Who Paid the French 75% Tax on Millionaires? Effects on top wage earners and their employers

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Abstract

Using several administrative datasets, I study the impact of temporary tax on top wage income earners, implemented for 2013 and 2014 only and known as the "75% tax above €1m". The tax is nominally paid by the firms. The tax base is gross annual salary income above one million euros and the top marginal tax rate on wage earners increased from 64% to 74% because of the tax. About 400 employers paid the tax each year and about 1000 employees were concerned. I document that the tax was largely borne by employers, who paid 80% of the tax. Taking advantage of the short term nature of the tax, I show that the tax triggered important optimization response of wage earners, taking the form of time-shifting. I do not see any income-shifting nor any migration response. I study the elasticity of the pre-tax labour income to the net-of-tax rate (1 minus the marginal tax rate) and find an elasticity of 0.3, that I interpret as pure optimization. The firms were also affected by the tax through a decrease in the total number of employees and demonstrate some evidence of optimization behaviour.

Keywords: wages, tax incidence, working rich, rent-sharing, profit shifting
JEL codes: H22, H31, J3

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1 Introduction

The increase in income inequality is more and more documented across space and time. The top of the income distribution, where labour and capital incomes grow much faster than in the rest of the income distribution, plays a major role: income growth is not evenly distributed and is up to three times larger in the top 0.01% of the income distribution than in the rest of the distribution (Garbinti *et al.*, 2017). Labour income was identified to be key in explaining the increase, with the emergence of a "working rich" population (Piketty and Saez, 2003), who earns such high wages that they can reach the top of the wealth distribution without any other source of wealth. On top of that a recent literature documents an increase in CEO pays (Bell and Reenen, 2013) and investigates some explaining factors for the increase (Bertrand and Mullainathan, 2001; Gabaix and Landier, 2008; Bell and Reenen, 2016). Because of their position in the firms, CEOs are particularly subject to take advantage of the differences in firm and individual taxation in order to optimise their net income. Taxation constitutes a counteracting political tool to limit inequality growth. Yet, its impact on top income earners is not clear and is likely to heavily depend on the overall tax design. On top of that, it is crucial to understand how taxation affects the very top wage earners as theoretical models of optimal top tax rates depend on the answer.

In that context, understanding the impact of taxes on this working rich population is key for redistributive and efficiency purposes. Yet, it is very difficult to identify how these workers respond to tax changes as the possibilities are very diverse. After a tax increase, they can migrate, change the timing of bonus receipt, optimise the nature of the income received, decrease their labour supply, bargain over their income so as to extract a rent and shift the tax burden onto employers. This paper provides new evidence on this question using a quasi-experimental variation created by the introduction of the 75% tax above €1m in France in 2013[1]. The tax increased the top marginal tax rate from 64% to 75% on wage. It was temporary and nominally paid by employers like a payroll tax.

The 75% tax on millionaires provides an ideal setting for assessing the response of top wage earners at an extremely high level of income (top 0.003%, about 1500 individuals). I do not intend to interpret the impact of the tax variation as coming from a permanent tax change but rather to shed light on the individual and firm optimisation response. Even if top earners are among the most responsive to taxes, wage earners are also the least responsive. Simulating this tax based on payroll and firm tax data, I propose a short-term analysis that can be interpreted as an upper bound of potential longer term impacts. I provide evidence of the impact of the tax both at the individual level and at the firm level, adopting a dual

[1] *Taxe exceptionnelle de solidarité sur les hautes rémunérations versées par les entreprises*, created by the Finance Law for 2014, article 15.

approach that has never been used for such high wage earners. I also interpret the results in terms of elasticity to the tax. The large and salient change in marginal tax rate enables me to identify the impact of the tax. The phasing in and the phasing out of the tax provide two variations for the identification. I rely on the universe of matched employer-employee relationships for 2009-2010, which come from payroll tax data, and on firm corporate tax data. There is a unique firm identifier that enables me to match payroll tax data and firm tax data and to create a panel of firms.

I first provide graphical evidence on the extensive margin of response and show compelling evidence that the tax triggered a sizeable response. Second, I study more precisely the mechanisms at play by first looking at the individual and firm-level effects of the tax on wages. I identify the incidence of the tax comparing the evolution of average income by percentile in a difference-in-differences setting and find that the tax was shifted at 20% on employees even though the nominal incidence was on employers. This shared incidence may be due to the bargaining power of employees. The second part of analysis documents the firm-level impacts of the tax, taking advantage of the fact that the tax nominally applied to firms. The aim is to identify how the tax changed the intra-firm profit growth and distribution as well as the remuneration of the different production factors. The identification strategy is based on the difference in treatment intensity of the firms, defined as the share of the payroll subject to the tax. I find that the tax decreased overall employment and profit of the most affected firms.

Third, I study the behavioural responses to the tax, and find an elasticity of income with respect to the net-of-tax rate of -0.1 for the labour cost and of 0.2 for the net wage. This elasticity encompasses all the margins of behaviour and cannot be interpreted as pure labour supply response. Following the framework of the three elasticities proposed by Piketty *et al.* (2014), I interpret this elasticity as a mix of optimisation and bargaining response.

This article contributes to the existing literature in several ways. First, such a large tax variation at this level of earnings is quite unique and enables me to analyse the behavioural response of top earners on labour income, usually thought to be not very responsive to taxation. Second, the tax affects a broader category of workers than the existing studies that focus on precise occupations such as CEOs and football players (Kleven *et al.*, 2013) or on specific outcomes such as migration. Third, the tax being nominally paid by firms, I encompass the behaviour of firms in the analysis whereas the literature on the behavioural responses to taxation focuses traditionally on individual taxation.

The remainder of the article is organised as follows. Section 2 presents the literature. Section 3 describes the institutional setting of the tax and the reform. Section 4 presents the administrative data and the microsimulation method used to compute the tax. Section 5 presents the worker-level and firm-level impact of the tax on wages. Section 6 proposes

different estimation strategies of the behavioural elasticity triggered by the tax. Section 7 concludes.

2 Literature

This article is built on four strands of literature. The first one concentrates on the evolution of top income earners inequality. The second strand relates to theoretical models of optimal taxation of top labour income earners. The third strand gathers papers documenting the different types of behavioural responses to taxation and developing empirical estimation methods. The last one focuses on identifying the economic incidence of labour income taxation.

Inequality at the top The increase in wage inequality over the last forty years is well documented for many developed countries (Katz and Murphy, 1992; Autor *et al.*, 2008; Bozio *et al.*, 2016). Overall inequality as well as inequality at the top are increasing, though to a lesser extent in European continental countries. A srand of literature concentrates on top labour income inequality and investigates the contribution of the financial sector to the increase as well as the one of CEOs' pay. The "working rich" are studied by Godechot (2007, 2017) using both qualitative and quantitative methodologies. He concentrates on workers of the financial sector. The wages of this population depends more directly on the firm's profit, he shows. The presence of rents in this sector is documented by Philippon and Reshef (2009) who show that wages are 50% to 60% higher in the financial sector than in other sectors, for a same educational achievement. (Bell and Reenen, 2013) focus on CEOs' pay and show that CEOs' wage has driven top income inequality in the US and the UK. Different explanations for this increase has been considered (Bertrand and Mullainathan, 2001; Gabaix and Landier, 2008; Bell and Reenen, 2016). I focus on the taxation of these top income earners and investigates whether this can be an effective tool for limiting the increase in top labour incomes.

Top optimal tax rates The level of top optimal tax rates on wage is debated in the literature. The parameters of the debate depend on how responsive these individuals are and on their type of response (real economic behaviour, avoidance) as well as on their rent-extraction power. An optimal taxation framework encompassing three different types of responses has been proposed by Piketty *et al.* (2014). Their main contribution is to take into account the consequence of rent extraction behaviour on top optimal tax rates. The model encompasses three channels of response. The first two belong to the standard supply-side explanation whereby low tax rates favour entrepreneurship and the tax avoidance response. The third

one is the compensation-bargaining response, that is limited by a tax reducing rent extraction possibilities. They show that CEOs have a higher bargaining power when top tax rates are lower. Yet, the relative weights of the three elasticity components are difficult to assess. In particular, optimisation response and bargaining are difficult to disentangle empirically. I document the behavioural and distributional impact of the 75% tax, providing evidence that the tax is mainly borne by employers, which support a bargaining story. I also provide evidence of optimisation response, taking the form of time-shifting of income.

Behavioural responses to taxation A large literature surveyed by Saez, Slemrod and Giertz (2012) attempts to estimate the elasticity of taxable income to the marginal net-of-tax rate (one minus the marginal tax rate) using tax returns data. The literature shows that top income earners are the most responsive to taxes and documents several margins of response to taxation that can be divided into three categories: (i) real economic behaviours in terms of labour supply; (ii) re-timing of income; (iii) shifting some income from one income category to another.

Real economic response of top earners does not transit through the intensive margin of labour supply, which is the main channel for the rest of the income distribution. Instead, the literature documents responses at the extensive margin such as migration. For example, Kleven *et al.* (2014) use a preferential Danish tax scheme targeting foreigners to study the migration response and find a very large elasticity.

In the case of the French 75%, A pure re-timing strategy would cause an increase in the marginal tax rate in 2012 and/or 2015 incomes and a decrease in 2013 and 2014 incomes. Wages are known to be rigid and hence less subject to time-shifting than other incomes such as capitalised gains and stock options. Yet, top income earners are typically prone to larger behavioural responses. Both capitalised gains and stock options were shown to be affected by re-timing behaviour (Auerbach, 1988). Goolsbee (2000) shows that there was a short-term time-shifting response to the 1993 tax increase in the US concentrated on top earners with stock-options. Yet, Kreiner *et al.* (2016) provide evidence that re-timing of wages can happen and that the size of the response increases with earnings. Saez (2017) also shows that there was some re-timing of wages for the top 0.1% in 2012, in anticipation of the 2013 tax increase in the US. The 75% tax could cause some re-timing, especially on 2015 incomes since the date of the tax removal was known in advance.

The 75% tax increased the difference between the tax rate of labour and capital income. This could lead to a shift toward non-wage remuneration. Harju and Matikka (2016) propose elasticity estimates which disentangle the income-shifting component from the real response. Taking advantage of the 2005 reform of the dividend tax in Finland, they show that the income-shifting response accounts for 2/3 of the overall response among business

owners.

