility as research item in the spatial disciplines, accessibility thus became “the end goal of a transportation system, with mobility as just one means of reaching this goal”.

Put differently, in accessibility-based planning practices, the scope and size of mobility flows result from the travel opportunities and constrains that policy makers implement in the transport infrastructure whereby local land uses are the incentives for people to move. Despite highlighting place-based qualities as people’s incentive to move, “heterogeneous and dynamic network/urbanisation relations are often reduced to a static and featureless mesh of density dots”, thereby marginalising “the qualitative character of places and their embedded relations with the surrounding landscape” in accessibility studies. In a relational understanding of urban landscapes, this is a missed opportunity precisely as the ability of a transport network to generate societal change lays in the impact that the organised relations between places have on local land uses. Therefore, the impact that the Belgian railway policies had on local land uses in city and countryside alike, has the attention in this dissertation to give the rural households their voice.

4.3 Selective answers to structural change

In his historical geography of European peasants in the early modern period, John Langton considered “the major continuity in human history [the fact] that humankind cannot escape

148 Beckers, Location and network structure, 2019, 12.
151 Proffitt e.a., “Accessibility planning”, 2019, 168.
from the biological need to sustain itself”. Though he added fuel to William Cronon’s list of food, clothes and shelter, he agreed with the author of *Nature’s metropolis* that the countryside derives its weight in rural-urban relations from the land as natural system that provides the basic necessities of life. A few pages further, Johann Heinrich von Thünen’s geographical model is introduced by John Langton to demonstrate that the ‘tyranny of distance’ severely restricted market exchange between 1400 and 1800. The invention of steam-driven transport vehicles lifted this tyranny in the nineteenth century while the rationale of economic growth became integral to transport planning, validating John Langton’s claim that “the market system is not just a means of exchanging goods; it is a mechanism for sustaining and maintaining an entire society”. Indeed, in the book of European history, the decisive pages where combining land and labour in a livelihood lost its significance belong to the twentieth century. Moreover, the idea that land was destined to lose out to wage work is only endorsed by the ubiquitous presence of money to satisfy material needs in today’s society related to the belief in societal progress. The latter likewise installs a tendency in historical interpretations to concentrate on things in the past that survive in the present. Hence, the importance of Steve Hochstadt’s study on modernity and mobility in Germany, in which he aptly demonstrated that much of the resistance that the modernisation process evoked among rural households was centred on safeguarding their access to a plot of land at home. This finding resonates with Tim Soens, Eline Onacker and Kristof Dombrecht’s recommendation of taking rural regions into account when studying urbanisation dynamics in the countryside.

If an observed resistance to modernity is associated with an element of choice rather than accusing people of “obstructing the path to progress, cherishing old-fashioned values” or attaching labels of “backwardness, traditionalism and inhibiting progress” to agrarian lifestyles, then spatial patterns on empirically maps going against mainstream theories arguably offer insights in bottom-up agency of rural households. In migration and mobility research, it has long been accepted that structural change in the economic organisation of a society delineates migration constrains and opportunities without, however, determining a household’s decision

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158 Kinneging, *De onzichtbare maat*, 2022, 15.
160 Soens, Onacker and Dombrecht, “Metropolis and hinterland?”, 2012.
to migrate. Indeed, gravity models to predict “the volume of migration between places and countries on the basis of distance, population size and economic opportunities in destinations and origin areas” combined Isaac Newton’s gravity law with the migration laws of Ernst Georg Ravenstein. These so-called macro-economic push-pull models theorise that economic, environmental and/or demographic factors “push people out of origin and pull them into destination places”. Despite their overarching explanatory value, the models fail to elucidate why, under identical circumstances, some households departed whilst others remained. The observed heterogeneity in migration flows introduced the selectivity of a decision in migration and mobility research, whereby the macro-economic push-pull layer received the company of a meso- and micro-level under which the causes of migration were distributed. Accordingly, the structural factors that constrained or stimulated migration on the macro level were refined by taking intermediary institutions on the meso-level and circumstances of the household and individual on the micro-level into consideration. As a result, the traditional image of a rural exodus in the age of industrialisation that drained the countryside while increasing the concentration of the population in cities has been nuanced by demonstrating that “mobility patterns were much more complex than a one-off transfer of the population from the countryside to cities [as] people moved in many directions at different stages of their life courses.”

In contrast, selective answers to structural change have difficulties to land in research that seeks to understand how space is transformed by organised relations between places. To be sure, researchers have challenged “reductionist tendencies that have led to an overemphasis on scientific and technical solutions” by revealing “the astonishing lack of political thinking by both scholars and practitioners” in landscape design. Yet, exposing the societal and political nature of planning practises only adds to veiling selectivity in human responses. Indeed, the idea that transport infrastructure serves as spatial tool to engineer space, rests on the promise of the Enlightenment movement that “Nature’s secrets could be unlocked and adapted to man’s own

168 De Block e.a., “Landscape design as a political project”, 2019, 5.
purposes”. Or, mankind is able to write its own history as soon as the universal laws that drive societal development are discovered and instrumentalised. This means that all people will act as planned, based on the logic that the plan is carefully devised to further people’s self-interest in line with societal progress. Nonetheless, with the biased nature of statistical data in mind, it follows that societal progress is a mental concept whose meaning and realisation lies in the eye of the beholder. Hence, what kind of societal phenomena are in need of solving, what kind of data is collected to generate knowledge and what kind of policy recommendations this knowledge produces, always reflect a particular perspective on society. Or, instead of assuming that planned and actual mobility flows on transport networks are interchangeable, searching for heterogeneity in bottom-up uses of transport infrastructure is of interest. Indeed, as will be shown on the following pages of this dissertation, grasping selectivity in the responses of rural households to nineteenth-century policies for making Belgian wage workers mobile, broadens current understandings of entangled transport policies, commuting and urban morphology.

5 Reader’s guide

The main aim of this research is to decide whether solving the friction of distance in a homework split was all rural households needed to integrate railway commuting in their livelihoods. In other words, were the railway policies the Belgian government launched in 1869 successful in realising the commuting flows that the planned connectivity of a territory-covering railway network aimed for? Hereby, examining the organised mobility flows that drive societal change by affecting land use in a place is accounted for by deploying the lens of transport infrastructure whilst the economic lens that William Cronon’s theory pulled from under the dust for grasping network and space inserts livelihoods and labour markets in this investigation of Belgium’s rural-urban continuum from the mid-nineteenth till the mid-twentieth century. Although these choices imply that other relevant variables to elucidate spatial transformations, like social networks, information channels and companies, fall outside the analytical framework, they are implicitly present in the data on location preferences and labour mobility: it is assumed that the decisions rural households took to preserve their livelihoods, based on their familiarity with the context of constrains and opportunities that regulated their access to land and labour, are reflected in these data. It also implies that salary scales to determine where the best wages were located lack. Similar, the design of the railway infrastructure and the regulations determining

the access to trains for wage workers are considered to reflect the decisions engineers and politicians had to take to organise mobility flows. As such, political discourses exposing the utopian ideals of socialists or the Catholic Party wanting to keep the rural dweller under the church tower, remain undiscussed. Although this approach is silent on the dynamics at play within the group of rural households and the group of policy makers, it underlines that the data are produced by human decisions taken from a perspective that represents the interests of the social group as a whole. To expose this perspective, a longitudinal spatial analysis has been conducted that spans a national scale in the first three chapters whilst the last chapter zooms in on the station area of a rural village.

In the first chapter, it is asked if the spatial models Belgian policy makers embedded in the railway infrastructure during the nineteenth century created the planned mobility flows. In literature, as scheme 1 displays, transport infrastructure derives its ability to act as societal engineering tool from accessibility and circulation. Goods and people circulate on transport infrastructure whose flows are carefully planned during the selection of places whose amenities granted them accessibility. The spatial model geared at creating a prosperous nation by stimulating market exchange, therefore, connected the places that had industrial and commercial growth potential whereas the spatial model underlying a rural-urban continuum connected villages and cities to disperse the population and maintain the industrial and urban labour force. As the latter model promoted the interests of rural households by offering the opportunity to combine higher industrial and urban wages with a plot of land in the countryside, it follows that planned opportunity and actual use coincided. However, using a transport-cum-mobility lens to analyse the empirical data published in Ernest Mahaim’s seminal study on the use of cheap railway subscriptions by Belgian wage workers during the first decennia of the twentieth century validated the use of an economic angle in understanding commuting flows. While the railway network provided the connectivity needed to bridge the distance separating the home from the workplace, the structural transformation of the labour markets due to the rise of an industrial and commercial world was the impetus a majority of rural households needed to integrate railway commuting in their livelihoods. Moreover, once agriculture ceased to be the main employer of Belgian households, which happened at the turn of the twentieth century, the demand for cheap railway subscriptions continued to rise even when railway administrations restricted the access to the railway network for wage workers.

In the second chapter, it is asked if the rural-urban continuum policy makers envisioned in 1869 materialised as planned the moment railway commuting had become a phenomenon of societal importance in Belgium. As the empirical analysis to answer this question relies on population data, the two disciplines in which population data figure prominently to examine
urban growth, namely transport geography and migration research, are brought together in scheme 2. As a rule, migration historians zoom in on livelihoods to explain rural outmigration and urban concentration in the Western world during the nineteenth century whereas transport and economic historians dive into the interplay of steam trains and economic activity. Railway networks and migration dynamics are linked by labour markets. Indeed, gaining direct access to railway infrastructure revitalises the economic activity of a place that let local labour markets expand, which influences the direction of labour migration, resulting in a rural exodus towards cities at a time when agrarian activities are structurally replaced by industrial employment, with the Belgian government opting for the home-work split in a national rural-urban continuum to solve the societal problems created by overcrowded cities. However, visualising population patterns before and after railway commuting became widespread, revealed both the success and failure of the railway policies to curb rural outmigration in Belgium. On the one hand, as more people lived in rural municipalities in 1961 compared to 1846, depopulation of the countryside was prevented. In contrast, the geographical scope as well as the size of rural outmigration increased after 1895, being the period when railway commuting was widely practiced by rural households. Again, an economic angle proved its value to elucidate the observed variation in population dynamics. Indeed, a rural region was found to influence a rural household’s decision to either migrate or commute, with a fertile soil encouraging rural outmigration while land as a subsistence means rooted rural households in their villages.

In the third chapter, it is asked if labour markets and livelihoods had a say in the spatial coherence commuting flows gave to the Belgian territory in 1910. In literature on urban sprawl, travel is defined as a derived demand as it overcomes the physical separation of various human activities. This ability of transport technology to deal with the friction of distance is also key in explaining urban sprawl. Indeed, policy makers in the nineteenth century addressed the societal problems associated with overcrowding in cities by developing transport networks to locate the population outside the urban core without, however, disconnecting them from the urban core. As shown in scheme 3, the time-space contraction delivered by transport networks merged city and countryside in an urban landscape whose spatial coherence is streamlined by core-periphery relations or as a rural-urban continuum in which isotropic flows link cities, towns and villages. To empirically expose this spatial coherence, commuting flows are of interest as their daily
**Scheme 1:** transport infrastructure functions as a spatial tool for engineering society.

```
accessibility and circulation
↑
tool for **societal engineering**
↑
industry and trade ← economy ← transport → urbanisation → rural-urban continuum
infrastructure
↓
facilitate mobility
↓
planned opportunity = actual use
```

**Scheme 2:** linking railway accessibility, migration flows and urbanisation via population data.

```
economic growth → expanding labour markets → pull labour migration
↑
railway access place
↑
urban growth

↑
railway infrastructure → population data
↓
no railway access place
↓
rural exodus
↑

economic decline → shrinking labour markets → push labour migration
```
Scheme 3: two models that streamline spatial coherence in an urban landscape.

sepaltung human activities = travel as derived demand
  ↓
overcoming friction of distance
  ↓
transport network = time-space contraction
  ↓
two relational models
  ↓
core-periphery  rural-urban continuum
  ↓
suburbanisation  villages/towns/cities
  ↓
economic agglomerations  isotropic flows
  ↓
daily urban systems

Scheme 4: networked connectivity and societal progress in the rural-urban continuum.

urban location  rural location
  address overcrowding  access cheap land
  access higher wages  lack of job opportunities
  ↓
  networked transport connectivity
  railway policy: combine higher wages and living in village
  housing policy: cheap building plots countryside
  ↓
  engineered rural-urban continuum
routine perpetuates the geography of the home-work split and, hence, urban morphology. Accordingly, Joris Beckers applied the community detection approach to the origin-destination relations present in the commuting data recorded in the industrial census of 1910, thereby exposing that both proximity and networked connectivity shaped the calculated job basins. Moreover, the average distance trains covered in the commuting flows of 1910 only slightly differed from the average distance that commuters travelled on the road network to connect the home with the workplace in 2010. Turning the attention to labour markets and livelihoods clarified this unexpected result by highlighting the double-sided effect of railway policies. The goal of nineteenth-century railway policies to make the nation prosperous by spurring market exchange, reshaped the geography of labour markets. The concentration of jobs in urban and industrial nuclei on the railway network combined with access to a plot of land for subsistence purposes as metaphorical sun around which other source of income circled in the livelihoods of rural households, exposed the importance of approaching commuting both as an economic imperative and an opportunity for understanding urban space relationally.

In the fourth chapter, it is asked whether the cause-consequence relations policy makers activated in the railway and housing policies to engineer societal progress, materialised in the station area of a rural village. As summarised in scheme 4, to engineer a rural-urban continuum, policy makers had to connect villages, towns and cities in a railway network whose design and organisation let the amenities of rural and urban locations interact. Making this interaction possible was all households needed to combine higher wages in the urban location with cheap land in the rural location in line with societal progress, thus addressing the societal problems of overcrowding in cities and underemployment in the countryside. The amenities of Holsbeek met the theory. Its location made the small village not only part of rural Hageland, which lacked large farms and industrial activities, but was also a stone's throw from Leuven with its industrial labour markets and a station acting as a national commuting hub in 1910. In other words, in the rural village, easy access to industrial labour markets fused with easy access to cheap land. The opening of a train stop in Holsbeek in 1907 only reinforced the attractiveness of these amenities. Accordingly, industrial wage workers who owned a home in the station area of Holsbeek should have been prominent in the municipal’s population and cadastral data document in 1920. Yet, farmers were still well represented in the occupational structure of the station area. Moreover, farmers dominated the list of homeowners whilst industrial wage workers were mainly with high turnover rate.
CHAPTER 1: THE TRANSPORT-CUM-MOBILITY LENS.
EXPLORING THE SPATIAL MODELS EMBEDDED IN BELGIUM’S RAILWAY INFRASTRUCTURE DURING THE NINETEENTH CENTURY

“One of the most striking features of modern life is the extent to which railway travel has entered the life of the people.”
W.T. Stephenson, Economic Journal, 1910, 600

1 Introduction

Neither labour mobility, nor transport infrastructure were new phenomena at the onset of the nineteenth century, but the observation that people started to move in unseen numbers during the era of steam and steel made concepts like ‘mobility transition’ and ‘transport revolution’ enter the academic debates. In 1971, geographer Wilbur Zelinsky put forward the hypothesis of a mobility transition and outlined it as the presence of “patterned regularities in the growth of personal mobility through space-time during recent history, and these regularities comprise an essential component of the modernisation process”.170 Whilst this line of inquiry appealed to geographers and demographers, as Steve Hochstadt remarked, migration historian Lesley Page Moch argued against the idea of a sedentary and static premodern Europe.171 By relating the social and economic organisation of a society to the statement that “people have long moved in a variety of ways”, she dismissed the causal relationship between migration and modernisation process that Wilbur Zelinsky had inserted in the academic debates.172 More migration historians walked in her footsteps as they continued to reveal that “overall changes in migration behaviour during the transition from preindustrial to industrial society were less novel and spectacular than originally envisaged”.173 Based on this material, Tomás Klir and Jonas Lindström concluded that Wilbur Zelinsky’s scientific model “had more to do with efforts to understand the modern world than with the realities of premodern societies”.174 Nonetheless, as the quantitative analysis of movement in Europe between 1500 and 1900 conducted by Jan Lucassen and Leo Lucassen

170 Zelinsky, “Mobility transition”, 1971, 221-222.
displayed, Wilbur Zelinsky was right to state that migration levels jumped after 1850. Instead of reinstating the ‘modernisation process’ thesis, the two migration historians underlined the effect of transport development on migration levels. They posited that although the structural causes of migration remained unchanged, the ongoing transport revolution had “dramatically increased possibilities for people to find permanent and temporary jobs farther away from home” by making travel cheaper and faster, with an unseen acceleration of migration flows in the latter half of the nineteenth century as outcome.

The ability of transport infrastructure to raise mobility levels by dealing with the friction of distance was also the mechanism policy makers utilised to make wage workers mobile in the latter half of the nineteenth century. As a rule, European transport polices that organised the home-work split to relieve overcrowded urban cores restricted the spatial dispersal of the labour force to the boundaries of a city and its suburbs. The Belgian government, in contrast, aimed for a nationwide rural-urban continuum they hoped to establish by nationalising the railway network, expanding its connectivity with light railways and issuing cheap railway subscriptions for wage workers. In the minds of intellectuals and politicians alike, granting wage workers access to a territory-covering railway network was key for preserving the historical distribution of the Belgian population over villages, towns and cities, because the railway policy gave rural households the possibility to combine higher wages on industrial and urban labour markets with a vegetable garden in the ancestral village. Whether overcoming the mobility barrier of physical distance was indeed the key to increasing mobility flows, as Jan Lucassen and Leo Lucassen stressed and nineteenth-century decision makers envisioned, represents the research question of this chapter. In particular, it is asked when rural households integrated railway commuting in their livelihoods, to what extent they did so and what kind of commuting flows this generated.

A first set of historical data to answer these questions is to be found in the statistical study of Belgian sociologist and reformer Ernest Mahaim, which he conducted in the first decennium of the twentieth century to explore the societal consequences of the cheap railway subscriptions issued for wage workers in Belgium. Yet, first the transport-cum-mobility lens is introduced so that the top-down perspective of transport planners can be linked to the bottom-up use of the

179 Mahaim, Abonnements d’ouvriers, 1910.
railway network by wage workers. Next, a literature review is presented on the spatial models that engineers and state representatives embedded in the Belgian railway infrastructure in the nineteenth century to familiarise the reader with to the goals the networked connectivity was to realise. Subsequently, Ernest Mahaim’s data are compared with the kind of mobility flows the railway policies predicted, whereby the outcome of this exercise strengthens Lesley Page Moch’s understanding of labour mobility. Indeed, although trains were necessary to make commuting possible, the accelerated demand for cheap railway subscriptions by wage workers only occurred when industry had replaced agriculture as major employer at the turn of the twentieth century. Moreover, as demonstrated in the last part of this chapter, the time tables of the Belgian State Railways confirmed the prevalence of labour markets over transport technology in making the labour force mobile. In the first decennia of the twentieth century, the Belgian State Railways issued regulations that severely restricted the access to trains for wage workers. Nevertheless, despite the substantial increase in prohibitions, the demand for cheap railway subscriptions kept mounting too, thus creating a period of mobility friction for the Belgian labour force.

2 The transport-cum-mobility lens
2.1 Thinking space relationally
As people depend on transport infrastructure to move from one place to another, it seems logical that insights in transport and migration research would find each other. However, a decade after Jan Lucassen and Leo Lucassen published their article, Colin Pooley still pleaded for bridging the disciplinary divide between transport history, migration history and mobility studies to better apprehend how changes in both transport technology and access to transport means influence migration patterns and mobility behaviour. For him, the pertinent questions still remained: why was a particular travel mode chosen, how did this choice impact the experience of the journey and what was the effect of this experience on future travel decisions? These research questions resonate with the anthropologically oriented research of the influential ‘new mobility paradigm’ send into the academic world by Mimi Sheller and John Urry in 2006. Observing the outspoken difference in speed, intensity and volume of present-day mobility flows compared to past times, urged the two sociologists to reconceptualise the meaning of place and space. Instead of considering place a geographically isolated and spatially fixed container in

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which social processes unfold, they turned to Zygmunt Bauman’s idea of a “liquid modernity” that thrives on mobility as inducer of societal change and as basic factor in the production of space.182

Addressing the ubiquitous presence of movement in twenty-first-century societies whilst imbuing movement with cultural meaning aided the new mobility paradigm to quickly spread in academic circles as antidote for “the shortcomings of static social science”.183 Consequently, movement and a relational view of place quickly landed in academic research to investigate societal transformations.184 The popularity of the new paradigm even uplifted mobility as a core geographic concept, next to space, place, network, scale and territory.185 However, underneath cultural interpretations and experiences of movement in a mobile society remains a physical distance requiring transport infrastructure and vehicles if people and goods are to move between point A to point B. Already in 1954, in his book *Geography as spatial interaction*, Edward L. Ullman stated that all places are “bound up in a network of interaction and interdependency”.186 In that same decade, Walter G. Hansen defined accessibility as “the potential of opportunities for interaction”.187 From there, accessibility as network concept gained prominence in the spatial disciplines for analysing relations between mobility and space whilst books like *The rise of the network society* published in 1996 and the introduction of the ‘new’ mobility paradigm of Mimi Sheller and John Urry twenty years later, let flows, networks and a relational production of space advance in societal analyses.188

With movement as a core element in transport and mobility research, geographers Jon Shaw, Markus Hesse and James D. Sidaway wondered whether the theories and methodologies transport geographers and mobility scholars used perhaps represented “two sides of a common boundary”.189 Historians too recognised the potential of bridging the disciplinary divide between transport geography and mobility studies to enrich understandings of movement vector of societal change.190 Consequently, Massimo Moraglio proposed a ‘transport-cum-mobility’ lens to answer the criticism that current conceptualisations of transport are “insufficient to understand

187 Hansen, “How accessibility shapes land use”, 1959, 73. Mobility differs from accessibility as the former is about the ability of people to move between places whilst the latter is about the destinations people want to reach, linked to the effort it takes to reach these destinations.
the movement of people, things and ideas” and reinvent transport history.\textsuperscript{91} Infusing transport history with the method of mobility studies would stimulate a critical reflection on the obsession in transport debates for time and budget savings due to the “fascination for innovation [that] has been embedded in a progressive story, tracing development from ‘poor’ and ‘inefficient’ preconditions to ‘smart’ and ‘proficient’ outcomes”.\textsuperscript{92} Indeed, despite the guidance of such influential figures like Thomas Kuhn, Michel Foucault and Bruno Latour as well as stressing technology and society as being mutually constitutive in the transdisciplinary domain of Science, Technology and Society, the conception of technology “as an independent entity, a virtually autonomous agent of change” maintains its tenacious grip on present-day research that associates societal change with “the inescapable yet strikingly plausible result of technological innovation”.\textsuperscript{93}

2.2 Top-down transport policies and bottom-up uses of transport infrastructure

For example, the discourse that the leap in car ownership after the Second World War caused cities to sprawl into the countryside is driven by the narrative of technological innovation; after all, cars do have the technological features to deal with the friction of distance in an easy and comfortable manner.\textsuperscript{94} This capacity of transport technology to dissolve physical distance as mobility barrier was the asset nineteenth-century engineers and politicians activated in the novel practice of planning territory-covering transport networks top-down.\textsuperscript{95} Places that the railway infrastructure had to connect because of their potential in the eyes of the policy makers to spur economic growth, were carefully selected. The ensuing “rapid transformation from a rural agricultural society into an urban-based industrial country” boosted labour migrants towards cities, which proved to be unfit to digest the unseen influx of people.\textsuperscript{96} As a result, the ability of transport technology to act as spatial tool was activated a second time, intending to make the home-work split an integral part of labour markets.\textsuperscript{97} Hereby, the transport policies of the American and Belgian state representatives stood out as they transgressed the scale of a city-suburb geography: sleighs, horse-drawn wagons or cars on the roads of the United States had to give households with a home in the countryside access to industrial and urban labour markets whilst trains and trams riding on rails supported the rural-urban continuum in

\textsuperscript{91} Moraglio, “Seeking a (new) ontology”, 2017, 3.
\textsuperscript{92} Moraglio, “Seeking a (new) ontology”, 2017, 5.
\textsuperscript{93} (reciprocity) De Block, Engineering the territory, 2011, 39; (quote) Smith and Marx, Technological determinism, 1994, xi.
\textsuperscript{94} De Block, “Planning rural-urban landscapes”, 2014, 542-543.
\textsuperscript{95} See Introduction: 2.1 The planned vector of economic growth in transport infrastructure.
\textsuperscript{97} See Introduction: 3.1 The home-work split in European transport policies.
Belgium. This strand of literature thus unravelled the reciprocity between society and technology by exposing transport infrastructure as sociotechnical products.

Yet, reading transport infrastructure as a societal engineering tool with “science as a way of improving the conditions of daily life” obstructs the observation of a selective use of well-thought-out opportunities. Indeed, a mindset that sees technological innovations and societal progress as interchangeable assumes people will act according to plan precisely because the top-down imposed plan is designed to install societal progress. Or, the principle of a malleable society is exactly the expectation that coherently planned transport infrastructure will produce the desired mobility flows to reshape the territory as envisioned. The transport-cum-mobility perspective comes in handy to critically reflect on this expectation. Transport highlights the spatial models decision makers embed in the design and organisation of transport infrastructure whilst mobility reveals what users make of these spatial models. Hereby, conceiving mobility as a “complex assemblage of movement, imaginings and experience” in mobility studies is in this research replaced by livelihoods and labour markets as the variables that trigger mobility flows. Accordingly, this chapter links top-down planned mobility flows to bottom-up uses of the railway network by inquiring the extent to which rural households picked up the commuting flows engineers and politicians had in mind when planning Belgium’s rural-urban continuum.

3 An engineered network of flows
3.1 The first steps in ensuring connectivity between places
From the sixteenth to the eighteenth century, so-called *Placcaeten op het stuck van Beleyden* regulated the common maintenance of roads in the area that the Belgian flag claimed in the nineteenth century. Unsurprisingly, roads at that time differed greatly from the modern road network “planned, constructed, owned and managed” by the state. However, the *Placcaeten* not only reveal that safeguarding a smooth passage of people and goods between places was a main concern of premodern governments too, but that this top-down goal of smooth passage simultaneously met fierce resistance of bottom-up road uses like planting trees in the middle of the sandy road for personal gain. It is telling that trees still were planted in the latter half of

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the eighteenth century when governmental initiatives to improve the connectivity between cities were already in full swing. From 1700 till 1706, the southern Netherlands were ruled by Philippe V of Anjou, who, following the example of his grandfather Louis XIV, ordered the construction of a road network radiating from the capital, i.e. Brussels in his case, in 1704.  

His policy of building coherent transport networks was continued by empress Maria-Theresia of Austria and her son Joseph II from the mid-eighteenth century in their pursuit of realising a west-east connection to generate new trade flows. To this end, acquiring a concession for constructing a paved road became obligatory. This legal obligation tightened the grip of the central government on the entire road network, as it permitted them to influence the trajectory of paved roads that were built with private funding. As a result, the central government was able to align local and regional interests with national concerns whereby transport over land and water was reconceptualised as complementary transport networks instead of competing infrastructure. Notwithstanding, dependence on private capital still gave provincialism the upper hand in eighteenth-century transport policies, which explains why the wealthy provinces of West-Flanders, East-Flanders, Brabant and Hainaut had the best equipped network of paved road, as map 1 shows.

3.2 Fortifying connectivity and circulation in transport policies

Belgium’s independence, the advance of engineers as technocrats and the developments in public funding during the nineteenth century allowed Belgian decision makers to amplify the coherence of transport networks by transforming them into full-blown instrument to engineer society. In 1830, his southern subjects defied the will of William I, king of the United Kingdom of the Netherlands, when they claimed Belgium’s independence. Almost immediately after this act, the provisional government commissioned state engineers Pierre Simons and Gustave De Ridder to restore Antwerp as a transit port for the German hinterland. After all, the transport

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208 Van der Herten, België onder stoom, 2004, 166. In the eighteenth century Liège was part of the Prince-Bishopric of Liège. Hence, the province lacks in the enumeration of the rich provinces of the southern Netherlands.
Map 1 shows the lay-out of the paved road network at the end of the eighteenth century as well as the part of Belgium under control of the Austrian Habsburgs at that time. These areas are coloured whilst the grey colour around Liège indicates that this area was part of the Prince-Bishopric of Liège in 1789. The map illustrates the presence of provincialism in the paved road policy of the Austrian Habsburgs. (sources: Buyst, Dercon and Van Campenhout, “Road expansion”, 2006, 189 and commons.wikimedia.com for map of Austrian Netherlands)
routes connecting those two places now ran through the ‘hostile’ territory of the Netherlands.210 In retrospect, mobilising trains to establish the “twin goals of positioning Belgium within Europe and facilitating the emerging national industry” seems to be an obvious choice.211 Yet, as railway technology had only just seen the light of day, the choice was a bold one in the 1830s.212 With the support of cabinet leader Charles Rogier, the bold proposal of the two state engineers to build a railway line led to fierce debates in parliament during which the original envisioned transport mode, design and funding mechanism of the connection between Antwerp and Cologne were altered. It was the new political economy of the French Saint-Simonian engineers that inspired the conduct of Charles Rogier, Pierre Simons and Gustave De Ridder.213 In contrast with many nineteenth-century reformers, Claude-Henri de Saint-Simon (1760-1825) and his followers associated industrialisation with societal progress. As a technological object was the precipitation of scientific knowledge, it followed that mechanised production was the direct application of technology. Moreover, instead of being the outcome of trial and error, this line of reasoning landed in the believe that societal phenomena were engineerable via a strategic use of rational knowledge. Among other, it inspired Michel Chevalier’s dream of a circulation society in which the unparalleled capacity of railway technology to connect “scattered people” would “enable economic progress for all countries, all social classes, and all individuals like never before”.214

As to be expected, the link between industrialisation and societal progress guided Pierre Simons and Gustave De Ridder’s top-down planning of the iron cross too (map 2). The ‘universe of precision’ was mobilised to ensure the young nation its economic fundament.215 During the selection process of the locations the railway infrastructure was to connect, the two engineers considered practical obstacles caused by physical distance or variations in geographical height secondary to the amenities a location possessed to spur the circulation of goods. In their opinion, these designated amenities coincided with industrial production sites and commercial cities: the former to supply tradeable goods while the latter assured the distribution of these goods over competitive trade networks. The natural advantage that the presence of coal and iron

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212 The first timetabled train made its appearance in 1830, when a carriage and some wagons rode the distance between Manchester and Liverpool. (De Block, “Designing the nation”, 2011, 716)
214 Högselius, Kaijser and van der Vleuten, Europe’s infrastructure transition, 2015, 2.
Map 2 visualises the iron cross in 1843 with the urban and industrial growth poles coloured in grey. The top-down planned connectivity of this cross links industrial growth poles, commercial centres and, with the port as pivotal point in Antwerp, the neighbouring countries. (source: Olyslagers, Belgische nijverheid, 1947)
mines gave to Belgium in the era of steam and steel translated in an iron cross that joint the industrial growth poles of Ghent, Mons-Charleroi and Liège-Verviers to the port of Antwerp and the capital of Brussels. In addition, the branches of the iron cross stretching out in the four wind directions safeguarded transit and international trade with England, the Netherlands, Germany and France.

Not only the coherent planning of “a radical, top-down, territory-covering instrument” was novel at that time, but likewise its funding with public means. Although the railway infrastructure was originally to be paid with concessions mixing private capital and public interests, it took only a few months to plant the seed of full state funding. This reorientation in funding system underlines the central role politicians and state engineers assigned to the iron cross for securing the economic and political viability of the brand new nation. After all, public funding meant that the state had complete control over the railway infrastructure. Freight tariffs, for example, could easily be adjusted to the needs of industry and commerce. Similar, preventing that the yields of thriving lines ended in the hands of private companies, who aim at exploiting trajectories that promise economic gain by their very nature, made the profits from these lines available for supporting less affluent railway lines that nevertheless increased the performance of the transport network as a whole. Furthermore, public funding enhanced the societal goal of a prosperous nation as it avoided the concentration of railway lines in the hands of foreign companies. Finally, the design of the railway network itself was influenced by the prospect of public funding: municipalities that were previously uninterested in the railway infrastructure as their economic activity was too insignificant to attract private capital, now claimed a share of the pie “in the name of equitable distribution of benefits among citizens”.

3.3 Circulation yes, but rails as motor of economic growth?

In sum, to integrate the territory of a nascent nation and give this nation economic strength, state engineers Pierre Simons and Gustave De Ridder meticulously planned the connectivity of a railway network top-down during a four-year period. Their final design encouraged large-scale production and market exchange as it connected industrial growth poles and distribution hubs whilst it synchronously anchored Belgium as a transit country in Europe. Nonetheless, whether industry was the designated engine to develop the economic growth potential of other places in Belgium was the subject of doubt, as the pleas held by engineer Remi De Puydt in parliament in

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1834 and 1836 exhibit. According to this engineer, a transport network of rails, roads and water increasing rail freight across a cross of iron rails was inferior to a road network connecting villages and towns with the waterways as natural extensions. After all, it was agricultural produce that fed the population, even in an industrial society. Accordingly, Remi De Puydt reasoned, a network of roads and waterways provided agriculture and small industries with the market access that was needed to let the nation prosper bottom-up.

The first railway law was voted in 1834 while the funds to improve road infrastructure in the southern province Luxembourg were assigned to Remi De Puydt in 1836, a year before the second railway law was voted. This chronology and the astonishingly short span of seven years in which the iron cross was made part of the Belgian landscape, both demonstrate that the national government sided with Pierre Simons and Gustave De Ridder’s preference for industry as motor of economic growth. It is, however, noteworthy that whilst the amenities of a place for making the location a node in a transport network were open for discussion, the method of optimising the circulation of goods over a transport network to create a prosperous nation was not. Both scenarios thus underwrite Michel Foucault’s thesis that planning a territory from the nineteenth century onwards “involved not so much establishing limits and frontiers, or fixing locations, as, above all and essentially, making possible, guaranteeing, and ensuring circulation”. Juxtaposing the lay-out of the nineteenth-century iron cross to the eighteenth-century pattern of paved roads highlights this adherence to circulation too. Indeed, map 3 shows the west-east connection empress Maria-Theresia and her son Joseph II aspired for according to Michael-W. Serruys, as well as a north-south link connecting Antwerp with Arlon. Yet, the multitude of fanning-out lines around cities and towns like Ypres, Ghent, Bruges or Liège, catches the eye in the pattern of paved roads. Arguably, a fan shapes fortifies core-periphery relations because the corresponding transport connections support movement between urban centre and its hinterland. These fan shapes are absent in the design of the iron cross, which leads to the conclusion that facilitating mobility flows on a regional, national and even international scale was the primary aim of the transport corridors that crossed Belgium from west to east and north to south.

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221 The chronology of the different segments built between 1836 and 1843 can be find in: Van der Herten, Belgïe onder stoom, 2004, 315-316.
222 Michel Foucault as quoted in De Block, “Material politics of infrastructure networks”, 2021, 358.
223 See 3.1 The first steps in ensuring connectivity between places.
Map 3 juxtaposes the lay-out of the eighteenth-century paved road network and the nineteenth-century iron cross.
3.4 Population concentration as unforeseen side effect of engineered space

On 5 May 1835, throngs of people celebrated the opening of the first railway line and cheered as the train with 900 passengers on board passed them on its journey along the twenty-two kilometres stretch between Brussels and Malines. A year later, almost to the date, Antwerp was accessible by railway with French writer Victor Hugo travelling back and forth between Antwerp and Brussels in 1837: the travel speed that continued to amaze him throughout the entire journey earned the new transport technology a literary fan. Ironically, in his eulogy of the train, he accused people of being “such dumb merchants” failing to understand “anything about, art, nature, intelligence, fantasy or beauty and what we fail to understand, we dismiss from our narrow-minded view as useless”.  

It is quite safe to argue that some of these ‘dumb merchants’ certainly understood how useful railway technology was from an economic point of view, given that the connectivity of the iron cross was expanded through private capital. The Belgian government was unable to build these secondary railway lines itself, because the financial claims sealing the peace treaty with the Netherlands in 1839 exacerbated the hole that the construction of the iron cross had left in the Belgian treasury. The distinct period of private railway construction was launched by English investors in 1845 and ran till 1870. In this period, the “network grew exponentially from an intercity system to an intricate maze” so that railway exploitation became a mixture of private and state interests, as figure 1 illustrates for 1886.

The strategy of Pierre Simons and Gustave De Ridder paid off: Belgium was the first country to industrialise on the European continent. The seed of the industrialisation dynamic on the European continent was planted by British entrepreneur William Cockerill (1759-1832) in 1799, when he introduced mechanised looms he knew from Lancashire in the wool factory of Iwan Simonis in the city of Verviers. The railway adventure Belgium’s decision makers made official in 1834, nurtured this seed on a double level: next to providing the transport means to move tradeable goods wherever demand commended them, trains made the most out of iron and coal as natural sources of Belgium. Indeed, not only mechanised production required machines with steam engines that were made of steel and depended on coal to power it, but the materiality of trains and rails themselves stimulated the demand for iron and coal. Hereby, the

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Figure 1 shows the mixed operation of the Belgian railway infrastructure in 1886, being the decade between the first wave of nationalisation in the 1870s and the second wave of nationalisation in the 1890s. The black lines were under control of the Belgian State Railways whilst the coloured lines were under private exploitation, whereby the colours differ between various private companies. (source: Chemins de fer de l’Etat, compte rendu 1886)
“novel rationality linked technology, statistics and national development [in] the engineer’s perception of space [that] converted the territory into a quantifiable space in which cities like Antwerp and Brussels were no longer obvious focal points surrounded by neutral countryside, but rather dense nodes in a complex network of commercial and industrial flows”. As the administrators of the Belgian State Railways published in their annual report for 1867, the result of this reconfigured space was impressive: “The Belgian State Railways, the first effort of its kind on the continent, had gradually gained such a prosperous position that it exceeded the expectations of those whose confidence in its future seemed reckless. It was not only in financial terms that the results were quite unexpected; it was also in terms of the enormous boost these new lines of communication had given to the development of industry and public wealth”.

However, what the engineer’s logic forgot to calculate in its statistical approach was the unseen concentration of population in nineteenth-century cities that Adna Ferrin Weber marked as “the most remarkable social phenomenon of the present century” in his statistical study that he published in 1899. To address this unforeseen outcome of economic growth, the Belgian government decided once again to activate the “modern technology par excellence” as engineering tool. The new railway policies that were launched in 1869 envisioned a rural-urban continuum in which commercial and industrial labour markets kept their labour force up to date whilst the Belgian population remained distributed over villages, towns and cities. Accordingly, the Belgian government conducted a railway policy that adjusted the design as well as the organisation of the railway infrastructure so that every rural dweller, even in Belgium’s most remote village, could take the train to work. To make the home-work in a rural-urban continuum feasible, firstly, private railway lines had to brought back under control of the Belgian state, secondly, light railways were to be built to unlock the countryside and, thirdly, cheap railway subscriptions for wage workers were to be issued to assure commuting between city and countryside.

3.5 Giving rural households access to the railway network

When the Belgian parliament voted the first law to make railway commuting part and parcel of modern labour markets in 1869, the railway network counted 2,816 kilometres of which 1,954

kilometres were exploited by private companies.\textsuperscript{236} The remaining 862 kilometres belonged to the Belgian State Railways, with the iron cross and its length of 560 kilometres making up the lion’s share of this part. The downside of private railway concessions had become palpable in the 1860s: several private lines merged in major transport veins to ensure the profitability of their operations by mobilising economies of scale.\textsuperscript{237} The length of the trajectories that Société générale d’exploitation (848 km), Grand Central Belge (605 km), Grand Luxembourg (288 km) and Nord-Belge (196 km) had under their control in 1867, highlight that private companies had grown into severe competitors of the Belgian state. The difficulties of entangled private and state exploitation for imposing a coordinated tariff system on the entire transport network meant the extra push the Belgian parliament needed to launch a policy of repurchasing private railway lines in 1870. It resulted in a quasi-monopolistic exploitation of the Belgian railway infrastructure by the state in 1913. The only time that the state had exercised its right to buy back a private railway concession before 1870 was in 1857, when bringing the railway section Bergen-Manage under Belgian control prevented a monopoly on transit trade between France and Germany by the French Company Nord-Belge.

Even though large parts of the territory were covered by the Belgian railway network in 1870, not all places had access, nor was the network's density evenly spread.\textsuperscript{238} Especially in rural areas, the distance to the nearest railway station was substantial sometimes. The creation of a rural-urban continuum thus required an expansion in geographical reach of trains, with light railways providing the technological solution. In the early 1860s, politicians felt the need to address the imbalance between the high construction costs of a railway line and the low revenues from its exploitation. This transport technology suited the government’s policy of making rural households mobile. The construction materials for making a light railway line productive were cheaper and literally lighter compared to the infrastructure that made trains move. This gave light railways the ability to meander through the countryside, which in turn was the tool the National Company of Light Railways needed to give villages located in the mazes of the main railway infrastructure access to this railway network whilst collecting as many people and goods in the countryside as possible. The act of 28 May 1884 establishing this company likewise stressed that while trains furthered the national interest, a secondary network of trams advanced the public good by protecting the interest of local municipalities. In tune with the engineer’s logic of circulation, “a network of flows’ in the planning of light railway lines overruled the radial-

\textsuperscript{236} Chemins de fer de l’Etat, compte rendu 1869, (9).
\textsuperscript{237} Van der Herten, België onder stoom, 2004, 340-349, 316.
concentric pattern of city-hinterland relations with stations instead of cities operating as the nodes that linked feeder to main lines.\textsuperscript{239}

With a public railway network paving the way for uniform railway tariffs and light railways providing the hardware for the mobility flows that underly a rural-urban continuum, issuing cheap railway subscriptions for wage workers was the icing on the cake.\textsuperscript{240} Affordable prices were the \textit{conditio sine qua non} for rural households to integrate railway commuting in their livelihoods. Moreover, pricing had to make it more advantageous for the rural dweller to maintain family life in the countryside than to rent an accommodation near the job, even with rates that varied according to the distance travelled. The Belgian State Railways adjusted the formula of the cheap railway subscriptions, which defined the scope of movement on the railway network, several times. Each time, the mobility opportunities for wage workers increased, either because wage workers were allowed to bridge longer distances or because the number of maximum trips per week had altered. What remained unchanged, however, was the validity period of a cheap railway subscription: whatever formula wage workers chose, a subscription always gave them the right to use the railway infrastructure for the duration of one week.\textsuperscript{241} While the subscriptions effectively unlocked the railway infrastructure for rural households, their freedom to travel was nevertheless restricted because wage workers with a cheap railway subscription only had access to a limited number of trains.\textsuperscript{242} The Belgian State Railways organised special workmen trains if their cost was covered by the number of cheap railway subscribers or because the requesting company paid for it. Otherwise, wage workers had access to the third class coupé of a regular train if, and only if, the railway administration had given its permission, which usually came down to taking the first and last train of the day. An exception to this rule applied from November 1890 till February 1902, allowing the holder of a cheap railway subscription to use “all ordinary trains on which their presence does not interfere with the regular running of the service.”\textsuperscript{243}

\textsuperscript{239} De Block, “Planning rural-urban landscapes”, 2014, 553; De Block and Polasky, “Rural-urban continuum”, 2011, 322.
\textsuperscript{240} Schepers e.a., “Organising the work-home split”, 2020.
\textsuperscript{241} The exception to the rule concerned wage workers who were employed by the Belgian State Railways. They were entitled to a special category allowing them one round trip per week for a period of twelve weeks (Mahaim, \textit{Abonnements d’ouvriers}, 1910, 11-12).
\textsuperscript{242} Mahaim, \textit{Abonnements d’ouvriers}, 1910, 18-20, 11.
4 Railway commuting as nationwide phenomenon around 1900

By 1910, Belgium was covered by a railway network of 4,721 kilometres, of which 4,330 kilometres or 92 percent were operated by the Belgian state.²⁴⁴ Hereby, 1,128 stations gave access to the public railway infrastructure, with 3,786 kilometres of light railway lines extrapolating the trains’ connectivity into the countryside, as map 1 in the general introduction visualises.²⁴⁵ Arguably, the railway policies of the Belgian government had been successful in delivering the hardware that was needed to support commuting in a national rural-urban continuum.²⁴⁶ Moreover, the interest a liberalist, a socialist and a catholic displayed for railway commuting at the turn of the twentieth century, testifies that wage workers had answered the call of the Belgian government, even to the extent that liberalist Ernest Mahaim described the mobility flows on the railway network as a phenomenon of societal importance in Belgium.²⁴⁷ Socialist Emile Vandervelde sided with him by proclaiming the issuing of cheap railway subscriptions for wage workers “the most profound revolution perhaps to occur in Belgium’s labour system”.²⁴⁸ Jesuit Henri Demain acknowledged the magnitude of the home-work split too, but simultaneously deplored “its demoralising impact” when he compared “this constant coming and going from the countryside to the cities and from the cities to the countryside” with a river whose beautiful and pure water once flowed past the factory and now continued its poisonous course.²⁴⁹ Whereas Henri Demain’s metaphor alluded to the fear of Catholics that workmen trains enhanced the spread of the socialist doctrine in the countryside, Ernest Mahaim’s study was more down-to-earth: he combined law, statistical analyses and social science methods to examine the spatial as well as the socio-economic effects of the cheap railway subscriptions for wage workers on a national scale. As such, he provided this dissertation with a first set of empirical data to enlighten the ‘mobility’ side of the transport-cum-mobility lens and to ask if granting rural households the means to bridge the friction of distance sufficed to integrate the home-work split into their livelihoods.

²⁴⁴ Chemins de fer de l’Etat, compte rendu 1910, A (14) and 1910, A (67).
²⁴⁶ See Introduction: 1.2 An encounter between nineteenth-century engineers and twenty-first-century planners for a visualisation of the railway network.
²⁴⁸ [own translation] Vandervelde, L’exode rural, 1903, 143.
4.1 Introducing Ernest Mahaim and his study on railway commuting

Ernest Mahaim was born on 27 August 1865. His birthplace was a rural village in the province of Hainaut that was renowned for its glass production, but also for its smuggling due to its border with France. Seventy-three years later, the academic died in the city of Liège, having led a productive life. At the age of 27, he was hired by the University of Liège with three degrees on his résumé. That he had been a disciple of Emile de Laveleye was retraceable in his focus on political economy and a research driven by the ambition to contribute to society in general and improve the living conditions of the labour force in particular. He considered it his professional duty to first assemble as much knowledge as possible about a societal problem before defending the practical solutions that best suited the situation. The comprehensive and interdisciplinary publication he wrote on railway commuting in Belgium testifies to this work ethic. Reviewer G.G. Groat, for example, considered Ernest Mahaim’s *Les abonnements d’ouvriers sur les chemins de fer belges et leurs effets sociaux* to be a reliable piece of work with intriguing, yet, trustworthy conclusions about the home-work split because they were based on a large array of facts presented in numerous tables. Similar, the anonymous writer of a review in the *Journal of Political Economy* was impressed by the unusual presence of maps and diagrams in this type of research.

These tables, maps and diagrams were part of the statistical analysis that Ernest Mahaim performed on data the administration of the Belgian State Railways provided him with. The quantitative data in the annual reports of the railway administration gave him a first overview of the demand for cheap railway subscriptions by wage workers. His request for more detailed information about the professions of the cheap railway subscribers, resulted in a questionnaire to be completed by railway officials for the months of January and July 1906. The survey was answered by 1,206 station chefs, meaning no commuters were present in 78 stations or 7 percent of the stations that the Belgian state managed. Furthermore, private companies still controlled 587 kilometres of railway lines in 1906. As some of these railway lines crossed major industrial regions, it follows that Ernest Mahaim’s numbers underestimate the actual amount of railway commuters in January and July 1906. For instance, without being able to quantify, Ernest Mahaim mentioned the crowded trains that ran morning and evening on the segment of the *Compagnie

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250 All biographical data is taken from Dechesne, “Ernest Mahaim”, 1942, 129-149.
254 *Chemins de fer de l’Etat, compte rendu* 1906, A (12).
255 *Chemins de fer de l’Etat, compte rendu* 1906, A (63).
This line, represented by a light blue colour on figure 1, connected Namur with Liège and, consequently, gave access to the important labour markets of the horizontal Walloon axis. Despite this lacune in the data, the results of Ernest Maham remain significant: 978,202 cheap railway subscriptions were used in 1,128 stations scattered over the entire nation during the months January and July 1906 (map 4). Next to being present in 93 percent of the public railway stations, the number of commuters thus agreed with the interest the journey to work had raised among scholars at the turn of the twentieth century.

In 1906, Ernest Mahaim concluded based on his empirical observations that “the double purpose aimed at in 1869 is on the way to be fully reached. It would be difficult to find another country where employers can more easily get cheap labour, and at the same time where workmen (at least in some trades) have more opportunities for finding work”. He scrutinised travel distance and the demand for cheap railway subscriptions by wage workers to understand the extent to which the Belgian railway policy of making railway commuting an affordable alternative to migration for rural households had delineated the geographical reach of urban and industrial labour markets. As travel distance is the component policy makers dealt with, by activating transport technology to create time-space contractions, whilst the demand for cheap railway subscriptions by wage workers highlights the meaning households attached to railway commuting for making a living, it follows that a transport-cum-mobility lens guided the empirical research of Ernest Mahaim.

4.2 Travel distance

Once again, the railway administration helped Ernest Mahaim find out the distance wage workers covered on the railway network, by providing him with all the cheap railway subscriptions that were issued nationwide during the months May, June and July 1908. The number of kilometres mentioned on the subscriptions made it possible to calculate the average travel distance per displacement for each of the different subscription formula. Table 1 shows that the average of all formulas together delivered 15.8 kilometres for wage workers employed by the Belgian State Railways whilst 19.4 kilometres was the average distance wage workers bridged with a job in private industry. According to Ernest Mahaim, a train took an average of 45 minutes to cover 20 kilometres. Arguably, wage workers with a one-way displacement per day crossed the shortest distances, as they were likely to return on foot, whereas long-distance

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256 Mahaim, Abonnements d’ouvriers, 1910, 128-129.
257 Mahaim, “Cheap railway tickets”, 1906, 540
258 Mahaim, Abonnements d’ouvriers, 1910, 49-57.
259 Mahaim, Abonnements d’ouvriers, 1910, 53.
Map 4 displays the spatial distribution of stations where wage workers took the train to work in January and July 1906. The light green colour symbolises one return trip per week while the dark green colour indicates daily displacements. As a reminder, Ernest Mahaim had only access to the data of the Belgian State Railways. Moreover, the number of subscriptions is displayed as these are the data recorded by Ernest Mahaim. However, they remain silent on the exact number of subscribers. (source: Mahaim, *Abonnements d’ouvriers*, 1910, annexe I)
Zooming in on map 4 for the Antwerp region (above), the Liège region (middle) and the region of Brussels, Charleroi and Mons (below) respectively.
Table 1 shows the average travel distance Ernest Mahaim calculated for each subscription formula based on the cheap railway subscriptions Belgian wage workers requested in the months of May, June and July 1908. (source: Mahaim, *Abonnements d’ouvriers*, 1910, 52)

<table>
<thead>
<tr>
<th>CATÉGORIES</th>
<th>NOMBRE</th>
<th>TOTAL des DISTANCES Kilomètres</th>
<th>PARCOURS MOYEN par BILLETS Kilomètres</th>
<th>VOYAGES par BILLETS</th>
<th>VOYAGES EFFECTUÉS</th>
<th>KILOMÈTRES PARCOURS</th>
<th>PARCOURS MOYEN par VOYAGE Kilomètres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrie privée</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simples à 6 déplacements . . .</td>
<td>7.671</td>
<td>36.272,5</td>
<td>4,73</td>
<td>6</td>
<td>46.026</td>
<td>217.635</td>
<td>4,73</td>
</tr>
<tr>
<td>» 7 »</td>
<td>328</td>
<td>1.420</td>
<td>4,33</td>
<td>7</td>
<td>2.296</td>
<td>9.940</td>
<td>4,33</td>
</tr>
<tr>
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<td>1.118.637</td>
<td>19.846.367,5</td>
<td>17,74</td>
<td>12</td>
<td>13.423.644</td>
<td>238.156.410</td>
<td>17,74</td>
</tr>
<tr>
<td>» 7 »</td>
<td>54.726</td>
<td>928.470</td>
<td>16,95</td>
<td>14</td>
<td>766.164</td>
<td>12.998.580</td>
<td>16,95</td>
</tr>
<tr>
<td>» 1 déplacement</td>
<td>294.332</td>
<td>18.342.122</td>
<td>62,32</td>
<td>2</td>
<td>588.664</td>
<td>35.684.244</td>
<td>62,32</td>
</tr>
<tr>
<td>Total .</td>
<td>1.475.694</td>
<td>39.154.652</td>
<td>26,63</td>
<td>—</td>
<td>14.826.794</td>
<td>288.066.809</td>
<td>19,43</td>
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<tr>
<td>Administration</td>
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<tr>
<td>Simples à 6 ou 7 déplacements .</td>
<td>1.239</td>
<td>3.557,5</td>
<td>2,87</td>
<td>7</td>
<td>8.673</td>
<td>24.902</td>
<td>2,87</td>
</tr>
<tr>
<td>Aller et retour à 6 ou 7 déplacements .</td>
<td>106.298</td>
<td>1.600.905</td>
<td>15,06</td>
<td>14</td>
<td>1.488.172</td>
<td>22.412.670</td>
<td>15,06</td>
</tr>
<tr>
<td>» 12 déplacements .</td>
<td>903</td>
<td>53.322,5</td>
<td>59,05</td>
<td>24</td>
<td>1.806</td>
<td>1.270.740</td>
<td>59,05</td>
</tr>
<tr>
<td>Total .</td>
<td>108.440</td>
<td>1.657.785</td>
<td>15,29</td>
<td>—</td>
<td>1.498.651</td>
<td>23.717.312</td>
<td>15,29</td>
</tr>
<tr>
<td>Total général .</td>
<td>1.585.134</td>
<td>40.812.437</td>
<td>25,76</td>
<td>—</td>
<td>16.325.445</td>
<td>311.784.121</td>
<td>19,10</td>
</tr>
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</table>
travel was characteristic for a round trip once a week. **Graph 1** details that a majority of wage workers requested a cheap railway subscription for a journey between 6 and 10 kilometres during the three sample months. Distances up to 25 kilometres were also popular. The category of 25 to 30 kilometres almost matched the demand for 1 to 5 kilometres, thus balancing each other. From graph 1 therefore spins the conclusion that most wage workers opted for proximity while some commuters used the geographical reach of the railway network to its full extent.

Ernest Mahaim’s observation that proximity mattered in the home-work split around 1910 is confirmed by two other official sources. Whilst the annual report of the Belgian State Railways published an average distance of 18.8 kilometres for cheap railway subscriptions used by wage workers in 1908, the data of the industrial census composed in 1910 revealed that 80 percent of the commuters restricted their home-work split to the same canton or even to a neighbouring municipality. In sum, the spatial analyses of empirical data by contemporaries demonstrate that proximity rather than long-distance travel described the commuting flows on the Belgian railway network, which nonetheless had fulfilled its promise of delivering the time-space contraction aligning with a national labour market in 1910.

4.3 Demand for cheap railway subscriptions on an annual basis
Wage workers who took the train to work had to renew the cheap railway subscription every week, regardless of the formula supported daily or weekly commute. Therefore, the number that the railway administration published in their annual reports, namely the number of cheap railway subscriptions requested by wage workers each year, is only informative about the number of railway commuters if the wage workers renewed their cheap railway subscription 52 times a year. Finding out whether this hypothesis corresponded to reality, made Ernest Mahaim examine the names that were written on cheap railway subscriptions issued in twenty stations in the year 1908. Two criteria guided the selection of these stations: the stations had to be evenly distributed over the nation and the station had to be an important distribution points of cheap railway subscriptions for wage workers. The outcome of this exercise is depicted on **map 5**, whereby the twenty station together met 9.5 percent of the national demand for cheap railway subscriptions in 1908. After going through the names, 35,999 wage workers employed in the private industry were counted who had requested 518,532 cheap railway subscriptions in the

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261 *Chemins de fer de l‘Etat, compte rendu 1908, A (33); Demain, Migrations ouvrières, 1919, 33*. The industrial census of 1910 will be discussed in depth in chapter 3.
262 As this obligation differed for wage workers who were employed by the Belgian State Railways and they were small in numbers, Ernest Mahaim excluded them from his calculations.
Graph 1 quantifies the different distance categories printed on the cheap railway subscriptions asked for by Belgian wage workers during the months May, June and July 1908. The vertical axis gives the distance category whilst the horizontal axis shows the number of subscriptions. (source: Mahaim, Abonnements d’ouvriers, 1910, 54-5)
Map 5 depicts the spatial distribution and size of railway subscribers for twenty major departure stations in 1908. With a number of 3,078 railway subscribers, most wage workers departed from Bruges whereas Gembloux had the smallest number. (source: Mahaim Abonnements d'ouvriers, 1910, 43)
twenty railway stations, thus translating in an average demand of 14 subscriptions per wage worker per year. Put differently, wage workers departing from stations for which Ernest Mahaim had “no reason to believe they were more or less likely to stimulate commuting” took the train to work 14 weeks a year.\textsuperscript{264} Prudence advised Ernest Mahaim to uplift the average use of 14 cheap railway subscriptions by a single wage worker to 20 weeks per year, which made at least 20 percent of all wage workers commuters in 1908.\textsuperscript{265} His main conclusion, however, was that year-round commuting was the exception rather than the rule.

Moreover, nearly 19 percent of the registered 35,999 names returned only once in the data. This encouraged Ernest Mahaim to take his empirical study to the next level by zooming in on one station. This time, the station chef of Leuven was requested to keep track of railway commuting from May 1908 till April 1909.\textsuperscript{266} Again, Ernest Mahaim asked himself if Leuven was the odd one out, yet, his data claimed otherwise.\textsuperscript{267} The exercise revealed that 25 percent of the subscribers used the formula most in demand, i.e. six round trips a week, one time during the entire year whilst only 2 percent demanded a cheap railway subscriptions for 52 weeks. The station staff found the discontinuity in railway commuting easy to explain: those searching for employment or those sent out by their boss to work in various places needed just one week a cheap railway subscription while others alternated between railway commuting and periods of industrial unemployment. The periods of unemployment were either voluntary, to take care of the rural property at home, or involuntary, due to accidents or illness. Ernest Mahaim interpreted the irregularity in railway commuting as follows: the rural dweller “does not travel for pleasure, no matter how cheap the railway subscriptions are. In principle, the rural dweller prefers to stay at home, yet the dependence on the railway network for finding work and bread is immense, even if rural households only used it on a periodical basis”.\textsuperscript{268} He added that the system of cheap railway subscriptions therefore rendered the rural population a huge service.

Even though the empirical data of liberalist Ernest Mahaim aptly demonstrated that few wage workers used cheap railway subscriptions all year round, no agreement existed on the exact number of weeks in which railway commuting provided for a household’s livelihood. Socialist Emile Vandervelde proposed an average of 30 à 35 subscriptions per wage worker per year.\textsuperscript{269} Jesuit Henri Demain, in spite of his reference to Ernest Mahaim’s estimation, still claimed that
wage workers commuted all year round as they obviously needed an income every day.\textsuperscript{270} Henri Demain, however, made room for two exceptions: first, the presence of wage workers who lived in urban agglomerations, but were occasionally sent by their bosses to serve customers further afield and, second, seasonal wage workers.\textsuperscript{271} Related to the latter, he mentioned brickmakers whose season ran from April to September and female wage workers cleaning vegetables in canned food factories during winter. He also included the opposite phenomenon of seasonality: masons and earthworkers who were without a job from December till February. With these exemptions in mind, his estimation centred on a minimum use of 40 cheap railway subscriptions per wage worker per year.

Another observation puzzled Ernest Mahaim: the use of cheap railway subscriptions by wage workers failed to produce a cyclical pattern on an aggregated level despite the link with seasonal labour, as the four sample years in graph 2 display.\textsuperscript{272} Emile Vandervelde collected the data per month for the year 1901, with Ernest Mahaim carrying out the same exercise for the years 1906, 1907 and 1908.\textsuperscript{273} To correct the numbers for the four months a year that contain five week-ends, the number of subscriptions were divided by the number of Sundays per month. Consequently, the graphs show the average demand for cheap railway subscriptions per week. Though this lack of seasonality in the irregular use of cheap railway subscriptions recommends further investigation, it does emphasis the agency of household for giving selective answers to structural policies.

5 Labour mobility and livelihood to grasp commuting patterns
The quantitative data Ernest Mahaim collected on railway commuting on a national scale for the months January and July 1906 showed that almost all Belgian municipalities had a station in its vicinity where wage workers took a train to work. Combined with Ernest Mahaim’s estimation that at least one fifth of the wage workers were railway commuters in 1908, it can be concluded that the railway policies to establish a rural-urban continuum that kept the population dispersed over villages, towns and cities had paid off. Or, the activation of railway technology to deal with the friction of distance landed in mobility flows that connected urban labour markets with rural villages. Yet, Ernest Mahaim’s observations on travel distance and the demand for cheap railway subscriptions by wage workers simultaneously call for a critical reflection on the idea that giving

\textsuperscript{270} Demain, \textit{Migrations ouvrières}, 1919, 63.
\textsuperscript{271} Demain, \textit{Migrations ouvrières}, 1919, 64.
\textsuperscript{272} Mahaim, \textit{Abonnements d’ouvriers}, 1910, 57-62.
\textsuperscript{273} Vandervelde, \textit{L’exode rural}, 1903, annex IV; Mahaim, \textit{Abonnements d’ouvriers}, 1910, 58-60.
Graph 2 brings the absence of seasonality in the picture by giving, per month, the average weekly demand for cheap railway subscriptions by wage workers and this for the sample years 1901, 1906, 1907 and 1908. (sources: for 1901: Vandervelde, L’exode rural, 1903, 301, annexe IV; for 1906, 1907 and 1908: Mahaim, Abonnements d’ouvriers, 1910, 58-60)
wage workers access to the railway network alone sufficed to make the labour force mobile. First, the distance wage workers were allowed to cover by train was unlimited. Nevertheless, 6 till 10 kilometres had the preference, as graph 1 detailed. Even with popular distances being stretched to 25 kilometres, the data still question the hypothesis that people travel further simply because transport technology allows them.\textsuperscript{274} Second, the periodical use of cheap railway subscriptions by wage workers opposes the idea that the friction of distance alone needed to be solved for rural households to participate in urban and industrial labour markets. The observed discontinuity in railway commuting is also at odds with macro-economic push-pull models that emphasise “economic disparities between the place of origin and of the destination” as driver of labour migration.\textsuperscript{275} Indeed, if “push and pull conditions at macro level were a main determining force of migration change” whilst industry had replaced agriculture as largest employer in Belgium on the eve of the First World War, railway commuting should have been a labour practice exercised all year round.\textsuperscript{276} So, how did shifting labour markets interact with transport technology that brought faraway places nearby?

