A signal of (Train)ability? Grade repetition and hiring chances

A Signal of (Train)ability? Grade Repetition and Hiring Chances*

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1. Introduction

Grade retention, i.e. having pupils repeat a year of schooling in primary, secondary or tertiary education (Eide and Showalter, 2001), is a common educational practice across OECD countries. In Belgium, our country of analysis, 34.0% of the 15-year-old students surveyed in the 2015 PISA Student Questionnaire had been retained during primary and/or secondary education (OECD, 2016).[1] This percentage is lower in the United States (11.0%) and Australia (7.1%), but of comparable magnitude in other European countries such as France (22.1%), the Netherlands (20.1%), Portugal (31.2%) and Spain (31.3%). Despite its widespread use, during recent years there has been a debate, both in policy and academic circles, concerning the effectiveness of this practice to remedy pupils' learning deficits (Brodaty et al., 2013; Cockx et al., 2019; Eide and Showalter, 2001; Knipprath, 2013; Reschly and Christenson, 2013). Moreover, grade retention yields a delayed entrance into the labour market and has been related to adverse first labour market outcomes, as employers may perceive grade retention as a signal of lower productivity and trainability (Bills, 2003; Brodaty et al., 2013; Di Stasio, 2014).

While empirical research on the effect of grade retention on further academic

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[1] The Programme for International Student Assessment (PISA) is a worldwide survey by the Organisation for Economic Co-operation and Development (OECD) of 15-year-old pupils' educational attainment with respect to mathematics, science and reading (Ikeda and García, 2014).

attainment is abundant,[2] the effect on labour market outcomes has rarely been studied. Table 1 summarises all studies we are aware of that, as a central or secondary focus, connect grade retention to first labour market outcomes.[3] This nascent literature is multidisciplinary in nature, with contributions from the fields of economics (Aina and Casalone, 2011; Brodaty et al., 2013; Eide and Showalter, 2001), sociology (Bernardi, 2003; Di Stasio, 2014; Di Stasio and van de Werfhorst, 2016), psychology (Jimerson, 1999) and pedagogy (Knipprath, 2013). Overall, these studies, based on micro-data for Belgium, England, France, Italy, the Netherlands and the United States, provide evidence of adverse labour market effects of grade retention. More concretely, these studies empirically relate the treatment of grade retention to a higher probability of unemployment and underemployment,[4] lesser wages and lower levels of job security. The only exception is Oosterbeek (1992), who reports evidence of a positive impact of study duration on earnings.

<Table 1 about here>

For most of the cited studies, it is doubtful whether their estimates can be interpreted as causal effects due to the endogeneity of grade retention with respect to labour market success. Naïve estimations of the covariation between these two variables might reflect differences in personal characteristics, such as intelligence, general ability, motivation and social and family background, which are often unobserved or difficult to measure in survey or administrative data and potentially affect both retention and first labour market outcomes (Brodaty et al., 2013; Eide and Showalter, 2001). A majority of the contributions listed in Table 1 are methodologically unconvincing as their primary identification strategy is to only control for (a few) observable determinants of these outcomes.

More ambitious is the instrumental variable (IV) approach proposed by Brodaty et al. (2013) and Eide and Showalter (2001). These authors use geographic variation in stock of

[2] See, for instance, Cockx et al. (2019), García-Pérez et al. (2014), Goos et al. (2013), Jimerson (2001) and Lorence (2014) for evidence on the effect of grade retention on academic achievement in the subsequent school year(s); Cockx et al. (2019), Eide and Showalter (2001), Jacob and Lefgren (2009), Manacorda (2012), Roderick (1994) and Stearns et al. (2007) for its effect on school drop-out rates; and Fine and Davis (2003) and Ou and Reynolds (2010) for its effect on higher education enrolment. See also the meta-analyses in Allen et al. (2009), Holmes and Matthews (1984), Jimerson (2001) and Xia and Kirby (2009).

[3] See also Babcock and Bedard (2011) for an assessment of the impact for cohorts of students exposed to different primary school retention rates on long-term labour market outcomes.

[4] A worker is considered to be underemployed if her/his education level is higher than the level that is typically required to perform adequately in her/his job (Baert et al., 2013).

colleges, vocational high-schools and kindergarten entry dates and individual variation in month of birth to account for the endogeneity of grade retention. However, whether a direct effect of these instruments on first labour market outcomes is ruled out, i.e. a crucial assumption of this approach, is debatable.[5] Moreover, even when an instrument is truly exogenous, imprecisely estimated effects might emerge if the instrument does not explain enough variation in the endogenous variable (Angrist et al., 2000).

Finally, the endogeneity problem is tackled by design in Di Stasio (2014) and Di Stasio and van de Werfhorst (2016). In their vignette experimentation framework, grade retention is randomly assigned to fictitious job candidates then submitted to recruiters who have to make fictitious hiring decisions. The drawback of this approach is that it captures stated intentions rather than real decisions and that it is subject to social desirability bias. Given these concerns with respect to external validity, Di Stasio (2014) mentions that one should "try to capture the judgements of employers in a real hiring setting" as a direction for future research.

For the present study, we take up this challenge. That is, we conduct the first field experiment on the relationship between grade retention and employment opportunities. Within the context of this experiment, 1,592 fictitious job applications are sent out to real employment vacancies in Belgium. As grade retention is randomly assigned to these applications, the endogeneity problem is solved by construction. By additionally introducing variation in the candidates' education level and (first) work experience, we are able to measure heterogeneous treatment effects according to these characteristics. Moreover, as we submit the fictitious job applications to vacancies for divergent occupations, we are able to test whether the effect of grade retention on hiring potential is more demonstrable in vacancies where on-the-job training is important. By means of the latter two features of our experiment, we can test the empirical power of the two key theories supporting a relationship between grade retention and employment opportunities, which are outlined in

[5] For instance, IV approaches based on college and program proximity are not uncontested because people residing near (particular) colleges might perform differently than others on the (youth) labour market (Carneiro et al., 2011; Kolstad and Wiig, 2014; Reynolds, 2012; Verhaest and Baert, 2018). In addition, the instruments applied seem to ignore the recent literature on early skills formation (Bedard and Dhuey, 2006; Cunha and Heckman, 2007; Heckman, 2006) and the long-term effects of kindergarten entry in particular (Lincove and Painter, 2006), and on relative age effects in the labour market (Black et al., 2011; Du et al., 2012; Muller-Daumann and Page, 2016; Plug, 2001).

the following section. As a consequence, we not only provide insight into *whether* grade retention affects later employment, but also *why* this might be the case.

