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TO DIVIDEND TAXATION :
EVIDENCE FROM FRANCE**

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Wealth and Income Responses to Dividend Taxation : Evidence from France*

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Abstract

This paper analyzes the responses of wealthy taxpayers to an important increase in dividend taxation in France in 2013. Using an exhaustive panel of French households liable for wealth taxation, we use a difference-in-difference strategy to elicit responses of both incomes and wealth to changes in dividend taxation. Unsurprisingly we observe a decline in dividends payments due to the rise in dividend taxation. This drop is severe enough for the tax hike to actually result in a loss of government revenue. However, we show that this direct response of dividend to its own marginal tax rate is not sufficient to account for the total impact of the reform. Indeed, we document a significant increase in wealth in response to the tax hike on dividends, especially when we focus on financial wealth. This rise in taxable wealth mitigates the impact of the decline in dividends, although it does not completely offset the loss in government revenue.

Keywords : Dividend taxation, Wealth Tax, Efficiency, Difference-in-Difference

JEL Code: H21; H24; H31 ; C23

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1 Introduction

In developed economies, capital income is highly concentrated, especially compared to labor income. France is no exception, as according to [Garbinti et al. \(2021\)](#), the top 1% wealth group owns up to 35% of total capital income, while their share of total labor income does not exceed 4.5%. Besides, this concentration of capital income is significantly increasing since the 80s, while in the meantime the share of labor income of the wealthy is declining. Hence if one is concerned about making the "extremely wealthy pay their fair share"¹, shifting the tax burden towards capital income rather labor income can be appealing. This was actually the policy route followed by the French government in 2012 as they decided to increase capital income taxation.² Although such a policy can have important consequences for inequality, as documented for instance by [Paquier and Sicsic \(2020\)](#), the main rationale was to actually increase government revenue in order to balance French budget and comply with European fiscal rules. In that respect, short run behavioral responses are of first order importance as it will eventually determine the revenue raised by the tax hikes. Estimating these behavioral responses and its consequences for government revenue is the main goal of this paper.

Using the French reform of dividend taxation implemented in 2013, we document how wealthy households can respond to capital income tax hikes. Our objective is not only to unravel the direct response of dividend to its own marginal tax rate but also to detect so-called "cross-base responses", *i.e* changes in other tax bases that could be attributed to the reform. Focusing on wealthy households allows us not only to identify cross-base responses of other incomes, from labor income to rents, but also to elicit changes in taxable wealth. Indeed, at the time of reform, France levied a comprehensive wealth tax so that top wealth owner had to report their wealth to French authority, with the wealthiest ones having to decompose between financial and real estate assets. Thanks to the CASD³, we have an access to both income and wealth tax returns of all French households that allows us to construct a 10-year long panel documenting individual-level evolution of taxable incomes and wealth.

The 2013 reform did not affect all taxpayers as it consists in removing a flat-tax option, called *Prélèvement forfaitaire libératoire* (PFL), which was not used by all households earning dividends. The end of PFL therefore provides an exogenous variation of dividend marginal tax rate for only a subgroup of taxpayers, allowing us to implement a difference-in-difference

¹We quote US senator Bernie Sanders here.

²According to François Hollande's program, these tax hikes were needed to bring capital income taxation closer to labor income taxation.

³Centre d'accès sécurisé aux données

strategy to elicit the causal impact of the reform. We consider as treated taxpayers that have always used the flat-tax option for their dividends and are thus the most likely to be affected by the reform. To find a counterfactual similar to the treated, we choose households with only an intermittent use of PFL for their dividends as our control group. As they have not always chose the PFL option for their dividends, they are likely to be less affected by the reform. Since the PFL option for dividends was created in 2008, this imply that treated households have chosen the flat tax for 5 consecutive years. The average flat tax rate for dividend during this period was of 31.86% and can move up to 40.2% after the removal of PFL, so that the reform provide a salient increase of dividend taxation.

Our main results are the following. First, the increase in dividend tax rates led to a significant drop in dividends reported to tax authorities. This drop is persistent as it amounts to a 44% decrease in dividends 5 years after the reform. Second, we do not find significant responses of other income types, be it labor incomes, fixed incomes or rents. Third, we find a significant cross-base response of taxable wealth, with a more than 11% increase in reported gross wealth. In particular, we identify an important response of financial wealth, especially when excluding liquidity. This non-liquid financial wealth increases by 19% because of the dividend tax hike. This is our main contribution as this cross-base response of taxable wealth to capital income taxation has not been yet documented to our knowledge. Behaviors such as retained earnings could both explain the drop in dividend distribution and the increase in non-liquid assets' value after the reform. Eventually we compute the impact of such cross-base responses on government revenue. Without cross-base responses, the increase in dividend taxes for our treated households led to a shrinking tax base, eventually resulting in a loss of more than 46 million euros for the government. Including the increase of taxable wealth can compensate for up to 24% of the direct loss in tax revenue. Hence wealth cross-base responses mitigate strong direct behavioral responses of dividends but are not sufficient to offset the loss in government revenue caused by the tax hike.