5.1 Average travel distance and industrial branch
According to the commuting data published in the industrial and commercial census of 1910, wage workers who earned an income in the mines, in metallurgy or on construction sites were willing to travel over prolonged distances whereas textile, food and paper industries as a rule attracted wage workers who lived nearby.\textsuperscript{277} The data on the professional activities of railway commuters in January and July 1906, which Ernest Mahaim had at his disposal, also shows an entanglement of industrial branch and commuting distance.\textsuperscript{278} During those two months, the chefs of the access points to the public railway network were asked to record a commuter’s occupation and assigned it to one of the following six categories: mines, heavy industry, construction, public works, others or employee of the Belgian State Railways. As implied by the label, ‘others’ was a residual category: next to the dockers in Antwerp, it embraced a wide range of professions that were exercised in various industrial branches spread over cities and towns.\textsuperscript{279} Knowing that these labour markets were located in urban places, adds explanatory value to the spatial pattern of the stations where this type of railway commuters took the train to work (map

\begin{flushleft}
\textsuperscript{274} Banister, “Sustainable mobility paradigm”, 2008, 73.  
\textsuperscript{275} (quote) Winter, Migrants and urban change, 2009, 10.  
\textsuperscript{277} Demain, Migrations ouvrières, 1919, 33.   
\textsuperscript{278} Mahaim, Abonnements d’ouvriers, 1910, 101-107.  
\textsuperscript{279} Mahaim, Abonnements d’ouvriers, 1910, 102-103. 
\end{flushleft}
Indeed, it explains the size of the circles near Brussels and Antwerp. For instance, Antwerp’s functionality as distribution node in flows or tradeable goods was boosted by the second industrial revolution (1896-1910), whereby the expansion of the port triggered a heightened demand for dockers.\footnote{Grauwels e.a., \textit{Hedendaagse economische geschiedenis}, 2011, 49.}

If map 6a is placed next to the departure stations of the mine workers on map 6b, then an invisible wall imposed on the landscape by Antwerp’s port almost seems to block the appeal of the mine industry whose location is also well-known. Whereas the coal basins of the Borinage (near Mons), the Centre (between Mons and Charleroi), Charleroi and Liège occupy the horizontal Walloon axis from west to east, a fifth coal basin is situated in the Limbourg province.\footnote{Caestecker, “Arbeidsmarkstrategieën”, 2008, 312.} Because the exploitation of the latter started as late as 1917, it follows that mine workers commuting in the months of January and/or July 1906 went to the coal basins in the Walloon axis.\footnote{Caestecker, “Arbeidsmarkstrategieën”, 2008, 31; Grauwels e.a., \textit{Hedendaagse economische geschiedenis}, 2011, 52.} Besides, to make the picture complete, the crowded workman trains riding on the private line of \textit{Compagnie du Belge-Nord} between Namur and Liège, as Ernest Mahaim observed during his research, have to be mentally added to map 8b. This results in a geography displaying a mix of proximity and long-distance commuting. Indeed, the yellow dots clustering in and near the industrial axis linking Mons over Charleroi and Namur to Liège and Verviers foreground proximity as prominent feature of the commuting flows while the circles scattered over the nation expose that the tentacles of the Walloon coal basins reached deep into the Flemish countryside.

The horizontal Walloon axis complemented by the vertical ABC-axis linking Antwerp over Brussels with Charleroi was simultaneously a major destination for railway commuters classified under ‘heavy industry’.\footnote{Grauwels e.a., \textit{Hedendaagse economische geschiedenis}, 2011, 39-40.} This category assembled all factory workers. As \textit{table 2} displays, it also had the highest number of cheap railway subscriptions.\footnote{Mahaim, \textit{Abonnements d’ouvriers}, 1910, 102.} While making again an image of the workmen trains on the private line of \textit{Compagnie du Belge-Nord} and projecting them on map 6c, proximity and long-distance commuting mingle, but a restricted home-work split appears to prevail. Due to the multitude of locations where wage workers were in demand to build a house or construct a railway segment, formulating an informed statement on origin-destination patterns for the categories ‘construction’ (map 6d) and ‘public works’ (map 6e) is difficult. Overall, however, the origin-destination patterns streamlined by professional activity in the empirical data amplifies the argument that unfolded when analysing the distances that were
Map 6a shows the stations where wage workers with an occupation in the residual category 'others' took the train to work in January and July 1906.

With 5,950 cheap railway subscriptions, Kapellen near Antwerp ranks first.

Map 6b shows the stations where wage workers with an occupation in the category 'mine' took the train to work in January and July 1906.

With 2,475 cheap railway subscriptions, Gastuche near Waver ranks first.

(source: Mahaim, Abonnements d’ouvriers, 1910, annexe II)
Map 6c shows the stations where wage workers with an occupation in the category 'heavy industry' took the train to work in January and July 1906.

With 5,241 cheap railway subscriptions, Halle near Brussels ranks first.

Map 6d shows the stations where wage workers with an occupation in the category 'construction' took the train to work in January and July 1906.

With 4,325 cheap railway subscriptions, Sint-Genesius-Rode near Brussels ranks first.

(source: Mahaim, *Abonnements d’ouvriers*, 1910, annexe II)
Map 6e shows the stations where wage workers with an occupation in the category 'public works' took the train to work in January and July 1906.

With 2,850 cheap railway subscriptions, Terhulpen near Waver ranks first.

(source: Mahaim, *Abonnements d’ouvriers*, 1910, annexe II)

Table 2 gives the numbers that go with the different occupation categories displayed on the five maps. Hereby, ‘mineurs’ = mine, ‘usines’ = heavy industry, ‘bâtiment’ = construction and ‘terrasiens and manoeuvres’ = public works.

(source: Mahaim, *Abonnements d’ouvriers*, 1910, 103)
written on the cheap railway subscriptions wage workers requested nationwide during the months May, June and July 1908: proximity as the upper hand in railway commuting, but was complemented by long-distance travel, in particular in the mine industry and metallurgy. The observation is again noteworthy as it is generally assumed, both in past and current studies, that the introduction in 1896 of a new formula for cheap railway subscriptions, which gave wage workers permission to commute over an unlimited distance once a week, explains why railway commuting soared after 1895.285

5.2 The value of a simple graph
This cause-consequence relation between long-distance commuting once a week granted by the railway administration in 1896 and the marked rise in demand for cheap railway subscriptions by wage workers after 1895 was so firmly rooted in common narratives that it even led to the erroneous belief that Catholic minister Jules Vandeperreboom had introduced the workmen train.286 The mistake intrigued Ernest Mahaim because it was no secret that the administration of liberal minister Alexandre Jamar had been the first to issue cheap railway subscriptions for wage workers.287 His empirical data questioned the assumption too. For instance, 77 percent of the wage workers who took the train to work in Leuven station during May, June and July 1908 asked for six round trips a week and covered 17.7 kilometres on average.288 Similar, the visualisation on map 5 of the cheap railway subscriptions per departure station that supported either daily or weekly commute per departure station in the months January and July 1906, delivers a spatial pattern that is dominated by daily labour mobility. The near absence on the same map of departure stations in the peripheral provinces of Limbourg and Luxembourg represents an additional argument.289 The annual reports of the Belgian State Railways also debunk the cause-consequence between weekly commute and surge in labour mobility.

The figures that give the annual distribution of cheap railway subscriptions for wage workers for the year 1870 till 1908, published by Ernest Mahaim in his study on the societal effects of railway commuting, are shown in graph 3.290 Splitting this annual demand in daily and weekly displacements, whereby the green colour exposes the former whilst the blue colour exhibits the magnitude of the latter, immediately reveals that daily displacements by far exceeded the

286 Mahaim, Abonnements d’ouvriers, 1910, 3.
288 Mahaim, Abonnements d’ouvriers, 1910, 50, 52. See also table 1 under 4.2 Travel distance.
289 Further investigation is needed to extend the argument to the province of West-Flanders due to the numerous private railway lines covering this peripheral area (figure 1).
290 Mahaim, Abonnements d’ouvriers, 1910, 35-36.
Graph 3 displays the number of cheap railway subscriptions that the Belgian State Railways issued each year from 1870 to 1908, divided according to the subscription supporting daily or weekly commute. (source: Mahaim, Abonnements d’ouvriers, 1910, 35-36)
number of cheap railway subscriptions demanded for a round trip once a week. Hence, juxtaposing the magnitude of daily and weekly displacements on the railway network renders the conclusion that weekly travel effectively added to the marked expansion in labour mobility from 1895 onwards without being responsible for it. Why then is this link between weekly commute and increased railway commuting so widespread? Arguably, the fact that the two phenomena occurred simultaneously combined with a theorised causality needed to activate transport infrastructure as spatial tool to make the home-work split part of labour markets, comes a long way in providing an answer.

Indeed, the Belgian state representatives decided to “root workers in their own homes in countryside villages to maintain both the status quo of small landholdings in rural areas and social stability in cities” to remedy the societal problems associated with the unprecedented concentration of people in nineteenth-century cities.\footnote{De Block and Polasky “Rural-urban continuum”, 2011, 320-321.} Hence, the introduction of a formula for weekly commute in 1896 as part of a series of adjusted regulations embedded in the cheap railway subscriptions for wage workers to expand the labour mobility of rural households.\footnote{Schepers e.a., “Organising the work-home split”, 2020, 106.} Next to developing the railway network in such a way that place-connectivity and travel times enabled decentralised living and working physically, the societal benefit of the policy had to be defended. Hence, policy makers emphasised that railway commuting combined the best of both worlds: it gave rural households access to the higher wages paid by industrial and urban employers while preserving their access to a plot of land for growing vegetables and perhaps keep some livestock in their home villages.\footnote{De Block and Polasky, “Rural-urban continuum”, 2011, 321.} Based on this premise, rural households turned to commuting the moment their village was integrated in the railway network. Hence, the inhabitants of villages in remote parts of Belgium started to commute as soon as the formula of weekly commute brought the best of both worlds within geographical reach of these rural households, with the simultaneous occurrence of weekly commute and surge in labour mobility proving the premise. Or, the eagerness of rural households to participate in industrial and urban labour markets was the principle the Belgian government needed to let their envisioned rural-urban continuum materialise in the landscape.

5.3 Scrutinising the policy discourse from the perspective of a rural household
In the minds of decision makers, in a period when an agrarian world structurally shifted in an industrial society, railway commuting was indeed conceived as an asset for rural households by transforming “agricultural labourers and farmers into industrial workers without forcing them
to leave their ancestral villages”. The top-down policy to prevent the countryside from depopulation, therefore, followed the logic of the macro-economic push-pull model: it was the destiny of rural households to participate in urban or industrial labour markets, regardless if the structural shift towards an urban society pulled the rural dweller in industrial labour owing to the appeal of higher wages or that it pushed the rural dweller into these labour markets due to the lack of local job opportunities. However, the spatial economic disparities that drives the explanatory value of the macro-economic push-pull model falls short in elucidating the periodical use of cheap railway subscriptions by wage workers at the eve of the First World War. With the decisive move towards an industrial society having been taken in the closing years of the nineteenth century, railway commuting should have been a year-round labour practise in Ernest Mahaim’s study. Instead, his empirical data expose that the majority of rural households commuted on their terms.

Steve Hochstadt’s book *Mobility and modernity: migration in Germany, 1820-1989* is inspirational for getting to the bottom of this observation. He recommended a line of research in which the perspective of “the peasant family, the cottage weaver, or the farm labourer” is elaborated upon to debunk the conventional assumption in migration literature that peasants jumped at the ‘opportunities’ cities offered them to escape a stifling, backward existence in their villages. Even though German peasants were unable to influence the international forces of economic change, they still retained important elements of choice in what Steve Hochstadt described as their “resistance to modernity”. Charles De Zuttere also exposed in his study on the Belgian cottage industry of rope-making that modernity and technology as synonyms of economic prosperity met with resistance in the minds of rural households. In spite of a station giving the rope makers of Hamme, a village in the province of East Flanders, easy access to the agglomerations of Antwerp, Brussels and Ghent as early as 1875, they only began making railway commuting part of their livelihoods at the onset of the twentieth century. This chronology thus suggests that the exodus of wage workers to urban centres, coal mines and public works became part of daily life only when mechanised production had finally made handmade produced ropes obsolete.

When he emphasised the preference of rural dweller to stay at home, Ernest Mahaim

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296 See 4.3 Demand for cheap railway subscription on an annual basis.
likewise turned his attention to rural households to grasp why cheap railway subscriptions were only periodically used.\textsuperscript{300} By simultaneously stressing the dependency on urban and industrial labour markets to sustain a rural household’s members, even on a periodical basis, he, consciously or unconsciously, touched upon the widespread practice of ‘income pooling’ or ‘multiple job holding’.\textsuperscript{301} For centuries, putting bread on the table by working on the fields required balancing agrarian activities with other sources of income, like cottage industry or working for a boss, whereby the additional sources of income were the ones to alter through time so that the livelihood retrieved from agrarian activities was ensured.\textsuperscript{302} Consequently, Anne Winter argued while relating income pooling as “key mechanism in the survival policy of the rural population” to the structural layer of the macro-economic push-pull model, higher wages to be earned elsewhere had to accord with the activities the household as a whole relied upon to maintain a livelihood.\textsuperscript{303} Because the safeguarding of cities “from disease, revolt and an unstable labour market” was at the forefront of the political agenda of the home-work split instead of the benefit of rural households, as Greet De Block and Janet Polaksy stated, policy makers had little interest in asking why rural households commuted.\textsuperscript{304} Fortunately, luck was with the historian, as Ernest Mahaim wanted to know.\textsuperscript{305}

5.4 Six types of commuters

Of the six types of commuters Ernest Mahaim discerned based on his interviews with wage workers, only three categories contained wage workers who saw commuting as a way of life in alignment with the picture decision makes painted. Some wage workers were born in the countryside and travelled to work on a daily basis, others commuted because they had decided to trade the city for the countryside whilst a third type lived near the work during the week but travelled to their home villages in the weekend. A fourth category consisted of skilled workers who were sent off by their bosses to help clients scattered over the entire nation; worker-farmers labouring on the land in summer and on industrial sites in winter made up the fifth category whereas the sixth category corresponded with farmers who were bound by the land and commuted only when in dire need. The distinction between six categories of commuters alone

\textsuperscript{300} Mahaim, Abonnements d’ouvriers, 1910, 48. See also 4.3 Demand for cheap railway subscriptions on an annual basis.


\textsuperscript{302} De Moor, “Landarbeiders”, 2001, 28.


\textsuperscript{304} De Block and Polasky “Rural-urban continuum”, 2011, 321.

\textsuperscript{305} Mahaim, Abonnements d’ouvriers, 1910, 139-143.
questions the policy claim that the home-work split benefited all rural households: rather, some rural households were in favour of combining the best of both worlds whereas others considered it a plight. Moreover, the variegated strategies households deployed for integrating railway commuting in their labour practices, underlines the agency rural households held in making a living, even when rural economies were progressively replaced by large-scale production and market exchange.

The six commuter categories emerged from visiting households who lived in villages and suburbs scattered over the provinces of East-Flanders, Antwerp, Limbourg and Liège.\textsuperscript{306} The fact that the last three commuter categories made railway commuting an irregular income resource, expands the geographical scope of the observations done in the station of Leuven from May 1908 till April 1909.\textsuperscript{307} In all likelihood, the difference in magnitude between the small amount of wage workers who commuted all year round and the majority who took the train to work only a few weeks a year, is extendable to the six commuter types as well. Yet, what has induced further inquiries in this research, is the rural plot of land that Leuven’s station chef mentioned as reason for abstaining from all-year-round commuting because it resonates with the best-of-both-worlds argument stressed in policy discourse. Indeed, for rural households who complied with the top-down intended rural-urban continuum by making commuting their way of life, it was the combination of a vegetable garden with higher industrial wages that did the trick with having one’s family near in a healthy and cheap countryside as a bonus.\textsuperscript{308} For the rural households who commuted on a periodical basis, access to a plot of land was the bedrock of income pooling strategies, even to the degree that a household’s lifecycle reflected the preference for land over wages. For example, in Lorcé, a village in the south of the province Liège, the father commuted whilst the mother and the children tended after the land. This labour division changed when the children were old enough to find a job in the factory, the mine or at the public works; from that moment on, they took the train to work whilst the father returned to the fields.\textsuperscript{309} This centrality of land in the livelihoods of rural household is discussed in more detail in chapter two. Here, the impact of a maturing industrial and commercial society on railway commuting as income pooling activity of rural households has the attention.

\textsuperscript{306} In the province East-Flanders: the environment of Aalst, a suburb of Geraardsbergen and the village of Beveren-Waas; in the province Antwerp: the suburb Edegem; in the province Limbourg: the villages of Gelinden and Mechelen-Bovelingen; in the province Liège: the village Lorcé and Hermalle-sous-Argenteau.
\textsuperscript{307} See 4.3 Demand for cheap railway subscriptions on an annual basis.
\textsuperscript{308} Mahaim, \textit{Abonnements d’ouvriers}, 1910, 140.
\textsuperscript{309} Mahaim, \textit{Abonnements d’ouvriers}, 1910, 141.
5.5 The gravity pull of a small plot of land for ‘growing vegetables’

The shock waves that the subsistence crisis of the 1840s and the agrarian crisis of the 1880s sent through rural economies forced rural households to reorganise their income activities.\(^{310}\) Migration to places where prospects are better is an often deployed mechanism when exogenous factors put a severe restrain on a household’s livelihood.\(^{311}\) In the era of steam and steel, these opportunities were to be found in the labour markets that developed in the rhythm of industrial production and market exchange as motors of economic growth, thus triggering a rural exodus towards urban locations and industrial sites.\(^{312}\) Accordingly, migration levels rose to unseen heights after 1850, as geographer Wilbur Zelinsky exposed and for which historians Jan Lucassen and Leo Lucassen credited him.\(^{313}\) Notwithstanding, historical research demonstrated that in this migration drift “mobility patterns were much more complex than a one-off transfer of the population from the countryside to cities” as the decision to migrate is always selective.\(^{314}\) Therefore, to get a grip on the wide variety of migration flows, a meso-level for highlighting social networks and information channels, and a micro-level for elucidating the characteristics of household and individuals, enriched the explanatory value of the macro-economic push-pull model.\(^{315}\)

Nonetheless, within this explanatory framework, two basic assumptions of the macro-economic push-pull model remained untouched. First, as local employment opportunities fell short, in particular during periods of crisis, due to the structural transition to an industrial society, rural households sooner or later had to leave the countryside, even if higher wages failed to attract them. No wonder then that Nick Deschacht and Anne Winter were surprised to retrace in their empirical data an “overall modest migration response to the subsistence crisis of the 1840s” in Flanders.\(^{316}\) Second, it is considered to be as trivial as it is true “that people move with an eye to better opportunities than they had or expected to have where they were”.\(^{317}\) If the goal of migration is to search for a better live elsewhere, than perceiving return migration as a failure is logical. Moreover, exposing in empirical studies that “return migration reflects unskilled labourers in particular” while explaining it by “[them having] based their decision to move on incomplete or inaccurate information” was bound to strengthen the idea that return migration


\(^{312}\) Neven, “Retourmigratie in een plattelandssamenleving”, 2004, 49.

\(^{313}\) See Introduction.


indicated a failed enterprise. For Steve Hochstadt, on the contrary, return migration was “neither an irrational nor an ignorant choice, as many modern social scientists assume, but rather a typical one”, with the gravity pull radiating from “a tiny plot of land”. As such, the village became the anchor point in a rural household’s livelihood with the mechanism of income pooling sending rural dwellers to other locations whilst preserving their access to land.

After discovering that immobility rather than migration was the answer the population in the Flemish countryside gave to the 1840s subsistence crisis, Nick Deschacht and Anne Winter strengthened the thesis of Steve Hochstadt by emphasising the “relatively strong ties to the land” in their conclusion. Similar, the conclusion Muriel Neven drew from her empirical analysis of return migration in the land of Herve during the nineteenth century appears to attune with Anne Winter’s above mentioned statement on income pooling balancing the activities of all household members, as she stated that the glue that brought migrants back to their villages consisted of family ties. Moreover, the family with the greatest appeal was born in the area and possessed a small rural exploitation. Or, as Steve Hochstadt aptly summarised: “From the perspective of the peasant village, the historical observer sees migrants leaving temporarily so they can come back permanently.”

5.6 The structural shift towards industrial and urban labour markets

Importantly, Steve Hochstadt linked return migration as a typical choice of rural households, rather than an ignorant or irrational one, to the structural transition from an agrarian world to an industrial and commercial society. Without denying that this structural transformation had a sectorial shift in labour markets as its companion, the spotlight was placed on the substantial increase in demand for seasonal and temporary wage workers, both in city and countryside, precisely because of the rise in mechanised production and commercialisation. Edmond Ronse quoted a certain M. Lair in his publication on seasonal emigration, thereby informing his readers at the turn of the twentieth century that the intention to raise agricultural output led to an increased demand for rural wage workers and, in its wake, migration flows. Steve Hochstadt explained this mechanism by combining the fact that agriculture “is inherently a seasonal labour process determined by soil, crops and climate” with “the several forces of change” that were

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319 Hochstadt, Mobility and modernity, 1999, 214.
320 Deschacht and Winter, “Rural crisis or rural exodus?”, 2015, 47-48.
322 Hochstadt, Mobility and modernity, 1999, 214.
324 Ronse, L’émigration saisonnière, c. 1913, 55.
brought into the agrarian production process in the course of the nineteenth century. For him, the “most fundamental was the changeover from extensive to intensive cultivation”. Indeed, feeding a growing number of inhabitants required a more productive agricultural system. Consequently, the extensive exploitation of the soil, keeping seasonal unemployment at bay, was replaced by an intensive cultivation of the land, causing peaks in labour demand at certain times of the year when nature’s cycle puts planting, tending and harvesting on the agenda.

A prime example of this mechanism is the cultivation of sugar beets. This agricultural product reached the shores of the European continent thanks to Napoleon Bonaparte whose ban on British imports (1806-1814) had turned cane sugar in an unavailable sweetener for his subjects. The defeat of Napoleon Bonaparte in 1815 ushered in a bleak period for sugar beets as the change on the political stage reopened the European borders for cane sugar. The cultivation of sugar beets, nonetheless, found its second breath shortly after Belgium’s claim to independence in 1830 owing to the provisional government’s favourable tax regime. The intensive cultivation of sugar beets concentrated the field work for sugar beets in the months April till September, with the advancement of technology shortening the number of workdays from 150 in 1850 to 70 after 1900. October as the harvest month for sugar beets meant that processing the agricultural staple in the factories provided job opportunities during the winter months, which in the nineteenth century stood for employment until February and after 1900 till January. Seasonality in industrial production still left its traces in the archive of the National Light Railway Company when the board of directors discussed the so-called beet campaign in the 1940s that involved the deployment of extra trams on light rails to let sugar beets flow from the fields into the factories.

In sum, even though seasonal labour was all but new in the age of industrialisation, “rural labour markets [becoming] seasonalised to an unprecedented extent as a result of the intensification of agricultural production” altered its societal impact decisively. For the system of seasonal peaks to land in an industrialising society, two structural conditions had to be met: first, industrial employment had to permit rural household’s to fill in the time laps between

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325 Hochstadt, Mobility and modernity, 1999, (quote 1) 189, (quote 2), 190, 189-196.
326 Hochstadt, Mobility and modernity, 1999, 190.
327 Ronse, L’émigration saisonnière, c. 1913, 55; Hochstadt, Mobility and modernity, 1999, 189-196. See also Boltvinik, “Poverty and persistence”, 2016, 49.
328 Draye, Tiense suiker en de IJzerenweg , 2016, 14-15.
329 Hochstadt, Mobility and modernity, 1999, 191.
330 Hochstadt, Mobility and modernity, 1999, 204.

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peaks of agricultural labour demand and, second, unskilled labour still had to be in high demand despite a mechanised production process. Indeed, for wage workers to easily switch between occupational activities, muscular strength had to be a constituent part of different labour markets. Hilde Greefs and Anne Winter state that particularly in the early years industrialisation was a labour-intensive affair. Their statement resonates with the national survey the Belgian government ordered in 1886 to inquire the working conditions of the industrial labour force after a wave of violent strikes had broken out in the industrial regions. According to this historical source, the process of mechanisation advanced slow, making physical strength still a prominent feature on industrial production sites. Similar, Alfred Kelley translated a book having the rare autobiographies of wage workers at the end of the nineteenth century as its subject matter. Next to demonstrating the enduring shift from one occupational activity to another on a wide range of labour markets as common experience of the German labour force, Alfred Kelly not only stressed that “many of those who worked in cities lived on, or maintained contact with, the surrounding countryside, sometimes working part of the year in agriculture”, but also warned not to let “increasing mechanisation obscure the continuing importance of brute strength”. In the years leading up to the First World War, Ernest Mahaim still identified unskilled labour as a feature of industrial and urban labour markets, with commuters arriving from the countryside being mainly unskilled whilst skilled wage workers travelled in the opposite direction or between cities and towns.

This sustained demand for unskilled labour despite a dynamic of industrialisation and market exchange that profoundly reshuffled nineteenth-century labour markets thus permitted rural households to continue their practice of income pooling built around a plot of land. For example, the collapse of the linen industry in the subsistence crisis of the 1840s forced rural households to replace cottage industry with an alternative source of income. As it turned out, seasonal labour offered a way out. Luc Schepens, for instance, linked the acceleration in seasonal migration from West-Flanders to France to the structural impact the 1840s crisis had on the textile industry in urban as well as rural labour markets. Emile Vandervelde too remarked that these so-called Franschmans significantly expanded in numbers after the 1840s crisis, adding that this migration pattern was most apparent in the villages belonging to the dispersal area of

336 Mahaim, “Cheap railway tickets”, 539.
337 Ronsijn, Commerce and the countryside, 2014, 161-166.
the former textile cottage industry.\textsuperscript{339} To be complete, the blow the textile cottage industry suffered was severe, but the economic activity in reduced form held its ground, even literally: the highest concentration of domestic textile production was still to found in the provinces of East-Flanders and West-Flanders in 1910.\textsuperscript{340} The agrarian crisis of the 1880s was another contribution to the “the structural disintegration of the rural livelihoods” during the long nineteenth century.\textsuperscript{341} The massive import of agricultural products from America, India, Australia and Russia let food prices on Western European markets plummet so that “the survival of Belgian agriculture itself was endangered”.\textsuperscript{342} This time, the Belgian railway policy to establish a rural-urban continuum provided rural dwellers with the possibility “to migrate whilst staying at home at the same time”.\textsuperscript{343} As the economic crisis of the 1880s was a general one, the marked demand for cheap railway subscriptions by wage workers needed the labour markets of the second industrial revolution to materialise.\textsuperscript{344} In literature, the start of the second industrial revolution, energising more sectors and countries compared to the steam machine at the start of the nineteenth century, coincides with the year that a policy measure created the opportunity to commute on a weekly basis, being 1896.\textsuperscript{345} Therefore, with daily commute outweighing a roundtrip once a week in graph 2, the economic chronology amplifies the argument of this doctoral research that labour markets and livelihood have the preponderance over the ability of transport technology to deal with the friction of distance in Belgium’s governmental policy to install the home-work split.

In conclusion, using a transport-cum-mobility lens built the argument from Ernest Mahaim’s empirical data that access to land, no matter how small its size, was central to the livelihood of low-income households to secure access to food in times of unemployment. Whereas the structural transition from an agrarian to an industrial and commercial society before the welfare state landed, left the primordiality of cultivating land for most households living in the countryside untouched, it nevertheless impacted their mechanism of income pooling. As a consequence, new occupational activities on urban and industrial labour markets find their way into the livelihood of rural household first and foremost as an alternative for the income resources that the economic transition had erased. An eye-catcher in this dynamic is the shift from cottage industry to seasonal labour after mechanised production and enhanced

\textsuperscript{339} Vandervelde, \textit{L’exode rural}, 1903, 162.
\textsuperscript{341} Winter, \textit{Migrants and urban change}, 2009, 190.
\textsuperscript{344} (general crisis) Caestecker and Scholliers, “Belgische mijnen”, 2019, 1214.
\textsuperscript{345} Grauwels e.a., \textit{Hedendaagse economische geschiedenis}, 2011, 29, 49.
market exchange made manual production at home redundant. The complementary rhythm of peaks in demand for industrial wage workers and nature’s cycle of agrarian activities, explains why seasonal migration on such a scale was possible in the long nineteenth century whilst the fact that Belgium was a country of smallholdings clarifies the decisiveness of the shift.\footnote{The importance of smallholdings for grasping Belgium’s rural-urban continuum is demonstrated in chapter 2.} Another eye-catcher is the surge in demand for cheap railway subscriptions by wage workers after 1895. Again, an economic crisis had reshaped rural economies with new sources of income provided for by the second industrial revolution.

6 Periods of ‘mobility friction’

So, as soon as the perspective of the rural household is integrated in research on the impact of transport policies on urban morphology through mobility flows, the efficiency of transport technology to direct the mobility flows of people is nuanced by the influence of labour markets and livelihood without, however, refuting transport infrastructure as \textit{a conditio sine qua non} in making people mobile. Indeed, if the Belgian government had denied wage workers their access to the railway network, rural households were simply unable to blend wage work further afield with the plot of land at home. After all, as Colin Pooley so aptly pointed out: “transport is essential for all forms of movement.”\footnote{Pooley, “Transport, mobility and migration”, 2017, 252.} Therefore, it is necessary to put the argument of labour markets and livelihood to the test by giving the word back to transport policies and inquire if increasing the friction of distance by reducing the access to the railway network for wage workers translated in a relapse of railway commuting. First, the historical sources shedding light on the matter are introduced. Next, the access regulations and their expansion in time and space are discussed, followed by an examination of the actual impact these regulations had on the journey to work. To keep this exercise feasible, the station of Leuven serves as departure station, whereby the selection has been inspired by the choices Ernest Mahaim made in his study. Once all this information has been presented to the reader, a discussion of the empirical results starts.

6.1 Timetables and parliamentary proceedings to examine railway access (1891-1909)

Transport policies influence movement by deciding which places to integrate in the design of a transport network, and later, once the transport infrastructure has unfolded in the landscape, by regulating its use. Policy measures can encourage labour mobility, which in all likelihood was the reason of the 10 percent price reduction the railway administration passed through in 1897...
for all wage workers who used a cheap railway subscription.\textsuperscript{348} Notwithstanding, top-down regulations are equally capable of restricting access to transport infrastructure. It is the effect on labour mobility of the latter that constitutes the research topic of this part, with the timetables of the Belgian State Railways proving their value as historical source.\textsuperscript{349} Next to communicating departure and arrival times, these guides informed the reader on the trains and the trajectories that were subjected to access regulations. With 1896 as hinge year for railway commuting in mind, the years 1891, 1902 and 1909 have been chosen as sample years.

The data embedded in the timetables are enriched with the parliamentary proceedings of 28 November 1905 and 5 December 1905.\textsuperscript{350} They contain the interpellation of minister Juliean Liebaert by, among others, socialist Emile Vandervelde and priest Adolf Daens who spoke on behalf of the holders of cheap railway subscriptions and contested the harsh treatment of wage workers in the organisation of the train schedules. Although political debates by definition include speakers who defend their societal ideology, the proceedings nevertheless offer some valuable insights in the instrumental use of the railway network by the Belgian government.

6.2 Regulated train access

Whereas the regulations printed in the timetable of summer 1891 gave detailed information on the train trajectory, like unguaranteed connections or where luggage was to be registered, the timetable of summer 1909 first and foremost regulated access to the railway network. Users of a cheap railway subscription in particular were addressed, with the dividing categories being ‘ordinary’, ‘student’ and ‘wage worker’.\textsuperscript{351} None of the prohibitions published in the selected timetables had the students as target group, despite the identical argumentation for intervening in the train cost for students, granted in 1868, or for wage workers, made official a year later, namely the facilitation of mobility flows to support the reunion of the household’s members at evening.\textsuperscript{352} In contrast, some prohibitions implied restricted access to trains for ordinary

\textsuperscript{348} Mahaim, \textit{Abonnements d’ouvriers}, 44-45: diagram n° 1. To be complete, the additional demand in 1897 of more than 70,000 cheap railway subscriptions compared to 1896 likewise reflects the nationalisation of the private railway compagnie \textit{Grand Central Belge} in that year. At its peak, the \textit{Grand Central Belge} operated 605 kilometres with some of its trajectories supporting commuting flows between major origin-destination locations, like the railway line connecting the villages in the rural Campine and Hageland areas to the industrial basin of Charleroi.

\textsuperscript{349} \textit{Belgian State Railways, timetables: July?-September 1891; January?-April 1902 and July-September 1909.}

\textsuperscript{350} \textit{Annales parlementaires: chambre des représentants}, 28 November 1905, 5 December 1905.

\textsuperscript{351} \textit{Chemins de fer de l’Etat, compte rendu 1910, A (144)}.

\textsuperscript{352} \textit{Chemins de fer de l’Etat, compte rendu 1868, A (41)}.

« Le jeune population des écoles, des collèges, des universités, des conservatoires etc., a trouvé dans ce tarif un moyen de se déplacer à bon marché, pour venir, le matin, aux cours qu’elle fréquente et rentrer, le soir, au foyer de famille. »

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subscribers, or the holders of a retour ticket, but these regulations were never as detailed as those that had the wage workers as target group.

Indeed, prohibitions directed to the former group usually stipulated that it was forbidden to take a specific train in a certain station or, the exact opposite, to take only that one train in the designated station.\textsuperscript{353} For wage workers, these kind of regulations could include additional restrictions that pertained to the rest of the train trajectory, like a departure station that was linked to specific destinations so that taking a train in station A prohibited the wage worker to get off in station B, C and/or D. Sometimes, a train was inaccessible for wage workers on certain days. Some stipulations were a conundrum, like the ones addressing wage workers who used a cheap railway subscription to take a train in the station of Ruisbroek in the first months of 1902.\textsuperscript{354} These subscribers were not allowed to take the 18:05 train if they were to get off at Brussels-Midi, except on Sundays, Mondays and 1 April. Intriguingly, this regulation hardly limited their mobility as a special train departed in Ruisbroek station on the prohibited days at 18:13 with Brussels-Midi as sole destination. The distinction in access regulations according to target group structured international traffic too, as wage workers were \textit{de facto} forbidden to take a train that crossed the Belgian border whilst exceptions were granted to students.\textsuperscript{355}

The growing amount of pages in the timetables reveal that the number of trains riding on the railway network expanded between 1891 and 1909. Growth was likewise the term applicable for the regulations outlining railway commuting: \textbf{table 3} summarises the expansion per time block of the trains that had a regulation attached to them whilst \textbf{map 7a, 7b} and \textbf{7c} visualise their geographical expansion. In the summer of 1891, the private railway line of company \textit{Grand Central Belge}, connecting Antwerp via Leuven with Charleroi, was the only one to restrict the access for wage workers using a cheap railway subscription to pay for commuting.\textsuperscript{356} On this trajectory, a special workmen’s train brought commuters from Waver to Charleroi in the morning and transported them back in the evening, as dictated by the 1869 ministerial decree of minister Alexander Jamar that made cheap railway subscriptions for wage workers official. The train rode every morning and evening, except on Sundays and public holidays. The train stopped at every station underway to collect as many wage workers as possible. On Mondays and after a public holiday, the train left Waver station at 6:02 for a two-hour ride to Charleroi whilst on the other days the wage workers had to be in the station before 4:20 for a train journey that was an half hour shorter. In the evening, the flow of labour reversed with one train available

\textsuperscript{353} See for example \textit{timetable January?-April 1902}, 109: line 63 Oostende-Brugge-Roeselare-Lille-Paris.  
\textsuperscript{354} \textit{Timetable January?-April 1902}, 139: line 94 Londres-Calais-Lille-Tournai-Brussel.  
\textsuperscript{355} \textit{Timetables January?-April 1902}, 333 and \textit{July-September 1909}, 567: 404 Conditions d’accès dans les trains.  
<table>
<thead>
<tr>
<th>Year</th>
<th>Time Period</th>
<th>Number of Trains</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1891 (July-September)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morning</td>
<td>4:20 or 6:05</td>
<td>1</td>
</tr>
<tr>
<td>Evening</td>
<td>17:08 or 18:50</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td></td>
<td><strong>2</strong></td>
</tr>
<tr>
<td><strong>1902 (January-April)</strong></td>
<td>time period</td>
<td></td>
</tr>
<tr>
<td>Morning</td>
<td>4:52 and 8:06</td>
<td>15</td>
</tr>
<tr>
<td>Noon</td>
<td>12:11 and 15:45</td>
<td>6</td>
</tr>
<tr>
<td>Evening</td>
<td>16:38 and 19:54</td>
<td>19</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td></td>
<td><strong>40</strong></td>
</tr>
<tr>
<td><strong>1909 (July-September)</strong></td>
<td>time period</td>
<td></td>
</tr>
<tr>
<td>Morning</td>
<td>3:59 and 9:06</td>
<td>43</td>
</tr>
<tr>
<td>Noon</td>
<td>10:10 and 15:49</td>
<td>12</td>
</tr>
<tr>
<td>Evening</td>
<td>16:15 and 20:25</td>
<td>69</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td></td>
<td><strong>105</strong></td>
</tr>
</tbody>
</table>

Table 3 is an overview of the increase in size, time period and geographical scope of prohibitions drafted by the Belgian State Railways to regulate access to trains for wage workers holding a cheap railway subscription. (sources: Belgian State Railways, timetables: July-September 1891, January-April 1902 and July-September 1909)
Map 7a depicts the routes with access regulations for wage workers holding a cheap railway subscription in 1891 combined with major stations of arrival in 1908. (sources: Timetable July-September 1891; Mahaim, Abonnements d’ouvriers, 1910, 75)
Map 7b depicts the routes with access regulations for wage workers holding a cheap railway subscription in 1902 combined with major stations of arrival in 1908. (sources: Timetable January? - April 1902; Mahaim, Abonnements d’ouvriers, 1910, 75)
Map 7c depicts the routes with access regulations for wage workers holding a cheap railway subscription in 1909 combined with major stations of arrival in 1908. (sources: Timetable July-September 1909; Mahaim, Abonnements d’ouvriers, 1910, 75)
in Charleroi at 17:08 on Saturdays and prior to a public holiday whereas the other days the whistle blew at 18:50. In the evening, travel times corresponded with respectively one and a half hours and one hour and forty minutes. It has to be assumed that all other holders of the cheap railway subscriptions knew which third-class compartments were accessible for them as no other information about this topic was noted down in the 1891 timetable, although the 1869 ministerial decree explicitly stated that the administration of the Belgian State Railways had the task to assign specific third-class compartments to commuters belonging, as a rule, to the first morning train and one of the last trains to ride in the evening.  

The number of trains equipped with additional information for commuters, increased from two to forty in the timetable train passengers consulted in the first months of 1902. Amongst them were three special workmen’s trains that rode on the private railway line of Compagnie du Belge-Nord; yet, all the stations of departure and arrival were located in the North of France. The footnote that the private railway line of Compagnie du Belge-Nord added for the flows between Namur and Liège is also noteworthy, as it informs the commuter that the administration of the Belgian State Railways decided which trains were available for the holder of a cheap railway subscription without, however, being informative on the trains that were involved. The number of trains with an access regulation had risen again in the timetable for July, August and September 1909, this time to 105. As the three maps display, the growth in access regulations coincided with a geographical expansion that incorporated almost all major commuting destinations, whereby Ernest Mahaim deduced the importance of a station from the origin-destination relations printed on the cheap railway subscriptions that the railway administration issued for January and August 1908. So, both the growth in numbers and the locations the prohibitions affected create the expectation that the regulations imposed by the railway administration restricted the labour mobility of wage workers in a significant way.

6.3 The hardships endured by wage workers using a cheap railway subscription

The train schedule for Ruisbroek station illustrates that some of the access regulations hardly impeded the labour mobility of cheap railway subscribers. The fierce interpellation of minister Julian Liebaert in the parliamentary sessions of 28 November 1905 and 5 December 1905, on the

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357 Mahaim, Abonnements d’ouvriers, 1910, 8-9.
358 Timetable January?-April 1902.
359 Timetable January?-April 1902, 130-131: line 88 Tourcoing-Ascq-Orchies.
360 Timetable January?-April 1902, 181: line 129 Liège-Namur-Charleroi (Sud).
361 Timetable July-September 1909.
362 Mahaim, Abonnements d’ouvriers, 1910, 74-86.
contrary, testifies that some prohibitions certainly did.\textsuperscript{363} In his article on the birth of the modern commuter, Donald Weber consulted the parliamentary proceeding of November 1905 to highlight the cause of this interpellation: the bourgeoisie wanted to keep the renovated and enlarged station of Brussels North free from the nuisance railway commuters brought with them every morning and evening.\textsuperscript{364} To this end, the railway administration’s circular of 15 April 1905 prescribed that wage workers with a cheap railway subscription were allowed to enter the building between 8:00 and 16:00 or after 20:00. These ‘opening hours’ corresponded with the period of the day when wage workers were at labour in the factories or constructions sites of Brussels or when most of them had already left the city. Accordingly, the time frame turned “all trains, absolutely all of them, departing in Brussels-North [. . .] forbidden for labourers”.\textsuperscript{365} Minister Julien Liebaert disagreed: the absence of wage workers in Brussels-North station during the permitted hours confirmed that the activation of the Tour-and-Taxis station as an alternative hub for the mobile labour force still guaranteed rural dwellers their access to the workplaces that were scattered over the capital’s territory. The refutation of this assumption in Emile Washer’ letter, an important factory owner in Brussels, was supported by a wider group of industrialists and traders. The letter was read by socialist Georges Delbastée to inform the parliamentarians on the real effects of the switch in stations: poorly coordinated train connections aggravated an already peripheral location of the Tour-and-Taxis station so that the late arrival of wage workers at work implied a loss of income for both the commuter and the factory owner.

This parliamentary interpellation on the most favourable location for a transit station to support labour mobility in Brussels, illustrates that “the anticipated spatial and organizational continuum between country and city did not place the workers on equal terms ideologically and socially with the rising social class of the bourgeoisie”, as Greet De Block and Janet Polasky posited in their article on the planning of a rural-urban continuum in nineteenth-century railway policies.\textsuperscript{366} An unequal treatment of social classes is also a guideline the railway administration followed when the trains were scheduled for wage workers travelling with a cheap railway subscription, as the end result inflicted vexations up these commuters that other train passengers were bound to consider intolerable due to the ensuing sleep deprivation, prolonged travel times and packed compartments.\textsuperscript{367} From a multitude of examples on the deprivation of sleep, Georges Delbastée cited a letter written by a wage worker on 14 November

\textsuperscript{363} Annales parlementaires: chambre des représentants, 28 November 1905.
\textsuperscript{366} De Block and Polasky “Rural-urban continuum”, 2011, 321.
\textsuperscript{367} Annales parlementaires: chambre des représentants, 28 November 1905.
1904 concerning a daily commute of almost 25 kilometres separating Liedekerke and Brussels. Despite the station of Liedekerke being located in a core region of the political desired rural-urban continuum, with 400 to 500 railway commuters departing in the village every day, the holders of a cheap railway subscription were obliged to take the train of 4:30 as the frequent delay of half an hour made the train departing an hour later unreliable to arrive on work at time. Ernest Mahaim’s numbers were more modest for this station, i.e. 1,909 subscriptions delivered for the months January and July 1906, but the figure still underlines the importance of this station in the planned rural-urban continuum.

The second complaint that handled inadequate train connections recurred with clockwise regularity in parliamentary debates, because the end result forced wage workers to waste a considerable amount of time on a station platform. To demonstrate the injustice, the station of Tour-and-Taxis was taken as example by George Delbastée where a train awaited the wage workers at 19:09. Yet, with a workday ending nine minutes earlier, it was nearly impossible for them to get on this train. Moreover, the next train they had access to departed almost two hours later, at three minutes to nine. Incompatible train connections turned commuting into a nightmare if the trip implied taking two or more trains, with wage workers able to bridge a part of the distance by foot belonging to the lucky ones. The third complaint was related to the inadequate number of trains connecting the stations of departure and arrival. Attached to this objection was a vivid image of cattle being better treated than wage workers with a cheap railway subscription because for animals at least the number per wagon was limited.

In sum, the debates in parliament held at the start of the twentieth century exhibited that terrible departure times, mismatched train connections and packed compartments penalised the wage workers who bridged the distance of a home-work split with a cheap railway subscription. Yet, after 1895, the demand for cheap railway subscriptions followed a line that investors love to see on the charts of stock market prices, namely a steep increase continuing its way upwards over a prolonged period of time. Consequently, it has to be asked if the exposed hardships were not merely concoctions of socialists and reformers. After all, in his seminal study on the societal effects of railway commuting Ernest Mahaim estimated an average travel time of 45 minutes on the railway network, which corresponds with a distance of 19.4 kilometres. Similar, based on the industrial censuses, which incorporated walking and other transport vehicles besides trains in the data on commuting flows between municipalities, Suzy Pasleau

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368 Annales parlementaires: chambre des représentants, 28 November 1905. See also Annales parlementaires: chambre des représentants, 5 December 1905.
370 See 4.2 Travel distance.
states that the separation between home and work municipalities averaged 9 kilometres in 1896, with this average rising to 12.4 kilometres in 1910. Importantly, Suzy Pasleau limited her research to locations that employed at least 25,000 persons in private industry, i.e. Antwerp, Brussels, Charleroi, Ghent, La Louvière, Liège, Mons and Verviers. Ernest Mahaim, on the contrary, studied the commuting flows of the entire nation.

6.4 Access regulations and railway commuting in Leuven station in January and July 1909

The outburst of violence in the station of Jette on Monday 15 November 1905 is a first indication that the access regulations drafted by the railway administration effectively caused the wage workers harm. The riot was emanated by a new regulation that prohibited the holders of a cheap railway subscription to get on the evening trains they normally took to return home. In the resulting turmoil wage workers stormed the trains and took a seat, regardless if authority had granted them the permission to do so. This upheaval, Georges Delbastée wittily clarified, was the worker’s answer to railway minister Julien Liebaert’s assertion that “the service was extraordinarily well organised”, as such enabling the rural dweller to combine “the best of all worlds”. The trajectories in the timetable for July-September 1909 also exhibits that this ‘excellent service’ was rather one of drudgery for wage workers who used the cheap railway subscriptions to connect the station of Leuven with Brussels. Although the distance of 25 kilometres resembles the railway commuting between Liedekerke and Brussels, Leuven’s status as departure station was more prominent: it functioned as a major commuting hub in the politically desired rural-urban continuum.

Indeed, Ernest Mahaim selected Leuven station as case study for calculating the average usage of cheap railway subscriptions per year, based on his finding that this station issued the second highest number of cheap railway subscriptions within a list of twenty stations that together fulfilled 9.7 percent of the demand in 1909. Ernest Mahaim was curious about the geographical reach of these ‘sites of dispersal’, as he called them, and thus recorded the origin-destination relations of the commuting flows occupying the Belgian railway network during the months January and July 1909. Map 8 displays this spatial pattern for the station of Leuven. Wage workers connected Leuven with 105 different stations dispersed all over Belgium. Whilst the location of Poperinge almost touching the French border in West-Flanders (156 kilometres)

375 Mahaim, Abonnements d’ouvriers, 1910, 43: Bruges being the first station on the list.
376 Mahaim, Abonnements d’ouvriers, 1910, 89 and map nr 15.
Map 8 visualises the number of commuters with their destination departing from Leuven during the months January and July 1909. (source: Mahaim, Abonnements d’ouvriers, 1910, 89, 97 & map 15)
or Arlon in the southern part of Luxembourg (197 kilometres) underwrite the existence of a national labour market, the main destinations of the railway commuters were situated in the vicinity of Leuven, with the industrial basin of Charleroi on second base. Within the vicinity of Leuven, the labour market of Brussels stood lonely at the top as the capital accounted for 43.3 percent, or 2,437 of the 5,624 cheap railway subscriptions that were granted by the station chef of Leuven during these two months. The availability of this geographical pattern combined with the timetable of July-September 1909 makes it possible to paint a more accurate picture of the effect train schedules and access regulations had in store for commuters departing in Leuven station in July 1909.

6.4.1 Departing hours

For reasons of efficiency, a railway policy intended on establishing a rural-urban continuum would compose a train schedule tailored to the needs of wage workers so that it stimulates commuting between the capital of Belgium and the town of Leuven. This logic seemed to be at play for the commuters who started their journey to work in Leuven station as the railway administration had scheduled five trains heading for Brussels between 4:45 and 7:30 (figure 2). Notwithstanding, if the argument made in parliament that a working day starts at 7:00 the latest is combined with the access regulations printed in the timetable, then two morning trains remain that bring commuters to work on time. The first train left the platform at 4:53, stopped at every station underway and entered its terminus Brussels-North 72 minutes later. Wage workers with the station of Herent, Veltem, Kortenberg, Nossegem, Zaventem or Diegem as destination were obliged to take this train because the second train leaving at 5:39 only stopped in Schaarbeek and Brussels-Midi. In theory, some commuters could also take the train of 5:58, but it was forbidden for all subscribed wage workers to get on the train during the week. The departure time of 7:02 of the fourth train made the transport vehicle de facto inaccessible for wage workers. However, an access regulation that applied to the 7:26 train seems to support railway minister Julien Liebaert’s argument that not all workdays were clocked at 7:00. Indeed, why ban commuters from boarding a train if the target group was non-existent? Be that as it may, it did not stop the railway minister from stating in the same sentence that most wage workers had to be at work by 7:00, leaving only two trains available for commuters with employment in Brussels. Arguably, the first train would be the preferred vehicle as the second train trajectory obliged commuters to get off in Schaarbeek station, which, as socialist Prosper

377 Timetable July-September 1909, line 103: 36 Liège à Bruxelles.  
379 Annales parlementaires: chambre des représentants, 28 November 1905.
Figure 2 is a picture of the page in the timetable July-September 1909, from which the connectivity between Leuven and Brussels for wage workers holding a cheap railway subscription can be deduced.
Van Langendonck explained in the session of 5 December 1905, either added a half-an-hour-to-three-quarters walk to their journey to bridge the distance between station and workplace, being an unpleasant activity especially during winter, or prompted commuters to take the tram, thereby dissolving the advantage of using a *cheap* railway subscription.

Although the appeal of the horizontal Walloon axis was small compared to Brussels, it nevertheless attracted a significant number of wage workers having a home in the catchment area of Leuven station. Hereby, it is worth to note that the appeal of Liège’s industrial basin was substantial lower than the flux towards the industrial basin of Charleroi despite the fact the production of inferior coal for domestic use in the two regions, meaning that the mining companies in both areas needed additional labour to meet an enlarged demand for energy during winter. Moreover, railway infrastructure linked both regions directly with Leuven, whereby the trains of line 139 supported labour mobility towards the city of Charleroi and the trains of line 36 facilitated movement from Leuven to Liège. Perhaps a favourable time schedule explains the divergence in commuting flows? The first train to Charleroi left Leuven station at 5:12, stopped at every station underway and entered its terminus Charleroi-South exact three hours later. The train, however, had a detailed access regulation attached to it: “Train 708 is prohibited for wage workers using a cheap railway subscription: except on Sundays, from Wavre, Bierges-lez-Wavre and Limal; on days when train 704 is in operation: from the stations served by this train only. However, the following are admitted to train 708: (1) between Sint-Joris-Weert and Gastuche, and between Ottignies and Charleroi-West, the wage workers who have a subscription for Charleroi-South and beyond; (2) those who have all the stations served by this train as destination and arrive at Ottignies from the direction of Brussels-Leopoldskwartier at 6:10 and 6:17 or from the direction of Namur at 6:17; (3) those who arrive at Fleurus from the direction of Gembloux at 7:23 or from the direction of Nivelles at 7:22.” No restrictions were attached to the second train leaving in Leuven at 6:38, but the arrival time in Charleroi-West at 9:21 makes it unlikely that this train had wage workers on board who started their journey in Leuven.

Like the timetable for Charleroi, the first train to Liège departed at 5:30 and brought its passengers almost three hours later in the terminus Liège-Guillemins. Whereas this train was accessible for wage workers with a cheap railway subscription, its arrival time at 8:21 still makes

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382 *Timetable July-Sept 1909*, 318: line 139 Louvain-Ottignies-Charleroi (Sud); *Timetable July-Sept 1909*, 97: line 36 Bruxelles-Liège.
it unlikely that commuters from Leuven used the train to get to the industrial basin of Liège. Accordingly, rural households in the catchment area of Leuven station were left with two choices: either a weekly displacement or opting for night work. The preference for the former can be inferred from map 9 while representatives of the labour force informed August de Winne that switching travel direction at the beginning and end of a workday delivered better departure times.\textsuperscript{384} That the organisation of train trajectories is indeed better suited to night work is also evident from the timetable pages. For instance, mineworkers departing in Leuven at 17:13 needed a mere hour and half to enter Liège-Guillemins station.\textsuperscript{385} After their nightshift, the first train to Leuven was waiting on them in the station at 4:53 in the morning, with another departing at 6:59. A train at 5:59 was available too, yet passengers on this train needed a transfer in Landen station to arrive in Leuven.\textsuperscript{386} The train schedule for commuters heading to Charleroi was somewhat less beneficial with a stop train departing in Leuven at 15:18 for a ride of two hours and a half.\textsuperscript{387} A return train to Leuven departed in Charleroi-West at 6:51 whilst the first train in Charleroi-South left the station at 8:56.\textsuperscript{388} Overall, it is to be concluded that travel times fall short in explaining the preference for the industrial basin of Charleroi, in fact, the train schedules in the timetable July-September 1909 were even slightly in favour of Liège and its environment.

\textit{6.4.2 Travel times}

The lack of smooth train connections for wage workers with a cheap railway subscription generated another lively debate in the November and December 1905 parliamentary sessions. For wage workers with a home near Leuven, stations in Brussels ranked first as interchanges to travel to job opportunities located in the western half of Belgium. The much praised station of Tour-and-Taxis by minister Julien Liebaert as gateway for rural dwellers to the factories and construction sites of Brussels in 1905, unfolds as a quite transfer point in the timetable of July-September 1909.\textsuperscript{389} Indeed, none of the five trains leaving Leuven station before 7:30 stopped in this station. Furthermore, on the railway lines that included Tour-and-Taxis and Brussels-North, only one train departed in Tour-and-Taxis station before 8:00 while twenty trains were scheduled in Brussels-North.\textsuperscript{390} Socialists and reformers thus seemed to had right on their side.

\textsuperscript{384} De Winne, Arm Vlaanderen, 1904, 183.
\textsuperscript{385} Timetable July-Sept 1909, 100: line 36 Bruxelles à Liège.
\textsuperscript{386} Timetable July-Sept 1909, 103: line 36 Liège à Bruxelles.
\textsuperscript{387} Timetable July-Sept 1909, 319: line 139 Leuven-Ottignies-Charleroi (Sud).
\textsuperscript{388} Timetable July-Sept 1909, 316: 139 Charleroi (Sud)-Ottignies-Louvain.
\textsuperscript{389} Annales parlementaires: chambre des représentants, 28 November 1905.
\textsuperscript{390} Timetable July-September 1909, 97-98: line 36 Bruxelles à Liège; Timetable July-September 1909, 145-146: line 50 Bruxelles-Ostend; Timetable July-September 1909, 196: line 72 Bruxelles-Denderleeuw-Audenaerde-Courtrai.
Map 9 visualises the calculated travel times for wage workers departing in Leuven in January and July 1909, based on the origin-destination relations Ernest Mahaim published in his study of railway commuting. As such, his data delineated the catchment area of Leuven station as well as the destinations of the railway commuters. (sources: Timetable July-September 1909; Mahaim, *Abonnements d’ouvriers*, 1910, 89, 97 & map 15)
when they attested the unjust treatment of railway commuters by denying them the access to Brussels-North during rush hours in 1905. Even with an active Brussels-North station in the summer of 1909, travel times that encompassed a national labour market could still be considerable, as map 9 illustrates. Importantly, the travel times visualised on the map are calculated based on the assumption that wage workers took the first morning train to which they had access. However, if the trajectory involved changing trains with the length of the waiting time making it possible for wage workers to take a later train in Leuven, the travel times were calculated based on the departure time of the later train. This was, among others, the case for Bastogne-Sud, Bellecourt and Blankenberge.391

First, transferring often involved a long waiting time due to a limited supply of trains, in particular if the first train had been delayed. For instance, if the first train from Leuven arrived eleven minutes too late in Brussels-North, then the journey of wage workers to Oudenaarde or Kortrijk was expanded with two hours because the next train to connect the stations departed at 8:15 instead of 6:15.392 With a train that was probably packed with commuters and stopped at twelve stations between Leuven and Brussels, a delay of eleven minutes was well within the realms of possibility. Second, the access regulations of the railway administration further reduced a wage worker’s chance of getting a good train connection. For example, commuters from Leuven to Asse were obliged to wait an hour and half before their connecting train left the station platform of Brussels-North. Every passenger was allowed to get on the first train to Asse at 5:28 and the second at 7:35 in Brussels-North, but wage workers with a cheap railway subscription were prohibited to take the train of 5:58 in Leuven station. By forcing these wage workers to take the train of 4:53, the railway administration thus added 65 minutes to the journey to work.393 In addition, a connecting train was at risk of having stipulations attached to it with the wage worker as target group. The travel scheme towards Ghent and Bruges act as an example. As commuters were present in Brussels-North at 6:05, they could take the train of 6:40 towards Bruges where they arrived at 8:17. At least, this was the case in the months July and August given that the train was cancelled after 5 September. If Ghent was the arrival station, then the 6:40 train had to be left alone because it passed through Ghent station whilst the train leaving in Brussels-North at 6:44 was forbidden for cheap railway subscribers. As a result, they had to wait

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391 The used method implies that some calculations are indicative rather than reflecting actual travel times, especially when the prolonged distance in the home-work split favoured weekly commute or night work. In these cases, the journey to work probably started in the afternoon or during the evening. Despite this deficiency, the map retains its value in demonstrating the influence of distance on travel times.

392 Timetable July-September 1909, 196: line 72 Bruxelles-Denderleeuw-Audenaerde-Courtrai.

393 Timetable July-September 1909, 176: line 58 Bruxelles-Opwijk-Termonde.
one hour and two minutes for their connection to Ghent.\textsuperscript{394}

The problem of connecting trains prolonging travel times was absent in labour mobility directed to the industrial basin of Liège, as all the destinations on map 9 were located on the iron cross that linked Liège to Leuven. In contrast, eight of the thirteen destinations located in Charleroi and its surroundings on the same map, involved taking a second train to bridge the distance of the home-work split. The station of Tamines demands the attention as some wage workers commuted every day between this station and Leuven although the journey implied taking a connecting train in the station of Fleurus. Of the four trains that brought passengers from Leuven to Fleurus, the first and last train are to be ignored because the former arrived in Tamines as late as 9:08 whilst the latter had no connecting train anymore in Fleurus. The two remaining trains left Leuven station at 15:18 and 17:33 with an arrival time in Tamines station of respectively 18:04 and 19:59. Hereby, divergent waiting times at the station platform of Fleurus explains the twenty-minute difference in travel time.\textsuperscript{395} Moreover, the time schedule relates daily commute to nightwork. Finally, it took less time to reach Marchienne-au-Point than to enter the station of Charleroi-Sud despite the fact that the first destination required two train transfers whilst a direct train connected the stations of Leuven and Charleroi-Sud. As the reader will suspect by now, one condition had to be met: commuters to Marchienne-au-Point had to catch their connection in Brussels, otherwise 65 minutes were added to their journey, which gave the advantage to the stop train of Leuven/Charleroi-Sud.\textsuperscript{396} In other words, a trajectory involving more than one train always entailed the risk of prolonged travel times for wage workers unless the waiting time between the train connections was \textit{de facto} a tiresome affair.

6.5 Explaining increased use despite loss in railway access

As the politically desired rural-urban continuum rested on the institutionalisation of a home-work split that required a mobile labour force, it is reasonable to expect that the administration of the Belgian State Railways drafted timetables that favoured railway commuting amongst rural households. An examination of the timetables, however, tells otherwise: the regulations that restricted railway access for wage workers using a cheap railway subscription multiplied between 1891 and 1909. These regulations expanded in number, time and geographical scope. Moreover,

\textsuperscript{394} \textit{Timetable July-September 1909}, 160: line 51 Bruxelles (Nord)-Gand-Bruges-Blankenberge; \textit{Timetable July-September 1909}, 146: line 50 Bruxelles-Ostend.

\textsuperscript{395} The attentive reader may have noticed that the travel time of over 3.5 hours displayed on map 10 differs from the travel time of 2.5 à 3 hours put forward in the text. The assumption underlying the calculations of the map, i.e. starting the journey to work in the morning, is responsible for the different outcomes.

\textsuperscript{396} \textit{Timetable July-September 1909}, 103: line 36 Liège à Bruxelles; \textit{Timetable July-September 1909}, 278: line 124 Bruxelles (Midi)-Baulers-Luttre-Charleroi (Sud).
prohibitions regulated access for railway commuters in all major employment centres according to the cheap railway subscriptions issued in January and August 1908. Some provisions were of little consequence. Others, by contrast, prolonged travel times severely. Moreover, the trains that wage workers were allowed to take were in general limited in number, even without extra restrictions, and, in addition, usually stopped in every station. This turned railway commuting by times into an absolute ordeal. Notwithstanding, despite the hardships that policy measures imposed on railway commuters, increasingly more cheap railway subscriptions for wage workers were issued.

So why have regulations that restrained railway mobility for wage workers abstained from reducing, or even stabilising, railway commuting? The response railway minister Julien Liebaert gave to Georges Delbastée’s interpellation during the parliamentary session of 28 November 1905 is elucidating. The socialist accused the national government of regretting the introduction of cheap railway subscriptions for wage workers, otherwise why would they draft so many regulations to discourage rural dwellers from using them? The minister replied: “In the emigration from countryside to city, cheap railway subscriptions for wage workers do not act as cause, the cause lies in economic activity, with cheap railway subscriptions only intervening to limit the duration of an emigration that would have been definitive till the end of days; it is a correction”. This answer emphasis the changing labour markets as driver of labour mobility with the railway technology as ancillary to bridge the friction of distance. Or, the ability of transport technology to impose place-connectivity on the landscape and realise space-time contractions through reduced travel times, turned decentralised living and working into a possibility for rural households. Nevertheless, an upheaval of rural economies followed by the second industrial revolution was needed for the majority of these households to make railway commuting an integral part of their income pooling strategies. Consequently, once the shift to industrial and urban labour markets had been established on a societal level, the way back was blocked so that railway commuting remained part of a household’s livelihood, even if access to the railway infrastructure was restricted.

