Follow the money!
Why dividends overreact to flat-tax reforms *

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December 2021

Abstract

We estimate behavioral responses to dividend taxation using recent French reforms: a rate hike and, five years later, a cut. Exploiting tax data at household and firm-level, we find very large dividend tax elasticities to both reforms. Individuals who control firms adjust dividend receipts instantaneously, accounting for most of the aggregate dividend reaction. Investment is insensitive to dividend taxation, except in small firms whose reaction is moderately negative. Dividend adjustments are instead driven by corporate saving, as owner-managers treat firms as tax-free saving vehicles. Small businesses' profits decline following dividend tax increases, suggesting firms also serve as tax-free consumption vehicles.

Keywords: Dividend tax ; Intertemporal income shifting ; Firm behavior.

JEL codes: G35, H24, O16.

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1 Introduction

Over the last three decades, a flurry of reforms leading to much lower dividend tax rates has taken place.[1] These reforms typically generate massive surges in the amount of dividends received by households, suggesting that these tax cuts "pay for themselves" (Poterba, 1987, 2004). The ensuing dynamism of dividends has however raised equity concerns (Saez and Zucman, 2019), eventually leading some governments, in 2013 in France and in 2021 in the US, to cancel preferential dividend tax regimes. Whether they go in one or the other direction, dividend tax reforms are appealing to policymakers because their effects on dividend receipts are so quick and strong. Yet, such reactivity is desirable only if it reflects changes in real economic behavior, which have proven difficult to distinguish from tax optimization responses (Saez *et al.*, 2012). The goal of this paper is to provide such a joint assessment of real and avoidance responses to dividend tax reforms.

To this end, we investigate two French reforms of dividend taxation, which were both followed by large variations of total dividends in the national accounts: a tax hike which occurred in 2013, and a tax cut implemented in 2018. We investigate which households exhibit a large responsiveness, and highlight the distinctive role of owner-managers of privately held firms. We then thoroughly identify the response margins through which these households adjust their dividend receipts.

There is a data challenge in fulfilling this task. This is because dividends are the result of decisions made simultaneously by firms and households. Faced with higher tax rates, households may choose to divert their savings away from dividend-paying assets, while firms may distribute fewer dividends to favor other forms of payouts to investors. These choices may be made independently

[1] In the nineties, Nordic countries have been forerunners of this trend with the implementation of the so-called dual income taxation, which taxes separately capital income, with a flat rate tax, at lower level than top marginal income tax rates (see Sørensen, 1994). Other countries followed this trend: the US in 2003, Spain in 2007, France in 2008 and 2018.

of each other, or they may instead be a joint decision as is the case when the main owner of a business is also its manager. In the latter case, opportunities for income shifting between the company tax base and the personal tax base abound, either between personal and corporate income or between the various ways in which a manager may be remunerated (Gordon and Slemrod, 2000; Kopczuk and Zwick, 2020). Investigating all those potential avoidance mechanisms requires having access to both household-level and firm-level data, and to data granular enough that one can identify the household dimension in corporate data and vice-versa.

To fulfil these data requirements, we exploit newly-available administrative tax data. First, we have access to the universe of French personal income tax returns matched with wealth tax files from 2006 to 2019. We obtain information on whether individuals are firm managers or whether they hold equities with a certain degree of control over firms. Second, we have access to the universe of French corporate income tax returns, covering both listed and unlisted firms from 2000 to 2020, and providing the tax situation as well as the ownership structure, complete balance sheet, and profit and loss account of each firm.

The second challenge in accounting for the tax elasticity of dividends is one of identification, as dividends are a volatile source of income (Chetty and Saez, 2005) distributed by profitable companies and received by wealthy households. To address this challenge, we exploit two large French flat-tax reforms, of opposite directions. In 2013, President Hollande abolished a flat-rate withholding tax for dividends, as a result of which the top marginal tax rate on dividend increased from 36.5% to 40.2%. In 2018, President Macron re-introduced a flat-rate withholding tax for capital income whereby top incomes may now reduce their marginal tax rate on dividends from 40.2% to 30%.We implement two distinct difference-in-differences strategies on our sample of households and on our sample of firms. Among households, we can precisely identify those affected by the change in personal income tax. In 2013, the tax reform only affects a