To our knowledge this paper is the first to provide evidences of cross-base responses of wealth to capital income taxes, namely dividend taxation. Our work first relates to the literature estimating the responses of dividend to taxes. Using firm-level data, [Chetty and Saez \(2005\)](#) and [Yagan \(2015\)](#) exploit a decrease of dividend tax rates in the US in 2003 to unravel the elasticity of dividend to its tax rate. [Yagan \(2015\)](#) also provides an analysis of investment reactions to the tax cut and find no significant impact of the policy. Making a similar exercise on French data, [Boissel and Matray \(2021\)](#) document a strong decrease in dividend payments

after a rise in social contribution requirements for a specific category of firm owner. Combining French household level data with firm-level data, [Bach et al. \(2019\)](#) not only estimate the elasticity of dividend to its marginal tax rates but also link it to changes in firms payout policy. The increase in treated firms' equity they identify can explain part of the rise in taxable wealth that we observe at the household level. Exploiting a vast reform of both capital income and wealth taxation in the Netherlands, [Zoutman \(2018\)](#) deliver estimates of the elasticity of taxable wealth with respect to the after tax gross rate-of-return. More precisely, the author combines changes in wealth and capital income taxation to compute the overall variation of the marginal tax rate of returns induced by the reform. In this sense, wealth and capital income taxes are treated as equivalent instruments for taxing returns to savings. Our exercise is different as we study variation of both wealth and income resulting from tax changes of only capital income taxation, namely dividend taxation. In particular, we show that responses of wealth and dividend differ strongly and have actually opposite signs : increasing the marginal tax rate of dividends leads to a decrease in dividends (direct response) and to an increase of taxable wealth (cross-base response).

The rest of the paper is organized as follows. Section 2 provides an overview of the French capital tax system and explains the 2013 reform. Section 3 details our data source and the construction of our panel of French households paying the wealth tax. We present our empirical strategy in Section 4, by providing a definition along with descriptive statistics of the treatment and control groups and by describing our estimation equation. Section 5 gives the theoretical expectation one can have regarding household's behavioral responses to the reform. Our results are presented in Section 6. Section 7 concludes.

2 Institutional Setting

2.1 A brief overview of capital taxation in France before 2013

There exists three ways to tax an asset, be it a financial or a real estate one, in France. First, the government can directly tax the ownership of an asset through property and wealth taxation. Second, the income generated by an asset, be it rents, interests, dividends or capital gains, can also expose a household to taxes. Third, the French government levies taxes on asset transmission through bequest taxation. The relation between these three dimensions of capital taxation can vary across asset types. For instance, the vast majority of French households is not liable for taxes on the ownership of corporate stocks. However, most of them would have

to pay taxes on dividends, *i.e.* on an income associated to stock ownership. Therefore, a basic knowledge of the whole capital tax system before the 2013 reform is needed to understand behavioral responses of household, as their tax profile can vary in a more or less complicated fashion along the three dimensions of capital taxation.

Capital income taxation. Before the 2013 reform, households could choose between two options for the taxation of their dividends, interests and capital gains. First, they could decide to include these incomes within the French personal income tax, called *Impôt sur le Revenu* (IR). In this case, capital incomes are taxed according to a progressive income tax with four brackets until 2012 (5.5%, 14%, 30% and 41%). In 2012, a fifth bracket at 45% is created for income above 150,000 euros. As this paper focuses on dividends, it is worth mentioning that dividends taxed at the IR benefit from a 40% tax rebate, lowering the top marginal tax rate on dividends roughly to 27% (60% of 45%). Before 2013, there was a second option for capital income taxation called the *Prélèvement Forfaitaire Libérateur* (PFL). This option, originally limited to some specific capital incomes but extended to dividends in 2008, granted access to a flat tax on capital income instead of the standard progressive income tax. Basically, every year taxpayers can decide whether they use or not the flat tax option for their dividends. The PFL rate for dividends has gradually increased from 18% in 2008 to 21% in 2012, before the removal of this option with the 2013 reform. Eventually, note that on top of the IR or the PFL, capital incomes are submitted to social contributions, with a flat-rate ranging from 12% in 2008 to 15,5% in 2012. For taxpayers, the choice between the PFL or the IR was not necessarily obvious, as it depends on the amount of dividends but also family composition⁴, tax credits, labor income, pensions and other taxable income.

Wealth taxation. Until 2017, the French government levied a wealth tax on rich households named *Impôt de Solidarité sur la Fortune* (ISF). The wealth threshold above which one had to pay the ISF was 800,000 euros in 2008, with a tax base including real estate, luxury goods and financial assets. Work-related properties are not included in taxable wealth.⁵ Although there has been some reform of the ISF between 2008 and 2013, with for instance a raise in the threshold from 800,000 to 1,3 million euros, it remained a progressive wealth tax with 6 brackets in 2013, ranging from 0.5% to 1.5%. In 2018, financial wealth has been excluded from

⁴In France, taxable income depends on the number of tax units called *part fiscale*, with 1 unit per adult, 0.5 unit for the two first children and 1 unit for the other children. Roughly speaking, taxable income = income/total number of units.

⁵A taxpayer who owns assets of a firm she is working in can qualify these assets as Work-related properties, under certain conditions. For instance, she has to prove that these assets are needed for the activity of the firm and that her activity in the firm is her main activity. In particular, a household has to own at least 25% of the firm equity to qualify their closely-held-stock as Work-related property.

taxable wealth and the ISF turned into a tax on housing wealth, becoming an *Impôt sur la fortune immobilière* (IFI).