7 Conclusion
This chapter foregrounded a transport-cum-mobility lens to examine if embedding the spatial model of a national rural-urban continuum in the design and organisation of the railway network triggered an intended societal transformation. Juxtaposing the top-down activation of

railway infrastructure to make the labour force mobile with a bottom-up use of mobility opportunities by wage workers, relates structural change to selective answers, because it holds the ability of transport technology to overcome the friction of distance against the agency of wage workers to adapt railway commuting to their own needs. In the nineteenth century, the Enlightenment’s belief in a malleable society, the maturation of nation states and the rise of the engineer as technocrat all came together in the novel practice of planning territory-covering networks top-down to engineer a specific societal transformation through the reorganisation of space. It was reasoned that instrumentalising scientific knowledge made it possible to produce the mobility flows needed to achieve the envisioned societal goal. Accordingly, improved travel speed, a meticulous planned connectivity of places, complementary transport networks and public funding were the assets policy makers mobilised in accord with the universal laws that ruled society so that the circulation of goods and people were steered in particular patterns. In migration research, however, it has long been accepted that although structural layers delineate opportunities and constraints of movement, the decision to migrate is always a selective one. Whereas mobility scholars link selectivity to cultural and anthropological concepts, like identities and embodied experiences, migration historians stress economy as structural layer. The latter was inspirational for this doctoral research. Therefore, the investigation of transport infrastructure as engineering tool started with elucidating the societal goal of making the nation prosperous by stimulating economic growth. The Belgian policy makers were the first on the European continent to put the practice of planning the territory to the test when they conceived the iron cross as a means to spur economic growth and create political stability in the 1830s. Nearly thirty-five years later, railway infrastructure again served as spatial tool for the national government, this time to address societal problems caused by overcrowded cities. It is in this second round of railway policies that the selective decision of rural households linked to labour markets and livelihoods steps in. To preserve the historical distribution of the population over villages, towns and cities, the Belgian government conducted a railway policy that (1) brought the exploitation of the entire railway network under control of the state, (2) unlocked the countryside by extending the geographical reach of the railway network with light railways and (3) issued cheap railway subscriptions for wage workers. With one fifth of the industrial wage workers taking the train to work in 1908, the political envisioned rural-urban continuum arguably had landed.

Nonetheless, Ernest Mahaim’s empirical analysis of railway commuting in the first decade of the twentieth century, yielded two observations that question the axiom underlying the efficiency of transport infrastructure to steer the circulation of people, being that planned and actual use are interchangeable. First, while some wage workers used the geographical reach of
the railway network to its full extent, most of them favoured short-distance travel to provide for the household. Or, the popularity of a train journey of 6 à 10 kilometres among wage workers in May, June and July 1908 is at odds with the assumption that people spontaneously travel further if transport technology allows them to do so. This assumption, in contrast, explains why the roundtrip once a week over an unlimited distance the Belgian railway administration granted to wage workers in 1896, is considered the cause of accelerated railway commuting after 1895. Similar, the argument of technical efficiency and prolonged travel justifies why widespread car ownership is considered the cause of urban sprawl after the Second World War. Second, while the macro-economic push-pull model creates the expectation of a year-round use of cheap railway subscriptions once wage workers had found their way to the higher wages of the industrial and urban labour markets, the empirical results of Ernest Mahaim reveal that the majority of wage workers used the cheap railway subscriptions on an irregular basis. Hereby, the practice of income pooling delivers the missing piece of the puzzle.

Unlike policy makers, who gave priority to urban and industrial labour markets in their railway policies, rural households valued their access to land first and foremost. Or, for a rural household, a plot of land was the sun around which additional income resources had to circle. As a result, rural dwellers only ‘jumped’ to the opportunities offered by the railway network if they aligned with the occupational activities practiced at home. It is in these additional income resources that transport infrastructure as spatial tool to spur economic growth and as spatial tool to install the home-work split meet. For instance, the planned vector of economic growth that stimulated large-scale production and market exchange brought havoc to cottage industry. Accordingly, rural households had to search for alternative sources of income, with seasonal labour being a prime candidate after the 1840s subsistence crisis. Importantly, a continued demand for unskilled labour, despite mechanised production, and an alternation in industrial and agrarian production peaks, as outcome of commercialisation, was the structural layer rural households needed to earn a livelihood with seasonal employment. The so-called ‘agrarian invasion’ of foreign food products in Europe during the 1880s reshaped the livelihoods of rural households again, whereby the start of the second industrial revolution combined with the possibility of taking the train to work aided the rural households this time in blending the plot of land at home with performing occupational activities elsewhere.

In other words, transport technology’s ability to dissolve distance as mobility barrier progressively mixed with shifting labour markets and livelihoods throughout the nineteenth century. Hence, Belgium’s governmental policy to remake the railway network into a spatial tool supporting the mobility flows of a nationwide rural-urban continuum was simultaneously the product of a coherently planned railway network to enhance economic growth and to ease
overcrowding in cities. Accordingly, for rural households, railway commuting was an aid and a curse at the same time: an aid, as it made it replacement of income resources to safeguard their access to a plot of land easier and a curse, as they became dependent on labour mobility. It is this dependency that explains why increasingly restricting access for railway commuters did not result in a declined use of the railway network.
CHAPTER 2: LAND, LABOUR AND NETWORKED CONNECTIVITY.

THE DIFFERENT EFFECTS OF RAILWAY INFRASTRUCTURE ON BELGIUM’S POPULATION PATTERNS BETWEEN 1846 AND 1961

“Now, the velocity at which a man and his belongings may pass about the earth is in itself a very trivial matter indeed, but it involves certain other matters not at all trivial, standing, indeed in an almost fundamental relation to human society”

Wells, _Anticipations_, 1903, 20

“ces pauvres Flamands, qui travaillent comme des bêtes et se nourrissent de pain noir et de pommes de terre, comme les cochons”

Vandervelde, _La propriété foncière_, 1900, 27

1 Introduction

Population data are readily used in studies investigating the effect of transport infrastructure on territorial transformations during the nineteenth and twentieth century. Migration historians too use demographic data to unravel urban growth in that era. However, Colin G. Pooley pointed out that both disciplines rarely meet. In this dissertation, this divide is bridged by mobilising labour markets as the variable that links the focus on livelihood in migration research to the focus on economic growth induced by transport access in spatial analyses. Indeed, transport infrastructure connects places whereby the mobility flows structured by the transport network change amenities

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within a place. Moreover, gaining direct access to the railway network in the era of steam and steel, upscaled a location’s geographical reach for market exchange and, as a consequence, revitalised the economic activity of a place. In the process, the location pattern of labour markets altered, which, unavoidably, restructured the origin-destination relations in labour mobility flows. The increasing pressure placed on rural households’ livelihoods by the transition to an industrial and commercial society affected labour markets likewise. As a result, with transport modes to facilitate commuting still beyond reach of most European wage workers at that time, the transformed labour markets triggered an unseen level of migration flows from rural regions to the locations of economic growth.

Britain and Belgium, being the countries that sparked the industrial revolution, were the first to experience the downside of large-scale production without the presence of a home-work split. Indeed, “the crowding of workers and their families into tenements and hovels in the capital cities threatened to overwhelm the civilisation that they were labouring to build”. To ease this urban overcrowding whilst safeguarding industry and trade as engines of economic growth, reformers on both side of the Channel proposed the creation of a labour force, able to work in and live outside the city. As a result, English and Belgian governments developed housing and railway policies to make the wage worker mobile, with the geographical scale of ‘outside’ the city in Britain extending to the suburbs whereas in Belgium this spatial model encompassed the whole nation. In the previous chapter, it was shown how the Belgian government activated the railway infrastructure to establish this envisioned rural-urban continuum. Hereby, the empirical analysis revealed that the gravity pull exercised by a plot of land combined with labour markets affecting the income pooling strategies of rural households was a much greater incentive to integrate railway commuting into their livelihoods than governmental railway policies solving the friction of distance in a home-work split. However, once the shift towards an industrial and commercial society was decisive, the number of railway commuters rose rapidly. Consequently, in this chapter, it is asked whether commuting as accepted labour practice after 1895 succeeded in realising the spatial goal of

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404 Polasky, Reforming urban labour, 2010, 2.
Belgium's railway policy, i.e. keeping industrial and urban wage workers dispersed over the national territory.

To answer the question, the added value of mixing migration theories and transport planning to analyse spatial patterns of urban growth, is argued more thoroughly first. Next the reader is familiarised with the data and methodology to visualise spatial coherence between railway access and population dynamics in Belgium from 1846 to 1961. The subsequent empirical analysis exposes the regional differences in the usage of railway infrastructure as spatial tool to influence population distribution. Two observations deserve special attention. First, although railway infrastructure acted as backbone of urban growth in general, the mechanism that “brought social and economic activity to previously barren areas and stimulated growth in areas that were already settled” failed to produce uniform territorial outcomes. Second, despite the fact that railway commuting matured into an entrenched labour practice of wage workers after 1895, rural outmigration persisted and even expanded in the twentieth century, whereby specific rural regions appeared to influence the choice of a household for commuting or migration. These findings induced a further exploration of entangled livelihoods, economic growth, transport infrastructure and rural regions, wrapped up in a conclusion at the end of the chapter.

2 Migration theories and transport infrastructure

2.1 The effect of railway networks on the spatial distribution of labour markets

Although transport infrastructure is rarely their research object, migration historians acknowledge the impact transport development has on migration rates, both in magnitude and in geographical scope. Indeed, migration rates rose to unprecedented levels in the nineteenth century, resulting in a ‘democratisation’ process allowing unskilled and semi-skilled workers to travel in patterns that previously were the privilege of skilled workers to enhance their career prospects. While migration historians gave the transport revolution its credit due in raising mobility, they never neglected to relate labour migration to a structural economic layer. In tune with Steve Hochstadt’s hypothesis that the nineteenth-century expansion of industry and commerce resulted

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in an unrivalled demand for temporary and seasonal wage work, migration historians also paid special attention to factor.\textsuperscript{410} For instance, a huge increase in seasonal labour on transport infrastructure construction sites was noticed by Leslie Page Moch.\textsuperscript{411} Seasonality was especially outspoken in the case a railway line was built, as the digging was done either by local dwellers after harvesting or by a team of often foreign migrant workers.\textsuperscript{412} Yet, questions such as who had access to what kind of transport mode, what kind of places were selected during transport infrastructure planning and how expanding transport networks affected urban morphology are rarely on the agenda of migration research. In contrast, these questions occupy the minds of historians and geographers with a particular interest in the ability of transport infrastructure to reshape space.

Hereby, it is the designed and organised connectivity between places that transport planning imposes on the landscape that takes centre stage in elucidating the reality of living and working in the Western world during the past two centuries.\textsuperscript{413} This strand of literature, therefore, links the transformation of a place to mobility, process and flow.\textsuperscript{414} Or, to paraphrase Matthias Qviström, Nik Luka and Greet De Block, the geographical relations between places deserve the attention for understanding change within a place.\textsuperscript{415} In 1959, Walter G. Hansen introduced the network concept ‘accessibility’ to grasp how mobility and space affect each other and defined it as the “potential of opportunities for interaction”.\textsuperscript{416} Since then, the network concept has taken on several meanings that nevertheless centre on, first, the amenities of a place and, second, the networked connectivity of transport infrastructure: the former to explain why people want to reach certain places and the latter as key in overcoming the friction of distance.\textsuperscript{417} The growing popularity of GIS (Geographical Information System) to “identify patterns of change that occur simultaneously over time and across geographic space” helped the network concept to find its way into historical research.\textsuperscript{418} For instance, in the 1960s, Robert W. Fogel and Albert Fishlow wondered whether unfolding railway

\begin{itemize}
\item \textsuperscript{410} Hochstadt, \textit{Mobility and modernity}, 1999, 191, 202. See also Chapter 1: 5.6 The structural shift towards industrial and urban labour markets.
\item \textsuperscript{411} Moch, \textit{Moving Europeans}, 1992/2003, 121.
\item \textsuperscript{412} For a description of a railway construction site seen through the eyes of a seasonal wage worker: “Karl Fischer, railroad excavator” in: Kelly, \textit{The German worker}, 1987, 51-63.
\item \textsuperscript{413} Van der Herten, Van Meeteren and Verbreught, \textit{Sporen in België}, 2001, 9.
\item \textsuperscript{414} Cresswell, \textit{Place}, 2004/2015, 62.
\item \textsuperscript{415} Qviström, Luka and De Block, “Beyond circular thinking”, 2019, 789-790.
\item \textsuperscript{416} Hansen, “How accessibility shapes land use”, 1959, 73.
\item \textsuperscript{418} Gregory and Schwartz, “Population and railways in Wales”, 2009, 144.
\end{itemize}
networks actively induced or rather followed economic growth.\textsuperscript{419} Historians, geographers and economists alike picked up this question, using accessibility as analytical lens and GIS as spatial method to find answers.\textsuperscript{420} In this still ongoing debate, a spatial question popped up. Was the railway infrastructure capable “to inspire cooperation and enable economic progress for all countries, all social classes and all individuals like never before”, as imagined by Count Claude Henri de Saint-Simon, hoped for by engineer Michel Chevalier and mobilised in the goal of railway policies to make the nation prosperous?\textsuperscript{421} Or did the railway network instead amplify regional disparities?\textsuperscript{422}

Central to this research question is the geography of economic growth. Notwithstanding, the methodological difficulties to yield the historical data for revealing the economic activity of a place, resulted in deploying population numbers as suitable “indicators of economic development that are consistently defined over time”.\textsuperscript{423} Commercial and industrial firms were expected to locate near railway stations giving access to the cheapest and fastest transport technology over land, with an expansion of local labour markets in its wake, which in turn attracted labour migrants and thus delivered an exogenous growth of the population.\textsuperscript{424} Accordingly, investigating the entanglement of railway infrastructure and economic growth with demographic data as intermediary variable unveiled the influence of railway infrastructure on the redistribution of the population, as exemplified by the title Jeremy Atack, Fred Bateman, Michael Heines and Robert A. Margo used for their article \textit{Did railroads induce or follow economic growth? Urbanisation and population growth in the American Midwest, 1850-1860}. Researchers produced series of empirical maps for different European countries that visualised both the chronological expansion of railway lines on a regional, national or even international scale and accompanying population changes on a local scale.\textsuperscript{425}

\textsuperscript{422} For an original approach: Baten and Fertig, “A micro-regional analysis of heights”, 2009.
\textsuperscript{424} Bogart e.a., “Railways, divergence, and structural change”, 2022, 1.
\textsuperscript{425} See footnote 1.
A general conclusion drawn in these studies designated “urbanisation, population concentration and regional inequality” as the spatial transformations railway development called into the world. Moreover, these empirical analyses exposed that “the municipalities with the best levels of accessibility to the railway network had the greatest potential for population growth”. As such, a coherently planned railway network not only relocated labour markets in places with direct access to the flows of circulation, but also “accelerated rural depopulation and hastened the decline of rural communities” complemented by a population concentration in urban nuclei.

2.2 Labour migration as a selective answer to macro-economic change

To explain this unprecedented growth of cities fed by a rural exodus in the course of the nineteenth century, livelihoods had the attention in migration research. Migration historians allocated the several causes leading to labour migration to three different levels: (1) a macro-layer outlining the structural push- and pull factors in migration flows, (2) a meso-level of intermediary institutions linking the macro-level with the micro-level, and (3) the micro-level where households and individuals are to be found who take the actual decision to migrate. Location patterns of labour markets belong to the macro-level; hence, betterment opportunities in the place of destination as well as a lack of income resources in the place of origin respectively pull or push people into migration. As a rule, higher urban and industrial wages mark cities and industrial sites as places of destination whilst places of origin are situated in rural regions due to nineteenth-century developments initiating “a reversal of fortunes [. . .] that left many people with few alternatives to departure from home”. In sum, the macro-economic push-pull model gives a theoretical foundation for the acceleration in rural outmigration during the era when industry and trade were in full expansion. Yet, if regional economic disparities alone explained the decision to migrate, then

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431 Winter, Migrants and urban change, 2009, 32, 10.
the on-off transfer between poor and rich regions would deliver homogenous migration patterns. As studies showed otherwise, migration theorists dived deeper in the matter and stressed the selectivity of the migration decision: regardless the constrains and opportunities of the structural economic layer, the decision to migrate is always made by households and individuals at the micro-level, with individual features, like gender, age, education and property, as well as family ties, social practices and local customs elaborated upon as explanatory variables. To link agency at the micro-level with shifting labour markets on the macro-level, the intermediary structures of information channels, social networks and migrant communities at the meso-level demand the attention.

As Anne Winter aptly argues, deploying the three explanatory levels as separate frameworks gives rise to “very different strands of migration research, employing very different questions, sources and methodology” that range from the “abstract level of econometric modelling” to the “cultural realm of ethnicity studies”. Anne Winter, therefore, utilised an integrative approach in which all the causes of migration interact, though not on an equal basis. The preponderance lies at the macro-economic layer as it “predetermines the considerations at play in migration decisions, and the variety of patterns which evolve in reality can be interpreted as variations within these limits, shaped by the variety in mediating meso structures and micro circumstances”. In other words, the constraints and opportunities outlined by the macro-economic push-pull model put labour migration on the plate of rural households, whereby the variables on the meso- and micro-levels influence the actual decision of staying or leaving. Anne Winter’s research of migration and urban transformations between 1760 and 1860 let the macro-economic layer coincide with the rise of mechanised production and commercial exchange, causing the “structural disintegration of rural livelihoods”. With the macro-economic layer prevailing in illuminating migration patterns, Anne Winter’s research question was not so much whether households adapted livelihoods to the emerging industrial and urban labour markets, but rather why the experiences of different migrant groups variegated in adjustment speed and rates of success.

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2.3 The depopulation of the countryside during the age of industrialisation

Next to introducing variations in adjustment speed and successful outcomes, the selectivity of the migration decision opened up lines of inquiry to revise the conceptualisation of rural outmigration as a desperate and one-directional move from village to city for escaping a life of destitution in the countryside.\textsuperscript{439} For instance, Leslie Page Moch stated that in this period “Europeans were not irrevocably attracted to the city”, but instead oscillated between town and country in a rhythm that was dictated by life cycle and economic circumstances.\textsuperscript{440} Similar, Hilde Greefs and Anne Winter demonstrated that turnover rather than settlement was the salient feature of the Belgian migration experience at the close of the nineteenth century, with repeated movements in various directions accompanying the high volatility of the urban population.\textsuperscript{441} Repeated movement, although in the shape of return migration to a rural region, being the Land van Herve bordering the Netherlands and Germany in the east of Belgium, characterised the empirical data of Muriel Neven too, even when the industrial age turned the agrarian world upside down.\textsuperscript{442} This revision of a straightforward relation between rural exodus and urban growth by migration historians resonated in the work of Robert Schwartz, Ian Gregory and Thomas Thévenin, as it contradicted “the oft-repeated notion that the expansion of rural rail service accelerated labour mobility and out migration” in literature on railway infrastructure and population change.\textsuperscript{443} Indeed, in their study of railway technology and population patterns in France and Great Britain between 1850 and 1914, they noticed a temporarily drawback in population loss in rural municipalities gaining direct railway access during the period preceding the agrarian crisis of the 1880s.\textsuperscript{444}

However, as Michel Oris pointed out, despite the attention for more nuanced interpretations, “the dynamic exchanges between centre(s) and peripheries, usually the former being urban and the latter rural” remained the red thread for coming to terms with migration patterns.\textsuperscript{445} After all, a Western urban world had been produced during the nineteenth century that had made occupational activities in agriculture the lesser of industrial and urban wage work in a modern

\textsuperscript{441} Greefs and Winter, “Cities in motion”, 2020, 88.
\textsuperscript{442} Neven, “Retourmigratie in een plattelandssamenleving”, 2004, 49.
\textsuperscript{444} Schwartz, Gregory and Thévenin, “Spatial history”, 2011, 56.
\textsuperscript{445} Oris, “The European rural family”, 2003, 191.
The mere observation of this societal transition justifies Anne Winter's choice of making the macro-economic layer the foundation on which all migration flows are grafted, which in turn makes the geographical pattern of income resources a key driver in dynamics of population redistribution, even if a selective migration decision is taken into consideration. Or, to tap into Tim Cresswell’s insights, making the macro-economic layer the linchpin around which migration decisions revolve delivers migration theories that are about places rather than about movement, precisely “because of the particular relationship between the push and pull factors associated with different places”. If this argument is agreed upon, then it follows, firstly, that the impact railway access exercises on the economic activity of a place underlines the significance of transport infrastructure for grasping migration patterns and, secondly, that the revised literature on the rural exodus urges historians to connect the city as “focal point of many of the economic, political and social transformations of the long nineteenth century” with the amenities rural locations possessed to influence migration and mobility flows.

Its nineteenth-century railway policies foregrounds Belgium as well-suited case study for an empirical analysis of population patterns between 1846 and 1961 while keeping both the place-connectivity of the railway network and the amenities of urban as well as rural places in mind. To this end, the argument of the previous chapter that a plot of land was the rock around which rural households build their livelihoods is of particular interest, as it connects the push and pull factors of the macro-economic layer with income pooling at the micro-level. Moreover, this plot of land was a corner stone in the Belgian railway policies geared at establishing a rural-urban continuum after 1869. Policy makers claimed that making railway commuting a feasible and affordable alternative for rural households to migration combined the best of both worlds for everybody: higher wages guaranteed urban and industrial employers their large-scale labour force while a mobile labour force circumvented overcrowding in cities and industrial sites. As demonstrated in the first chapter, the majority of rural households only started to integrate railway commuting in their livelihood with the onset of the second industrial revolution in 1895. Hence, a second advantage arises out of the selection of Belgium as case study: by visualising the population

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447 Tim Cresswell quoted by Shaw and Sideway, "Making links”, 2010, 505.
448 (quote) Winter, Migrants and urban change, 2009, 35.
449 See Chapter 1: 5.5 The gravity pull of a small plot of land for ‘growing vegetables’.
450 See Chapter 1: 5.2 The value of a simple graph.
451 See Chapter 1: 5.2 The value of a simple graph.
distribution before and after 1895, it can be investigated to what extent railway commuting as established practice succeeded in preserving the historical distribution of the population over villages, towns and cities.

3 Data and methodology

3.1 Historical sources, research design and sample years

The role of the railway network in shaping urban growth is grasped via a longitudinal analysis of maps that visualise the geographical patterns of railway development and population distribution in Belgium between 1846 and 1961. Basic variables are used to display railway access and urban location. First, the visual distance between the location of a municipality and the lay-out of the railway infrastructure informs the reader on the degree of railway access the inhabitants of the municipality had. Points are added to the developing railway lines in the landscape to indicate the location of the railway stations and thus the places where wage workers were able to take the train to work. Second, urban growth is represented by the population data printed in the national population censuses, with LOKSTAT providing the digitised format of the population level per Belgian municipality for the different census years. Two types of maps resulted out of the GIS software: seven maps that visualise spatial change between two moments in time (map 1, map 2, map 6 till map 10) and five cross-sections that show the state of affairs at a specific moment in time (map 3, map 4, map 5, map 11 and map 12). A map with the rural regions of Belgium is added to the source material to give the rural households a voice. The selected map of the rural regions was published in the first national atlas of Belgium. Although the map dates from 1970, it is useful for a spatial analysis covering the period 1846-1961. Indeed, as the juxtaposition of an 1878 map (figure 1) and the 1970 map (figure 2) illustrates, it is the quality of the soil that inserts longevity in a rural region.

In 1846, national censuses documenting Belgium’s population, agriculture and industry were published for the first time while railway construction was still in its infancy. Hence, 1846 is a good year to start the empirical analysis. With 1895 being the year preceding the surge in demand for

452 LOKSTAT refers to the ‘Historical database of Belgian municipalities, Ghent University, Quetelet Center’. The contact person of the HIS/GIS project Sven Vrielinck was so kind to provide this research with the necessary quantitative data.
Figure 1 shows the soil types that divided Belgium in rural regions in 1878.

(source: De Laveleye, L’agriculture Belge, 1878)

Figure 2 shows the regional geography of Belgium as published in the first national atlas of Belgium in 1970.

(source: map 50A – Regionale indelingen)
cheap railway subscriptions by wage workers, its selection as a sample year is equally self-evident: it permits to ask if the national rural-urban continuum that policy makers envisioned materialised once wage workers started to take the train to work. The choice of the year to end the period of the spatial analysis, is less straightforward. At first sight, the focus in this dissertation on the railway network as spatial tool to distribute the population over a territory combined with the oft-repeated notion in literature that cars replaced trains as commuting vehicle after the Second World War, highlights the 1947 census year.\(^{453}\) Moreover, the association of postwar car ownership with urban sprawl as new phase in urban development only adds to the selection of 1947 as sample year. Yet, a brief examination of historical articles and statistical sources on car use, debunks 1947 as sample year. First, Els De Vos and Hilde Heynen demonstrated that the period in which cars came within financial reach of the average Belgian household coincided with the last years of the 1960s.\(^{454}\) Second, this chronology aligns with the demand for cheap railway subscriptions by wage workers published in the annual reports of the National Company of Belgian Railways: the initial rise in postwar demand started to decline in 1963.\(^{455}\) Third, according to the Belgian statistical office, private cars (2,059,616) were catching up with bicycles (2,741,250) as late as 1970.\(^{456}\) Accordingly, census year 1961 is more likely to have marked the end of the railway’s heyday in mobility flows to overcome the distance of the home-work split.\(^{457}\)

3.2 What the population level of a municipality can tell about ordinary people

Jeremey Atack and his co-authors rightly underlined that population numbers are one of the few quantitative data that are consistently defined over time.\(^{458}\) True, in different national censuses, the definition of population *de jure* and population *de facto* is used to discern respectively between persons who were legally domiciled in a municipality and persons who effectively lived in the

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\(^{454}\) De Vos and Heynen, “The garage”, 2011, 760.

\(^{455}\) NMBS, *Statistisch jaarboek*, 1976, 4-5.

\(^{456}\) *Statistisch Jaarboek voor België*, Brussel: Nationaal Instituut voor Statistiek, dl 91, 1971.

\(^{457}\) The three arguments favour 1961 as the concluding year of an empirical analysis investigating the effect of railway commuting on population patterns in Belgium. However, to show that the selection of 1947 would have yielded the same conclusions, annex 1 contains the cross-section of Belgian municipalities classified as rural, urban and susceptible for rural outmigration in 1947 and 1961.

\(^{458}\) (quote) Atack e.a., “Urbanisation and population growth”, 2010, 181.
municipality the moment the data for the census were collected. However, this distinction leaves
the recording of a physical person who has a domicile in a certain place at a specific time untouche

The resulting consistency over a prolonged period of time of population numbers de jure as well as
the basic meaning of the variable, i.e. informing on the physical correspondence between a place
and a person, keeps the mediated representation of society in official documents for these data at
a minimum. Moreover, Belgium has the advantage that “the total number of municipalities was
fairly stable until 1963”. In other words, showing the spatial pattern of the population level per
municipality simply informs the reader on the locations where people had their domicile in the
census year.

Ordinary people are brought within the historian’s gaze the moment they partake in one of
the four demographic events: birth, marriage, death and migration, with migration being the least
structured by biological constrains or cultural norms. The mere act of being born, getting
married, pass away or change domicile was enough for a person to appear in a historical source. As
such, demography can be considered “essentially the science of the masses of people rather than of
the ruling classes”, to use the words of Josiah Cox Russell. In this study, the agency of ordinary
people is related to the population level of a municipality, with a decreasing or increasing
population level over time indicating the preference of Belgian households to live in that particular
municipality. A decline in population numbers that exceeds the death rate, exposes that people
chose not to live in the municipality, whereas a population level outpacing national growth rates
reveals the opposite. Making the outpacing of national population growth part of the criterion
directs the attention to the impact of the migration rate on raised population levels. In addition, it
elucidates another phenomenon that spurred the expansion of the urban fabric during the
maturation process of present-day society, i.e. the demographic transition.

459 Gutmann and van de Walle, “The Belgian population registers”, 1978, 123; Bracke and Vanhaute,
Historische statistieken, 2005, 13; Neven, “Retourmigratie in een plattelandssamenleving”, 2004, 53-55. It is
interesting to note that labour markets affected the count of population de jure and de facto. Seasonal
labourers or domestic servants, for instance, stayed in one place for a prolonged period of time whilst having
their domicile elsewhere. (Bracke and Vanhaute, Historische statistieken, 2005, 18)
460 See Introduction: 4 A methodology that gives rural households a voice.
461 De Moor and Wiedemann, “Reconstructing territorial units”, 2001, 72. For those interested in the numbers:
Belgium counted 2,739 municipalities in 1831 and 2,663 in 1961.
462 Hochstadt, Mobility and modernity, 1999, 1-2, 7-8.
463 Josiah Cox Russell quoted by Hochstadt, Mobility and modernity, 1999, 1.
464 To be sure, it is a mere observation of preference without providing a meaning for ‘like’ or ‘dislike’.
whose manifestation is bounded by place and by time, high levels of fertility and mortality are replaced with low ones, whereby population soar in the demographic phase when birth rates are still high whilst death rates have already dropped. For Belgium, the outcome of the demographic transition was a population that more than doubled between 1846 and 1961.466

3.3 The ‘urban’ or ‘rural’ character of a municipality

Whilst the equation of population change in a municipality with location preferences of ordinary people still remains close to the basic meaning of population numbers, this falters when population numbers are used to label a municipality as ‘urban’ or ‘rural’. Notwithstanding, the distinction is needed in a study that examines the effectiveness of railway commuting to curb rural outmigration. Adding the adjective ‘urban’ or ‘rural’ to a municipality is anything but a straightforward exercise. The difficulties historians, geographers, economists, sociologists and planners have struggled with to justify their choice, have turned this quest into a discipline of its own endorsing the principle that outlining “the physical and functional limits of a city is a difficult task and obviously depends on research and normative objects”.467 Engaging in this quest would stretch the boundaries of a research on railway policies, labour mobility and population distribution too far. Therefore, the number of inhabitants has been chosen as variable that marks a municipality as ‘rural’ or ‘urban’. Hereby, Anne Bretagnolle, Denise Pumain and Céline Rozenblat’s argument worked inspirational: “Population figures remain the more readily available information regarding the importance of cities. The meaning of this indicator is not only demographic, since the number and variety of the urban functions and the general level of complexity of urban society and culture are highly correlated with population size”.468 Moreover, population numbers not only easily concur with GIS software to conduct a longitudinal analysis, but likewise permit to mobilise demography as the science of the masses, thereby enabling the agency of ordinary people to denounce the meanings that policy makers have poured into statistical definitions.

466 As the population census inform, the population rose from almost 4,350,000 persons in 1846 to almost 9,200,000 Belgians in 1961.
Figure 3 shows the spatial pattern of population density in Belgium for the census years 1846, 1880, 1900 and 1930, which Omer Tulippe made for the First National Atlas of Belgium.
To this end, the standard of 2,000 inhabitants, which the International Institute of Statistics adapted in 1887, is used to classify a municipality as ‘rural’ or ‘urban’.\textsuperscript{469} Most Western countries had accepted this norm by 1900.\textsuperscript{470} Belgian statisticians instead set the limit at 5,000 persons and retained a separate category for municipalities with fewer than 2,000 inhabitants.\textsuperscript{471} This deviation provides the possibility to discern three categories: (1) a municipality is classified as ‘susceptible for rural outmigration’ if the administrative unit offered a roof for up to 2,000 individuals, (2) a municipality with a population level between 2,000 to 4,999 persons is labelled ‘rural’ and (3) every location with more than 5,000 inhabitants is referred to as ‘urban’. The study Omer Tulippe published in 1962 confirms that municipalities with fewer than 2,000 inhabitants were effectively at risk of facing a rural outmigration. According to the geographer, municipalities underneath 2,000 inhabitants were sentenced to a demographic stagnation in the nineteenth and early twentieth century, as their population density remained stable in 1846, 1880, 1900 and 1930 despite a national growth rate of 86.6 percent or an increase of 3,754,808 persons (figure 3).\textsuperscript{472}

<table>
<thead>
<tr>
<th>Year</th>
<th>Relative Change</th>
<th>Correction</th>
<th>Susceptible</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>1846</td>
<td>-35.2%</td>
<td>x 0.647</td>
<td>1,296</td>
<td>3,240</td>
</tr>
<tr>
<td>1895</td>
<td>-4.2%</td>
<td>x 0.958</td>
<td>1,916</td>
<td>4,790</td>
</tr>
<tr>
<td>1900</td>
<td>Reference Year</td>
<td>x 1</td>
<td>2,000</td>
<td>5,000</td>
</tr>
<tr>
<td>1961</td>
<td>37.3%</td>
<td>x 1.373</td>
<td>2,746</td>
<td>6,865</td>
</tr>
</tbody>
</table>

Table 1 highlights the method for recalculating the class boundaries in accordance with the national rate of population growth and gives the corresponding outcomes for the three sample years in which the Belgian municipalities are classified as ‘susceptible for rural outmigration’, ‘rural’ or ‘urban’ in the empirical analysis.

\textsuperscript{469} Weber, \textit{The growth of cities}, 1899/1965, 14, 4-19; Vandervelde, \textit{L'exode rural}, 1903, 22. Adna Ferrin Weber developed an elaborated argument why statisticians preferred population numbers over population density or an agglomeration variable to discern between a rural and an urban location. In addition, he explained why the boundary was set on 2,000 inhabitants.


\textsuperscript{472} Tulippe, “Bevolkingsdichtheid”, 1962, 9.
Finally, the activation of the railway network as engineering tool to curb rural outmigration only effected the choice between residential migration or daily mobility. With the demographic transition in play, the proposed class boundaries therefore have to be adjusted for an endogenous growth of the municipal population. Consequently, the population level of the class boundaries are recalculated in alignment with the national growth figure of the corresponding period for the selected sample years 1846, 1895 and 1961 (table 1). As most European countries had accepted the standard of the International Institute of Statistics as the most adequate norm to delineate a rural environment by 1900, this year is used as reference. Taking 1961 to illustrate the calculation, the table informs its readers that the Belgian population grew between 1900 and 1961 by 37.3 percent. Therefore, the figure of 5,000 inhabitants is to be corrected with a factor 1.373 to mark the border between an urban and a rural municipality. Although the applied method is far from flawless, it does make the reader aware of the sustained population growth on a national scale that underlies the regional differences in urban growth recalculated in alignment with the national growth figure of the corresponding period for the selected sample years 1846, 1895 and 1961 (table 1). As most European countries had accepted the standard of the International Institute of Statistics as the most adequate norm to delineate a rural environment by 1900, this year is used as reference. Taking 1961 to illustrate the calculation, the table informs its readers that the Belgian population grew between 1900 and 1961 by 37.3 percent. Therefore, the figure of 5,000 inhabitants is to be corrected with a factor 1.373 to mark the border between an urban and a rural municipality. Although the applied method is far from flawless, it does make the reader aware of the sustained population growth on a national scale that underlies the regional differences in urban growth.

4 The impact of railway infrastructure on the location preferences of Belgian households

4.1 The spatial coherence between railway network and location preferences

The Belgian government launched its railway policies to curb rural outmigration in 1869, but had to wait until 1896 before railway commuting started to spread among rural households.\textsuperscript{473} As such, visualising the spatial coherence between railway infrastructure and population dynamic for each municipality before and after 1895 permits to illuminate the efficiency of the railway network to organise the home-work split. The comparison is facilitated by colouring a municipality in line with

\textsuperscript{473} See Chapter 1: 5.2 The value of a simple graph.
its rhythm of population growth, or decline. A yellow colour reveals a municipality that accorded with the national growth rate. The population growth of a green coloured municipality hoovered between the national average and twice that national average whilst in blue municipalities the number of inhabitants surpassed a double national growth rate, hence the adjective ‘explosive’. An orange colour indicates an unchanged population number while red municipalities faced population loss. By adding the enrolment of the railway lines before and after 1895 the spatial coherence between population level and railway proximity to the fore, with map 1 and map 2 showing the results of this exercise for the periods 1846-1895 and 1895-1961 respectively.

Yellow as salient colour on map 1 informs that a majority of Belgian municipalities followed the rhythm of national growth between 1846 and 1895, i.e. a population increase of maximum 47.8 percent. In addition, map 1 exposes the impressive expansion of the railway network, whereby the gradual loss in network density along a west-east divide is worth noting. Overall, map 1 aligns with historical studies that emphasise a “causal relationship between the development of the railway network and the distribution of the population”. Indeed, most green and blue municipalities are located on or near a railway line with Belgium’s two industrial corridors, namely the vertical ABC belt and the horizontal Walloon axis, clearly adding structure to the patchwork of green and blue municipalities. The most extreme case of ‘explosive’ population growth had taken place in Saint-Gilles, located south of Brussels, as its population tenfolded prior to 1895. In contrast, spatial coherence is less retraceable in the pattern of the red municipalities, except for the presence of the two historical textile regions of Belgium: Inland Flanders in the western part of Belgium and the surroundings of Verviers located in the east.

The growth of the Belgian population was slightly smaller in relative numbers between 1895 and 1961 compared to 1846 and 1895, namely 43.3 percent. In absolute numbers, however, the ranking is inversed: 2,767,371 inhabitants were added to the Belgian population between 1895 and 1961 whilst the Belgian population mounted with only 2,073,587 individuals between 1846 and 1895. The stark contrast in spatial patterns on map 1 and map 2 deserves the attention: the municipalities with an explosive growth in inhabitants and the municipalities with a population loss both multiplied on map 2, which was compensated for by a downfall of the yellow colour. Within this overall observation, the prevalence of the blue surface in the north-west corner of Belgium as well as the scope and spatial coherence of the red-coloured territory confuses a second time. Indeed,

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Map 1 visualises the population dynamics and railway development in Belgium between 1846 and 1895.
Map 2 visualises population dynamics and railway development in Belgium between 1895 and 1961.
although the pattern of the blue municipalities at the Belgian coast, near Antwerp and Brussels and, to a lesser degree, around Ghent and Liège, aligns with the railway network’s ability to concentrate the population in cities and metropolitan corridors, the location preference of the Belgian population in the northeast on the other hand defies it. Yet, as the population dynamic unfolds in a period that railway commuting had become popular among wage workers, the first thought coming to mind to explain the blue surface is a successful landing of the government’s goal to keep the labour force distributed over the countryside. But what then with the substantive spread of red municipalities after 1895? Granted, map 2 shows that the railway network knew little expansion after 1895. However, as figure 4a demonstrates for 1930 and figure 4b for 1960, the few trains added to the territorial coherence of Belgium during this period, the more the construction of light railways contributed. Buses replaced light railways during the 1950s, thus making the network of bus lines on figure 4b illustrative for the territorial coverage of light railways after the Second World War. It is interesting to note that, in contrast with the main railway infrastructure, the density of the light railway lines increased along the west-east axis.

In conclusion, continuity and change both describe the spatial pattern of location preferences before and after the year that railway commuting became a common labour practice of wage workers. On the continuity side, the railway network acted as backbone for the municipalities with a relative growth rate that outstripped the national rhythm. Therefore, map 1 and map 2 confirm the railway network’s capacity to sharpen territorial differentiation between regions as “over time, railway services contributed to an increase in the concentration of population” in places with well-developed access to the railway infrastructure. However, change is dominant once attention is turned to the remaining part of the Belgian territory: whilst most municipalities scattered across Belgium followed the national growth rhythm before 1895, after 1895 the distinction between either explosive growth or population loss is prevalent. This shift towards a sharp divide between gain and loss in population level accords with the widespread conclusion in literature that the railway network stimulated urban growth whilst simultaneously causing a rural exodus. Yet, in contrast to other European countries, the Belgian government had introduced a railway policy in 1869 that explicitly stimulated railway commuting to preserve the historical population distribution over villages, towns and cities. With the Belgian wage workers answering the call of their government

475 See Chapter 1: 3.5 Giving rural households access to the railway network.
Figure 4a shows a cross-section of the railway network in 1930, whereby the red lines represent the light railways and the black lines the main railways. (source: archive VlaTAM)
Figure 4b shows the network of bus lines in 1960, with the red lines representing electrified light railways. (sources: NMVB, Annual report, 1960, 34, www.lillo-fort.be)
from 1895 onwards, the sharp increase in red and blue municipalities between 1895 and 1961 is, therefore, at odds with the expectation of a rural-urban continuum.

Robert Dickinson also claimed that the Belgian urbanisation process “has developed not only through the drift of the people in the towns but also, more than in any other country in the world, through the development of the daily journey from home to workplace”.\(^\text{477}\) He demonstrated that Belgium was a land of commuters by comparing the census data of different countries. In 1947, 40.0 percent of the active Belgian population worked outside the municipality in which they lived whereas this was 15.2 percent for the Netherlands, 13.0 percent for Switzerland and 15.3 percent for North Rhine-Westphalia. If these testimonies on the significance of commuting are held against the geographical pattern of map 2, then it is intriguing that only the northeast area substantiates the presence of a rural-urban continuum, even a flourishing one, whereas vast areas of red coloured municipalities cover the rest of Belgium. Finding explanations for this conundrum requires a deepening of the longitudinal spatial analysis. As such, maps are brought into the study, first, for scrutinising the extent to which changing geographical patterns of urban and rural municipalities are linked to the materialisation of the railway infrastructure. Subsequently, the actual impact of the rural exodus on the distribution of the Belgian population is displayed. Once this additional information is at hand, the search for explanations starts.

4.2 The era of urban growth

The explosive growth in population in some Belgian municipalities between 1846 and 1961, shown on map 1 and map 2, not only exposed spatial variegations in population dynamics, but also affirmed that the nineteenth century was indeed the era of urban growth, given that the concentration of the population on a limited surface gained in relevance.\(^\text{478}\) Both maps likewise elucidate the ability of the railway network to affect the geography of population growth. To grasp this spatial interplay between railway construction and urban growth in more detail, cross-sections of the years 1846 (map 3), 1895 (map 4) and 1961 (map 5) come in handy. By definition, a cross-section present “but a glimpse at a continually evolving whole”.\(^\text{479}\) Hence, the usage of three maps to detect shifts in the classification of the Belgian municipalities in ‘urban’, ‘rural’ and ‘susceptible for rural outmigration

\(^{479}\) Kendall, “Population changes in Belgium”, 1938, 147.
Map 3 displays a cross-section of the Belgian municipalities classified as urban, rural and susceptible for rural outmigration in 1846. (sources: railway history and LOKSTAT)
Map 4 displays a cross-section of the Belgian municipalities classified as urban, rural and susceptible for rural outmigration in 1895. (sources: railway history and LOKSTAT)
Map 5 displays a cross-section of the Belgian municipalities classified as urban, rural and susceptible for rural outmigration in 1961. (sources: railway history and LOKSTAT)
in theory’ related to the two indicators outlining access to the railway infrastructure, namely the unfolding of the railway lines in the landscape and the location of the railway stations. To make continuity and change visible at first glance, an urban municipality is orange while green is the colour for a rural municipality, with a darker shade of green identifying the municipalities that were theoretically susceptible for rural outmigration. The importance attached to a railway network by policy makers to facilitate the mobility flows of the Belgian population is indirectly reflected in the colour of the railway station: a black colour symbolises a railway station that is active whereas a red colour means the railway station has been closed. The multitude of black dots on map 4 thus elucidates that railway transport stood high on the political agenda in 1895, whereas the red dots on map 5 attest to the loss of this position in 1961.

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<th>Susceptible Municipalities</th>
<th>Rural Municipalities</th>
<th>Urban Municipalities</th>
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<td>660</td>
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<tr>
<td>1895</td>
<td>2,605</td>
<td>1,868</td>
<td>519</td>
<td>218</td>
</tr>
<tr>
<td>1961</td>
<td>2,663</td>
<td>1,938</td>
<td>446</td>
<td>279</td>
</tr>
</tbody>
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Table 2 overviews the changes in the number of municipalities and in population size that the three municipal categories experienced in the sample years 1846, 1895 and 1961.

Table 2 informs that a substantial part of the Belgian population already lived in an urban municipality in 1846, as 9.6 percent of these administrative units, or 241 on 2,521 in total, housed 44.3 percent of the Belgian population. Map 3 adds the geography to the numbers: the urban places were primarily concentrated in the north-west part of Belgium with the iron cross state engineers Pierre Simons and Gustave De Ridder designed in the 1830s, supporting full circulation in the four wind directions in 1843. Railway passengers who departed in the coastal city of Ostend to travel via the west-east branch of the railway network to Germany, would notice that halfway their ride a rural landscape replaced an urban environment. In contrast, if the railway journey was started in
the port city of Antwerp and went in north-south direction to France, then the impression left behind was that of an urbanised country. The lifespan of three years was too short for the iron cross (1836-1843) to already restructure the geographical pattern of the urban municipalities. Instead, the root of the settlement pattern unfolding for the eyes of the railway passengers in 1846 is to be retraced to the late medieval period, when a booming textile trade let towns appear in the County of Flanders, the County of Hainaut and the Duchy of Brabant with towns also popping up in the Meuse Valley.\textsuperscript{480}

In 1895, the amount of urban municipalities had dropped to 218 although the total number of Belgian municipalities had increased with 84 units. With an unchanged Belgian surface, the drawback in urban municipalities suggests a loss in urban surface that, however, failed to translate in a decline of urban dwellers; on the contrary, the urban municipal category now gave shelter to 50.9 percent of the Belgian population. The quantitative picture thus aligns with the experience of nineteenth-century cities bursting at the seams and, in its wake, perceptions about urbanisation as “a monster, a chaotic explosion of mines, a mass of factories and miserable houses constructed without order and caution, a cradle of new epidemics like cholera, and a society where promiscuity endangers sexual morality as well as private hygiene”.\textsuperscript{481} Whilst chaos might have ruled housing patterns, map 4 confirms the capacity of a railway network to structure urban geography. Some of these municipalities were already classified as urban in 1846, other municipalities gained access to the railway infrastructure and became urban during the era of steam and steel. The former situation is illustrated by the railway line in the northern part of Belgium that facilitated movement between the towns of Aarschot, Herentals and Turnhout from 1863 onwards; the latter dynamic is exemplified by the surroundings of Charleroi located in the eastern part of the Hainaut province. If the attention is turned to the municipalities that lost their urban status between 1846 and 1895, then the provinces of West-Flanders, East-Flanders and Hainaut come into sight. The observation that these municipalities were located in an area with a well-developed railway network nuances the hypothesis that gaining access to the railway network revitalises local economic activities by bringing distant market opportunities nearby.\textsuperscript{482}

\textsuperscript{481} Oris, "Mortality and migration", 2001, 453.
\textsuperscript{482} For a discussion of the hypothesis: see \textit{Introduction: 2.3 The geographical reach of market opportunities.}
Compared to the redistribution of the urban municipalities between 1846 and 1895, the changes shown on map 5 are modest. In the period 1895-1961, the urban municipalities enlarged their surface with 61 urban municipalities, an increase of 28 percent, whilst the total number of Belgian municipalities augmented with 58 units. The share of the Belgian population choosing an urban location went up too, reaching 58.7 percent. Hereby, the railway network kept structuring the spatial pattern of urban municipalities whilst the decline of places with an urban status in West-Flanders continued. New, on the other hand, was the expansion of urban municipalities in the surroundings of Antwerp and Brussels along the industrial ABC-axis as well as in the northeast corner of Belgium in the vicinity of the railway infrastructure. Likewise noteworthy is the closure of railway stations, as the municipal category to which the railway station belonged seemed to had no influence on the decision of the railway administration to close the access point.

The longitudinal analysis of the spatial interaction between the materialisation of the railway infrastructure in the landscape and the redistribution of municipal categories, based on population numbers, aligns with the patterns of change and continuity observed in map 1 and map 2 exposing the geographical variegations in the Belgian population dynamics between 1846 and 1961. In other words, the geographical patterns on map 3, map 4 and map 5 endorse the statement that in Belgium too the “progress in communications and transport is both a condition and a consequence of the growth of cities”. What is remarkable, however, is that railway commuting as established practice of the Belgian labour force after 1895 left both the growth and the geography of urban locations untouched. Despite the success of the Belgian railway policy to establish a rural-urban continuum, the population level of urban municipalities kept mounting with the railway network acting as structural backbone in the spatial pattern. At the same time, however, this beneficial relationship between railway access and urban growth displays regional differences. Indeed, municipalities in the northwest part of Belgium were at risk of losing their urban status in spite of being located in an area with a territory-covering railway network. In contrast, the municipalities with direct access to a major trunk line that connected Leuven over Liège with Germany, i.e. the eastern branch of the iron cross, as early as 1842 failed to become urban as their population numbers remained below 2,000 inhabitants throughout the entire period under study. Map 1 and map 2 make the population pattern near the eastern branch even more intriguing: a loss in population only occurred

after 1895, whereby the railway line functioned as a kind of border as almost all municipalities south of this ‘border’ faced a population decline whilst those located north of the railway line did not.

4.3 Absolute population decline in municipalities susceptible for rural outmigration in theory

Here, the spotlight is turned on the households the Belgian politicians had in mind when they intended to make “the countryside simultaneously urban and rural, modern and traditional”.485 As the reader knows by now, the public targeted by the Belgian railway policies to install the home-work split were the rural households who lived in the countryside and whose agrarian livelihood was under increased pressure due to the nineteenth-century rise of an industrial and commercial society. These rural households are given central place on map 6 and map 7 by visualising absolute population loss in the municipalities up to 2,000 inhabitants, as these were the rural municipalities that in theory were susceptible for outmigration. Absolute population loss for the years 1846 till 1895 are displayed on map 6, whereby the population levels of 1846 decided if a municipality was theoretically susceptible for rural outmigration. On map 7, the years from 1895 till 1961 is covered with the population level of 1895 serving to categorise a municipality. Map 6 and map 7 also provide information on the real impact of rural outmigration on the depopulation of the countryside. They do so by visualising the number of inhabitants who remained in the municipality in the closing year of both time periods. Accordingly, the red colour in the pie charts shows the absolute decline in population whereas the blue colour shows the remaining population level. To be sure, the number underlying the red colour was caused by outmigration as well as mortality; yet, for reasons of feasibility, it is assumed that the demographic transition has affected the rural municipalities more or less equally. A look at the two maps reveals that population loss was generally smaller compared to the number of rural dwellers who remained in their villages. Hence, the impression created by map 1 and map 2 of vast areas being deserted is amended by map 6 and map 7. Instead, the latter two maps render the conclusion that the historical distribution of the Belgian population in villages, towns and cities was preserved even though, as table 2 informs, the countryside had lost its position as chosen living place somewhere during the latter half of the nineteenth century.

In 1846, most municipalities were classified as rural with the majority amongst them being in theory susceptible for outmigration as a consequence of the structural transition to an economy

Map 6 informs on population loss and persons remaining in their villages between 1846 and 1895 in the municipalities theoretically susceptible for rural outmigration in 1846. Whereas the minimum and maximum population in 1895 was 24 and 1,287 respectively, in 1846 it was 36 and 1,293. (source: LOKSTAT)
Map 7 informs on population loss and persons remaining in their villages between 1895 and 1961 in the municipalities theoretically susceptible for rural outmigration in 1895. Whereas the minimum and maximum population in 1961 was 48 and 1,814 respectively, in 1895 it was 86 and 1,915. (source: LOKSTAT)
organised around large-scale production and market exchange. Together, these municipalities housed 55.7 percent of the Belgian population, corresponding with 2,413,941 rural dwellers. In 1895, the relative share of those living in rural municipalities had declined to 49.1 percent, though 731,517 villagers were added in absolute numbers owing to a sustained national growth of the population during the nineteenth century. Hereby, the municipalities associated with rural outmigration held their relative position in population numbers while having expanded their surface, as the dark green colour on map 3 and map 4 exhibits. In contrast, the other category of rural municipalities with its boundaries set between 2,000 and 4,999 habitants in the reference year 1900, had to give way both in relative share of population as in surface covered on map 3 and map 4. The demographic data for 1961 also show a relative decline in rural dwellers that nonetheless masked an increase in absolute numbers. This time, however, the two rural municipal categories combined had to give up territory as their urban counterpart claimed a slightly larger share, namely 10.5 percent. In sum, the data of table 2 confirm the growth of an urban society that concentrated ever more people on a limited area. Notwithstanding, Belgium’s urban growth “differed from the common pattern of expanding European cities surrounded by virgin land”. Indeed, from the data of table 2 as well as the blue colour on map 7 spins the conclusion that the countryside remained populated, thus demonstrating railway commuting served its purpose and facilitated labour mobility in a rural-urban continuum. Yet, simultaneously, the empirical patterns on map 6 and map 7 are at odds with the finding in the previous chapter that railway commuting had been adapted by Belgian wage workers as a viable alternative for labour migration after 1895. Consequently, the spread in population between 1895 and 1961, both in geographical scope and size, needs further investigation.

Though 1,620 or 65.5 percent of the Belgian municipalities were in theory susceptible for rural outmigration in 1846, only 360 or 22.2 percent faced actual population loss between 1846 and 1895, coinciding with a decline of 1 to 546 inhabitants. The grey areas on map 8 show the geography of the municipalities theoretically susceptible for rural outmigration in 1846, with the red circles giving the locations that lost inhabitants with the corresponding absolute number. As can be observed, the pattern of rural outmigration seems to defy spatial coherence: not only because clustered red circles in some areas complement a pattern of isolated circles scattered all over

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486 Vanhaute, “Leven, wonen en werken”, 2003, 158.
Map 8 locates the municipalities that were susceptible for rural outmigration in theory in 1846 with the circles indicating the municipalities where an actual population loss occurred between 1846 and 1895. (source: LOKSTAT)
Map 9 locates the municipalities that were susceptible for rural outmigration in theory in 1895 with the circles indicating the municipalities where an actual population loss occurred between 1895 and 1961. (source: LOKSTAT)
Belgium, but also because the theoretical threshold of 2,000 inhabitants shows little resemblance with the actual occurrence of outmigration. In 1895, the number of municipalities at risk of rural outmigration had risen to 1,868 municipalities (71.7 percent). Yet, this increase paled next to the jump in municipalities that effectively lost some of their inhabitants, being 1,029 municipalities (56.3 percent), whereby the loss ranged from 1 to 805 persons. As a comparison of map 9 and map 8 reveals, the geography of red circles in the first period matured in the next period with the separate red dots before 1895 flowing like an ink blot into a contiguous area of red circles after 1895. The only area of Belgium to escape this dynamic is to be found in the northeast corner that displayed an absence of population loss after 1895.

As mentioned at the start of this chapter, population numbers and the economic activity of a place are often linked in studies seeking to understand the transport network as vector for spatial transformations. This link, however, proved equally poor at predicting population decline in both periods. Indeed, the number of municipalities with a threshold of 2,000 inhabitants had slightly increased in the northeast area in 1895, yet, population loss disappeared in this region after 1895. In contrast, rural outmigration accelerated in southern Belgium, where municipalities theoretically susceptible for rural outmigration were significant throughout the entire period under study. The networked connectivity of the railway infrastructure seemed of little importance in this dynamic. Indeed, as figure 4a shows, the mazes in the main railway network in both regions were filled in with a well-developed network of light railways. Consequently, light railways substantially added to the capacity of the main railway infrastructure to install the home-work split in both regions. As such, the railway network was able to root rural dwellers in the northeast part of Belgium, but not in the southern part. Perhaps distance explains the preference of migration over railway commuting in southern Belgium. After all, the inhabitants in this area had to cross a greater distance to reach industrial and urban labour markets. Yet, regions with short distances and easy travel by train between village and labour market also colour red on map 9.

In conclusion, although the increase in persons living in rural municipalities between 1846 and 1961 shows that the historical distribution of the population over villages, towns and cities held its ground during the period under study, the empirical maps also suggest that the ability of the Belgian policy makers to engineer a rural-urban continuum is less straightforward than generally stated in literature. Indeed, after 1895, railway commuting found its momentum while population

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488 See for example Schepers e.a., “Organising the work-home split”, 2020.
loss likewise increased in volume and geographical scope. Moreover, commuting flows and rural outmigration mixed in a spatial pattern that lacks clarity. In transport literature, giving a location access to railway infrastructure usually translates in population growth or stabilisation at least.\textsuperscript{489} This is so because giving a location direct access to an upscaled circulation of goods and people, firstly, boosts opportunities for market exchange, with expanding labour markets and an influx of labour migrants in its wake, or, secondly, curbs migration by facilitating the home-work split. However, map 8 and map 9 show the validity of the cause-consequence relation for some parts in Belgium whilst simultaneously refuting it for the areas where population loss did occur despite a high degree of networked place-connectivity. The growth pattern of the red colour, in contrast, displays uniformity: almost all of the scattered circles on map 8 have become part of a continuous surface on map 9. To understand why rural outmigration not only continued after 1895, but also in a pattern that seemingly defies the structuring role of railway infrastructure, the urban bias present in understanding space relationally, argued in the general introduction of this dissertation, deserves the attention. Especially, two points needs further investigation, i.e. the vector of economic growth policy makers embedded in railway infrastructure and the advice of Tim Soens, Eline Van Onacker and Kristof Dombrecht to recognise rural agency in rural-urban relations.\textsuperscript{490}

5 Railway access, market exchange and urban growth

5.1 Breaching the link between railway access and population growth

In the nineteenth century, the novel practice of imposing coherently designed and organised transport infrastructure top-down on landscapes to spur economic growth quickly became popular among Western nations.\textsuperscript{491} While eighteenth-century policy makers enhanced place-connectivity by constructing paved roads and canals, their peers in the nineteenth century recognised the added value of the railway technology to contribute to a nation’s wealth by enhancing market exchange.\textsuperscript{492} Importantly, during railway infrastructure planning those places were selected that in the minds of policy makers possessed the amenities required for economic growth. Put differently, technology

\textsuperscript{489} See 2.1 The effect of railway networks on the spatial distribution of labour markets.
\textsuperscript{490} Soens, Onacker and Dombrecht, “Metropolis and hinterland?”, 2012.
\textsuperscript{491} See Introduction: 2.4 The planned vector of economic growth in transport infrastructure.
\textsuperscript{492} Atack e.a., “Urbanisation and population growth”, 2010, 172; De Block, “Designing the nation”, 2011, 713-717.
and mindset agreed to spur market exchange. Planning economic growth into railway infrastructure and a city’s dependency on trade to provide for its inhabitants, thus turned transport technology and market exchange in self-amplifying catalysts promoting the growth of urban networks for which transport infrastructure served as an economic backbone. With a time span of two centuries to produce this societal transformations, Jean-Marc Offner agreed with Manual Castells, Peter Hall and Saskia Sassen claim that “the way the economy functions as a network [is] a major key to understanding the development of cities”. Moreover, historical research has the tendency to dive into phenomena that are considered to have explanatory value for today’s society. The origin of the phenomenon is retraced first and its historical development subsequently unravelled with progress as the principle giving direction to societal transformations. Even with contingency drawn into the framework, projecting contemporary phenomena into the past whilst mobilising the past as root of the present, favours narratives that unwittingly lose sight of phenomena that were central in previous societies, but have disappeared or become marginal today.

As a result, societal progress together with today’s networked economy, makes it almost self-evident that railway access causes population growth through a chain of events market exchange sets in motion. Furthermore, embedding the vector of economic growth in railway infrastructure effectively resulted in a dynamic that concentrated the population in urban nuclei and metropolitan corridors, as map 3, map 4 and map 5 demonstrate. Nevertheless, the three maps simultaneously elucidate regional differences: urban locations displaying population loss despite a dense railway network in the northwest corner of Belgium as well as a the eastern branch of the iron cross failing to raise population levels in municipalities with direct access to this major trunk line. These observations align with Thomas Vanoutrive’s quote on congestion pricing adapted to urban growth: “looking in hindsight, it might seem a natural evolution of [urban growth], but it was not self-evident that [market exchange] would have become the standard [economic principle]”. Here, the ideas of geographer and urban planner Jean-Marc Offner on technical networks are a good start to explain alternative interactions between railway infrastructure and population dynamics.

495 Kinneging, De onzichtbare maat, 2022, 15.
496 See 4.2 The era of urban growth.
5.2 Highlighting market competition as loyal companion of economic growth

In his article on technical networks transforming space, Jean-Marc Offner aimed at “going behind the recurring myths of determinist relationships between networks and society, and between networks and territories”.\textsuperscript{498} In the process, he stated that direct access to a transport network might benefit local economic activity, but without a fault serves market competition as side dish.\textsuperscript{499} As such, Jean-Marc Offner deviated from the well-trodden avenue that associates opportunities with an extended geography of market exchange and exposed the negative effect of market competition on economic activity. His statement that history “provides many examples of local economies which have suffered from the arrival of the railway” is illustrated by the article of Robert Schwartz, Ian Gregory and Thomas Thévenin.\textsuperscript{500} As the reader might recall, the advent of the locomotive’s whistle in the French and British countryside slowed rural outmigration on a temporarily basis in the villages gaining direct access to the railway network in the 1850s and 1860s. Market opportunities were instrumental to the explanation: elevating the circulation of goods from a local to a regional and even a national scale enhanced local activities in logistics, extractive industries and/or commercial farming. However, the word ‘temporarily’ is crucial. The golden grain stream that let Chicago and its rural hinterland flourish in the book of William Cronon, overflooded the markets of France and Great Britain in the 1880s.\textsuperscript{501} The farmers who had previously benefited from market opportunities, now had to face international competition, with their survival depending on their ability to reinvent agrarian incomes, which they did by turning to cattle raising and dairy farming. Or, to use the words of the three authors to dot the i’s, “what railways – and steamships – gave with one hand, they often took away years later with the other, forcing even favoured communities to adapt to changing market conditions”.\textsuperscript{502}

Both opportunity and competition thus transform the amenities in a place, albeit on another basis: market opportunities induce spatial change via the attractiveness of economic gain whilst market competition forces alterations to sustain economic gain. The mechanism is universal. Yet, the societal preferences of an historically and geographically conditioned world outline what kind

\textsuperscript{498} Offner, “Territorial deregulation”, 2000, 166.
\textsuperscript{499} Offner, “Effets structurants”, 2014, 52.
\textsuperscript{502} Schwartz, Gregory and Thévenin, “Spatial history”, 2011, 70.
of amenities hold the promise of economic gain. For example, during the 1830s, Belgian engineers Pierre Simons and Gustave De Ridder decided to integrate locations into the design of the iron cross where iron ores and coal were dogged, because these natural resources tuned in with the opportunities of market exchange in a period that is now referred to as the age of steam and steel. In addition, societies are anything but static so that societal preferences are continuously in the state of being made and remade. Transport networks as the material currents of market exchange play their part in this dynamic, with nineteenth-century transport to increase the circulation of goods accelerating the pace of changes in amenities and societal preferences. As the principle of economic growth translates in “regions of greater economic importance [obtaining] rail service early on”, the conclusion of Jean-Marc Offner on entangled transport infrastructure and territorial change almost formulates itself, i.e. that the amenities in a place already working well, gain from increased accessibility. Noteworthy, however, is his addition of market competition as vector of spatial change. In addition, Robert Schwarz, Ian Gregory and Thomas Thévenin demonstrated that market competition not only amplifies and accelerates amenities aligning with societal preferences, but also forces a reinvention of amenities that let a place prosper until market competition as loyal companion of economic gain decided otherwise. Whereas replacing the cultivation of grain by cattle raising and dairy farming did the job in the French and British countryside after the agrarian crisis of the 1880s, the cottage industry in Inland Flanders was less successful in recovering from the blow mechanised textile production in England inflicted on it during the 1830s and 1840s. As Inland Flanders is positioned in the northwest corner of Belgium, it is worth inquiring if market competition explains the decline in urban municipalities in this region.