2. Theoretical Mechanisms and Research Hypotheses

From a theoretical point of view, two well-established theories support a hypothetical relationship between grade retention and employment opportunities: Spence's (1974) Signalling and Thurow's (1975) Queuing theories.[6]

The starting point of Signalling theory is that employers often lack access (at a reasonable cost) to trustworthy information on their job applicants' productivity. Therefore, they use the material they are able to review as a signal for other, unobserved factors. Translated into the context of the present study, some have argued that employers may use grade retention as a sign of lower intelligence, self-assurance and engagement (Brodaty et al., 2013; Jimerson, 1999; Miller and Rosenbaum, 1997). As a consequence, grade retention may result in lower hiring chances.[7] However, what employers generally read in a candidate's résumé is the year of graduation and, therefore, they can discover whether the number of years of study deviates from those nominally required to obtain a given degree. If spending more years to merit a diploma is perceived as a signal of perseverance or a more thorough understanding of the educational curriculum, predictions based on the Signalling theory may go the other way round (Oosterbeek, 1992).

In contrast, the starting point of Queuing theory is that on-the-job training—rather than skills acquired in formal education—is crucial to employees' productivity. Therefore, employers rank job candidates by their expected trainability, with the person they believe

[6] As our experimental design keeps employees' job searching behaviour constant, other seminal theories on educational and employment outcomes, such as Human Capital (Becker, 1964), Credentialism (Berg, 1970; Collins, 1979) and Social Network (Granovetter, 1973) theories, cannot have predicting power in our setting.

[7] This first channel is thereby closely related to Arrow's (1973) model of Statistical Discrimination. This theory predicts that minority characteristics (such as a foreign ethnicity or a minority sexual orientation) lead to unfavourable treatment in respect of employers, not because of a general distaste for collaborating with them—as predicted by Becker's (1957) model of Taste-based Discrimination—but because of the fact that minority group characteristics are used to predict a particular minority applicant's productivity (Baert, 2018a).

to be easiest to train holding the first position in the queue and the person they perceive as the least trainable the last (Di Stasio, 2014; Thurow, 1975; Van Belle et al., 2018). Subsequently, these employers only invite individuals above a certain cut-off value with respect to perceived trainability to a job interview. Since employers do not possess complete information, they must consult the limited information available based on, e.g., a written application to assess a job applicant's trainability. In particular, it is argued that educational outcomes are used as an indicator of this trainability (Di Stasio, 2014; Miller and Rosenbaum, 1997; Wolbers et al., 2001). In the context of the present study, it is straightforward to argue that grade retention, as inherently related to difficulties in gaining experience during school, is an outcome that employers can interpret as a signal of low trainability.[8]

Supported by these two theories, as well as by the empirical evidence summarised in Table 1, we state a first research hypothesis:

H1: Job candidates with a history of grade retention receive fewer positive call-backs in response to their job applications.

In addition, following Signalling theory, the effect of grade retention should be lower when applicants provide employers with more objective information, such as a university degree or work experience. In that case, employers should rely to a lesser extent on indirect signals of productivity (Brodaty et al., 2013; Drydakis, 2014; Protsch and Solga, 2015). Finally, following Queuing theory, a higher penalty for grade retention is expected when on-the-job training is more important for the occupation to which one applies. Therefore, supported by Signalling and Queuing theory, respectively, we state the following hypotheses:

H2: Revealed grade retention affects hiring chances to a lesser extent when job candidates have obtained a higher education degree or (more) work experience.

H3: Revealed grade retention affects hiring chances more within occupations where on-the-job training is more important.

[8] Hence, Queuing theory can be seen as an application of Signalling theory in which retention is not used as a signal of general ability but as a specific signal of trainability.

3. Experiment

3.1 Extended Correspondence Experimentation Framework

To test H1, H2 and H3, we run a field experiment that extends the correspondence experimentation framework of Bertrand and Mullainathan (2004). In general, within this type of experiment, pairs of fictitious job applications are sent to real vacancies. The applications differ only from their pair member in the characteristic that is to be tested, which is randomly assigned within the pair. By monitoring the subsequent call-back, unequal treatment in initial hiring decisions according to this characteristic can be identified and given a causal interpretation (Baert, 2018b; Bertrand and Mullainathan, 2004; Neumark, 2018).

At their inception, correspondence experiments were exclusively applied to investigate hiring discrimination based on forbidden grounds, such as ethnic discrimination and gender discrimination (Bertrand and Mullainathan, 2004; Neumark, 2016). More recently, however, scholars have employed related experiments to study the causal impact on employment opportunities of other treatments, such as former student employment, engagement as a volunteer and unemployment duration (Baert et al., 2016; Baert and Verhaest, 2019; Baert and Vujić, 2018; Eriksson and Rooth, 2014; Kroft et al., 2013).

We conducted our experiment between November 2014 and April 2015 in the labour market of Flanders, situated in the Northern part of Belgium. Two fictitious applications of job candidates were sent to vacancies randomly selected from the database of the Public Employment Agency of Flanders, i.e. the major Flemish job search channel. For each vacancy, we randomly assigned the treatment of grade retention to one of the two applications and sent the resulting combinations in a randomised order to the employer. This within-pair randomisation of grade retention was combined with between-pair variation in other factors, in view of introducing variation needed to test H2 and H3. Thereafter, the reactions from the employer side were analysed to investigate unequal treatment in hiring based on grade retention in general, as well as by a candidate's degree level and work experience and according to the importance of on-the-job training for the occupation.

In what follows, we discuss the design of the experiment in depth. The resulting variables and their descriptive statistics are summarised in Table 2.

3.2 Job Application Template Pairs

For each level of education and work experience (see Section 3.4), we constructed two application templates comprising a résumé and a motivation letter, which we labelled Type A and Type B. These templates differed only in inessential details (see below) and layout to avoid detection. To ensure that our templates were realistic, examples from the Public Employment Agency of Flanders were used as a starting point.

Type A and Type B applicants were males born and living in Ghent, the second largest city in Flanders, with approximately 249,000 inhabitants. Both types mentioned in their résumé the start and end years of primary, secondary and (for the more highly educated) tertiary education and the school at which this part of their education took place. The mentioned schools were of the same type and had similar reputations. With respect to secondary and tertiary education, both candidate types also displayed similar courses of study (see Section 3.4).