2.2 The 2013 reform

In 2013, capital income taxation is modified with the removal of the PFL option for most of capital incomes (with the exception of life insurance products and other very specific saving products). Therefore dividends became necessarily taxed at the personal income tax rate while still benefiting from the 40% tax rebate. For instance, the marginal tax rate on dividends of a household in the 45% bracket in 2013 rises from 36,5%⁶ to 40,2%⁷ after the reform.

3 Data

3.1 Data Source

We use two data set provided by the French General Direction of Public Finance (DG-FIP) on the CASD : the personal income tax files and the wealth tax files.⁸

Personal Income Tax Records : We use the POTE⁹ files to have access to all the information, regarding income, age or family composition, filled by taxpayers on their personal income tax report.¹⁰ The data set is exhaustive and provides an encrypted identifier so that we can follow taxpayers for several years and create a panel data. Besides, note that personal income tax records are pre-filled by fiscal authorities using information directly transmitted by employers, public administration or banks. It therefore appears as a particularly reliable data source.

ISF/IFI. We also use the ISF/IFI files to get information on the wealth of taxpayers, be it financial or housing wealth. These files contain all the items of the wealth tax declaration, with the same encrypted identifier as the POTE files so that we can match the wealth tax record of an household with its personal income tax report. However, not all households subject to wealth taxation have to precisely fill the wealth tax report since those below a certain thresh-

⁶36,5% is the sum of the 21% PFL rate and the 15,5% social contribution rate in 2012.

⁷Taking into account the 40% tax rebate and the tax deduction of 5.1% of social contributions when dividends are taxed at the IR, we have : $40,2\% = 0,6 * 0,45 + 0,155 - 0,45 * 0,051$

⁸Centre d'accès sécurisée aux données

⁹Fichier permanent des occurrences et des traitements

¹⁰More precisely this includes all the items of the 2042 and 2042 complementary tax returns.

old¹¹ only report their total net wealth. Since we examine the responses of different component of wealth in this paper, we focus on taxpayers who have to report separately real estate and financial wealth, using the 2725 wealth tax report.

3.2 Data Construction

The main difficulty when using fiscal data is to create stable income and wealth aggregates, despite the various changes in tax boxes resulting from changes in legislation. To create stable income aggregates that we can track year upon year, we use the Tax and Income Survey (ERFS) produced by the French National Institute of Statistics and Economics (INSEE). Wealth variables are less prone to tax box changes so that we only use the handbook provided by the fiscal administration to construct our aggregates.

Once the various income aggregates for each year constructed, a cylindrical panel of tax returns is build using the encrypted tax identifiers corresponding to household and tax filer "1". This technique excludes from our study households that experienced divorce, death, PACS or marriage between 2008 and 2017.

4 Empirical Approach

4.1 Sample of analysis

In this paper we use a difference-in-difference strategy to examine the behavioral responses of rich taxpayers to an increase in dividend taxation. More precisely we are interested in the cross-base response of wealth aggregates, especially financial ones, to an exogenous increase in dividend taxation, namely the end of PFL in 2013. To do so we compare a group of household that is likely to be strongly affected by the end of PFL to a group that is likely to be less affected by the 2013 reform. We start from two balanced panel. The first one is composed of all households liable for the ISF (*i.e* the wealth tax) every year between 2008 and 2017. We use this panel to track the responses of dividends and other incomes to the removal of PFL in 2013. The second one is a subsample of the first one, as we focus on households liable for the ISF who have to decompose their holdings of assets between financial and real estate ones. We often refer to the first sample as the "large panel" and to the second one as the "constrained panel".

¹¹For instance in 2017, households submitted to wealth taxation but with net taxable wealth below 2,57 million euros did not need to fill a complete wealth tax record.

Definition of treatment and control group. Our treatment group is composed of all households who have used the PFL for their dividend every single year between 2008 and 2012, which is the period where the PFL was available for dividends. These households, either because of their marginal income tax rate, their dividend level or their family composition, have always used the PFL and are therefore likely to be strongly affected by the removal of this option in 2013. We compare this treated households to taxpayers that had an intermittent use of PFL. Therefore our control group is composed of households who have used the PFL between 2008 and 2012, but not every year. These households, as they have been interested in the PFL at some point, are likely to be similar to our treated households. However, as they did not always use the PFL for their dividends, they are likely to be unaffected or less affected by its removal in 2013.

4.2 Descriptive Statistics

In table 1 we provide descriptive statistics on the treatment and the control groups in both large and constrained panels. The large panel is composed of 18 880 households which represent all taxpayers liable for the ISF who have used the PFL at least once between 2008 and 2012. 3 271 have declared their dividends at the PFL every year between 2008 and 2012 and therefore belong to the treatment group while 15 609 have had only an intermittent use of the PFL and belong to the control group. We report population average and standard of deviation of several income categories, family composition and age in both groups. Total income is the sum of all income perceived by the members of an household during a given year.¹² Here labor income is understood in a broad way as it includes not only wages but also pensions, unemployment benefits and business incomes of liberal professions.