5.3 Railway access and population loss in areas of market exchange

The processing of flax already added to the livelihoods of rural households living in Inland Flanders during the late Middle Ages. In general, preparatory activities were carried out in the countryside whilst urban dwellers produced the end product. Next to establishing a relation of mutual dependency between urban and rural places, the economic cooperation made it possible for a large population to live in the countryside, where working on the fields could be combined with cottage

505 Ronsijn, Commerce and the countryside, 2014, 162-163.
Throughout the eighteenth-century, population numbers kept mounting so that the share of cottage industry expanded in the livelihood of ever more rural households, resulting in approximately half of the rural population in the provinces West- and East-Flanders being full-time engaged as spinner or weaver around 1800. Meanwhile, the paved road policy of the Austrian Habsburgs had greatly enhanced the territorial integration of Inland Flanders, with trains stretching this place-connectivity even further by linking Ghent, Bruges and Courtrai with England over Ostend and Antwerp as early as 1839. All in all, the presence of numerous small plots of land cultivated by household, a textile industry knitting rural and urban locations together and a robust web of commercial relations supported by rural as well as urban markets, generated a coherent economic region that linked rural and urban municipalities to each other and to more distant markets whilst providing for a dense population scattered over town and countryside. The sustained presence of this regional coherence is illustrated by the widespread reference in literature as one of the most urbanised areas in premodern Europe. With “an urbanisation degree of more than 30 per cent”, the reference was still standing at the onset of the nineteenth century.

At that point in time, however, the region’s fortune stood at the verse of breaking down due to the march of machines and factories. Interestingly, it was the same march on which the Belgian state engineers Pierre Simons and Gustave De Ridder had relied for achieving the exact opposite effect: the acceleration of regional and national development through a careful selection of places possessing the amenities to unleash the economic potential of machines and factories. Place-connectivity, unfortunately, brought the competition of mechanically produced textile in England to the heart of Inland Flanders. English manufacturers not only started to buy local flax to satisfy their appetite for raw materials, but they simultaneously outpaced Flemish producers with cheaper and better-quality linen cloth that allowed them to take over France as Flanders’ traditional sales market. Domestic competition struck too: in 1835, textile city Ghent found its second wind to mechanically produced cotton while two years later the first mechanical flax factory opened its

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509 See Chapter 1: 3 An engineered network of flows; Van der Herten, België onder stoom, 2004, 315-316.
511 De Block, Engineering the territory, 2011, 3, 21.
512 Neven and Devos, “Historical demography”, 2001, 315.
doors in Saint-Gilles near Brussels.\textsuperscript{514} A year later, four new mechanical spinning factories were established in Mechelen, Liège and Ghent, with other places like Tournai and Ensival near Verviers following suit. Although prospects for manual produced linen were already deplorable in the 1820s, vested interests delayed the use of machinery in Inland Flanders until 1852 when the first mechanised weaving factory was set up in Roeselare: apparently with success, considering that Guido Gezelle called Roeselare the ‘Manchester of Flanders’ in 1868.\textsuperscript{515} Yet, the interplay of market competition, transport connectivity and mechanical production caused a crisis in the textile industry of Inland Flanders that left the amenities of neither urban nor rural municipalities untouched.

As Wouter Ronsijn in his doctoral research exposed, urban municipalities that reorganised around mechanical or large-scale production re-entered the arena of market opportunities while the economic activity stagnated in towns ruled by small-scale artisanal companies.\textsuperscript{516} At the same time, he observed the disappearance of peripheral markets due to a collapsed linen industry. If it is accepted that market exchange and heightened population levels are irrevocable intertwined, then the withdrawal of peripheral markets stands for a loss in urban municipalities. Despite crop failures in 1845 and 1846, followed by epidemics raging in the years 1847, 1848 and 1849, were aggravating the hardships that market competition had already brought upon rural households by making manual produced yarn and linen cloth redundant, rural outmigration was surprisingly low, as Nick Deschacht and Anne Winter discovered.\textsuperscript{517} By revealing that population loss was indeed most outspoken in Inland Flanders, the population censuses of 1846 and 1856 confirm that the times indeed were bleak for rural households in this part of Belgium. Yet, this increased pressure on a household’s livelihood refused to let migration levels soar, either abroad or domestic.

Consequently, the question arises what kind of income resources a battered Inland Flanders had to offer rural households to replace the cottage industry of spinning and/or weaving. Being a rural region, agrarian activities are the first to come to mind. For instance, population loss was kept at bay in the flax-growing districts of Sint-Niklaas, Dendermonde, Courtrai and Yper, given that

\textsuperscript{516} Ronsijn, \textit{Commerce and the countryside}, 2014, 213, 164-165.
both the cultivation of flax and its manual processing into raw material for textile production remained in high demand.\textsuperscript{518} Historical research also mentions a temporary revival of agrarian activities.\textsuperscript{519} Notwithstanding, Omer Tulippe’s maps in figure 3 inform that despite the population loss, population density was still high in Inland Flanders, making it unlikely that cottage industry and agrarian activities alone provided all the households in the region with a livelihood. The norm of two hectares of land agreed upon by historians for a household to be self-sufficient, makes the probability even more shaky.\textsuperscript{520} Indeed, smallholdings with up to two hectares of land prevailed in Belgium’s rural regions throughout the nineteenth century.\textsuperscript{521} Equally intriguing are the population dynamics at play in the Polders and the part of West-Flanders bordering France between 1846 and 1961 (map 6 and map 7). As large-scale agricultural exploitations were common in both regions while railway development strengthened their involvement in commodity markets, the regions should be textbook prove.\textsuperscript{522} Therefore, the presence of rural outmigration, especially after 1895, is surprising and undermines population growth linked to an upward spiral of railway access, market opportunities and economic growth.

In conclusion, the policy of extending the connectivity between places via coherent transport development brought national and international market exchange to Belgium’s northwest corner. However, rather than expanding local economic activities, existing income resources evaporated due to market competition. Moreover, while the increased pressure on their livelihoods should have started the search for betterment opportunities elsewhere, most rural households instead chose to stay in their ancestral villages, even at a moment when railway commuting was still a promise hidden in the future. Conversely, in the regions where large-scale farming gave households easy access to extra income and at a moment when railway commuting had fulfilled her promise, rural outmigration accelerated. If “[g]reat cities are born and give rise to great infrastructure”, then it is

\textsuperscript{518} Ronsijn, \textit{Commerce and the countryside}, 2014, 96-97, 163-166.  
\textsuperscript{519} Demasure, \textit{Sociaal-economische streekstudie}, 2011, 82; Ronsijn, \textit{Commerce and the countryside}, 2014, 166-172.  
\textsuperscript{520} Ronsijn, \textit{Commerce and the countryside}, 2014, 208; Nath, \textit{Brood willen we hebben!}, 2013, 119; De Moor, “Occupational and geographical mobility”, 2001, 295, 304, 298; Vanhaute “Rich agriculture and poor farmers”, 2001, 22; De Belder and Vanhaute, “Sociale en economische geschiedenis”, 1993-1999, 118. It is of interest to notice that Emiel Vliebergh and Robert Ulens mentioned a subsistence surface of 5 hectares for a household in fertile Haspengouw while a number of 2 to 2.5 hectare was needed in the much less fertile region of Hageland, whereby the presence of animals in the latter’s agrarian activities made the difference. (Vliebergh and Ulens, \textit{Het Hageland}, 1914/1921, 112, 130).  
\textsuperscript{522} Bouché, \textit{Les ouvriers agricoles}, 1913, 43-45.
equally true that land is the bread and butter of a rural economy. If the former is instrumental in explaining the mutual constitutive dynamic between market exchange, transport infrastructure and population growth, then it is now time to turn to a plot of land to grasp the significance of the rural region in the location preferences displayed by rural households.

6 Putting the rural back in the rural-urban continuum

6.1 Tying soil condition, agricultural exploitation and population level together

The esteemed mentor of Ernest Mahaim, Emile de Laveleye, believed Belgium excelled as country to examine relations between condition of the soil and economic organisation of a rural region. English sociologist Seebohm Rowntree likewise considered the characteristics of the soil a suitable criterion to distinguish the different rural regions in Belgium, as he stated that “[t]he variation of the soil in these districts plays so important a part in the agricultural economy of the country that it will be worthwhile to give a brief description of them”. He started his classification in the northern part of Belgium with the stiff clay soil of the Polders, followed by a broad stroke of sandy soil, with a broad zone of loamy soil varying from sandy till stiff as next layer. Here, the industrial Walloon axis interrupts the agricultural regions, after which the classification continues with the stiff-clay soil of the Condroz area, than the poor soil of the Ardennes, to end with a soil of limestone that typified the Jurassic area in the most southern point of Belgium.

The six horizontal strokes are easily joined to the rural regions shown on figure 2 or map 10: (1) the dark green colour corresponds with the Polders; (2) the yellow surfaces of Inland Flanders and the Campine area depict the regions that are covered with a sandy soil; (3) the brownish-orange-reddish colours represent a zone of loamy soil, divided in an upper layer embracing sandy loam Flanders, Hageland and Haspengouw and a lower layer uniting loamy Hainaut, Brabant and the other part of Haspengouw; (4) the light blue and green tints correspond with the Ardennes and

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524 De Laveleye, L’agriculture Belge, 1878, xvi.
525 Rowntree, Land and labour, 1910, 4; De Laveleye, Économie rurale, 1862. Whilst Emile de Laveleye considered the sandy loam region, the loam region and the land of Herve as three separate categories, Seebohm Rowntree united them into one rural region, which he divided internally.
526 Rowntree, Land and Labour, 1910, 4.
**Map 10** juxtaposes Belgium's rural regions and actual population loss between 1895 and 1961 in municipalities that were susceptible for rural outmigration in theory in 1895. (sources: *First atlas of Belgium* and LOKSTAT)
(6) the brown colour with the Jurassic region. Subsequently, the economic organisation of a rural region can be added to Seebohm Rowntree’s classification by mobilising the link between soil condition and dominant agricultural exploitation Emile de Laveleye distilled out of his agricultural examinations, confirmed by other agricultural surveys. The mentor of Ernest Mahaim concluded that the poor quality of a sandy soil creates a landscape of small-scale exploitations as a rule whereas a soil of clay breathes life into commercial farming. Based on his rule, Emile de Laveleye arguably concluded that smallholdings prevailed in Inland Flanders, the Campine area and the Ardennes. The sandy soils in Inland Flanders and the Campine area made cultivating land demanding while the destitution of the soil in the Ardennes resented agricultural activities even more. Nature, in contrast, came to the aid of mankind in the Polders, loamy Hainaut, Brabant and Haspengouw, Condroz and the Jurassic region with commercial farms reaping the fruits of the fertile soil that characterised these regions.

It is surprising to see the dots that indicate population loss between 1895 and 1961 on map 10 proliferate in regions where a well-developed railway network and a naturally fertile soil stimulating large-scale exploitation raise the expectation of population growth. Instead, the dense presence of dots extends the conclusion previously drawn for the most western and northern part of West-Flanders. There too, commercial farming and networked transport connectivity pushed people out of the villages instead of an extended geographical reach of market exchange raising population levels. The time period only adds to the conundrum. After 1895, railway commuting should have kept population loss at bay, even in the absence of a revived economy. The high number of dots in the Ardennes exposes that also in the antipode of a fertile region the railway infrastructure failed in curbing rural outmigration. Antipode indeed, as the Ardennes with the Campine area formed Belgium’s poorest regions at the turn of the twentieth century. Next to poverty, the Ardennes and the Campine area shared the features of a sparse population and a train network whose connectivity

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527 To be complete, the green-coloured part in eastern Belgium delineates the Land Of Herve having a stiffy loam soil.
528 De Laveleye, L’agriculture Belge, 1878, xxii; Ronsijn, “Gaining ground”, 2022, 95.
532 Vliebergh and Ulens, La Hesbaye, 1909, 3.
was greatly enlarged by light railways.\textsuperscript{533} This makes the near absence of population loss in the Campine area all the more remarkable: why had the rural households of the Campine area turned to railway commuting whilst their colleagues of the Ardennes opted for migration? The limited population loss in Inland Flanders suggests that the rural households in this area of sandy soils and dense population also complied with the home-work split, even though Seebohm Rowntree claimed that the people in this rural region were worse off in comparison with the Ardennes and Emile de Laveleye stated that the soil quality of the land demanded such an intensive cultivation that it barely sustained the members of a peasant’s household.\textsuperscript{534}

The variegated answers of rural households on railway construction in their regions, makes it clear that local economic growth and railway commuting need to be enriched with a region’s rural economy to fully grasp the capacity of transport infrastructure to influence population distribution in a rural-urban continuum. In the previous chapter, it was argued that having access to a plot of land, no matter how small its size, was central for rural households who earned a livelihood through the mechanism of income pooling.\textsuperscript{535} Hence the double meaning of land in rural economies, i.e. as a production factor in commercial farming engaged in market exchange, on the one hand, and as an asset in the livelihoods of rural households to meet their basic needs, on the other.\textsuperscript{536} Though this double use of land is characteristic for rural economies in general, the position smallholdings held in the first nation to industrialise on the European continent was standing out, both due to its ubiquitous presence in the Belgian landscape and its integration in Belgium’s railway policies after 1869. Related to the latter, providing wage workers with the possibility to commute nationwide was quite unique compared to the core-periphery constellations European governments generally had in mind when developing policies for a spatially distributed industrial labour force in the latter half of the nineteenth century.\textsuperscript{537} With Belgian railway policy making abstraction of rural regions, given that the intended dispersal of the industrial labour force was built on dealing with the friction of distance through the efficient use of transport technology, the pattern of population loss after 1895 depicted on map 10 is intriguing: it seems to suggest that that

\textsuperscript{535} See Chapter 1: 5.5 The gravity pull of a small plot of land for ‘growing vegetables’.
\textsuperscript{536} Scott, “Peasaintries of Europe”, 1998, 5-9.
\textsuperscript{537} See Introduction: 3.1 The home-work split in European transport policies.
land as production factor spurred the rural exodus in fertile regions whilst land as subsistence factor rooted rural dwellers in regions that had difficulties in providing their inhabitants with a livelihood.

6.2 Rural exodus: the commercial use of land in a rural economy

If a commercial exploitation of land by farmers, large landowners and/or capitalists outlines the economic organisation of a rural region, then market exchange is key for understanding how the rural region influences the location preferences of a rural household. In the commercial use of land, making a living is tied to the prospect of realising economic gain through the opportunities market exchange offers. However, as argued earlier, market competition comes with market exchange. Accordingly, the enrolment of coherently planned transport networks sometimes had devastating effects on a region’s economic activities: the crisis in manual textile production during the 1840s being one example, the agrarian crisis of the 1880s another. Market liberalisation and extensive place-connectivity made the so-called ‘agricultural invasion’ of the 1880s possible: steamboats replaced sailboats, trains became salient landmarks and transport costs fell. As with Flander’s textile crisis, goods produced elsewhere poured in and destabilised local markets. During the 1870s and 1880s, massive imports of grain and other foodstuffs from America, India, Australia and Russia affected West-European commodity markets and brought international market competition to the doorsteps of the Belgian farmers.

Whereas the international competition on the textile markets of the 1840s first and foremost transformed the industrial amenities in rural and urban locations alike, the agricultural crisis of the 1880s functioned as catalyst in the reorganisation of the agricultural sector. Like their French and British colleagues, market competition pushed Belgian farmers into reinventing their agrarian activities in line with a renewed reality in which a traditional survival economy had to retreat for an agricultural sector that had market exchange high on its agenda. First, with the cultivation of staple foods having left the agrarian stage, the activities holding the promise of gain henceforth were dairy, livestock and horticulture, as they tuned in with a rising urban demand for meat, butter,

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538 For the 1840s crisis, see: 5.3 Railway access and population loss in areas of market exchange.
Second, farmers progressively purchased animal feed, seeds and fertilisers on commodity markets, instead of producing these goods themselves, whereby Jan Blomme accredited this incremental use of intermediary products for achieving unprecedented agricultural yields. Emile Vandervelde noticed that this progressive infiltration of market exchange in agrarian practices entered the domestic sphere too. While examining changes in nineteenth-century landownership, he observed that the women in La Hulpe left their children at school during haymaking and potato harvesting. This unusual behaviour compared to the conduct of women in nearby villages was explained by the fact that the women in La Hulpe bought bread and fodder on markets, which cancelled the time they spent in the forest gathering wood to bake bread or along the road when walking with their cows for grazing purposes. Third, the transfer from farms to non-agricultural and specialised industries of agricultural product processing further contributed to productivity gains and commercialisation in agriculture. In sum, the realisation of a modern agricultural sector strengthened interdependency relations between trade, industry and agriculture, with an “impending depopulation of agriculture and countryside” as one of its spatial outcomes.

At the turn of the twentieth century, the popularity of this spatial dynamic in research not only reveals the societal importance of rural outmigration, but likewise that contemporaries indicated the ‘agrarian invasion’ as the decisive event in agricultural employment losing out to industrial wages. The thoughts of Emile Vandervelde on how the structural shift in employment affected migration and mobility flows are exemplary. For a municipality to depopulate, instead of merely seeing its number of persons active in the agricultural sector decline, the region had to lack (1) industrial resources, (2) easy transport communications with urban growth poles and (3) local job opportunities for rural wage workers. If these causes of rural outmigration are approached the other way around, then the presence of industrial labour markets, a well-developed railway network and commercial farming were the ingredients to keep a region populated. This logic, however, is refuted by, among others, the surroundings of Mons where population decline was

543 Vandervelde, La propriété foncière, 1900, 68.
547 Vandervelde, L’exode rural, 1903, 103, 21.
salient and continuous between 1846 and 1961. Indeed, southwest of Mons lay the mines and factories of the Borinage, an already prosperous industrial basin at the onset of the nineteenth century. The fertile soil surrounding Mons indicates that rural job opportunities were also present, as Ernest Mahaim referred to this type of rural region when he wrote in 1906: “it is a fact common to Belgium and to other countries that agriculture wants labour”. The availability of railway commuting makes the circle complete. Indeed, the railway network serving this region had a density that matched the place-connectivity the establishment of a rural-urban continuum required. Whilst the region of Mons surprises, the opposite effect of a failed initiation of urban growth is equally intriguing. Here, the above mentioned municipalities between Leuven and Liège with direct access to the eastern branch of the iron cross as early as 1842 are illustrative. Despite their access to a major trunk line planned with the explicit intent “to inject the entire territory with the Industrial Revolution”, population levels were reluctant to rise to the urban threshold. In addition, the municipalities situated south of the trunk line belonged to loamy Haspengouw. Emiel Vliebergh and Robert Ulens described this rural region as probably the most prosperous one in Europe. Hence, both railway access and commercial farming should have triggered population growth, yet, their population level classified the municipalities a susceptible for rural outmigration in theory throughout the entire period under scrutiny.

To resume, the progressive intertwining of trade, industry and agriculture after the ‘agrarian invasion’ follows William Cronon’s theory about commodity markets that reshape the amenities of rural and urban locations. In the spatial reorganisation, both a commercial agricultural sector and the spread of industry, affected the livelihoods of rural households that materialised in a rural exodus. The depopulation of the countryside at the turn of the twentieth century, was explained by contemporaries via a shortage in local job opportunities, be it industrial or rural, and an inadequate railway network to support a home-work split. However, as map 10 shows, population loss after 1895 was particularly outspoken in fertile regions where, firstly, commercial farming excelled, leading to complaints over a labour force that fell short, and, secondly, a dense railway network

549 (quote) Mahaim, “Cheap railway tickets”, 1906, 542. Authors who mention the lack of rural wage workers include De Kerckhove de Denterghem, Vlaanderens zandstreken, 1879, 73; Vandervelde, L’exode rural, 158-159, 186-191, 192, 194; Demain, Migrations ouvrières, 1919, 144; Ronsijn, “Gaining ground”, 2022, 112.
551 Vliebergh and Ulens, La Hesbaye, 1909, 4.
552 See Introduction: 2.1 City and hinterland reshape each other.
covered the region’s territory. Admittingly, a part of the population loss is explicable by the pull factor of higher industrial and urban wages. Nevertheless, the empirical geographical pattern is certainly at odds with the image of an impoverished countryside where dwindling job opportunities pushed rural dwellers into migration. Moreover, it appeared that the poorest parts of rural Belgium were best equipped to keep rural dwellers in the countryside. Consequently, Emile Vandervelde’s proposal of installing large-scale farms to create labour markets in the countryside, seems doubtful at best. In contrast, Emiel Vliebergh and Robert Ulens’ suggestion that smallholdings were the way forward, is worth inquiring.

6.3 Land as subsistence factor: place-boundness of rural households
As stated above, the use of land in a rural economy was twofold: next to being a production factor to yield economic gain, land was a means of subsistence for rural households. Peasant households in particular valued the latter, as having access to a plot of land ensured their ability to put food on the table. Accordingly, from a peasant’s point of view, periods of economic upheaval that caused the shortage in labour demand was the best reason for rural dwellers to stay in their villages and cherish their access to a plot of land. Or, a top-down perspective that is unreceptive for the meaning land holds in the survival strategies of rural households, easily associates the reluctance to go and find betterment opportunities elsewhere with a stubborn mindset and a hostile attitude towards innovation of all kinds. An ‘obstinate’ attachment to the soil in dire living conditions, was a recurrent interpretation in the works of, among others, Emile Vandervelde, August De Winne and Edmond Ronse, with the latter quoting an American who was dumbfounded that Flemish peasants rather suffered a live in depressing mediocrity than vastly improving their circumstances through migration.

While this inexplicable attachment to a place confused contemporaries, migration theories went one step further by defining as migration the prevalent mechanism of households to cope

554 Vliebergh and Ulens, La Hesbaye, 1909, 141.
555 Vliebergh and Ulens, La Hesbaye, 1909, 143.
558 Vandervelde, L’exode rural, 1903, 46; De Winne, Arm Vlaanderen, 1903, 211-212; Ronse, L’émigration saisonnière, c. 1913, 39.
with increased pressure on their income resources. By omitting that safeguarding the access to land was the bedrock around which rural households build their income pooling strategies, place-boundness became overlooked in research seeking to understand labour mobility. To be sure, some historians have devoted attention to a plot of land as variable in a household’s decision to migrate. Leslie Page Moch, for example, explicitly advised historians to “look to the countryside to understand the plethora of movement that came with the nineteenth century”. Hereby, Anne Winter remarked that a “migrant’s own farming activities” were to be taken into account, precisely because rural dwellers were most reluctant to jeopardize this income source during a period when industry and commerce were on their way to conquer the labour markets, but had not yet fully succeeded. Consequently, Anne Winter emphasised the need to align migration opportunities with income pooling strategies of all the members of the households, both in the short and the long term. The family migration patterns exposed by Jan Kok for the Dutch province of Utrecht between 1850 and 1940 are relevant too. While dwindling labour opportunities in the countryside create the expectation that rural wage workers were the first to leave their ancestral villages, the empirical data of Jan Kok demonstrated that quite the opposite happened. These households were the least inclined to migrate as their livelihoods depended on the entanglement of land and labour, whereby the wages earned by working on someone else’s fields had to be supplemented with the vegetables, potatoes and the pig that the own plot of land provided for. Or, to paraphrase a report of 1908 on the well-being of rural wage workers: the impact on their livelihoods of a plot of land was felt so acutely that only the loss of this land was able to start the search for betterment opportunities elsewhere.

In general, the strong attachment to the village explained by the prominence a plot of land had in the livelihoods of rural households, is understudied in migration and urban research alike. Arguably, the lived experience of Emile Vandervelde and his contemporaries of migrants being “hypnotized by the city lights like the sea bird after sunset flying bewildered under the beam of the lighthouse”, encouraged the natural inclination of stressing higher wages as urban pull factor and

559 Kok, “Migratie als gezinsstrategie”, 1999, 89; Hochstadt, Mobility and modernity, 1999, 183.
560 See Chapter 1: 5.5 The gravity pull of a small plot of land for ‘growing vegetables’.
563 Winter, Migrants and urban change, 2009, 12.
a shortage of income opportunities as rural push factor. Yet, these rationales of the macro-economic push-pull model veiled the income pooling strategies of rural households centred on safeguarding their access to land. If asked, rather than the temptation of higher wages, the prospect of escaping wage work all together motivated rural dwellers to search employment on the industrial and urban labour markets. Rural dwellers regarded working for someone else as “un pis aller”. They endured wage work as a means of one day acquiring, either owned or leased, the size of land that enabled them to be self-sufficient. Or, for the rural household, economic thought translated in living on agriculture alone to own an independent and secured livelihood. While Benoit Bouché discovered this ambition while studying the lives of the rural wage workers in Belgium at the turn of the twentieth century, Louis Verhulst concluded it during his socio-economic survey of the Between-Zenne-And-Dender region, located west of Brussels. Despite good connected to the capital’s labour markets, by proximity and railway commuting, most rural households stucked to agriculture as the profession of their predilection, performing urban and industrial wage work only to fulfil their goal of a small holding allowing them to return to the fields permanently someday.

Similar, H. Demain explained that the reluctance of rural households to leave their villages behind when circumstances necessitated it, was motivated by the rural dweller’s goal of an independent life in line with their dictum that “the peasant in his domain is king”. By writing that “all weavers, who they may be, remain in fact in the depths of their being, agricultural workers, who return to the land as soon as they can”, Ernest Dubois also exposed the strong attachment of the rural households to their soil in his study on Belgium’s cottage industry for linen.

These findings urge the researcher to take the ‘stubborn’ refusal of rural dwellers to relocate into consideration in migration studies, especially in a period when the replacement of agrarian activities by full-time employment in industry or service was still in full swing. Furthermore, if Belgium is the setting where the entanglement of railway policies, labour mobility and population distribution are scrutinised, then access to a plot of land takes on an extra dimension: it handed the

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567 Bouché, Les ouvriers agricoles, 1913, 33.
569 Bouché, Les ouvriers agricoles, 1913, 33-34, 97; Verhulst, Entre Senne et Dendre, 1926, 53.
571 Dubois, Tissage du lin, 1900, 167.
politicians the rural amenity to make the institutionalisation of the home-work split a successful one.

6.4 The added benefit of railway commuting for industrialists and rural households alike

The slogan of British philosopher Eli Hampshire ‘Three acres and a cow’ demonstrates the awareness of nineteenth-century policy makers on the meaning of land in a household’s livelihood. The slogan entered the political scene of England during the 1880s when Jesse Collings and Joseph Chamberlain used it in their land reform campaign to tackle rural poverty. According to them, the ills of rural England could be cured if wage workers received a plot of land to fulfil their consumption needs. Arguably, Belgian state representatives understood the slogan too, as Seebohm Rowntree highlighted Belgium as the place where the “average size of the holdings [was] smaller than in any other country of Europe”. Whilst the British sociologist added the numbers to confirm Belgium’s status as land of smallholdings, Eric Vanhaute refers to the ideologically coloured debate about a plot of land and social stability, which Greet De Block and Janet Polasky complemented by relating the existence of smallholdings to the nineteenth-century railway policy of establishing a rural-urban continuum. To disperse wage workers on a national scale without compromising the mechanism of economic growth, the attachment of rural households to their plot of land came to the aid of the Belgian policy makers, with railway commuting supporting movement between land as subsistence means and industrial wage work as income resource.

That a mobile labour force effectively served the interests of industrial and urban employers is illuminated by Janet Polasky. She pointed out that industrialists had asked railway minister Alexandre Jamar to organise special workmen trains with the argument that the “[e]mployers in mines and industrial centres had been trying since the 1850s to lure workers from rural areas to come work for them but could tempt few peasants to follow higher wages to industrial centres”. Even though Ernest Mahaim denied that industrialists had called the workmen train into existence to solve problems of labour shortage, he generously admitted that the institutionalisation of railway

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576 Polasky, Reforming urban labour, 2010, 79. See also Dennis, “The geography of Victorian values”, 1989, 41 on commuting and “the perpetuation of a low-wage economy”.

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commuting gave industrial employers access to an abundance of cheap labour.\textsuperscript{577} The “poor country districts, like some parts of Flanders and the Campine” in particular represented “the reservoirs of unskilled cheap labour for industry”.\textsuperscript{578} Another advantage of railway commuting, manifested itself in times of dwindling industrial production: smallholdings as building blocks of railway commuting let the ‘peasant-worker hybrid’, as Janet Polasky described them, return to their plot of land where “the family can live upon the potatoes, vegetables, bacon, or other produce which they have raised” during periods of unemployment.\textsuperscript{579} In sum, the ‘incomprehensible’ attachment of rural dwellers to their soils benefitted the industrial and urban employers by providing a sustained access to an exceptional cheap and flexible labour force.\textsuperscript{580}

While the gains of railway commuting for industrial and urban employers are rarely touched upon in literature, the economic value of railway commuting for rural households has been stressed with clock-like regularity: the geographical reach of the railway network gave rural dwellers access to more job opportunities, higher wages while living in a healthy and cheap environment.\textsuperscript{581} In the previous chapter, these top-down alleged benefits of commuting were confronted with a bottom-up use of cheap railway subscriptions by rural households, whereby heterogeneity in conduct contradicts the straightforwardness of this political scheme.\textsuperscript{582} The pull factor of higher wages also needs to be revisited, as evidenced by Ernest Mahaim’s summary of accounts about why rural dwellers started to take the train to work; they all mention “a real drama” that had pushed them into commuting whilst the attachment to the soil had kept them in the village.\textsuperscript{583} Admittedly, some appreciated the higher wages once railway commuting had been integrated in their labour practices, but others held their predilection for working on a field over a higher wage earned in a factory.\textsuperscript{584}

Finally, railway commuting as viable alternative for rural outmigration had booked results, as the absolute increase of almost 1,400,000 persons living in the countryside in 1961 compared to 1846

\textsuperscript{577} Mahaim, \textit{Abonnements d’ouvriers}, 1910, 4-5; Mahaim, “Cheap railway tickets”, 1906, 540.
\textsuperscript{578} Mahaim, “Cheap railway tickets”, 1906, 541.
\textsuperscript{580} Rowntree, \textit{Land and labour}, 1910, 95-97. For a conceptualisation of the cheap railway subscriptions as a policy tool in the hand of the Belgian government to regulate the elasticity of labour markets: De Meulder e.a., “Belgian urban landscape”, 1999, 83.
\textsuperscript{581} See Chapter 1: 5.4 Six types of commuters.
\textsuperscript{582} [own translation] Mahaim, \textit{Abonnements d’ouvriers}, 1910, 144.
\textsuperscript{583} Mahaim, \textit{Abonnements d’ouvriers}, 1910, 139.
exhibits (table 2). Ernest Mahaim, nevertheless, concluded his study on the societal effect of cheap railway subscriptions for wage workers by stating that the influence of railway commuting on urban morphology was double-sided: though it rooted wage workers in the countryside, taking the train to work simultaneously opened the horizon of another world, thereby feeding the appetite of rural dwellers to leave their village permanently.\textsuperscript{585} Observing this incentive to migrate, made H. Demain curious about the places rural households picked as their new home. He selected a rural municipality of around 800 inhabitants in the Brabant loam region beneath Brussels, for which he registered the profession, the destination and the migration cause of every person who left the village permanently between 1909 and 1913.\textsuperscript{586} Of the thirty labour migrants who motivated their destination choice, twenty-five wanted to have a home near the railway network to heighten their connectivity with the workplace whilst five migrants moved to live near the work. Improving one’s access to the railway infrastructure thus influenced the decision of a rural household to migrate. Yet, inquiring why rural households left their villages in the first place, again elucidates the importance of a plot of land, as the research of Emile Vandervelde and Benoit Bouché exposes.

6.5 Rooting the rural dweller: easy railway access or a plot of land?

Emile Vandervelde was intrigued by the divergence in mobility patterns that he discerned in the basin of Basse-Sambre during the closing decade of the nineteenth century.\textsuperscript{587} In theory, the well-developed connectivity between the villages and the industrial labour markets in the surroundings of Charleroi and Namur, should have turned the industrial wage workers with a home in this region into railway commuters. In reality, most industrial wage workers in the canton of Gembloux opted for migration after having commuted for a while whereas the industrial wage workers in the canton of Fosses remained loyal to commuting. With Gembloux located north of the industrial labour markets and Fosses in the south, the distance of the home-work split was approximately the same for both cantons. Distance thus fails to account for the divergent mobility choices. If any, the connectivity of the railway infrastructure in the canton of Gembloux was slightly better in comparison to the canton of Fosses, and yet, the municipalities with direct railway access in the canton of Gembloux lost their inhabitants in contrast to the canton of Fosses.

\textsuperscript{585} Mahaim, Abonnements, 1910, 144.
\textsuperscript{586} Demain, Migrations ouvrières, 1919, 194-195. See also Grosjean, Urbanisation sans urbanisme, 2010, 165-166.
\textsuperscript{587} Vandervelde, L’exode rural, 48-52, annexe I.
As soon as Emile Vandervelde directed his attention to the rural regions, the conundrum was solved: the canton of Gembloux belonged to Haspengouw whereas the canton of Fosses was part of the Condroz region, specifically the Entre Sambre-et-Meuse region. Both rural landscapes were blessed with fertile grounds, nevertheless, commercial farming in the surroundings of Gembloux had induced a competition for land that made it hard for a wage worker’s household to get hold on land for subsistence purposes whilst in the Entre Sambre-et-Meuse area the subsistence use of land was part and parcel of the region’s economic organisation. Indeed, wage workers with the Condroz region beneath their homes only paid a small fee to access municipal land as a means to supplement their livelihoods.588 During his inspirational stay in Belgium for solving the problem of poverty in England, Seebohm Rowntree also commented on commercial farmers, smallholdings tilled by rural wage workers and allotments cultivated by industrial wage workers all having their space in the Condroz region.589 When Emile Vandervelde asked a miner in Fosses why he endured such a tiring commute, the miner casted a look of disbelief and answered: “Because there, we would not have enough land to keep our cow!”590 The man apparently had a convincing attitude, because the future chairman of the Belgian Workers’ Party advised his readers to give a cow the credit it deserves in the livelihood of a rural household. He further argued that land as a means of subsistence outdid easy access to railway infrastructure in clarifying migration patterns of rural households.591

The population dynamics of two villages located north of the industrial Walloon axis in the Hainaut loamy region in the last decennia of the nineteenth century described by Benoit Bouché, ratify Emile Vandervelde’s argument.592 The village best equipped to support a home-work split had a higher emigration rate than the village where the ‘peasant-worker hybrid’ flourished. This again hints that commuting made way for proximity the moment rural households lost their access to arable land. The societal shift to market exchange and large-scale production only amplified the occurrence of this situation. Indeed, first, the dependency on industrial wage work grew as additional incomes previously retrieved from the opportunities embedded in a rural economy had

588 Ulens, Le Condroz, 1920, 82-83.
589 Rowntree, Land and labour, 1910, 9.
590 [own translation] Vandervelde, L’exode rural, 1903, 52. Information on why a cow was considered a livelihood asset is given by Renatus Geleyns in his agriculture survey of Holsbeek that he compiled in 1943. According to this teacher, the food a cow needed was easy to cultivate, demand for milk and butter was ubiquitous and the stable manure of cows came in handy to make the land more fertile. See also Verbeken, Grand Central Belge, 2012/2014, 44.
591 Vandervelde, L’exode rural, 1903, 48.
592 Bouché, Les ouvriers agricoles, 1913, 95-97.
to be compensated for. Second, with the vanishing of available land, the prospect of owning a small holding melted into the air too. Third, while the access to land was lost, the cost of a railway subscription as well as the fatigue of a prolonged workday remained. Arguably, these factors made it more appealing for rural households to search betterment opportunities elsewhere. This adds logic to the observation that rural outmigration after 1895 increased whilst the demand for cheap railway subscriptions by wage workers synchronically rose. After all, the maturation of industry and trade had relocated the growth of labour markets in industrial sites and urban locations.

Nonetheless, if the loss of land in the livelihoods of rural households makes intelligible the replacement of railway commuting with labour migration, how then to explain the multiplication of smallholdings in Belgium during the nineteenth century?593 To answer this pertinent question the agricultural census of 1895 provides the numbers to nuance a last assumption in the top-down claim that railway infrastructure improved “the quality of life of the working class [by giving them the opportunity to] build a house with kitchen garden near a light railway stop in the fields or close to the railway station bordering the villages, where land was affordable”.594

6.6 Combining land and labour
In the year that railway commuting stood on the verge of becoming a widespread labour practice among Belgian households, officials were busy gathering data to stay informed on the whereabouts of the agricultural sector.595 Among the collected data was the size of an agricultural exploitation. To answer the question asked, agricultural exploitations smaller than 0.5 hectares have the interest. According to Minister of Agriculture and Public Works Léon de Bruyn, the inclusion of allotments in the 1895 census rendered the only correct representation of the agricultural sector, as households cultivating a plot of land were part of the agricultural population, even if the cultivable land was smaller than 0.5 hectare.596 In the mindset of Emile Vandervelde, registering allotments coincided with an administrative error: for him, the practice of growing vegetables and perhaps keeping some animals for household consumption was part of the industrial world instead of agriculture.597 Or,

594 De Block, “Planning rural-urban landscapes”, 2014, 545-546. 
595 Agriculture. Recensement général de 1895, digitised by LOKSTAT.
596 Introduction au recensement général de 1895, publié par le ministère de l’Agriculture et des Travaux Public, Bruxelles 1900, 438 as mentioned by Vandervelde, L’exode rural, 1903, 178.
597 Vandervelde, L’exode rural, 1903, 178-179.
both the minister and the socialist emphasised the importance of combining land and labour in the livelihood of Belgian households, yet, they disagreed on whether a plot of land aligned with a custom of an agrarian household gaining additional income in industry or an industrial household supplementing wage work with an allotment garden. Looking at the phenomenon in retrospect, it is tempting to side with Emile Vandervelde and agree with Seebohm Rowntree that “Belgium has gone further than any other country in supplying her working-class population with gardens [whereby the] possession of these gardens, so highly prized by the working-class population, is rendered possible by the system of cheap railway tickets, which enable men to live at some distance from their work in districts where land is comparatively cheap”. Nonetheless, if the perspective is taken of a person knowing the past with an undecided future in 1895, then classifying households generating income via industrial employment while working a plot of land in their spare time under the umbrella of an agricultural population, is as legitimate as Emile Vandervelde’s point of view.

Indeed, as Martina De Moor stated, income pooling was “the key mechanism in the survival policy of the rural population”, given that the amount of land rural households had at their disposal was generally insufficient to sustain all its members. Eric Vanhaute and Leen van Molle retraced the origin of the coping mechanism to the eleventh century, with Martina De Moor arguing that the combining land and labour by households in the countryside continued well into the twentieth century. Hereby, Wouter Ronsijn stressed that the broader economic organisation of society delineated the kind of non-agrarian activities rural households integrated in their income pooling strategies. Although factories and mines progressively claimed their place in the livelihood of rural households during the era of steam and steel, cottage industry and rural wage work held their space with even a mix of all three activities belonging to the possibilities. Furthermore, the economic value Seebohm Rowntree ascribed to the allotments of industrial wage workers in 1910 matched the meaning peasant households attributed to their plot of land in previous centuries, i.e. “providing a welcome addition to the family dietary, and often a substantial contribution to the family income”. Land and labour as constituent elements of a livelihood were thus far from new

598 Rowntree, Land and labour, 1910, 108. See also Mahaim, Abonnements d’ouvriers, 1910, 140.
601 Ronsijn, “Gaining ground”, 2022, 95.
602 See Chapter 3: 6.5 The effect of rural economies on the spatial pattern of commuting ratios.
at the turn of the twentieth century, nor was the combination restricted to Belgium. The size of the allotment likewise had little value in distinguishing between an industrial wage worker and an agricultural member of society, as exemplified by Wouter Ronsijn’s use of a plot of land beneath 0.5 hectares as variable to identify semi-landless peasant household during the latter half of the nineteenth century.

In sum, meaning attached to a plot of land beneath 0.5 hectares is a social construct, which is more revealing about the mindset of the person applying the label, rather than representing an objective fact. Noteworthy, however, is the short time span between the agrarian classification argued by Léon de Bruyn in 1895 and the industrial association in the work of Emile Vandervelde, Seebohm Rowntree, Ernest Mahaim and H. Demain around 1910. As both the agricultural census and the literature on railway commuting impose the agricultural or industrial label on the Belgian households top-down, the conceptual shift in mindsets to grasp the ways of the world arguably reflected a transformed society. Indeed, the time between 1895 and 1910 was long enough to turn railway commuting into a societal phenomenon whose scale and scope gave Belgium an unique position within Europe. This altered scale of railway commuting linked to labour mobility as a “feature of modern industry”, in all likelihood inspired the popularity of railway commuting as research theme. With their curiosity raised by movement and railway technology as vectors of change, little attention was spared to illuminate the continuity side of historical development.

Consequently, the attachment to the soil as part and parcel of an ancient coping mechanism went in oblivion, even when the stubborn attitude of rural households to leave an impoverished countryside left intellectuals dumbfounded. This blind spot aligns with William Cronon’s keen observation that people are always inclined to reshape a particular landscape in line with their perception of progress without paying much attention to the advantages a landscape already has in store. These advantages are neglected either because their familiarity has made them invisible or because they are inconsistent with the mainstream vision of societal progress. Yet, reintroducing these forgotten features in academic circles opens up interesting lines of inquiry, as Stephen Graham and Simon Marvin proved with their book Splintering urbanism in which they restored the “often taken-for-granted world of networked urban infrastructure” at the turn of the twenty-first century.

605 Ronsijn, “Gaining ground”, 2022, 93.
606 See Introduction: 4.1 Exposing the social construction of statistical data.
century. Visualising the geography of allotments beneath 0.5 hectares before taking the train to work rose to prominence, gives the ‘vegetable garden’ back to the rural households in this dissertation.

6.7 The value of a timeline
A time line is helpful in elucidating when a landscape asset went into oblivion as its linearity pinpoints the turn to redundancy in the long-term development of society. Indeed, a timeline unites the three time scales theorised by Fernand Braudel that together steer historical development: structure, conjuncture and event. As a structure spans centuries, a conjuncture ties decennia and an event coincides with a short-lived period, it follows that the structure is primarily the guardian of continuity with the event the explicit expression of change whilst the game-changing interaction between continuity and change takes place on the conjuncture scale, which is retraceable in the context of societal transformation. So, if it were the Belgian railway policies connecting villages with urban and industrial labour markets that gave industrial wage workers their allotments, then it is in the line of expectations that most allotments are located near the hotspots of mechanised production of the first industrial revolution, i.e. Ghent, Mons-Charleroi and Liège-Verviers. Moreover, with railway commuting becoming an enshrined labour practice after 1895, the magnitude of allotments before 1895 should be small. Both expectations are refuted by the data registered in the agricultural census of 1846 and of 1895.

In 1846, 572,656 agricultural exploitations were registered with land surfaces ranging from less than 0.5 hectares to more than 120 hectares. Agricultural exploitations beneath 0.5 hectares were the most numerous, representing 43.2 percent or 247,563 units. With 14.4 percent, the second place was assigned to 82,580 agricultural exploitations between 1 and 2 hectares whereas the third place was occupied by 70,427 agricultural exploitations that had a land surface between 0.5 and 1 hectares, being 12.3 percent. The data recorded in the agricultural census of 1895 proved that this ranking had stood the test of time, though the weight of the three types of agricultural exploitations had altered. On a total of 830,694 agricultural exploitations, 55.2 percent had a size beneath 0.5 hectares, 10.9 percent a size between 1 and 2 hectares and 10.4 percent a size between 0.5 and 1

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612 Agriculture. Recensement général (15 october 1846) and Agriculture. Recensement général de 1895, both digitised by LOKSTAT.
hectares, corresponding with respectively 458,430 units, 90,553 units and 86,106 units. The spatial patterns of agricultural exploitations beneath 0.5 hectares on map 11 and map 12 also confirm that allotments existed long before railway commuting appeared on the world stage. For example, the ubiquitous presence of allotments in the Courtrai area as early as 1846 is at odds with the railway network causing the parcellation of this area noticed by Emile Vandervelde around 1900.

The magnitude as well as the geography of agricultural exploitations beneath 0.5 hectares in a period when taking the train to work was still a project of the future, undermines the causal relation between railway commuting and vegetable garden. Moreover, the presence of allotments all over Belgium debunks the strong conception of allotments being a construct of urban labour markets, either because the allotment is approached as an ancient landscape element that developed in or at the fringe of towns or it has been integrated in a discourse of bringing urbanity to the countryside thanks to railway development. Indeed, the outspoken density of allotments in the Courtrai area in 1846, indicates that cottage industry and a vegetable garden were complementing a household’s livelihood with a home in the countryside. The similar pattern of allotments in the Hainaut province in 1846 are by G. Braive likewise linked to a mutual dependency between a plot of land and industrial wage work. Map 12, however, reveals why the idea of an urban origin of vegetable gardens is so persuasive. Even without railway commuting as entrenched practice of households having a home in the countryside, the economic growth poles of the nineteenth century are easy detectable in the restructured geography of agricultural exploitations beneath 0.5 hectares in 1895, with Ghent and Brussels as the proverbial exceptions.

It is the irony of history that the ‘stubborn’ attachment of rural households to the soil so questioned by policy makers, was the precise mechanism that reformers mobilised in their idea of providing urban wage workers with a vegetable garden to ease the dire living circumstances and this in the exact year that the second industrial revolution made railway commuting popular. In 1896, two French priests and a catholic printer-publisher from Brussels discussed the charity initiative in the north of France, leading to the establishment of the Ligue Française du Coin du Terre et du Foyer in France in 1897 and its counterpart in Belgium two years later. In 1900, the

603 De Block, “Planning rural-urban landscapes”, 2014, 546.
Map 11 shows the geography and numbers of agricultural exploitations beneath 0.5 hectares according to the agricultural census of 1846. (source: LOKSTAT)
Map 12 shows the geography and numbers of agricultural exploitations beneath 0.5 hectares according to the agricultural census of 1895. (source: LOKSTAT)
initiative of renting out a plot of land so industrial wage workers could grow their own vegetables, was to admire at the world fair in Paris, being the marketing event par excellence of an industrial world seeking to inspire awe in its visitors for the marvels modernity had bestowed on the world. Three years later, in the same capital, the first international congress on vegetable gardens was a fact. Hence, the reconceptualization of a vegetable garden as hybrid phenomenon integrating an agrarian activity in an urban context.

Without refuting the hybrid nature of vegetable gardens, the spatial patterns exposed on map 11 and map 12 foregrounds a discourse in which cultivating a plot of land beneath 0.5 hectares was a practice of households in the countryside long before steam engines turned their world upside down. Accordingly, a garden attached to a wage worker’s home for consumption purposes would have been familiar to rural households weaving linen for market purposes as early as the late medieval period. For them, however, the ranking would be the other way round, whereby the loyalty is attached to the plot of land and other activities being interchangeable. As the research of Eric Vanhaute, Jos De Belder and Martina De Moor revealed that the pooling of land and labour by rural households continued well into the twentieth century, it is explored in the next chapter how railway commuting helped these households to safeguard their access to a plot of arable land.648

7 Conclusion
The empirical maps of this chapter visualised the population dynamics in Belgium between 1846 and 1961. To interpret the exposed patterns, the effect railway infrastructure exerts on population patterns was combined with migration theories that approach migration as a selective decision. In particular, the government’s goal to turn Belgium in a national rural-urban continuum from 1869 onward was put on the dissection table by asking if Belgian wage workers complying with this policy after 1895, as demonstrated in the previous chapter, effectively kept the population distributed over cities, towns and villages. To this end, labour markets were introduced as the variable that relates the impact of railway infrastructure on population dynamics to a household’s need for a livelihood. Accordingly, population numbers were mobilised to trace the places in the countryside where rural households preferred to stay despite the structural shift towards industrial and urban employment, triggering the rural outmigration that the Belgian railway policies wanted to address. Choosing 1846, 1895 and 1961 as sample years made the period

long enough to let the interplay between networked connectivity and urbanisation dynamic materialise in population patterns.

First, the effect of the government’s ambition to make the home-work split a key ingredient of industrial labour markets was verified by mapping population dynamics before and after 1895. In contrast with the policy expectations, migration flows increased both in size and geographical scope after trains were adopted as commuting vehicles by wage workers. Second, a map was created for each of the three sample years that simultaneously highlighted the material connectivity of the railway network and the classification of a municipality as ‘urban’, ‘rural’ or ‘susceptible for rural outmigration in theory’ based on its number of inhabitants. The spatial patterns that emerged in the three cross-sections confirmed the ability of railway infrastructure to induce population growth in a place by revitalising its local economic activity. At the same time, however, the maps showed that the relation between direct railway access and population failed to produce an univocal effect. The observed discrepancies between theorised and actual outcomes prompted the creation of other maps that showed the population loss in municipalities susceptible for rural outmigration in theory. Again the unfolding patterns synchronically confirmed and refuted spatial expectations.

Overall, the regional differences that the empirical maps displayed left the researcher with two conundrums: first, why did direct railway access fail to trigger population growth in certain municipalities and, second, why did migration rates increase in general and in some well-connected municipalities in particular? The Jean-Marc Offner’s spotlight on market competition as loyal companion of market exchange proved to be of value to explain population loss in urban municipalities. Indeed, the connectivity between places that resulted from transport development affected the urban municipalities whose amenities no longer tuned in with societal preferences, the replacement of manual by mechanised textile production being one example in case. This kind of market competition also impacted the livelihoods of rural households, as it translated in dwindling incomes from cottage industry. However, a successful commercialisation was also able to cause population loss in specific municipalities. Indeed, whereas a successful process of market exchange in urban locations resulted in a concentration of the population in nodes on the railway network, commercial exploitations in rural regions launched a dynamic of population loss. Neither the proximity of industrial labour markets, nor large farms supporting a local labour market or a well-developed railway network facilitating the home-work split were able to keep the rural dwellers in their ancestral villages, although these three geographical amenities should have rooted the rural household in its ancestral village if asked to Emile Vandervelde.
He solved the puzzle by bringing the perspective of the rural household into the equation: access to a plot of land was the physical asset rural households valued above all. Once land as the bread and butter of rural economies illuminated the results of the empirical analysis, the patterns became explicable. Therefore, the economic organisation of a rural region should be taken into account in investigations of urban growth. In other words, next to the connectivity between places transport planning imposes on territories and the rational of economic growth that reshapes city and countryside through market exchange, the rural region has to take its place as a spatial vector that influences a rural household’s decision to either migrate or commute. A rural region’s influence on location preferences of rural households is tied to livelihoods and it plays on a double level, i.e. the economic reorganisation of the rural region, on the one hand, and the mechanism of income pooling, on the other.
“Although this format suggests a scientific neutrality, in fact the assumption of many social scientists – for example, a strong belief in environmental determinism and an equally strong belief that government should play a major regulatory role in land use – are so deeply engrained that they virtually guarantee that only a relatively narrow range of conclusions will be reached and that evidence to the contrary will be discounted.”

Bruegmann, “Paradoxes of anti-sprawl reform”, 2000, 164

“Bref, dans presque toute la Wallonie, le travail de la terre est de plus en plus dédaigné et, malgré l’extension des pâtures permanentes, malgré les perfectionnements du machinisme, les fermier se trouveraient fort dépourvus et ne sauraient comment se tirer d’affaire, s’ils n’avaient point à leur disposition les ouvriers chassées par la misère des villages du pays flamand.”

Vandervelde, L’exode rural, 1903, 158-159

1 Introduction

Contemporary debates on sustainable environments frequently address the climate-unfriendly CO2 emissions from private cars, thereby placing the mobility flows generated by an intrinsic feature of modern labour markets, namely the home-work split, high on the agenda. In these societal discussions, the compact city is often presented as the way forward, as densification brings human activities in close proximity and, hence, solves the need for travel. It is, however, interesting to note that this way forward can also be considered a leap back in the past: living near the work, after all, typified labour markets for most of human history. In literature, this asset of the past in the creation of sustainable environments today was lost because of a transport revolution that produced increasingly faster, cheaper and more comfortable modes of transport. Indeed, progressive time-space contraction eliminated physical distance, being the

barrier that held the size and geographical scope of movement at a leach in premodern times. During the process, time-space contraction made the home-work split feasible and, consequently, affected urban morphology. To examine how the development of transport infrastructure reshaped urban morphology, commuting flows are of interest: these flows make the geography of the home-work split comprehensible while their routine aspect perpetuates this spatial pattern. Yet, as will be the argument of this chapter, if the intertwinement of transport networks, commuting flows and urban morphology is viewed through the lens of time-space contraction alone, then the risk of technological determinism looms around the corner. For instance, arguing that the “quantum leap of private car ownership” is responsible for the sprawling of cities into the countryside, because the flexibility, speed and comfort that the technical features of a private car deliver were needed to cover daily distance in a “strung out, discontinuous and leapfrogged landscape”, is built on a logic that considers technology as “a virtually autonomous agent of change”.

Historians already pointed out the flaw in this logic when they exposed the sociotechnical production of transport infrastructure. A straightforward relationship between urban shape and specific transport mode has been questioned too. Yet, technological determinism is still at work in planning models assuming that wage workers seize the opportunity to commute as soon as transport policies and transport technology made routine travel available. In this strand of literature, households are assumed to integrate commuting in their livelihoods either because trains made the higher wages of urban and industrial labour markets accessible for wage workers with a home in the countryside or, the opposite, because transport infrastructure made it possible for wage workers to escape overcrowded cities while keeping their urban livelihoods. Or, making wage workers mobile simply by giving them access to transport infrastructure that connects the right places only works if commuting is equated with an opportunity. This equation features prominently a relational understanding of urban landscapes. For instance, the garden-

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625 See Introduction: 2.4 The planned vector of economic growth in transport infrastructure and Chapter 1: 3 An engineered network of flow.
city model of Englishman Ebenezer Howard, who literally speaks of a Town magnet and a Country magnet, inspired twentieth-century planning practices. Similar, classic economic urban models, like the city model of Alonso and Muth, stress “benefit-maximizing behaviour on the part of consumers” to scrutinise commuting patterns in the twenty-first century.

Yet, conceiving commuting as an undivided blessing for all households is at odds with Ernest Mahaim’s observation that most Belgian wage workers used cheap railway subscriptions discontinuously in the first decade of the twentieth century, or with his six commuter types for that matter. This empirical finding introduced labour markets and livelihoods in chapter 1, uncovering that the bottom-up necessity to preserve a livelihood by far outweighed the top-down policy of giving Belgian wage workers access to a territory-covering railway network in making the labour force mobile. In this chapter, the link between livelihoods, labour markets and commuting is further explored by turning the attention to the geography of labour markets, with the analysis demonstrating that the expanding network of trains not only concentrated major labour markets in urban and industrial gravity nodes, but also deprived rural households of local income resources. As such, the double-sided effect of railway infrastructure exposes commuting both as a pull and a push factor. On the one hand, gaining access to the railway network made it possible for some households to organise their location preferences based on balancing income resources and commuting costs whilst the centralisation of labour markets in gravity nodes on the railway infrastructure turned labour mobility in an economic imperative for households who already had a home in the countryside.

To build the argument, the double-sided effect of railway policies is used as lens to study commuting flows in Belgium in 1910. Commuting being a necessity next to an opportunity is argued first by showing that narratives of technological determinism overlooked the impact of railway policies on labour markets and, hence, on urban morphology. Next, the 1910 industrial census is presented as excellent source to research commuting flows: the commuting data that officials collected for each Belgian municipality document origin-destination relations and industrial branch. Hence, it is possible, firstly, to expose the spatial coherence wage workers

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630 See Chapter 1: 4.3 Demand for cheap railway subscriptions on an annual basis and Chapter 1: 5.4 Six types of commuters.
631 See Chapter 1: 5 Labour mobility and livelihood to grasp commuting patterns.
632 (planned economic growth) Introduction: 2.4 The planned vector of economic growth in transport infrastructure; (gravity nodes) Chapter 2: 2.1 The effect of the railway networks on the spatial distribution of labour markets; (deprivation) Linters, “Evenwicht tussen noden en mogelijkheden”, 1990, 77, 79, 81-82; Chapter 1: 5.6 The structural shift towards industrial and urban labour markets and Chapter 2: 5 Railway access, market exchange and urban growth.
gave to the Belgian territory with their commuting flows and, secondly, to explore the impact of livelihoods on commuting flows. Joris Beckers has my sincere gratitude for having visualised the home-work split on a national scale by applying a network analysis on the origin-destination relations structuring Belgium’s domestic commute in December 1910. A network analysis of commuting flows available for 2010 made it possible to show the influence of the global economy on the geography of core labour markets in Belgium and, hence, substantiate commuting as both an opportunity and an economic imperative. Subsequently, the link between livelihoods and industrial branch is elaborated on by juxtaposing home municipalities and workplaces for commuters employed in textile, mining, metal and transport industry. While the maps for metallurgy and transport underline the railway network as vector of centralisation, the spatial patterns of textile and mining industry in particular are useful in exposing the resonance of rural economies in commuting ratios.

2 Transport networks and urban shapes

2.1 ‘Hard’ technological determinism: the efficiency of transport to bridge distance

The place-connectivity that transport policies built into the world are by increasingly more people experienced as “a geographical power so irresistible that people must shape their lives according to its dictates”. A city’s dependency on market exchange for making life viable within its premises already goes a long way in clarifying the pronounced impact of transport networks on daily life. The sprawling of urban cores in their peripheries only added to a societal reliance on transport infrastructure, whereby “Christaller’s Central Place Theory, bid-rent models, and economies of scale and agglomeration all use ideas of concentration of population and declining population density with distance from the core.” In sum, both market exchange to provide for the needs of urban dwellers and stretched distances in daily travel due to a progressive separation of human activities increased the dependency of people on transport infrastructure. Yet, in research that seeks to comprehend how transport infrastructure and urban morphology influence each other, the impact of market exchange was

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633 Recensement de l'industrie et du commerce (31 décembre 1910). The 1910 census was the first national survey to combine industry and commerce, yet the majority of commuters practised a job in industry. For reading convenience, the historical source is thus referred to as industrial census instead of industrial and commercial census. See 3.1 The industrial census of December 1910.
634 Joris Beckers is a tenure track docent at the department of Transport and Spatial Economy at the University of Antwerp.
636 See Introduction: 2 The urban bias in understanding space relationally.
637 (quote) Mojica, Gregory and Marti-Henneberg,” Long-term urban change”, 2013, 94.
redirected to the shadows whilst a spotlight stressed “newer and more efficient modes of transportation and the spreading outward of urban activity at ever lower densities.” 638

A radial-concentric expansion of urban cores is also the spatial dynamic that prevails in urban models explaining the sprawled condition of cities today. 639 Hereby, the “gradual increase in mean travel speed” realised by transport innovations in the past advanced a plausible cause-consequence theory that identified the progressive efficiency of subsequent transport modes as the vectors of regional urban expansion. 640 Railway lines and streetcars were the first to substantially breach a medieval city’s compact shape by turning the circle into a star during the latter half of the nineteenth century. Houses and urban activities clustered near the iron transport axes whereas agrarian activities remained in the space between. Once the mushrooming of bus services and bicycles provided point-to-point connections in the interbellum, the agrarian activities in the interstices of the star were to make way for residential development. Next, the freedom to move at own will came to maturation. While it is undeniable that bicycles offer their owners flexible travel too, this flexibility loses out to the private car in terms of prolonged travel, comfort and speed. Similar, there is no doubt that public transport supports long-distance travel. Yet, it was a car’s ability to connect any plot of land as long as the place is attached to a street that energised a further dispersal of the urban core in the countryside. Moreover, the subjugation of the countryside to urban sprawl required the car as a toy of the rich to become an affordable object for the average household. 641 Hence, the separation of daily activities in a leapfrogged landscape materialised after the Second World War. 642

The theory that cars caused urban sprawl gets its appeal from the congruence between theorised cause-consequence relations and the observed morphology of urban landscapes today. The extensive built-up areas are indeed adequately described as regions “where the rate of land consumption is higher than the increase in population density”, whereby the omnipresence of private cars testifies to the vehicle’s suitability to bridge distances on a daily basis. 643 Moreover, the theory incorporates the two principles having stood the test of time in analytical frameworks


of transport planning. Namely: travel is a derived demand instead of “an activity that people wish to undertake for its own sake” and that the *homo economicus* desires to minimise costs.644 Nevertheless, this deterministic approach misses two crucial points that transport geographers Jon Shaw and James D. Sidaway aptly summarised by stating that transport networks are “a means by which society chooses to trade and interact”.645

First, approaching movement as a *societal choice* stresses the sociotechnical nature of transport infrastructure. It thus emphasises that the place-connectivity transport technology has generated is an utterly man-made and well-thought-out product aimed at achieving specific societal goals. Second, calling *trade* the rationale behind transport development urges a critical reflection on the geographical models that are conceived with the dominance of the urban core in mind.646 The presence of this bias in urbanisation theories is not only argued in the general introduction, but also related to planning practices that embedded the rationale of economic growth in the design and the organisation of railway infrastructure in the nineteenth century.647 The railway policies geared at stimulating market exchange were instrumental in the unseen concentration of the population in nineteenth-century cities, whereby the societal nuisances these growing cities produced led to an additional railway policy that had the dispersal of the labour force over the countryside as goal.648 In other words, by directing the attention to the railway policies prior to the organisation of a home-work split for wage workers, the capacity of transport infrastructure to delineate “where people live, work, and spend their leisure time” still stands.649 However, the definition of travel as a derived demand due to the radial-concentric expansion of the urban core has to be revised in line with the impact railway infrastructure exercised on the geography of labour markets.

2.2 ‘Hard’ technological determinism redefined: first trade, than commuting
The vector of economic growth planned in nineteenth-century railway infrastructure redirected the main labour markets to urban and industrial core locations.650 With commuting still absent in the middle of the nineteenth century, wage workers had to settle near their job, which accelerated migration to cities and industrial sites.651 The ensuing congestion in urban cores

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647 See *Introduction: 2 The urban bias in understanding space relationally*.
648 See *Introduction: 3.1 The home-work split in European transport policies*.
650 See *Chapter 2: 2.1 The effect of railway networks on the spatial distribution of labour markets*.
caused a spill-over effect that manifested itself in a radical-concentric expansion of the urban fabric as soon as city tolls were abolished and transport infrastructure supported daily travel. So, even if the impact of the railway infrastructure on the spatial pattern of labour markets is taken into account, the dependency on transport technology to support mobility flows between core and periphery again makes it possible to insert technological determinism for explaining historical development, albeit in a redefined version. Indeed, instead of “an independent entity, a virtually autonomous agent of change”, technological determinism now refers to “the human tendency to create the kind of society that invests technologies with enough power to drive history”. This definition underwrites the sociotechnical production of transport networks as it elucidates that technology and societal goals are deeply intertwined. Yet, once mankind designed the technology to solve the societal problem and released it into society, this reasoning assumes that technology creates its own path of development, dictating the course of events according to the inner logic of technological efficiency.