Even if individuals at the top of the income distribution are shown as the most responsive, there are also the ones for whom it is the most challenging to identify a response due to econometric issues such as mean-reversion of income from year to another. I do not expect any labour supply response at the intensive margin for such high income earners. The tax could trigger a migration response. This is unlikely since the migration cost would have to be borne by only two years of taxes. Because of its temporary nature, the 75% tax is likely to trigger time-shifting rather then income-shifting responses.

Tax incidence The strand of the literature studying the behavioural responses of top income is mainly using income tax variation. Studying a tax on labour income paid by employers, I broaden the question on the behavioural response to the more general question of the incidence of a tax on the very top wage earners. Classic theory on incidence shows that even if a tax is legally borne by individuals or households, the economic incidence is not necessary the same as the legal one: the one paying the tax might not be the same than the one who bears in the end the burden of the tax. Fullerton and Metcalf (2002) review the theoretical models in partial and general equilibrium. In the case of labour income, this depends on the elasticity of supply and demand for labour. Yet, empirical evidence on the incidence of taxation on labour supply and wages is still scarce and there is no consensus. The recent literature uses micro data and exploits social security reforms. But evidence goes from full incidence on employers (Saez, Matsaganis and Tsakloglou, 2012) to full incidence on employees (Gruber, 1997). The tax-and-benefit linkage seems to matter (Bozio *et al.*, 2017; Iturbe-Ormaetxe, 2015). More recently, Saez *et al.* (2017) analyse a tax cut on the wage of young workers. They provide evidence that the incidence was borne by employers. They also demonstrate that the tax cut had firm-level effects, as the most treated firms expanded more after the reform.

Studying the incidence of a tax on very high wage earners seems particularly relevant since these workers, most of the time CEO or managers, play a direct role on the profit distribution.

3 Context

This section presents the main features of labour taxation in France (subsection 3.1) as well as the 75% tax (subsection 3.2).

3.1 Taxing Labour Income Earners in France

Compulsory taxes in France amount to 43.6%[2] of GDP in 2012 (44.8% in 2013). These taxes rely on several tax schedules and associated tax bases[3]. Incomes from salary work, which I am interested in here, are concerned both by the income and payroll taxes. Wage earnings are first subject to payroll taxes. On top of the regular employer and employee social security contributions (SSCs) schedule, there are two French-specific proportional contribution, the CSG (*Contribution Sociale Généralisée*) and the CRDS (*Contribution pour le Remboursement de la Dette Sociale*). There are also other taxes on payroll, such as the *taxe sur les salaires*, which is nominally paid by firms. The tax base for these three types taxes (SSCs, CSG-CRDS and other taxes on payroll) is the gross income (or posted wage). Second, wage earnings net of SSCs and part of the CSG are aggregated with other sources of income to constitute the income tax base. Table 4.B.1 shows the importance of each of these tax devices as a percentage of GDP in 2012. Payroll taxes appear as the main channel of taxation on labour earnings (amounting to 16.8% of GDP) as compared to the two income taxes[4].

Income taxe rates Figure 4.B.3 shows the overall marginal and average tax rates on a logarithmic scale of total labour cost. The simulation is done for the test case scenario of an individual single with no child, working full-time full-year and earning an annual labour cost wage varying between the minimum wage (*SMIC*) and 1500k€. The tax rates encompass the progressive and flat income taxes as well as payroll taxes. Even if the official tax thresholds are expressed in terms of the relevant tax base, I chose to translate all the thresholds and rates in terms of labour cost in order to have a complete picture of the tax wedge. The vertical lines stand for these thresholds (green for the income tax schedule, blue for the SSCs schedule).

The figure 4.B.3 shows that the average rate of labour taxation is not increasing everywhere, meaning that the overall schedule is not fully progressive. Indeed, the tax base for some employer SSCs is capped at 8 times the social security threshold (SST). The introduction of the 75% tax restored the progressivity above the €1m (of gross wage) threshold. The importance of payroll and income taxes for a wage earner with €2m of labour cost is pictured on figure 4.B.2. The tax wedge corresponds to the average tax rate. In this example, there is a 65% tax wedge, meaning that the employee has in the end a disposable labour income of €0.7m (35% of the labour cost).

[2] National Accounts

[3] Among which salary and non-salary labour incomes, capital incomes, wealth, products.

[4] See André and Guillot (2014) for a brief history of the income taxes in France.

3.2 The 2013-2014 reform

The 75% tax on wages above €1m During the 2002-2012 period, the effective tax rate on top (labour and capital) income earners decreased by 3.6 ppt according to Bozio *et al.* (2012). When running for the presidential election in 2012, F. Hollande committed to end this decreasing trend with a token measure: a marginal tax rate of 75% for incomes above €1m. The purpose of this promise was to force the wealthiest to contribute to the post-crisis recovery. The practical implementation took time and faced criticism. The first version of the tax relied on an individual (capital and labour) income but was not deemed constitutional by the Constitutional Council in 2012. The second version is restricted to labour income and has a legal incidence on employers. It was finally accepted on December 29th, 2013 and was implemented by the Budget Law for 2014 (article 15) for earnings of 2013 and 2014 only. Another feature of the tax is that the total tax paid by the firms was capped at 5% of the total firm profit, due to protests from football players and teams. I take that into account in my computation of the tax.

Figure 1 pictures the change in marginal tax rate relative to the labour cost. The marginal tax rate on 2013 (gross) labour income above 1 000 k€ is 11p.p.t. higher than it was in 2012. The threshold of 1 000 k€ is expressed in gross labour cost and corresponds to a labour cost of 1 309 k€[5]. The marginal rate did not change for incomes below the threshold. The new 50% marginal tax rate relative to gross income corresponds to a marginal tax rate of 28% (cf. figure 4.B.1 for a decomposition of the marginal tax between what comes from the income tax, the SSCs and taxes on payroll, or the 75% tax).

The 75% tax base consists of the following types of revenue:

- all types of salary incomes, including in kind payments
- attendance fees to the executive board (tokens)
- profit sharing and incentives plan
- stock options and shares.

Importantly, chief executives' compensations (fixed and variable parts of the pay, tokens), which are not paid by a wage but by a special remuneration decided by the executive board, are subject to the tax.

Tax revenue: forecasts and estimations The revenue of the 75% tax cannot be found in the National Accounts nor in any other official document. I was only able to find an ex-ante estimation in the draft law. Table 1 compares this estimation (column 1) with my own computation (column 2 to 4). Around 1000 employees and 450 firms are subject to the tax every year.

[5] I had to inverse the tax schedule to compute that threshold.

The ex-ante evaluation done in the draft of the Finance Law is based on the 2011 administrative dataset on payroll. I use the same dataset in order to compare my simulations with the official forecast (column 2). The figures are very consistent regarding the tax base, yet I estimate that the total tax revenue almost 30% higher than what was expected by the government. The difference might come from some behavioural assumption that are not detailed in the draft law. I then compute the tax revenue for 2013 and 2014, based on realized incomes in 2013 and 2014. I find a total tax revenue consistent with my ex-ante estimation.

The most striking result is that the tax did not seem to raise less revenue than expected. This raw back of the envelop calculation suggests that there were little behavioural responses to the tax. Yet, one would have to compare the revenue with a counterfactual tax revenue where the tax base evolves like it would have in the absence the tax in order to come to this conclusion.

4 Data and descriptive statistics

The analysis is based on three administrative datasets. The first two can be matched and constitute a linked employer-employee database with detailed information on the outcomes of the firms. The third one is a sub-sample of the income tax returns data, containing all individuals of the top percentile of the taxable income distribution.

4.1 Linked employer-employee dataset

4.1.1 Payroll tax data (DADS Postes)

This dataset is the administrative database constituted by the universe of payrolls in France (available since 1993). I focus on the 2009-2015 period, because the data changed in 2010 with the introduction of the public sector. The information unit is the job, but it can be aggregated at the individual level and at the plant/firm level. The database contains information at the job level, such as the gross wage, the number of hours and days worked during the year, the occupation and the sector. At the firm level, the number of employee as well as the complete structure of employment are available. Each year t of data contains information for year t and for the previous year $t-1$.

The DADS database is available at the regional level and contains all employees living or working in the regions. Hence, individuals working and living in two different regions are present twice: I choose to keep in my database only the individuals working in the region.

Then, I drop the following categories of jobs:

- employees employed by individual employers (*particuliers employeurs*);
- region or activity unknown;

- farm sector;
- trainees, interns, subsidized employment (*emploi aidé*).

This choice does not impact the analysis since employees from these categories earn low wages.

In order to aggregate information at the individual level, I consider two concepts of earnings. First, I select one job by individuals, considering the job that is associated with the highest earning. I choose to proceed like that in order to consider all information related to this specific job, such as the firm, the sector and the occupation. My second earning concept is defined by the aggregation of the incomes from all the jobs. These two concepts are very close since almost all workers in my sample work full-time full-year. The simulation of social security contributions ultimately relies on the gross wage, which is the most comprehensive income variable available in the database. This income concept is larger than the salary part of the pay, and encompasses also non pay elements, such as profit-sharing and participation. Importantly, the pay of CEOs as well as tokens are included in the gross wage. Yet, I cannot disentangle between these different labour income components using payroll or income tax data. Stock options, which are included in the 75% tax base, are not observed. I focus on the top 0.01% of the wage distribution. Table 2 presents some descriptive statistics.

4.1.2 Firm data (FARE)

I use a richer dataset to complement the information on firms, FARE (*Fichier Approché des Résultats Esane*). It contains balance sheet and accounting documents that detail the production and net profits of the firms. The FARE data come from the administrative documents used for corporate tax returns.

The firm and payroll tax data are matched on the firm identifier. The population of FARE is constituted by the firms subject to the corporate tax, apart from 50% of the financial sector (national account definition) and all the farm sectors. A significant share of firms from FARE are not in the DADS dataset because they do not have any employees. Conversely, firms from the public sector are in the DADS but are not in FARE. I reduce my sample to the firms present in the DADS, dropping the firms with no employee, by definition not subject to the tax. Importantly, the matching allows me to use information on firm profit for the computation of the 75% tax. I provide descriptive statistics of the firm data when I present the empirical strategy at the firm level (Table 4).

4.2 Income tax return data

I use a 500 000 households sample of the income tax files containing all individuals in the top percentile of taxable income. This database gives detailed information on the different com-

ponents of the taxable income. The taxable income is composed by the aggregation of labour income from wage earners and from self-employed as well as capital incomes. Depending on the incomes, the information is disposable at the individual or at the fiscal household level.