small group of very rich and sophisticated taxpayers who were exercising the flat-tax option prior to its suppression—the treated households—and those who were not—our control group. In 2018, the affected group is larger, as all households in the highest two income brackets benefit from the reform. We compare these households whose income (excluding dividends) makes the flat tax option valuable, and we compare their behavior with households with slightly lower income. Because avoidance is more easily available to owners of closely-held firms, we also study the heterogeneity of the behavioral response within treated households, depending on whether the taxpayer is an owner-manager of a firm, has some control over firms' decisions or not at all. Among firms, an intent-to-treat group consists of those for which at least 50% of the shares are directly-held by individuals, including many top income shareholders but not exclusively so. Our control group includes independent firms whose capital is held in majority by legal entities, which are not subject to the flat tax reforms we analyze.

Our main findings are as follows. First, we find very large dividend tax elasticities, even in comparison with the existing literature, both as a response to the 2013 tax increase and to the 2018 tax decrease. Using household data, we estimate that the sophisticated households who exercised the flat tax option prior to 2013 reduced their dividends by 50% when the option disappeared. Using firm data with an intent-to-treat framework, we find that firms owned in majority by individuals reduced their dividends by 14%. The 2018 reform led to marked increases in dividend payments in the same group of firms, reversing almost all the decrease which happened in 2013. Among households, we find an 18% average increase in dividend income for the treated group. This is of a lower magnitude than our estimation of the response to the 2013 tax increase, but the 2018 estimate corresponds to a much larger and less sophisticated group.

Second, we find that the very strong dividend tax elasticity is driven primarily by individuals having some control over firms, either through their ownership or their management of these firms. We identify in 2018 a much stronger

response from owner-managers, who experience an increase of 50% in dividend income, larger than the response observed for treated households with only limited control over closely-held firms and even more so compared to households without any observable control. In 2013, 71% of the very rich households who exercised the flat dividend tax option have either owner-manager status or some other form of firm control.We do not find that households affected by the 2013 reform substituted their dividends with either higher labor incomes, higher interest payments or higher capital gains.

Third, we confirm that dividend tax reforms have no noticeable effect on aggregate investment. Indeed, we observe no reduction of investment following the 2013 tax increase, nor an upsurge following the substantial 2018 tax decrease among the larger firms, which are the firms that matter for the aggregate impact of the reforms, in spite of very large reactions of their dividend payouts. We detect, however, a small impact of both reforms on small businesses, with a negative investment response representing about a third of the dividend response after 2013, and a marginally significant positive response following the 2018 reform. While these results are in contrast to the positive response put forward by Boissel and Matray (2021), we show in the discussion section how they can be rationalized with existing theories tying dividend taxes and investment.

Fourth, we carry out a decomposition of firms' dividend response to identify where the missing dividends may have gone in 2013, and from where the increased dividends have come from in 2018. In 2013, the decrease in dividend payouts can be entirely explained for larger firms by an increase in net corporate savings, leading to intertemporal shifting, i.e. a shift away from today's dividend tax base towards either future dividend or future capital gains tax bases. The response from the smaller firms is somewhat different: some of the response to higher tax rates can indeed be attributed to increased saving within the firm, but three-quarters of the response can be attributed to a reduction in the profits of the firm. We interpret this response as personal consumption within the firm,

although we cannot have evidence from tax files that such behavior should be characterized as fraud.

Related literature. Our work contributes to the literature in four main ways. First, this paper confirms previous papers showing that personal dividend taxation has a large impact on dividend payouts (Chetty and Saez, 2005, 2010; Jacob and Michaely, 2017), with no detectable impact on firms' investment on average (Yagan, 2015; Alstadsæter *et al.*, 2017). Our analysis goes further as we estimate dividend tax elasticities using household-level data, while previous papers only use firm-level data and have to assume a uniform exposure of company shareholders to dividend tax reforms. Such intent-to-treat estimates by nature lead to lower elasticities than the estimates one can obtain with personal tax data. Our decomposition of the dividend response into all potential response margins at firm-level is also novel with respect to the existing literature, which does not explain where the dividend money is surging from.