Related to transport technology, this ‘inner-logic’ deals with distance as mobility barrier. Therefore, if travel remains a derived demand due to the separation of human activities, then transport technology’s efficiency to reduce commuting time keeps linking the spatial pattern of urban growth to “a centrifugal fanning out of the functional urban area”. Moreover, this idea of causal efficiency only gains in traction as long as “today’s politicians”, like yesterday’s “enlightened rulers”, consider it their duty to make “perfect markets a reality [...] to maximise the efficiency of the use of resources and the happiness of men”. Indeed, this policy approach maintains market exchange as the bedrock for economic growth. Consequently, logistic hubs and large-scale production sites remain central in designing and organising transport networks in the twentieth and twentieth-first centuries, spurring a self-perpetuating growth of circulation and production on a global scale in which cities function as “hotbeds of demand and exchange” as well as locations where “the majority of job opportunities are still to be found [...] in line with

652 Abernethy, “Opening up the suburbs”, 2015; Passalacqua, “Reluctant capitals”, 2014; Verhetsel, Thomas and Beelen, “Belgian metropolitan areas”, 2010, 113; Smets, De tuinwijkgedachte in België, 1976, 8. The time gap between abolishing city tolls and developing transport policies that make commuting possible is noteworthy. For example, in Belgium city tolls were abolished in 1860 while the policy of giving wage workers access to the railway network only landed in a law nine years later (De Block and Polasky, “Rural-urban continuum”, 2011, 317, 319-320). In London and Paris, it even took till the 1880s for railway infrastructure facilitated commuting between core and suburb (Capuzzo, “Between politics and technology”, 2018, 25).

653 Smith and Marx, Technological determinism, 1994, (quote 1) xi, (quote 2) xv.

654 Smith and Marx, Technological determinism, 1994, xi, xiv.

655 Van Meeteren e.a., “Belgian metropolitan area”, 2016, 976

Like the inability of the compact city to digest the influx of labour migrants in the nineteenth century, present-day cities are physically forced to expand in their periphery. Indeed, the dependency of cities and large-scale labour markets on transport infrastructure has only increased due to the expansion of a networked economy whereas the surface of urban cores with direct access to the inter-urban flows of trade remained limited. As such, identifying the rise of a networked economy as root cause of peripheries being consumed by urban cores, is stating the obvious. However, if the logic of the interaction between core and periphery is turned around by pointing out that plenty of households lived in the countryside long before railway technology entered the world, then drawing the attention to the altered labour-market geography caused by railway policies geared at economic growth, opens the door for displaying commuting as economic imperative. The empirical analysis of population data in the previous chapter showed that the decisive shift towards industrial labour employment at the turn of the twentieth century failed to depopulate the countryside in Belgium. Accordingly, using the commuting data of 1910 to visualise the geography of industrial labour markets and corresponding home-work configurations, permits to draw conclusions on commuting as an opportunity and an economic imperative.

3 Data and methodology

3.1 The industrial census of December 1910

The government ordered the collection of data on commuting for all Belgian municipalities for the first time in 1910. State representatives also displayed an interest in the home-work split in the previous edition of the industrial census, yet, in 1896, the Belgian officials only collected commuting data for the municipalities that counted 500 or more industrial employed households among their inhabitants. Fourteen years later, the second industrial revolution had spread over Europe with almost 95 percent or 2,490 out of 2,629 Belgian municipalities hosting commuters in December 1910. Next to the geographical coverage, which justifies the scaled-up registration of the home-work split to the national level, the size is impressive. Indeed, on an active population of 3,228,799 persons, 16.7 percent or 538,691 wage workers lived and

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worked in different municipalities. The 1910 industrial census thus confirms Ernest Mahaim’s claim that commuting was a societal phenomenon no longer to be ignored in Belgium at the start of the twentieth century. Over the years, travelling to work has only grew stronger. In 1947, the number of commuters reached 40 percent. In that same year, the Netherlands counted 15.2 percent commuters, Switzerland 13.0 percent and North Rhine-Westphalia 15.3 percent, thus remaining all under the 16.7 percent that had been established in Belgium as early as 1910.

To investigate the home-work split, Ernest Mahaim quantified the spatial distribution of cheap railway subscriptions. As such, the eminent jurist and sociologist linked commuting to the railway network. The 1910 industrial census, in contrast, defined commuting as crossing at least one municipal boundary during the journey to work. Therefore, Belgian officials not only captured commuting by trains, but also by other transport modes, like walking, cycling and travelling by trams and light railways. Unfortunately, the type of transport mode that a wage worker preferred to bridge the distance in the home-work split was not defined. Travel distance and travel time were also not registered in 1910. Finally, using the home municipality of the commuter as spatial unit to organise the data on the home-work split gives information about the commuters who lived in the municipality and worked elsewhere, but is silent on the number of commuters who lived elsewhere and worked in the municipality. Despite these information gaps, the industrial census is a rich source for investigating commuting patterns on a national scale in December 1910.

LOKSTAT facilitated the quantitative and spatial analysis of this chapter by making the commuting data available in digitised format, thereby giving the GIS software information on gender, social status, industrial branch of employment as well as the origin-destination relations of commuting flows. Gender and social status are briefly discussed here while the informative value of origin-destination relations and industrial branches, as building blocks of this chapter, are covered when describing the methodologies to visualise spatial patterns. The interpretation of the ‘gender’ variable is binary: a commuter was either male or female. The title Recensement de l’industrie et de commerce is relevant for the interpretation of the social status as it highlights

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660 The amount of commuters is to be found in the 1910 industrial census whilst the number indicating the active population is taken from the census Population. Recensement general, 31 décembre 1910.
663 See Chapter 1: 4.1 Introducing Ernest Mahaim and his study on railway commuting.
664 For information on the bicycle as a commuting vehicle that became very popular amongst wage workers at the start of the twentieth century see for instance: Oosterhuis, “Cycling”, 2016, 240; Van Zutphen, “Het fietsen te Leuven”, 1979, 101; Bek, No bicycle, no bus, no job, 2022, 47-54.
665 As the reader will discover later, the month in which the commuting data were collected is important for the interpretation of the empirical maps.
666 Historical Database of Belgian Municipalities (LOKSTAT), Ghent University, Quetelet Centre.
Another novelty: the national census of 1910 was the first document to give insight in the world of both industry and commerce. The distinction that the published version makes between industrial and commercial employment in the quantification of the social status is somehow lost in the digitized format of the commuting data. Accordingly, the digitised data related to the four social statuses ‘entrepreneur’, ‘helper’, ‘worker’ and ‘clerk’ mix industry and commerce. The social status is of interest for this research because the composers of the census only associated workers and clerks with a mobile labour force, given that no ‘entrepreneur’ or ‘helper’ was registered as commuter. This social construction accords with the even more restrictive definition that the administration of the Belgian State Railways used, in which paid manual work was a prerequisite to be entitled to a cheap railway subscription. In his statistical study, Ernest Mahaim calculated that at least 20 percent of the latter were commuters in 1908.

This restriction translates in the historical data as follows. In Belgium in 1910, 69.3 percent of the active population, or 2,237,983 individuals on a total of 3,228,799, were occupied in industry and commerce. Restricting the home-work split to workers and clerks while taking their unemployment figures into account, results in 1,359,450 potential commuters. This number represents 60.7 percent of the persons active in industry and commerce, divided into 1,223,836 workers and 135,614 clerks. Of the workers, 505,454 or 41.3 percent effectively commuted whilst this equalled 24.2 percent or 32,867 commuters for the clerks. Alas, it is unclear how the total figure of 538,709 commuters is divided over industry and commerce. Given that industry employed 1,710,140 individuals (76.6 percent), including entrepreneurs, helpers, workers and clerks, whereas 522,759 persons (33.4 percent) were active in commerce, it is reasonable to assume that a majority of commuters retrieved an income from an industrial occupation. It is the preponderance of industry in the census data that explains the focus on industrial branches in this research to expose how livelihoods and commuting patterns interact. Finally, the restriction of the spatial analysis to the commuting flows that remained within the Belgian border excludes the 46,791 commuters who travelled abroad, being 8.7 percent of all commuters.

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668 Mahaim, “Cheap railway tickets”, 1906, 537.
669 Mahaim, Abonnements d’ouvriers, 1910, 48-49.
670 For the interested reader, annex 2 contains a map showing where wage workers lived who travelled abroad in December 1910.
The Belgian officials recorded the number of commuters per home municipality and added the different municipalities that these commuters had as destination, thus informing on the spatial relations that labour mobility drew between various Belgian municipalities. Joris Beckers, expert in network analysis, applied the community detection approach to the 1910 commuting data to visualise this spatial coherence. Two arguments urged the selection of network analysis as method. First, a relational understanding of space, being “the mantra of the early twenty-first century in human geography”, has made networks and flows crucial organisers of space on the methodological stage of the spatial disciplines. Secondly, the origin-destination data of the commuting flows correspond with the information needed to uncover “the spatial configuration of the network [being] the outcome of the contacts and movements, which themselves depend on the spatial context of the people and places”. Furthermore, commuting flows are routine displacements streamlined by transport infrastructure. Hence, empirical commuting data provide the spatial information that, on the one hand, links the transport network to the spatial patterns of the home-work split and, on the other, delineates territories based on the economic interconnectedness of a place.

Community detection algorithms are popular within network analysis because they make a priori defined central places and thresholds based on set spatial interactions redundant. Indeed, instead of assuming spatial contiguity in advance, relational data are used as input so that spatial coherence is exposed by these algorithms bottom-up. To this end, network analysts use nodes and the weighed edges between these nodes to calculate interaction fields. These interaction fields make the communities embedded in the structure of the network visible, with a community being “a set of highly connected nodes that are more intensively linked together than with the rest of the network.” In this doctoral research, the municipalities of origin and destination are the nodes in the network while the number of commuters per origin-destination relation determine the weight of the edges. Deciding the degree of centrality a node holds in the

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672 Beckers, Location and network structure, 2019, 10.
674 Verhetsel, Beckers and De Meyere, “Assessing daily urban systems”, 2018, 635.
675 Detailed information on the community detection approach, especially on the Louvain method, can be found in the doctorate of Joris Beckers and articles such as Adam, Delvenne and Thomas, “Detecting communities”, 2018; Verhetsel, Beckers and De Meyere, “Assessing daily urban systems”, 2018; Thomas, Adam and Verhetsel, “Community detection algorithm”, 2017; Jones e.a., “Does geography still matters?”, 2016. The community detection method can be applied on all kind of data as long as the data is relational. What makes the method deliver geographical outcomes is choosing a spatial entity as node, in this case municipalities. If, for example, nodes are represented by persons, the community detection approach detects communities within social networks.
network, implies calculating two parameters. The within-module degree \( z \) reveals the connectivity the node possesses in the community while the participation coefficient \( P \) gives the connectivity that the node has with nodes outside this community. In both cases, interconnectedness increases in line with a higher value. Next, the seven categories of Roger Guimèra and Louis A. Nunes Amaral are of interest for classifying a node in accord with the calculated values of the two parameters. If connections with other municipalities both within and without the community are non-existent or limited, then a municipality is classified as an ultra-peripheral or a peripheral node. Non-hub connector nodes and non-hub kinless nodes resemble these two nodes by having a low level of connectivity within the community, but their connections with municipalities outside the community is stronger. As the connections of a kinless hub with other municipalities is almost equally divided, the node escapes hierarchical ranking. Provincial and connector hubs, in contrast, infuse the network with hierarchical ranking, whereby provincial hubs act as strong connectors within the community and connector hubs put their stamp on the entire network.

Using the interaction between nodes as flexible mechanism to delineate a community has two consequences that are of interest for the reader. First, communities can overlap. The overlap that emerges out of the empirical data indicates that the calculated interconnectedness of a node “hesitate[s] for membership of a community” while the size of the overlap is imposed on the data by the researcher when deciding upon the maximum limit for community membership. Second, the network analysis aims to display the spatial coherence of a territory so that every node has to be assigned to a community. If multiple nodes have a very loose connection with a community, then this methodological requirement risks to create a false impression of relational coherence.

### 3.3 Descriptive cartography: what an industrial branch elucidates in commuting patterns

The community detection approach exposes the spatial coherence embedded in the origin-destination relations of commuting flows in December 1910. The Belgian officials also organised the commuting data per industrial branch, making it possible to highlight ‘livelihood’ as a variable affecting the geography of commuting by visualising home-work configurations per industrial branch. Since the registration principles of the 1910 industrial census remain silent on origin-destination relations per industrial branch, the method of juxtaposing had to be used to

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677 All the information in this alinea is taken from Verhetsel, Beckers and De Meyere, “Assessing daily urban systems”, 2018, 640-641.
relate the home municipality of a commuter in a particular branch to the municipalities where that specific industrial activity was practised. Juxtaposition means that the empirical maps are approximative by definition, with the absence of data on the exact locations of the industrial labour markets adding to this approximation. To address this informative gap, the assumption that entrepreneurs are potential employers is combined with the categorisation of entrepreneurs and their helpers as non-commuters in 1910 so that the municipalities where entrepreneurs in a specific industrial branch lived serve as proxy for the location of the respective labour markets. In other words, the distance in the home-work split per industrial branch is deduced from the spatial coherence between the municipalities where the commuters lived and the municipalities where the entrepreneurs lived and worked.

While the national registration of the number of commuters per industrial branch makes the weight of the home municipalities in the commuting patterns easy to display, the potential size of the labour market, in contrast, is to be calculated for each municipality. To this end, the number of commuters was subtracted from the total number of persons active in each industrial branch and for each municipality. The result of this calculation results in the municipalities that housed local actives in a particular industrial branch without, however, giving any information about the presence as well as the number of commuters who were employed in the municipality in the corresponding industrial branch. Equally important for the interpretation of the maps is the meaning of the adjective ‘industrial’ in the census: referring to mechanised production in large-scale factories or in exploitation sites as well as manual crafts and domestic production. As such, employment in, say, the metal industry covers a variety of occupations, ranging from producing nails at home, over a blacksmith with a workshop in a village to a factory worker keeping a blast furnace in operation. What the precise nature was of the occupation that underlie the statistical number, is again beyond the level of information the census provides.

4 Networked connectivity in commuting patterns

4.1 Detecting job basins in Belgium in 1910

Applying the community detection approach on the origin-destination relations of domestic commuting flows in Belgium in December 1910 results in map 1, which displays the sixteen

Map 1 shows the job basins in Belgium according to the industrial census of 1910. Some municipalities are white due to the spatial mismatch between the census data and shifts in municipal borders. (source: LOKSTAT)
Map 2 visualises the spatial coherence between job basins, provincial and connector hubs and the railway network in 1910. As such, map 2 adds hierarchical ranking to map 1 and highlights the importance of the railway network in streamlining commuting flows. (source: LOKSTAT)
economic interaction fields or communities that the algorithms calculated. Henceforth, a commuting community is also called “job basin”, as it is the spatial configuration of the home-work split that knits different municipalities into a community. It is immediately clear from the shape of the coloured surfaces that the job basins display a high degree of spatial contiguity, whereby the limited presence of isolated municipalities and overlapping communities reflect the robustness and clear delineation of these job basins. Overlap, symbolised by a hatched zone, emerges in case the community membership of a municipality was less than 70 percent, thus indicating that the commuters in these zones travelled to different job centres. Within the variegations in shape and size of the job basins, West-Flanders stands out because it is the sole province that coincides with a job basin of which the commuting flows remain within the provincial border. The provinces of East-Flanders, Antwerp, Brabant, Hainaut and Namur count twelve job basins, with the commuting community in the eastern part of Antwerp in particular extending well into Limburg. The size of these job basins is considerably smaller compared to the three commuting communities that colour Limbourg, Liège and Luxembourg. The calculated communities thus create spatial heterogeneity that follows an east-west divide.

The degree of connectedness of a municipality within the commuting network is shown on map 2, thereby adding hierarchical ranking to map 1. To keep the map legible, only the provincial (blue colour) and connector hubs (red colour) are displayed, given that within the seven categories indicating a node's connectivity, the provincial and connector hubs have the strongest impact on the spatial integration of home and workplace. A provincial hub derives its local importance from boasting the links between municipalities in the same job basin; a connector hub, on the contrary, is influential over the entire network as it ties municipalities in and outside a community together. The calculation delivered 4 connector hubs that are all be found on map 2 whilst the 68 provincial hubs are divided in two groups: a blue dot represents a provincial hub with at least one other provincial hub in its vicinity while a blue star symbolises an isolated provincial hub. For further reference, the resulting 13 dots and 8 stars are reduced to 16 numbers equal to the number of job basins, with the provincial hub that attracts the most commuters per job basin giving its name to the respective commuting community (map 3).

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681 When Joris Beckers performed his network analysis, the municipal borders that shift throughout time were not yet aligned with the Belgian municipalities that existed in 1910 and that streamlined the commuting data in the industrial census. As such, the map displays white surfaces that result out of the mismatch between spatial unit on the map and administrative unit in the industrial census.


683 For the seven categories: see 3.2 Network analysis: revealing the spatial coherence of origin-destination relations.


685 For information on the clustering of the provincial hubs next to a map displaying all these hubs in 1910: see annex 3.
Map 3 is a reference map. It serves to locate the different job basins of 1910.
Next to hierarchical ranking, the lay-out of the railway network is visible on map 2, which reveals two interesting spatial relations. Firstly, as the 1910 industrial census lacked information on the transport modes wage workers used to connect the home with the workplace, an *a priori* link between commuting and railway infrastructure is missing in the empirical data Joris Beckers utilised to delineate the job basins. It is therefore interesting to note that all the hubs that give centrality to the commuting network are attached to the railway network. The spatial relation between railway infrastructure and commuting flows is even more outspoken for the provincial hubs that named the job basin, as only Couvin is not located at a railway junction. Secondly, as the eye moves from west to east, a loss in railway density can be detected corresponding with an increase in the geographical scope of job basins: smaller communities with a fine-mazed railway infrastructure characterise the western half of Belgium whereas a coarse-meshed railway network serves the extended job basins in the eastern half of the nation. Take, for example, the commuting community of La Louvière, which has the provincial hubs Haine-Saint-Pierre and Morlanwelz-Mariemont in its cluster (annex x). The labour markets of these three industrial municipalities are situated in the heart of the mine area known as *Le Centre* and give spatial coherence to a small job basin interlaced with various railway lines. In contrast, the elongated commuting community of Verviers is streamlined by one dominant railway line that connects the southern periphery with the labour markets of Verviers in the north. The job basin of connector hub Leuven is a second example of trains structuring the geography of an economic interaction field: the shape of the commuting community follows the curves of the railway infrastructure in a contiguous surface. The commuting community of Charleroi exposes yet another spatial pattern in which the far-reaching tentacles of the labour markets clustered in the industrial basin exhibit the full power of trains to connect homes to remote job opportunities.

In sum, the empirically calculated job basins reveal that proximity as well as pro-longed travel gave spatial coherence to Belgium’s commuting landscape in 1910. Indeed, the surface of most commuting communities is contiguous and rather compact, thus elucidating proximity as a rationale in the home-work split. Nevertheless, other wage workers used the connectivity of a territory-covering railway network to its full extent, as the extensive job basins of Liège, Verviers, Jemelle and the leapfrogged shapes of Bois-de-Lessines, Charleroi, Namur and Couvin indicate. Secondly, map 2 shows an empirical link between trains and the location of core labour markets. Relating the spatial pattern of calculated commuting communities to the railway network revealed that, in 1910, all the provincial and connector hubs had direct railway access. From this observation spins the conclusion that railway development imposed the home-work split on rural households who lived in the countryside, by tying the majority of workplaces to economic
growth nodes on the railway network. As discussed in chapter 2, the attachment of rural households to their villages was particularly outspoken in Belgium due to the strong reliance of these households on their plot of land.686

This attachment also influenced urbanisation dynamic that unfolded after the Belgian government had made the railway network accessible for wage workers: the ‘back-to-the-land’ movement that Emile Vandervelde had predicted failed to occur, but the option of taking the train to work “caused an endogenous growth of rural municipalities”, as Greet De Block and Janet Polasky pointed out.687 Or, rather than dispersing the urban dweller over the countryside, railway commuting eased the home-work split that the relocation of labour markets imposed on rural households who were reluctant to leave their village. This link between labour markets and commuting flows highlights commuting as a push factor. A first step in deciding whether this line of reasoning has merit, is asking to what extent the widespread use of private cars as commuting vehicle has increased the average commuting distance after the Second World War, as the association between cars and a strung-out landscape derives its explanatory strength from conceptualising commuting as a pull factor with transport development curing “all metropolitan ills” by solving the “limited availability of land” in the urban core.688

4.2 Commuting on rails in 1910 and on roads in 2010

The article in which Ann Verhetsel, Joris Beckers and Michiel De Meyere exposed the spatial coherence of domestic commute in Belgium by applying community detection algorithms on the home and company addresses of commuters in December 2010, allows comparing both the number, shape and size of job basins and the economic interconnectedness of a place before and after private cars entered the commuting scene.689 The calculated job basins are visible on figure 1a.690 Whereas sixteen job basins partitioned Belgium along a west-east axis in 1910, the map of 2010 counts thirteen job basins that follow a north-south divide. As employment centres give spatial coherence to economic interaction fields on which the partitioning algorithm are based, the shifts in core labour markets serve to explain the changed commuting communities. In the hundred years between the two cross-sections of Belgium, Wallonia lost six out of ten core destinations for commuters while Flanders gained three attraction poles and replaced one job

687 De Block and Polasky, “Rural-urban continuum”, 2011, 313.
Figure 1a shows the commuting communities in Belgium in December 2010. (source: Verhetsel, Beckers and De Meyere, “Assessing daily urban systems”, 2018, 644)
centre in the northeast corner. The multiplication dynamic in the northern half of Belgium produced job basins that either retained or increased their compactness, with the economic interaction fields of Brussels and Hasselt being the proverbial exceptions. The latter two helped in countering the loss in territorial coverage caused by more compact and less numerous commuting communities. Nonetheless, the real credit accrues to the three job basins in southern Belgium: these job basins make the need for long-distance commuting apparent by embracing three and a half provinces. Likewise noteworthy is the disappearance of leapfrogged commuting communities in 2010, which gives the impression that wage workers in 1910 were willing to commute over longer distances compared to 2010.

Graph 1 shows the average distance travelled on the railway network from 1872 to 1910 for three types of train passengers who were entitled to a subscription. (source: Chemins de fer de l’Etat, compte rendu 1910, A (144-145))

To inquire the validity of this impression, average commuting distances are of interest. Whilst the three geographers used their empirical data to calculate average commuting distances in 2010, the industrial census of 1910 remains silent on the subject. Fortunately, the annual reports of the Belgian State Railways fill the gap: starting in 1872, the railway administration calculated and published the average distance that holders of a subscription covered by train on

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691 Bois-de-Lessines, Cuesmes, La Louvière, Couvin, Jemelle and Verviers lost their status as commuting destination in Wallonia whereas Kortrijk, Sint-Niklaas and Hasselt emerged in Flanders, with Turnhout taking over from Overpelt in the northeast corner of Belgium.  
an annual basis. Subscriptions were available for three types of railway travellers: students, workers and a general category that captured all other subscribers. As graph 1 shows, holders of a general subscription took full advantage of the railway network’s ability to support long-distance travel whereas the displacements of workers and students were locally oriented. An average distance between 10.5 and 14.5 kilometres from 1872 to 1910 attributes short and stable travel behaviour to the student category. Workers increased their average railway commuting from 12.2 kilometres in 1872 to 18.8 kilometres in 1910. The cheap railway subscriptions wage workers departing from Leuven station used in the months of May, July and August 1908, gave Ernest Mahaim an average travel distance of 19.4 kilometres. Although this number resulted in his exclamation that a distance of 17.3 kilometres published by the railway administration for 1904 till 1908 was “une veritable méprise”, Ernest Mahaim admitted that both numbers led to the same conclusion: “as a rule, wage workers with a cheap railway subscription travelled over short distances”. Nevertheless, as map 4 demonstrates, an average railway commuting of 19.4 kilometres still makes a commuter’s home part of a rural-urban continuum surpassing the built-up area of suburbs around core labour markets.

Ann Verhetsel, Joris Beckers and Michiel De Meyere used the connectivity of the road network to determine the distance between the centroids of home and work municipalities, with a calculated average distance of 20.4 kilometres. The calculation coincides with figures that are published in other official documents like the 2001 socio-economic survey, noting 17.2 kilometres on average for home-work displacements in 1991 with the number climbing up 19.0 kilometres in 2001. One might comment that home-work displacements within municipal borders are by definition short and thus bring down the average travel distance. Yet, the empirical data of 1910 reduces the average commuting distance too, as it only informs on the part of the home-work split that was covered by train. Indeed, only if the stations of departure and arrival were both located in the home and work municipality of a commuter, then the length of the railway commuting in 1910 would coincide with the distance of a home-work split that links the centroids of home and work municipalities. Dan Bogart and his co-author’s “starting point [. . .] that commercial and industrial firms would have had an incentive to locate near

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693 Chemins de fer de l’Etat, compte rendu 1910, A (144-145).  
694 Mahaim, Abonnements d’ouvriers, 1910, 49-57. See also Chapter 1: 4.2 Travel distance.  
697 Verhetsel e.a., Pendel in België, 2009, 10, 56. The home-work displacements in this socio-economic survey is defined as every movement between the place of residence and the workplace, regardless if a municipal border is crossed. This definition corrects for the fusions of municipal borders that reduced the number of Belgian municipalities from 2,629 in 1910 to 589 in 2010.
Map 4 gives an impression of the distance covered in an average railway commuting of 19.4 kilometres according to Ernest Mahaim’s data for the months of May, June and July 1908.
railway stations because the cheapest, high speed transport network could be easily accessed there” makes it plausible that for a majority of workplaces, the arrival station was located in the same municipality.⁶⁹⁸ Moreover, this location pattern aligns with the railway policy stimulating market exchange to create economic growth. However, the extension of this railway network with light railways to unlock the countryside, makes it less likely that a departure station was present in each municipality where commuters lived.⁶⁹⁹

So, neither the shape and size of the commuting communities, nor the average commuting distance indicate that the connectivity of the road network in 2010 had considerably expanded the geographical reach of the home-work split trains bridged in 1910. Rather, the outcomes substantiate Colin G. Pooley’s counterfactual history in which he stated that mobility flows in a landscape without cars would differ little from present-day patterns on the condition that a territory-covering public network offered the flexibility of travel associated with private cars.⁷⁰⁰

This public network was to support, on the one hand, a gravitational logic letting overcrowded urban cores radiate into their hinterlands and, on the other, a densification of space between the villages escaping gravitational logic due to their location further afield, but nonetheless part were part of the rural-urban continuum because relocated labour markets had made them part of economic interaction fields. In this scenario, the urban economy equally tightens its grip on the countryside and the result is a sprawled landscape all the same, yet, it places the focus on a commuter’s home being part of “boundless spaces in ever more complex networks of urban relations. Such networks link cities not only to their hinterlands but also to sites over all the globe”, to quote Dorothee Brantz, Sasha Disko and Georg Wangern-Kyora.⁷⁰¹

4.3 The influence of the global economy on the location pattern of Belgium’s labour markets
A network is “a machine for circulation as well as an instrument for territorialisation”.⁷⁰² If networked circulation enhances the ability of transport technology to flatten space by providing the same service everywhere, then the ensuing isotropic flows turn transport infrastructure into an equaliser of space. This mechanism allowing for spatial decentralisation inspired the Belgian government to establish a rural-urban continuum in which a mobile labour force preserved the distribution of the population over villages, towns and cities.⁷⁰³ If, instead, networked circulation is combined with the ability of transport technology to spur economic growth, then the self-

⁶⁹⁸ Bogart e.a., “Railways, divergence and structural change”, 2022, 1.
⁶⁹⁹ See Chapter 1: 3.5 Giving rural households access to the railway network.
⁷⁰³ See Chapter 1: 3.5 Giving rural households access to the railway network.
reinforcing dynamic of cities, market exchange and transport infrastructure inserts hierarchical ranking into a territory.\textsuperscript{704} This mechanism that enhances spatial centralisation is at work in the process of nineteenth-century cities becoming urban nuclei on a railway network that serves as economic backbone, with an unseen population concentration in its wake. The dual network system of Giovanni Favero, Michael-W. Serruys and Miki Sugiura captures the double-sided effect of a network on spatial coherence. In their model, cities intertwine isotropic flows with centralised economic activities because urban nuclei act as gateways that ty the flows of circulation on global networks to local city-hinterland relations.\textsuperscript{705} The importance of interactivity within a dual network is pointed out by Colin Divall and George Revill who underlined that transformations at one scale of linked networks inevitably trigger changes at the other.\textsuperscript{706}

Interestingly, the $z$ and $P$ parameter of the community detection approach can be linked to the vectors of dispersion and concentration giving spatial coherence to a territory in the dual network system.\textsuperscript{707} Indeed, the $z$ parameter detects the connectivity of a municipality within its community whilst the $P$ parameter retraces the connections maintained with municipalities outside the community. Hence, the $z$ parameter highlights core-periphery patterns whereas the $P$ parameter uncovers hierarchical network relations. The two parameters combined deliver a classification scheme in which an ultra-peripheral node, having little or no connections with other nodes in the network, is at one end of the spectrum whilst a connector hub, with strong connections both within and outside its community, occupies the other end. This classification scheme and the double-sided effect of networked connectivity use the same principles to investigate the spatial coherence of a territory so that the hierarchical position of the Belgian municipalities in the commuting networks of 1910 and 2010, displayed on map 5 and figure 1b, make it possible to examine how flows of market exchange on a global scale influence the location pattern of labour markets on a national scale and, consequently, the core-periphery relations in regional commuting communities.\textsuperscript{708}

One superficial look at the two maps suffices to notice that the stain pattern present in 1910 has flattened out in 2010, resulting in a reduced complexity of provincial and connector

\textsuperscript{704} See Introduction: 2.4 The planned vector of economic growth in transport infrastructure.
\textsuperscript{705} Favero, Serruys and Sugiura, Urban logistic network, 2019, 5. See also Introduction:2.2 Erasing reciprocal rural-urban relations in urbanisation theories.
\textsuperscript{707} See 3.2 Network analysis: revealing the spatial coherence of origin-destination relations.
\textsuperscript{708} Map 5 is calculated by Joris Beckers; figure 1b is published in Verhetsel, Beckers and De Meyere, “Assessing daily urban systems”, 2018, 647.
Map 5 gives the connectivity calculated by the community detection approach for the Belgian communities in 1910.
Figure 1b gives the connectivity calculated by the community detection approach for the Belgian municipalities in 2010. (source: Verhetsel, Beckers and De Meyere, “Assessing daily urban systems”, 2018, 647)
hubs both in magnitude and spatial distribution. Zooming in on the magnitude uncovers that the 4 connector hubs of 1910 amounted to 15 in 2010 whereas the 68 provincial hubs shrank to 3. Here, it is plausible to assume that the sharp decline in provincial hubs is explained by municipal mergers, bringing 2,629 municipalities in Belgium in 1910 back to 589 in 2010. Nevertheless, the clustering of the provincial hubs in 1910, which reduced the count of 68 provincial hubs to 21 provincial hubs effectively dispersed over the nation, makes this assumption unlikely. The number of commuting communities declined too. In contrast, polycentricity remained, albeit in reduced form: the shift from 16 job basins and 25 (clustered) provincial and connector hubs in 1910 to 13 job basins and 18 hubs in 2010 still rendered a situation in which the economic interaction fields emerging from home-work configurations were outnumbered by hubs giving centrality to the spatial coherence of commuting flows. Also the balance in this polycentricity shifted: provincial hubs that dominated the commuting scene in 1910 had passed the torch to connector hubs by 2010. This shift in interconnectedness deserves the attention. Indeed, with a provincial hub stressing core-periphery relations within an economic interaction field and a connector hub stressing hierarchical relations between different economic interaction fields, the replacement of provincial hubs with connector hubs during the twentieth century indicates that more leverage has been put on a city acting as a gateway in flows that span the globe and less on the significance a city as central place derives from its local hinterland. Or, the ability of transport infrastructure to facilitate both global exchange and local movement on a daily basis is at work in home-work configurations.

The job basins, provincial and connector hubs in 1910 compared to 2010 substantiate this claim for the Belgian territory. Firstly, cities alone gave centrality to commuting flows in 2010 while porphyry extraction in Bois-de-Lessines (1,743 inhabitants), metallurgy in Couvin (3,193 inhabitants), lime extraction in Jemelle (2,248 inhabitants) and zinc factories in Overpelt (4,147 inhabitants) show that villages functioned as provincial hubs too in 1910. Especially the core-periphery relations structured by village Bois-de-Lessines impress, as the industrial basins of Cuesmes and La Louvière next to the cities of Brussels, Ghent and Tournai represent the neighbouring commuting communities. Hence, the provincial hubs on map 5 confirm that the materialisation of railway infrastructure in the long nineteenth century triggered a progressive concentration of labour markets in industrial and urban locations. Hereby, the loss of industrial villages acting as provincial hubs on figure 1b demonstrates that the ongoing process of

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709 See 4.1 Detecting job basins in Belgium in 1910.
globalisation amplified the centralisation of core labour markets in the twentieth century.\textsuperscript{710} Observing that the numerous ultra-peripheral nodes, which coloured the Belgian territory in 1910, had left the map in 2010 only adds to the argument of relocated labour markets, because an absence of ultra-peripheral nodes “means that there always exist some commuting flows towards other communities”, thus implying that the five percent of Belgian municipalities providing in 1910 their inhabitants with a home as well as a livelihood had joined the home-work split in 2010.\textsuperscript{711}

Secondly, the four cities that the $z$ and $P$ parameters designated as connector hubs in 1910 were hardly considered to be the industrial blockbusters of their era, nor were they the cities on which the top-down planning of the railway network hinged “as a coherent infrastructure frame facilitating transnational transport” during the 1830s.\textsuperscript{712} Geraardsbergen, Leuven and Namur, on the other hand, figured on Ernest Mahaim’s list that enumerated the twenty stations issuing 9.7 percent of the cheap railway subscriptions asked for by Belgian wage workers in 1908.\textsuperscript{713} Their presence on this list marks these cities as important facilitators of the isotropic commuting flows Belgian decision makers depended on to establish the envisioned rural-urban continuum. The “thorough analysis of the spatial structure of commuting by train” conducted by Jonathan Jones, Christophe Cloquet, Arnaud Adam, Adeline Decuyper and Isabelle Thomas by applying community detection algorithms on digital requests for train travel made between December 2015 and February 2016, exposes that Leuven and Namur still were “important crossroad[s] on the railway network”, with Namur even having the larger cities of Liège and Charleroi in its community.\textsuperscript{714} These empirical observations forward the argument that the primordial focus of a connector hub in 1910 supported a mobile labour force in a rural-urban continuum that spanned the nation whereas the dominance and geography of connector hubs hundred years later emphasise their function as gateway in a hierarchically-ranked network of global flows.

In sum, the nineteenth-century railway planning geared at achieving the societal goal of national prosperity simultaneously developed cities in gateways of global market exchange whilst progressively concentrating major labour markets in cities and industrial sites. As such, transport technology not only furthered the growth of urban nodes that had direct access to

\textsuperscript{710} (concentration) Chapter 2: 2.1 The effect of railway networks on the spatial distribution of labour markets; Chapter 2: 4.2 The era of urban growth and Chapter 2: 5.1 Linking network, territory and market exchange in a vicious circle (globalisation in 1990s) Creswell, \textit{Place}, 2004/2015, 89.

\textsuperscript{711} (quote) Verhetsel, Beckers and De Meyere, “Assessing daily urban systems”, 2018, 644; (five percent) see 3.1 The industrial census of December 1910.

\textsuperscript{712} (quote) De Block, “Designing the nation”, 2011, 703; (planning) see Chapter 1: 3.2 Fortifying connectivity and circulation in transport policies.

\textsuperscript{713} Mahaim, \textit{Abonnements d’ouvriers}, 1910, 42-43.

\textsuperscript{714} Jones e.a., “Does geography still matters?”, 2016, (quote 1) 2, (quote 2) 10.
global transport networks, but also extended the grip on regional urbanisation dynamics by catering for the mobility the home-work split required. This mutual dynamic between gateway function and labour-market geography affects the pattern of commuting flows too, as the transformation of the Belgian commuting communities between 1910 and 2010 showed. Furthermore, due to the mere fact that earning a living is a daily task, proximity still matters in the commuting flows that are delineated by the urban core so that “nearby places are more strongly related than the distant places” despite the ability of transport networks to create isotropic flows.\textsuperscript{715} Within this regional coherence, the technological features of the car indisputably unlocked building plots that are inaccessible to transport modes following fixed routes, like trains, trams and buses. Yet, a gravitational logic whereby cities sprawl in their periphery has little value in explaining the unexpected large job basins of Jemelle or Overpelt in 1910. To make this observation intelligible, the planned vector of economic growth in transport infrastructure and commuting as a push factor are of interest.

5 The double-sided effect of networked connectivity on commuting patterns
5.1 The home-work split as opportunity
Ignoring the planned vector of economic growth in transport infrastructure favours a history of commuting as opportunity, whereby transport technology delivering time-space contraction and economic development resulting in higher wages to address transport costs explain why current labour markets have the home-work split as common feature. In this approach, the growth of cities is seen as “a path-dependent result of the agglomeration-economy regimes that were present when urbanisation occurred [whereby] key mobility technologies have led to expansion of the size of the functional urban area in each cycle”.\textsuperscript{716} The need of mechanised production for a vast labour force in the nineteenth-century cycle, landed in “a momentous process of condensation in the inner city” that was fed by a rural exodus.\textsuperscript{717} According to Robert Bruegmann, the desire to escape the nuisances of a city without losing access to the place is as old as the city itself. Alas, for most of history, this spatial arrangement was restricted to “those fortunate enough to have private transportation” until transport development and transport policies brought this privilege of the rich within the reach of the masses.\textsuperscript{718} Enabling urban dwellers to realise a longstanding desire to live on cheaper building plots in a healthy

\textsuperscript{715} Adam, Delvenne and Thomas, “Detecting communities”, 2017, 365.
\textsuperscript{716} Van Meeteren e.a., “Belgian metropolitan area”, 2016, 976.
\textsuperscript{717} Verhetsel, Thomas and Beelen, “Belgian metropolitan areas”, 2010, 113.
\textsuperscript{718} Bruegmann, “Sprawl and accessibility”, 2008, 5.
countryside while staying connected to the urban labour markets, thus translated in the spread of the urban fabric over the countryside.

Hereby, the historian went against the grain of technological determinism by arguing that “rather than say, as many people do, that the automobile was a principal cause of sprawl in the twentieth century, it would probably be at least as accurate to say that a desire for lower density living was the reason automobile makers were able to transform themselves from a small industry turning out luxury products to an enormous industry making a product that was become a standard fixture in affluent households worldwide”. His debunking of cars causing urban sprawl was preceded by geographer Kevin R. Cox who tackled the link between private cars and urban sprawl as early as the 1970s when he made cultural values the rationale behind the preference for a home in a spacious environment. He deduced this priority of lot size over technological car qualities from his observation that American households already had widespread access to private cars in the first half of the twentieth century while sprawling cities only started to reconfigure the urban landscape in the second half of that same century. In his counterfactual history, Colin G. Pooley went even a step further by making the private automobile redundant in the home-work split of a stretched urban landscape.

Whilst the arguments of these authors refute a deterministic relationship between cars and urban sprawl, the conceptualisation of the home-work split as an opportunity and a personal choice still stands. This needs amending. Take for example the “Haussmannian make-over to accommodate the bourgeoisie” in the Belgian capital around 1900. This embellishment forced wage workers to relocate in the outskirts of Brussels, thereby not only justifying the resentment of the socialist in Schaerbeek who compared the involuntary move of the wage workers with the tucking away of the Native Americans into reservations, but also exposing commuting as imposed labour practice. Plain acts of injustice can be encountered around the globe, yet, this kind of compulsory relocation pales next to the effect that the societal goal of making the nation prosperous had on forcing the home-work split upon rural households in the long nineteenth century.

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720 Cox, Human geography, 1972, 6.
722 Schepers e.a., “Organising the work-home split”, 2020, (quote) 104, 103-104.
723 Take, for example, South Africa. At the onset of the twentieth century Africans were expelled from ‘white’ cities and forced to live in dormitory townships. With one stroke, this removal not only installed segregation, but likewise made the inhabitants of the township dependent on workmen trains to have access to work. (Pirie, “African township railways”, 1987, 283-295)
5.2 The home-work split as economic imperative

As already demonstrated, the progressive centralisation of labour markets due to the rise of a networked economy deprived rural households from local income resources.\(^\text{724}\) This process meant coerced labour mobility for rural households who were reluctant to leave their villages. If this effect of transport development is neglected, then the observed rise in commuting flows only enhances the conceptualisation of commuting as an opportunity. Even in the nation where households already living in the countryside were targeted by the policy makers to make their envisioned rural-urban continuum a reality, the home-work split was anything but an economic imperative.\(^\text{725}\) On the contrary, as Raoul Blanchard explained in 1906, railway commuting solved the problem of the Flemish peasants who had to look for employment elsewhere because they so stubbornly wanted to stay in the countryside.\(^\text{726}\) Reversing the cause-consequence relation between requiring a livelihood and becoming mobile, thus reconceptualised commuting as an opportunity.

The literature study Patrick Bek conducted for his doctoral research on commuting in the Netherlands is useful for exposing that this bias effectively veils commuting as a push factor. The articles in Labor History and The International Review for Social History, two leading journals in labour history, mark the end of the nineteenth century as the period in which “daily commute became a more common job market strategy for blue-collar workers” in countries as diverse as Germany, Turkey or India.\(^\text{727}\) Of course, this outcome of the literature review can easily be seen as favouring commuting as a pull factor as the periodisation coincides with the urbanisation phase in which trains and trams redrew the circular shape of the compact city into a star. Nevertheless, the red thread in Patrick Bek’s No bicycle, no bus, no job is the consistent failure of the Dutch state to meet the actual mobility needs of “five key industrial centres in the Netherlands” throughout the twentieth century.\(^\text{728}\) The large-scale labour force required for industrial production surpassed local supply so that wage workers who lived further afield had to be addressed. As the state fell short in bridging distance in the home-work split, employers and wage workers were left to their own devices, whereby the title of Patrick Bek’s publication hints that private motorisation was unavailable as commuting vehicle during the larger part of the twentieth century. The inadequacy of public transport to support a mobile labour force thus tips the balance in favour of a home-work split being imposed on households by the progressive

\(^{724}\) See Chapter 1: 5.6 The structural shift towards industrial and urban labour markets and Chapter 2: 5 Railway access, market exchange and urban growth.

\(^{725}\) Mahaim, Abonnements d’ouvriers, 1910, 6.

\(^{726}\) Blanchard, La Flandre, 1906/1970, 509.

\(^{727}\) Bek, No bicycle, no bus, no job, 2022, 20.

\(^{728}\) Bek, No bicycle, no bus, no job, 2022, (quote) 27, 36, 58, 184-185.
concentration of labour markets in industrial and urban locations. Hence, turning the attention to labour markets and livelihoods holds the potential to expand on commuting as a push factor.

6 Labour markets in commuting patterns

6.1 Workplaces and commuting ratios in the 1910 industrial census

In the cross-section statisticians made of Belgium’s industry and commerce in December 1910, wage workers and clerks alone were considered potential commuters. Visualising the home municipalities of entrepreneurs and their helpers therefore give a glimpse on where potential workplaces for commuters were located. By subtracting the number of commuters from the total number of active persons per municipality, results in the number of entrepreneurs and helpers living in a municipality. The presence of industrial employment in a municipality is then calculated by dividing this number by the population level of the municipality, with the results shown on map 6. The national average of 15.8 percent serves as criterion to colour municipalities according to their classification, with a darker colour equalling a higher presence of potential job opportunities in industry. Hereby, a municipal’s level of industrial employment was labelled ‘unimportant’ if the ratio lay between 1 and 7.9 percent, the label ‘beneath national average’ indicates a range between 8.0 to 15.8 percent with the label ‘above national average’ standing for a range between 15.9 and 32.2 percent whilst a number ranging from 32.3 and 18.5 % was labelled ‘very important’. The absence of the colour red on map 6 implies that all Belgian municipalities offered a roof to at least one entrepreneur. This highlights the importance of a statistical definition: the adjective ‘industrial’ in 1910 referred to large-scale production as well as manual craftwork and cottage industry.

Map 7 complements the spatial pattern of potential commuter’s destinations on map 6 by informing on the distribution of the commuters’ home municipalities. The commuting ratio is calculated per municipality by dividing the number of commuters by the total amount of wage workers and clerks living in that municipality. The national average of 52.1 percent again serves as criterion for classifying the municipalities with a darker colour standing for a higher presence of commuters. The label ‘not important’ was assigned to municipalities that had a ratio between 1 and 26.5 percent, the label ‘beneath national average’ reflects a value between 26.6 to 52.1

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729 See 3.1 The industrial census of December 1910.
730 See 3.3 Descriptive cartography: what industrial branches elucidates in commuting patterns As a remainder, the social status mixes industrial and commercial employment. Yet, as industrial employment had the upper hand, references to the commercial element in the national census have been omitted for ease of reading.
Map 6 relates railway network, provincial and connector hubs to the geography of industrial workplaces in Belgium in 1910. The latter is calculated by dividing the number of entrepreneurs and their helpers living in a municipality by the municipal’s total population. (source: LOKSTAT)
Map 7 relates the railway network, provincial and connector hubs to the geography of commuting ratios in Belgium in 1910. The latter is calculated by dividing the number of commuters in a municipality by the municipal’s total number of wage workers and clerks. (source: LOKSTAT)
percent, the label ‘above national average’ coincides with a ratio between 52.2 to 78.2 percent and the label ‘very important’ captures all remaining municipalities, except those where the commuting ratio was either 0 percent or 100 percent. The former embraced 139 red-coloured municipalities. In these places the home-work split lacked, either because no wage workers or clerks had a home in the municipality (26.6 %) or none of the wage workers or clerks commuted (71.9 %). The latter are dark-brown and encompassed 205 municipalities or 8.2 percent of the 2,490 Belgian municipalities that offered at least one commuter a roof.

Both maps delineate the vertical ABC-axis, linking Antwerp over Brussels to Charleroi with a small detour involving La Louvière, and the horizontal Walloon axis, relating Cuesmes, La Louvière, Charleroi over Namur to Liège and Verviers. Hereby, the colours painting the horizontal Walloon axis on map 6 endorse Christian Vandermotten’s statement of a spatial metaphor, given that Mons/Cuesmes-Charleroi and Liège-Verviers are separated industrial basins. As can be seen on map 7, municipalities with heightened commuting ratios were present in the vicinity of both axes. Proximity between workplace and a commuter’s home is observable in the northwest part of Belgium too, where the few municipalities with commuting as labour practice are located near Ostend, Bruges and Ghent. Overall, however, the spatial patterns in this corner is distinctive. Inland Flanders colouring dark on map 6 hints at an outspoken presence of industrial workplaces, which contrasts with the light colour dominating the surface of West- and East-Flanders on map 7, as it indicates a region where commuting is almost absent.

The presence of a seemingly contradictory pattern on map 6 and map 7 equally applies to the Campine area, Hageland and sandy-loam Haspengouw in the northeast part of Belgium and to the Ardennes in the southern half of the nation. In these rural regions, a coherent surface of light colours indicating the near absence of industrial labour markets on map 6 is matched by a mottled pattern of dark-brown and red municipalities neighbouring each other with all other variegations in commuting ratio present on map 7 too. Hence, the home-work split in these rural regions was defined by long-distance commuting for those households who had turned to railway commuting for preserving a livelihood. The pattern of long-distance commuting accords with the enlarged job basins that the community detection algorithms calculated for the eastern half of Belgium in 1910. It likewise aligned with the national labour market underlying the rural-urban continuum Belgian policy makers envisioned in 1869. In related political discourses,

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731 The remaining 1.5 % are municipalities without data in the industrial census of 1910.
732 Van Meeteren e.a., “Belgian metropolitan area”, 2016, 980.
733 For the names of the rural regions: Chapter 2: figure 2.
commuting was always portrayed as a pull factor. After all, issuing cheap railway subscriptions for wage workers gave rural households access to the higher wages of the industrial and urban labour markets whilst allowing them to stay in the ancestral village to grow some vegetables and perhaps keep some livestock. Nevertheless, the erratic pattern of commuting ratios on map 7 undermines this rhetoric. Indeed, if railway commuting was beneficial for all rural households, why was it practiced by only some of them? Neither proximity nor long-distance commuting offer a way out of this conundrum, but zooming in on industrial branches might.

<table>
<thead>
<tr>
<th>industrial sector</th>
<th>number of commuters</th>
<th>employment</th>
<th>% commuting/employment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>absolute</td>
<td>%</td>
<td>absolute</td>
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<tr>
<td>Fish</td>
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<td>20.2</td>
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<tr>
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<td>1.9</td>
<td>31,641</td>
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<td>16,614</td>
<td>3.3</td>
<td>29,773</td>
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<tr>
<td>Chemistry</td>
<td>16,894</td>
<td>3.3</td>
<td>36,247</td>
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<td>9.6</td>
<td>262,746</td>
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<td>4.5</td>
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<td>Construction</td>
<td>51,968</td>
<td>10.3</td>
<td>163,810</td>
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<tr>
<td>Wood</td>
<td>30,672</td>
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<td>Leather and skin</td>
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<td>68,711</td>
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<td>1.7</td>
<td>28,432</td>
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<tr>
<td>Transport</td>
<td>59,020</td>
<td>11.8</td>
<td>154,180</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td><strong>505,454</strong></td>
<td><strong>100</strong></td>
<td><strong>1,710,161</strong></td>
</tr>
</tbody>
</table>

Table 1 shows the reliance of an industrial branch on commuters for the month December 1910. *(source: 1910 industrial census)*

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6.2 The reliance of an industrial branch on commuters

As can be deduced from table 1, the composers of the national census distinguished seventeen industrial branches and added transport as a separate eighteenth branch. The commuting ratios in December 1910 inform that the reliance on commuters varied per industrial branch. A ratio of 55.8 percent indicated the glass industry was most dependent on commuters to meet labour supply: 16,614 out of 29,773 persons active in the glass industry were commuters. The absolute number of commuters in the glass industry, however, pales against the amount of commuters active in metallurgy, mining and transport. Metallurgy ranked first, as it employed 20.2 percent or 102,125 commuters of all 505,454 persons travelling to work, followed by 73,500 commuters in the mining sector (14.5 percent) and 59,020 commuters in the transport sector (11.8 percent). While the amount of 48,276 commuters holding jobs in the textile industry fetched a fifth place in this ranking, with a rate of 9.6 percent, the textile branch was first among its peers when it came to employment figures: 262,746 or 15.4 percent of the 1,710,161 industrial actives worked in textiles. In this list, metallurgy ranks second and mining fifth, thereby demonstrating that the pillars of the first industrial revolution (1770-1840) still were giants in the second industrial revolution (1896-1910).736

This strong presence on industrial labour markets as well as their increased reliance on commuters make textile, mining and metallurgy interesting candidates to investigate the interplay between livelihood and commuting patterns. With mobility flows and railway infrastructure as central research objects, the transport sector almost automatically inserts itself as a fourth candidate for making a cross section of home-work configurations per industrial branch. For each of the selected industrial branch, grey circles represent the number of commuters in their home municipality while coloured circles give the amount of entrepreneurs and helpers present in a municipality. A circle that is grey and coloured at the same time thus symbolises a municipality that was simultaneously a home for commuters and provided local employment. Accordingly, a two-coloured circle indicates that either the labour supply in the municipality fell short in meeting local demand or that commuters preferred to work in another municipality. Furthermore, selecting the method of juxtaposition to visualise spatial coherence of home-work configurations is, by definition, approximate. Using home municipalities of entrepreneurs and their helpers to detail the location of potential labour markets only reinforces this approximate nature. Indeed, indicating the presence of potential employment opportunities

in an industrial branch remains silent on the magnitude or even the presence of commuters arriving from other municipalities.

6.3 The home-work configurations in textile, mining, metallurgy and transport

The eye is immediately directed to the northwest corner of Belgium on map 8, where a coherent green surface representing the textile industry exhibits a high concentration of labour markets. The clustered textile industry in West-Flanders and East-Flanders is complemented by smaller labour markets in the provinces of Hainaut (Tournai and Leuze), Brabant (near and in Brussels), Antwerp (Lier and Turnhout) and Liège (Verviers and Dison). The pattern of almost completely green coloured circles with a small amount of grey in the northwest corner of Belgium and in smaller labour markets, like Lier and Turnhout, reveals that local employment sufficed to meet local demand, making the home-work split redundant or limited in distance. The geography of commuters’ home municipalities closely matching the location pattern of the entrepreneurs’ municipalities likewise suggests that short-distance commuting dominated the home-work split in the textile industry. Pointing at short-distance commuting too are the various smaller circles surrounding one big circle, which for example, characterises the spatial coherence of the textile industry in Verviers or Brussel.

This clustering of circles also figures on map 9 displaying the spatial coherence of the home-work configurations in the mine industry. As the yellow colour demonstrates, the Mons-Charleroi axis and Liège-Verviers axis state engineers Pierre Simons and Gustave De Ridder selected as industrial growth poles in the 1830s, were still standing in 1910. The absence of the Campine mine basin is explained by its late exploitation, which began in earnest only after 1917. The grey circles covering the yellow circles expose a mobile labour force commuting over short distances within the mine basins. The other half of the story is filled in by combining the grey dots situated in the northern half of Belgium with the known location of the mine basins in the middle of Belgium. Here, the scattered geography of the home municipalities shows that the appeal of the mine industry reached deep into the countryside and thus places long-distance commuting as equally important feature of the home-work split on the map. The scarcity of grey dots beneath the industrial belt is intriguing, as it raises the question why the wages of the mine industry were unable to practice their magic on rural households living in the Ardennes, even though Emiel Vliebergh and Robert Ulens stated that the Campine area had the company of

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737 See Chapter 1: 3.2 Fortifying connectivity and circulation in transport policies. See also Dejongh and Segers, “Kleine natie in mutatie”, 2001, 172.
Map 8 depicts the home-work configurations of commuters in the textile industry in 1910. Gent, Verviers and Moeskroen top the list of local employment, with respectively 21,601; 7,378 and 5,949 persons active in textiles. (source: LOKSTAT)
Map 9 depicts the home-work configurations of commuters in the mining industry in 1910. Liège, Seraing and Wasmes top the list of local employment, with receptively 5,163; 4,130 and 4,126 persons active in the mines. (source: LOKSTAT)
Map 10 depicts the home-work configurations of commuters in the metal industry in 1910. Liège, Seraing and Herstal top the list of local employment, with receptively 14,279; 5,867 and 5,276 persons active in metallurgy. (source: LOKSTAT)
Map 11 depicts the home-work configurations of commuters in the transport industry in 1910. Antwerpen, Gent and Mechelen top the list of local employment, with receptively 25,008; 5,031 and 4,021 persons active in transport. (source: LOKSTAT)
the Ardennes as the two poorest regions in Belgium at the turn of the twentieth century. To be sure, the slightly denser railway network serving the rural dwellers of the Campine area fails to account for the near absence of commuters in the Ardennes.

A spatial pattern mingling centrality and dispersal unfolds for the metal industry on map 10. On the one hand, a concentration of workplaces in the vertical ABC axis, in the horizontal Walloon axis with Liège as eyecatcher and in cities like Ghent, Tournai and Leuven matches the provincial and connector hubs the community detection approach retrieved from the origin destination relations of commuting flows in 1910 (map 2). On the other hand, the multitude of small blue dots spread over the Belgian territory exhibits a very dispersed pattern of workplaces, with some kind of metal processing activity going on in nearly all Belgian municipalities. The distribution of grey circles is also scattered, making it impossible to decide on the validity of Henri Demain’s claim that long-distance commuting characterised the metal industry in the same way that it featured in the mine industry in 1910. In contrast, the presence of short-distance commuting on map 10 can be inferred from the blue and grey colours in the smaller circles that have a large circle in their midst. Map 11 highlights that a hybrid pattern of centralisation and decentralisation is present in the home-work configurations of the transport industry too. Here also small dots dispersed over the countryside complement large circles coinciding with the locations of provincial and connector hubs that the community detection approach calculated. The cross-sections of the home-work split for metal and transport industry are comparable at first sight. However, one difference is noteworthy: whereas the spatial pattern of the centralised labour markets in the metal industry only hints at a geography of the home-work split following the logic of the railway network, this relation is outspoken for the transport branch (map 10a and map 11a).

In brief, depicting home municipalities and potential destinations for commuters at the same time uncovered home-work configurations that differed per industrial branch. Commuting was absent or limited in distance in the textile industry. In the mine industry, both short-distance and long-distance commuting were present while the hybrid pattern of concentration and dispersal in metallurgy and the transport industry suggests the presence of various commuting distances without, however, being able to make a clear-cut distinction. Moreover, the cross-sections of the metal and transport industry fortify the argument that trains acted as vectors in a progressive centralisation of scattered labour markets into a limited number of well-connected nodes on the railway network. Consequently, railway infrastructure streamlining the

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739 Vliebergh and Ulens, La Hesbaye, 1909, 3.
740 See Chapter 2: Figure 4a and Figure 4b.
741 Demain, Migrations ouvrières, 1919, 33.
Map 10a adds railway infrastructure to map 10

Map 11a adds railway infrastructure to map 11

Map 10a and map 11a exhibit how the railway network induces centrality in the geography of workplaces in metallurgy and transport.
geography of labour markets forced rural households into residential migration or in adapting to a home-work split. Hence, the “feature of modern industry that labour is becoming more mobile” has commuting both as a pull and a push factor as undercurrent. The two undercurrents still validate travel as a “derived demand and not an activity that people wish to undertake for its own sake”. Nevertheless, while commuting as opportunity and personal choice favours a mindset in which the separation of the home from the workplace is driven by subsequent transport modes making it easier to deal with the friction of distance in routine travel, acknowledging that commuting might as well result from a household’s dependency on a livelihood zoom in on the home-split as an economic imperative.

6.4 Relocated labour markets and altered livelihoods

Both history and geography are at play in the locations that emerged on the maps as assemblers of core labour markets throughout the long nineteenth century. Historical roots had a hand in the towering of Ghent over the textile industry (map 8) and the unfolding of Liège as leader in metallurgy (map 10). For instance, Wout Saelens marking Ghent as “medieval, cloth-producing metropolis” illustrates the city was a giant early on in the development of urban networks. Yet, “hosting the first completely integrated and mechanised cotton factories on the continent” considerably boosted the city’s position in the textile industry in the nineteenth century. This set the city apart in 1910, as Ghent employed 21,601 people in the textile industry whereas Verviers came second with 7,378 persons and Moeskroen third with 5,949 persons (table 2). Liège and its two neighbouring municipalities Seraing and Herstal occupied the top three in the metal industry with (1) 14,279, (2) 5,867 and (3) 5,276 employees respectively. The Liège region’s natural wealth of timber, iron and water in combination with the societal element of political neutrality in a period of religious warfare that divided Europe in the sixteenth and seventeenth century, launched the region as world-renowned centre of arms production. The first industrial revolution added the construction of hydraulic presses, pumps, steam engines and other machinery to the economic flagship of this area, which resumed in the large circles representing the workplaces in metal industry in 1910.

746 Hupkens, Afdeling wapens, 2020, 6.

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Table 2 enlists per industrial branch the municipalities having the highest numbers of inhabitants who were either active in the respective industrial branch, who were living and working in the same municipality or who were commuters working elsewhere. (*source: LOKSTAT*)

<table>
<thead>
<tr>
<th>Industrial Branch</th>
<th>municipality</th>
<th>absolute</th>
<th>relative</th>
<th>municipality</th>
<th>absolute</th>
<th>relative</th>
<th>municipality</th>
<th>absolute</th>
<th>relative</th>
</tr>
</thead>
<tbody>
<tr>
<td>textile - first</td>
<td>Gent</td>
<td>20,461</td>
<td>9.5</td>
<td>Gent</td>
<td>4,818</td>
<td>10.0</td>
<td>Moeskroen</td>
<td>4,818</td>
<td>10.0</td>
</tr>
<tr>
<td>textile - second</td>
<td>Verviers</td>
<td>5,050</td>
<td>2.4</td>
<td>Aalst</td>
<td>2,784</td>
<td>5.8</td>
<td>Verviers</td>
<td>2,366</td>
<td>4.9</td>
</tr>
<tr>
<td>textile - third</td>
<td>Moeskroen</td>
<td>4,835</td>
<td>2.3</td>
<td>Sint-Niklaas</td>
<td>2,366</td>
<td>4.9</td>
<td>Menen</td>
<td>2,366</td>
<td>4.9</td>
</tr>
<tr>
<td>textile - Belgium</td>
<td>262,746</td>
<td>214,470</td>
<td>16.1</td>
<td>Gent</td>
<td>4,818</td>
<td>10.0</td>
<td>Moeskroen</td>
<td>4,818</td>
<td>10.0</td>
</tr>
<tr>
<td>metallurgy - first</td>
<td>Liège</td>
<td>11,078</td>
<td>8.8</td>
<td>Liège</td>
<td>3,201</td>
<td>3.1</td>
<td>Gent</td>
<td>1,887</td>
<td>1.8</td>
</tr>
<tr>
<td>metallurgy - second</td>
<td>Seraing</td>
<td>4,605</td>
<td>3.7</td>
<td>Gent</td>
<td>1,887</td>
<td>1.8</td>
<td>Gent</td>
<td>1,887</td>
<td>1.8</td>
</tr>
<tr>
<td>metallurgy - third</td>
<td>Herstal</td>
<td>4,564</td>
<td>3.6</td>
<td>Herstal</td>
<td>1,431</td>
<td>1.4</td>
<td>Brussel</td>
<td>1,431</td>
<td>1.4</td>
</tr>
<tr>
<td>metallurgy - Belgium</td>
<td>227,826</td>
<td>125,701</td>
<td>102,125</td>
<td>Liège</td>
<td>3,201</td>
<td>3.1</td>
<td>Liège</td>
<td>3,201</td>
<td>3.1</td>
</tr>
<tr>
<td>mines - first</td>
<td>Liège</td>
<td>4,142</td>
<td>5.1</td>
<td>Liège</td>
<td>2,514</td>
<td>3.4</td>
<td>Pâturges</td>
<td>2,514</td>
<td>3.4</td>
</tr>
<tr>
<td>mines - second</td>
<td>Seraing</td>
<td>3,668</td>
<td>4.1</td>
<td>Seraing</td>
<td>1,758</td>
<td>2.4</td>
<td>Gilly</td>
<td>1,758</td>
<td>2.4</td>
</tr>
<tr>
<td>mines - third</td>
<td>Wasmes</td>
<td>2,706</td>
<td>3.3</td>
<td>Wasmes</td>
<td>1,629</td>
<td>2.2</td>
<td>Saint-Nicolas</td>
<td>1,629</td>
<td>2.2</td>
</tr>
<tr>
<td>mines - Belgium</td>
<td>155,325</td>
<td>81,735</td>
<td>73,500</td>
<td>Liège</td>
<td>3,201</td>
<td>3.1</td>
<td>Pâturges</td>
<td>3,201</td>
<td>3.1</td>
</tr>
<tr>
<td>transport - first</td>
<td>Antwerpen</td>
<td>22,263</td>
<td>23.4</td>
<td>Antwerpen</td>
<td>2,772</td>
<td>4.7</td>
<td>Antwerpen</td>
<td>2,772</td>
<td>4.7</td>
</tr>
<tr>
<td>transport - second</td>
<td>Gent</td>
<td>4,419</td>
<td>4.6</td>
<td>Gent</td>
<td>2,072</td>
<td>3.5</td>
<td>Schaarbeek</td>
<td>2,072</td>
<td>3.5</td>
</tr>
<tr>
<td>transport - third</td>
<td>Mechelen</td>
<td>3,618</td>
<td>3.8</td>
<td>Mechelen</td>
<td>1,475</td>
<td>2.5</td>
<td>Borgerhout</td>
<td>1,475</td>
<td>2.5</td>
</tr>
<tr>
<td>transport - Belgium</td>
<td>154,180</td>
<td>95,160</td>
<td>59,020</td>
<td>Liège</td>
<td>3,201</td>
<td>3.1</td>
<td>Pâturges</td>
<td>3,201</td>
<td>3.1</td>
</tr>
</tbody>
</table>
Geographical assets were prominent in Antwerp casting its shadow over the workplaces of transport industry on map 11 or in the position that the Mons-Charleroi axis shared with the Liège-Verviers axis in the mine industry on map 9; the former because of the city’s beneficial location for trade, the latter because of its natural resources. Antwerp’s location has been a prominent asset for economic growth. Prior to the transport revolution, the Scheldt river gave access to the north sea and the Atlantic economy.\textsuperscript{748} State engineers Simon Ridders and Gustave De Ridder too considered its location a legitimate reason to give Antwerp “excellent railway connections with the rapidly growing Ruhr area in Germany”.\textsuperscript{749} Geographical location thus had a strong hand in the 25,008 inhabitants employed in the transport sector in 1910, with the figure even outnumbering the textile industry in Ghent. Nevertheless, with 5,031 active persons, Ghent stood second place followed by Malines with 4,021 individuals. The size difference between first and second place in the textile, metal and transport industries lacks in the mine industry. In this industrial branch, the geographical distribution of natural resources minimised the gap between municipalities: the 5,163 miners in Liège followed by 4,130 miners in Seraing are comparable with the number of 4,123 miners in Wasmes near Mons.