4.3 Simulation of income and payroll taxes

Income and payroll taxes are not directly observed in the data, so I have to simulate them. I use a program developed at the Institute of public policies, TAXIPP 0.3[6], in order to compute income and payroll taxes as well as marginal and average overall tax rates. In order to compute marginal and average rates of taxation, I assume that all individuals are single with no child and only earn labour income. This simplification is driven by the underlying data (payroll tax data), that does not contain any demographic information nor any other type of income. This enables me to compare the pre-reform to post-reform tax rates and to have a mere idea of the taxation faced by these incomes.

4.4 Descriptive statistics and graphical evidence

The first evidence is a descriptive graph of the evolution of the number of wage income earners. Figure 2 depicts the number of people with earnings above the tax threshold T (€1m of gross wage) (solid line) and compares it with two groups, the number of employees with earnings between 0.9T and T (long dash line) and between 0.8T and 0.9T (short dashed line). The y-axis unit is set at 100 in 2012, meaning the yearly number of employees in each group is rescaled relative to the 2012 number. The vertical dashed lines denote the two reform years. On the graph, the numbers next to the points give information about the number of individuals in each group. In 2013 and 2014, about 1000 employees are the subject to the 75% tax. I provide the same picture with two different datasets. The first panel 2a uses the income tax returns data whereas the second panel 2b uses payroll tax data. The two graphs are very similar in trends and in levels[7]. The income tax returns data allow me to have a longer time perspective, validating the approach. But I mainly use the payroll tax data as I can compute social security contributions using this database with more accuracy.

Before the reform, the three groups follow the same trend. The increase between 2009 and 2010 can be explained by the 2009 post-crisis recovery. After the reform, the groups clearly diverge. The number of employees whose income is above the threshold is stable during reform years apart from a decrease by 5% in 2013, whereas there is a stark increase in the number of individuals in the control group, which increases by more than 20% in 2014

[6] See Bozio *et al.* (2015) for a description of the model as well of its underlying assumptions.

[7] There is nonetheless a difference in the number of employees in each group that is difficult to interpret, as both data contains the universe.

relative to 2012. After the reform, the two groups evolve in a parallel trend again. Moreover, the number of millionaires (in terms of annual gross wage income) increases in 2015 by exactly as much as the control group did in 2013 and 2014: the two lines are overlapping as they did before the reform.

Figure 3a further decomposes the previous evidence of behaviour by dividing the group of millionaires into two, wages between €1m and €1.5m (in orange) and wages above €1.5m (in red). The two groups of millionaires behave similarly, suggesting that they react similarly. Yet, the number of millionaires above €1.5m increases much more than the number of millionaires below €1.5m in 2015. This is a suggestive evidence of time shifting after the tax is abolished.

Figure 3b decomposes the number of employees depending on the previous year income. Conditioning on being millionaire one year, what is the wage next year? Among the 1011 millionaires of 2011, 50% still are millionaires (503) in 2012 and 6% (64) have a wage between €0.9m and €1m. The increase in the €0.9m to €1m category observed in 2013 comes from about additional 32 millionaires in 2012. 10% of the millionaires of 2012 have a wage between €0.9m and €1m, hence a difference of 4ppt with 2012. This suggests that a small yet identifiable fraction of millionaires saw a wage decrease in 2013.

Many things can explain the temporary divergence between the number of millionaires and the number of employees just below the million. A first explanation is that some millionaires decreased their income in order to stay just below the threshold, as shown by Figure 3b. But the number of individuals in the €0.9m to €1m group should then decrease in 2015, unless some new individuals enter this group. A second possibility is that employees whose income was on an increasing trend did not overtake the threshold and reached the .9T to T groups instead. Yet, I do not observe a large bunching at the threshold, maybe due to the low density of workers around the threshold. These two explanations are not exclusive from one another and underpin the presence of some kind of time-shifting behaviour, both when the tax is introduced and when it is abolished. Yet, it is also possible that there was some income-shifting. Another possible channel of response is migration of top incomes out of France. I investigate these different optimisation possibilities in part 6.

5 Worker-level and firm-level effects on wage

5.1 Wage incidence

In this section, I focus on the employees belonging to the top 0.01% of the salary income distribution.

I decompose the individuals from the top 0.01% into ten groups of equal size according

to the wage distribution. Millionaires belong to the top 0.003%. I compare the evolution of the wage by group, looking at the group-level wage growth. I focus on two earning concepts. The first and most inclusive one is the labour cost. It contains employer and employee social security contributions (SSCs) as well as all other payroll taxes[8]. The second one is the net wage, obtained by deducting employee SSCs from the gross wage. These income concepts can be considered as wages since almost all of the top earners are working full-time and full-year.

Graphical results The figure 4 shows, for each category of the income distribution (deciles of the top 0.01%), the average wage of the category, relative to the average wage as of 2012 (the last pre-reform year). Panel 4a presents the evolution of the net wage and panel 4b the evolution of the labour cost. In 2013, the net wage decreases and the labour cost increases starting at the 99.997 percentile, exactly where the 75% tax kicks in. The divergence directly comes from the computation of the tax and increases with the income category. In the richest group, the net wage decreases by almost 5% and the labour costs increases by almost 20% in 2013. In 2014, there is the same difference between the growth of the two wage concepts, but the net wage of the richest group increases relative to 2012. The top 0.001% group behaves differently from the rest of the top 0.01%: individuals belonging to this group gained back the net wage that they had lost in 2013. In 2015, labour costs and net wages of the top 0.01% increase relative to 2012 by around 10%. Starting at the 99.997 percentile, the growth is increasing with the percentile. The top 0.01% enjoyed an overall wage increase, larger for the top 0.03%. This general wage growth in 2015 is likely to come from the implementation of a bonus cap in the banking sector in the European Union. Bonuses were capped at 100%[9] of the fixed part of the salary.

Regression results In order to estimate the incidence of the 75% tax on millionaires I propose a regression analysis relying on a cell-based approach corresponding to the previous graphical results. I use the following difference-in-differences specification to estimate the treatment effect of the reform:

$$w_{pt} = \alpha_p + \beta_t + \gamma \cdot \mathbb{1}(p \geq p_{eligible}) \cdot \mathbb{1}(t = 2013, 2014) + \epsilon_{pt} \tag{1}$$

where

- $p = 99.990 - 99.991, ..., 99.999 - 100$ denotes 10 percentiles categories,
- t denotes 8 years (2008 to 2015),
- w_{pt} is the net wage or labour cost annual average income for percentile p and year t

[8] Except for the tax on wage targeting sectors not subject to VAT.
[9] The cap can reach 200% of the salary if the firm's shareholders agree on that.

- $\mathbb{1}(p \geq p_{eligible})$ is a dummy equal to one if the percentile group is subject to the 75% tax,
- $\mathbb{1}(t = 2013, 2014)$ is a dummy equal to one for reform years,
- ϵ_{pt} is the error term

The objective is to estimate the treatment effect γ, the coefficient on the interaction percentile eligibility and reform-years dummy.

Table 3 displays regression results. Column (1) provides the baseline estimates and column (2) decomposes the reform-years dummy into 2013 and 2014. I find a large positive effect of the tax on labour cost and a smaller (not significant) negative effect on the net wage, consistent with figure 4. Using these estimates, I compute a measure of the wage incidence, the pass-through, defined as the share of the tax borne by employers. I find that 77% of the tax increase is borne by employers. The estimate is highly significant (standard errors are estimated by the delta-method). The decomposition of the effect between 2013 and 2014 shows that the incidence on wage was more important in 2013 and decreased in the following year, which is in line with the increase in net wage observed for the top 0.001% in 2014.

One limitation of this approach is that the individuals in each yearly cells are not necessarily the same from year to year. Due to the high wage variability that is attributed to this population, the composition effects associated with the construction of the cell might affect the results. This can be addressed with a panel strategy.

5.2 Wages and employment at the firm level

The previous subsection 5.1 shows that employers bore most of the cost of the tax. After studying the employee level, I focus on the employer level of response. The legal incidence of the 75% tax being on the firm, the tax is likely to impact the workers through a strategy operating at the firm level. I develop an empirical strategy aiming to identify the effect of the tax on wages and employment at the firm level. I address the following underlying research question: how do taxes ultimately affect the share of the value added of the firm? There is to my knowledge no article on the impact of top income taxation at the firm level even though top income earners have been studied in their employment context.

Data and empirical strategy Exploiting the variations in intensity of the intention to treat across firms, I look at firms' outcomes. The treatment intensity is defined by the payroll share affected by the tax.

Figure 5a presents the distribution of the treatment intensity in 2012. I decompose the 467 firms having a positive treated share of payroll in 2012 into two groups of same size (below and above the median)[10] and exclude the bottom 1% and the top 1% of the distribution.

[10] I exclude the few firms who hit the cap.

I call the bottom 50% firms the *lower share* (blue in figure 5) and the top 50% the *upper share* (red in figure 5). I cannot further split the sample because of its small size. Figure 5b shows the evolution of the share of payroll affected by the group in the two groups. The share of payroll decreases more in the more treated group than in the less treated group. Figure 5c provides a check that the simulation of the tax is relevant. Using the information from the accounting data of the firm, I compute an effective tax rate. It is defined by the total amount of taxes on payroll paid by the firm divided by the total payroll of the firm. Indeed, according to this accounting information, the more affected firms experienced a 40% increase of the tax rate in 2013 and 2014 only. Table 4 presents some descriptive statistics on a panel of firms made of the firms from figure 5a. The less treated group contains a much larger number of employees than the more treated firms. The firm sectors also differ according to the treatment group. Firms with lower share of treated payroll belong more to the industry, business and information & communication sectors whereas more treated firms belong more to the financial and consulting sector.

Evolution of wages at the firm level In order to identify the impact of the tax on wages at the firm level, I compare the evolution of the average wage between the two groups of firms for the workers of the top 0.005% of the wage distribution (Figure 6a), for the workers of the following 0.005% (Figure 6b) and for all workers excluding the top 0.001%. The top 0.005% workers experienced a small decrease in net wage, comparable in the two groups. For workers of the following 0.005% and of the rest of the wage distribution, nothing really changes with the tax nor differs between the two groups of treatment. This suggests that the tax on millionaires induced a comparable wage decrease in the two groups and did not have spillovers on the wages of the other workers of the firms.