Secondly, our results relate to the literature documenting income shifting from personal to corporate tax bases, especially among the self-employed and taxpayers with control over firms (Alstadsæter *et al.*, 2014; Alstadsæter and Jacob, 2016; Pirttilä and Selin, 2011; Harju and Matikka, 2016; Miller *et al.*, 2019). These papers typically investigate avoidance behavior among a very large set of business owners in proportion to the general population. This prevents a specific analysis of the richest business owners, even though their response disproportionately contributes to the aggregate response to dividend taxation. In contrast, our empirical analysis is made in a relatively big country, France, in which flat rates on dividends were predominantly attractive to the very highest segments of the income distribution. We show that, even in this highly relevant context in which the businesses owned may no longer be considered small, intertemporal shifting around dividend tax reforms accounts for the bulk of the dividend response to taxation.

Third, our paper is related to the theoretical debate around dividend taxation. Previous results have highlighted that the lack of response from investment is hard to reconcile with the traditional model of the user cost of capital (Yagan, 2015). Alternative models of corporate taxation have pointed to the role of principal-agents relationship—between shareholders and managers—to rationalize the empirical impact of dividend taxation (Chetty and Saez, 2010). Our results point to a simple rationale for low or null investment responses to changes in the apparent cost of capital: the cost of capital is in reality not affected by changes in dividend taxation because income shifting dramatically reduces the effective impact of the tax on households' total income. Owner-managers of firms have no agency conflict and can integrate their personal finances with those of the firm. This corporate structure is widespread in the economy: apart from listed firms, which are known to show little sensitivity to tax reforms (Michaely and Roberts, 2011), the firms we study span the whole distribution of firm sizes, and can explain almost all of the variation in dividend aggregates observed in national accounts.

Finally, this research is to be placed among a series of recent papers evaluating tax reforms that took place in France since 2012 using newly-available administrative data. Guillot (2019) studies the impact on the top of the income distribution of the 75% marginal income tax rate introduced in 2013, Aghion *et al.* (2019) exploit tax records to estimate the taxable income elasticity and Lefebvre *et al.* (2019) exploit household tax data to estimate behavioral responses to changes in capital income taxation in 2013. We depart from them by incorporating owner-managers and firms into the picture and identifying where the missing dividends are going. Boissel and Matray (2021) use a secondary extraction of the firm-level tax data we use in this paper to study an anti-avoidance scheme implemented also in 2013 for some small businesses. Dividends received by owner-managers of such firms were submitted to social security contributions, to align them with the tax treatment of labor earnings. By contrast, the two

reforms we study are applicable to all firms, including the largest ones, thus affecting the bulk of aggregate dividends. In our empirical analysis, we pay particular attention to households and firms jointly affected by the reforms of the flat income tax regime and the anti-avoidance mechanism. In this group, which is common to both papers, we confirm the strong negative response of dividends to higher taxation in 2013 but find a slightly negative investment response, rather than a strongly positive response of the sort described by Boissel and Matray (2021).

Organization of the paper. The rest of the paper is organized as follows. Section 2 presents the institutional setting of the tax reforms we analyze. Section 3 describes the data and main variables. Section 4 analyzes responses to both reforms at the household level. Section 5 delves into responses observed at the firm level. Section 6 discusses the fiscal revenue implications and the economic interpretation of our results. Section 7 concludes.

2 Institutional setting

In this section, we briefly present the capital income taxation in France, and the 2013 and 2018 reforms we analyze in this paper. A more comprehensive presentation of tax rules and reforms can be found in Appendix A.

2.1 Dividend taxation in France before 2013

Personal income taxation in France. The French income tax, called *Impôt sur le revenu* (IR), is a progressive income tax with joint taxation of members of married couples (or in civil partnership). All types of income should normally be included in the tax base, i.e., wage income, pensions, business income, rents, and other financial incomes. However capital income can fall into tax-favored or exempted schemes (e.g., tax-favored savings accounts, life insurance, pension saving accounts, etc.). In particular, dividends enjoy a 40% tax exemption. Up

to 2012, the tax schedule included four brackets (5.5%, 14%, 30% and 41%), with the top marginal tax rate applying to income above 70,830 euros per tax share[2]. In 2012, a new tax bracket is introduced at the rate of 45% for income above 150,000 euros per share.