Crucially, labour markets in the countryside and thus rural households’ livelihoods were altered by the effect railway development had on the concentration of employment in industrial and urban nodes. For socialist Emile Vandervelde and his predecessors Robert Owen (1771-1858), Constantin Pecqueur (1801-1887) and Charles Fourier (1772-1837) forwarded the decoupling of industrial and agrarian activities in preserving a livelihood was as mean reason of rural outmigration, with in its wake “an extreme growth of urban agglomerations as one of the most peculiar societal phenomena of the nineteenth century”.\textsuperscript{750} Still, Emile Vandervelde remarked, Charles Fourier “had not foreseen how the development of mechanical, physical and chemical inventions, but above all improved means of transport stood on the verge to remould industrial production”.\textsuperscript{751} His birth and death years indicate that the French socialist was part of “a generation which would have had no inkling of an ‘industrial revolution’ waiting in the wings”, so this neglect is understandable.\textsuperscript{752} What deserves attention, however, is the idea that “the modern system of centralisation” was destined to transform a livelihood mixing labour and land in a livelihood only consisting of industrial wage work.\textsuperscript{753}

\textsuperscript{748} Greefs and Winter, “Cities in motion”, 2020, 82.
\textsuperscript{749} (quote) Buyst, “Belgium’s industrial revolution”, 2019, 88.
\textsuperscript{750} [own translation] Destrée, “Villes dépeuplant les campagnes”, 1903, 84; Vandervelde, L’exode rural, 1903, 5.
\textsuperscript{751} [own translation] Vandervelde, L’exode rural, 1903, 8.
\textsuperscript{752} (quote) Jones, Agricultural Enlightenment, 2016, 5.
In their socio-economic study of rural Haspengouw for the long nineteenth century, Emiel Vliebergh and Robert Ulens exemplify how this separation of industrial and agrarian activities induced by technological progress landed in the livelihoods of rural households. Cottage industry was the sole industrial activity practised in Haspengouw at the start of this century; hundred years later, this activity had left the region due to the competition from mechanised production. Notwithstanding, the prospects for rural households in Haspengouw were less bleak than the disappearance of cottage industry might suggest because the synchronous expansion of commercial farming came with new industrial opportunities in the rural region. Indeed, next to the economic speciality of producing straw hats at home as well as in small workshops in the Geer valley, wage work was available in local factories that produced sugar, sirop, vinegars and fertilisers. In the Condroz too, new forms of industrial employment spread over the countryside in the nineteenth century, with Robert Ulens explicitly linking this development to the absence of towns in the region and an improved transport connectivity that fortified the stone industry while increasing the demand for stones. Rural households in Inland Flanders likewise had access to local industrial activities. The shock wave the economic crisis of the 1840s had sent through the textile industry considerable downsized the manual production of textile alongside low payment and well-known abuses. Despite “the redoubtable competition of centralised production using sophisticated tools”, which redirected large-scale textile production to mechanised factories in cities and their suburbs, cottage industry still stood its ground at the turn of the twentieth century. Production at home even went “against the logic of the industrialisation and urbanisation process by slightly increasing” between 1896 and 1910. Also at the political level, cottage industry had its proponents: in the view of Catholic Party members, the possibility of combining industrial and agrarian activities circumvented rural outmigration and thus prevented social unrest. Emile Vandervelde added local crafts to the variety of industrial activities in the countryside keeping rural outmigration at bay.

Although the labour markets in a modern society would eventually comply with the socialists’ prediction that technological innovations and networked connectivity disentangled agrarian and industrial activities in a household’s livelihood by making full-time employment in one economic sector the norm, this dynamic was still in full sway at the onset of the twentieth century.

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Rural economies proved to be far more resilient than allowed for in statements on a straightforward shift from agrarian employment as relic of the past to industrial employment as promise of the future. Rather, Seebohm Rowntree’s title *Land and Labour* captures the structure of Belgium’s labour markets at the start of the twentieth century. The sociologist and industrialist concluded his four-year stay in Belgium for shedding light on the problem of poverty and land tenure in Britain with pointing out that “the extraordinarily wide distribution of the land among the people [was] a fact of vital important [laying at] the root of the social and economic life of Belgium [and underlying] most of the lessons which Belgium has to teach.”

The significance of a plot of land for rural households has already been mobilised in chapter 1. It explained why the demand for cheap railway subscriptions by wage workers was at odds with the policy claim that commuting permitted rural households to combine the best of both worlds. In chapter 2, the access to a plot of land made the difference in a rural household’s choice for residential migration or commuting. In the last part of this chapter, raised levels of labour mobility are related to the plot of land, being the metaphorical sun around which labour in a rural household’s livelihood circled, and the relocation of labour markets due to railway policies stimulating economic growth. Approaching the home-work split from the place-boundness of rural households, first highlights seasonal labour and later commuting as economic imperative.

### 7 Enforcing labour mobility in the livelihoods of rural households

#### 7.1 The rise of seasonality in the advancement of a modern economy

As elucidated in chapter 1, Steve Hochstadt attributed the unseen rise in labour mobility in the nineteenth century to an increased demand for temporary and seasonal wage work in both agriculture and industry. The drive to improve the efficiency of the production process, so that surplus production held the promise of economic gain through market exchange, landed in a dynamic of product specialisation. For agriculture, product specialisation meant replacing an extensive crops rotation by intensive cultivation. Reducing the number of crops on the fields disrupted the practice of spreading planting and harvesting as evenly as possible over the year.

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764 See also Ronsijn, “Gaining ground”, 2022, 91-116.
765 Delbroek, “Moeilijke genese van een moderne arbeidsmarkt “, 2012, 14. On a theoretical level, the mix of occupational activities in the livelihoods of rural households is supported by the simple observation that the three-sector model to classify an occupation as primary, secondary and tertiary sector was only conceived during the interbellum (Schafran e.a., “Three-sector theory”, 2018, 1708).
767 Chapter 1: 5 Labour mobility and livelihood to grasp commuting patterns and Chapter 2: 6 Putting the rural back in the rural-urban continuum.
768 Chapter 1: 5.6 The structural shift towards industrial and urban labour markets.
to peak moments of heightened activity. Or, to use the words of Steve Hochstadt: “During the nineteenth century, the rural labour market became seasonalised to an unprecedented extent as a result of the intensification of agricultural production.” Changing the rhythm of agricultural produce had repercussions for industrial employment too, as the moment of harvesting dictated the period in which the fruit of the earth was processed in the factory. Seasonal demand was also present for certain industrial products, as the use of domestic coal during the winter months exemplifies. Even today, where production and availability of goods is taken for granted all year round, energy bills remind mankind that seasonal demand still leaves its mark on economic affairs.

Steve Hochstadt’s case study was Germany, but Emile Vandervelde’s writings confirm that seasonality equally affected Belgian labour markets. He drew the attention to the group of industrial wage workers who periodically switched to agricultural work, either because it was the period of the year or because of an industrial crisis, with their numbers being large enough to render the reliability of official statistics a little suspect. Similar, Henri Demain mentioned plasterers and masons who worked on the fields in their villages or thresher grain to earn extra income during winter. In the same breath, he referred to the countless rural households who eagerly awaited the annual period of industrial unemployment to do the necessary work at home. In their socio-economic survey of the Hageland area, Emiel Vliebergh and Robert Ulens specify wage workers who set their industrial employment aside during summertime to labour on the large farms in Wallonia, motivated by the wages paid by the farmers that surpassed their industrial equivalents. Around 1900, mingling industry with agriculture was a structural part of the gun industry in the Liège region: due to frequent periods of unemployment in army production, a gunsmith and his employees often left the workshop to work in the fields. Mine work or construction were other options open for gunsmiths to maintain an income. In the fertile Condroz region, industrial wage workers had the habit to raise an additional income from working in the fields, with the local stone industry or the factories of the industrial Meuse basin providing the main income.

Industrial wage workers mixing labour with land in their livelihoods had the company of seasonal labourers who supplemented mainly agricultural work with industrial activities. This

766 Hochstadt, Mobility and modernity, 1999, 191.
767 Vandervelde, L’exeode rural, 1903, 120.
768 Demain, Migrations ouvrières, 1919, 165-166.
769 Vliebergh and Ulens, Het Hageland, 1914/1921, 171. See also Vandervelde, L’exeode rural, 1903, 184.
770 Vandervelde, L’exeode rural, 1903, 74.
772 Ulens, Le Condroz, 1920, 12, 26.
773 Demain, Migration ouvrières, 1919, 141.
was the group Erik Buyst had in mind when he termed seasonal labour a marginal phenomenon at the end of the nineteenth century, whereby he especially referred to the so-called Franschmans who lived mainly in Inland Flanders while working in France. According to Edmond Ronse, sugar beet cultivation first drew Flemish peasant to France around 1820, with the 1840s textile and subsistence crisis vastly increasing the popularity of seasonal migration to France, followed by another boost after 1870. The fluidity of seasonal labour defies statistical attempts to capture reality in a number, making the estimate of number of Franschmans around 1900 vary between 40,000 and 60,000 persons. This figure is considered marginal by Erik Buyst. For Belgian politicians, on the contrary, the size was enough to put the Franschmans on the political agenda as soon as the universal plural voting right was a fact in Belgium in 1893. By visiting seasonal labourers in France, socialists defeated Catholics in districts traditionally loyal to the Catholic Party. Equally telling are the pleas priest Adolphe Daens made in parliament to ask for elections to be organised in May or October, being the months when most Franchmans were at home. Moreover, the number of Franschmans was enlarged with the Walenmannen who left their homes several times a year to work on the large farms in Brabant Walloon, Haspengouw and the Condroz as well as in the factories and mines of the industrial Walloon axis.

7.2 The blueprint of a national labour market in seasonal labour

So, the unrivalled demand for seasonal and temporary labour due to product specialisation both mixed industrial and agrarian occupations and raised the level of labour mobility in the era of steam and steel. The mobility flows inherent in seasonal labour had the interest of geographer Blanchard, who in 1906 wrote a geographical survey of Inland Flandres in which he related labour emigration in this rural region to the problem of overcrowding. He retraced the origin of working outside the rural region to the twelfth century while he considered the manifestation of seasonal labour as the prevailing answer of the rural households to the region’s problem of overpopulation in the nineteenth century. Accelerations in seasonal labour Edmond Ronse had discerned for Franschmans, had been highlighted for Walenmannen by Evrard Mattheus and Willy Van Calster. They situate the presence of the first Walenmannen in rural Hageland around 1850. Rural wage workers living in the fertile Walloon regions were attracted by the

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775 Ronse, L’émigration saisonnière, c. 1913, 35-38. See also Schepens, “Emigration”, 1974, 427.
776 Ronse, L’émigration saisonnière, c. 1913, 70-71.
780 Mattheus and Van Calster, Seizoensarbeiders, 1988, 39, 126.
labour markets of the nearby industrial basins so that the shortage in labourers to harvest grain on the large farms of Wallonia was filled in by the rural households living in Hageland where local job opportunities were scarce. Around 1870, the large farmers in the fertile Walloon regions again increased their demand for seasonal labour, this time for felling and lifting sugar beet. According to Emiel Vliebergh and Robert Ulens, the 1880s agrarian crisis first spurred the search for income on the large farms of Wallonia, followed by a swelling of the labour flows towards the factories and mines in Charleroi and Liège after 1896.78\textsuperscript{1}

The two author duos differ about why the rural households of the Hageland area shifted in their choice of seasonal-labour activities from mainly working in the fields to jobs in the mines and factories. For Evrard Mattheus and Willy Van Calster, searching for an explanation in retrospect, seasonal labour enabling rural households to stay in their village during the era of steam and steel, ended by the desire to earn money all year round.\textsuperscript{782} For Emiel Vliebergh and Robert Ulens, searching for an explanation as contemporaries, the introduction of the cheap-railway-subscription formula making long-distance commuting possible in 1896 let mobility to mines and factories rise.\textsuperscript{783} By stressing the vectors of higher wages and the networked railway connectivity, the four authors together thus conceptualise commuting as an opportunity. Yet, the undercurrent in their research is a home-work split that the transformed geography of labour markets imposed on rural households: how else make intelligible that marked changes in labour mobility emerge in times of structural economic hardship? Take, for example, the nineteenth-century chronology of seasonal labour reveals or the decisive shift from seasonal to full-time employment in the economic crisis of the 1930s, even though rural households had already access to higher wages and railway commuting at the end of the nineteenth century.\textsuperscript{784} The home-work split as economic imperative thus clarifies Emiel Vliebergh and Robert Ulens’ statement that the cheap railway subscription permitting a round trip once a week did not unlock the Walloon labour markets for the Flemish peasants, but made it easier for them to return to their home municipalities on a weekly basis instead of staying at the workplace for several weeks.\textsuperscript{785}

\textsuperscript{781} Vliebergh and Ulens, \textit{Het Hageland}, 1914/1921, 168-170.
\textsuperscript{782} Mattheus and Van Calster, \textit{Seizoensarbeiders}, 1988, 215.
\textsuperscript{783} Vliebergh and Ulens, \textit{Het Hageland}, 1914/1921, 169.
\textsuperscript{784} Mattheus and Van Calster, \textit{Seizoensarbeiders}, 1988, 217. To be complete, even with the 1930s economic crisis as push factor, a rapport on the cultivation of sugar beets in Belgium revealed that remnants of seasonal labour still lingered in the economy of the region during the 1950s (Rijksdienst voor Arbeidsbemiddeling en Werkloosheid, \textit{Bietencampagnes in België}, 1957, figuur 2). See also \textit{Richtplan Zuiderkempen, Hageland, Noord-, Midden- en Zuid-Limburg}, 1963, 17 for remnants of seasonal employment in the northeast corner of Belgium.
\textsuperscript{785} Vliebergh and Ulens, \textit{Het Hageland}, 1914/1921, 172-173.
The blueprint of a national labour market arising from the mobility flows created by seasonal and temporary labour is hereby of interest. For example, the influx of wage workers to the hop fields in West-Flanders and Brabant during the harvest period, knitted villages in the northern half of Belgium together. Not only farms, mines or factories attracted peasants from Inland Flanders, the Campine area or Hageland, but unskilled wage workers were also in high demand to perform activities as diverse as brick-making, dragging goods in the port of Antwerp or digging earth in public works. Demand in these labour markets influenced each other so that the construction of a new transport line made the lingering problem of insufficient rural wage workers for large farms acute, whereby Henri Demain added that digging earth was an activity typically practised by Flemings. Rural households in the Ardennes too connected places within the confines of the Belgian realm, albeit on a more moderate scale: they only lend their muscles to farmers during grain harvesting while their colleagues in the northern half of Belgium assisted in the cultivation of sugar beets too. This, however, made the rural dwellers of the Ardennes not less mobile, as their work as lumberjacks brought them to France.

All in all, seasonal labour brought job opportunities scattered over Belgium within reach of the home municipality of a rural household, which arguably makes seasonal labour the rural predecessor of railway commuting as it kept rural households rooted in the countryside while providing a national labour market with wage workers. This statement refutes Jules Destrée’s critique on Emile Vandervelde’s treatment of seasonal labour in a study of the rural exodus, as “there was nothing modern about the labour practice that had existed since time immemorial although improved communications undoubtedly had extended and multiplied the migration of the harvestmen of Connaught, the Sachsengangers of Germany, the braccianti of Italy or the August harvesters, brickmakers and woodcutters of Belgium”. Instead, it raises the question how the ancient practice of rural households to combine land and labour helped Belgian policy makers to establish the rural-urban continuum they aimed for with their railway policies from 1869 onwards. Two features of the 1910 industrial census enable the historian to complement the question with an answer: firstly, the integration of cottage industry and craft work in the industrial data and, secondly, the gathering of the data in the month of December. As nature grants agriculture a rest in winter, December is a well-suited time to investigate the presence of industrial activities in a rural household’s livelihood and expose the influence a rural region’s

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economy exerts on the spatial pattern of commuting ratios. Especially, the textile and mining industry are of interest, given that textile production at home has traditionally been an important part of rural economies whereas the mining industry gained momentum in the era of steam and steel.

7.3 Relating the textile and mining industry to the livelihoods of rural households

Despite the march of mechanised production and a severe setback during the 1840s textile crisis, cottage industry still had a voice in the economic landscape at the start of the twentieth century. Indeed, in 1910, the “regime of decentralised production”, as statisticians defined cottage industry in the industrial census of 1910, accounted for 12 percent of total industrial output. As a rule, Eric Vanhaute informed, cottage industry only constituted a part of a rural household’s livelihood and the labour practice was not a sign of affluence. In two out of three cases, the additional income was earned from textile production, whereby the lion’s share going to female lace makers. Moreover, cottage industry experienced a temporary revival during the second industrial revolution (1896-1910). The home production of scutched flax, which had weathered the textile crisis of the 1840s, faltered at the end of the nineteenth century so that rural households with a home in the textile provinces had to look for another source of income, again. This search presented lace manufacturers with an abundance of cheap female labour which they put to work to meet the rapidly growing demand for lace products. Accordingly, West Flanders and East Flanders remained core centres in cottage industry, as figure 2 displays for 1910.

Making lace for little pay was an experience twentieth-century rural households shared with their eighteenth-century counterparts when expanding rural industries created what Myron Gutmann called ‘hybrid societies’ in Europe. In this age of early industry, rural households combined industrial and agrarian activities to make the family property flourish, in the case of wealthy farmers, or to survive, in the case of less fortunate peasants, like the poor Westphalian families Leslie Page Moch described who “drew both on home linen production

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794 See also De Brabander, Regionaal-sectoriële verdeling van de economische activiteit, 1984, 129.
795 Ronsijn, Commerce and the countryside, 2014, 163.
Figure 2 shows in which municipalities cottage industry was still practised in 1910, with the colour gradation indicating the number of persons engaged in cottage industry relative to the total population per municipality. *(source: Vanhaute, “Huisnijverheid in België omstreeks 1900”, 1994, 472)*
and on men’s seasonal migration to Holland”. Although the origin and destination geography is situated in a different place on the European continent, map 8 and map 9 demonstrate that rural households still combined cottage industry and seasonal labour two centuries later. Indeed, the circles on map 8, representing the home-work configurations of the textile industry in 1910, put next to figure 2 composed by Eric Vanhaute show that textile production at home was widely practised in the northeast corner of Belgium. The grey circles on map 9 indicate that mine workers also had a home in this area. If it is known that mining was an industry that especially in the long nineteenth century relied on temporary labour to meet increased demand, say in December as winter month, then home municipalities located at prolonged distances from mine basins point at seasonal labour. True, the presence of mine workers in West-Flanders is rather modest, but adding the previously discussed group of Franschmans makes the picture complete.

Hereby, it is interesting to note that the mobility flows aligning with the national labour market Belgian state representatives related to a rural-urban continuum, appear on the map of the mining industry, which is considered central to the economic development of Belgium. Also telling, but less known, is the perennial concern of mining companies about a palpable shortage in wage workers willing to mine the black gold, studied by Frank Caestecker, Peter Scholliers, Bart Delbroek and Leen Roels. The jump from 100,000 to 150,000 mine workers between 1890 and 1910, for example, is indicative for the difficulties mining companies encountered to keep their labour force up to date. Outspoken testimonies to this labour shortage for the twentieth century are the agreements that mining companies signed to stop recruiting each other’s miners, followed by an impressive number of angry letters about the violation of these agreements.

The societal goal of creating economic growth synchronically caused and raised the need for an enlarged industrial labour force. As the reader will recall, in the planning process of the

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801 Caestecker and Scholliers, “Belgische mijnen”, 2019, 1213; Delbroek, *In de put*, 2016; Roels, *Het tekort*, 2014. The preference of the local population for a job in metal or glass industry over mines placed the search for wage workers on the agenda of the mining companies in the basins of Le Centre, Charleroi and Liège in the nineteenth century (Roels, “Luikse steenkoolmijnen”, 2008, 110). Only after the First World War, with the instalment of the eight-hour work day, mining companies in the Borinage faced the same problem as their colleagues, obliging them to attract mine workers further afield (Caestecker, “Arbeidsmarktstrategieën”, 2008, 40).
iron cross in the 1830s, Pierre Simons and Gustave De Ridder selected the mine basins of Mons-
Charleroi axis and Liège based on the potential these locations held to spur economic growth.\textsuperscript{804} Their strategy paid off: whilst employers and employees alike considered work in the mine the
perfect fit to close the seasonal cycle of agrarian employment around 1800, the rising demand
for industrial coal in the era of steam and steel turned the periodical extraction of this natural
resource into a year-round occupation around 1900.\textsuperscript{805} At that time, technological innovations
boosted the demand for coal to heat the house in the winter, this time favouring Charleroi and
Liège because the earth in these mine basins had delivered coal of inferior quality that matched
the requirements for domestic use.\textsuperscript{806} Overall, the intention to create economic growth let the
30,000 wage workers mining companies needed in 1830 amount to 150,000 in 1910.\textsuperscript{807} The
nineteenth-century upheaval of rural economies was beneficial for the mining companies, with
a first wave of Flemish peasants turning to the mines after the textile crisis of the 1840s and a
second wave following after the 1880s agrarian crisis.\textsuperscript{808} However, as argued in the previous
chapters, at the root of the two crises that rocked rural economies was the goal of creating a
prosperous nation: in the 1840s, mechanised production set in motion a dynamic that eventually
pulled the plug on cottage industry while in the 1880s market competition urged a reinvention
of the agricultural sector.\textsuperscript{809} Therefore, despite the fact that Leen Roels and Bart Delbroek linked
the rise in labour mobility at the end of the nineteenth century to the weekly commute
introduced in 1896, Frank Caestecker’s interpretation of the phenomenon is worth quoting.\textsuperscript{810}

Granting wage workers access to the railway network was the “initiative of the state that
provided industry with sufficient miners without asking them to depart from the rural
environment”.\textsuperscript{811} In his view, railway commuting suited the interests of the mining companies
the moment cheap railway subscriptions for wage workers were introduced in 1869 while rural
households succumbed to railway commuting the moment agriculture finally ceded its place as
the main employer to industry. Indeed, already in the first half of the nineteenth century mining
companies depended on migrant labour to supplement local supply whilst seasonal labour
remained an integral part of the mining industry’s operation, even though a year-round demand

\begin{itemize}
  \item \textsuperscript{804} See Chapter 1: 3.2 Fortifying connectivity and circulation in transport policies.
  \item \textsuperscript{805} Caestecker, “Arbeidsmarktstrategieën”, 2008, 33, 34.
  \item \textsuperscript{807} Caestecker, “Arbeidsmarktstrategieën”, 2008, 32, 38.
  \item \textsuperscript{808} Roels, “Luikse steenkoolmijnen”, 2008, 110; Caestecker, “Arbeidsmarktstrategieën”, 2008, 39;
  \item \textsuperscript{809} Caestecker, “Limburgse mijnwerkers”, 1998, 310.
  \item \textsuperscript{810} See Chapter 1: 5.6 The structural shift towards industrial and urban labour markets and Chapter 2: 6.2
Rural exodus: the commercial use of land in a rural economy.
  \item \textsuperscript{811} Roels, “Luikse steenkoolmijnen”, 2008, 111; Delbroek, “Pendelarbeid”, 2019, 1278.
\end{itemize}

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for coal increased the rate of full-time employed miners too.\textsuperscript{812} It is in this seasonality that the interest of mining companies and rural households converged. Between 1830 and 1860, local households “who sought to supplement their income from small-scale agrarian activities with an income from industry” extracted coals in the Borinage, the oldest mine basin in Belgium.\textsuperscript{813} Around 1900, the raised demand for domestic coal suited the seasonal labourers who worked in the fields in summer and sought additional incomes in winter.\textsuperscript{814} During the interbellum, the shortage of mine workers in the Limburg basin caused mining companies to forge a bond with local peasants by allowing them to descent in the mines at night or in winter.\textsuperscript{815} In 1950 still, a recruiter of the Houthalen mine in Limburg had difficulties to fulfil his task, as rural households in Diksmuide and Veurne prioritised access to land over industrial employment, even if it meant losing an unemployment benefit.\textsuperscript{816} In sum, as Frank Caestecker stressed, the introduction of cheap railway subscriptions for wage workers was one of the first state interventions that helped mining companies to expand their recruiting capacity as it balanced their search for miners with the desire of rural households to combine land and labour.\textsuperscript{817}

7.4 The resonance of rural economies in the spatial pattern of commuting ratios
The puzzle posed by comparing the geography of industrial workplaces on map 6 with the commuting ratios on map 7, can now be solved by relating these spatial patterns to cottage industry and seasonal labour. Cottage industry as a labour practice of rural households in 1910, explains why an outspoken presence of industrial workplaces failed to raise commuting ratios in the northwest corner of Belgium. Seasonal labour, in addition, sheds light on the erratic pattern of commuting ratios in northeast and southern regions of Belgium. This pattern can be further subdivided in rural Hageland and Haspengouw with high commuting ratios as a rule and in the Campine area and the Ardennes where commuting was generally low. Commons, as a third alternative for rural households to safeguard their access to a plot of arable land, make this divide comprehensible. As map 12 informs, the commons in the Campine area and the Ardennes still had their share of municipal surface in 1895. In the 15 years leading to 1910, commons expanding their ground are unlikely, as nineteenth-century policies to enhance the economic productivity

\begin{itemize}
\item \textsuperscript{813} [own translation] Caestecker, “Arbeidsmarktstrategieën”, 2008, 32.
\item \textsuperscript{814} Caestecker, “Arbeidsmarktstrategieën”, 2008, 8; Demain, Migrations ouvrières, 1919, 142.
\item \textsuperscript{815} Caestecker and Scholliers, “Belgische mijnen”, 2019, 1217. The resemblance of this strategy with the practice of large-scale farmers to cope with the shortage in rural labour by providing their wage workers with a plot of land deserves the attention (Demain, Migrations ouvrières, 1919, 80; Vandervelde, L’exode rural, 1903, 187-188).
\item \textsuperscript{816} Delbroek, “Pendelarbeid”, 2019, 1287.
\item \textsuperscript{817} Caestecker, “Arbeidsmarktstrategieën”, 2008, 31.
\end{itemize}
Map 12 relates Belgium’s rural regions to municipalities where commons had held their ground in 1895. As can be seen, places where commons compared to agricultural exploitations still claimed a substantial part of the municipal’s territory were prominent in the Campine area and the Ardennes. (source: 1895 agricultural census – LOKSTAT)
of the land only intended to reduce their size. Rural households in the Campine area and the Ardennes, on the other hand, abhorred these policies as it tantamount to eroding their livelihood. Indeed, whereas Emile Vandervelde emphasised that these “remnants of medieval customs” kept destitution at bay, Seebohm Rowntree wrote that “the differences in the social well-being of the people in various parts of Belgium largely depend upon the presence or absence of common lands”. The resistance against land clearance was most outspoken in the Campine area where neither afforestation nor factories were welcomed by its rural population. The municipal council of Overpelt, for instance, refused a zinc company the permission to build a factory for fear of alienating the rural population. In contrast, the municipal councils in the Ardennes were eager to sell their commons, which they later bitterly regretted. Seebohm Rowntree added that even the Belgian state representatives regained their senses as they acknowledged the folly of land clearance by the time the English sociologist and industrialist conducted his study of the Belgian economy. The two authors, however, disagreed on the role played by commons in restricting rural outmigration. According to the socialist, the use of commons rooted poor households in their villages whereas the sociologist agreed that this might be true for some municipalities, but in general the connectivity of the railway network was the asset rural households needed to remain in the countryside.

From a look on map 6 and map 12 spins the conclusion that commuting ratios were overall low in municipalities where commons were important. Integrating in this conclusion the job basins the community detection approach calculated for 1910, clarifies why Overpelt as simple village was able to attract industrial wage workers over prolonged distances. In particular, the methodological demand of the community detection approach to assign even loosely connected municipalities to a community has its importance. In the long run, the refusal of the zinc factory described by Emile Vandervelde mattered little as German investors received the permission to build a zinc factory in Overpelt in 1888, with a second plant arising in Lommel in 1904. Hereby, the growing demand for zinc and sulphuric acid was the economic context the German investors needed to build the two factories and make this remote corner of Belgium a gravity centre for zinc production. With the exploitation of the Limburg mines still on hold in 1910, the zinc

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industry let Overpelt and Lommel materialise as provincial hubs in the community detection approach. The commuting flows that both zinc factories sparked complemented the local labour force that was housed in the labour districts the company had built near their factories in 1896 and 1905 respectively. Based on their experiences with the workmen’s houses in Overpelt, the allotment garden was considered a necessary amenity for the labour district in Lommel, as it benefited the zinc company in three ways. First, it eased the shift from agrarian to industrial wage work for rural households in a tight labour market; second, the extra livelihood industrial wage workers retrieved from the garden made it less likely that they would ask for a pay rise and third, working in the garden kept the industrial labour force in good health. Arguably, the three advantages of coupling an allotment garden and industrial wage work in the micro-cosmos of the zinc factory, resonate in the introduction of cheap railway subscriptions for wage workers to establish a rural-urban continuum that is underpinned by a national labour market, as policy makers claimed railway commuting gave rural households the opportunity to combine the higher wages of industrial or urban labour markets with growing vegetables on a plot of land.826

Commuting distances that align with a national labour market are also present in the stretched-out job basin of Liège and the leapfrogged community of Charleroi (map 3). These two commuting communities were streamlined by the two mine basins where an inferior coal quality that suited domestic heat teamed up with technologically improved heating devices for homes gaining ground in the second industrial revolution, thus enhancing a production peak in winter and spurring demand for seasonal mine workers.827 In the discussion of the home-work split for the mine industry, the observation was made that mines attracted considerably less commuters from the southern half of Belgium, though the Ardennes was a poor rural region.828 Light on this observation is shed by the survey the minister of the interior commissioned in 1897 to gather knowledge on the extent of seasonal labour abroad. This survey is summarised by Emile Vandervelde about the rural exodus (figure 3), whereby Edmond Ronse in his book on seasonal migration explained that the survey informed on seasonal migration in Belgium too as the phrase “naar ’t Fransche gaan” for the Dutch-speaking peasant referred to France as well as Wallonia.829

The first piece of the puzzle is the activities seasonal workers engaged in: rural wage workers, brick makers, masons, lumberjacks and industrial wage workers featured most often in the enumeration of dominant occupations. The second piece of the puzzle is formed by the spatial pattern of these dominant occupations. Brick makers and masons were scattered all over

827 See 7.3 Relating the textile and mining industry to the livelihoods of rural households.
828 See 5.3 The home-work configurations according to industrial branch.
829 Vandervelde, L’exode rural, 1903, Annexe VI; Ronse, Emigration saisonnière, c. 1913, 69, Annexe B.
Figure 3 gives the summary of the 1897 survey on seasonal labour abroad, printed by Emile Vandervelde in his book on rural outmigration.
the country, although the latter to a lesser extent. Lumberjacks, instead, were mostly concentrated in Luxembourg. Rural wage workers lived in West Flanders, East Flanders, Antwerp, Hainaut, Brabant and Limburg while wage workers employed in a factory claimed Luxembourg, with a mixed presence of rural and factory wage workers in Liège and Namur. Rural wage workers with a home in the Campine area and North Brabant had the large farms in Namur and Liège as their main destination whereas the rural wage workers of West-Flanders and East-Flanders mostly went to Hainaut. The third and final piece of the puzzle is formed by the time schedule. The fact that the 1910 industrial census recorded commuting data for the month December, lifts brick makers, masons and rural wage workers out of the spatial analysis. Indeed, the season of the brick maker ran from mid-April till mid-September; winter months meant reduced activity on construction sites for masons and working on the land occupied the months March/April till October, which could be extended till mid-December if the rural wageworkers also engaged in the processing of sugar beets in the factory. Yet, as an allowance to bridge periods of structural unemployment was beyond the imaginative capacity in 1910, brick makers, masons and rural wage workers searched for an additional winter activity, with the mines filling the gap for most of them. Lumberjacks, in contrast, were active during four months in winter so that the Belgian forests provided 32,000 men with an income in winter of which 3,200 were employed permanently. It is this intertwinenment of geographical distribution of occupations and periodicity of seasonal labour that underlies the shape of the commuting communities of Charleroi and Liège.

8 Conclusion
In literature about transport infrastructure reshaping urban morphology, the hypothesis that cars caused urban sprawl has almost become self-evident. In this narrative, the car is the latest in a series of transport modes whose technical features enhanced the freedom to travel. Remote places were likewise made accessible by unfolding transport networks in the landscape. As a result, urban dwellers were able to live wherever they wanted, as long as the place was plugged in to a transport network and the location accorded with income level and commuting cost. The

830 Vandervelde, L’exode rural, 1903, 160.
831 Demain, Migrations ouvrières, 1919, 143, 154; Vandervelde, L’exode rural, 1903, 165-166; Schepens, “Emigration”, 1974, 430; Mattheus and Van Calster, Seizoenarbeiders, 1988, 39; Delbroek, “Moeilijke genese van een moderne arbeidsmarkt”, 2012, 31
833 Rowntree, Land and labour, 1910, 170.
societal desirable assets of being cheap, healthy, green and spacious turned the countryside into the territory were preferred locations were predominantly to be found. With welfare economics, utility maximisation and cars in place in the second half of the twentieth century, the urge to have a home in the countryside whilst being connected to a city produced the leapfrogged urban landscape of current society. Historical research already breached the deterministic relationship between cars and urban sprawl by, first, exposing that transport infrastructure is a sociotechnical product that engineers and politicians instrumentalised as spatial tool to realise specific societal goals and, secondly, by questioning a straightforward relationship between transport mode and urban shape. Yet, the conceptualisation of commuting as a personal choice in line with location preferences remained unquestioned. This needs amending. It neglects that the home-work split has been imposed on households in the countryside, as it veils the key role market exchange has played in making the home-work split an intrinsic feature of today’s labour markets.

Elucidating commuting as a push factor, puts the spotlight on the novelty of policy makers planning the vector of economic growth in the design as well as the organisation of nineteenth-century railway networks. This transport policy progressively concentrated labour markets in industrial and urban nuclei the railway infrastructure connected while transforming an agrarian society into an industrial and commercial one. This spatial reorganisation of labour markets first generated a rural exodus, whereby the problems due to overcrowded cities, like epidemics, social unrest and moral degeneration, were subsequently addressed by developing transport policies that brought routine displacements between home and workplace within reach of the labour force. In most Western cities, the creation of a mobile labour force was restricted to the radial-concentric expansion of the urban core into its suburbs. In Belgium, in contrast, wage workers were given access to a territory-covering railway network to preserve the population distribution over villages, towns and cities. In other words, the societal goal of making a nation prosperous by spurring economic growth via market exchange concentrated labour markets in urban cores whilst making the labour force mobile intended a dispersed population pattern, by facilitating core-periphery relations and connecting an already dispersed population in a rural-urban continuum.

Collecting commuting data for each municipality ordered by the Belgian government as early as 1910, not only foregrounds commuting as a national phenomenon long before private cars on driveways became a familiar sight, but also provided the empirical data needed to study the integration of the home-work split in the livelihoods of rural households. The origin-destination relations of the commuting flows between Belgian municipalities noted in the industrial census allowed Joris Beckers to visualise the spatial coherence wage workers gave to their nation via the community detection approach. Conducting the same exercise on
commuting data in 2010 yielded empirical maps, which question the discourse of cities sprawling in the countryside due to the time-space contraction that car technology created. Though, over the course of a century, the location pattern of large commuting communities had shifted from a west-east divide to a north-south orientation, the geographical reach of the job basins was remarkably similar. The consistency in average travel distance backed up this finding. Hence, a second spatial analysis that expanded on the observation by visualising commuting ratio and level of industrial activity for each Belgian municipality in 1910. The scarce presence of commuting in a region where industrial activity was high and the erratic patterns of commuting ratios in areas where industrial workplaces were scant, again questioned a straightforward translation of improved transport efficiency to overcome the friction of distance into commuting as an ubiquitous labour practice. Consequently, a third series of maps juxtaposed the home and work municipalities of commuters per industrial branch. The pillars of Belgium’s dynamic of industrialisation were selected, i.e. textile, mine and metal industry, whereas the dissertation’s research theme added the transport branch. On the maps of metallurgy and transport industry, a mixed pattern of dispersed and centralised workplaces appeared, with the railway network structuring the spatial coherence of labour-markets centralisation. In contrast, the distinct visualisation of the textile and mining industry became intelligible as soon as cottage industry and seasonal labour were drawn into the analytical framework. In other words, as in the previous two chapters, the old habit of rural households to combine land and labour in their livelihoods emerges again in the spatial patterns produced by the commuting data of 1910. Indeed, cottage industry, wage labour and/or commons influence the commuting patterns in line with the region-specific organisation of the rural economy.

In conclusion, zooming in on rural livelihoods to comprehend the spatial coherence wage workers gave to Belgium in 1910, unveiled the double-sided impact of transport on urban morphology: firstly, transport development sustains the concentration of core labour markets in urban nuclei that have direct access to the transport networks, and, secondly, centralised labour markets turned the home-work split into a complement of economic growth. Put differently, the nineteenth-century activation of transport networks by policy makers to endow the nation with prosperity via enhanced market exchange created the need for a mobile labour force to address the large-scale labour demand, whereby policy makers answered this need by activating transport technology a second time to facilitate daily mobility so that workplaces and homes could be separated.

Arguably, this double-sided effect of transport infrastructure is to become part of “a key debate in urban geography literature [that is] continuously revived by evolving location and
transport behaviour” and centres on delineating “cities morphologically and functionally”. By making this double-sided effect of transport infrastructure intrinsic to this debate, the key to understand urban morphology no longer rest by core-periphery relations but by the dictum of economic growth impacting these core-periphery relations. Here, market exchange’s reliance on transport networks is crucial: it by definition makes companies, and therefore labour markets, dependent on transport networks. Unavoidably, this makes the location of major labour markets dependent on global economic shifts, as the comparison of job basins in 1910 and 2010 illustrates. Moreover, it makes the progressive concentration of labour markets in commercial hubs on transport networks the core key in explaining raised labour mobility. If this lens is used, then commuting as an economic imperative takes its place alongside the portrayal of the home-work split as an opportunity, which in turn is needed to raise awareness for structurally implemented, although undesired outcomes. First, acknowledging that choices made by humans created a society that is utterly dependent on mobility and networked connectivity, urges a critical reflection on associations between the private automobile and unsustainable environments. Although the societal goal of establishing sustainable environments is laudable, providing a cure based on the symptom instead of the deeper cause is bound to aggravate the problem of mobility injustice, as it leaves low-income households again to their own device in a society built on mobility as economic imperative, without having the certainty to realise the promised sustainable outcomes. Second, acknowledging that commuting is both a push and a pull factor, even in today’s society, prompts critical reflection on the assumption that all wage workers are mobile by definition.

834 (quotes) Thomas e.a., “City delineation”, 2018, 6.
IV
CHAPTER 4: THE POWER OF LAW AND THE IMPORTANCE OF LAND.
The Materialisation of Planned Space Near a Train Stop in Rural Hageland Between 1861 and 1921

### 1 Introduction

In 1889, the Belgian railway policies for making the home-work split part and parcel of large-scale labour markets, received the company of a Housing Act that promoted homeownership among wage workers, industrial and rural alike. Although the Housing Act gave wage workers the freedom to settle wherever they wanted in principle, policy makers reasoned that the cheaper building plots in the countryside would radiate industrial wage workers from a congested city to its urban hinterland. Railway commuting and homeownership thus became the spatial tools at the disposal of the national government to disperse the labour force across the countryside while maintaining centralised labour markets in urban and industrial nuclei that had direct access to railway infrastructure. In contemporary research, these nineteenth-century railway and housing policies are textbook examples of how urban landscapes can be engineered. As such, researchers Bruno De Meulder, Jan Schreurs, Annabel Cockx and Bruno Notteboom referred to both policies as the seeds explaining the “near-total urbanisation of the territory of Belgium” today. Similar, Bruno Meeus and Pascal De Decker posited that “successive Belgian governments have never challenged the fundamental two pillars of Belgium’s housing policy: the strategic stimulation of homeownership on the one hand and of commuting instead of

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837 A special thanks goes out to Rudy Janssens and Jos Libotton. Next to endowing me with the rich data set I needed to answer the research question, their passion for Holsbeek’s past was truly inspirational for writing this chapter.


840 De Meulder e.a., “Belgian urban landscape”, 1999, (quote) 81, 82.
residential moving on the other”. Michael Ryckewaert and Katrin Theunis too argued that the Belgian housing policy with the support of mobility flows to structure urbanisation dynamics after 1945, rested on a spatial model intended on creating an urban society that existed in harmony with and spread across the countryside. Christian Kesteloot and Walter de Lannoy emphasised the rationale of economic policies underlying the further growth of stretched-out urban landscapes in the second half of the twentieth century, when they identified the home and the private car as the two pivotal products to spur mass consumption in the postwar period, with cheaper land outside the urban core anew the vector of suburbanisation. By stating that the introduction of cheap railway subscriptions for wage workers in 1869, the establishment of the National Company of Light Railways in 1884 and the Housing Act of 1889 are generally recognised as the three laws that initiated the sprawled condition of cities in Belgium today. Moreover, her empirical analysis of railways and light railways producing Belgium’s rural-urban landscape before the road network took over, aptly demonstrated the statement.

In brief, rather than being unplanned, researchers have adequately shown that “drawn-out landscape ideologies inscribed in public works policy” were instrumental in engineering the shape of sprawled cities. The practice of engineering replaces a learning process of trial-and-error by theorised cause-consequence relations that enable the transformation of space as planned. Furthermore, landscape engineering is geared at creating a society that benefits all its inhabitants. This makes it tempting to make the theorised cause-consequence relation stressed as opportunity in policy discourses, the rationale that explains the spatial transformation of a landscape. In Belgium’s case, this perspective links the efficiency of the railway network to engineer a rural-urban continuum to giving rural households access to higher wages. In this chapter, creating awareness for the mobilisation of rural households as a blank screen on which urban desires and mindsets are projected by highlighting the agency of rural households, has already added heterogeneity and coercion to engineered space. In this chapter, the veiling of different realities by theorised cause-consequence relations is further explored by elucidating Jean-Marc Offner’s warning on the tendency of policy legitimations to become self-fulfilling.

844 Grosjean, Urbanisation sans urbanisme, 2010, 104-105. See also the review of Janet Polasky’s book Reforming urban labour by Brian Lewis in which he wrote that “the project of population dispersal” pursued in Britain and Belgium “worked all too well and continued apace throughout the twentieth century, helping to generate unsustainable urban sprawl” (Lewis, “Book reviews”, 2012, 944).
846 See Chapter 1: 5.3 Scrutinising political claims from the perspective of a rural household.
To this end, it is asked if the cause-consequence relations activated by the three laws to establish Belgium’s rural-urban continuum landed as planned in the station area of a rural village between 1861 and 1921. Answering the question first requires an understanding of the policy claims that legitimised the Belgian railway and housing policies, followed by a description of available historical sources and designated methodology to expose the spatial transformation of a station area. Next the selection of Holsbeek as case study is argued. Subsequently, the empirical analysis is conducted with the observed urbanisation dynamic summarised in the concluding part of this chapter. previous chapters, directing the attention to the agency of rural households has revealed

2 Policy claims and intended outcomes
2.1 Three laws to make the rural dweller modern

At the closing decade of the nineteenth century, the three laws to stimulate railway commuting and homeownership among wage workers in line with the envisioned rural-urban continuum were in place. The cheap railway subscriptions for wage workers introduced in 1869 and the establishment of the National Company of Light Railways in 1884 strengthened the ability of the railway infrastructure to facilitate commuting between rural and urban locations whilst the Housing Act of 1889 entitled industrial wage workers to cheap housing loans. Politicians justified the attached price tag by claiming that the laws benefited the public good. Indeed, the National Company of Light Railways was to integrate every village in the “new dynamic of disconnecting locations of working and living”. The idea that knitting space together via a coherent planned transport network endowed economic prosperity on a nation, represented an universal principle that allowed an Enlightened society to engineer societal progress. Hence, the postulate that granting a place access to territory-covering railway infrastructure injects the location with economic growth because the transport network extends the geographical circulation of locally produced commodities. The plea parliamentarian Adolphe le Hardy de Beaulieu held to demonstrate the need for light railways fifty years after the first railway law was voted in 1834, illustrates the steadfastness of this engineered path to national prosperity:

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849 Grosjean, Urbanisation sans urbanisme, 2010, 104-105; De Meulder e.a., “Belgian urban landscape”, 1999, 81-86
851 See Introduction: 2.4 The planned vector of economic growth in transport infrastructure.
852 See Introduction: 2.3 The geographical reach of market opportunities. For a more nuanced vision on the interaction between transport infrastructure and economic growth see Chapter 2: 5.2 Highlighting market competition as companion of economic growth.
“Although light railways are only small streams compared to the great rivers of iron and steel that mankind have placed on the earth’s surface, they will bring the same benefits, the same advantages as the railways. They will restore the disrupted economic balance between different parts of the territory.”

The light railway line as a “cost-effective tool that was comprehensive, rational and flexible at the same time” was thus assigned the task to restore an disturbed economic balance of the nation by giving small cultivators access to urban markets whilst synchronically serving as feeder lines for the main railway network.

Furthermore, the cheaper and technically better equipped light railways to unlock the countryside, were assumed to flatten space in another way. Although the pursuit of national prosperity went hand in glove with the rise of cities as “our species’ greatest invention”, it also had misery, poverty and unhealthy living conditions in store for industrial wage workers who were packed in urban cores. This deterioration of urban space imprinted cities as “hotbeds of fever and vice” in the imagination of better-off citizens. The societal problems caused by urban overcrowding let to the issuing of cheap railway subscriptions for wage workers in 1869, with light railways exporting the practice of railway commuting to every corner of the Belgian countryside.

Political rhetoric claimed this railway policy brought the best of two worlds at a rural household’s doorstep, being the opportunity to grow vegetables and perhaps keep some livestock in the countryside while having access to higher industrial and urban wages. To be sure, “leaving home was as much a part of life in [a] village as were the fields at home” prior to the rise of an industrial society. Yet, daily or weekly commute was a novelty of the nineteenth century: besides the reliance on transport technology to bridge physical distance in a home-work split, transport policies were needed that made routine travel affordable for wage workers.

Granting cheap housing loans intended to encourage commuting as labour practice even further. The idea of complementing railway commuting with homeownership was already

856 (quote) Polasky, “Transplanting and rooting workers”, 2010, 533; Smets, De tuinwijkgedachte in België, 1976, 8.
857 See Chapter 1: 3.5 Giving rural households access to the railway network.
861 Schepers e.a., “Organising the work-home split”, 2020, 101.
present in the parliamentary debates discussing the issuing of cheap railway subscriptions for wage workers in 1869. Notwithstanding, only after social conflicts and general strikes had brought Belgium in an uproar between 1873 and 1886 did cheap housing loans for wage workers became law. In line with the principles of a liberal state, wage workers were free to build their house wherever they wanted. The policy makers, however, were convinced that the housing policy would address the problem of overcrowding in the city due to land being cheaper in the countryside and railway commuting preserving the connection with higher wages in industrial sites and urban cores. The housing policy was made all the more attractive in the eyes of the bourgeoisie by assuming that the obligation to repay the loan would transform wage workers into “frugal, hard-working”, thereby alleviating the social unrest that socialists were constantly fomenting.

2.2 Explaining a sprawled landscape through policy legitimations

In his “quest to find the significance of the infrastructure project within the urbanisation project” in Belgium, Maarten Van Acker took at heart the warning of Jean-Marc Offner that “political discourses develop their own efficiency by using the supposed effects of infrastructure as legitimisation”. There is indeed a tendency in research seeking to grasp the effect of networked connectivity on urban landscapes to side with the cause-consequence relations emphasised in legitimations of nineteenth-century housing and railway policies. For instance, the claim that light railways were beneficial for rural households was based on the assumption that rural dwellers jumped to the opportunity of railway commuting as soon as transport technology removed the barrier of physical distance in the home-work split. The idea that connecting places was all that was needed to make rural households mobile likewise drives the statement that introducing a weekly commute over an unlimited distance in 1896 caused the marked rise in railway commuting from that year onwards. As argued in chapter 1, the size of daily commute compared to weekly displacements calls into question the validity of this

862 Mahaim, Abonnements d’ouvriers, 1910, 8.
863 Grosjean, Urbanisation sans urbanisme, 2010, 186; Smets, De tuinwijkgedachte in België, 1976, 46-47. See also Van Coppenolle, De Belgische politiek van de volkswoning, 1932, 150-152.
866 Van Acker, From flux to frame, 2014, 18-19.
Still, the idea that transport development almost automatically increases travel distance, as “the increased speed of travel has outweighed the costs of travel”, is very much alive in research relating urban sprawl to widespread car ownership.\textsuperscript{870}

Policy legitimations fit the observed shifts in urban shapes so well precisely because the cause-consequence relations that are accredited with the ability to engineer society represent the perspective of policy makers on what constitutes progress. Mindset and reality are thus locked up in a vicious circle that, importantly, has been given the power of law. Here, the quote that ‘a problem cannot be solved with the same mind that created it’ offers way out. Ascribing the quote to Albert Einstein lends it scientific authority, but it also underpins the usefulness of going against the grain to uncover facets that escape mainstream explanations of a societal phenomenon. Take for example the subsistence crisis of the 1840s or the Agrarian Invasion of the 1880s: both times the ‘universal’ principle that granting a place direct access to the railway network revitalises its economic activity is contradicted by the havoc market competition, as travel companion of market opportunities, has wreaked on rural economies.\textsuperscript{871} The policy argument for making wage workers mobile serves as another example. Whilst cheap railway subscriptions for wage workers were promoted as a blessing for a household’s livelihood, political discourse is silent on the large numbers of rural households pushed into the home-work split due to the progressive centralisation of labour markets in industrial sites and cities.\textsuperscript{872} As such, it is recommendable to examine spatial transformations that elude the cause-consequence relations foregrounded in policy discourses.

2.3 Two spatial dynamics emphasised in policy discourse

To examine whether the cause-consequence relations that the Belgian housing and railway policies activated transformed the station area of a rural village as planned, it is of interest to distinguish the two spatial dynamics that were to render “the countryside and its inhabitants simultaneously rural and urban, traditional and modern”.\textsuperscript{873} Although the two spatial dynamics became intertwined over time, issuing cheap railway subscriptions for wage workers in 1869 had the initial purpose of preserving a population that was distributed over villages, towns and cities whereas the introduction of cheap housing loans in 1889 wanted to ease overcrowding in cities by initiating a radial-concentric expansion of the urban core in its surrounding. In 1869, state

\textsuperscript{869} See Chapter 1: 5.2 The value of a simple graph.

\textsuperscript{870} Banister, “Sustainable mobility paradigm”, 2008, 73.

\textsuperscript{871} See Chapter 2: 5.3 Railway access and population los in areas of market exchange and Chapter 2: 6.2 Rural exodus: the commercial use of land in a rural economy.

\textsuperscript{872} See Chapter 3: 5.2 The home-work split as economic imperative.

\textsuperscript{873} (quote) De Block and Polasky, “Rural-urban continuum”, 2011, 313.
representatives reasoned that making railway commuting a viable alternative to rural outmigration compensated for dwindling job opportunities in rural regions that lacked large farms or industrial activity.\textsuperscript{874} Making cheaper building plots in the countryside accessible for wage workers who called an urban core’s “tumbledown tenements and malodorous hovels” home, was key in the spatial dynamic of 1889.\textsuperscript{875} Or, as Emile Vandervelde hoped for, giving wage workers the opportunity to combine housing loans with railway subscriptions had the potential to facilitate a 'back-to-the-land' movement.\textsuperscript{876} Both dynamics depended on the networked connectivity of railway infrastructure to support daily or weekly commute, but the envisioned urban transformation foregrounded by the policy legitimations differed. The goal intended by a preservation dynamic was achieved if population decline was avoided and rural dwellers practised industrial activities instead of agrarian occupations. The spatial dynamic of a radial-concentric expansion of an urban core corresponded with an exogenous growth of the village and industrial wage workers becoming homeowners.

3 Data and methodology

3.1 Research goal and historical sources
Inspired by Bénédicte Grosjean, this research scrutinises houses and households as well as population data to explore urban growth in the station area of an agrarian village.\textsuperscript{877} Hence, historical sources with population and cadastral data serve as building blocks of the empirical analysis. On the level of the village, the Mouvement de la population and the Atlas cadastral parcellaire de Belgique of Philippe C. Popp deliver the empirical data while administrative sources of a village are inserted in the research to investigate a station area.\textsuperscript{878} Whereas the Mouvement de la population has the data to decide upon an endogenous or exogenous growth of the population in a municipality, the cadastre of Philippe C. Popp makes the population data spatial by visualising the location pattern of houses; most people, after all, have a roof above their head. Yet, whereas the Mouvement de la Population contains the data to examine annual changes in the population level of a municipality over a longer period of time, the cadastre of

\textsuperscript{874} Vandervelde, L'exode rural, 1903, 103.
\textsuperscript{876} De Block and Polasky, “Rural-urban continuum”, 2011, 313.
\textsuperscript{877} Grosjean, Urbanisation sans urbanisme, 2010, 165.
Philippe C. Popp is a cross-section of the spatial characteristics of a village at a particular moment in time. Other sources are thus needed to stretch the spatiality of the Popp cadastre in time. The municipal cadastre and population registers of a village handle this task. Next to elucidating a municipal’s spatial transformation, the documents enrich the changes in the population level of a village with information on occupational shifts and homeownership, whereby marriage certificates link households to a broader familial context. Together, these historical sources deliver the empirical data needed to compare the intended effect of the Belgian housing and railway policies formalised in the laws of 1869, 1884 and 1889 with actual urban growth in an agrarian village.

3.2 Time period
The principle that sufficient time has to pass before the spatial dynamics policy makers aimed for materialise in the landscape, aligns with Holsbeek as case study and 1930 as appropriate closing year. The suitability of Holsbeek to serve as a case study will be discussed later in more detail. Here, it is important to know that this agrarian village at the borders of Leuven’s industrial world gained a train stop on 1 October 1907. This coincides with the time period in which studies stated that the Belgian policy to stimulate railway commuting had borne fruit and industry had finally replaced agriculture as largest employer. In other words, both the habit of commuting and easy access to industrial employment were in place in 1907. Adding the date of the Housing Act to this chronology makes 1930 a year in which enough time has flowed over the three laws to expose the role they played in the establishment of a rural-urban continuum.

The dependency of historical research on source material related to the time frame of the research question, likewise delineates the chronology of a study. For this chapter, the municipal cadastre recording the names, occupations and domicile of the persons who owned land and/or a house in Holsbeek between 1846 and 1920 has been instrumental in marking the start and closing year of the empirical analysis. Although the municipal cadastre contains spatial information, it comes without a map. The life work of Philippe Christian Popp addresses this lacuna. His Atlas cadastral parcellaire de la Belgique represented a source of income so that the cadastral leggers and maps of the Belgian municipalities were published without a date to reduce the harm a rapid obsolescence of these data caused to the economic value of the information

879 For a discussion of the population registers and marriage certificates as historical source: Gutmann and van de Walle, “The Belgian population registers”, 1978.
881 Vandervelde, L’exode rural, 1903, 143; Mahaim, Abonnements d’ouvriers, 1910, vii; Rowntree, Land and labour, 1910, 288-291; Demain, Migrations ouvrières, 1919, 1-2; De Leener, “L’agriculture”, 1926, 144.
As benefits a historian, Wouter Ronsijn did the detective work and concluded that most municipalities in the province of Flemish Brabant had its cross-section made in 1861, which makes 1861 the opening year of this chapter’s spatial analysis. To determine whether a household owned the house they lived in, the municipal cadastre and population registers have to be linked. With the first volume of Holsbeek’s cadastre ending in 1920 and given the time-consuming characteristic of this activity, it was decided to end the empirical analysis of occupations and homeownership in 1920.

3.3 Exploring population dynamics with the Mouvement de la population
Data on Belgian population dynamics per municipality on an annual basis are to be found in the *Mouvement de la population*. The continuity of the data series is verifiable, because the municipal’s population level for the year under scrutiny is written next to that figure recorded in the previous year. Importantly, these population levels are calculated: they result from adding up and subtracting the numbers of birth, death, immigration and emigration registered in the administrative sources of a municipality for the corresponding year. This practice has two consequences. First, it means that the *Mouvement de la population* preserved the quantitative data of the four demographic events for future generations, which makes the historical source well-suited to retrace an endogenous or exogenous growth of a village. Indeed, if the rate of natural growth surpassed the rate of migration, then the local population caused the amount of inhabitants to increase whilst an exogenous growth supposes the opposite scenario. Second, calculating the population level entails the risk that the calculated number differs from the actual population level. To reduce the errors inherent to this method to minimum, a correction on the calculated number was applied every time a national population census was composed: after all, the gathering of the data for this statistical source included an actual count of the population. If there is a marked difference in population level in the *Mouvement de la population* between two consecutive years, then the reason is usually linked to this administrative correction.

3.4 Linking a house in the municipal cadastre to a household in the population register
As Wout Vande Sompele aptly remarked in his doctoral research, linking municipal cadastre to population registers comes with its challenges. First, in Holsbeek’s archive, the years 1861 till 1920 were covered by one municipal cadastre while the population register consisted of five

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883 Vande Sompele, *De rurale middenstand in Doel*, 2021, 136-137.
volumes with 1857, 1867, 1881, 1901 and 1911 as opening years respectively. Second, the municipal cadastre only registered homeowners, thereby neglecting the households renting a house in the station area. Third, the spatial pattern of houses structures the sequence of households in the population register while the plots in the municipal cadastre are ordered by ownership. Moreover, the spatial pattern that gives a house its number in the population register varies in each of the five volumes, with the practice to identify a house by street name and house number only started in 1901 in the fourth population register. To make the exercise even more complicated, households who arrived in a house that was built after the year a new population register was opened were registered in the back of the population register. In this spot also residents of a house were registered who had one page available to them at the start of the registration period, but where the space of one page was insufficient to record all the inhabitants of the house.

Fortunately, the part of Holsbeek that was to become a station area in 1907 was located in the southern tip of the municipality, being the place where each population register started its registration (map 1). In addition, the cadastral map of Philippe C. Popp proved its value to link the houses in the municipal cadastre to the households in the population registers. The fact that Holsbeek’s municipal cadastre used the same procedure to identify a plot as Philippe C. Popp, made it possible to correct the cadastral map of Popp for the mutations that a plot underwent in Holsbeek’s municipal cadastre between 1861 and 1920. The municipal cadastre only provided a description of the mutations. Accordingly, the number of houses and plots displayed in the cross-section of the station area in 1920 are correct in number, yet the shapes are entirely fictive. Finally, the houses in the station area coincided with a recurring cluster of households in the population registers, which was conducive in retracing the order of houses needed to link the municipal cadastre to the population register (map 2a and map 2b). The assumption that homeowners were less inclined to depart from their roof compared to tenants, permitted to relate the names of the homeowners in the municipal cadastre to the names of the households in the population register, on the one hand, and the physical houses depicted on the cadastral map of Philippe C. Popp where these households lived, on the other. Once this relation was established, a basic structure unfolded permitting to give cadastral mutations and other households their place in the empirical analysis.

The singular house located at the extremity of Holsbeek on map 2a is the beacon needed to retrace the spatial pattern that ordered the households in the population registers. In the first
Map 1 shows the municipality of Holsbeek in 1848 with a projection of Holsbeek’s street pattern in 1841 and Popp’s cadastral map in 1861. The area that would become Holsbeek’s station area between 1907 and 1958 is outlined in yellow. (sources: Municipal archive of Holsbeek, Atlas of Local Roads, Cadastral Map of Philippe C. Popp)
**Map 2a** shows the street and housing pattern of the station area in 1861, based on the cadastre of Popp (1861) and the Atlas of Local Roads (1841). The red arrow indicates where the registration of the households started in the first volume of Holsbeek’s population register. The house sequence results from combining the data in this population register with the data of the municipal cadastre.

