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# Vertical and horizontal equity of wealth taxes: an assessment from a joint income-wealth perspective <sup>1 2</sup>

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## Abstract

Despite an established theoretical literature on (optimal) wealth taxation, the empirical literature is still scarce. Previous studies usually focus on country case studies and a specific type of wealth tax in isolation. This paper analyses from a cross-country perspective the distributional effects of the mix of taxes on wealth, on capital income and on transfers of wealth. Moreover, we use the joint distribution of income and annuitised wealth as our analytical framework. To this end we combine data of the Eurosystem Household Finance and Consumption Survey with the tax-benefit microsimulation model EUROMOD, covering six countries: Belgium, Germany, France, Finland, Italy and Spain. Results indicate that existing wealth taxes do not contribute to vertical and horizontal equity: they are often progressive but do not achieve any significant redistribution due to the low revenues they generate and they imply a much lower burden on those deriving their living standard predominantly from wealth than on those who derive it mainly from income.

**Key words:** wealth taxes, progressivity, redistribution, microsimulation

**JEL Classification:** C15, D3, H2

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## 1 Introduction

Rising inequality and the seminal work of Piketty (2014) have put wealth taxes<sup>3</sup> firmly on the academic and public agenda. Wealth taxes are a potential instrument to increase government revenues and they are often defended on grounds of fairness. They also allow to reduce the tax burden on labour. Despite an established theoretical literature on (optimal) wealth taxation (Bastani & Waldenström, 2020), the empirical literature is still scarce but in the process of catching up (Jakurti & Süssmuth, 2023). Previous studies usually focus on country case studies and a specific tax in isolation, mostly a net wealth tax (Halvorsen & Thoresen, 2021; Durán-Cabré & Esteller Moré, 2021).

This paper contributes to this emerging literature by analysing from a EU cross-country perspective the horizontal and vertical equity effects of the mix of wealth taxes referred to by Piketty et al. (2022) as the ‘ideal triptych’, i.e. taxes on wealth, on capital income and on transfers of wealth. Since living standards, and hence ability to pay, depend on both income and wealth (Stiglitz et al., 2009) we use the joint distribution of income and annuitised wealth as our main analytical framework, comparing it to results based on the marginal income or wealth distribution.

## 2 Data

Data on households’ wealth, income and socio-demographics from the second wave of the Eurosystem Household Finance and Consumption Survey (HFCS) are combined with the EU-wide microsimulation model EUROMOD. The latter calculates cash benefit entitlements, personal income tax liabilities and social insurance contributions on the basis of the policy rules in place and information taken from an underlying database (Sutherland & Figari, 2013). Hence, it allows to derive disposable incomes for the HFCS, which originally only covers gross incomes.

Furthermore, EUROMOD has been extended with additional policy codes such that it allows to simulate both existing and hypothetical wealth taxes. In the current paper we focus on the vertical and horizontal equity effects of existing wealth taxes, yet the extended EUROMOD version easily allows to simulate the potential (first-order) redistributive and budgetary impact of policy reforms or of the introduction of completely new wealth taxes. Details on the process of extending EUROMOD to include wealth taxation are described in Kuypers et al. (2020a).

The analysis covers six EU countries: Belgium, Germany, France, Finland, Italy and Spain<sup>4</sup>. This choice is motivated by the fact that they are all highly developed European welfare states, but with important

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<sup>3</sup> Wealth taxes are used to denote all types of taxes levied on (parts of) wealth, their transfer and/or their yields. Net wealth tax is used to denote the annual tax on the stock of wealth.

<sup>4</sup> The income reference year is 2010 for Spain, 2013 for Belgium, Germany and Finland and 2014 for France and Italy.

differences in both the income and wealth distribution as well as in their correlation (Kuypers et al., 2021). They also represent various tax-benefit systems in which wealth taxation differs in importance.