The objective is to provide a first comparison between the treatment and control group. Households in the treatment group have on average higher incomes than those in the control group, be it labor incomes, dividends or fixed capital income. In particular, treated households declared three times more dividends in 2011 compared to those in the control group. This is not surprising as both higher dividends and higher total income, implying higher marginal tax rates, can explain the choice of the PFL instead of the regular personal income tax. Note however that on average households in the control group are larger with 2,3 tax units against 2,1 in the treatment group, given that a couple has 2 fiscal units while a couple

¹²More precisely it corresponds to the *Revenu Fiscal de Référence (RFR)* which is more or less the French equivalent of the American Adjusted Gross Income (AGI).

| <i>Large Panel - 18 880 household</i> | | | | |
|---|------------------------------------|-----------|-----------------------------------|-----------|
| Variable | Treatment group - 3 271 households | | Control group - 15 609 households | |
| | Mean | SE | Mean | SE |
| Total Income | 785 252 | 1 997 100 | 431 724 | 1 257 250 |
| Labor Income | 202 884 | 258 215 | 156 466 | 217 019 |
| Dividend | 439 034 | 1 670 092 | 142 576 | 639 948 |
| Fixed Income | 25 131 | 61 614 | 21 182 | 99 407 |
| Nb Tax Units | 2.130 | 0,84 | 2.29 | 0,86 |
| Age | 60,99 | 10,83 | 61,99 | 10,78 |
| <i>Constrained Panel - 6 750 households</i> | | | | |
| Variable | Treatment group - 1 521 households | | Control group - 5 129 households | |
| | Mean | SE | Mean | SE |
| Total Income | 1 149 506 | 2 831 269 | 683 990 | 1 704 453 |
| Labor Income | 241 346 | 342 680 | 186 958 | 308 393 |
| Dividend | 657 207 | 2 383 620 | 256 677 | 981 539 |
| Fixed Income | 39 903 | 84 549 | 43 514 | 163 177 |
| Total Gross Asset | 6 994 264 | 5 865 503 | 7 669 037 | 9 333 424 |
| Real Estate Asset | 1 825 363 | 1 854 535 | 1 826 352 | 1 759 709 |
| Financial Asset | 4 386 195 | 5 253 482 | 4 561 150 | 8 606 755 |
| Nb Tax Units | 2.257 | 0,80 | 2,257 | 0,84 |
| Age | 63,47 | 11.06 | 63,54 | 10,97 |

Table 1: Descriptive Statistics on the treatment and control groups in the large and constrained Panels in 2011

with 1 child has 2,5 fiscal unit. Unsurprisingly households in this part of the wealth distribution are relatively old, although they are on average one year older in the control group (62 years old) than in the treatment one (61 years old). In the constrained panel we only consider the richest households who therefore had to fill an ISF form and especially to distinguish between financial and real estate assets. Within this subsample, 1 521 have always used the PFL while 5 219 only used it occasionally. Although the treated still earned higher income in 2011, they declared 2,5 times more dividend than the control group so that the gap between treated and untreated is less important. Regarding wealth levels in 2011, the treatment and control group appear quite similar, be it in real estate or financial wealth. Financial wealth, which include corporate share, bonds, treasury bill, cash and deposit, is slightly larger in the control group (around 4,6 million euros) than in the treatment one (around 4,4 million euros) while real estate is almost identical in both groups (around 1,8 million euros).

4.3 Estimation

We want to estimate the following equation for all households in our sample over the period 2008-2017.

$$\ln(y_{i,t}) = \alpha + \sum_{k \neq 2011} \beta_k \mathbb{1}_{t=k} \times \mathbb{1}_{\{i \in \text{Treated}\}} + \sum_{k \neq 2011} \delta_k \times \mathbb{1}_{\{t=k\}} + \omega_i + u_{i,t} \quad (1)$$

where $y_{i,t}$ is our variable of interest for household i at time t and $\mathbb{1}_{\{i \in \text{Treated}\}}$ is a dummy equal to 1 for household i belonging to the treatment group. ω and δ are household and time fixed effect, respectively. ω captures the time-invariant difference between households while δ reflects changes over time that affect all households. Standard errors are clustered at the household level. Instead of directly estimating equation (1), we get rid of the household fixed effect ω_i by normalizing $\ln(y_{i,t})$ in 2011 :

$$\ln\left(\frac{y_{i,t}}{y_{i,2011}}\right) = \alpha + \sum_{k \neq 2011} \beta_k \mathbb{1}_{t=k} \times \mathbb{1}_{\{i \in \text{Treated}\}} + \sum_{k \neq 2011} \delta_k \times \mathbb{1}_{\{t=k\}} + u_{i,t} \quad (2)$$

The coefficients we are interested in are the β_k that capture the difference between the treatment and the control groups in a given year k relative to the year 2011. We chose 2011 as our baseline year since the reform is announced in 2012 and could therefore affect dividends earned in 2012. 2011 is therefore the last year unaffected by the end of PFL. The identification hypothesis is that absent the suppression of PFL in 2013, household in the treatment group would have evolved in the same way as households in the control group. Although this assumption cannot be verified, the dynamic specification of (2) allows us to assess the credibility of this so-called "parallel trend" hypothesis by checking if coefficients β_k are not statistically significant for $k < 2011$.