Evolution of employment at the firm level If the workers' wages of the two treated groups are affected the same by the reform, this is not the case when it comes to employment. Figure 7 presents the evolution of the number of millionaires (Figure 7b) and of the number of workers whose wage is just below the threshold, showing that there is a reallocation of workers in the two groups happening at the firm level. In the more treated group, millionaires were substituted into workers paid just below the threshold. This can be achieved by two different strategies: either wages decrease at the individual level, either millionaires are laid off and replaced by lesser paid workers.

At the firm level, it appears that wages evolve similarly depending on the intensity of the treatment. Yet, this translates into a more visible substitution between employees affected by the tax and employees with a wage just below the threshold. The firm is possibly the theatre of a more complex optimisation strategy, if non-wage remunerations are paid. Firms could

for example pay some employees with stock options or with dividends for those who own shares. This is however difficult to identify based solely on payroll and firm tax data[11].

6 Optimisation behaviour of the individual

6.1 Conceptual Framework

I rely on the traditional economic model used in the taxable income literature. It departs from a standard labour supply model by assuming that individuals chose to maximise a utility function $u(c,z)$ depending positively on c, the disposable income or consumption and negatively on z, the reported income. In my case, c is the disposable labour income and z is the labour cost, as pictured in figure 4.B.2. Following Kopczuk (2005), I choose to look at the broader measure of income, labour cost. Utility is maximised subject to the following budget constraint $c = z - \mathrm{T}(z) = (1-\tau).z + y$ where τ is the marginal tax rate and $y = \tau.z - \mathrm{T}(z)$ is virtual income. Solving the optimisation problem leads to the following labour supply function: $z = z(1-\tau, y)$, implying the following specification:

$$\log(z_{it}) = \alpha + e.\log(1-\tau_{it}) + f.\log(y_{it}) + \epsilon_{it} \tag{2}$$

where e is the uncompensated elasticity of the reported income with respect to the marginal net-of-tax rate. f is the income elasticity. I will further assume that there is no income effect, as is common in the literature.

The literature proposes different strategies to estimate equation 2. The most straightforward strategy relies on time series. A second type of approach estimates equation 2 by difference-in-differences using repeated cross-sections. A third and more demanding approach requires a panel dataset. I compare the results using two different strategies, a cell-based approach and a regression approach.

Equation 2 has an endogeneity issue because the marginal tax rate τ_{it} depends on the level of income z_{it}. Diverse instruments are proposed to tackle this endogeneity issue. With repeated cross-sections, the log of the net-of-tax rate is instrumented using the interaction between a post-reform and a treatment group indicator. Panel data allows for more complex instrumentation strategies. The classical strategy consists in instrumenting the log of the net-of-tax rate using the predicted net-of-tax rate, i.e., applying the year t tax schedule to the income of year $t-1$. Yet, the instrumentation strategy for the panel estimation is known to have further limitations. Indeed, problems related to an intrinsic evolution of incomes

[11] In the firm tax return data, the dividend variable mixes information from the two previous years. The income tax data informs on the dividends received. Yet, there was a reform on dividend taxation in 2013, which affected greatly the dividends received in 2013.

can further cause endogeneity of the instrument. The income process can be divided into a transitory and a permanent component. The fluctuations of the transitory component can cause a mean-reversion bias. The instrumentation based on the predicted net-of-tax rate magnify this problem since the income of year $t-1$ enters the estimation *via* the instrument. On top of that, income growth can affect the estimates. Including time trends allow to control for homogeneous income growth. Yet, income growth might be heterogeneous according to the level of income, especially at the top of the distribution. This happens for example when inequality is rising. To control for the different levels of growth of the permanent component of income, several income controls from previous years can be included in the panel regression. I discuss these endogeneity problems occurring when using panel data in appendix A.1.

6.2 Cell-based approach

In order to exploit the diversity of the individual responses according to the wage level, I consider a cell-based approach similar to the one presented for the wage incidence analysis. The only difference comes from the rescaling of the effect of the treatment, needed to interpret the parameter of interest in terms of elasticity. The elasticity measures the percent change in income when the net-of-tax rate increases by 1%. The estimated equation is the same than equation 1 except that I use for treatment the log of the net-of-tax rate instead of the interaction term. The outcomes are the same than for the incidence approach and are pictured on figure 4.

Table 5 presents the regression results for net wage and labour cost. Consistent with the previous estimates, I find a negative elasticity for the labour cost and a positive elasticity for the net wage. The elasticity of the labour costs is driven by the phasing in of the reform in 2013 whereas the result for the net wage is driven by the phasing out. The elasticity of the labour cost is -0.082. The negative sign is consistent with the increase in labour cost following the reform. The elasticity of the net wage is around 0.121, which is small as compared to the rest of the literature[12].

6.3 Repeated cross-section approach

The approach relying on repeated cross-sections is very similar to the previous cell-base approach. It further allows me to differentiate the effect according to individual characteristics.

I estimate the following two-stage-least-squares equation

$$\log(z_{it}) = \alpha_t + \beta.1(\text{top 0.003 percent}) + e.\log(1-\tau_{it}) + \epsilon_{it} \tag{3}$$

[12] See for example Saez (2017) who finds an elasticity of wages for the top 0.01% of 1.34.

using the reform indicator and the treatment group interaction as an instrument.

Table 6 presents the results of the repeated cross-section approach. Panel A first restricts the estimations to the phasing in (2012-2013) and the phasing out (2014-2015) of the tax. Consistent with the cell-based approach, the negative elasticity associated to the labour cost is driven by the phasing in period whereas the positive net wage elasticity comes from the phasing out of the tax. The elasticity is then decomposed by occupation[13]. The aggregate results are driven by the CEOs and the deputy CEOs category. Net wages of managers are more negatively affected by the tax than those of CEOs, reflecting maybe the lower bargaining power of managers. The elasticity of labour cost is negative and even lower for artists and sportsmen. This can be due to the fact that highly paid sportsmen (mainly footballers) negotiated a net wage.

The cell-based and the repeated cross-section approaches give consistent results. Yet, they do not take into account possible sorting effects in the treatment category, as it is defined each year. I develop a panel strategy addressing this issue (presented in appendix A.1) but that is also plagued with problems inherent with the use of the panel.

7 Conclusion

This article looks at a large variation of the very top marginal tax rate on wages, created by the 75% tax (new tax rate of 50% on gross wages) above €1m. It addresses the short-term responses of labour incomes. About 400 employers paid the tax each year and about 1000 employees were concerned. Even if the tax defies the first principles of taxation with its very narrow tax base on unstable incomes for a very short period of time and a large marginal tax rate, it seems to have contributed to raise the total tax revenue. Simple graphical evidence of the evolution of the number of millionaires suggest that the tax triggered a sizable response.

I document that the tax was largely borne by employers, who paid 77% of the tax. Looking at the difference in the intensity of the intention to treat, I further look at how firms share the tax burden on workers. The analysis shows that the wages of the workers who were not affected by the tax did not decrease.

Taking advantage of the short term nature of the tax, I show suggestive evidence that the tax triggered important optimisation responses of wage earners, taking the form of time-shifting. I study the elasticity of the pre-tax labour income to the net-of-tax rate (1 minus the marginal tax rate) and find an elasticity of -0.1, consistent with the fact that the cost of the tax was mostly paid by employers. The elasticity of the net wage to the net-of-tax rate is nonetheless positive and around 0.2. These elasticities are driven by the CEOs and the

[13] I take advantage of the panel dimension of the database, which is not used in this approach, by categorizing individuals according to their main occupation across the period. Because of that, individuals cannot change between occupation category across the period.

deputy CEOs. Interestingly, the elasticity of the net wage is larger for managers than it is for CEOs, meaning that their wage decreased more. This difference illustrates the importance of the bargaining power in the wage setting process of these top wage earners.

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8 Tables and figures

Table 1 – Tax revenues: forecasts and estimations

	Comparison with the Budget Law 2013 or 2014		Own estimations 2013	2014
	Budget Law	DADS 2011	DADS 2013	DADS 2014
	(1)	(2)	(3)	
Firms with at least one millionaire	470	483	430	460
No. Employees subject to the tax	1000	1004	937	966
Tax base	715	716	708	790
Gross tax (total)	310	358	354	395
Net tax (total)	210	271	253	281
Net / gross tax	68%	76%	71%	71%
Total revenue expected	**420**	**542**	**534**	

Notes: revenues are in million Euros. Column (1) shows the official forecast for the tax revenue and the tax base, as published in the appendix of the Budget Law for 2014. In column (2), I use the same database used by the government and try to reproduce their findings. Columns (3) and (4) present the results of my computation of the tax for 2013 and 2014.

Table 2 – Descriptive statistics

Variable	2010	2011	2012	2013	2014	2015
Worker characteristics						
Male	.92	.92	.92	.92	.9	.9
	(.27)	(.27)	(.27)	(.28)	(.3)	(.3)
Age	49.1	49.6	50.34	50.73	51.2	51.31
	(10.7)	(10.21)	(10.18)	(10.14)	(9.9)	(9.91)
Share of full-time employees	.99	1	.99	1	1	.99
	(.1)	(.06)	(.08)	(.06)	(.06)	(.08)
No. of millionaires	1050	1094	1016	961	1025	1268
	(.47)	(.47)	(.46)	(.45)	(.46)	(.49)
Net wage	975.97	929.54	914.2	891.89	920.9	1074.22
	(1145.94)	(657.12)	(743.28)	(711.15)	(800.86)	(973.34)
Gross wage	1098.11	1049.92	1033.46	1009.36	1043.08	1212.89
	(1253.9)	(720.73)	(815.36)	(780.01)	(879.94)	(1070.18)
Labour cost	1426.69	1367.1	1347.01	1413.69	1471.03	1568.74
	(1566.41)	(905.24)	(1027.81)	(1329.97)	(1511.89)	(1343.6)
Artists	.01	.02	.01	.01	.01	.01
	(.12)	(.12)	(.11)	(.11)	(.1)	(.09)
Managers	.51	.52	.52	.51	.53	.53
	(.5)	(.5)	(.5)	(.5)	(.5)	(.5)
Sportsmen	.09	.08	.08	.07	.06	.06
	(.28)	(.27)	(.27)	(.25)	(.24)	(.24)
CEOs and deputy CEOs	.31	.3	.31	.32	.31	.31
	(.46)	(.46)	(.46)	(.47)	(.46)	(.46)
Employer characteristics of the workers						
No. of full-time equivalent workers	2102.57	2859.67	2459.18	3029.82	3190.48	3232.62
	(8397.37)	(10293.17)	(9174.28)	(19489.31)	(9473.91)	(9827.44)
Share of employers from the private sector	.98	.99	.98	.98	.98	.98
	(.13)	(.12)	(.13)	(.15)	(.15)	(.15)
Sector: industry	.05	.06	.06	.08	.07	.07
	(.22)	(.23)	(.23)	(.26)	(.25)	(.26)
Sector: business	.08	.09	.1	.09	.1	.09
	(.28)	(.29)	(.3)	(.29)	(.3)	(.29)
Sector: information and communication	.08	.06	.07	.06	.06	.06
	(.26)	(.25)	(.25)	(.24)	(.23)	(.24)
Sector: finance	.29	.3	.28	.29	.3	.29
	(.45)	(.46)	(.45)	(.45)	(.46)	(.46)
Sector: consulting	.32	.32	.32	.32	.32	.33
	(.47)	(.47)	(.47)	(.47)	(.47)	(.47)
Sector: administrative	.05	.04	.05	.04	.04	.04
	(.21)	(.2)	(.21)	(.2)	(.21)	(.19)
Sector: entertainment	.09	.09	.08	.07	.07	.06
	(.29)	(.28)	(.28)	(.26)	(.25)	(.24)

Notes: revenues are in millions euro 2013.
Source: DADS 2010-2015, sample of individuals in the top 0.01% of the annual labour income distribution.