**Map 2b** shows the end result of the transformations occurring between 1861 and 1920 in housing stock, land plots and transport connectivity. It also gives the house sequence in 1920. As the red arrow indicates, the increase in houses created a new start point to register the households whereas the orientation and the area of the loop prevailed.
population register, the sequence goes north along the municipal boundary whilst passing five houses near the Vunt creek to the point where the paved road Leuven-Aarschot crossed a south-east oriented path entering the municipality. This path turns into a street, the future called Pleinstraat, which opens onto the road connecting Holsbeek with Leuven. Following this road southwards brings the route back to the singular house from where it started. The demarcation of the area as well as the general orientation of the loop remained unchanged throughout the period under study, although the growth of the housing stock brought slight alterations in the route numbering the houses, as map 2a and 2b illustrate.884

4 The suitability of Holsbeek as case study to examine the effects of spatial policies
4.1 A village in rural Hageland with Leuven and its suburbs as neighbours
As map 3 shows, the location of Holsbeek made it easy for an industrial world to knock at the municipal borders of the agrarian village between 1860 and 1930. True, the transition “from quasi-rural villages to densely populated suburban – or arguably urban – districts in the later nineteenth century” that Hilde Greefs and Anne Winter laid bare for the suburbs of Antwerp, Brussels and Ghent, hardly corresponded with the dynamics at play in Wilsele and Kessel-lo.885 During the era of steam and steel, rural and urban lifestyles nevertheless got mixed in the two neighbouring municipalities of Holsbeek and Leuven. The canal that connected Leuven to Mechelen since 1752 made Wilsele an attractive location site for nineteenth-century factories, in particular for the processing of agricultural products grown in Leuven’s rural hinterland, called Hageland.886 The large-scale complex built for train maintenance in 1863 transformed Kessel-lo into an industrial suburb of Leuven.887 Similar, although the three cities listed above were giants compared to Leuven, the provincial town nonetheless represented a major hub in Belgium’s domestic commute in 1910.888 With natural resources being scarce in the Leuven region, movement was de facto the vector that drove local industrial development, whereby the second industrial revolution transformed the Leuvense Vaart from a mere supply route into a

884 Given that human endeavours are anything but flawless and the sources thar are used are man-made too, some minor errors are undoubtedly present in the reconstruction of the station area. However, the result of the exercise is reliable enough to examine if the spatial dynamics predicted by the railway and housing laws became a reality in the station area of Holsbeek.
888 See Chapter 3: 4.1 Detecting job basins in Belgium in 1910.
Map 3 displays the location of Holsbeek at the beginning of the twentieth century. In the immediate vicinity lie the industrial labour markets of Leuven, Wilsele and Kessel-lo whereas the cabinet map of the Austrian Netherlands (1777) used as background shows that Holsbeek is part of Leuven’s rural hinterland.
full-fledged ‘industrial zone’ in the beginning of the twentieth century. This meant that a bicycle ride of about half an hour separated the inhabitants of Holsbeek from a thriving industrial labour market.

As soon as the municipal boundary of Holsbeek was crossed, Leuven’s industrial world made way for rural Hageland. As figure 1 exposes, Hageland was a transitional zone located between the sandy soil of the Campine area and the fertile loam region of Haspengouw, which explains why the soil of the region variegated in quality. Although the soil lacked the fertility needed for large-scale farming, almost the entire population who lived in Hageland’s hilly and forested landscape worked on the fields to earn. Like the households in the Campine area, the rural dwellers in Hageland balanced their ambition of acquiring land with the discipline to obtain the amount of land needed to support the household. As the few large farms that arose in Hageland’s landscape had an average size around 20 hectares, the demand for rural wage workers was low. Also industry was reluctant to spread its wings over Hageland. The shortage in large farms and industrial activity not flagged Hageland as a backward region by the standards of a market economy. Combined with an inadequate railway infrastructure to support commuting, designated Hageland in the logic of governmental policies as a region destined to depopulate.

In Hageland’s economic analysis Modest Goossens published in 1984, these “nineteenth century roots of evil” had changed little after the Second World War. The geographer stated that the “heartland of Hageland was long deprived of adequate transport infrastructure, lacked an aptitude for industrialisation and underperformed even as an agricultural region”. Hence, Hageland kept ticking all the boxes Emile Vandervelde had identified around 1900 as the causes of a rural exodus that encompassed both a decline in agrarian activities and a loss in population. Yet, rural outmigration was kept at bay. Or, as Modest Goossens wrote: “In the

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890 According to Nan Van Zutphen, 1900 can be considered the year in which the bicycle shifted from a means of leisure to a means of transport for wage workers (Van Zutphen, “Het fietsten te Leuven”, 1979, 101, 119).
893 Vliebergh and Ulens, Het Hageland, 1914/1921, 129-130, 155.
894 Vliebergh and Ulens, Het Hageland, 1914/1921, 152.
896 Vandervelde, L’exode rural, 1903, 103.
899 Vandervelde, L’exode rural, 1903, 103.
900 Vliebergh and Ulens, Het Hageland, 1914/1921, 57.
Figure 1 indicates the different rural regions in Belgium, with Holsbeek located in a transitional zone separating the sandy Campine area from the sandyloam region of Haspengouw (source: Goossens, Probleemschets Hageland, 1984)
struggle for life the inhabitants of the area managed to survive through seasonal work in rich agricultural regions, through employment in the Limburg mines, through intensive fruit farming or through practising agricultural activities as a secondary occupation coupled with long-distance commuting. In other words, to resolve the lack of local income resources, rural households in Hageland turned to seasonal labour in the nineteenth century whilst commuting gained prominence in the course of the twentieth century.

4.2 Municipal transport policies to become part of a modern society

Holsbeek’s municipal council had been inspired by the national railway policy engineers and state representatives conceived to induce economic growth by enhancing the circulation of goods and people, as they too went along with a policy improving the connectivity of the agrarian village with Leuven in general and the station of this provincial town in particular. The argument of furthering the public good used by the national government to legitimise the deployment of the railway network as spatial tool, was also invoked by the municipal council to justify the financial effort this transport policy demanded from the villagers. The first step was taken by the Provincial Governor of Brabant who asked them in a circular dated 14 May 1859 for their cooperation in the construction of a paved road. They agreed, unaware of the obstacles that came with the realisation of the paved road. The frequent discussion in the municipal reports of the costs to construct the paved road, for instance, illustrates the heavy burden it placed on the village. Moreover, Kessel-lo lagged behind in building their part of the paved road so that the smooth connection between Holsbeek and Leuven still lacked on 17 March 1868, when the last cobblestone completed the road between the village centre and Kessel-lo.

The outcome of the next project, i.e. the construction of a light railway line facilitating travel between the stations of Leuven and Aarschot, was even worse. The proposal for the iron road made by the road commissioner of Aarschot was accepted by the council of Holsbeek on 6 April 1899. The first feasibility study performed by the employers of the National Company of Light Railways was signed in 1904, followed by an adjusted version in 1911. The concession was granted on 28 May 1913, but the First World War threw a spanner in the works. The construction

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903 See Chapter 1: 3.2 Fortifying connectivity and circulation in transport policies.
904 Municipal report of Holsbeek, n° 211_23 February 1860; n° 297_26 November 1863.
905 Municipal report of Holsbeek, n° 197_4 August 1859.
906 Municipal report of Holsbeek, n° 369_17 March 1868.
907 Municipal report of Holsbeek, n° 744_6 April 1899.
plans lingered on till 1938, when the plug was finally pulled on the project due to a shortage of funds. Interestingly, both feasibility studies of the National Company of Light Railways explicitly mention the hamlet of ‘Attenhoven’ in Holsbeek as a place to be served by the light railway line.909 It is in this hamlet that the train stop, which gave the inhabitants of Holsbeek direct access to the railway network between 1907 and 1958, was installed. Accordingly, the train fulfilled the promise of improved mobility flows raised by the light railway line, in particular because the railway line that crossed the municipal grounds of Holsbeek connected the stations of Leuven and Aarschot too.909 The private railway company *Entre Sambre & Meuse* had built the line in 1863. A year later, the fusion of several railway companies materialised in the *Compagnie des Chemins de Fer Grand Central Belge* whereby the railway line became part of a major north-south axis referred to as *La Ligne du Grand Central*.911 This transport axis started in Hainaut in the village of Treignes near the French border and worked its way up north via Charleroi, Ottignies, Leuven, Aarschot and Lier to end in Antwerp. In 1897, the policy to nationalise the Belgian railway infrastructure brought this axis under the wings of the Belgian State Railways.912

In the case of the paved road and the light railway line, a hierarchical higher authority had invited the council of Holsbeek to partake in a project fuelling the ambition of the local councillors to improve Holsbeek’s connectivity. The initiative for a train stop, in contrast, was taken bottom-up: socialist Prosper Van Langendonck claimed he represented the mayor of Holsbeek and Wilsele in parliament when he asked the Minister of Railways to install a train stop in the agrarian village.913 His request was rejected a first time in 1903, given that a light railway was underway to upgrade flows of labour mobility in Holsbeek, Wilsele and Kessel-lo.914 In 1905, Prosper Van Langendonck again pleaded to ease the workday for these wage workers: without the train stop, they had to walk three quarters to reach the station of Leuven whilst the plans for the light railway line kept lingering on.915 The second denial of his request was based on the argument that the number of people living near the train stop was too small to justify the cost.916 Nonetheless, the railway minister changed his mind shortly afterwards, as wage workers were able to take the train to work in Attenhoven between 1907 and 1958.

912 More information on the nationalisation policy can be found in *Chapter 1: 3.3 Facilitating urban sprawl avant-la-lettre*.
914 *Annales parlementaires: chambre des représentants*, 31 March 1903.
4.3 Commuting to combine higher industrial wages and cheap building plots in Holsbeek

In 1905, the municipal council responded to a circular inquiring about the need for a special court to hear labour disputes. According to them, the occupational structure of Holsbeek made such an institution obsolete, as a community of farmers constituted the village while lacking industrial workplaces. In 1950, urban planner Jos Heymans still described Holsbeek as a predominantly rural municipality where industrial jobs were virtually absent and the poor quality of the soil resented commercial exploitation. However, the proximity of Leuven, Wilsele and Kessel-lo not only ensured the presence of industrial employment nearby, but the opening of a train stop in 1907 also brought distant job opportunities within reach of the rural dwellers. Here, it is of interest to recall Modest Goossens’ observation that commuting was an ingrained labour practice of the households living in rural Hageland in the twentieth century. Emiel Vliebergh and Robert Ulens made commuting a nineteenth-century phenomenon when they explicitly mentioned La Ligne du Grand Central as major mobility artery unlocking the industrial labour markets of the Hainaut basin for Hageland’s inhabitants. The network analysis of chapter three too confirms the importance of this railway line in the home-work split: the shape of Leuven’s job basin matches the curb of the railway line perfectly. In other words, based on the economical and spatial amenities of Holsbeek and the cause-consequence relations stressed in the laws of 1869, 1884 and 1889 the village was destined to transform in an urban node where industrial wage workers bought or built a home.

Therefore, it is time to examine whether the train stop in Holsbeek effectively lived up to the claims mister Declerq formulated when he questioned the government’s intention to abolish train stops for budgetary reasons in 1924. To give the floor to mister Declerq: “Every one of us will admit that in earlier years some of these stops were requested for electoral reasons and allowed by the ministers to satisfy political friends. So these stops were built when they were of little importance, but now the situation has changed. Now most of these stops have acquired real importance. A number of workers and clerks take the train on a daily basis and have even established their homes around these stops. Farmers use them to reach markets easily. Trading houses and workshops have sprung up around it. Many a worker’s or farmer’s son owes it to these stops that he is allowed to study, as he can more easily get to the city to attend classes. And now they would abolish these train stops!” The exclamation mark included the train stop of Holsbeek.

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917 Municipal report of Holsbeek, n° 797_15 June 1905.
918 Libotten, Geschiedkundige sprokkelingen, 2010, 126-127.
919 Vliebergh and Ulens, Het Hageland, 1914/1921, 36.
920 See Chapter 3: 4.1 Detecting job basins in Belgium in 1910 - map 2.
5 Population dynamics in an agrarian village between 1860 and 1930

5.1 Graphs to uncover an endogenous or exogenous population growth

According to the Mouvement de la population, Holsbeek counted 1,243 inhabitants in 1860. This number had risen to 1,817 in 1930, representing an increase of 46.2 percent over a period of seventy years. The steady increase in population, shown on graph 1, was interrupted twice: in 1866, with a sharp drop in number of inhabitants, and after 1925, by a modest acceleration in population growth. In all probability, the loss of nearly hundred inhabitants between 1866 and 1867 is explained by the administrative procedure to correct the calculated numbers in the Mouvement de la population each time a national population census was held.\footnote{See 3.3 Exploring population dynamics with the Mouvement de la population. Graph 1 displays the corrected numbers because these figures served in the Mouvement de la population as start point for the next round of annual calculations.} The impact of this correction on the population data is negligible after 1867 so that the empirical analysis of population dynamics in Holsbeek starts in this year. The modest acceleration in population growth from 1926 onwards is less evident. With 1907 as opening year, the train stop arguably had little to do with it. Also noteworthy in graph 1, major events like the agrarian depression of the 1880s, the second industrial revolution (1895–1910) and the First World War are hardly reflected. Indeed, 5 years of the 64 years separating 1867 from 1930 had missing data in the Mouvement de la population. In the remaining 59 years, a population decline was registered 15 times, a population growth 40 times and a status quo during 4 years (graph 2). Holsbeek’s demographic data thus seem consistent with Emiel Vliebergh and Robert Ulens’ observation that inhabitants of Hageland rarely left their native village for good.\footnote{Vliebergh and Ulens, Het Hageland, 1914/1921, 57.}

To determine whether the steady population growth was exogenous or endogenous, a closer look has to be thrown at death and emigration numbers in the years of decline as well as birth and immigration numbers in the years of growth. This data is detailed in graph 3. The negative bars show the number of deaths and emigrants for each year data are available while the positive bars inform on the number of births and immigrants. As dark blue dominates the negative bars, it follows that emigration population decline was mainly caused by emigration in Holsbeek. The pattern of births and immigrants is a bit more mixed. Nevertheless, the two colours reveal that population growth before 1917 was generally driven by birth, after which immigration took over. In sum, with births prevailing in population growth and population growth surpassing population decline most of the time, it can be stated that Holsbeek owes its steady population rise to an endogenous dynamic. Only from 1927 onwards, the demographic
Graph 1 shows the annual population growth in Holsbeek between 1860 and 1930. The vertical axis informs on the population level with the horizontal axis displaying the time line. In addition, the orange line marks the year in which the Housing Act was published whilst the black line indicates the year in which the train stop opened. (source: Mouvement de la population)

Graph 2 shows the increase or decrease in absolute population number for Holsbeek for the years 1867 to 1930. Data are lacking for the years 1883, 1887, 1888, 1903 and 1908 whereas growth equalled decline in the years 1869, 1892, 1896 and 1924. The rectangle outlines the agrarian crisis of the 1880s (source: Mouvement de la population)
Graph 3 shows the annual contribution of births, deaths, immigrants and emigrants to Holsbeek’s population level between 1867 and 1930. The numbers of birth and immigration, being the two demographic events that add to the absolute population, are represented by the positive bars whereas the negative bars display the demographic events of deaths and emigrants, substracting numbers from a municipal’s population level. (source: Mouvement de la population)
data indicate exogenous growth, with an immigration number exceeding both the numbers of birth and emigrants. In other words, the graphs endorse Greet De Block and Janet Polasky’s hypothesis that “the early dislocation of working and living had primarily caused an endogenous growth of rural municipalities”.

5.2 What population data reveal over policy legitimations

<table>
<thead>
<tr>
<th>Year</th>
<th>Station Area</th>
<th>Holsbeek</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1867</td>
<td>120</td>
<td>1,205</td>
<td>10.0</td>
</tr>
<tr>
<td>1881</td>
<td>130</td>
<td>1,343</td>
<td>9.7</td>
</tr>
<tr>
<td>1901</td>
<td>135</td>
<td>1,455</td>
<td>9.3</td>
</tr>
<tr>
<td>1911</td>
<td>128</td>
<td>1,564</td>
<td>8.2</td>
</tr>
<tr>
<td>1921</td>
<td>166</td>
<td>1,660</td>
<td>10.0</td>
</tr>
</tbody>
</table>

*Table 1* places the number of inhabitants in the station area next to the municipal’s population level and this for each year a population register volume was started. (sources: the five population registers of Holsbeek, *Mouvement de la population*).

As mentioned above, the economic upheaval caused by the transition from an agrarian society to an industrial world passed unnoticed in Holsbeek’s population data. *Table 1* adds to this observation by exhibiting a highly comparable rhythm of population growth in the station area and the municipality. With the train stop opening in 1907, the drawback in population growth in 1911 is confusing. However, in 1921 the station area had caught up again. Hence, the population data neither confirm nor deny the dynamic of a train stop rooting rural dwellers in their village. This inconclusiveness of Holsbeek’s population data about railway and housing policies stimulating urban growth in a rural village likewise resonates in the migration data.

All types of migration are represented in the migration numbers of the *Mouvement de la population*. Consequently, more context is needed to identify labour migration as the main cause of population decline. For example, the rectangle in graph 2 delineates the period when the 1880s agrarian crisis plagued Europe. The outspoken presence of population decline in this rectangle together with the municipal council naming Holsbeek a community of farmers in 1905, makes it reasonable to assume that shifting labour markets drove peasants out of Holsbeek. Yet, this explanation is less plausible for the negative bars in 1920 and 1923, given that the train stop was well in place by that time. Or, if labour migration is at the basis of the two negative bars, then

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*924 De Block and Polaksy, “Rural-urban continuum”, 2011, 313.*
the policy discourse that the opportunity of railway commuting kept rural dwellers rooted in their villages is questioned, at least for these two years. Similar, graph 3 shows that immigration became the dominant factor in the rise of Holsbeek’s population level after 1917. Yet, the time laps of ten years between 1917 and the opening of the train stop in Holsbeek, makes it challenging to attribute the rising immigration numbers to easy access to cheap building plots distributing the industrial labour force across the countryside.

In brief, the demographic data of the *Mouvement de la population* leaves the hypothesis that railway commuting and cheap housing loans provided industrial wage workers with a home in the countryside open for debate. Here, Greet De Block’s research is interesting, because it exposes the railway network at work in the materialisation of “a new urbanity and architecture that often contrasted with the existing landscape”.925 To examine the development of a station area as second village node complementing the existing one under the church tower, houses and households are indispensable according to Bénédicte Grosjean, as population decline can go hand in hand with a stabilisation, or even a rise, in the number of houses and households.926 By integrating the three variables in her research, Bénédicte Grosjean demonstrated that the process of a rural exodus followed by radially expanding urban cores only partially explains the diffuse urban landscape of Belgium today.927 Taking up her methodology, permits to further examine how the two spatial dynamics stressed in the cause-consequence relations of policy legitimations, affected the morphology, homeownership and professional activities of Holsbeek’s station area.

6 The rise of a second village node around the train stop between 1861 and 1921
6.1 Transformations in street pattern and building practices

Visualising houses on a map adds a spatial dimension to population data because it connects households with the roofs above their heads. Map 1 renders this spatiality by showing the cadastral map Philippe C. Popp published in 1861 for Holsbeek, with dispersal the first word that comes to mind when characterising the housing pattern. The ‘hamlet village’, as Wouter Ronsijn called the distribution of houses along roads with a small concentration of buildings under the church tower, was a typical settlement pattern for rural Hageland: it betrayed a soil unfit for large-scale exploitations.928 This contrasted with fertile rural regions, like Doel, where the “value

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925 De Block, “Planning rural-urban landscapes”, 2014, 553.
Photo 1 shows the entrance gate of Attenhoven’s castle and the farm Jan-Baptist Overloop-Vandeput bought from a merchant living in Leuven in 1891. (sources: Libotton, Geschiedkundige sprokkelingen, 2007, 37; municipal cadastre: art 113 and art 1026)
*Figure 2* shows the map dated 14 July 1791. The central street of Holsbeek’s future station area and some of its buildings are already visible on this map. (source: Libotton, *Geschiedkundige sprokkelingen*, 2007, 32)
of the agricultural land literally pushed the village and the other dike hamlets to the edge of the polder.\textsuperscript{929} The train stop, which was to endow the village with “the promise of an optimised life in the countryside”, belonged to the future in 1861.\textsuperscript{930} The past, in contrast, was kept alive by the remnants of a majestic entrance gate belonging to the castle of Attenhoven (\textit{photo 1}). An image of this castle is preserved by a beautifully drawn map of 14 July 1791, whereby the castle’s moat and the central street make it easy to link the map to the cadastral map of Philippe C. Popp and, consequently, to the future station area of Holsbeek (\textit{figure 2}). Indeed, the street crossing the eighteenth-century map from left to right coincides with the Pleinstraat, being the street that gained a train stop in 1907. The \textit{baene von Loven op Holsbeek} is another point of reference. The municipal council recommended this road to the Provincial Governor of Brabant as a better candidate to be paved than the road that was proposed in the governor’s circular of 1859.\textsuperscript{931} Whilst the seventy years that separated the eighteenth-century map from the work of Philippe C. Popp might create the expectation of building activity, it was primarily the larger geographical scale that let the houses expand from seven in 1791 to seventeen in 1861.\textsuperscript{932} As map 2a shows, the Pleinstraat still centred most of the houses in 1861 with an additional five houses located near the municipal border of Wilsele and one house with courtyard almost tumbling onto the municipal land of Kessel-lo in the southern tip of the station area.

<table>
<thead>
<tr>
<th>year</th>
<th>houses start</th>
<th>expansion absolute</th>
<th>expansion relative</th>
</tr>
</thead>
<tbody>
<tr>
<td>1861</td>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1867</td>
<td>20</td>
<td>3</td>
<td>17.6</td>
</tr>
<tr>
<td>1881</td>
<td>22</td>
<td>2</td>
<td>10.0</td>
</tr>
<tr>
<td>1901</td>
<td>27</td>
<td>5</td>
<td>22.7</td>
</tr>
<tr>
<td>1911</td>
<td>28</td>
<td>1</td>
<td>3.7</td>
</tr>
<tr>
<td>1921</td>
<td>35</td>
<td>7</td>
<td>25.0</td>
</tr>
</tbody>
</table>

\textbf{Table 2} quantifies the houses in the station area of Holsbeek between 1861 and 1921. (\textit{sources: Popp cadastre, municipal cadastre})

\textsuperscript{930} Peleman and Uyttenhove, “Engineering the rural idyll”, 2012, 419.
\textsuperscript{931} Municipal report of Holsbeek, n° 197, 4 August 1859.
\textsuperscript{932} The count delivers seven houses as the castle no longer existed in 1861 whilst the large house on the right side of the road to Leuven has been excluded because it is located outside the station area.
Table 2 exhibits that the expansion of houses in the station area gathered pace between 1861 and 1921. Interestingly, the rate at which the housing stock doubled closely matches the dynamic of population numbers in table 1. Like the population data, the first decennia of the twentieth century disrupted the steady growth in houses with the second decennia making up for this slack in expansion. Indeed, from the eighteen houses that were added to the landscape of the station area between 1861 and 1921, seven of them popped up after 1911. The spatial dynamic guiding this house expansion, is discernible on map 2a and map 2b. Firstly, urban growth in the station area was all in all modest. Secondly, the location pattern of the houses attracts the attention. They emerged in the Pleinstraat and near the paved road to Leuven, which were precisely the two streets the municipal council targeted to stimulate circulation between Holsbeek and Leuven. As map 2b shows, the Pleinstraat gained a train stop whilst a street redevelopment gave direct access to the paved road Leuven-Aarschot. The Holsbeek-Leuvenroad got cobbled during the period under study. As such, the location pattern aligns with the urbanisation dynamic of a maturing industrial society that relied on commuting due to a progressive concentration of the labour markets in industrial and urban nuclei. Thirdly, while the houses in the Pleinstraat filled the voids between existing buildings during the entire period, a new phase of urbanisation started in the vicinity of the baene von Leuven op Holsbeek after 1889.

This year also appears as a pivotal year in the mutations that plots underwent in the municipal cadastre. Before the voting of the Housing Act, the housing stock of the station area mainly expanded via the demolishing, splitting, merging or renovating of existing buildings while the construction of new houses took over as building practice in 1889. Indeed, between 1861 and 1888, only two houses were newly built. These houses were owned by the state and accommodated the households whose task it was to secure a safe passage at the two railway crossings in Attenhoven, coming into existence in 1863 in the Vuntstraat and the Pleinstraat respectively. Locating the state property next to the two crossings made it easier for the guardians to lower the railway barriers each time a train passed through the village. The house in the Pleinstraat was renovated in 1900 whilst the house in the Vuntstraat had to make way for a broader railway line in 1906. A third house that popped up in the station area in 1863, resulted from the enlargement and division of a house already present in the Pleinstraat. The fire that destroyed these two houses in 1907 left the quantification of the housing stock untouched as

\[933\] See Chapter 3: 5 The double-sided effect of networked connectivity on commuting patterns.
\[934\] Municipal cadastre: art 677.
\[935\] Municipal cadastre: art 677.
\[936\] Municipal cadastre: art 613 (parcel 35).
Photo 2: The villa near the railway crossing in the Pleinstraat on a postcard dated 3 October 1913.
they were replaced with two new constructs a year later.937 The remaking of a building into a house added a fourth house to the station area in 1868. The owner of this house let the housing stock increase a second time in 1871, when he divided the house in two.938 Both houses were demolished in 1910 and replaced by a singular house, which better reflected the social status of a veterinary officer. This house next to the railway crossing is still to be admired in the Pleinstraat (photo 2). On the opposite side of the crossing, three adjoining houses were remodelled into four roofs in 1885.939 In 1889, the first house that was newly built by a private person entered the station area, followed by another thirteen houses between 1899 and 1917.

In spite of the overall limited urban growth, the emerging of houses near the two roads whose connectivity with Leuven had been ameliorated, the renewed building practice in 1889 and the acceleration in building rhythm after 1911 favour the argument that the 1889 Housing Act helped by railway commuting was successful in dispersing the industrial labour force over the Belgian countryside. Yet, to make the argument rock solid, zooming in on homeownership and occupations is recommendable. The empirical data needed for this exercise is to be found in the municipal cadastre and the population registers of Holsbeek while map 4 and table 3 summarise the information. Map 4 relates the houses in the station area to the households who became homeowners after 1888. In addition, their professional activities are listed next to the map. For reading convenience, only the occupations mentioned in the municipal register are enumerated. However, to illustrate the fluidity in the professional activities these homeowners practised, the occupations of the municipal cadastre, the five population register volumes as well as marriage certificates are all woven into the picture painted below. Similar, the cascade of names, dates and places might confuse the reader, yet, it is needed to create a vivid image of the social and geographical relations at work in the micro-world of a station area in a rural environment. The purpose of table 3 is to streamline this cascade of details a bit by displaying the built year of the house, the previous domicile of the homeowners and the way the building plot and the house came into their possession.

937 See 6.2.4 Buying a house in the Pleinstraat from the family Van Tilt.
938 Municipal cadastre: art 555.
939 Municipal cadastre: art 555.
HOMEOWNERS
Households who bought or built a house in the station area between 1889 and 1921

1 Soetewey-Symans : tailor
2 Swings-Van Meensel : farmer/innkeeper
3 Claessens-Troey : farmer/innkeeper
4 Caluwaerts-Organe : workman
5 Fortan-Geeraerts : factory worker/shopkeeper
6 Swings-Van Ing : farmer
7 Beulens-Weynants : farmer
8 Geeraerts-Peelaerts : farmer
7 Peelaerts & co : female innkeeper & mason
8 Perdieus-Servranckx : farmer
( 9 Frans Perdieus-Servranckx)

Map 4 relates homeowners and their occupations to the houses that emerged in the station area of Holsbeek after 1888. (source: municipal cadastre)
Table 3 gives the name of the homeowners, their previous domicile, the year when the house was built and how it come into the possession of the homeowners entering the station area after 1888. (source: municipal cadastre)
6.2 Painting a picture of homeownership in the station area from 1889 till 1921

6.2.1 Three houses emerging on Jozef Geeraerts’ plot of land

In 1889, Jozef Geeraerts, a farmer in Kessel-lo, his pregnant wife and his daughter entered the house they had built on a plot of land squeezed between the paved road to Leuven and the railway line of the Compagnie des Chemins de Fer Grand Central Belge. He and a farmer of Holsbeek, Jacob Sterckx, had bought the land from Frans Terweduwe and his children in 1881. A year later, the railway company claimed almost half of the land, leaving Jozef Geeraerts behind as sole owner of the remaining part. Chronology elucidates that the house was constructed without the help of a cheap housing loan, as the household took the house in possession in February 1889 whereas the law received its legal stamp on 9 August 1889. Jozef Geeraerts had been born in Holsbeek in 1849. Yet, after his marriage he had lived with his wife Juliana Peelaerts in her ancestral village, being Kessel-lo where she saw her first daylight in 1859. While the change in domicile had been adjusted in the municipal cadastre, the registration as farmer had been left untouched. Interestingly, in the population register the occupation of mason-workman was noted as source of income.

Unfortunately for Jozef Geeraerts, his life as homeowner was short-lived: he died aged forty in May 1889, with his newborn son passing away three months later. In 1891, Juliana Peelaerts took Frans Geeraerts as second husband. Like her, he had been born in Kessel-lo, but he was domiciled in Herent when he married. Once settled in the house along the paved road to Leuven, he stayed there with his wife till his death twenty-nine years later. Juliana Peelaerts, on the other hand, was still registered as an occupant of the house in 1930. Frans Geeraerts covered a wide range of occupations: at his marriage, he was a factory worker, he was named a farmer in the municipal cadastre while subsequent population registers referred to him as a workman, a blacksmith-assistant and an innkeeper. Juliana Peelaerts was a female innkeeper when she married, was named a female farmer, housekeeper and innkeeper in the municipal cadastre while the three population registers wrote female innkeeper next to her name. During

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940 Population register 1881/1901, blad 266.
941 Municipal cadastre: art 453; art 923.
942 Population register 1881/1901, blad 266; (housing law) Mahaim, Abonnements d’ouvriers, 1910, 189.
943 Population register 1881/1901, blad 266.
944 Population register 1881/1901, blad 266.
945 Population register 1881/1901, blad 266.
946 Municipal cadastre: art 932.
947 Population register 1881/1901, blad 266.
948 Population register 1881/1901, blad 266; 1901/1910, blad 1; 1910/1920, blad 1; 1920/1930, blad 3.
949 ARA online: Mixed certificates Holsbeek 1871/1910, p 440: marriage certificate 1891 n° 9.
950 Municipal cadastre: art 932; Population registers 1881/1901, blad 266; 1901/1910, blad 3; 1910/1920, blad 1; 1920/1930, blad 3.
their marriage, the housing stock on their land tripled. The house they lived in was extended in 1906 and a second time in 1912, when it was also divided in two. Another house that was built the same year, let the total housing stock amount to three in 1912.

All this building activity on the plot of land that Jozef Geeraerts had made the family’s property, was most likely facilitated by the qualified knowledge the son-in-law Hendrik Henin possessed: he was a mason who had learned the trade from his father. In 1908, he married a female land worker Leonia Geeraerts, who was the daughter of Jozef and Juliana. She had met her husband during a nine-month stay in Kessel-lo, which was the ancestral village of Hendrik Henin. When they married three years later, they chose Kessel-lo as their home municipality for three and half years, after which they lived for two years by her mother and stepfather before they took off to England in 1914. On their return in 1919, they moved in to one of the other houses on the family ground where she passed away in 1921. As a consequence, Hendrik Henin and Juliana Peelaerts became shared homeowners of the three houses on plot 23b. Compared to his stepsister, the son of Frans and Juliana was less adventurous. Like her, he married a native of Kessel-lo, yet, the couple shared a roof with his parents. His occupation as iron driller in the population register is worth noting: in absence of an iron industry in Holsbeek, this implies that Isidoor Frederik Geeraerts had to commute.

6.2.2 Five new houses popping up on the land of Frans Perdieus

On the other side of the railway line, almost neighbouring the land of Jozef Geeraerts and his heirs, lay the plot of land that Frans Perdieus had created by uniting different parcels; he also had enriched it with five houses. This farmer let the population number of Holsbeek mount in 1847, when he was born as second son of Louis Perdieus and Anna Terwerduwe. His wife, Catherina Servranckx, was born a year earlier in Wilsele. They married in 1884 and moved a year later to the house with courtyard located at the tip of the station area. When the uncle of Frans Perdieus decided to move to Herent with his children, Frans Perdieus and his two brothers took their chance and bought the house with garden in 1881. Intriguingly, a certain Frans

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953 Municipal cadastre: art 923.
954 Marriage certificate 1908 n° 1.
959 Municipal cadastre: art 971.
960 Population register 1887/1887, blad 19.
961 Population register (marriage) 1910/1920, blad 2.
962 Population register (house) 1881/1901, blad 1.
963 Municipal cadastre: art 453; art 922.
Persoons owned the house in 1885, from whom Frans Perdieus bought it back in 1886. From that moment on, the house was shared property of Frans Perdieus and Catherina Servranckx until her death in 1918, when their son-in-law Jozef Geeraerts made his entry in the municipal register via his marriage with their daughter Anna-Maria Perdieus in 1913. Meanwhile, Frans Perdieus had enlarged the household’s possessions with a plot of land he had bought from a farmer in Kessel-lo (Gerard Van Aerschot) in 1888 and a plot of land he had bought from an innkeeper in Leuven (Peter Wouters) in 1907. In 1913, the first house arose on the plot of land, followed by four other houses in 1917. To be complete, despite a house was being built in the year that Jozef Geeraerts took Anna-Maria Perdieus as his wife, the couple lived by her parents from 1913 to 1920, only to be informed by the next population register that they had become the residents of the neighbouring house in the next decennia. With the exception of the son-in-law, who was a brewer, and the brother of Frans Perdieus, who was registered as a rentier for a while, farmer was the occupational title that the members of this family had attached to their names.

6.2.3 Wim-Frans Swings and Jan Beulens: building their home

In 1889, when Frans Swings left this earth, his son Wim-Frans Swings inherited the plot of land along Klein Langeveld. This parcel had been the property of his mother, Pelugia Laeremans, who married Frans Swings in 1858. This marriage brought Frans Swings from his ancestral village Wilsele to his bride’s native street, the Pleinstraat in Holsbeek. In 1859, Pelugia Laeremans gave birth to her son Wim-Frans. A year later, the couple bought a house from her sister’s husband, Jozef Vandeput, also located in the Pleinstraat and opposite of the parents of Pelugia. In 1884, it was Wim-Frans Swings’ turn to marry. He chose Catherina Van Ing as his wife, a native of the Pleinstraat too and this since 1861. Wim-Frans Swings stayed registered as a servant who lived by his uncle Jozef Vandeput till 1886, after which he moved in by his parents-

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966 Municipal cadastre: art 922; art 974; art 971.
968 Municipal cadastre: (1888) art 203; (1907) art 533.
969 Municipal cadastre: art 971.
970 Population register 1921/1930 blad 5; 1910/1920 blad 2.
972 Municipal cadastre: art 323; art 1008.
973 ARA online: Marriage certificates Holsbeek 1851/1860, p 450: marriage certificate 1858 n° 13.
974 Population register 1857/1867, blad 255.
975 Municipal cadastre: art 610; art 648.
976 Marriage certificate: 1884 n°3; Population register 1867/1880, blad 24.
in-law.\textsuperscript{972} In 1910, Wim-Frans Swings and Catherina Van Ing with their two sons and five daughters left this roof to take possession of their newly build house in Klein Langeveld.\textsuperscript{973}

As the marriage certificate reveals and the population registers confirm, both Wim-Frans Swings and Catherina Van Ing grew up amidst a family of farmers.\textsuperscript{974} The father of Wim-Frans Swings enriched this occupation with being active as a servant, tapper and brewer-assistant whilst Wim-Frans Swings was a servant the moment he received his wedding ring.\textsuperscript{975} Farming became mixed with occupations of a modern society when the children of Wim-Frans and Catherina entered the labour markets: both sons started as a factory worker, but the youngest switched to prison guard.\textsuperscript{976} Again, the nature of this wage work related to the eldest son leaving the house in Klein Langeveld at the age of twenty-four and the youngest at twenty-seven, points at commuting. Jan Uyttenbroek commuted too: he married Eliza Swings, was a factory worker and moved in by his father-in-law in the house in Klein Langeveld.\textsuperscript{977}

In 1903, a farming couple living in Kessel-lo left their son Jan Beulens, aged thirty-seven, a plot of land along the paved road Holsbeek-Leuven.\textsuperscript{978} In 1906, he built a house there while simultaneously marrying his wife to be Maria-Leonia Weynants, a native of Holsbeek since 1875.\textsuperscript{979} In 1930, they still lived in the house without any children surrounding them.\textsuperscript{980} In all the administrative documents, Jan Beulens was named a farmer and Maria-Leonia a female farmer.\textsuperscript{981} From the marriage certificate, it is also known that Jan Beulens’ brother was a farmer who lived in Herent whilst his brother-in-law was a mason living in Kessel-lo. The parents of Maria-Leonia Weynants were farmers too, her brother-in-law was an innkeeper living in Holsbeek and her cousin was a farmer in Kortrijk-Dutzel.\textsuperscript{982}

\textsuperscript{972} Population register 1881/1901, blad 22, blad 13/
\textsuperscript{973} Population register 1910/1920, blad 28.
\textsuperscript{974} Marriage certificate: 1884 n° 3; Population register (Swings) 1867/1880, blad 255; 1881/1901, blad 19; (Van Ing) 1867/1880, blad 24; 1881/1901, blad 13.
\textsuperscript{975} (Frans Swings) Municipal cadastre: art 648; Population register 1867/1880, blad 255; 1881/1901, blad 15; ARA online: Marriage certificates Holsbeek 1851/1860, p 450: marriage certificate 1858 n° 13;
(Wim-Frans Swings) Marriage certificate: 1884 n° 3.
\textsuperscript{976} Population register 1910/1920, blad 28.
\textsuperscript{977} Population register 1920/1930, blad 41.
\textsuperscript{978} Municipal cadastre: art 878.
\textsuperscript{979} Municipal cadastre: art 878, art 1158; ARA online: Mixed certificates Holsbeek 1871/1910, p 501: marriage certificate 1906 n° 1.
\textsuperscript{980} Population register 1901/1910, blad 48; 1910/1920, blad 29; 1920/1930, blad 42.
\textsuperscript{981} Municipal cadastre: art 878; ARA online: Mixed certificates Holsbeek 1871/1910, p 501: marriage certificate 1906 n° 1.
\textsuperscript{982} ARA online: Mixed certificates Holsbeek 1871/1910, p 501: marriage certificate: 1906 n° 1.
6.2.4 Buying a house in the Pleinstraat from the family Van Tilt

The houses emerging near the paved road to Leuven were private initiatives taken by small players on the real estate market. In contrast, the family Van Tilt constructed five houses in the Pleinstraat between 1899 and 1908 with the intention to sell. This wealthy family entered the municipal cadastre as a family of brewers who was domiciled in Leuven; they possessed a considerable amount of land in Holsbeek.983 Around 1830, Jacques Van Tilt’s widow bought the farm and country house referred to as *Cense du Grande College* on the Ferraris map of 1777 from Leuven university ([figure 3]).984 On the cadastral map of Philippe C. Popp of 1861, the place is identified as ‘castle Van Tilt’. This castle was called home by Ludo Van Tilt and Bertha Verzyl, whom he married in 1873 when he was mayor of Holsbeek.985 In 1878, the possessions of the family had mounted to almost a sixth of the municipal grounds.986 In sum, what started as a prosperous family buying land in an agrarian village had grown into a close relationship between the Van Tilt family and the village community by the time the 1889 Housing Act became a fact.987

In 1899, Victor Soetewey and Theresia Symans were the first couple to buy a house from the family Van Tilt in the Pleinstraat.988 In 1880, at the age of nineteen, Victor Soetewey had left his native village of Wilsele to move to the house in the Pleinstraat in which the widow of tailor Jan-Baptist Rogge, who had died two months earlier, and a fellow called Frans Pluskens lived.989 Frans Pluskens was born in Borgerhout in 1859 and arrived in Holsbeek at the age of sixteen.990 The first population register that mentioned him left his occupation blank whereas the next described him as a factory worker.991 In 1886, when he married Ludovica Geleyns, a native of the Pleinstraat, he was a cabinet-maker.992 After his marriage, Frans Pluskens left the house, only to be replaced by the household of Victor Soetewey, the household of land worker Frans Tuyls and a temporary stay of two servants, born in two villages near Aarschot.993 In 1880, the moment he

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983 Municipal cadastre: art 285; art 377.
987 It is worth noting that large landowners without the ambition to expand the housing stock were also present in the station area. For example, art 620 of the municipal cadastre reveals that Severinus Persey-Verreght inherited a substantial amount of land in 1889, including an elongated parcel along the paved road Holsbeek-Leuven. By 1920, Severinus Persey-Verreght had moved from Aarschot to Brussels whilst his profession had changed from industrialist to owner. Yet, not a single building was added to the land he possessed in the station area.
988 Municipal cadastre: art 1058.
989 Formulieren van verblijfsverandering 1880_Jan-Frans-Victor Soetewey.
990 Population register 1867/1880, blad 12.
991 Population register 1881/1901, blad 12.
993 Population register 1881/1901, blad 12.
Figure 3 locates the castle of Attenhoven and the farm with country house, named Cense du grand College, on the Ferraris map (1777). As such, the map highlights that the castle of the Van Tilt family, being the former grand College, was within walking distance of the hamlet Attenhoven, where the future station area would arise.
entered the house, Victor Soetewey was registered as a tailor. From the fact that he shared his roof with railway guard Peter Verveken’s household, it can be deduced that he lived in the house near the railway crossing built by the state in 1863. In 1881, the household of the railway guard no longer occupied pages in the administrative sources whilst the widow of Jan-Baptist Rogge appeared as new railway guard.

On June 1891, tailor Victor Soetewey married female land worker Theresia Symans, born in Aarschot in 1863. His parents were farmers in Wilsele whilst her parents lived in Nieuwrode practising the occupations of slat sawyer and female housekeeper. As witnesses, Theresia had chosen her two brothers, one being a farmer in Oud-Heverlee and the other a farmer in Holsbeek. Victor had given the honour to his brother, a farmer in Wilsele, and his brother-in-law, a cabinet-maker in Holsbeek. In spite of their marriage date, Theresia Symans entered the population register as late as August 1892. A month later, she gave birth to her oldest daughter, the only one of three children to survive childhood. She herself passed away on Christmas day 1898. Tailor Victor Soetewey took the sister of Theresia, Isabelle Symans, as his second wife in April 1899. Once again, close family members served as witnesses, rendering the occupations of a farmer, a miller-assistant and a male servant. On the marriage certificate, the bride was classified as a servant whilst the population register named her a seamstress. She brought one son to the wedding and gave her husband one of his own in 1901. In 1906, however, the household split: tailor Victor went to Herent and his fourteen-year old daughter headed off to Kessel-lo. In 1907, Isabelle and her two sons closed the door of the house in the Pleinstraat and left for Heverlee.

In 1907 too, the keys of the house were handed to Jan-Baptist Swings and Maria Van Meensel, as the new homeowners. Jan-Baptist was born in Holsbeek in 1879, raised in the Pleinstraat and had the above mentioned Wim-Frans Swings as stepbrother. Maria greeted the world in Nieuwrode in 1874 and married in Wilsele thirty years later, after which the couple entered the population register of Holsbeek as residents of another house in the station area. From there, they moved to their own home in 1907. The municipal cadastre named Jan-Baptist a farmer, which later was changed into an innkeeper. In the population registers, he was a factory

994 Population register 1867/1880, blad 12.
995 ARA online: Mixed certificates Holsbeek 1871/1910, p 440: marriage certificate 1891 n° 10.
996 Population register 1881/1901, blad 12.
997 Population register 1881/1901, blad 12.
998 ARA online: Mixed certificates Holsbeek 1871/1910, p 470: marriage certificate 1899 n° 7.
1000 Municipal cadastre: art 1086.
worker during the first decennia of the twentieth century, a driver and innkeeper during the second decennia and a driver during the third decennia.\footnote{Population register 1901/1910, blad 20 ; 1910/1921, blad 10 ; 1920/1930, blad 21.} During this last decennia, his oldest son entered the labour markets as an iron foundry workman, which in all likelihood designated his son as a commuter.\footnote{Population register 1920/1930, blad 21.}

In 1900, Alfons Fortan and Maria-Albertina Geeraerts were the second couple to buy a house from the family Van Tilt in the Pleinstraat.\footnote{Population register 1920/1930, blad 21.} They were both born in Holsbeek; he in 1870 and she in 1873. According to the certificate legitimising their wedding vows in 1895, his parents were land workers.\footnote{Municipal cadastre: art 1092.} Her parents had worked their way up from land workers to farmers. In spite of Benoit Bouc’h’s claim that such type of rural dwellers were place-bound, the Maria-Albertina and her kin moved to Wilsele in 1891.\footnote{ARA online: Mixed certificates Holsbeek 1871/1910, p 455; marriage certificate 1895 no 3.} Albertina, however, returned to the station area of Holsbeek in 1894 where she worked as a servant for her former neighbour and likewise farmer, Felix Stuckens.\footnote{Population register: 1881/1901, blad 10.} Servant was the profession she exercised at the time of her wedding whilst Alfons was a factory worker.\footnote{Population register: 1881/1901, blad 10.} Before they moved to their own house in the Pleinstraat, the couple was to be found in one of the four adjoining houses in the station area near the Vunt Creek.\footnote{Population register: 1881/1901, blad 283.} They rented it from Barbara Verheyden, who owned two of these houses, whereby the two other houses were added to her possessions in 1900, when her father passed away.\footnote{Population register 1881/1901, blad 283.} Far from being part of a wealthy family, Barbara grew up in one of these four houses, whereby her father was a day worker becoming a farmer according to the municipal cadastre.\footnote{Municipal cadastre: art 290.} The population register confirmed his occupational status by writing agricultural worker next to his name.\footnote{Population register 1881/1901, blad 283; 1901/1910, blad 23; 1910/1920, blad 22; 1920/1930, blad 34.} Barbara was a servant who, aged seventeen, left the village in 1859 to work in Diest while later expanding her geographical horizon with work in Sint-Jans-Molenbeek and Schaarbeek.\footnote{Population register 1857/1867, blad 6; 1867/1880, blad 3.} Returning to the household of Alfons Fortan, like Barbara Verheyden’s father, Alfons Fortan was chronicled in the population register as a day worker during the four years that he lived with his wife, daughter and son in the house near the Vunt creek.\footnote{Population register 1881/1901, blad 283 ; 1901/1910, blad 23; 1910/1920, blad 22; 1920/1930, blad 34.} Once settled in their own house, he was active as a shopkeeper, a factory worker, a baker and a farmer.\footnote{Population register 1881/1901, blad 283 ; 1901/1910, blad 23; 1910/1920, blad 22; 1920/1930, blad 34.}
carrier of Maria-Albertina was more stable: she succeeded her husband as shopkeeper with her
youngest daughter assisting her in the shop the moment she entered the active population.107

In 1904, Felix Caluwaerts and Pélugia Organe were the third couple to buy a house from
the family Van Tilt in the Pleinstraat.108 The marriage certificate portrays the couple as being
born and raised in Holsbeek in families with an agricultural background.109 The joyous day that
united Felix and Pélugia in May 1900, Felix was active in a workshop, Pélugia was a seamstress
whereas the brother of Felix was a telegraph worker. In his further carrier, Felix supported his
household as day worker, telegraph worker, trader-farmer and electrician-assistant.1020 The
official who kept the municipal cadastre up-to-date circumvented this myriad of occupations by
booking Felix as a workman.1021 Right after their wedding day the couple left for Wilsele, only to
find themselves back in Holsbeek in November 1900.1022 From then, the household stayed in the
station area to raise their three children in the house they owned. The moment these children
took on a job, the industrial and agrarian world mixed again: the oldest son was a day worker
before he started as an electrician-assistant, the daughter married a miller and the youngest son
was a cabinetmaker-assistant.1023

In 1908, Viktor Claessens and Joanna Troey bought the last two houses from the family
Van Tilt.1024 Although these two adjacent houses were new in the year of purchase, they replaced
the two houses that had caught fire in 1907.1025 One of the two houses had been the ancestral
home of Viktor Claessens. In 1890, his mother Catherina Soetewey moved to Wilsele, his
stepfather Frans Verwimp to Gelrode and his wife Joanna Troye, whom he had married in 1889,
joined him in the house in the Pleinstraat. He bought the house five years later, presumably from
his mother given that his father Frans Claessens had passed away in 1876, although that fact had
gone unnoticed in the municipal cadastre.1026 The other house was linked to Victor Claessens
too. In 1857, his mother Catherina Soetewey and her sister Antonia became co-owners of a house
that had been in the possession of family Van Tilt whilst this family remained the owners of the

107 Population register 1910/1920, blad 22; 1920/1930, blad 34.
108 Municipal cadastre: art 1138.
109 Marriage certificate 1900 n°7.
1020 The official who kept the municipal cadastre up-to-date circumvented this myriad of occupations by
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that had been in the possession of family Van Tilt whilst this family remained the owners of the

1024 Municipal cadastre: art 1180.
1025 Formulieren van verhuijsverandering 1900_Felix Caluwaerts and Maria-Pélugia Organe.
1027 See 6.1 Transformations in street pattern and building practices.
land beneath the house.¹⁰²⁷ In 1863, the house was extended and divided in two.¹⁰²⁸ One house was registered under the name of Frans Claessens-Soeteway whilst the other house with a rural building came into the hands of Antonia Soeteway. The fact that family Van Tilt remained the owner of the land explains why this family demolished the three buildings and replaced them with two new houses after the fire.¹⁰²⁹

In the various articles of the municipal cadastre, the two sisters and Frans Claessens are consistently registered as farmers. Viktor Claessens, in contrast, is noted down as a farmer first and an innkeeper later.¹⁰³⁰ The population register inverts the chronology by naming Viktor Claessens respectively a cabinet-maker, an innkeeper and a farmer.¹⁰³¹ Viktor probably learned the cabinet-maker trade from his stepfather whilst he passed it on to two of his three sons.¹⁰³² The youngest son opted for fluidity in professional activities by being a driver and later a factory worker.¹⁰³³ Victor’s nephew traded his ancestral village of Wilsele for Holsbeek for one year, where he was registered as a mineworker.¹⁰³⁴ Hence, both the factory worker and the mine worker had to commute.

6.3 The landing of the 1889 Housing Act in the station area of Holsbeek

As she worked her way through the land registry archives to unravel the relation between the Housing Act of 1889 and changes in Chastre-Villeroux-Blanmont’s morphology, Bénédicte Grosjean was surprised by the quantity and the complexity of the real estate transactions that took place under the auspices of Belgian wage workers.¹⁰³⁵ Wage workers appear in the administrative sources as individuals who “were not inclined to restrict themselves to growing vegetables once they had acquired their ‘home’: almost like ‘large landowners’, they ‘fertilised’ their property through buying and selling, extending and rebuilding, etc.”.¹⁰³⁶ This description certainly fitted the industriousness of Jozef Geeraerts and his heirs and of Frans Perdieus: eight of the fifteen houses that emerged in the station area between 1889 and 1920 were built by these

¹⁰²⁷ Municipal cadastre: art 613; Population register: 1857/1867, blad 13 and blad 229. It is a bit confusing that Antonia is named Catherina in the population registers, like her sister. Nevertheless, as Gerard Coster was the husband of this second Catherina and he lived in the house owned by Antoina, it can be concluded that Antoina was the aunt of Viktor Claessens.
¹⁰²⁸ Municipal cadastre art 687, art 686. The division of property that is mentioned in these two articles for 1882 can be linked to art 403 in which the properties of Ludo-Jozef Van Tilt and his children likewise are redivided in 1882.
¹⁰²⁹ Municipal cadastre: art 950–928, art 950–941.
¹⁰³⁰ Municipal cadastre: art 950–928.
two families. Five other houses were built by the family Van Tilt who cumulated properties in Holsbeek with taking up responsibilities within the rural community. Wim-Frans Swings and Jan Beulens, lastly, limited themselves to the construction of their own houses.

Whereas the family Van Tilt simply had the money to build the houses, this option is less obvious for the households of Jozef Geeraerts and Frans Perdieus. Probably the principle of ‘quasi auto-construction’ that Bénédicte Grosjean highlighted in her book Urbanisation sans urbanisme explains the building activities of Jozef Geeraerts and his heirs.1037 In this principle, the novelty of skilled construction workers inhabiting the village, on the one hand, and the use of bricks to build a home, on the other, mixed with the ancient custom to auto-construct simple houses from local materials. As described above, the sole homeowner skilled as a mason married Jozef Geeraerts and Julian Peelaerts’ daughter. Moreover, according to the population register Jozef Geeraerts had been active as a mason-workman too, although the municipal cadastre labelled him a farmer. Frans Perdieus was a farmer in all the municipal’s administrative sources. Besides making him the odd one out, as all other homeowners after 1888 easily changed occupations, it is also remarkable that a household of farmers added an equal amount of houses to the station area as a family who owned a castle.

6.3.1 Farmers and innkeepers surpassing factory workers

Only one factory worker figured on the list of households who built or bought a house in the station area between 1889 and 1921. Not only did this factory worker buy a house from the Van Tilt family in the Pleinstraat in 1900, thus prior to the opening of the train stop in 1907, but he also decided that being a shopkeeper suited him better than remaining a factory worker. Farmers, on the other hand, dominated the list of homeowners with ease. Importantly, as the label ‘farmer’ in a municipal’s source derives its meaning from the rural region in which the village is located, the label ‘farmer’ can refer to an owner of a large-scale farm, but equally to a person whose plot is barely bigger than an allotment garden. Obviously, the meaning impacts the interpretation of the empirical data. Take for example the case study of Bénédicte Grosjean. The empirical data she dogged up from the cadastral archive for the village Chastre-Villeroux-Blanmont counted two farmers among eighty-three households acquiring an house between 1890 and 1914.1038 Hence, the opportunity for “labourers to travel daily by train from their homes in rural villages to employment in industrial centres throughout Belgium” is in line with the small number of farmers in the list.1039 However, Bénédicte Grosjean’s case study was located

1039 (quote) Polasky, Reforming urban labour, 2010, 76.
near the region that had caught the attention of Emile Vandervelde when he was examining the rural exodus. In theory, the presence of a dense railway network giving the inhabitants of the canton of Gembloux access to the industrial basin of Charleroi, should have made the homework split a signature of the landscape. In practice, however, rural outmigration continued. The fertility of the soil had to step in to solve the conundrum: it turned out that the nineteenth-century advance of the market economy had triggered a fierce competition for land with large-scale exploitations pushing the farmer-households out of the region, as they lost their access to a sufficient amount of land to be self-sustaining. Or, the underrepresentation of the farmers in the data of Bénédicte might equally by explained by the competition for arable land pushing other farmers out of the region.

Moreover, the maturation of a commercial agricultural sector impacted fertile regions differently. For instance, commercial farmers had taken their place as large landowners next to wealthy investors in the Doel Polder in the course of time whilst rural wage workers, in contrast to the Gembloux region, multiplied as small land owners during the nineteenth century. In rural Hageland, with the quality of the soil resisting large-scale farming, the label ‘farmer’ typically referred to a peasant household who had access to two à three hectares of land and two cows. As most of these rural households depended on additional incomes to generate sufficient livelihood, they worked on the fields of large farms in the Brabant loam region, Haspengouw and the Condroz, in the industrial basins of Liège and Charleroi or on the construction sites of public works. This wage work not only set farmers of rural Hageland apart from commercial farmers in Gembloux or Doel, but it simultaneously means that these households, like their industrial colleagues, were entitled to a cheap housing loan as they “worked with their hands for others”. Furthermore, Emiel Vliebergh informed that it was a widespread practice in Hageland to effectively make use of these cheap housing loans. It might explain why ‘farmer’ stayed a prominent occupation in the municipal cadastre, even after the Housing Act was voted in 1889. Nonetheless, it remains noteworthy that a household of farmers contributed five houses to the housing stock of Holsbeek’s station area.

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1040 Vandervelde, L’exode rural, 48-52.
1041 (quote) Polasky, Reforming urban labour, 2010, 76.
1042 Vande Sompele, De rurale middenstand in Doel, 2021, 53-56.
1043 Vliebergh, Het Hageland, s.d., 157; Vliebergh and Ulens, Het Hageland, 1914/1921, 130.
1044 Vliebergh, Het Hageland, s.d., 172-173.
1046 Vliebergh, Het Hageland, s.d., 167.
1047 For an overview of the occupations exercised by all the homeowners in the station area between 1861 and 1920 according to the municipal cadastre: see annex 4.
Equally intriguing is the failure of the train stop to install an appetite for industrial wage work among households whose livelihoods, after all, were modest. Instead, the above painted picture of households acquiring a house in the station area after 1888 elucidates that returning to a rural occupation after having gained an industrial wage was more common. As such, the empirical data of the station area confirm Bénédicte Grosjean’s conclusion that the ability of an unskilled worker to perform a wide range of tasks encouraged to change professional activity on a regular basis.\textsuperscript{1048} The data are also in line with Emiel Vliebergh’s statement that industrial wage workers had the habit to return to the fields in summer, when commercial farmers paid higher wages.\textsuperscript{1049} In 1950 still, industrial wages were complemented by agrarian activities.\textsuperscript{1050}

Finally, the high frequency of ‘innkeeper’ in list of homeowners deserves the attention as, after all, the station area only covered a small surface of the agrarian municipality. Once again, Emile Vandervelde’s observations left an interesting clue. In his study of land property in Belgium, he noticed the nineteenth-century surge in rural drinking establishments, which he subsequently linked to the national policy of stimulating railway commuting.\textsuperscript{1051} In his view, drinking establishments represented a new source of additional incomes for rural households, who needed this money to cover rising expenses resulting, among other things, from increased rent prices due to the transformation of rural properties into building plots.\textsuperscript{1052} In addition, he remarked that the impact of “an extreme mobility [that] transformed every piece of land into a potential building lot for labourers” was especially strong in the immediate hinterland of a city.\textsuperscript{1053} Although relating Emile Vandervelde’s perspective to the urbanisation dynamic in Holsbeek requires further investigation, it aligns with the habit of rural households to combine various income resources.

\textsuperscript{1048} Grosjean, Urbanisation sans urbanisme, 2010, 262.  
\textsuperscript{1049} Vliebergh, Het Hageland, s.d., 170, 174.  
\textsuperscript{1050} Landtornooi 1951, 1951, 111-112, 12, 118, 145-146.  
\textsuperscript{1051} Vandervelde, La propriété foncière, 1900, 69.  
\textsuperscript{1052} Vandervelde, La propriété foncière, 1900, 64.  
\textsuperscript{1053} (quote) De Block and Polaksy, “Rural-urban continuum”, 2011, 312; Vandervelde, La propriété foncière, 1900, 270.
6.3.2 A small world of homeowners

Table 3 revealed that homeownership in the station area was stable between 1889 and 1921: tailor Viktor Soetewey alone resold the house he had bought from the family Van Tilt in 1899 to farmer Jan-Baptist Swings in 1907. The geographical information is of similar importance: almost all homeowners were previously domiciled in Holsbeek, with the two homeowners deviating from this pattern arriving from a neighbouring municipality. Take, for instance Frans Perdieus. Before this farmer born in Holsbeek started to create his own imperium of houses on his plot of land, he already possessed a house in the station area that had belonged to his uncle. Or the stepbrothers Wim-Frans Swings and Jan-Baptist Swings who shared their childhood in the Pleinstraat. As such, it appears that existing relations with inhabitants of the agrarian village were far more conclusive for buying or building a house in the station area than the opportunity of combining railway commuting and cheap building plots stressed in policy discourses. The shrinking in geographical scope of land owners also goes against the policy’s expectation that immigrants from further afield would contribute to the building activity in the station area after 1888. In particular the disappearance of Leuven as nearest town in the enumeration of previous domicile is puzzling.

In sum, if a station area in the countryside acted as urban node in the Belgian housing and railway policies with “an extensive network of national and local railways [causing the] difference between city and countryside [to fade] significantly as more urban activity entered the rural villages”, as David Peleman and Pieter Uyttenhove wrote, then Holsbeek’s station area stands out in the crowd. Indeed, the 1889 Housing Act intended to help realise this rural-urban continuum by making homeownership the solution for the wretched living conditions wage workers endured in cities and industrial sites. However, none of the new homeowners in the station area displayed a preference for industrial occupations nor were they immigrants arriving from an urban location. Yet, other households also inhabited the station area: perhaps they were adherents of combining railway commuting and industrial labour markets?

1054 The conclusion drawn in Landtornooi 1951, 1951, 140 invites further investigation. It posits that wage workers with an adequate income can relocate more easily than their less fortunate collegeaus, as the latter dependent on their local social network to make their circumstances liveable.
1056 Grosjean, Urbanisation sans urbanisme, 2010, 186.
7 The railway commuters in Holsbeek’s station area between 1911 and 1920

7.1 Making the portrait of the households complete

<table>
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<th>year</th>
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<td>35</td>
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Table 4 shows the ratio of homeowners and tenants living in the station area between 1881 and 1921. (sources: municipal cadastre and population registers of Holsbeek)

The households who built or bought a house in the hamlet of Attenhoven after 1888, mingled with homeowners already present in the station area whilst tenants made good use of a house that belonged to a household with more than one house written by its name in the municipal cadastre. The distinction between a household who called its possession in the station area their home and a household who rented a house, is made by comparing the homeowners in the municipal cadastre with the households recorded in the volumes of the population register. The resulting steady divide, shown in table 4, of nearly fifty/fifty homeowners and tenants in the years 1881 to 1921, despite the accelerated growth in housing stock, catches the attention. This ratio alone is reason enough to include tenants in the study. Moreover, Ernest Mahaim identified homeownership as a factor in rising commuting flows. According to him, the spatial implication of cheap housing loans made cheap railway subscriptions very welcome by wage workers, because homeownership riveted them to the ground whereas the connectivity of the railway network compensated for this place-boundness by unlocking labour markets further afield. Place-boundness thus made ‘owners’ the most reliant on railway access, ‘tenants’ the least and ‘relatives’ taking a position in-between: their family membership made them part of the station area, but neither a housing loan nor the obligation to pay rent kept them fixed in a relatives’ house. With the train stop in Holsbeek active in 1907, this hypothesis should be visible in the

1057 The information on homeowners versus tenants starts in 1881 due to an incomplete data set for the period 1867-1880.
1058 Mahaim, Abonnements d’ouvriers, 1910, 190.
occupational structure of the households living in the station area between 1911 and 1920. To this end, table 5 divides the occupations to be found in the population register volume for the years 1911 till 1920 into ‘owners’, ‘relatives’ and ‘tenants’. In addition, the local economic activity of the village is used to deduce if a professional activity implied ‘no commuting’, ‘commuting’ or ‘commuting if’.

7.2 The spatial information embedded in an occupational title

Combining the professional activities practised by villagers with the economic profile of the village, exposes whether commuting was required to carry out the activity embedded in the occupational title. To make the most of this informative link between location and occupation, it is paramount to be aware that the policy discourse to “facilitate a modern dynamic” in the countryside, easily lets an urban bias slip into the interpretation of empirical data. Indeed, assuming that facilitating mobility flows between city and countryside de facto replaced rural activities with industrial ones, runs the risk of considering an occupational title to represent an urban activity that just as well could point at a rural occupation. To avoid this risk, Michel Oris advices researchers to approach an occupational title “first of all as a social indicator”. The empirical data of this chapter demonstrate that the economic context of the place where the occupational title is registered, should be taken into account too. This argument is nicely illustrated by the generic term ‘day worker’.