We simulate wealth taxes according to the rules applicable in 2017<sup>5</sup>, considering the following taxes: capital income tax (except on capital gains), recurrent real estate tax, real estate transfer tax, inheritance & gift tax and net wealth tax. With the exception of France where capital income is included in the progressive tax schedule of the personal income tax, capital income is taxed separately and often at lower and flat or mildly progressive tax rates. In all six countries the recurrent real property tax is levied on the taxable or also called cadastral value of the property. In contrast, the real estate transfer tax uses the price of the property as tax base, the exception here being Italy where cadastral values are used. Belgium, Italy and Spain also levy a tax on the registration of a mortgage. Inheritance and gift taxes are levied on the fair market value, with tax rates in all six countries varying according to the kinship between the beneficiary and the deceased/donor. Finally, the net wealth tax existed in general form (a tax on all or most types of assets) only in France and Spain with tax-free thresholds of €1,300,000 and €700,000 respectively (the latter doubled for couples), while a specific net wealth tax (a tax on specific types of assets) existed in Belgium (private pensions when people turn 60 years old) and Italy (ownership of bank accounts and financial products). While most of the taxes levy a flat rate, inheritance and gift taxes (except in Italy) and the general net wealth taxes adopt a progressive tax schedule (in both cases with certain exemptions and deductions). A more detailed overview of the main characteristics of the simulated taxes can be found in the appendix of Kuypers et al. (2020b).

Due to data limitations taxes on capital gains and financial transactions are not simulated as well as the Finnish inheritance and gift and real estate transfer tax. Data limitations also force us to make some assumptions or simplifications. Most importantly, the HFCS does not include information on cadastral values of real properties, so we approximated them by calculating a ratio between the sum of all cadastral values (i.e. at the national level) from external sources and the total market value of properties estimated based on the HFCS. The reported market value of each individual property in the HFCS is then multiplied by this ratio. Furthermore, for several taxes there exists regional and municipal variation in tax rates, most notably for the recurrent real estate tax in all countries as well as the real estate transfer tax, inheritance & gift tax and net wealth tax in Spain. Regarding the first we used a weighted average tax rate, while the simulations of the latter are based on the national legislation which is the default in case regions do not adopt their own schedule.

Importantly, due to the static nature of EUROMOD we take the pre-tax distribution as given and cannot account for behavioural responses such as tax avoidance and evasion (see e.g. Advani and Tarrant,

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<sup>5</sup> To this end monetary variables in the HFCS data are updated from their income reference period to 2017 price levels.

2021). Also, we cannot account for the fact that tax burdens may be shifted to other households, such as for instance between landlords and renters for the property tax (see e.g. Löffler & Siegloch, 2021).

Our simulation results were extensively validated on both their internal and external consistency. Usually, inconsistencies between the tax revenues we simulate and those reported in external sources such as the OECD Tax Revenue database are largely due to differences in the definitions and underlying populations (e.g. we only focus on households, while other statistics do not always distinguish between different types of economic actors) as well as underreporting in the HFCS data and/or tax evasion in real life. Indeed, we for instance simulate higher tax revenues for the net wealth taxes of France and Spain because we do not consider tax evasion. That is also the reason why we do not combine the HFCS with for instance national or international rich lists. The tax evasion among the very rich is likely to be extensive such that we cannot properly simulate their actual tax burden.

### 3 Evaluation framework

Previous studies often evaluate wealth taxes against the income distribution. Although this relates to the fact that taxes are usually paid with income and existing indicators are developed in these terms, it implicitly assumes that income inequality is what we care about and its decrease is the main goal of wealth taxation. However, there is no consensus on whether the main concern of redistribution should be to decrease wealth or income inequality (Fleischer, 2016). Nevertheless the choice is very relevant because they do not necessarily coincide (Pfeffer & Waitkus, 2021). Indeed, as Table 1 shows Finland is the most equal country in terms of disposable income, while it is among the most unequal in terms of net wealth. In contrast, Spain combines high income inequality with relatively low net wealth inequality. The last column indicates the extent to which households' positions in the marginal distributions are interdependent. It is the highest in France and Spain and lowest in Finland and Belgium. In other words, in the first two countries households with low (high) disposable income very often also have low (high) net wealth, while in the latter two countries you also have an important share of households combining low income with high wealth and vice versa.