Additional contributions on capital income. In addition to the income tax, capital incomes are subject to social contributions, i.e., the *Contribution sociale généralisée* (CSG) and *Contribution au remboursement de la dette sociale* (CRDS). CSG and CRDS are two flat-rate withholding tax, earmarked to Social Security but providing no individualised benefits. In 2009, these social contributions amounted to 12.1%, and they were increased in steps to 15.5% in 2012. In 2012 an "exceptional contribution on high income", known by the acronym CEHR, was introduced at the rate of 3% for income above 250,000 euros per adult. The tax base of the CEHR includes all income. Adding social contributions to the income tax, the total marginal tax rate for dividends reached 40.2% for those at the highest income tax bracket (and 44% for those households paying the CEHR).

Optional flat-rate taxation of capital income. Since 1965, France has offered taxpayers the option of a flat-rate withholding tax on some types of capital income, called *prélèvement forfaitaire libératoire* (PFL). From 2008 onwards, dividends were included in the PFL option with a flat-rate of 18%, increased to 19% in 2011 and 21% in 2012. Selecting the PFL option can be done only once a year, before the income is received, and does not remove the mandate to report the income in the tax returns. Simulations show that the PFL option can only be advantageous for households with a very large amount of dividends or taxable income in the top bracket (marginal tax rate of 41% or 45%). Opting for the

[2]Each household is divided in a given number of tax shares depending on household size and structure.

PFL in 2012 led to a top marginal tax rate on dividends of 36.5% (compared to 40.2% under the default option) for those at the top income tax bracket.

2.2 The 2013 reform

The removal of the PFL option. Fulfilling a campaign pledge to remove the preferential tax treatment of capital income, President Hollande's government cancelled the option for dividends to be taxed at the PFL with the 2013 Budget. The reform was thus announced during the presidential campaign in February 2012, with a hint that it could be applied as early as 2012 with the vote of an emergency finance law in July 2012. The Constitutional Court's decision to censor bills with retroactive effects led the government to present the reform to Parliament in October 2012 for a first application on January 1, 2013. Figure 1a presents the evolution of the top marginal tax rate for the income tax and social contributions from 2008 to 2019, comparing the situation if one opts for the flat-rate withholding tax or not.[3] Before 2013, the two tax alternatives are parallel, both experiencing increases in tax rates, while the 2013 reform removes the tax distinction. As a result, households in the top bracket, who used to opt for the PFL, experienced in 2013 a significant increase in their marginal tax rate of 3.7 ppt, from 36.5% to 40.2%, while households who did not opt for the PFL pre-2013 remained unaffected by the reform.

Anti-avoidance scheme for small businesses (SARL firms). Concomitant with the abolition of the PFL, an anti-avoidance scheme was introduced in 2013 to subject dividends of majority-owning managers (i.e., managers who also happen to own a majority of the shares of their companies) of limited liability companies (SARL is the French acronym for "*Sociétés à responsabilité limitée avec gérant majoritaire*") to social security contributions.[4] We are able to tag both

[3] In Appendix A, we present changes of marginal tax rates for other income tax brackets, and for the total tax rate on dividends if one incorporates the corporate income tax.

[4] See Boissel and Matray (2021) for a recent analysis of this reform.

households and firms affected by this reform, and therefore study them separately from those affected only by the PFL reform. Firms not affected by this anti-avoidance scheme but affected by the main 2013 reform include in majority SAS firms (SAS stands for *Sociétés par actions simplifiées*, i.e., a simplified version of the general limited liability company), and a minority of SA firms (SA stands for *Sociétés anonymes*), the legal form mostly used by listed firms.

2.3 The 2018 reform

President Macron was elected in 2017 with a markedly pro-business platform aiming to foster private investment. The wealth tax, *impôt sur la fortune* (ISF) is abolished and replaced by a tax on real estate wealth. The flat-rate taxation of capital income is reinstated in 2018 with the creation of the *prélèvement forfaitaire unique* (PFU) at the rate of 12.8%. Adding social contributions of 17.2% amounts to a total rate of 30%.