Bénédicte Grosjean associated the term with a modest income. This association made it likely that homeowners recorded as a day worker in the municipal cadastre needed a cheap housing loan to secure the roof above their head. Michel Oris considered a ‘day worker’ “a quite clear indication of the kind of job done, day by day, without stable engagement, consequently unskilled”. Accordingly, contextual information is needed to decide if the day worker is active in industry, commerce or agriculture. Hence, if a station chef mentions a ‘day worker’ in the register entitling the day worker to a cheap railway subscription, then assuming industrial or urban employment probably accords with reality, precisely because the railway

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1059 On a more practical level, only for this decade, the data to examine how station stop, occupational structure and the mobility of owners, tenants and relatives interacted was available. The fact that this decade encompasses the First World War is compensated for by the population growth in the station area between 1910 and 1920 (table 1).
1060 For a more detailed level of information on the empirical data summarised in this table: see annex 5.
1062 Oris, “The meaning of occupational titles”, 2010, 42.
1064 Oris, “The meaning of occupational titles”, 2010, 42.
<table>
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<td>6</td>
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<td>prison guard</td>
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<tr>
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</tr>
<tr>
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<td>27</td>
<td>21</td>
</tr>
</tbody>
</table>

Table 5 shows the professional activities practised in the station area between 1911-1920. The spatial information embedded in the occupational title is used to deduce if commuting was needed for an inhabitant of a rural village to practice the occupation whereas the categories 'owners', 'relatives' and 'tenants' indicates the place-boundness of a household member. (source: population register 1911-1920)
policy to create a mobile labour force intended to unlock industrial and urban labour markets for rural dwellers.\textsuperscript{1065} If, however, a ‘day worker’ is encountered in the administrative sources of an agrarian village, then linking the occupational title to an industrial activity reveals more about the mindset of the reader than about the reality on the ground, even when villagers had direct access to the railway network and the second industrial revolution was in full sway. After all, as Martine De Moor’s historical research on rural wage work demonstrated and the survey commissioned by the Ministry of Agriculture on labour shortage in agriculture in 1920 confirmed, demand was still high on agrarian labour markets at the turn of the twentieth century.\textsuperscript{1066}

The need for additional information to determine if a day worker is active in industry or agriculture also applies to other generic titles, such as ‘workman’ or ‘servant’. For example, Felix Caluwaerts was registered a ‘workman’ in the municipal cadastre but known as a day worker, a telegraph worker, a trader-farmer and an electrician-assistant in subsequent volumes of the population register.\textsuperscript{1067} With Holsbeek as agrarian municipality still lacking industrial companies in 1950, the occupation of telegraph worker points at commuting while the title trader-farmer makes the home-work split improbable.\textsuperscript{1068} The economic structure of Holsbeek thus makes ‘servant’, ‘workman’, ‘manual worker’ and ‘day worker’ an occupation for which the home-work split was conditional. This category also embraces an ‘iron road workman’ who, thanks to the adjective ‘iron road’, can be identified as a wage worker employed by the Belgian State Railways. On the one hand, the house in the Pleinstraat that the state had built to accommodate the guardians of the railway crossings, made commuting redundant. On the other hand, the population register of 1911-1920 mentions four persons who worked for the Belgian State Railways, of which one was retired, thus inserting commuting back into the analysis. Commuting was considered a necessity for the workmen who had ‘road’ and ‘state’ as adjective. A ‘factory worker’, ‘mine worker’ or ‘telegraph worker’ had to commute too, just as the persons who were employed as ‘prison guard’ and ‘sick attendant’, given that Holsbeek lacked a prison or a hospital.

As the occupation of a ‘mason’, ‘seamstress’, ‘cauldron maker’ and ‘driver’ is at odds with crafts and services traditionally exercised in an agrarian village, commuting comes to mind too. Yet, the Belgian State Railways only gave wage workers the right to cheap railway subscriptions, thus excluding self-employment. As it is unknown whether the persons behind the mentioned titles worked for their own account, the home-work split is made conditional. The requirement

\textsuperscript{1065} Mahaim, Abonnements d’ouvriers, 1910, 15-16.
\textsuperscript{1067} Municipal cadastre: art 1138; Population register 1901/1910, blad 32; 1910/1920, blad 27; 1920/1930, blad 37.
\textsuperscript{1068} Libotton, Geschiedkundige sprokkelingen, 2010, 132-137.
of wage work ruled out railway commuting for the occupations of ‘innkeeper’, ‘shopkeeper’, ‘baker, ‘brewer’, ‘cabinet-maker’, ‘blacksmith’ and ‘veterinarian’ practised by a person who lived the station area. Commuting neither interfered with ‘farmer’, ‘live-in servant’ and ‘female housekeeper’. ‘Land workers’ lived near their workplace too: returning home every day, sometimes even during the day, suited the cultivation of their land at home.

7.3 Railway commuting as alleged complement of homeownership

Fifteen houses in the station area were occupied by homeowners in 1911 while tenants had thirteen houses at their disposal (table 4). Ten years later, one extra roof offered shelter to homeowners whilst six houses were added to the residential opportunities for tenants, thus tipping the balance in favour of tenants. This expansion in housing stock, however, falls short in clarifying the numerical gap table 5 reveals for the occupations practised by homeowners and by tenants. Indeed, the 22 professional activities that separate the homeowners from the tenants during the period 1911 to 1920, is hardly met by the tenants calling three more houses their homes in the station area in 1921. A first explanation is given by the occupation ‘female housekeeper’. This label occurs thirteen times next to the name of a tenant’s spouse, yet, it is never written by the wife of a homeowner. Innkeeper, land worker and shopkeeper were the respective female occupations exercised by three women married to a homeowner. For the tenant’s spouses, one female factory worker and one seamstress complemented the female-housekeeper occupation. But even when the double registration of professional activity per couple is taken out of the numbers, delivering 58 occupations, the category ‘tenants’ still outnumbers ‘owners’ with ten occupations. In addition, the municipal sources inform that these 58 occupations were exercised by a total of 51 households sharing 35 houses in 1920.

This mismatch in figures points at a couple that either changed occupational titles but continued to live in the same house or the couple remaining true to their professional activity but switched houses on a regular basis. Interestingly, more detailed data of table 5, given in annex 2, highlight the outspoken link these two strategies have with the category of ‘owners’ and ‘tenants’ respectively. Homeowners linked place-boundness to shifting occupations while households who rented a house combined residential migration with a steadfast occupation in the population register. Furthermore, as table 5 shows, tenants displayed a clear preference for occupational titles that implied railway commuting. Homeowners, instead, avoided professional activities that came with a home-work split. Relatives occupied an intermediate position: their

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1069 Bouché, Les ouvriers agricoles, 1913, 54-55.
choices were more or less equally divided between earning an income in the local village economy or being active on industrial and urban labour markets elsewhere.

So, including all households in the station area in the analysis, effectively brought more industrial occupations into the picture. However, it likewise continues to question the cause-consequence relations that were activated in the housing and railway policies to enhance the urbanisation of the countryside. Indeed, the disinclination of the station area’s to combine a plot of land in the village with an industrial occupation interrogates the claim that railway commuting complemented by homeownership dispersed an industrial labour force across the countryside. Instead, the train stop seemed to attract tenants who were already active on the industrial labour markets, whereby the turnover rate of these tenant-households suggests that they actively mixed commuting with migration. Furthermore, based on the empirical data displayed in table 6, limited is the word that comes to mind to describe the geographical reach of both commuting and migration flows. The table shows the origin-destination relations that adults who arrived in and departed from the station area between 1911 and 1920 created. This data embedded in Holsbeek’s population register is further divided in the categories ‘owner’, ‘relatives’ and ‘tenants’, thereby confirming that migration was indeed most popular among tenants. The geographical scope remained largely within the provincial borders of Brabant. Moreover, the neighbouring municipalities Wilsele and Kessel-lo figure prominently as places of origin and destination. To visualise the information of table 6 on map 5, Holsbeek is coloured green whereas departure and arrival municipalities located in the province of Brabant are coloured grey. If a grey municipality contains a circle, then at least one adult travelled from the station area to that municipality.

Only one ‘owner’ left the station area of Holsbeek between 1911 and 1920. In fact, rather than a homeowner, the departing person was a live-in servant who ended his employment by Frans Perdieus to settle in Wilsele. Tenants switched domicile with greater ease. Nevertheless, the frequent recurrence of a neighbouring municipality as destination in the context of labour migration intrigues. The prevalence of short distance in this migration pattern loosens the link between soaring migration flows, on the one hand, and transport development, on the other, whereby the latter “dramatically increased possibilities for people to find permanent and temporary jobs further away from home” by solving the friction of distance in the nineteenth century. To be sure, transport infrastructure certainly played a role in the expansion of labour mobility. Moreover, a straightforward relationship between railway infrastructure, enhanced

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### Table 6

Table 6 displays the origin-destination relations created by adults arriving in and departing from the station area of Holsbeek between 1911 and 1920. *(source: population register 1911-1920)*

<table>
<thead>
<tr>
<th>Municipalities in the vicinity of Holsbeek</th>
<th>Owners</th>
<th>Relatives</th>
<th>Tenants</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>from</td>
<td>to</td>
<td>from</td>
<td>to</td>
</tr>
<tr>
<td>Kessel-lo</td>
<td>3</td>
<td>1</td>
<td>15</td>
<td>26</td>
</tr>
<tr>
<td>Kortrijk-Dutsel</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leuven</td>
<td>3</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nieuwrode</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Herent</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heverlee</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotselaar</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sint-Pieters-Rode</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Veltem</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wilsele</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Municipalities in the vicinity of Brussels</th>
<th>Owners</th>
<th>Relatives</th>
<th>Tenants</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>from</td>
<td>to</td>
<td>from</td>
<td>to</td>
</tr>
<tr>
<td>Anderlecht</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brussel/Laken</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Eterbeek</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Schaarbeek</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sint-Lambrechts-Woluwe</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Villers-la-Ville (Brabant province)</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Municipalities outside Brabant province</th>
<th>Owners</th>
<th>Relatives</th>
<th>Tenants</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>from</td>
<td>to</td>
<td>from</td>
<td>to</td>
</tr>
<tr>
<td>Antwerpen</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Watou</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tildonk</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
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</tbody>
</table>
Map 5 visualises migration flows to and from the station area of Holsbeek between 1911 and 1920 for the Brabant province. (source: population register 1911-1920)
Map 6 elucidates the commuting flows departing from Holsbeek in 1910 as recorded in the industrial census.
opportunities and travel distance has already been nuanced in historical research, for example by migration historian Thomas Verbruggen in his study on domestic servants.\textsuperscript{1071} Still, why tenants moved to municipalities situated within walking distance remains a brainteaser. With Leuven and Brussels as the main destinations, the relatives category was most inclined to travel further. From the empirical data, it can be deduced that female domestic servants first and foremost established the link with Brussels.\textsuperscript{1072}

A final observation unfolds when commuting data and migration flows are juxtaposed. As the municipal sources only inform on migration dynamics, the commuting data of the 1910 industrial census is visualised on map 6.\textsuperscript{1073} As can be observed, spatial proximity as feature of the migration flows between 1911 and 1920, also typifies the commuting flows of the entire municipality in December 1910. Commuters had Leuven as their major destination, followed by Wilsele and Herent in third. Kessel-lo relinquished the dominant position it held in the migration data, whereby the municipality next to Holsbeek counted one commuter more than the three wage workers who took the train to distant Châtelineau to earn an income in the industrial labour basin of Charleroi.

8 Conclusion
In the latter half of the nineteenth century, the Belgian government voted three laws to solve the societal problems policy makers associated with congested cities. In these laws, railway commuting and homeownership acted as spatial tools to establish a rural-urban continuum in which wage workers were dispersed across the countryside while railway technology assured the connectivity between village and modern labour markets. The three laws were legitimised by the conviction that space and society are engineerable products. Contemporary research confirmed the idea of engineered societal progress by linking the origin of Belgium’s current sprawled landscape to these three laws. Yet, as Jean-Marc Offner so aptly warned his readers, policy legitimations have the tendency to become self-fulfilling prophecies. Or, uncritically assuming that a theorised cause-consequence relation materialises in reality according to plan, entails the risk that societal inequalities are incorporated in the practice of engineering space. Hence, to judge the validity of Jean-Marc Offner’s warning, it needs to be asked if the spatial

\textsuperscript{1072} Barbara Verheyden took the nineteenth century for her account (Municipal cadastre: art 290, art 736) whilst Maria-Philomena Geleys was active in the second decennia of the twentieth century (Population register 1911/1920, blad 11).
\textsuperscript{1073} See Chapter 3 : The industrial census of December 1910.
policies geared at establishing a rural-urban continuum landed in the countryside as planned. To this end, the two spatial dynamics that align with the cause-consequence relations stressed in policy legitimations are made explicit first, followed by the selection of a case-study. Both the introduction of cheap railway subscriptions for wage workers in 1869 and the establishing of the National Company of Light Railways in 1884 connected the urban with the rural, which gave households who lived in the countryside access to industrial labour markets. In policy discourse, the engineered opportunity for villagers to combine the cultivation of land at home with higher wages paid by urban and industrial employers would root rural dwellers in their ancestral villages. The 1889 Housing Act addressed deplorable living conditions for wage workers in cities and industrial sites by entitling them to cheap housing loans. In policy discourse, homeownership would disperse industrial wage workers across the countryside as building plots and living were cheaper there. The two spatial dynamics foregrounded in these policy legitimations mixed over time. Nevertheless, it can be argued that the railway laws were instrumental in preserving the historical population distribution over villages, towns and cities whilst the housing policy lured industrial wage workers in the countryside. In empirical data, the policy of railway commuting reveals itself when a loss in population was prevented whereby the villagers shifted from an agrarian to an industrial occupation while an exogenous growth of a village’s population accompanied by a rise in homeownership among industrial wage workers indicates a successful realisation of the housing policy.

In the search for a suitable case-study, Holsbeek drew the attention as it possessed the amenities that agreed with the cause-consequence relations to make the intended rural-urban continuum a reality. The agrarian village was part of rural Hageland where, according to the criteria of a modern economy, the absence of large farms, industrial activity and an adequate transport network created bleak prospects for the population. The shortage in local jobs thus turned Hageland into a region destined for depopulation unless railway commuting made the home-work split feasible for its inhabitants. This was the case for the inhabitants of Holsbeek in 1907 when a train stop opened in the municipality. Railway commuting only increased their access to industrial employment, as the proximity of Leuven, Wilsele and Kessel-lo likewise brought the industrialisation dynamics taking place in these municipalities at their fingertips. In sum, all the boxes were ticked for the expected development of a second village node near the train stop in which industrial wage workers found a home. The empirical data embedded in the Mouvement de la population, the cadastral map of Philippe C. Popp, the municipal cadastral and the population registers of Holsbeek strongly disagreed.

The demographic data in the Mouvement de la population showed a steady growth in population level from 1867 till 1930. The predicted loss in population for rural Hageland had
been countered by an endogenous population growth, except for the last three years when immigration took over. The endogenous growth in population fits the railway policy to root rural dwellers in their ancestral villages. However, the shift towards industrial occupations as pivotal element in the railway policy refused to materialise in the empirical data. Similar, the acceleration of building houses in the station area after 1888 hints that the 1889 Housing Act acted as planned. However, contrary to the expectations of engineered societal progress, farmers dominated the list of homeowners, in 1920 still. Moreover, instead of cheap building plots, pre-existing ties with the agrarian village appeared to play first fiddle in attracting new homeowners. Turning the attention to households renting a house in the station area between 1911 and 1920, further complicated matters. Combining the lack of industrial activities in Holsbeek with the popularity of industrial occupations among the tenants, identified these households as adherents of the home-work split. However, they switched houses as easily as they commuted, whereby proximity dictated both types of labour mobility.

So, based on the empirical data available in common administrative sources, it has to be concluded that the households living in the station area of Holsbeek resisted the path to societal progress that policy makers had engineered, even in a context where the odds were in favour of the cause-consequence relations underlying the Belgian housing and railway policy. Although the unfolding morphology created the impression that the envisioned rural-urban continuum landed according to plan during the rise of an industrial and commercial society, zooming in on homeownership, occupations and labour mobility exposed that the train stop in rural Hageland failed to function as urban node. Contrary to the outcomes predicted by policy legitimations, neither access to industrial wage work rooted rural dwellers in Holsbeek, nor did industrial wage workers arrive from congested urban cores. Obviously, the questions raised by this case study can easily be dismissed by invoking the proverbial exception to the rule. Similar, households who are reluctant to comply with the engineered path to societal progress can simply be cast aside by portraying them as stubborn people who cling to the past. Or, one can ponder on the validity of Jean-Marc Offner’s warning about policy legitimations and self-fulfilling prophecies, in particular as policies have law enforcement as their ally. Next to opening new doors for research, this recognition comes with the commitment to critically reflect on the social constructions that underly the portrayal of engineered space as societal progress.
conclusion
CONCLUSION

City planners were pioneers in identifying transport infrastructure as a spatial element that impacted urban morphology. Historians followed suit by linking the outward expansion of nineteenth-century cities to the rise of mass transport or by examining the strategic land-use adaptations that transport infrastructure had initiated. Studying the sociotechnical production of network infrastructure further demonstrated that, far from being a neutral connecting device that is “logically secondary to arrangements of space and place” or a spatial element whose morphogenesis is subdued to a “universe of auto-regulation”, transport networks are policy instruments, literally aiming to engineer society.1074 Whereas the planning of railway infrastructure to strengthen national economies has been examined by transport historians and historians of technology alike, how these nineteenth-century planning practices impacted the livelihoods of rural households has remained under the historiographical radar. This doctoral research addressed this gap by giving rural households a voice and examine how top-down imposed railway policies on a national scale were answered by the bottom-up uses of the railway infrastructure by wage workers in general and rural households in particular. With the focus on economy, the central question was: how was the national policy for spurring economic growth by means of railway development in a national rural-urban continuum answered by the need of rural households to preserve a livelihood in a period when labour markets were structurally shifting towards industrial and urban employment.

In other words, did the policy of making a territory-covering railway network accessible to wage workers, thereby dissolving the friction of distance between a vegetable garden in the countryside and higher wages in cities and industrial sites, effectively turn rural households into railway commuters, as policy makers planned? This research question fell into four sub-questions, with the first three sub-questions inducing an empirical analysis on a national scale whilst the last sub-question zoomed in on the station area in a rural village. All the four chapters were set in a timeframe preceding widespread car ownership. As such, the first three chapters examined the efficiency of the Belgian railway policies to create a mobile labour force whereas the fourth chapter brought the 1889 Housing Act into the picture to examine if the urban transformation legitimised by societal progress landed as planned in the station area of Holsbeek. In this conclusion, the main findings of the spatial analysis integrating Belgium’s railway policies, population patterns and commuting flows from 1846 to 1961 are summarised first. Subsequently, their potential to enrich an understanding of the past is assessed.

In the first chapter, a transport-cum-mobility lens was introduced to inquire if the spatial models that Belgian policy makers embedded in the railway infrastructure during the nineteenth century created the mobility flows according to plan. As scheme 1 outlines, comparing the top-down implementation of the railway network as societal engineering tool with a bottom-up use of the railway network by wage workers, revealed that livelihoods outweighed transport technology in making the labour force mobile. Indeed, in his study on railway commuting, Ernest Mahaim discovered that most industrial wage workers used the cheap railway subscriptions only on a periodical basis in the first decennia of the twentieth century. This discontinuous use therefore questions the policy claim that giving rural dwellers access to the industrial and urban labour markets pulled them automatically in commuting. Instead, it aligns with the element of choice that Steve Hochstadt exposed in his study on Mobility and modernity when he discussed the reactions of German peasants to “the international forces of economic change”. Selective answers to structural change was likewise uncovered by Ernest Mahaim when he asked Belgian wage workers why they commuted. He distilled six categories in which wage workers alternately identified the home-work split as a pull or a push factor. Commuting offered the opportunity to combine a home in the countryside with fulltime employment in industry for some households while other households considered commuting a necessity to safeguard their access to a plot of land, the latter being the reason why they made railway commuting part of their income pooling strategies.

Moreover, Steve Hochstadt related the unrivalled rise in labour mobility in the nineteenth century to structurally transformed labour markets caused by an agrarian society making way for an industrial and commercial one. Whilst Steve Hochstadt highlighted the link between mechanised production and commercialisation to explain the significant increase in demand for

1075 (quote) Hochstadt, Mobility and modernity, 1999, 213.
seasonal and temporary labour during the era of steam and steel. Yet, quantifying daily and weekly commute after 1895, the year when Belgian wage workers started using cheap railway subscriptions in line with policy expectations, again shows the prevalence of livelihood over distance in labour mobility. Traditionally, this marked rise in railway commuting is linked to the Belgian State Railways introducing the formula of a weekly commute, thereby making the industrial and urban labour markets accessible for rural dwellers with in even the most remote corner of the nation. Nevertheless, the conclusion that subscriptions to support daily travel by far surpassed the number of wage workers asking for a weekly commute, points to commuting as widespread labour practice resulting from agriculture being replaced by industry as major employer at the turn of the twentieth century. The agricultural crisis of the 1880s was decisive for this shift, followed by the second industrial revolution launched in 1896, urging ever more agrarian households to integrate industrial employment in their income strategies. Directing the attention to labour markets in explaining raised mobility levels also makes the concept of ‘mobility friction’ palpable. Indeed, if livelihood and labour markets have priority over distance, then the rising demand for cheap railway subscriptions by wage workers despite state-imposed railway regulations that severely restricted their access to trains, becomes understandable.

2 The exposure of rural agency

<table>
<thead>
<tr>
<th>effect of railway infrastructure on population distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>urban location ← → rural location</td>
</tr>
<tr>
<td>↓ key = <strong>market</strong> ↓</td>
</tr>
<tr>
<td>↓ local amenities and societal preferences ↓</td>
</tr>
<tr>
<td>↓ attuned      ↓ not attuned</td>
</tr>
<tr>
<td>↓ population growth   ↓ population decline</td>
</tr>
<tr>
<td>↓ commercial       ↓ subsistence</td>
</tr>
<tr>
<td>↓ rural exodus      ↓ place-boundness</td>
</tr>
<tr>
<td>↓ land-use in rural region</td>
</tr>
</tbody>
</table>

**Scheme 2** exposes the impact of railway infrastructure on local population dynamic in line with the economic rationale defining a place as urban or rural.

In the second chapter, population data were used to give rural households agency. They served to examine whether the goal of the Belgian railway policies to root rural dwellers in the countryside without depriving industry and city from its labour force, materialised once railway
commuting had gained societal importance in Belgium. It turned out that the impact of a railway network on local population dynamic is linked to market exchange or land cultivation as the main rationale in the economic activity of a place, as scheme 2 displays. In literature, direct access to railway infrastructure commonly is equalled with local population growth, because the expanded geographical reach for market exchange increases opportunities to realise economic gain. Accordingly, the revitalisation of the local economy translates in growing labour markets and an influx of labour migrants, which, on a national scale, results in a population pattern that has the railway network as structural backbone. Nevertheless, population growth generated by market exchange takes a different turn if a location’s amenities disaccord with contemporary societal preferences that underly economic growth. In this case, market competition as loyal companion of market exchange results in a decline of the population level, unless the amenities of the place are reshaped in line with economic demand. Moreover, if the location is part of a rural region, then a successful process of commercialisation triggers rural outmigration.

Indeed, whilst an urban economy is lost without market exchange, land is the bread and butter of a rural economy. Hereby, land has a dual use: a commercial exploitation of the land, on the one hand, and the use of land as a subsistence means by rural households, on the other. Hence, the development of a networked economy in line with a society build around market exchange pushed rural households out of regions with large-scale exploitations. In regions of poor soil quality, on the other, the income pooling strategies centred on safeguarding access to a plot of land thus rooting rural households in their villages. Or, from a rural household’s point of view, rather than higher wages safeguarding access to a plot of land in a period of economic upheaval raised mobility levels. In their daily reality, working for someone else was ‘un pis aller’, something they endured to have one day a farm of their own. Approaching the rural-urban continuum from this point of view, unveils the plot of land as the asset the Belgian policy makers needed to curb rural outmigration and install the home-work split in a structural shift towards industrial and urban labour markets. Accordingly, commuting prevailed over labour migration in those rural regions where the quality of the soil resisted large-scale exploitations and the connectivity of the railway made it feasible for rural households to combine land and labour.
The double-sided effect of railway infrastructure in the creation of a mobile labour force

| home = work | ↓ | villages/towns/cities | ↓ | dispersion labour markets | ↓ | railway policy 1: spur market exchange | ↓ | centralisation labour markets | ↓ | villages | ↓ | rural exodus | ↓ | nuclei on railway network | ↓ | overcrowding | ↓ | commuting = push factor | ← | railway policy 2: install home-work split | ↓ | commuting = pull factor |

Scheme 3 shows how railway policies installed commuting as a pull and a push factor.

The spatial coherence that the mobility of wage workers attributed to Belgium in December 1910, took centre stage in the third chapter, with commuting distance and labour markets as main variables. Observing that the average commuting distance by train in 1910 was remarkable stable, corresponding with the average commuting distance by road in 2010, drew the attention to the double-sided effect of railway infrastructure in the creation of a mobile labour force, as scheme 3 exhibits. This double-sided effect highlighted that the 1869 railway policy aimed at installing the home-work split by making daily or weekly commute possible had the 1830s railway policy for boosting economic growth as determining undercurrent. Indeed, the ambition of the first Belgian government to plan a transport network that engineered societal change by steering the circulation of goods and people in specific directions, first landed in a railway network spurring market exchange through urban demand. This railway policy gradually concentrated labour markets in urban and industrial nuclei that trains connected. This new labour-market geography raised labour migration to a level cities were unable to digest in the era of steam and steel, with epidemics, social unrest and a moral degeneration of the labour force in its wake. The need to address these problems in the second half of the nineteenth century, led to an additional railway policy geared at establishing a national rural-urban continuum. In this landscape, networked railway connectivity synchronically fostered a dynamic of centralisation and dispersion: market
exchange tied major labour markets to places well-connected by transport infrastructure whilst cheap railway subscriptions made commuting flows a feature of modern labour markets.

Relating the reshaped labour-market geography to the necessity of rural households to safeguard their access to a plot of arable land, resulted in commuting being an imperative next to an opportunity. Visualising home-work configurations for commuters who were active in the textile, mine, metal or transport industry in 1910 gives empirical traction to this finding. For the textile and mine industry especially, the patterns become comprehensible once the region-specific organisation of a rural region is drawn into the analytical framework. Similar, the spatial pattern of commuting ratios delineates the regions where cottage industry, wage labour or commons constituted key elements in the rural households’ habit to pool different income sources. Moreover, the national labour market that Belgian policy makers had in mind when conceiving the rural-urban continuum in 1869 was grafted on seasonal labour, which already knitted different parts of Belgium together. Consequently, whilst it is undoubtedly true that giving wage workers access to the railway infrastructure was instrumental in organising the home-work split, it is equally valid to argue that the reshaped geography of labour markets combined with the attachment of rural households to their plot of land generated a mobile labour force, with the link between mechanisation and seasonality exposed by Steve Hochstadt fortifying the argument. In other words, studying the interaction of transport infrastructure, commuting flows and rural-urban relations with the outcomes policy makers expected, depicts commuting as an opportunity. On the other, performing the same exercise from the perspective of rural households, foregrounds commuting as economic necessity.

4 The tendency of policy legitimations to become self-fulfilling prophecies

In chapter four, the municipal cadastre and population registers of Holsbeek are examined to test whether the station area of a rural village transformed as intended by the laws of 1869, 1884 and 1889. According to the literature summarised in scheme 4, these three laws are at the origin of Belgium’s stretched-out landscape today. The introduction of cheap railway subscriptions for wage workers in 1869, the extension of the railway network with light railways that meandered through the countryside in 1884 and the introduction of cheap housing loans for wage workers in 1889 made the home-work split feasible for the industrial labour force. These three laws thus implemented the idea that connecting the urban and industrial labour markets with a cheaper building plot in the countryside was the asset needed to root rural households in their villages or disperse urban dwellers over the countryside. Moreover, twentieth-century policies solidified the key elements of commuting and homeownership. These laws therefore raise the expectation
engineered space: **rural-urban continuum**

= mobile and dispersed labour force

<table>
<thead>
<tr>
<th>tools:</th>
<th>cheap railway subscription</th>
<th>cheap housing loans</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>↓</td>
<td>↓</td>
</tr>
<tr>
<td>facilitate:</td>
<td>labour mobility</td>
<td>place-boundness</td>
</tr>
<tr>
<td></td>
<td>↓</td>
<td>↓</td>
</tr>
<tr>
<td>law</td>
<td>1869/1884</td>
<td>1889</td>
</tr>
<tr>
<td>spatial goal</td>
<td>preserve dispersed population</td>
<td>initiate core-periphery dispersal</td>
</tr>
<tr>
<td></td>
<td>↓</td>
<td>↓</td>
</tr>
<tr>
<td>policy claim</td>
<td>higher industrial/urban wages</td>
<td>cheap building plot in countryside</td>
</tr>
<tr>
<td>materialisation</td>
<td>- avoid population decline village</td>
<td>- exogenous growth station area</td>
</tr>
<tr>
<td></td>
<td>- shift to industrial occupations</td>
<td>- homeownership industrial wage workers</td>
</tr>
</tbody>
</table>

**Scheme 4** summarises the cause-consequence relations Belgian policy makers activated in the 1869, 1884 and 1889 Railway and Housing Acts to establish a rural-urban continuum.
that the spatial dynamic in the station area of a rural village is characterised by an exogenous population growth and an increase in homeownership among industrial wage workers. Neither was experienced in Holsbeek between 1861 and 1920, although the village was part of a poor rural region, bordered the industrial labour markets of Leuven and gained direct access to the railway infrastructure in 1907. Instead, most of the people who lived in the station area at the end of the period were still born in Holsbeek or had social ties with the village. Furthermore, farmers not only held their ground in the occupational structure of the station area, but even ranked first in the list of homeowners while industrial wage workers were mainly tenants. Importantly, these farmers were not the wealthy exploiters of a large farm, but had to combine land and labour to provide for the household. In the absence of industrial activity in Holsbeek, occupational titles indicate that the industrial wage workers were the commuters. Intriguingly, they were also the households that migrated the most.

The outspoken discrepancy between theorised and empirical outcomes in what should have been a textbook case, questions the ease with which the sprawled condition of Belgium’s urban landscape today is retraced to the railway and housing policies of the nineteenth-century. True, general conclusions cannot be drawn from one micro-case study. However, the empirical analysis of the three other chapters likewise demonstrate that the impact of the Belgian railway policies to establish a rural-urban continuum, were anything but straightforward. Here, Janet Polasky’s remark about time is instructive. According to her, the “nineteenth-century reformers’ dream of commuting home to suburbs or the countryside from work in the city had become a reality [only] by the end of the twentieth century”. If a substantial period of time is effectively needed for a landscape to transform as planned, as envisaged top-down, then Jean-Marc Offner’s warning about policy legitimations having the tendency to become self-fulfilling prophecies has to give its credit due. Indeed, while some wage workers undoubtedly agreed with policy makers that railway commuting benefited them the moment they gained access to railway infrastructure, the time inertia in Belgium’s development into a full-blown landscape of commuters indicates that other members of the labour force firmly disagreed.

How rural livelihoods, arable land and labour-market geography interacted with the use of the railway network as a spatial tool to establish first economic growth and later a nationwide rural-urban continuum has been detailed in the empirical analysis whilst scheme 5 summarises the

---

1076 Polasky, Reforming urban labour, 2010, 192.
**transport policy 1**: make nation prosperous by stimulating market exchange

<table>
<thead>
<tr>
<th>networked connectivity and economic growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct railway access = increase place connectivity</td>
</tr>
<tr>
<td>market <strong>opportunities</strong></td>
</tr>
<tr>
<td>pull spatial change</td>
</tr>
<tr>
<td>amplify existing amenities</td>
</tr>
<tr>
<td>expansion labour markets</td>
</tr>
</tbody>
</table>

**transport policy 2**: create mobile labour force to install home-work split

<table>
<thead>
<tr>
<th>access labour markets (wage work)</th>
</tr>
</thead>
<tbody>
<tr>
<td>live near work</td>
</tr>
<tr>
<td>expansion cities</td>
</tr>
<tr>
<td>rural-urban continuum anno 1869</td>
</tr>
<tr>
<td>policy makers</td>
</tr>
<tr>
<td>villages/towns/cities</td>
</tr>
<tr>
<td>root rural dwellers</td>
</tr>
<tr>
<td>keep industrial/urban labour force</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Scheme 5** captures the double-sided effect of nineteenth-century railway policies.
major findings. Arguably, the transport-cum-mobility lens has proven its value in enriching mainstream understandings of entangled railway policies, labour mobility and urban growth by making rural agency an integral part of the analysis. Hence, the potential of a policy-cum-use lens for opening up new lines of inquiry in historical research is discussed in the last part of the conclusion.

5 The policy-cum-use lens

Alan Baker is one amongst many to write that each “generation seeks answers to questions which are framed in terms of the concerns of its own ‘present-day’”.1077 Here, as William H. Sewell Jr. accurately pointed out, a teleological understanding of the past is never far away, if this answer is searched by going “back from the recent or current state of [a phenomenon] to its prior state”.1078 Massimo Moraglio’s equally apt remark that the “fascination for innovation has been embedded in a progressive story, tracing development from ‘poor’ and ‘inefficient’ preconditions to ‘smart’ and ‘proficient’ outcomes” only aggravates this risk.1079 Combining the practice “to extrapolate past conditions on the basis of present-day trajectories” whilst the idea that progress determines the direction of history, makes it difficult to keep an open mind for practices that were basic in the past, but have disappeared over time or are considered unimportant today.1080 Indeed, mobilising societal progress as engine of historical development reduces the past to the root of the present, whereby the ubiquitousness of a phenomenon in society today is explained by the phenomenon being an ‘opportunity’ in the past. However, only in retrospect does progress seem to enable a predestined transition from the past to the present. In the corresponding teleological narrative, as William H. Sewell Jr. argues, societies are part of “a single developmental continuum” in which they undergo “different stages of progression from a common origin”.1081 The successive economic stages of “savagery, pastoralism, agriculture, and commerce” is a familiar example of such single development continuum.1082 William H. Sewell Jr. likewise explained why contingencies, choices and consequences are foreordained in teleological interpretations by highlighting Immanuel Wallerstein’s three key assumptions in his theory of the modern world-system: (1) “local and global

1080 (quote) Smail, Deep history and the brain, 2008, 17.
1081 Sewell, Logics of history, 2005, 89.
1082 Smail, Deep history and the brain, 2008, 17.
processes partake of the same causalities”, (2) “the fates of local communities are determined not by local causes but by the operation of global, system-level causes” and (3) physic laws “can be projected backward in time”.1083 The two first assumptions were kept by William H. Sewell Jr. in his plea for practising an eventful sociology, but he refuted the latter by stating that “[h]umans, unlike planets, galaxies, or subatomic particles, are capable of assessing the structures in which they exist and of acting – with imperfectly predictable consequences – in ways that change them”. In my opinion, it is here that Jean-Marc Offner’s warning on policies having the tendency to become self-fulfilling prophecies has to step in to argue for a policy-cum-use lens to expose the many fits and starts in this proclaimed path to progress.

While stating that “sociology’s epic quest for social laws is illusory”, William H. Sewell Jr. drew the attention to an event’s ability to influence history. An event does so by “transforming the very cultural categories that shape and constrain human action”.1084 Given that cultural categories represent constitutive structures of society, societal change is thus induced by events “straining or rearranging structures, open[ing] the door to further transformative events”.1085 Or, an a posteriori logic that links empirical observations in a chain of linear causality loses its stable course because the event is able to insert a consistent, yet, other direction in the chain of events that underly societal development. This ties in with “different registers of causation: preexisting structural conditions [. . .], conjunctural conditions [. . .] and contingent or volitional actions”.1086 For an historian, this categorisation immediately calls in mind the three time scales of Fernand Braudel, i.e. “structural history, associated with the study of geological, geographic, social, and mental structures that change glacially; conjunctural history, associated with the study of economic and demographic cycles with durations of decades rather than centuries; and eventful history, associated with what [Fernand Braudel] tended to regard as the ephemera of politics and to disdain as mere froth on the waves of history”.1087 While for Fernand Braudel events are merely products of structural layers, for William H. Sewell Jr. events are key as it is in the event “where the action of human objects can reconfigure preexisting structures and conjunctures”.1088 Humans, therefore, drive history: their agency materialises in events, which in turn trigger societal change by affecting

1083 Sewell, Logics of history, 2005, (quote 1 & quote 2) 86, (quote 3) 87-88.
1085 Sewell, Logics of history, 2005, 98.
the conditions that delineate human choices and constrains on a structural level. One such event at the core of this doctoral research, was the nineteenth-century novelty of planning territory-covering railway networks top-down with the explicit intend to reorganise society by engineering the territory.

Arguably, events created by policy makers have a much greater potential to alter history’s course than, say, the daily practices of rural households to put food on the table. Moreover, policies in general and planning practices in particular are goal-oriented: they explicitly intend to create the conditions that are expected to realise a specific transformation. Importantly, whilst the goal-oriented event is created to shift societal structures in the direction policy makers intend, the policy is legitimised by associating it with societal progress. This is not to say that policy makers “take the narrative function hitherto assigned to God, or Providence, or the genius of great man”. Indeed, the discrepancies between planned and empirical outcomes discussed in the empirical analysis of this doctoral research, deny policy makers the power to install their vision of societal progress single-handed. The reason is simple: societal progress is a generic term whose concrete meaning is in the eye of the beholder. Only when the policy is sustained over a sufficient amount of time, societal structures will have shifted decisively in the direction policy makers aimed for so that all inhabitants of a territory have to adapt to the new societal structure. To illustrate it with William Cronon’s words: “few economic institutions [being commodity markets] more powerfully affect human communities and natural ecosystems [. . .] Even those who will never trade [. . .] depend on those markets for our very survival”. It is hard to imagine that Belgian state engineers Pierre Simons and Gustave De Ridder when planning the iron cross in a country of smallholdings, predicted that land as subsistence means would no longer be part of an urban world some hundred-fifty years later, even though their intention was centred on stimulating market exchange. It is in this dynamic that William H. Sewell Jr.’s theory on events influencing history and Jean-Marc Offner’s warning on policies being self-fulfilling prophecies converge. It is also in this dynamic that the using societal progress as the legitimation of a top-down imposed policy strengthens the idea that progress drives history whereas, more accurately, human intentionality presented as progress drives history. Indeed, in the above mentioned four successive stages of a single economic development continuum, commerce ends the row.

In my point of view, it is crucial to expose the tunnel vision that arises when goal-oriented policies are legitimised by something as vague as ‘societal progress’, which is often linked to the creation of sustainable environments in societies today. As Massimo Moraglio argued, a “proper self-reflexive, critical and long-term analysis” going behind the focus on “innovation, production and incremental trends [is] indispensable to appraise, critically, today’s debate, and to implement a sustainable future”.\textsuperscript{1091} William Cronon preceded him when writing in the early 1990s that “[i]f we wish to understand the ecological consequences of our own lives – if we wish to take political and moral responsibility for these consequences – we must reconstruct the linkages between the commodities of our economy and the resources of our ecosystem”.\textsuperscript{1092} As have been demonstrated in this doctoral research, a policy-cum-use lens is able to address these arguments. First, by placing humans back at the core of historical understanding: not as “a disturbing factor, a deviation from statistical laws”, but as the ones who alter societal structures and, therefore, are responsible for the ensuing consequences, both the wanted and the unwanted.\textsuperscript{1093} Second, to infuse heterogeneity in approaches of societal progress: not to reflect on what progress is (that is a discussion involving judgment and thus falls outside the domain of historical research), but to highlight what Daniel Lord Smail called ‘sedimentary facts’, being “the information [that] is present without anyone intending it to be there”.\textsuperscript{1094} A sedimentary fact raises awareness for the meanings policy makers unconsciously insert in empirical data and subsequent explanations of a societal phenomenon. By confronting top-down theorised outcomes with bottom-up agency that deviates from, or even is at odds with, the cause-consequence relations that policy discourse stress, biases in theories on societal development unfold. It becomes in particular interesting if the policy-cum-use lens demonstrates that the studied societal transformation is synchronically driven by opportunities and imperatives.

Indeed, using economy as lens and rural households as actor group to examine the intertwinement of railway policies, commuting flows and rural-urban relations in Belgium between 1846 and 1961, identified the vector of economic growth politicians and engineers made integral to nineteenth-century railway planning as key to comprehend urbanisation dynamics after 1850. The policy-cum-use lens lent empirical strength to this statement. It made the time lapse between the

\textsuperscript{1091} Moraglio, “Seeking a (new) ontology”, 2017, 5.
\textsuperscript{1094} Smail, Deep history and the brain, 2008, 65.
moment policy regulations made trains accessible for wage workers and the effective adaptation of railway commuting by wage workers as labour practice comprehensible. The influence of commodity markets on both the expansion of large-scale production sites and the labour-market concentration near the railway infrastructure serving as economic backbone, also explains why railway commuting kept raising despite the increase in policy regulations that restricted the access to trains for wage workers. Therefore, commuting as economic imperative has to be part and parcel of investigations seeking to create sustainable environments in societies that are structurally dependent on market exchange. This is necessary to get commodity markets at the heart of sustainability debates, with historical research searching for new ways to open up these debates by asking whether rural households really wanted access to higher wages, whether peasants really wanted to partake in market exchange and what prevented private car ownership to let cities sprawl in their hinterlands before the Second World War?
annex
Annex 1: the selection of a sample year – population levels in 1947 versus 1961

The left map shows the classification of Belgian municipalities in theoretically susceptible for rural outmigration, rural and urban based on their population level in respectively 1947 (left) and 1961 (right). As the reader can observe, both maps are highly comparable. (sources: railway history and LOKSTAT)
Annex 2: foreign commute in December 1910

The map displays where the commuters lived who worked abroad in December 1910. Moeskroen, Menen, and Antwerp in northern Belgium top the list of departure municipalities. (source: industrial census 1910 - LOKSTAT)
Annex 3: the clustering of provincial hubs in the commuting data of 1910

The provincial and connecter hubs for each of the sixteen commuting communities are present in the table. These hubs are ranked in line with the number of in-commuters that a municipality attracted according to the industrial census in December 1910 (last column). The municipality attracting the most commuters within the same commuting community gave its name to the job basin. The spatial coherence given by hub to a job basin, can be read in the two parameters calculated per hub, i.e. the within-module degree $z$ and the participation coefficient $P$. Hereby, the $z$-score reveals the connectivity the hub holds within an economic interaction field whereas the $p$-score uncovers the connections with municipalities outside the commuting community. In both cases, the interconnectedness increases in line with a higher value. The fifth column informs the reader on the number of provincial hubs per commuting community, whereby municipalities with the same colour are clustered. As such, the commuting community of Brugge has three distinct provincial hubs with the provincial hub Brugge being clustered with Sint-Michiels, Assebroek and Sint-Andreas. For reasons of comparison, the number of cheap railway subscriptions (not subscribers) for wage workers issued during the months of January and July 1906 according to the data of Ernest Mahaim are listed under the heading 'railway'.

<table>
<thead>
<tr>
<th>type hub</th>
<th>municipality</th>
<th>$z$-score</th>
<th>$p$-score</th>
<th>cluster</th>
<th>railway</th>
<th>in-commuters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>community ‘Bruges’</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>provincial</td>
<td>Brugge</td>
<td>11.13</td>
<td>0.15</td>
<td>(1)</td>
<td>8,815</td>
<td>2,344</td>
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<td>Kortrijk</td>
<td>5.72</td>
<td>0.18</td>
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<td>2,138</td>
<td>1,876</td>
</tr>
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<td>Sint-Michiels</td>
<td>3.91</td>
<td>0.02</td>
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<td></td>
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<tr>
<td>provincial</td>
<td>Oostende</td>
<td>3.04</td>
<td>0.26</td>
<td>(2)</td>
<td>280</td>
<td>1,160</td>
</tr>
<tr>
<td>provincial</td>
<td>Assebroek</td>
<td>2.63</td>
<td>0.04</td>
<td>(1)</td>
<td>478</td>
<td>412</td>
</tr>
<tr>
<td>provincial</td>
<td>Sint-Andries</td>
<td>2.55</td>
<td>0.03</td>
<td>(1)</td>
<td>273</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>community ‘Ghent’</td>
<td></td>
<td></td>
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<td>106</td>
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<td>0.05</td>
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<td>98</td>
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<td>Sint-Amandsberg</td>
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<td>280</td>
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<td>3</td>
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<tr>
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<td>Antwerpen</td>
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<td>3,491</td>
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<td>2.90</td>
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<td>0</td>
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<tr>
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<td>Overpelt</td>
<td>3.61</td>
<td>0.15</td>
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<tr>
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<td>Mol</td>
<td>2.58</td>
<td>0.13</td>
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<td>52</td>
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<td>5</td>
<td>community ‘Brussels’</td>
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<tr>
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<td>Brussel</td>
<td>10.26</td>
<td>0.18</td>
<td>(1)</td>
<td>8,619</td>
<td>43,533</td>
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<tr>
<td>provincial</td>
<td>Elsene</td>
<td>2.89</td>
<td>0.12</td>
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<td>10,485</td>
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<tr>
<td>provincial</td>
<td>Sint-Jans-Molenbeek</td>
<td>3.79</td>
<td>0.08</td>
<td>(1)</td>
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<tr>
<td>Community/Connector</td>
<td>Town</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
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<td>----------</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Population</td>
<td>Density</td>
<td>Size</td>
<td>Location</td>
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</tr>
<tr>
<td><strong>Provincial</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Administrative</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>1</strong> Anderlecht</td>
<td></td>
<td>8,519</td>
<td>3.08</td>
<td>0.12</td>
<td>(1)</td>
<td></td>
</tr>
<tr>
<td><strong>2</strong> Schaarbeek</td>
<td></td>
<td>7,955</td>
<td>3.48</td>
<td>0.15</td>
<td>(1)</td>
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<td><strong>3</strong> Saint-Gilles</td>
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<td>7,779</td>
<td>3.01</td>
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<td><strong>4</strong> Leuven</td>
<td></td>
<td>2,977</td>
<td>6.51</td>
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<tr>
<td><strong>5</strong> Kessel-lo</td>
<td></td>
<td>594</td>
<td>3.14</td>
<td>0.23</td>
<td>(1)</td>
<td></td>
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<td><strong>6</strong> Schaarbeek</td>
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<td>1,061</td>
<td>2.55</td>
<td>0.46</td>
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<td></td>
</tr>
<tr>
<td><strong>7</strong> Tournai</td>
<td></td>
<td>1,778</td>
<td>8.51</td>
<td>0.23</td>
<td>(1)</td>
<td></td>
</tr>
<tr>
<td><strong>8</strong> Antoing</td>
<td></td>
<td>742</td>
<td>3.11</td>
<td>0.08</td>
<td>(1)</td>
<td></td>
</tr>
<tr>
<td><strong>9</strong> Cuesmes</td>
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<td>3,230</td>
<td>3.59</td>
<td>0.09</td>
<td>(1)</td>
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<td>7.19</td>
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<td>6.51</td>
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<tr>
<td><strong>12</strong> Namur</td>
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<td>3,350</td>
<td>10.63</td>
<td>0.33</td>
<td>(1)</td>
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<td><strong>13</strong> Liège</td>
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<td>4,679</td>
<td>4.53</td>
<td>0.05</td>
<td>(1)</td>
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</table>

**Notes:**
- Population is given in thousands.
- Density is in persons per square kilometer.
- Size refers to the number of communities involved in the connector.
- Location indicates the type of location (provincial or community).
The map displays the 16 job basins with the locations and names of all the provincial and connector hubs. (source: LOKSTAT)
### Annex 4: occupational activities of households who owned a house in the station area of Holsbeek between 1861 and 1920

<table>
<thead>
<tr>
<th>domicile</th>
<th>plot number in 1920</th>
<th>homeowner</th>
<th>occupation in municipal cadastre</th>
</tr>
</thead>
<tbody>
<tr>
<td>prior to 1889 – no longer in 1920</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Holsbeek</td>
<td>8b/9b – inheritance 1900</td>
<td>Frans Verheyden</td>
<td>day worker / farmer*</td>
</tr>
<tr>
<td>Holsbeek</td>
<td>6d – sold 1918</td>
<td>Verhulst-Coosemans</td>
<td>farmer</td>
</tr>
<tr>
<td>Holsbeek</td>
<td>43c – sold 1918</td>
<td>Geleyns-Laeremans</td>
<td>farmer</td>
</tr>
<tr>
<td>Holsbeek</td>
<td>57f bis – inheritance 1889</td>
<td>Frans Swings-Vanhove</td>
<td>servant / farmer</td>
</tr>
<tr>
<td>near Brussels</td>
<td>10a/12a + inherited 8b/9b</td>
<td>Barbara Verheyden</td>
<td>servant</td>
</tr>
<tr>
<td>Holsbeek</td>
<td>22a</td>
<td>Perdieus-Servranckx</td>
<td>farmer</td>
</tr>
<tr>
<td>Holsbeek</td>
<td>1b</td>
<td>Decuber-Geeraerts</td>
<td>farmer</td>
</tr>
<tr>
<td>Holsbeek</td>
<td>12 / 50 a-b-c-d</td>
<td>Marbaise-Vandeput</td>
<td>officer / retired / proprietor</td>
</tr>
<tr>
<td></td>
<td>38d</td>
<td>Belgian state</td>
<td></td>
</tr>
<tr>
<td>Holsbeek</td>
<td>31c/33c – latter sold 1919</td>
<td>Van Tilt</td>
<td>(heir after 1903) officer</td>
</tr>
<tr>
<td>Holsbeek</td>
<td>57i bis / 56b</td>
<td>Vandeput-Vandeput</td>
<td>farmer</td>
</tr>
<tr>
<td>Holsbeek</td>
<td>60a</td>
<td>Overloop &amp; Testaert-Overloop</td>
<td>farmer &amp; farmer</td>
</tr>
<tr>
<td>since 1889 – no longer in 20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Holsbeek</td>
<td>23c 2 – inheritance 1890</td>
<td>Geeraerts-Peelaerts</td>
<td>farmer</td>
</tr>
<tr>
<td>Holsbeek</td>
<td>20 m-n-o-p-q</td>
<td>Perdieus-Servranckx</td>
<td>[farmer]**</td>
</tr>
<tr>
<td>Laken</td>
<td>6d – purchase 1918</td>
<td>by son Verhulst-Coosemans</td>
<td>baker</td>
</tr>
<tr>
<td>Holsbeek</td>
<td>43c – purchase 1918</td>
<td>by son Geleyns-Van Ingh</td>
<td>farmer</td>
</tr>
<tr>
<td>e.a.</td>
<td>57f bis – inheritance 1889</td>
<td>Alfons Swings among five owners</td>
<td>five farmers</td>
</tr>
<tr>
<td>Holsbeek</td>
<td>Lot</td>
<td>Event or Ownership Details</td>
<td>Occupants</td>
</tr>
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<td>--------------</td>
<td>-----------</td>
<td>----------------------------</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>23f/g 2</td>
<td>+ inherited 23c 2</td>
<td>widow Peelaerts &amp; son-in-law</td>
</tr>
<tr>
<td></td>
<td>e.a.</td>
<td>inheritance 22a/20 m-q in 1918</td>
<td>Perdieus &amp; brother-in-law Servranckx</td>
</tr>
<tr>
<td></td>
<td>6d</td>
<td>– purchase 1919</td>
<td>by Geeraerts-Corens</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Swings-Van Meensel</td>
</tr>
<tr>
<td></td>
<td>33c</td>
<td>– purchase 1919</td>
<td>by Jozef, Jan en Sidonia Laeremans</td>
</tr>
<tr>
<td></td>
<td>57f bis</td>
<td>– purchase 1906</td>
<td>by Alfons Swings-Steenbergh</td>
</tr>
<tr>
<td></td>
<td>36 d-e</td>
<td></td>
<td>Claessens-Troye</td>
</tr>
<tr>
<td></td>
<td>57k</td>
<td></td>
<td>Fortan-Geeraerts</td>
</tr>
<tr>
<td></td>
<td>57h</td>
<td></td>
<td>Caluwaerts-Organe</td>
</tr>
<tr>
<td></td>
<td>25e</td>
<td></td>
<td>Swings-Van Ing</td>
</tr>
<tr>
<td></td>
<td>26k</td>
<td></td>
<td>Beulens-Weynants</td>
</tr>
</tbody>
</table>

* / : homeowner changed occupation with the latter being the occupation practised in 1920 if the homeowner is still present in 1920

** [ ] : occupation of homeowner is already mentioned in another row
### Annex 5: occupational activities and migration flows of the households living in the station area of Holsbeek between 1911 and 1920

<table>
<thead>
<tr>
<th>source page</th>
<th>period of registration</th>
<th>household = homeowner</th>
<th>migration flow from</th>
<th>to</th>
<th>occupation in population register</th>
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<tbody>
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<td>1</td>
<td>1911/1920</td>
<td>Geeraerts-Peeelaerts</td>
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<td>blacksmith-assistant/innkeeper – innkeeper*</td>
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<td>2</td>
<td>1911/1920; 1911/1917</td>
<td>Perdieus-Serwanckx</td>
<td></td>
<td></td>
<td>blacksmith-assistant/innkeeper – innkeeper*</td>
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<tr>
<td>2</td>
<td>1911/1912</td>
<td>&amp; in-living servant</td>
<td></td>
<td></td>
<td>farmer</td>
</tr>
<tr>
<td>8</td>
<td>1911/1914; 1911/1918</td>
<td>Verhulst-Coosemans</td>
<td></td>
<td></td>
<td>farmer</td>
</tr>
<tr>
<td>101</td>
<td>1911/1920</td>
<td>Geeraerts-Corens</td>
<td></td>
<td></td>
<td>farmer – female land worker</td>
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<tr>
<td>9</td>
<td>1911/1915; 1911/1920</td>
<td>Decuber-Geeraerts</td>
<td></td>
<td></td>
<td>farmer</td>
</tr>
<tr>
<td>10</td>
<td>1911/1920</td>
<td>Swings-Van Meensel</td>
<td></td>
<td></td>
<td>driver/innkeeper</td>
</tr>
<tr>
<td>11</td>
<td>1911/1914</td>
<td>Geleyns-Laeremans (widow)</td>
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<td></td>
<td>female farmer</td>
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<tr>
<td>11</td>
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<td>Geleyns-Van Ingh (son)</td>
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<td>farmer</td>
</tr>
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<td>12</td>
<td>1912/1920</td>
<td>Marbaise-Vandeput</td>
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<td></td>
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<tr>
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<td>1920/1920</td>
<td>&amp; living-in maid</td>
<td></td>
<td></td>
<td>maid</td>
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<td>19</td>
<td>1911/1920</td>
<td>Swings-Steenbergh</td>
<td></td>
<td></td>
<td>farmer</td>
</tr>
<tr>
<td>21</td>
<td>1911/1920</td>
<td>Claessens-Troye</td>
<td></td>
<td></td>
<td>cabinet-maker/innkeeper</td>
</tr>
<tr>
<td>22</td>
<td>1911/1920</td>
<td>Fortan-Geeraerts</td>
<td></td>
<td></td>
<td>factory worker/baker - female shopkeeper</td>
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<tr>
<td>24</td>
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<td>farmer</td>
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<tr>
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<td>1911/1915; 1911/1920</td>
<td>Testaert-Overloop</td>
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<td></td>
<td>telegraph worker/trader-farmer</td>
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<td>1911/1920</td>
<td>Swings-Van Ing</td>
<td></td>
<td></td>
<td>farmer</td>
</tr>
<tr>
<td>29</td>
<td>1911/1920</td>
<td>Buelens-Weynants</td>
<td></td>
<td></td>
<td>farmer</td>
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<td>source</td>
<td>period of registration</td>
<td>household</td>
<td>migration flow</td>
<td>occupation</td>
<td></td>
</tr>
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<td>-----------</td>
<td>---------------</td>
<td>------------</td>
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</tr>
<tr>
<td>1</td>
<td>1912/1914; 1919/1920</td>
<td>son-in-law Geeraerts-Peeleerts</td>
<td>Kessel-lo</td>
<td>mason</td>
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<tr>
<td>2</td>
<td>1911/1920</td>
<td>brother Perdieus-Servranckx</td>
<td>Wilsele</td>
<td>farmer</td>
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<td>1913/1920</td>
<td>son-in-law Perdieus-Servranckx</td>
<td>Wilsele</td>
<td>brewer</td>
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<td>8</td>
<td>1911/1911</td>
<td>daughter Verhulst-Coosemans</td>
<td>Veltem</td>
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</tr>
<tr>
<td>8</td>
<td>1918/1919</td>
<td>daughter-in-law Verhulst-Coosemans</td>
<td>Laken</td>
<td>without</td>
<td></td>
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<tr>
<td>10</td>
<td>1911/1920</td>
<td>nephew Geeraets-Corens</td>
<td>Wilsele</td>
<td>farmer</td>
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</tr>
<tr>
<td>11</td>
<td>1911/1920</td>
<td>niece Decuber-Geeraerts</td>
<td>Kessel-lo</td>
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<td></td>
</tr>
<tr>
<td>11</td>
<td>1911/1920</td>
<td>two sons Geleyns-Van Ingh</td>
<td>Sint-Lambrechts-</td>
<td>Brussel; servant (return migration)</td>
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</tr>
<tr>
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<td>1911/1920</td>
<td>daughter Geleyns-Van Ingh</td>
<td>Wilsele</td>
<td>Etterbeek</td>
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<td>1911/1920</td>
<td>daughter Marbaise-Vandeput</td>
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<tr>
<td>21</td>
<td>1911/1919; 1911/1920</td>
<td>two sons Claessens-Troye</td>
<td>Wilsele</td>
<td>both cabinet-maker</td>
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<tr>
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<td>1911/1914</td>
<td>daughter Fortan-Geeraerts</td>
<td>Anderlecht</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>1911/1916</td>
<td>son Fortan-Geeraerts</td>
<td>Schaarbeek</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>1911/1912</td>
<td>daughter Vandeput-Vandeput</td>
<td>Brussel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>1911/1920</td>
<td>Overloop (brother of wife)</td>
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<td>farmer</td>
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</tr>
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<td>1911/1920</td>
<td>daughter Swings-Van Ing</td>
<td>Brussel</td>
<td>female land worker</td>
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</tr>
<tr>
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<td>1911/1912; 1920/1920</td>
<td>daughter Swings-Van Ing</td>
<td>Leuven (2 x)</td>
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<td>son Swings-Van Ing</td>
<td>Wilsele</td>
<td>factory worker</td>
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<td>1911/1920</td>
<td>son Swings-Van Ing</td>
<td>Antwerpen</td>
<td>factory worker/prison guard</td>
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<td>--------</td>
<td>------------------------</td>
<td>-----------</td>
<td>---------------</td>
<td>-----------------------------------</td>
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<tr>
<td>13</td>
<td>1919/1920</td>
<td>daughter + son-in-law Peeters-Thys</td>
<td>Wilsele; Rotselaar</td>
<td>female railway guard - state workman</td>
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<td>102</td>
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<td>stepdaughter Libotton-Goossens</td>
<td>Kessel-lo</td>
<td>female housekeeper</td>
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<td>102</td>
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<td>Kessel-lo; Leuven</td>
<td>manual worker - female housekeeper</td>
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</tr>
<tr>
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<td>daughter Goossens-Vanderborght</td>
<td>Kessel-lo</td>
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<tr>
<td>16</td>
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<td>son Delauré-Laermans</td>
<td>?</td>
<td>land worker</td>
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</tr>
<tr>
<td>17</td>
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<td>nephew Geleyns-Peeters</td>
<td>?</td>
<td>day worker</td>
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</tr>
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<td>son Laermans</td>
<td>?</td>
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<tr>
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<td>1911/1912</td>
<td>son Geleyns-Tuyls</td>
<td>Wilsele</td>
<td>factory worker</td>
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<th>occupation in population register</th>
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<td>Kessel-lo</td>
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</tr>
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<td>97</td>
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<td>Meulemans-Van Krunkelveldt</td>
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<td>De Keuster-Van Krunkelveldt</td>
<td>Wilsele</td>
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<td>Greveraars-Verbinnen</td>
<td>Kessel-lo</td>
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<td>Wilsele</td>
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<td>Goossens-Vanderborght</td>
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<td>Geeraerts-Goossens</td>
<td>Kessel-lo</td>
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<td>Tuyls-Geets</td>
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<td>1912/1920</td>
<td>Peeters-Aerts</td>
<td>Kessel-lo</td>
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<td>Tuyls-Van Aershot</td>
<td>Herent</td>
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<td>1917/1920</td>
<td>Corens-Van Achtere</td>
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<td>Rotselaar</td>
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<td>Geleys-Peeters</td>
<td>Wilsele</td>
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<td>1916/1920</td>
<td>Van Santvoort-</td>
<td>Kessel-lo</td>
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<tr>
<td>20</td>
<td>1912/1913</td>
<td>Verbinnen-De Coster</td>
<td>Wilsele</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>1913/1920</td>
<td>De Coster-Peeters</td>
<td>Wilsele</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td>Van Eylen-De Coster</td>
<td>Wilsele</td>
<td></td>
</tr>
</tbody>
</table>

(Observe the occupations and roles of each individual, noting specific details where necessary.)
<table>
<thead>
<tr>
<th>#</th>
<th>Date</th>
<th>Name</th>
<th>Occupation</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>1920/20</td>
<td>Claessens-Van Crikinge</td>
<td>Wilsele</td>
</tr>
<tr>
<td></td>
<td>1920</td>
<td></td>
<td>day worker - female housekeeper</td>
</tr>
<tr>
<td>23</td>
<td>1911/20</td>
<td>Geleyns-Tuyls</td>
<td>Kessel-lo</td>
</tr>
<tr>
<td></td>
<td>1911/20</td>
<td></td>
<td>female farmer</td>
</tr>
<tr>
<td>23</td>
<td>1918/19</td>
<td>Tuyls-Geets (son)</td>
<td>Kessel-lo</td>
</tr>
<tr>
<td></td>
<td>1918/19</td>
<td></td>
<td>factory worker - female housekeeper</td>
</tr>
<tr>
<td>104</td>
<td>1920/20</td>
<td>Tuyls-Van Aerschot</td>
<td>Herent</td>
</tr>
<tr>
<td></td>
<td>1920/20</td>
<td></td>
<td>factory worker - female housekeeper</td>
</tr>
<tr>
<td>25</td>
<td>1911/20</td>
<td>Delauré-Laeremans</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1911/20</td>
<td></td>
<td>cauldron maker</td>
</tr>
</tbody>
</table>

* / indicates that a person changed its professional activity during his/her stay in the station area of Holsbeek
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*July*-September 1891

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