**Table 1. Marginal and joint inequality and correlation net wealth and disposable income**

	(1) Gini coefficient net wealth	(2) Gini coefficient disposable income	(3) Gini coefficient joint income- wealth	(4) Rank correlation coefficient net wealth – disposable income
Belgium	0.590	0.251	0.338	0.466
Finland	0.671	0.228	0.260	0.415
France	0.675	0.262	0.352	0.665
Germany	0.745	0.321	0.410	0.568
Italy	0.600	0.338	0.389	0.565
Spain	0.572	0.384	0.427	0.641

Source: Own calculations based on HFCS-EUROMOD simulations

Our position is that both income and wealth inequality are relevant as well as how they are correlated. Considering only income either understates or overestimates a household's ability to pay. While the burden of paying off large amounts of debt can seriously decrease the capacity to pay taxes, those with high wealth often have much higher ability to pay than their incomes suggest. On the other hand, only considering the distribution of net wealth may not be sufficiently considerate for the liquidity which is necessary to pay taxes. Therefore, the main framework used in this paper is the distribution of an integrated measure of income and wealth.

To this end we use the approach proposed by Weisbrod & Hansen (1968) to annuitise wealth into a flow of resources, which is added to income, based on the following formula:

$$AY = Y + \left[ \frac{\rho}{1 - (1 + \rho)^{-n}} \right] * NW$$

$$n = T \text{ for unmarried,}$$

$$T_1 + (T - T_1)b \text{ for married}$$

$AY$  is what we call joint income-wealth,  $Y$  equals income received from labour, pensions and other transfers,  $NW$  is net wealth (assets minus liabilities), while  $\rho$  and  $n$  are the interest rate and length of the annuity. With regard to the latter  $T_1$  refers to time to death of the first person and  $T$  time to death of the survivor. These are expressed in life expectancies by country, age and gender.  $b$  is the reduction in the equivalence scale which results from the death of the first person. We equalise income and wealth by the modified OECD scale which is the sum of 1 for the first adult, 0.5 for every additional person of 14 years or older and 0.3 for every child younger than 14 years. The third column in Table 1 shows the Gini coefficients of the joint income-wealth distribution, it is lowest in Finland and highest in Spain.

We follow the methodology proposed in Kuypers et al. (2021) to define pre-tax and post-tax concepts of annuitised wealth and hence of joint income-wealth. In that methodology one-time wealth taxes (i.e. inheritance & gift and real estate transfer taxes) are taken into account in the wealth that is subject to the annuitisation ( $NW$ ), while recurrent wealth taxes (i.e. capital income, real estate and net wealth taxes) are captured by the difference between a gross and a simulated net interest rate of the annuity ( $\rho$ ). In practice we start from a 5% gross interest rate for everyone (long-term pre-tax interest rate assumed in Piketty (2014)<sup>6</sup>) and then simulate a net interest rate depending on the recurrent wealth

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<sup>6</sup> In practice rates of return to wealth have been found to differ between different asset types and individuals across the distribution. Due to information constraints, we have not been able to take this into account. However, for our analysis it is the difference between the net and gross interest rate that is of main importance rather than the actual level. Since the wealthiest generally achieve higher rates of return they would have higher annuities. This in turn results in higher inequality and hence very likely in even lower redistribution than what we find in our analysis.

taxes paid. For the existing tax systems this is on average equal to 4.82% in Belgium, 4.90% in Germany, 4.76% in Spain, 4.42% in Finland, 4.84% in France and 4.83% in Italy.

While the joint income-wealth distribution provides the best reflection of a households' overall level of financial well-being and hence their ability to pay taxes, the integrated measure of Weisbrod and Hansen is not without flaws (Galluser & Krapf, 2022; Kuypers & Marx, 2018). First, by aggregating everything in a single dimension certain complex dependencies may be blurred. Second, the approach imposes structure on the measurement of inequality and redistribution because it requires to make assumptions about the length and interest rate of the annuity, which particularly affects the relative position of the elderly as they have short life expectancies and often high wealth. Finally, the concept of annuitised wealth is a hypothetical measure reflecting what a household could sustainably consume from their wealth each year over their remaining expected life time. While annuitisation certainly exists and is in certain cases even optimal, it is currently not a financial product that households often make use of. In other words, the measure does not necessarily reflect how households handle their finances in practice.