Table 3 – Incidence of the tax, top 0.01% details

	(1)	(2)	
	2013-14	2013	2014
Net wage	-58.26	-84.53	-31.99
	(71.07)	(93.92)	(93.92)
Labour cost	194.46	140.54	248.37
	(106.78)	(140.95)	(140.95)
Pass-through	0.77	0.62	0.89
	(0.09)	(0.23)	(0.02)
N	80	80	

Sources: DADS POSTES 2008-2015 and TAXIPP 0.3.
Note: the pass-through is the share of the tax paid by employers. Standard errors of the pass-throug are estimated by the delta method.

Table 4 – Descriptive statistics at the firm level

Variable	Group	2010	2011	2012	2013	2014	2015
No. of employees	Lower	2021.64	2118.99	2039.92	1987.50	2027.19	2022.16
	share	(8363.17)	(8456.96)	(8166.74)	(7852.31)	(7757.11)	(7709.41)
	Upper	75.75	51.68	45.71	45.56	44.69	49.29
	share	(425.65)	(127.50)	(76.17)	(77.27)	(77.02)	(81.94)
No. of employees in the top 0.005%	Lower	2.00	2.54	2.81	2.50	2.52	2.54
	share	(3.49)	(4.65)	(3.43)	(4.19)	(4.12)	(5.66)
	Upper	2.22	2.63	2.98	2.50	2.33	2.25
	share	(4.18)	(4.67)	(4.40)	(4.51)	(4.30)	(4.33)
No. of employees in the next 0.005%	Lower	2.19	2.60	2.45	2.31	2.36	2.20
	share	(3.46)	(4.85)	(4.11)	(4.09)	(3.79)	(4.63)
	Upper	1.10	1.09	0.98	0.90	0.94	0.95
	share	(2.06)	(2.08)	(1.98)	(1.72)	(1.79)	(1.84)
Net wage by employee (k€2013)	Lower	63.52	67.25	68.60	67.21	70.13	74.29
	share	(50.04)	(63.78)	(55.73)	(58.36)	(68.70)	(76.94)
	Upper	295.96	334.19	389.23	317.51	293.45	311.68
	share	(368.33)	(419.60)	(538.92)	(373.15)	(367.09)	(449.10)
No. of millionaires	Lower	1.34	1.58	1.81	1.57	1.59	2.04
	share	(2.56)	(2.84)	(1.97)	(2.75)	(2.78)	(4.86)
	Upper	1.71	2.09	2.46	1.74	1.56	1.92
	share	(3.44)	(3.92)	(3.70)	(3.42)	(3.26)	(3.90)
Treated share of payroll	Lower	0.04	0.05	0.07	0.05	0.05	0.06
	share	(0.06)	(0.07)	(0.05)	(0.08)	(0.09)	(0.10)
	Upper	0.29	0.35	0.48	0.33	0.27	0.29
	share	(0.33)	(0.31)	(0.25)	(0.34)	(0.31)	(0.32)
Sector: industry	Lower	0.15	0.15	0.13	0.12	0.13	0.13
	share	(0.36)	(0.35)	(0.34)	(0.32)	(0.33)	(0.34)
	Upper	0.05	0.03	0.04	0.03	0.03	0.03
	share	(0.21)	(0.18)	(0.19)	(0.18)	(0.17)	(0.16)
Sector: production	Lower	0.00	0.00	0.00	0.00	0.00	0.00
	share	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	Upper	0.01	0.01	0.01	0.01	0.01	0.01
	share	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.10)
Sector: business	Lower	0.14	0.16	0.18	0.18	0.18	0.18
	share	(0.35)	(0.36)	(0.38)	(0.39)	(0.38)	(0.39)
	Upper	0.05	0.05	0.04	0.04	0.03	0.03
	share	(0.22)	(0.21)	(0.20)	(0.20)	(0.18)	(0.18)
Sector: information and communication	Lower	0.12	0.12	0.12	0.11	0.11	0.11
	share	(0.32)	(0.32)	(0.32)	(0.32)	(0.31)	(0.31)
	Upper	0.06	0.05	0.06	0.06	0.05	0.05
	share	(0.24)	(0.22)	(0.24)	(0.24)	(0.21)	(0.22)
Sector: finance	Lower	0.22	0.21	0.21	0.21	0.20	0.20
	share	(0.41)	(0.41)	(0.41)	(0.41)	(0.40)	(0.40)
	Upper	0.36	0.37	0.36	0.36	0.36	0.37
	share	(0.48)	(0.48)	(0.48)	(0.48)	(0.48)	(0.48)
Sector: consulting	Lower	0.24	0.24	0.24	0.23	0.24	0.24
	share	(0.43)	(0.43)	(0.43)	(0.42)	(0.43)	(0.43)
	Upper	0.35	0.37	0.36	0.35	0.35	0.37
	share	(0.48)	(0.48)	(0.48)	(0.48)	(0.48)	(0.48)
Sector: administration	Lower	0.04	0.04	0.04	0.03	0.04	0.04
	share	(0.20)	(0.20)	(0.19)	(0.18)	(0.18)	(0.19)
	Upper	0.05	0.04	0.05	0.05	0.04	0.04
	share	(0.21)	(0.20)	(0.21)	(0.21)	(0.19)	(0.19)
Sector: entertainment	Lower	0.03	0.03	0.03	0.03	0.04	0.04
	share	(0.16)	(0.17)	(0.17)	(0.18)	(0.18)	(0.19)
	Upper	0.05	0.05	0.05	0.05	0.05	0.05
	share	(0.21)	(0.21)	(0.21)	(0.21)	(0.21)	(0.22)
Sector: rest	Lower	0.01	0.00	0.00	0.02	0.01	0.00
	share	(0.09)	(0.00)	(0.00)	(0.15)	(0.09)	(0.00)
	Upper	0.00	0.00	0.00	0.02	0.05	0.03
	share	(0.00)	(0.00)	(0.00)	(0.14)	(0.21)	(0.18)

Notes: the table presents the descriptive statistics for a panel of firms. I consider the firms who have at least on employee treated in 2012 and divide them into two group of treatment intensity (the lower share and the upper share).
Source: Payroll tax data (DADS), firm tax data (FARE).

Table 5 – Elasticities using top income share time series

Decomposition of the phasing in and out of the tax	Labour cost	Net wage
1. Phasing in (2012-2013)	-0.106*	0.095***
	(0.06)	(0.031)
2. Phasing out (2014-2015)	-0.018***	0.188***
	(0.076)	(0.031)
3. Full time-series (2010-2015)	-0.082*	0.121***
	(0.042)	(0.028)

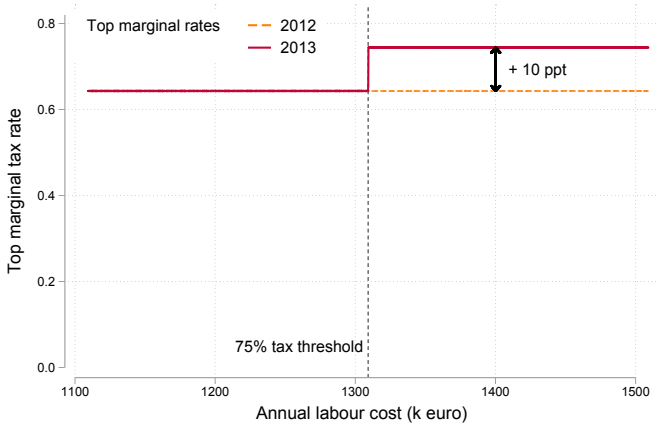
Notes: estimates are obtained using series from figure 4 by the following OLS time-series regression $log(w_{pt}) = \alpha_p + \beta_t + e \cdot ln(1 - \tau_{pt}) + \epsilon_{pt}$. The two first rows decompose the phasing in (2012-2013) and the phasing out (2014-2015) of the 75% tax. The third line groups all the years.
Standard errors in parentheses. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.
Sources: DADS POSTES and FARE 2009-2014.