This reform is the largest change in dividend taxation since 2010.[5] Figure 1b presents the changes in marginal tax rate on dividends around the 2018 reform. The top marginal tax rate fell by 10.2 ppt in 2018, from 40.2% to 30%. The 2018 reform leads to a bigger drop in top marginal tax rates than the 2013 reform, making the flat-rate withholding tax attractive to a much wider number of taxpayers: e.g., taxpayers in the 30% income tax bracket (with taxable income between 27,519 and 73,779 euros per share) also benefit from the flat-rate withholding tax option, albeit with reduced intensity. Compared to the drop of 10.2 ppt for the top marginal tax bracket (45%) households in the 30% income tax bracket experience a drop of 2 ppts, while the 14% income tax bracket sees an increase of 1.5 ppt.[6]

[5]The anti-avoidance scheme for majority owners of small businesses remained unchanged.

[6]The 2018 reform has increased marginal tax rates for lower income group because the flat-rate withholding tax is achieved through two flat-rate taxes, one replacing the standard income tax and another one with social contributions. It is the increase in social contributions from 15.5% to 17.2% which creates this marginal tax increase for lower income groups.

2.4 Aggregate series of dividend income

The first easily noticeable fact is the evolution of aggregate dividends received by French residents. Figure 2a presents the aggregate dividend series over the period 2000–2019, in particular those directly received by households in the income tax returns (blue dots) and those distributed to households by firms (red diamonds). To be as close as possible to the household series, the sample excludes listed firms (which distribute a significant share of their dividends via mutual funds and life insurance products rather than directly to households). In 2013, a massive drop is clearly visible in both series right after the tax hike, and amounts to 9 billion euros in the household data. Between 2017 and 2019, following the tax cut, dividends received by French residents increased again markedly by more than 9 billion euros.

A second step, in order to gain insights on the underlying responses, is to decompose these aggregate series according to the type of households (resp. firms) receiving (resp. distributing) dividends. Figure 2b shows yearly aggregate dividends according to the wealth tax (ISF) status, as well as to whether households have control over a firm.[7] It shows that owner-managers, whether they are wealth tax payers or not, account for a large share of total dividends, even though they are a small minority of households. What is more, they account for an even larger share of variations following both reforms, suggesting that these taxpayers have a very large reactivity to taxation. Our proxy for control over a firm is imperfect as it is far from identifying all households with some amount of control over a firm's dividend distribution, meaning that part of the observed variations following the reforms in the groups considered without control could actually stem from individuals with effective yet unobservable control. Figure 2c decomposes aggregate dividends distributed by firms according to the number of physical owners recorded in their corporate tax return. It strikingly shows

[7] Details on the nature and source of variables implying control over a firm are provided in the next section.

that the bulk of both the level and the variations of dividends distributed by unlisted firms originate from firms with either one or two owners, while firms with more that ten owners account for a very small share. This confirms that controlling owners should have a considerable weight on the dividend policy of the firms, even when they cannot be tagged as owner-managers in households' tax returns.

The combination of these facts observed at the household and at the firm level suggests that most of the dividends distributed by unlisted firms correspond to situations where agency problems should be minimal, and that the shareholders in these firms account for most of the national accounts variations which follow tax reforms. In the remainder of the paper, we investigate the responses of households affected by the tax reforms, with special attention given to the reactions of firms' owner-managers, and the consequences those reforms have on firm accounts.

3 Data

Administrative tax data have recently been made available in France following a legislative change allowing access for scientific research. Given the confidential nature of the data, our access is provided under secure remote access by CASD.[8] The household-level analysis relies on the exhaustive personal income tax as well as wealth tax returns. The firm-level analysis relies on exhaustive corporate income tax returns.[9]

Panel of income tax returns (POTE). The French tax authority, the *Direction générale des finances publiques* (DGFiP) at the ministry of finances, produces

[8]We were granted access from *comité du secret statistique* for household data on June 27th 2019 (M481) and March 6th 2020 (ME1086), and firm data on Oct. 11th 2018 (ME390), Sept 17th 2020 (ME1144) and Dec. 16th 2020 (Point ME1170).