5 Theoretical prediction

Theoretically, an increase of the marginal tax rate on dividends could trigger ambiguous responses, depending on the relative strength of income and substitution effects. Indeed, for a given level of before-tax income, the reform decreases after-tax income. If income effects dominate, household will compensate this decrease in after tax income by increasing their dividends. However, some income sources have not been affected by the reform. Therefore agents could compensate the decrease in after-tax income after the reform by substituting dividend payments with these unaffected income types. Interests have also been concerned by the end of PFL so one can think of at least three income sources that have become relatively more profitable after the reform :

- Labor income : in France, labor income has always been taxed at the progressive income tax schedule so the end of PFL does not affect labor income marginal tax rate. When

thinking about substitution between labor income and dividends, it is important to distinguish responses in labor supply from pure income shifting. Indeed, some households who own private businesses can to some extent switch their compensation from dividends to wages. This pure income shifting is only driven by fiscal considerations and is not related to actual changes in labor supply. On the other hand, households who do not have the leeway of choosing their compensation scheme could still substitute dividends with labor income by increasing their labor supply.

- Rents : Income from real estate investments, be it rents or taxable gains, could not be taxed at the PFL so were not affected by the 2013 reform. Rents could therefore provide an alternative to dividends although the taxation of real estate property might have changed during the period 2013-2017, depending on the location of the good. ¹³
- Capital gains : Before 2013, capital gains were taxed at the PFL so this source of income has been affected by the 2013 reform. However, depending on the type of assets sold or the date of acquisition of the asset before the sell, capital gains taxation can decrease substantially. These tax deductions for capital gains were not removed by the 2013 reform so that realizing such gains could provide an alternative to dividends.

A rise in dividend taxation can be seen as a tax increase of the underlying asset paying dividends. Therefore behavioral responses to dividend taxation can affect households' asset portfolio, be it through changes in asset value or portfolio composition. For instance, firms owned or partially controlled by households using the PFL might reduce dividends distribution because of the 2013 reform. Such retained earnings could therefore increase the value of the firm so that the value of assets owned by treated household would increase because of the end of PFL. This would be coherent with a substitution from dividends to capital gains compensation. In this sense, households could also change their portfolio allocation by substituting stocks from firms compensating their shareholders with dividends to firms with rising stock prices, compensating shareholders through capital gains. On the other hand, a strategy substituting dividends with rents would imply a reallocation of households' portfolios from financial to real estate assets.

¹³Property taxes are decided at the municipality level and could have increased in some places at the same time as the PFL ended. Besides, some cities like Paris introduced rent caps that could also have affected the profitability of real estate investments

6 Results

6.1 Responses of dividends and other incomes to the 2013 reform

As the 2013 reform induces an increase of the marginal tax rate of dividends for treated households relative to the control group, we first display the evolution of dividends between 2008 and 2017 in both groups. It appears from Figure 1 that dividends follow a similar pattern in both groups until 2012 before diverging from 2013 to 2017. Indeed, although dividends falls significantly in both groups when the PFL is removed in 2013, the treatment group experiences a more severe drop than the control one. This divergence is persistent since the gap between the treated and the control household does not reduce after the choc, while both groups declare far less dividends in the post-reform period compared with pre-reform years. It is not surprising though that both groups experience a decline of dividends, since households in the control group might have been directly affected by the end of PFL as well, although in a less severe fashion than the treated. Besides, firm-level decisions to decrease dividend payments affect all shareholders, independent of their exposure to the end of PFL. For instance, if households in the control group have stocks from a firm controlled by treated households, then they are likely to be affected by a decision of the firm to decrease dividends.

As discussed in section 5, the end of PFL in 2013 could have impacted not only dividends but also other types of income. To explore the potential responses of other incomes to the reform, we display in Figure 2 the evolution of labor incomes, fixed incomes and rents in the treatment and in the control group between 2008 and 2012. It appears from this comparison exercise that labor income have not been affected by the reform, with the two groups experimenting a quite flat labor income dynamic. At this stage, a substitution between labor income and dividends, either due to pure income shifting or to an increase in labor supply, seems unlikely. Regarding fixed income and rents, the two groups exhibit similar dynamics before the reform and a small divergence in 2013 and 2014, that disappear at the end of the period. So far, the end of PFL does not seem to have really impacted other incomes than dividends.

To rigorously establish the causal impact of the reform, we graph in Figure 3 the estimates of the β_k coefficients of equation (2). It first appear that the two group experiment similar trend before the reform as the β_k are not statistically significant before 2013, except for dividends in 2009, which is encouraging regarding our identifying assumption. As expected, the increase in dividend taxation induced by the reform has triggered an important drop in

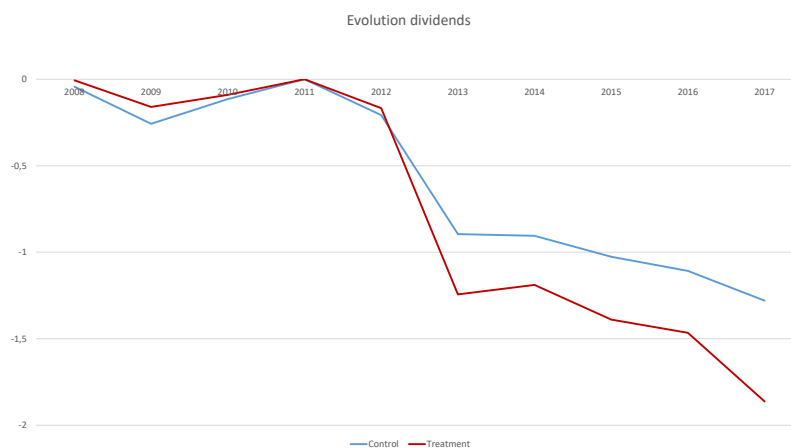


Figure 1: Evolution of the average log dividend normalized in 2011, in the treatment and in the control group - large panel.