The applicants further mentioned a random birthday in a year that was consistent with their educational degree and their number of years of grade retention (see Section 3.3). They had a typically Flemish sounding first name and surname and mentioned their Belgian nationality and their address (existing street name but non-existing house number) in a similar, middle-class neighbourhood. Finally, we added to both application templates the following features: an email address and a telephone number, both from major providers, adequate language skills (in Dutch, French and English) and adequate IT skills. The résumé and motivation letter templates (in Dutch) are available upon request.

It is important to note that the minimal differences between the Type A and Type B job application templates could not bias the estimation of the treatment effects as the grade retention treatment was randomly assigned to these types (see Section 3.3). The same is true with respect to (heterogeneous treatment effects by) the variables that were randomly assigned between the pairs of applicants (see Section 3.4).

3.3 Random Assignment of Treatment of Grade Retention

The treatment of grade retention and the control situation of no grade retention were randomly assigned to the Type A and Type B application templates. This aspect was signalled in two ways in the fictitious candidates' résumés. First, for candidates with a grade retention, the start and the end year of primary, secondary and/or tertiary education revealed that their study duration deviated from the prescribed period. This prescribed period, standardised within Flanders, is six years for primary education, six years for secondary education, three years for a tertiary education program of the Bachelor's type and four years for a tertiary program of the Master's type (De Ro, 2008).[9] Second, the treated candidates' year of birth deviated from the year of birth that could be expected without grade retention conditional on these candidates' highest education degree and years of work experience.

In addition, several intensities and timings of grade retention were randomly assigned between our candidate pairs. That is, we randomly assigned one out of nine histories of grade retention to the treated applicant. These nine options were based on all possible combinations totalling a maximum of one or two years of retention during primary, secondary and/or tertiary education. More concretely, the nine possible combinations that were randomly included for the treated pair member were: (i) one year of retention in primary education; (ii) one year of retention in secondary education; (iii) one year of retention in tertiary education; (iv) two years of retention in primary education; (v) two years of retention in secondary education; (vi) two years of retention in tertiary education; (vii) one year of retention in primary education and one year in secondary education; (viii) one year of retention in primary education and one year in tertiary education; and (ix) one year of retention in secondary education and one year in tertiary education. For candidates with a secondary education degree only, options (iii), (vi), (viii) and (ix) were not possible.

3.4 Application Procedure

The different combinations of treated and control candidates discussed earlier were sent to

[9] There are a few Master programs in Flanders that take five years (engineering, exact sciences and pharmacology) or six years (medicine and veterinary medicine), but they were not included in our experiment.

796 real vacancies (resulting in 1,592 fictitious applications). The two candidates within each pair were sent with 12 to 36 hours in between and the order in which the treated and control applicants were sent alternated.

We applied for vacancies that were open for one of the following diplomas within the broad field of business: the secondary education degrees of (i) accountancy, (ii) commerce and (iii) secretary-languages; the Bachelor degrees of (iv) accountancy and tax, (v) finance and insurance, (vi) legal practice, (vii) logistics management, (viii) marketing and (ix) SME management; and the Master degrees of (x) accountancy and taxation, (xi) finance and risk management, (xii) management and IT, (xiii) marketing management and (xiv) strategic management. Since these diplomas allow access to a wide range of professions within different sectors, we avoided measuring our treatment effect in one or a few professions only, as often has been the case in similar experiments (Baert, 2018b).

We submitted fictitious application pairs both to entry-level jobs, using candidate pairs without experience, as well as to jobs requiring at most five years of experience, using candidate pairs with five years of experience in a position similar to the one in the vacancy.

3.5 Call-Back Measurement

The genuine reactions of employers to our fictitious applications were received via email and mobile phone voicemail. The contents of these call-backs are available upon request. In line with many of the former correspondence experiments reviewed in Baert (2018b), we define a positive call-back as the situation in which the applicant received (i) an invitation to a job interview concerning the job for which the candidate applied, (ii) a proposal of an alternative position, (iii) an inquiry to provide the employer with more information or (iv) an inquiry to contact the employer that reveals some interest.

We also registered whether a temporary (versus permanent) contract and whether a part-time (versus full-time) contract was offered in the vacancy.

3.6 Merging with External Data

Based on the information in the vacancy texts, we matched all vacancies with an occupation

in the ISCO-08 classification system.[10] Then, according to their ISCO-08 code, we linked each vacancy to a proxy of the importance of on-the-job training based on Eurofound (2012). More in detail, we took the 2010 European Working Conditions Survey and, for each 3-digit ISCO-08 occupation, we computed the fraction of workers who answered positively to the question 'Over the past 12 months, have you undergone any on-the-job training to improve your skills or not?'. In what follows, we refer to this proxy of the importance of the on-the-job training as the 'OJT scale'. It is our benchmark scale to test H3.

We also computed two other scales for robustness checks. First, we took the average between the aforementioned fraction and the fraction of workers who replied affirmatively to the question 'Over the past 12 months, have you undergone any training paid for or provided by your employer or by yourself if self-employed to improve your skills or not?'. This is a proxy of the importance of more general forms of training. We refer to this as 'Training scale'. Second, we used a dummy version of the OJT scale, which is equal to 1 if the OJT scale for the occupation of the vacancy under concern is higher than 0.5 and 0 otherwise.

Finally, we also constructed a related 'Skill scale'. This is the 'Skills and Discretion' index proposed in Eurofound (2012) and based on items such as 'Generally, does your main paid job involve solving unforeseen problems on your own?', 'Generally, does your main paid job involve complex tasks?' and 'Generally, does your main paid job involve learning new things?'. This variable will be used as a control in our regression analysis.

<Table 2 about here>

3.7 Ethical Approval

This research procedure was approved by the Ethical Committee of the Faculty of Economics and Business Administration at Ghent University, largely based on the arguments mentioned in Riach and Rich (2004).

[10] ISCO-08 is the second-generation International Standard Classification of Occupations, based on a resolution of experts on labour statistics held in December 2007 and endorsed by the Governing Body of the International Labour Organization (ILO) in March 2008 (see https://www.ilo.org/public/english/bureau/stat/isco/intro.htm).