Table 6 – Elasticities using repeated cross-section

		Labour cost	Net wage
Panel A. Maximum revenue			
A1. Phasing in		-0.156*	0.183**
		(0.085)	(0.084)
	Obs.	4282	4282
A2. Phasing out		-0.001	0.323***
		(0.09)	(0.088)
	Obs.	4168	4168
A3. 2010-2015		-0.101*	0.231***
		(0.052)	(0.052)
	Obs.	12519	12519
Panel B. Total revenue			
B1. Phasing in		-0.176**	0.146*
		(0.084)	(0.084)
	Obs.	6562	6562
B2. Phasing out		0.064	0.382***
		(0.09)	(0.089)
	Obs.	6491	6491
B3. 2010-2015		-0.097*	0.222***
		(0.052)	(0.052)
	Obs.	19399	19399
Panel C. Decomposing by occupations			
Artists and sportsmen		-0.655**	-0.205
		(0.259)	(0.259)
	Obs.	1436	1436
CEOs and deputy CEOs		-0.16*	0.161*
		(0.082)	(0.083)
	Obs.	6185	6185
Managers		0.089	0.384***
		(0.067)	(0.068)
	Obs.	10364	10364
Others or missing		-0.207	0.095
		(0.16)	(0.161)
	Obs.	1686	1686

Notes: estimates are obtained from 2SLS regression: $\log(z_{it}) = \alpha_t + \beta.1(\text{top 0.003 percent}) + e.\log(1-\tau_{it}) + \epsilon_{it}$ using the reform indicator and the treatment group interaction as an instrument. Outcomes are the log of the labour cost (left column) and the log of the net wage (right column). I control by the sex and the log of the firm profit. Panel A and B decomposes the phasing in (2012-2013), the phasing out (2014-2015) of the 75% tax and groups all the years. The outcome is the maximum of the different wages earned by an individual in panel A and the total of all wages in panel B. Panel C decomposes the estimation by occupation. Standard errors in parentheses. $^*p < .05$, $^{**}p < .01$, $^{***}p < .001$.
Sources: DADS POSTES and FARE 2009-2014.

Figure 1 – 11 ppt increase in the top marginal rate on labour



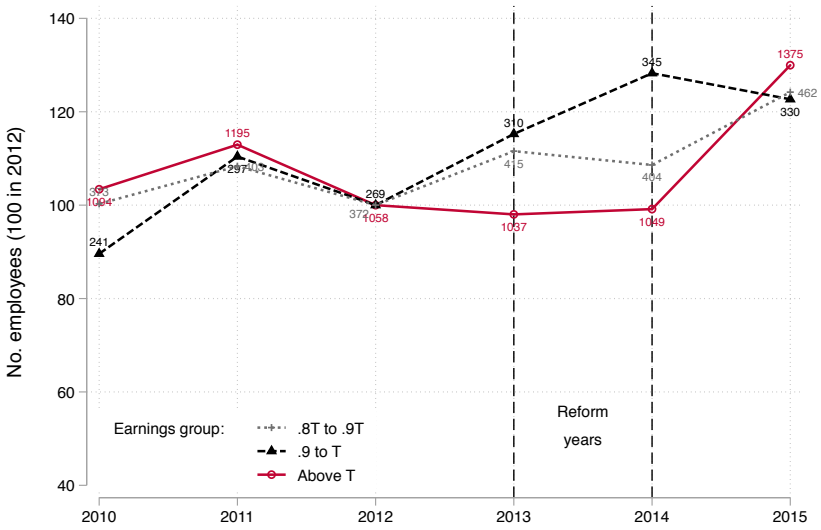
Note: the figure shows the marginal tax rate for a worker (single, no child) with labour income only. I take into account all SSCs, taxes on payroll and the flat (CSG+CRDS) and progressive income taxes. The only difference between 2012 and 2013 comes from the introduction of the 75% tax above 1000k€ of gross annual income. The marginal tax rate reached 75% in 2013 for income above 1309k€ of labour cost (=1000k€ of gross income). The new marginal rate of 50% on gross earnings introduced by the Budget Law is translated in terms of labour cost. I use the TAXIPP model developed at the Institut des politiques publiques (IPP) to compute payroll and income taxes. I assume that the firm is subject to the VAT and not to the tax on payroll (*taxe sur les salaires*).

Source: TAXIPP 0.3.

Figure 2 – Number of employees in different earnings groups

(a) Income tax return data

(b) Matched employer-employee dataset

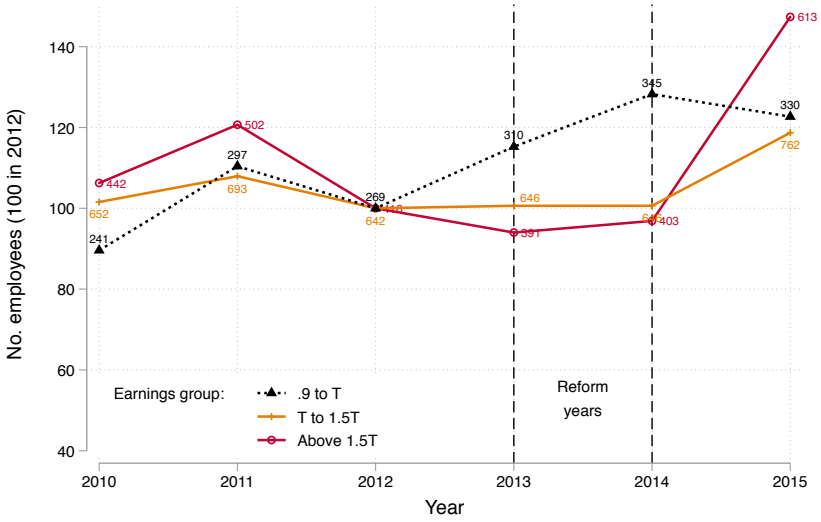


Note: the number of millionaires increased by 23% between 2014 and 2015. T corresponds to the tax threshold: €1m of annual gross wage which is equivalent to €1.309m of annual labour cost.

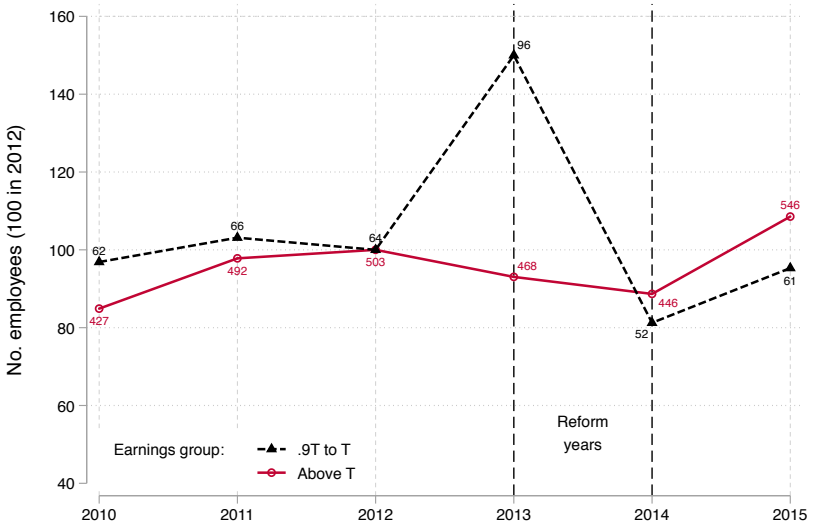
Source: Income tax return sample (*Échantillons lourds des déclarations de revenus*) for panel 2a. Payroll tax data (DADS) for panel 2b.

Figure 3 – Number of employees in different earnings groups - additional evidence

(a) Decomposition of millionaires



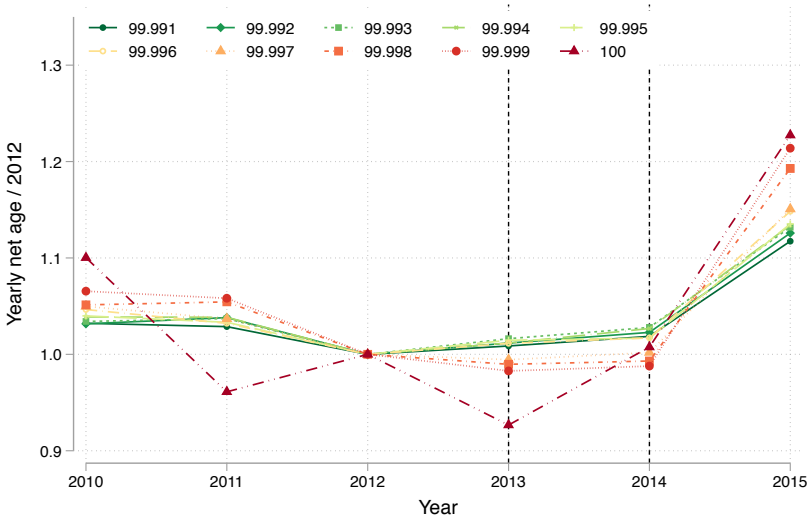
(b) Conditioning on income above €1m the previous year



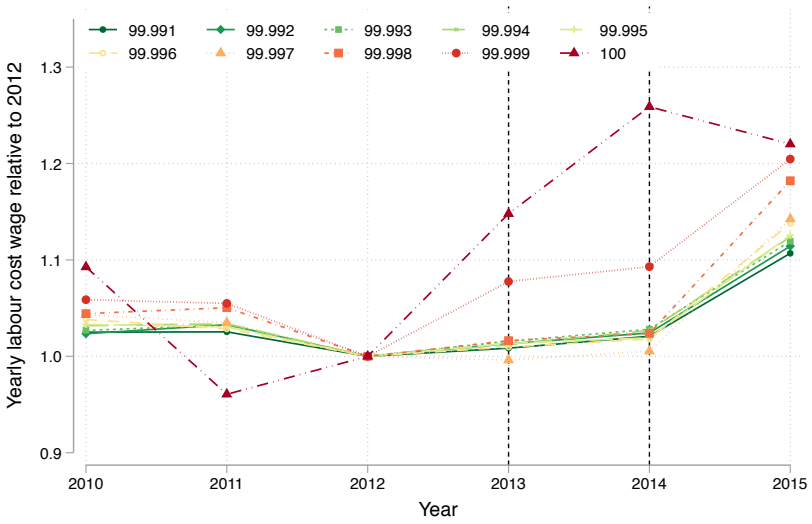
Note (a): this graph is similar to 2 but decomposes the millionaires into two groups.
Note (b): the black line represents the number of employees in the .9T to T group who were millionaires the previous year. The red lines represent the number of millionaire employees two years in a row.
Source: Payroll tax data (DADS))

Figure 4 – Incidence of the tax

(a) Net wage



(b) Labour cost

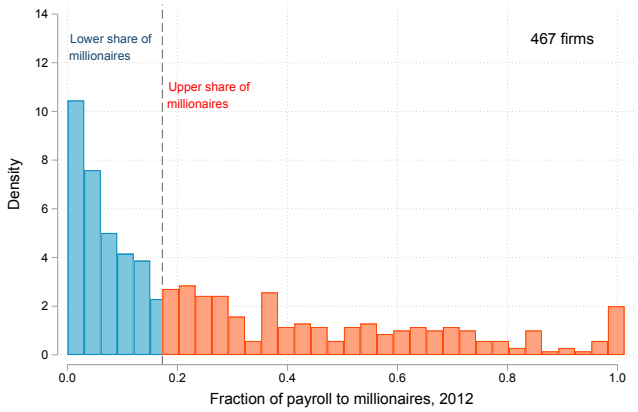


Notes: The figure presents the evolution of the average net wage (Panel 4a) and labour cost (Panel 4b) by groups of percentile.