Figure 2: Evolution of averages log labor incomes (top left), rents (top right) and fixed incomes (bottom), normalized in 2011, in the treatment and in the control group - large panel

dividends, with treated households declaring 30%¹⁴ less dividends in 2013 compared to the control group. This drop is persistent and becomes even more severe by the end of the period, with dividends eventually falling by 44%¹⁵ in 2017. Besides, it seems that other income types have not been used as substitute of dividend payments, as labor income for instance appear

¹⁴ $\exp(\beta_{2013}) - 1 \simeq \exp(-0.35) - 1 \simeq -0.3$

¹⁵ $\exp(-0.58) - 1 \simeq -0.44$

completely unaffected by the reform. Regarding fixed income, we can detect a statistically significant increase in 2013 but this effect vanishes quickly. Besides, looking at Figure 2 shows us that this small positive effect is due to a decline in fixed income of the control group and not to an increase in the treatment group.

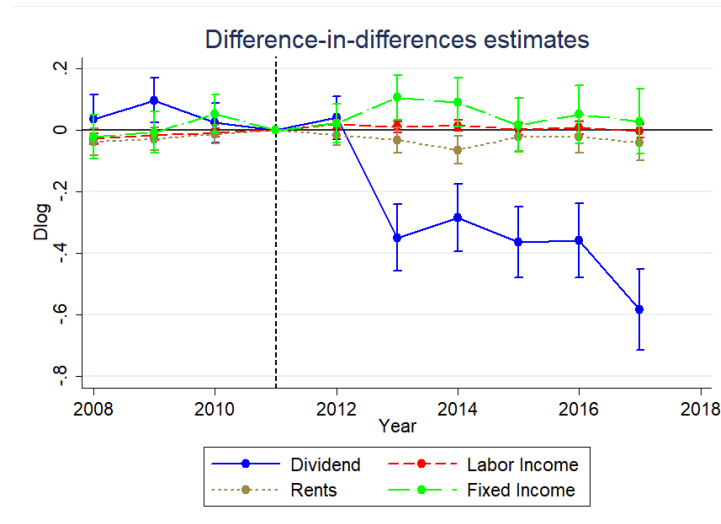


Figure 3: Estimates of the β_k coefficients in equation (2), for dividends, labor income, rents and fixed income. We display confidence interval at the 95% level with standards errors clustered at the household level.

6.2 Responses of wealth to the 2013 dividend reform

The end of PFL and the induced increase of the marginal tax rate of dividends has therefore generated a massive and persistent drop in dividends declared to fiscal authorities. However, this reform does not seem to have triggered significant cross-base responses of other incomes. In particular labor incomes of wealthy French households appear quite unaffected according to our estimates, ruling out income shifting behaviors. Nevertheless, as explained in section 5, changes in dividend taxation could not only impact incomes but also wealth, through changes in asset choices or in asset values. In particular, financial wealth, which includes assets that pay dividends, could be affected by the reform.

As discussed in section 3, not all households paying the wealth tax have to fill a detailed report with a decomposition between financial and housing wealth. Throughout this section we therefore focus on the constrained panel composed of households that had to precisely fill a wealth tax report between 2008 and 2017. To gauge the effect of the reform on financial wealth, we start by looking at the evolution of financial wealth in the treatment and in

the control group between 2008 and 2017. Looking at the left graph of Figure 4, it appears that financial wealth evolves in a similar fashion in both groups between 2008 and 2011. Besides, descriptive statistics in Table 1 indicates that in 2011, average financial wealth level amounts to a similar amount in both groups. However the two groups start diverging in 2012 with a widening gap between 2014 and 2017. Although dividends did fall in 2012, the divergence between the two groups only occur when the PFL is removed in 2013. This divergence in financial wealth in 2012 could be interpreted as a reaction of the increase of PFL in 2012, with the flat tax rate on dividends increasing from 32.5% to 36.5% between 2011 and 2012. The gap between the two group is even more striking when we exclude liquidity, *i.e* cash, deposit and liquid savings account, from financial wealth as shown in the right graph of Figure 4. Excluding liquidity allows us to focus on assets that are likely to pay dividends, such as corporate stock. While the value of such assets remains quite flat in the control group between 2014 and 2017, it increases substantially in the treatment one.

Our difference-in-difference analysis, depicted in Figure 5 indicate a positive, statistically significant and persistent impact of the reform on financial wealth. We do not detect a statistically significant pre-trend, especially when we exclude liquidity from financial wealth with a point estimate being really close to 0, so our identifying assumption appear plausible. Using our estimates for 2017, the increase in dividend taxation led to a 19%¹⁶ increase in non-liquid financial wealth. It appears from this analysis that the end of PFL did not alter the financial wealth accumulation process of rich French households, on the contrary. Such an increase in assets value is coherent with a substitution from dividends to capital gains compensation, be it either through a portfolio reallocation towards growing businesses or through a retained earnings behavior that mechanically augments assets' value. Note that if financial assets rise mainly because of retained earnings, then our estimates is likely downward biased as stocks from a company mainly owned by the household is excluded from taxable wealth. In any case, it seems that part of the lost dividends can be found, and actually can be taxed, by looking at the asset side of households' tax profile.