4. Results

Table 3 depicts the results of a bivariate analysis. In Panel A, the responses to all applications are evaluated together, with a view to testing H1. In Panel B, vacancies are broken down by level of education and number of years of experience of the fictitious candidates, related to H2. Finally, in Panel C, the degree of positive call-back is broken down into vacancies with an OJT scale value of 0.5 or higher versus a lower value, to give a first indication with respect to H3.

For each of those breakdowns of the data, in the different columns of Table 3 we present: (i) the number of vacancies to which we submitted pairs of fictitious job applications, (ii) the number of vacancies for which no candidate received a positive call-back, (iii) the number of vacancies for which both candidates received a positive call-back, (iv) the number of vacancies for which only the treated (i.e. retained) candidate received a positive call-back and (v) the number of vacancies for which only the control candidate received a positive call-back. The positive call-back ratio in column (viii) is then calculated by dividing the fraction of applications for which retained candidates received a positive call-back (column (vi)) by the corresponding fraction for the control candidates (column (vii)). The t-stat in column (ix) is the test statistic for the null hypothesis that these two fractions are the same.

<Table 3 about here>

Overall, grade retention does not significantly affect the receipt of a positive call-back from employers. The overall positive call-back ratio is 0.995, i.e. it is hardly different from 1 both in economic and in statistical terms. This means equal treatment between grade-retained and non-retained applicants. This finding contrasts to some extent with the summary of the previous literature in Table 1, which pointed almost uniquely to a negative impact of grade retention on labour market outcomes. This may have to do with the fact that (i) the findings in previous studies could only obtain a causal interpretation under strong conditions, (ii) we focus on the treatment effects inspired by the employer side and (iii) we concentrate on the first phase of the recruitment process. In addition, our finding contrasts with the one presented in Baert and Verhaest (2018), who, with a similar experiment, found a significant positive effect on hiring resulting from student leadership and degrees of merit

(distinction and great distinction).

However, the picture changes when the tested vacancies are divided up according to the importance of on-the-job training. In vacancies for occupations where the OJT scale is high, the positive call-back ratio is 0.840, which is statistically significantly different from 1 at the 5% significance level. So, those who had to repeat a year received 16% fewer positive responses. This finding, of a higher scar related to grade retention in occupations where on-the-job training is important, is in line with the theoretical expectations based on the Queuing theory discussed in Section 2.

In addition, we find that, for vacancies requiring no work experience, the positive call-back rate of the treated is significantly larger than that of the control applicants. Grade-retained candidates, in contrast to our expectations based on Signalling theory, are 26.8% more likely to receive positive reactions than applicants without grade retention. Abstracting from the possibility that this finding is a statistical artefact, it might be due to the employers' presumption that the reservation wage for an entry-level job is lower if the candidate has a weaker résumé and therefore feebler bargaining power. An alternative explanation is that the level of required experience by the vacancy relates to other vacancy and occupation characteristics. Therefore, in what follows, we discuss the results of a regression analysis controlling for vacancy and occupation characteristics.

More concretely, Table 4 presents the results of the Ordinary Least Squares estimation of a multivariate linear probability model where the binary indicator for the positive call-back is regressed on (i) having at least one grade retention experience, (ii) this experience interacted with other candidate, vacancy and occupation characteristics mentioned in Table 2 and (iii) vacancy fixed effects. Given that vacancy and occupation characteristics do not vary within vacancy and we already control for the vacancy fixed effects, they cannot be individually included for exact collinearity.[11] All regressors, except for the one indicating retention, are normalised by subtracting their mean among the subpopulation of retained candidates. Continuous variables are further standardised by dividing by the standard

[11] Adding indicators of (i) using résumé template type B (with type A as a reference category) and (ii) being the second candidate sent to the vacancy (with the first-sent pair member as a reference category) changed neither the empirical conclusions nor substantially increased the precision of the other estimates (as insignificant coefficients were found for (i) and (ii)).

deviation among this subpopulation.

We employ linear probability models because they do not suffer from incidental parameter problems, given our fixed effects specification, and because their parameter estimates can be directly interpreted as the partial effects on the response probabilities.[12] Finally, for hypothesis testing, we cluster standard errors at the vacancy level to take into account the within-vacancy correlation for each pair of applications.

In Model (1), we only include the constant and our indicator of grade retention as covariates. In Model (2), we include interactions with the variables related to H2 and H3, meaning interactions with educational level, work experience and the OJT scale. From Model (3) onwards, we also include the interactions with all the other observable factors. Finally, in Model (4) and Model (5), we control for alternative proxies of the importance of training in (the profession of) the job vacancy, as a robustness test related to H3.

<Table 4 about here>

The results of our multivariate analysis are in line with those of our bivariate analysis. Throughout all models, we find on average a nil effect of grade retention. Model (2) however shows that the effect is heterogeneous. Grade-retained candidates applying for jobs requiring work experience are significantly less likely to receive a positive call-back than similar non-retained applicants (minus 7.0 percentage points). Furthermore, grade-retained candidates applying for positions with more intensive on-the-job training are less likely to receive a positive call-back than comparable candidates without a grade retention experience: a one standard deviation increase in the OJT scale implies a reduction of 4.1 percentage points in the probability of a positive call-back for grade-retained applicants. The educational level does not determine the impact of grade retention on the probability of a positive call-back. These findings are virtually unchanged when in Model (3) we also include the full set of interactions of the grade retention indicator with all the other vacancy and occupation characteristics. Finally, the estimation results of Models (4) and (5), which differ

[12] On the contrary, non-linear probability models, like the probit model, typically result in the incidental parameters problem when fixed effects are included in the specification of the response probabilities. The fixed effects logit estimator could be viable to avoid this problem, since in this approach the fixed effects are not treated as parameters to be estimated. However, the partial effects on the response probabilities cannot be estimated within the latter regression framework: we would infer only the sign of the impact of the covariates on the positive call-back probability, missing the quantification of the effect size.

from Model (3) by their use of different definitions of training intensity, lead to the same conclusions as those of Model (3).

In sum, grade retention has on average no effect on the likelihood of a positive call-back, but its effect is heterogeneous, as grade retention is more harmful for those who apply for vacancies requiring work experience and on-the-job training. Hence, our analysis supports H3, while H1 and H2 are not corroborated.