Therefore, we compare the results of the joint income-wealth framework with those based on the two marginal distributions. On the one hand, using the marginal distribution of income lies fully in line with the previous literature, while on the other hand, using the marginal distribution of net wealth is more in line with the nature of the taxes as they are levied on wealth. The assumption is then that wealth taxes reduce the after-tax stock of wealth rather than being paid with income.

## **4 Results**

The analysis is based on the concepts of vertical and horizontal equity. Regarding the first we measure redistributive effect (RE) as the difference between the pre-tax and post-tax Gini coefficients. The RE is decomposed into two building blocks of each separate tax: its average tax rate and its progressivity given by the Kakwani index. The latter is calculated as the difference between the concentration coefficient of the tax and the pre-tax Gini coefficient. A positive (negative) index refers to a progressive (regressive) tax and an index that is not statistically different from zero a tax that has a proportional incidence. Overall progressivity is measured as the weighted sum of the separate taxes. The concept of horizontal equity refers to the extent to which those with equal ability to pay are treated similarly by the tax system.

### **4.1 Vertical equity**

Our results in terms of vertical equity indicate that the overall redistributive effect of wealth taxes is extremely small in all considered countries, which is mainly attributed to the small size of these taxes

(Kuypers et al., 2020b). Therefore, we focus here on the other building block of vertical redistribution, namely the progressivity given by the Kakwani index. Table 2 shows that progressivity of the total wealth tax mix is strongest in Finland, France and Italy, while relatively low in Belgium. This country ranking holds irrespective of the reference distribution that is used. In all countries total progressivity is higher when the joint income-wealth distribution is used as reference framework than when the marginal income distribution is used. Moreover, when using the marginal wealth distribution the total tax mix is progressive in Italy, proportional in Spain and regressive in the other four countries. This means that wealth taxes are more concentrated among those with both high income and high wealth and not necessarily among those who have either high income or high wealth.

Among the different types of taxes, the general net wealth taxes in France and Spain are by far the most progressive type of tax, irrespective of the reference framework used. This relates to the fact that these taxes have a high tax-free threshold of €1,300,000 in France and €700,000 (double for couples) in Spain. When using the marginal income or joint income-wealth distribution the capital income taxes of Finland and Spain also stand out as strongly progressive. The capital income tax is indeed also in design progressive in those two countries, while the others levy a flat rate (although sometimes varying for different types of capital income). The recurrent real property tax is regressive when evaluated against the marginal wealth distribution in all countries except Italy which is due to the exemption of the main residence from the tax base in the latter. Also the real estate transfer tax is regressive in this reference framework, most strongly so in Belgium. Since this tax more often relates to the purchase of a first house than a second, third, ..., those paying the tax are less wealthy than those not paying the tax. Both the recurrent and transfer taxes, however, become progressive or proportional when evaluated against the joint income-wealth distribution. This follows from the fact that those who combine low wealth with low income usually do not own real estate and hence do not pay these taxes. A noteworthy exception to this trend is the Belgian real transfer tax which remains regressive<sup>7</sup>. The results for the inheritance and gift tax differ across countries. Evaluated against the marginal wealth distribution they are progressive only in Spain and slightly in France, while evaluated against the marginal income distribution this is only the case in Germany. Among the five countries for which the tax is simulated, only in Italy the inheritance and gift tax is not progressively distributed in terms of joint income-wealth which is in line with its flat rate tax design.

Overall, the majority of the wealth taxes are more progressively distributed over the marginal income distribution than over the marginal wealth distribution, suggesting that those paying wealth taxes often have only average wealth, but high incomes. This relates to the fact that wealth taxes are mainly

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<sup>7</sup> Since the number of observations is limited, this result should be treated with caution.



levied on wealth components largely owned by the middle class (e.g. real estate, capital income) and less so on the wealth components owned by the wealthiest (e.g. business wealth). When using our preferred reference framework of the joint income-wealth distribution we then find that all wealth-related taxes are progressive with the exception of the real estate transfer tax.