While the end of PFL does not seem to have reduced investment in financial assets, some taxpayers might still have re-balanced their investment towards real estate. Although a look at Figure 3 indicates an absence of responses of rents to the reform, with even a slight decrease in 2014, it is still possible that households increase their real estate investment, as the taxation of such assets is left unchanged by the reform. This is why we look at the evolution of

¹⁶ $\exp(0,18)-1 \simeq 0,19$



Figure 4: Evolution of average log financial wealth, with (left) and without (right) liquidity, normalized in 2011, in the treatment and in the control group - constrained panel

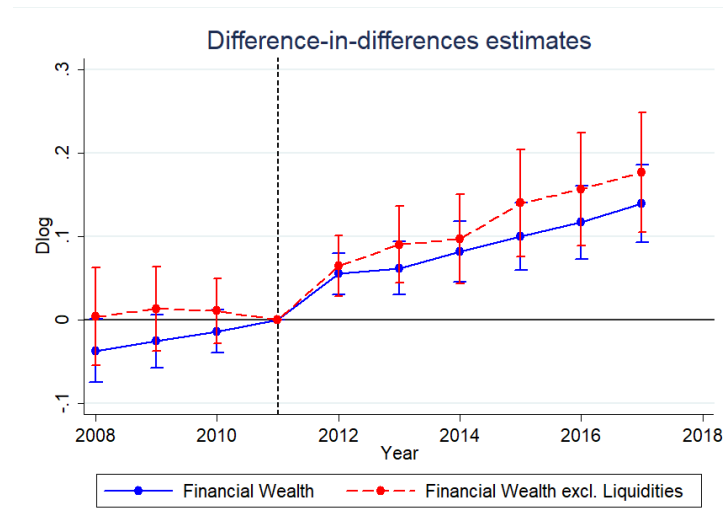


Figure 5: Estimates of the β_k coefficients in equation (2), for financial wealth, with and without liquidity. We display confidence interval at the 95% level with standards errors clustered at the household level.

housing wealth, as opposed to financial wealth, in both groups in Figure 6.

As one could have expected from descriptive statistics of Table 1, both groups display similar pattern regarding their housing wealth profiles before the reform. It appears from the left graph that the growth of housing wealth is slightly more important in the treatment group from 2014 to 2017, a divergence that is more striking when we exclude primary residences and therefore focus on a more investment-oriented definition of real estate. Our difference-in-difference estimates displayed in Figure 7 indicate that there is no statistically significant impact of the reform on total housing wealth, while we detect a slightly positive impact of 5.5%



Figure 6: Evolution of average log housing wealth, with (left) and without (right) primary residences, normalized in 2011, in the treatment and in the control group - constrained panel

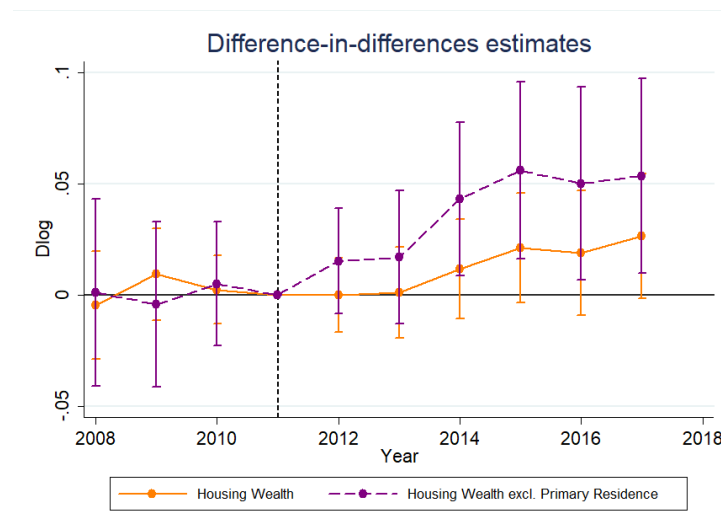


Figure 7: Estimates of the β_k coefficients in equation (2), for housing wealth, with and without primary residences. We display confidence interval at the 95% level with standards errors clustered at the household level.

¹⁷ when we exclude primary residences. Hence we cannot rule out an increase of investment in real estate after the reform, although the magnitude of this effect is not of the same order as the increase in financial wealth.

To get a sense of the overall impact of the dividend tax hike on wealth, one can aggregate all the responses of taxable wealth by directly looking at the evolution of gross wealth, as displayed in Figure 8. Unsurprisingly the evolution of gross wealth is aligned with our previous findings on financial and housing wealth so that treated households experience a stronger growth than control ones. Hence our difference-in-difference estimates for gross wealth, dis-

¹⁷ $\exp(0,053)-1 \simeq 0,055$

played in Figure 9 indicate a significant positive response of treated households to the dividend tax hikes, with an increase of 11.3% by 2017.