5. Conclusion

In this study, we presented the first field experiment on the relationship between grade retention and employment opportunities. We sent pairs of fictitious job applications, with the random assignment of different retention characteristics, to genuine vacancies in Belgium. We designed our experiment in such a way that it also varied according to the candidates' education level, (initial) work experience and level of on-the-job training in the occupation of the vacancy. Thereby, we were able to test whether grade retention affects hiring chances to a higher extent when (i) job candidates present a lower education degree or less work experience and (ii) within occupations where on-the-job training is more important, as expected based on Signalling theory and Queuing theory, respectively.

We found that on average grade retention does not significantly affect positive call-back by employers in response to job applications. However, when narrowing in on vacancies for occupations where on-the-job training is important, job candidates who had to re-sit (at least) one year are 16% less likely to receive a positive reaction. This finding is consistent with Queuing theory.

Based on our results, we suspect that grade repetition is interpreted by employers as a sign of lower trainability. From a societal point of view, our results indicate that anyone who repeated a year would do well to highlight their trainability when applying for a job. This can be done, for example, by emphasising successfully completed training courses outside formal education or by explicitly signalling one's own eagerness to learn. Moreover, if there is a reason for retention that has nothing to do with intellectual agility (and does not evoke

any other stigma), it may be interesting to mention it in one's motivation letter.

References

Aina, C., Casalone, G. (2011): Does time-to-degree matter? The effect of delayed graduation on employment and wages. AlmaLaurea Working Papers Series, 38, AlmaLaurea Inter-University Consortium.

Allen, C. S., Chen, Q., Willson, V. L., Hughes, J. N. (2009): Quality of research design moderates effects of grade retention on achievement: A meta-analytic, multilevel analysis. *Educational Evaluation and Policy Analysis*, 31, 480–499.

Angrist, J. D., Graddy, K., Imbens, G. (2000): The interpretation of instrumental variables estimators in simultaneous equations models with an application to the demand for fish. *Review of Economic Studies*, 67, 499–527.

Arrow, K. J. (1973): The theory of discrimination. In Ashenfelter, O., Rees, A. (eds.): *Discrimination in labor markets*. Princeton: Princeton University Press.

Babcock, P., Bedard K. (2011): The wages of failure: New evidence on school retention and long-run outcomes. *Education Finance and Policy*, 6, 293–322.

Baert, S. (2018a): Hiring a gay man, taking a risk? A lab experiment on employment discrimination and risk-aversion. *Journal of Homosexuality*, 65, 1015–1031.

Baert, S. (2018b): Hiring discrimination: An overview of (almost) all correspondence experiments since 2005. In Gaddis, M. (ed.): *Audit studies: Behind the scenes with theory, method, and nuance*. New York: Springer.

Baert, S., Cockx, B., Verhaest, D. (2013): Overeducation at the start of the career: Stepping stone or trap? *Labour Economics*, 25, 123–140.

Baert, S., Rotsaert, O., Verhaest, D., Omey, E. (2016): Student employment and later labour market success: No evidence for higher employment chances. *Kyklos*, 69, 401–425.

Baert, S., Verhaest, D. (2018): Work hard or play hard? Degree class, student leadership and employment opportunities. IZA Discussion Paper Series, 11971, Institute of Labor

Economics, Bonn.

Baert, S., Verhaest, D. (2019): Unemployment or overeducation: Which is a worse signal to employers? *De Economist*, 167, 1–21.

Baert, S., Vujić, S. (2018): Does it pay to care? Volunteering and employment opportunities, *Journal of Population Economics*, 31, 819–836.

Becker, G. S. (1957): *The economics of discrimination*. Chicago: University of Chicago Press.

Becker, G. S. (1964): *Human capital: A theoretical and empirical analysis, with special reference to education*. New York: National Bureau of Economic Research.

Bedard, K., Dhuey, E. (2006): The persistence of early childhood maturity: International evidence of long-run age effects. *Quarterly Journal of Economics*, 121, 1437–1472.

Berg, I. (1970): *Education and jobs: The great training robbery*. New York: Praeger.

Bernardi, F. (2003): Returns to educational performance at entry into the Italian labour market. *European Sociological Review*, 19, 25–40.

Bertrand, M., Mullainathan, S. (2004): Are Emily and Greg more employable than Lakisha and Jamal? A field experiment on labor market discrimination. *American Economic Review*, 94, 991–1013.

Bills, D. B. (2003): Credentials, signals, and screens: Explaining the relationship between schooling and job assignment. *Review of Educational Research*, 73, 441–469.

Black, S. E., Devereux, P. J., Salvanes, K. G. (2011): Too young to leave the nest? The effects of school starting age. *Review of Economics and Statistics*, 93, 455–467.

Brodaty, T. O., Gary-Bobo, R. J., Prieto, A. (2013): Does speed signal ability? The impact of grade retention on wages. *Mimeo*.

Carneiro, P., Heckman, J., Vytlacil, E. (2011): Estimating marginal and average returns to education. *American Economic Review*, 110, 2754–2781.

Cédiey, E., Foroni, F., Garner, H. (2008): Discrimination à l'embauche fondée sur l'origine à l'encontre des jeunes français(e)s peu qualifié(e)s. *Dares Premières Infos Premières Synthèses*, 06.3.

Cockx, B., Picchio, M., Baert, S. (2019): Modeling the effects of grade retention in high school. *Journal of Applied Econometrics*, 34, 403–424.

Collins, R. (1979): *The credential society: An historical sociology of education and stratification*. New York: Academic Press.

Cunha, F., Heckman, J. J. (2007): The technology of skill formation. *American Economic Review*, 97, 31–47.

De Ro, J. (2008): *Education in Flanders: A broad view on the Flemish education landscape*. Brussels: Agency for Educational Communication Publications.

Di Stasio, V. (2014): Education as a signal of trainability: Results from a vignette study with Italian employers. *European Sociological Review*, 30, 796–809.

Di Stasio, V., van de Werfhorst, H. G. (2016): Why does education matter to employers in different institutional contexts? A vignette study in England and the Netherlands. *Social Forces*, 95, 77–106.

Drydakis, N. (2014): Sexual orientation discrimination in the Cypriot labour market: Distastes or uncertainty? *International Journal of Manpower*, 35, 720–744.

Du, Q., Gao, H., Levi, M. D. (2012): The relative-age effect and career success: Evidence from corporate CEOs. *Economics Letters*, 117, 660–662.

Eide, E. R., Showalter, M. H. (2001): The effect of grade retention on educational and labor market outcomes. *Economics of Education Review*, 563–576.