**Table 2. Kakwani indices**

		Capital income tax	Real property tax	Net wealth tax	Real property transfer tax	Inheritance & gift tax	Total
Belgium	JIW	0.309*** (0.030)	0.132*** (0.010)	0.284*** (0.047)	-0.166*** (0.059)	0.222* (0.116)	0.063 (0.041)
	Income	0.192*** (0.024)	-0.089*** (0.016)	-0.154 (0.098)	-0.054 (0.068)	-0.128 (0.082)	-0.059** (0.029)
	Wealth	0.113*** (0.019)	-0.120*** (0.008)	0.186*** (0.038)	-0.724*** (0.065)	-0.021 (0.062)	-0.295*** (0.041)
Finland	JIW	0.468*** (0.040)	0.111*** (0.005)				0.325*** (0.024)
	Income	0.447*** (0.011)	-0.039*** (0.005)				0.247*** (0.011)
	Wealth	0.041*** (0.014)	-0.303*** (0.006)				-0.101*** (0.011)
France	JIW		0.237*** (0.005)	0.621*** (0.004)	0.054 (0.034)	0.298*** (0.067)	0.294*** (0.020)
	Income		0.114*** (0.006)	0.611*** (0.010)	0.135*** (0.033)	0.021 (0.058)	0.192*** (0.018)
	Wealth		-0.106*** (0.006)	0.316*** (0.006)	-0.381*** (0.035)	0.096*** (0.027)	-0.026** (0.012)
Germany	JIW	0.295*** (0.058)	0.244*** (0.009)		0.125*** (0.048)	0.335*** (0.054)	0.220*** (0.024)
	Income	0.334*** (0.030)	0.019 (0.018)		0.185*** (0.040)	0.340*** (0.036)	0.177** (0.021)
	Wealth	0.052 (0.034)	-0.033*** (0.006)		-0.269*** (0.053)	-0.011 (0.081)	-0.092*** (0.022)
Italy	JIW	0.284*** (0.008)	0.301*** (0.008)	0.006 (0.013)	0.049 (0.042)	0.128 (0.100)	0.272*** (0.006)
	Income	0.290*** (0.009)	0.152*** (0.012)	-0.061*** (0.013)	0.040 (0.043)	-0.078 (0.126)	0.184*** (0.009)
	Wealth	0.076*** (0.008)	0.167*** (0.005)	-0.279*** (0.011)	-0.114*** (0.039)	-0.040 (0.095)	0.105*** (0.005)
Spain	JIW	0.356*** (0.026)	0.063*** (0.005)	0.568*** (0.005)	0.059 (0.049)	0.220*** (0.060)	0.151*** (0.019)
	Income	0.322*** (0.036)	-0.118*** (0.008)	0.513*** (0.024)	0.149** (0.062)	0.019 (0.076)	0.042* (0.024)
	Wealth	0.209*** (0.026)	-0.079*** (0.004)	0.425*** (0.007)	-0.103** (0.041)	0.160*** (0.040)	0.015 (0.015)