Figure 8: Evolution of average log gross wealth, normalized in 2011, in the treatment and in the control group - constrained panel

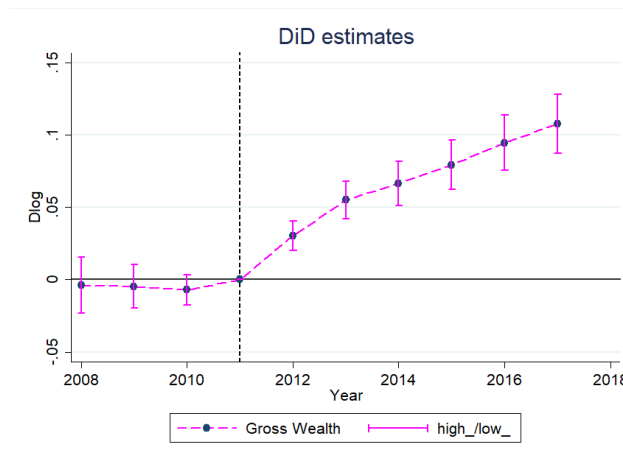


Figure 9: Estimates of the β_k coefficients in equation (2), for gross wealth. We display confidence interval at the 95% level with standards errors clustered at the household level.

6.3 Responses in terms of government revenue

It appears that the 2013 reform has triggered several significant responses of households' dividends and wealth. Among the many consequences such responses can have on welfare, we focus here on the impact of the reform on government revenue. We can quantify this impact using the following formula¹⁸:

$$\Delta \text{GovRevenue} = \text{Dividend} \times \Delta \tau_{div} + \Delta \text{Dividend} \times \tau_{div} + \Delta \text{Wealth} \times \tau_w \quad (3)$$

We can decompose the right hand side of equation (3) as the following :

¹⁸We do not identify responses of other incomes than dividends so we only include the cross-base response of taxable wealth in equation (3).

- The first term embeds the **mechanical effect** of the increase of dividend taxation, absent behavioral responses of households.
- The second term reflects the **direct behavioral responses of dividends** resulting from the reform on dividend taxation.
- Eventually our identification of significant responses of taxable wealth leads us to include a third term with the **cross-base response of wealth** to the increase of dividend taxation.

Hence our calculation of the impact of the reform on government revenue depends on the value we attribute to these three terms of equation (3). The result depends on which behavioral responses are taken into account and are summed up in Table 2.

| Mechanical Effect | Behavioral Responses | | Total Effect |
|-------------------|----------------------|---------|--------------|
| 68,13 | Dividend | -114,52 | - 46,39 |
| | NonLiq-FinWealth | 8,48 | - 37,91 |
| | GrossWealth | 11,05 | - 35,34 |

Table 2: Impact of the 2013 tax hike on dividends on government revenue, in million of euros

As we do not observe wealth of taxpayers in the large panel, our calculation is based on the the 1 521 households in the treatment group of the constrained panel. To account for the volatility of dividends and the changes of the flat tax rate between 2008 and 2012, we average both dividends and τ_{div} between 2008 and 2012. On average, the 1521 households in the treatment group have declared 537 116 euros of dividends between 2008 and 2012. Hence our tax base of dividend before the reform amounts approximately to 817 million euros. The average flat rate on dividends in the pre-reform period is of 31.86%. Assuming that all treated households would have been in the last bracket of the personal income tax after the reform, absent any behavioral responses, we use a 40.2% marginal tax rate on dividend after the reform. This yields a Δt_{div} of 0.0834. This therefore implies a mechanical increase of government revenue after the reform of 68,13 million euros, as displayed in the first column of Table 2. Using our estimated 44% drop in dividends, direct behavioral responses induce a loss of more than 114,5 million euros of government revenue. Hence by looking only at the direct effect of the reform, we find that the increase of dividend tax rates actually led to a loss of more than 46 million euros for the government.

Now, there exists several ways to include the cross-base response of wealth. Both theory and our estimation indicates that non-liquid financial wealth is the main component of taxable wealth to react to dividend taxation. On our sample, taking the average during the pre-reform period, non-liquid financial wealth amounts to approximately 4.5 billion euros. Besides,

we have estimated that non-liquid financial wealth has increased by 19% because of the reform. Assuming a 1% marginal tax rate on wealth, this would imply a gain of 8.4 million euros for the government. Hence the total effect on government revenue, accounting for both direct and cross-base responses, of the 2013 reform would amount to a loss of roughly 38 million euros. Note however that other components of wealth are likely to have responded to the dividend tax hike. Therefore, if instead of using our estimate for non-liquid financial wealth, we use our 11% estimated hike in gross wealth, applied to the 6.4 billion euros of gross wealth reported by the treated households, then government losses decrease to roughly 35 million euros.

Including the cross-base response of wealth therefore diminishes the direct loss (mechanical + behavioral response of dividends) imputed to the dividend tax hike. This mitigating effect lies between 18 and 24% of the direct loss, which is not sufficient to offset the strong behavioral response of dividends but is significant enough to be taken into account.

7 Conclusion

This paper provides estimates of behavioral responses of taxpayers to changes in dividend taxation using a panel of French taxpayers. It appears that dividends react strongly to their own marginal tax rate with an important decrease in dividends reported to tax authorities after a hike in dividend taxation. This result is in line with findings of the existing literature on dividend responses to taxes. We however suggest that in presence of a wealth tax, estimating only the responses of dividends is not sufficient as wealth is also likely to respond to the tax hike. Indeed, we show that while dividends significantly decline after the reform, wealth and especially non-liquid financial wealth, increases. Although this rise in taxable wealth does not compensate the loss in government revenue attributed the decrease in dividends, it mitigates the negative impact of the reform. This cross-base responses and the link between dividend payments and taxable wealth advocates for a comprehensive approach when measuring the impact of tax reforms.

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