[9]Prior to this work, some summary extractions of the corporate tax files (the FICUS-FARE files) have been made available to researchers, which we have chosen not to use given their lack of tax-relevant variables.

every year a file called POTE including the complete detail of income tax declarations for each of the 37 million French tax units, i.e., the amount recorded in each of the 3,000 items of the income tax return. We have this information at our disposal for income from 2006 to 2019 (i.e., for income declared in years 2007 to 2020). DGFiP creates an anonymous unique identifier for each tax unit between years which can therefore be followed over time. We take advantage of some specific information of the tax return to identify owner-managers in 2017 and 2018 (see Appendix B), which will be key in order to connect observed household and firm-level responses to tax changes.

Panel of Wealth tax returns (ISF-IFI). The DGFiP also produces a panel from wealth tax returns which can be merged with a common identifier to the income tax returns. Only tax units liable to the wealth tax report their taxable assets—with taxable assets above 1.2 million euros—, providing 350,000 tax units included every year into the panel. Taxable wealth includes all real estate and financial wealth until 2017, as the 2018 reform abolished the wealth tax for financial assets.

Taxable wealth excludes professional wealth, i.e., business assets for individuals who play a managerial role in the firm they own.[10] A number of other cases can lead to a reduction in wealth taxation when individuals do not qualify for the exemption of business assets. These include collective retention commitments for family businesses (so-called Dutreil pacts), shares in firms where one pursues some activities (without qualifying for the professional assets full exemption), or when the business assets represent more than 50 % of total wealth (see Appendix B). Such detailed information on wealth composition is available for all wealth tax payers up to 2011, and for households above a threshold of €2.57M from 2012 onwards, when a simplified declaration is introduced. It al-

[10]Further details on wealth taxation in France can be found in Bach *et al.* (2020).

lows us to identify some of the households that are not owner-managers but own assets implying some degree of control over corporate decisions.

Corporate income tax returns (BIC-RN). The tax data we use corresponds to a matching of three separate files: the tax files of the industrial and commercial profits under the normal regime (BIC-RN, DGFiP); the tax group perimeter files (PERIM, DGFiP) and the file of financial links between group companies (LIFI, DGFiP). The PERIM and LIFI files are used to identify the legal units belonging respectively to a tax group or an economic group. The reforms of interest concern the taxation of individuals. Therefore, it is important to consider companies which are independent and susceptible of paying dividends to individuals. We consider as independent all firms which are not subsidiaries of a fiscal group, and which are not wholly owned by a single legal entity. The BIC-RN file contains a variable related to the dividends distributed for the financial year ended on a given date.We use corporate income information for years 2009 to 2020. Given the peculiarity of the year 2020, we naturally check that all our results do not depend on its inclusion.

4 The treatment effect of dividend tax reforms on households

The first empirical exercise we conduct is to characterize reactions induced by both tax reforms on dividends received at the household level. Through these estimations, we aim to identify the potential mechanisms behind the dividend response, whether originating from household portfolio reallocation or linked to firms' decisions. We first present our identification strategies for both reforms, before turning to the results of our estimations.

4.1 Empirical approach

Identification strategy for the 2013 reform. We estimate the effect of the 2013 reform at the household level through a dynamic difference-in-differences estimation. Identification for the 2013 reform is quite straightforward. We define treatment at the tax unit level pre-reform such that our treated group is composed of fiscal households which had opted for the flat-rate withholding tax (PFL) at least once between 2009 and 2012, while our control group includes households which had never opted for the withholding tax before the reform. Thus, we assign each tax household in our sample a constant treatment status over time for this reform, as defined according to their dividend tax decisions before 2013.

The choice of our treatment and control groups follows directly from the reform which abolishes the option of the withholding tax: tax units using the PFL before 2013 are the exact population being affected by the reform; the ones receiving comparable amounts of dividends but not using it provide a natural control group since they are both unaffected by the reform and yet receive enough dividends so as to compare them with our treatment group both *pre* and *post* reform. Choosing the withholding tax before 2013 is determined by the amount of income and dividends but also by a series of factors not related directly to the potential amount of dividends (e.g., number of children, tax credits, and attention to tax optimization). It must also be noted that households opting for the PFL before 2013 probably are more active optimizers than the average taxpayer, hence our empirical strategy likely provides an upper bound on the population-wide dividend tax elasticity.