Eriksson, S., Rooth, D.-O. (2014): Do employers use unemployment as a sorting criterion when hiring? Evidence from a field experiment. *American Economic Review*, 104, 1014–1039.

Eurofound (2012): *Trends in job quality in Europe*. Luxembourg: Publication Office of the European Union.

Fine, J. G., Davis, J. M. (2003): Grade retention and enrollment in post-secondary education. *Journal of School Psychology*, 41, 401–411.

García-Pérez, J. I., Hidalgo-Hidalgo, M., Robles-Zurita, J. A. (2014): Does grade retention affect students' achievement? Some evidence from Spain. *Applied Economics*, 46, 1373–

1392.

Goos, M., Belfi, B., De Fraine, B., Van Damme, J., Onghena, P., Petry, K. (2013): Effecten van zittenblijven in het basis- en secundair onderwijs in kaart gebracht: een systematische literatuurstudie. *Pedagogische Studiën*, 90, 17–30.

Granovetter, M. S. (1973): The strength of weak ties. *American Journal of Sociology*, 78, 1360–1380.

Heckman, J. J. (2006): Skill formation and the economics of investing in disadvantaged children. *Science*, 312, 1900–1902.

Holmes, C. T., Matthews, K. M. (1984): The effects of nonpromotion on elementary and junior high school pupils: A meta-analysis. *Review of Educational Research*, 54, 225–236.

Ikeda, M., García, E. (2013): Grade repetition: A comparative study of academic and non-academic consequences. *OECD Journal: OECD Studies*, 2013, 269–315.

Jacob, B. A., Lefgren, L. (2009): The effect of grade retention on high school completion. *American Economic Journal: Applied Economics*, 1, 33–58.

Jimerson, S. R. (1999): On the failure of failure: Examining the association between early grade retention and education and employment outcomes during late adolescence. *Journal of School Psychology*, 37, 243–272.

Jimerson, S. R. (2001): Meta-analysis of grade retention research: Implications for practice in the 21st century. *School Psychology Review*, 30, 420–437.

Knipprath, H. (2013): Langetermijneffecten van zittenblijven en afstromen op opleidingsniveau, participatie in levenslang leren en de beroepscarrière. *Pedagogische Studiën*, 90, 74–88.

Kolstad, I., Wiig, A. (2015): Education and entrepreneurial success. *Small Business Economics*, 44, 783–796.

Kroft, K., Lange, F., Notowidigdo, M. J. (2013): Duration dependence and labor market conditions: Evidence from a field experiment. *Quarterly Journal of Economics*, 128, 1123–1167.

Lincove, J. A., Painter, G. (2006): Does the age that children start kindergarten matter?

Evidence of long-term educational and social outcomes. *Educational Evaluation and Policy Analysis*, 28, 153–179.

Lorence, J. (2014): Third-grade retention and reading achievement in Texas: A nine year panel study. *Social Science Research*, 48, 1–19.

Manacorda, M. (2012): The cost of grade retention. *Review of Economics and Statistics*, 94, 596–606.

Miller, S. R., Rosenbaum, J. E. (1997): Hiring in a Hobbesian world: Social infrastructure and employers' use of information. *Work and Occupations*, 24, 498–523.

Muller-Daumann, D., Page, D. (2016): Political selection and the relative age effect in the US Congress. *Journal of Royal Statistical Society: Series A (Statistics in Society)*, 1–21.

Neumark, D. (2018): Experimental research on labor market discrimination. *Journal of Economic Literature*, 56, 799–866.

OECD (2011): *When students repeat grades or are transferred out of school: What does it mean for education systems? PISA in Focus 2011/6*. Paris: OECD.

OECD (2016): *PISA 2015 Results (Volume II): Policies and Practices for Successful Schools*. Paris: OECD Publishing. http://dx.doi.org/10.1787/9789264267510-en.

Oosterbeek, H. (1992): Study duration and earnings: A test in relation to the human capital versus screening debate. *Economics Letters*, 40, 223–228.

Ou, S.-R., Reynolds, A. J. (2010): Grade retention, postsecondary education, and public aid receipt. *Educational Evaluation and Policy Analysis*, 32, 118–139.

Pager, D. (2007): The use of field experiments for studies of employment discrimination: Contributions, critiques, and directions for the future. *Annals of the American Academy of Political and Social Science*, 609, 104–133.

Plug, E. J. S. (2001): Season of birth, schooling and earnings. *Journal of Economic Psychology*, 22, 641–660.

Protsch, P., Solga, H. (2015): How employers use signals of cognitive and noncognitive skills at labour market entry: Insights from field experiments. *European Sociological Review*, 31, 521–532.

Reschly, A. L., Christenson, S. L. (2013): Grade retention: Historical perspectives and new research. *Journal of School Psychology*, 51, 319–322.

Reynolds, C. (2012): Where to attend? Estimating the effects of beginning college at a two-year institution. *Economics of Education Review*, 31, 345–362.

Riach, P. A., Rich, J. (2002): Field experiments of discrimination in the market place. *Economic Journal*, 112, 480–518.

Riach, P. A., Rich, J. (2004): Deceptive field experiments of discrimination: Are they ethical? *Kyklos*, 57, 457–470.

Roderick, M. (1994): Grade retention and school dropout: Investigating the association. *American Educational Research Journal*, 31, 729–759.

Spence, M. A. (1974): *Market signaling: Informational transfer in hiring and related screening processes*. Cambridge: Harvard University Press.

Stearns, E., Moller, S., Blau, J., Potochnick, S. (2007): Staying back and dropping out: The relationship between grade retention and school dropout. *Sociology of Education*, 80, 210–240.

Thurow, L. C. (1975): *Generating inequality: Mechanisms of distribution in the U.S. economy*. New York: Basic Books.

Van Belle, E., Di Stasio, V., Caers, R., De Couck, M., Baert, S. (2018): Why are employers put off by long spells of unemployment? *European Sociological Review*, 34, 694–710.

Verhaest, D., Baert, S. (2018): The effects of workplace learning in higher education on employment and match quality: is there an early-career trade-off? *Empirical Economics*, 55, 1229–1270.

Wolbers, M. H. J., De Graaf, P. M., Ultee, W. C. (2001): Trends in the occupational returns to educational credentials in the Dutch labor market: changes in structures and in the association? *Acta Sociologica*, 44, 5–19.