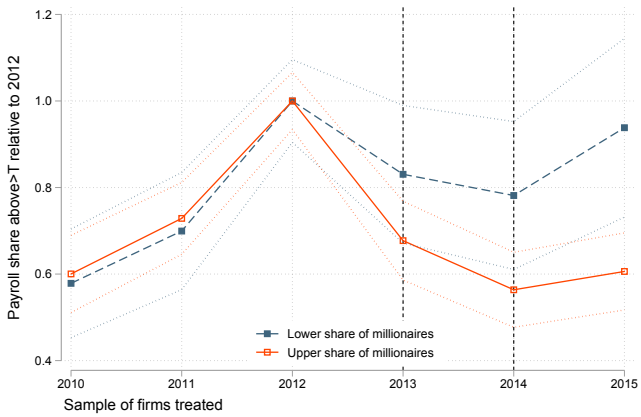
Source: Payroll tax data (DADS) and TAXIPP 0.3.

Figure 5 – Treatment definition at the firm level

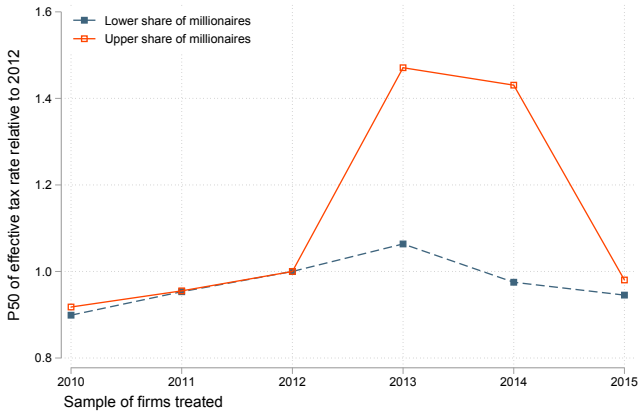
(a) Density of payroll share in 2012



(b) Payroll Share of millionaires, by 2012 groups



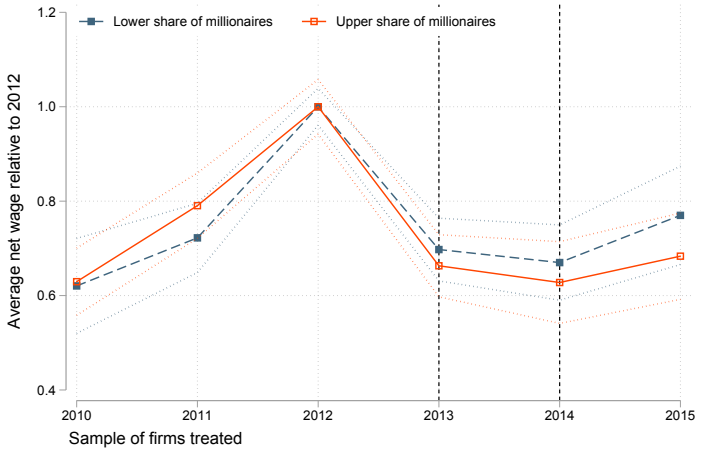
(c) Evolution of the effective tax rate



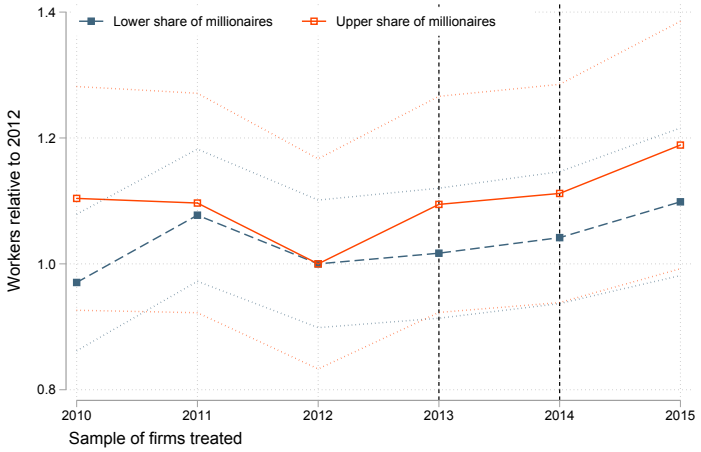
Notes: the panel 5a depicts the distribution of the share of payroll affected by the tax. The sample is divided in two categories: the lower half of the distribution (below the median) constitutes the *lower share* group and the upper half of the distribution is the *higher share* group. Panel 5b presents the evolution of the share of payroll affected by the tax in the two groups. The dashed lines denote the 95% confidence intervals.
Source: Payroll tax data (DADS), firm tax data (FARE) and TAXIPP 0.3.

Figure 6 – Firm-level wage effects

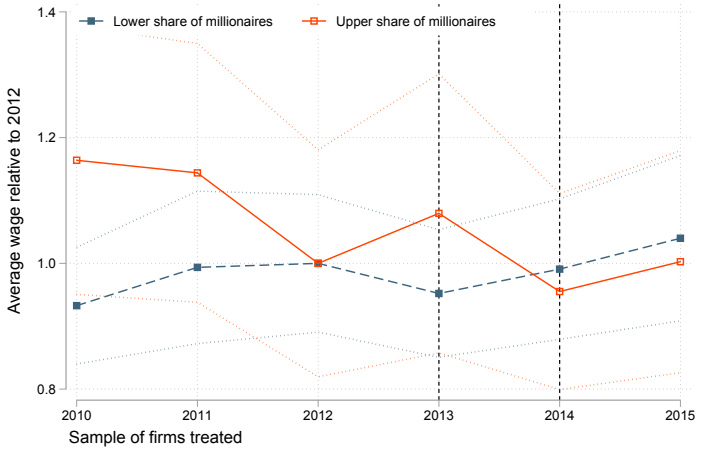
(a) Average wage of top 0.005% earners



(b) Average wage of 0.01% earners excluding the top 0.005%



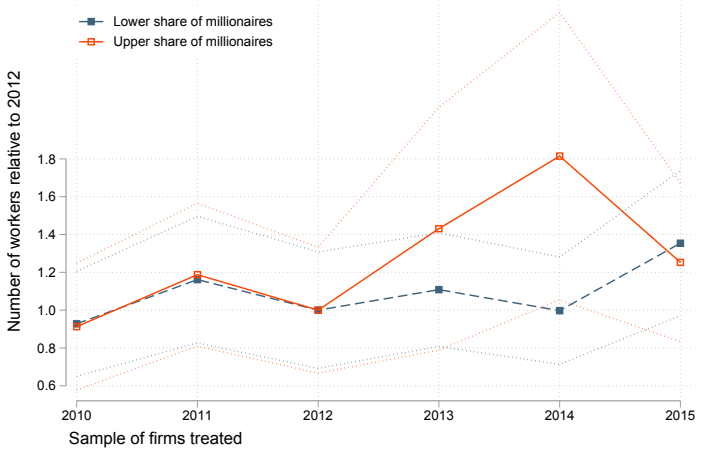
(c) Average wage of rest of the workers



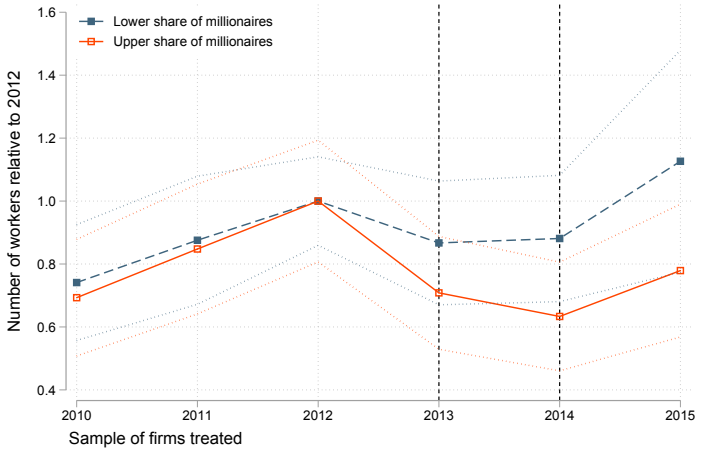
Notes: the figure depicts the evolution of average net and labour cost wage of workers for the top 0.005% earners (panel 6a) and for the next 0.005% (panel 6b). The dashed lines denote the 95% confidence intervals.
Source: Payroll tax data (DADS), firm tax data (FARE) and TAXIPP 0.3.

Figure 7 – Firm-level employment effects

(a) Evolution of the number of worker with a wage between 0.8T to T



(b) Evolution of the number of worker with a wage above T



Notes: the figure depicts the evolution of number of employees whose wage is between 0.8 to 1 T groups (panel 7a) and (panel 7b). T = 1 309k€ is the top bracket threshold. The dashed lines denote the 95% confidence intervals.
Source: Payroll tax data (DADS), firm tax data (FARE) and TAXIPP 0.3.

A Appendices

A.1 Panel regression approach

A.1.1 Building a panel data from administrative datasets

Each yearly payroll tax data contains two years of information. I take advantage of this in order to build an individual panel dataset. The procedure consists of three steps:

- First, for each year y, I consider the year y database and divide it into two databases. The first database contains the information relevant for year $y-1$ whereas the second database contains the information relevant for year y. For each individual, I keep only one observation: the one related to the job with the maximum gross wage.
- The second step performs a matching between the information of year $y-1$ from the database of year $y-1$ with the information of year $y-1$ from the database of year y. The matching is exact for the firm identifier, the municipality of residence, the month and place of birth when available. I allow for a maximum difference of 10€ between the gross wages and for a 1 year difference in age[14]. The outcome of this step is a dictionary of individual identifiers for data of year $y-1$ and of year y.
- The third step puts together all the year-to-year dictionaries and to use them in order to compute a unique individual identifier.

As these steps are very computationally demanding, I do them separately for men and women and append the two final databases. I perform the match for 2010 to 2015, since the scope of the DADS data was extended in 2010 (inclusion of the public sector). Using the information available for 2009 in the 2010 database, I am able to build an individual panel for 2009 to 2015.