The use of the PFL tax scheme was only profitable for high-income households. Thus, we restrict the sample to households with sufficiently high income pre-reform to make both treatment and control groups comparable. We select households that received at least once more than 1,500 euros in dividend in-

come pre-reform and were paying the wealth tax. We also restrict the sample to households whose income—excluding dividends—is in the top 0.5% of the entire distribution. In order to base our estimates on a sample of fiscal households which we observe over the whole period surrounding the reform, we keep only those households present in the tax files over the whole 2009 to 2017 period.

Panel A of Table 1 presents descriptive statistics of the sample, comparing the treated and control groups in terms of pre-reform characteristics, for the 2013 reform estimating sample. The treated group is, almost by definition, receiving more income and especially more dividends on average than the control group; however, there is significant common support across the two groups. The table also reveals that restricting oneself to households in the top 0.5% of the income distribution receiving a substantial amount of dividends naturally implies that most households (73% in the treated group and 64% in the control group) have significant control over a limited liability company. This means that the PFL tax scheme targets a part of the population which may be particularly able to adjust dividend receipts following a dividend tax reform.

We estimate a dynamic specification allowing us to gauge the unfolding of the effect over time and to detect potential differential pre-trends prior to the reforms. It writes as follows:

$$Y_{it} = \sum_{\substack{d=2009 \\ d\neq 2012}}^{2017} \beta_d \times \mathbb{1}\{t = d\} \times T_i + \mathbf{x}_i' \mathbb{1}\{t = d\}\boldsymbol{\delta}_d + \mu_i + \lambda_t + \varepsilon_{it} \qquad (1)$$

where Y_{it} is our variable of interest measured for tax unit i and year t, T_i is a variable indicating firm i is in the treatment group, $\mathbb{1}_{\text{year}=t}$ a variable indicating year equals t, λ_t is a year fixed-effect, μ_i a household fixed-effect, and $\mathbf{x}_i'\mathbb{1}\{t = d\}$ a set of time-invariant household characteristics set prior to the reform and interacted with year indicators. In this specification, the β_d coefficient captures the difference between the treatment group and the control group for a given

year d relative to the baseline year 2011. We control for fractiles of taxable wealth (20^{th}), taxpayer's age and number of fiscal shares (4^{th}).

Identification strategy for the 2018 reform. The choice of the flat-rate withholding tax before 2013 does not accurately predict the treatment by the 2018 reform. Affected households are those with income levels before 2018 which put them at or above the 30% marginal tax bracket. As a result, we present estimation results based on comparing wealth taxpaying households with income pre-2018 that fall in the 14% marginal tax bracket (non affected) versus households with higher income tax brackets before the reform. We follow the same specification as for the 2013 reform, except that we take 2016 as baseline year. We apply the same sample restrictions to our analysis (wealth tax households, at least € 1,500 in dividend income in the pre-reform years) but do not add any restrictions on non dividend income because of the larger scope of the 2018 reform compared to the 2013 reform.

Table 2 presents summary statistics for the 2018 reform estimating sample. Treated and control households differ by construction in their income levels, but have similar age and composition characteristics. In both groups, due to the larger scope of the 2018 reform, only slightly more than half of households exert significant control over a firm. This means that this reform may have very heterogeneous impacts depending on the degree of control a household has over one or several firms.

Differential responses according to firm control. In 2017, we observe whether households include an owner-manager. We also have information on whether households have some level of control over a firm (see Appendix B). We therefore decompose our treated households into four distinct groups: owner-managers of non-LLCs (affected only by the PFL), owner-managers of LLCs (also affected by the anti-avoidance scheme), households with some level of control, and other

households for which we do not have any information linking them to the ownership or control of a firm.

Table 2 shows in summary statistics how the treated group can be split according to the degree of control over firms. The first two groups of treated households represent respectively 6.6 and 10.8 % of all treated households. They have full control over firms' dividend distribution policy, but face different marginal tax rates because of differences in their SSC rates, and have been affected in different ways by the 2013 reform. The third group contains 21,874 households which should be able to influence the distribution policy of the firm based on the type of assets they declare for the wealth tax. The fourth group is composed of 36,095 households for which we do not have a proxy of dividend control in the tax data. Yet, many of these households receive large amounts of dividends directly, and could very well control their dividends without it being observable in the tax files. Overall, treated households with ability to control their dividends represent half of all treated households in 2018.