Xia, N., Kirby, S. N. (2009): *Retaining students in grade: A literature review of the effects of retention on students' academic and nonacademic outcomes*. Santa Monica: RAND Corporation.

Table 1. Literature Review

Study	Country	Retention variable(s)	Outcome variable(s)	Effect of retention on outcome(s)	Approach to deal with endogeneity
Aina and Casalone (2011)	Italy	Difference between time-to-degree and prescribed period in TE.	(i) Employment status one, three and five years after graduation. (ii) Duration time between graduation and first job. (iii) Wage one, three and five years after graduation.	Negative effect: (substantially) higher time-to-degree decreases probability of employment and wages (especially five years after graduation).	Parametric control for observable factors (e.g. course of study, school characteristics and parental education level).
Bernardi (2003)	Italy	Time-to-degree higher than prescribed period (i) in SE and (ii) in TE.	(i) Duration time between graduation and first job. (ii) Job quality score of first job.	Negative effect: grade retention during TE increases time between graduation and first job.	Parametric control for observable factors (e.g. specific education level and course of study).
Brodaty et al. (2013)	France	Difference between school-leaving age and average school-leaving age of individuals holding same degree.	Mean wage during first five years after graduation.	Negative effect: one additional year of delay decreases wages by about 9%.	IV approach exploiting exogenous variation (i) in distance between place of residence and nearest college, (ii) across counties in stock of vocational high schools per capita and (iii) in individuals' month of birth.
Di Stasio (2014) and Di Stasio and van de Werfhorst (2016)	England, Italy and the Netherlands	Two years of grade retention before graduation (counterfactual: no grade retention).	Stated intention to hire by experimental recruiters (on scale ranging from 0 to 100).	Negative effect: grade retention decreases hiring intention by about 7 points.	Vignette study with random assignment of retention variable to fictitious résumés.
Eide and Showalter (2001)	United States	Experiencing grade retention before graduation.	Mean earnings in 1990–1992 (i.e. 10–12 years after individuals were in SE).	No statistically significant effect.	IV approach exploiting exogenous variation across states in kindergarten entry dates.
Jimerson (1999)	United States	Experiencing grade retention before graduation.	(i) Wage at age 20. (ii) Job quality score at age 20.	Negative effect: lower wage and job quality among the retained group.	ANOVA comparison of retained and non-retained individuals.
Knipprath (2013)	Belgium	Experiencing grade retention (i) in PE and (ii) in SE.	(i) Employment status two months after graduation. (ii) Horizontal job match in first job. (iii) Horizontal job match at age 29. (iv) Permanent contract in first job. (v) Permanent contract at age 29. (vi) Wage in first job. (vii) Wage at age 29.	Negative effect: grade retention in PE decreases probability of horizontal job match at age 29 by 40%; grade retention in SE lowers probability of permanent contract at age 29 by 31%.	Simultaneous equations model with parametric control for observable factors.
Oosterbeek (1992)	The Netherlands	Time-to-degree in particular TE program.	Earnings at moment of survey.	Positive effect: additional year increases earnings by about 8%.	Simultaneous equations model with parametric control for observable factors.

Notes. Abbreviations used: IV: instrumental variables; PE: primary education; SE: secondary education; TE: tertiary education.

Table 2. Data Description

Variable	Description	Mean	SD
A. Outcome			
Positive call-back	1 if the candidate got a positive reaction, 0 otherwise	0.264	-
B. Treatment			
Retention	1 if the candidate revealed at least one year of grade retention, 0 otherwise	0.500	-
At least retention during SE	1 if the candidate revealed at least one year of grade retention during secondary education, 0 otherwise	0.492	-
At least retention during TE	1 if the candidate revealed at least one year of grade retention during tertiary education, 0 otherwise	0.302	-
Two years of retention	1 if the candidate revealed two years of grade retention, 0 in case of no or one year of retention	0.648	-
C. Further candidate characteristics			
Highest degree: SE	1 if the candidate held a secondary education degree as highest degree, 0 otherwise	0.322	-
Highest degree: TE: Bachelor	1 if the candidate held a Bachelor degree as highest degree, 0 otherwise	0.362	-
Highest degree: TE: Master	1 if the candidate held a Master degree as highest degree, 0 otherwise	0.317	-
Course of study: accountancy (SE)	1 if the candidate held a secondary education degree in accountancy as highest degree, 0 otherwise	0.090	-
Course of study: commerce (SE)	1 if the candidate held a secondary education degree in commerce as highest degree, 0 otherwise	0.133	-
Course of study: secretary-languages (SE)	1 if the candidate held a secondary education degree in secretary-languages as highest degree, 0 otherwise	0.098	-
Course of study: accountancy and tax (Bachelor)	1 if the candidate held a Bachelor in accountancy and tax as highest degree, 0 otherwise	0.131	-
Course of study: finance and insurance (Bachelor)	1 if the candidate held a Bachelor in finance and insurance as highest degree, 0 otherwise	0.046	-
Course of study: legal practice (Bachelor)	1 if the candidate held a Bachelor in legal practice as highest degree, 0 otherwise	0.029	-
Course of study: logistics management (Bachelor)	1 if the candidate held a Bachelor in logistics management as highest degree, 0 otherwise	0.060	-
Course of study: marketing (Bachelor)	1 if the candidate held a Bachelor in marketing as highest degree, 0 otherwise	0.058	-
Course of study: SME management (Bachelor)	1 if the candidate held a Bachelor in SME management as highest degree, 0 otherwise	0.038	-
Course of study: accountancy and taxation (Master)	1 if the candidate held a Master in accountancy and taxation as highest degree, 0 otherwise	0.092	-
Course of study: finance and risk management (Master)	1 if the candidate held a Master in finance and risk management as highest degree, 0 otherwise	0.036	-
Course of study: management and IT (Master)	1 if the candidate held a Master in management and IT as highest degree, 0 otherwise	0.057	-
Course of study: marketing management (Master)	1 if the candidate held a Master in marketing management as highest degree, 0 otherwise	0.075	-
Course of study: strategic management (Master)	1 if the candidate held a Master in strategic management as highest degree, 0 otherwise	0.057	-
5 years of work experience	1 if the candidate had 5 years of work experience, 0 in case of no experience	0.739	-
D. Vacancy characteristics			
Temporary contract	1 if the vacancy mentioned a temporary contract, 0 in case of a permanent contract	0.124	-
Part-time contract	1 if the vacancy mentioned a part-time contract, 0 in case of a full-time contract	0.152	-
E. Occupation characteristics			
OJT scale	Continuous measure in [0,1] capturing the importance of on-the-job training in the occupation (see Section 3.6)	0.448	0.124
High OJT	1 if OJT scale is 0.5 or more, 0 otherwise	0.456	-
Training scale	Continuous measure in [0,1] capturing the importance of any training in the occupation (see Section 3.6)	0.441	0.133
Skill scale	Continuous measure between 0 of 1 capturing the skills use in the occupation (see Section 3.6)	0.643	0.082

Notes. Abbreviations used: PE: primary education; SE: secondary education; TE: tertiary education; OJT: on-the-job training; SME: small and medium enterprises; SD: standard deviation. No standard deviation is displayed for binary variables.