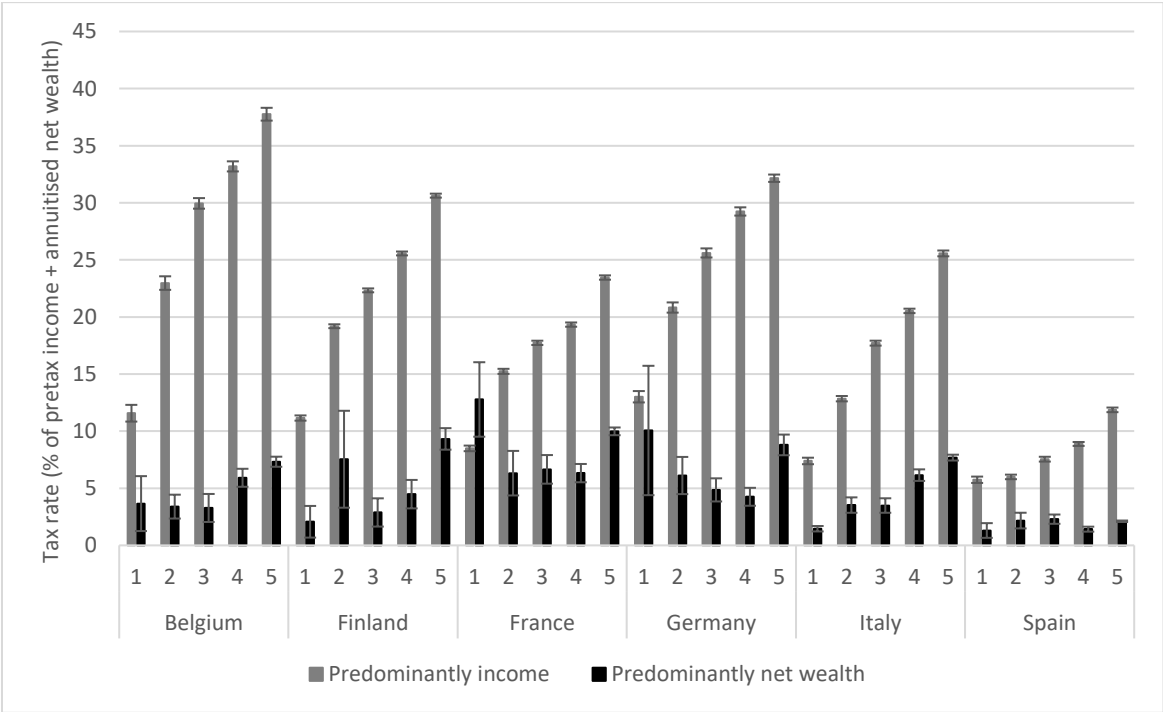
Notes: JIW=joint income-wealth. Standard errors are shown between parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1  
Source: Own calculations based on HFCS-EUROMOD simulations

## 4.2 Horizontal equity

Horizontal equity here implies that two households with the same position in the joint income-wealth distribution are treated equally for tax purposes irrespective of whether they derive that position primarily from their income or wealth. Figure 1 shows how far the current tax system is from achieving

this. In particular, it plots the total tax rate (i.e. sum of income taxes, social insurance contributions and annuitised wealth taxes as a percentage of pre-tax joint income-wealth) by quintiles of pre-tax joint income-wealth. We distinguish between two groups: those who predominantly derive their living standard from income and those who predominantly derive it from annuitised wealth, using 65% as the cut-off point (hence those with a balanced mix are not included). The results clearly show a large difference in tax rates throughout the entire distribution with much higher values for those predominantly retrieving their living standard from income. Moreover, for this group the tax rate is clearly progressive, while it is much flatter among those having mainly annuitised net wealth. The exception here is the lowest quintile in France where the average tax rate among those predominantly owning net wealth is higher than in the other four quintiles. These households can still derive up to 35% of their living standard from income and income taxes are in terms of size more important than wealth taxes. Since income and wealth are most strongly correlated in France (see Table 1) this is more outspoken than in the other countries. It should be noted, however, that confidence intervals are often large for those having predominantly net wealth in the first quintile, due to few observations at the bottom of the distribution who derive their living standard from net wealth. This implies, as expected, that wealth is most important at the top of the distribution.

**Figure 1. Total tax rate by quintile and main source of living standard**



Notes: Quintiles are based on pre-tax income + annuitised net wealth.  
 Source: Own calculations based on HFCS-EUROMOD simulations.

## 5 Conclusion

This paper analysed the vertical and horizontal equity of wealth taxes in six European countries. While the mix of wealth taxes hardly achieve any redistribution which is mainly due to their small size, they are progressively distributed, especially in the case of a net wealth or capital income tax. Furthermore, existing tax systems lack neutrality with regard to the source from which households draw their financial living standard. Those who derive it predominantly from (labour) income bear much higher taxes than those who derive it mainly from (annuitised) wealth. Further research indicated that there is also horizontal inequity between different types of wealth (Kuypers et al., 2020b).

In terms of policy implications it is clear that most progress in terms of both vertical and horizontal equity could be achieved by increasing average tax rates of wealth taxes, either by raising marginal tax rates or perhaps more importantly by abolishing exemptions, deductions, credits, etc. Moreover, for the public debate our results provide equity arguments in favour of progressive general net wealth taxes, such as the ones in France and Spain, and/or taxes on intergenerational wealth transfers which are more unequally distributed than the stock of wealth (Nolan et al. 2021).

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