A.1.2 Estimation strategy

Equation 2 takes the following first-difference form:

$$\log \frac{z_{it}}{z_{it-1}} = e.\log \frac{1-\tau_{it}}{1-\tau_{i-1}} + \alpha_t + \epsilon_{it} \tag{4}$$

where α_t are year fixed effects.

A panel dataset allows to address the endogeneity issue with a different instrumentation strategy. The classical instrument is defined by the change in the predicted net-of-tax rate $1-\tau^p_{it}$= value of $1-\tau_{it}$ if income is z_{it-1}:

$$X^0_{it} = \log\left(\frac{1-T_t(z_{it-1})}{1-T_{t-1}(z_{it-1})}\right)$$

It is valid under two conditions: the existence of the first stage and the exclusion restriction (instrument uncorrelated with any other determinants of the dependent variable). Yet, according to Weber (2014), this second condition might not be respected and the instrument

[14] Depending on the cases, the age can be the one of the beginning or of the end of the year.

might be still endogenous as it is a function of the dependent variable. Two other identification problems threaten the exogeneity of the instrument, mean reversion and heterogeneous income trends. These two problems are particularly relevant for the study of the 75% tax as they significantly affect top earners. The literature addresses them by using different types of base-year income controls. Yet, Weber (2014) also questions the endogeneity of these income controls and proposes a methodology dealing with it. First, she proposes the following family of instruments, depending on k:

$$X_{it}^{k} = \log\left(\frac{1-T_t(z_{it-1-k})}{1-T_{t-1}(z_{it-1-k})}\right)$$

Second, very high incomes are subject to important variations from one year to another. Indeed, the income can be considered as the sum of a permanent and a transitory component, the latter causing mean-reversion. Kopczuk (2005) proposes to control for the initial level of income by including splines of the log of the base year income and for the transitory income component using splines of log deviation of current income to base year income.

As noted by Saez, Slemrod and Giertz (2012), it is not possible to provide graphical evidence for the panel approach because of the regression to the mean phenomenon.

A.1.3 Estimation results

Table 4.A.1 shows the estimation results for the panel strategy. The columns stand for the labour cost and the net wage. Panel A presents the estimation results relying on the standard predicted net-of-tax rate as an instrument (based on the base year income). Panel B uses further lags of the income in order to construct the instrument. The results of panel A are in line with the repeated cross-section estimates. When using the instrumentation strategy proposed by Weber (2014), the estimates are not consistent any more with the previous results. This problem is inherent with the instrument used: even if it is supposed to be less endogenous, it is also weaker. This lack of consistency illustrates that the higher the incomes, the more difficult it is to disentangle between the response to the tax and mean reversion.

Table 4.A.1 – Elasticities using panel

		Labour cost	Net wage
Panel A. IV: predicted net of tax rate			
A1. No income controls		-0.106	0.201*
		(0.108)	(0.112)
	Obs.	26357	26357
A2. Splines of base year income		-0.187*	0.063
		(0.098)	(0.101)
	Obs.	26357	26357
A3. Restriction of A2 to individuals present		-0.241**	0.007
3 years in a row		(0.109)	(0.112)
	Obs.	16049	16049
Panel B. IV: predicted net-of-tax rate using lagged incomes			
B1. No income controls		0.745***	1.252***
		(0.245)	(0.252)
	Obs.	15994	15994
B2. Splines of base year income		0.257	0.678***
		(0.232)	(0.238)
	Obs.	15994	15994

Notes: Equation 4 (two-years differences) estimated by 2SLS. Controls are sex, log of firm profit. Standard errors in parentheses. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.
Sources: DADS POSTES and FARE 2009-2014

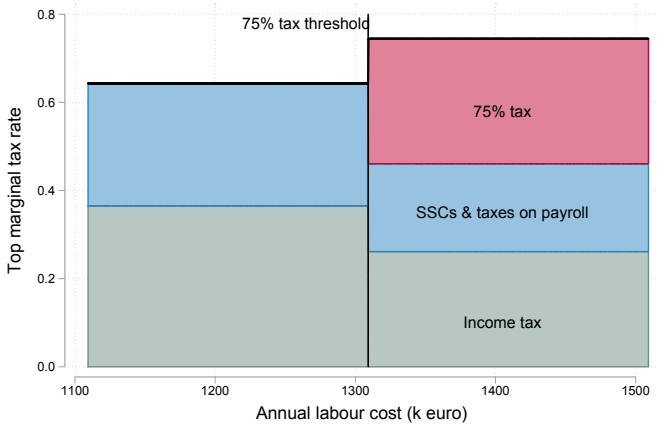
A.2 Additional tables and figures

Table 4.B.1 – Structure of taxation in France (2012)

		% of GDP
Indirect taxes		10.8
Taxes on production or imports		3.1
Progressive and flat income taxes	Flat income tax (CSG and CRDS)	4.7
	Income tax	2.9
Other income taxes		1.0
Corporate tax		2.0
Wealth tax and transfers		1.2
Payroll taxation	Other taxes on payroll	1.5
	Employer SSCs	11.3
	Employee SSCs	4.0
Self-employed labour income taxes		1.3
Compulsory tax rate		**43.6**

Notes: In 2012, compulsory taxes amount to 43.6% of GDP.
Source: National accounts (tables 3.212 and 7.301).

Figure 4.B.1 – Decomposition of the top marginal rate on labour income



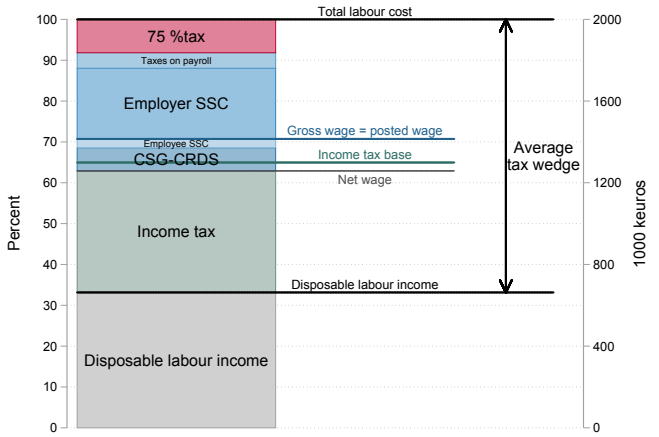
Note: The graph decomposes the total marginal rate of taxation (figure 1 relative to the total labour cost into three components:

1. the marginal income tax rate;
2. a marginal rate aggregating all social security contributions as well as the taxes on payroll;
3. the marginal rate of the 75% tax, introduced in 2013.

The income tax and payroll taxes marginal rates relative to labour cost decrease above 1 309 k€ because the denominator of their marginal rates is impacted by the new tax.

Source: Taxipp 0.3.

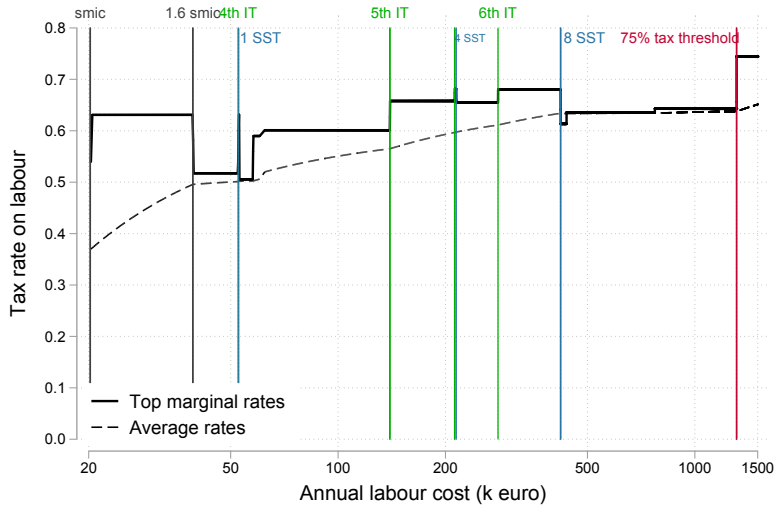
Figure 4.B.2 – Decomposition of the average labour wedge for a labour cost of 2000 k€



Note: in 2013, an employee with 2000 k€ of annual labour cost receives after all payroll and income taxes a disposable labour income of 700 k€, which represents 35% of the initial labour cost. The tax wedge is of 65%. In the law, a tax schedule is defined by tax rates that are applied to a tax base: the tax base for the CSG-CRDS, the SSCs, the taxes on payroll (blue areas) and the 75% tax (red area) is the gross wage and the tax base of the income tax (green) is the income tax base. Yet, only the total labour cost and the disposable income are of interest, as they are in theory the only ones playing an economic role.

Source: Taxipp 0.3.

Figure 4.B.3 – Labour tax rate along the income distribution (2013)

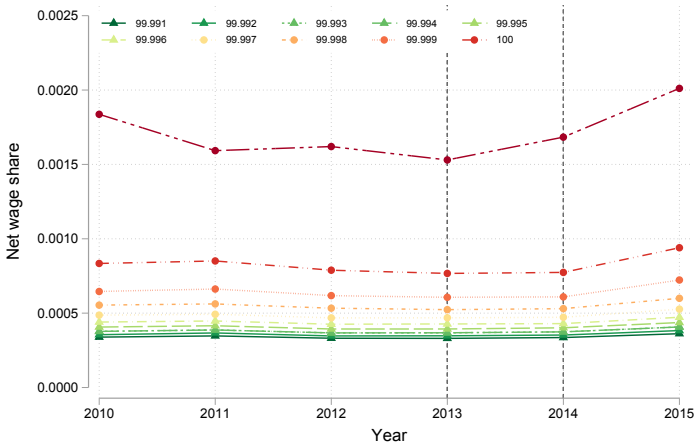


Note: The graph shows the marginal and average rates of taxation relative to the total labour cost for a labour income earner (single, no child) with a labour cost between the minimum wage and 1 500 k€. I assume that labour is the only source of income. The x-axis is in log-scale. The vertical lines show the thresholds of the overall payroll and income tax schedule:

- grey lines are at 1 and 1.6 times the minimum wage;
- green lines are the inferior threshold of the fourth, fifth and sixth income tax (IT) brackets;
- blue lines are the social security thresholds (SST, 4*SST and 8*SST).

Source: Taxipp 0.3.

Figure 4.B.4 – Top income shares



(a) Net wage

(b) Labour cost

Source: Payroll tax data (DADS) and TAXIPP 0.3.