Table 3. Bivariate Analysis

Data selection	Vacancies	Neither candidate positive call-back	Both candidates positive call-back	Only retained candidate positive call-back	Only non-retained candidate positive call-back	Fraction of retained candidates with positive call-back	Fraction of non-retained candidates with positive call-back	Positive call-back ratio	t-stat
	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)
A. Full sample									
Full sample	796	527	152	58	59	0.264	0.265	0.995	0.092
B. Subsamples by educational attainment and work experience of the pair of applicants									
Highest degree: SE	256	192	30	17	17	0.184	0.184	1.000	0.000
Highest degree: TE: Bachelor	288	206	45	18	19	0.219	0.222	0.984	0.164
Highest degree: TE: Master	252	129	77	23	23	0.397	0.397	1.000	0.000
No work experience	208	148	33	19	8	0.250	0.197	1.268**	2.135
5 years of work experience	588	379	119	39	51	0.269	0.289	0.929	1.266
C. Subsamples by occupation characteristics									
Low OJT	433	275	90	41	27	0.303	0.270	1.120*	1.702
High OJT	363	252	62	17	32	0.218	0.275	0.840**	2.154

Notes. Abbreviations used: PE: primary education; SE: secondary education; TE: tertiary education; OJT: on-the-job training. The positive call-back ratio is calculated by dividing the fraction of applications for which retained candidates received a positive call-back by the corresponding fraction for the control candidates. The t-stat is the test statistic for the null hypothesis that these fractions are the same for candidates from both groups. The t-stat is made robust to within-vacancy correlation. *** (**) ((*)) indicates significance at the 1% (5%) ((10%)) significance level.

Table 4. Multivariate Analysis

	(1)	(2)	(3)	(4)	(5)
Retention	−0.001 (0.014)	−0.001 (0.013)	−0.001 (0.013)	−0.001 (0.013)	−0.001 (0.013)
Retention x Highest degree: TE: Bachelor (norm.)		−0.005 (0.031)	0.016 (0.060)	0.023 (0.061)	0.009 (0.060)
Retention x Highest degree: TE: Master (norm.)		−0.008 (0.035)	−0.019 (0.065)	−0.005 (0.065)	−0.015 (0.065)
Retention x 5 years of work experience (norm.)		−0.070** (0.029)	−0.074** (0.030)	−0.073** (0.030)	−0.075** (0.030)
Retention x OJT scale (standardised)		−0.041*** (0.014)	−0.046*** (0.016)		
Retention x High OJT (norm.)				−0.079*** (0.029)	
Retention x Training scale (standardised)					−0.045*** (0.017)
Retention x At least retention during SE (norm.)			−0.077*** (0.028)	−0.073** (0.028)	−0.076*** (0.028)
Retention x At least retention during TE (norm.)			−0.057 (0.036)	−0.053 (0.036)	−0.056 (0.036)
Retention x Two years of retention (norm.)			0.022 (0.029)	0.020 (0.029)	0.022 (0.029)
Retention x Course of study: accountancy (SE) (norm.)			0.105** (0.053)	0.105** (0.053)	0.101* (0.053)
Retention x Course of study: secretary-languages (SE) (norm.)			0.020 (0.055)	0.008 (0.055)	0.015 (0.055)
Retention x Course of study: finance and insurance (Bachelor) (norm.)			0.073 (0.049)	0.071 (0.049)	0.069 (0.050)
Retention x Course of study: legal practice (Bachelor) (norm.)			0.077 (0.085)	0.069 (0.086)	0.083 (0.085)
Retention x Course of study: logistics management (Bachelor) (norm.)			−0.059 (0.068)	−0.094 (0.068)	−0.056 (0.068)
Retention x Course of study: marketing (Bachelor) (norm.)			0.087 (0.065)	0.073 (0.066)	0.091 (0.065)
Retention x Course of study: SME management (Bachelor) (norm.)			0.058 (0.072)	0.043 (0.073)	0.064 (0.072)
Retention x Course of study: finance and risk management (Master) (norm.)			0.051 (0.110)	0.051 (0.109)	0.057 (0.109)
Retention x Course of study: management and IT (Master) (norm.)			0.102 (0.077)	0.092 (0.077)	0.076 (0.077)
Retention x Course of study: marketing management (Master) (norm.)			0.129* (0.070)	0.106 (0.071)	0.115 (0.070)
Retention x Course of study: strategic management (Master) (norm.)			0.022 (0.084)	−0.007 (0.084)	0.014 (0.084)
Retention x Temporary contract (norm.)			0.027 (0.043)	0.026 (0.043)	0.026 (0.043)
Retention x Part-time contract (norm.)			−0.026 (0.039)	−0.023 (0.039)	−0.025 (0.039)
Retention x Skill scale (stand.)			−0.004 (0.017)	−0.020 (0.016)	−0.004 (0.018)
Intercept	0.265*** (0.007)	0.265*** (0.007)	0.265*** (0.007)	0.265*** (0.007)	0.265*** (0.007)
Vacancy fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	1,592	1,592	1,592	1,592	1,592

Notes. Abbreviations used: PE: primary education; SE: secondary education; TE: tertiary education; SME: small and medium enterprises; norm.: normalised; stand.: standardised. The presented statistics are linear probability model estimates. The dependent variable is receiving a positive call-back. All independent variables except for the one indicating retention are normalised by subtracting their mean among the subpopulation of retained candidates. Continuous variables are further standardised by dividing by the standard deviation among this subpopulation. Standard errors, corrected for clustering at the job posting level, are in parentheses. *** (**) ((*)) indicates significance at the 1% (5%) ((10%)) significance level.