4.2 Household-level responses: results

Responses to the 2013 tax hike pooling treated households. We first present results comparing all treated households, irrespective of their observed level of firm control, to households unaffected by the 2013 reform. Figure 3 presents raw averages (panel a) and difference-in-differences estimates (panel b) on dividends for the treatment effect associated to the 2013 dividend tax hike, following the specification in equation (1). We obtain a sizable negative coefficient for dividend income received, implying that dividends are cut by at least 30% of their baseline level. Average dividends remain strikingly stable in the control group, as panel a) shows. The treatment effect on dividends is permanent over our timeframe as very similar point estimates are found for all post-reform years up to 2017.

We also check the impact of the 2013 reform on other capital income (Fig. 4), which could reflect shifting to other forms of income or portfolio reallocation to assets paying less or no dividends. The possible options for shifting to other forms of capital income do not provide clear-cut optimization opportunities: share buy-backs are treated in France as dividend income for tax purposes; and capital gains were included into the standard income tax schedule with the 2013 reform.[11] Panels a) and b) of Figure 4 confirm that such shifting did not occur because of the 2013 dividend tax reform.

Similarly, we find no evidence of shifting to labor income, as the coefficient on wage income is not significantly different from zero (Fig. 4, panel c). This result is not surprising given that the 2013 reform—an increase in taxation of dividend income—has not made wage income more attractive in terms of tax treatment. To illustrate this point, we estimated the effective tax burden on dividend and labor income, including the deferred pension benefits that Social Security contributions provide, and at best the two forms of income have after 2013 a similar tax treatment (see Appendix A).

These results do not support the hypothesis that dividends received by households dropped because other sources of income had become relatively less taxed, either through income shifting in the form of wages, or through mere portfolio reallocation.

Responses to the 2018 reform and the role of firm owner-managers. To assess the effects of the dividend tax cut implemented in 2018, we define treatment based on the pre-reform tax bracket defining the marginal tax rate. We also distinguish between owner-managers and non-managers based on information available in the 2017 tax files.

[11] One should note however that the government changed the tax treatment of capital gains in 2013, with a more favorable tax treatment conditioning on holding onto shares for more than 8 years.

Figure 5 shows the raw averages (panel a) and the difference-in-differences estimates (panel b) comparing treated households to control households. The results indicate a positive and significant response of dividends received to the reform, of about 15%, much lower than in 2013. Figure 6 represents the same set of results when splitting the treatment group according to the degree of control over a firm. It shows a very heterogeneous degree of responsiveness of dividend receipts to the 2018 tax decrease. Households with an owner-manager of a firm experience an increase in dividends of 40% for SARL owner-managers and of 60% for SAS owner-managers.

The proxy for the fact of being an owner-manager—measured in 2017—is not as accurate for the first reform as it is for the second, simply because some households may have changed status between 2012 and 2017. In addition, there are very few households with no corporate control in the treatment group we define for the 2013 reform. Yet, following the comparison of owner-managers and non-owner managers around the 2013 reform gives a lower bound of their true relative reactions. In Figure C1, we interact the treatment variable with the same four different dummies (no control over a firm, some control, owner-manager of a SARL, owner-manager of a SAS). Similarly to the 2018 reform, we find that among treated households, owner-managers react more strongly (-60%) to the 2013 reform than the others (-40%).

This result, along with the result on the 2018 reform, provides direct evidence at the household-level that the key driver of the behavioral response to dividend taxation is the ownership and control of a dividend-paying firm. With this result in mind, we now turn to firm-level data to estimate the impact of the reform on firms' decisions.

5 Firm-level responses to dividend tax reforms

Given the first-order role of firms' owner-managers in explaining the massive changes in dividends received by households following both tax reforms, we naturally turn to firm-level responses to develop a better understanding of how these cuts in dividend payments translate into firms' accounts. In particular, the effect of dividend taxation on firms' investments is a longstanding question in public economics on which the *new view* (which predicts no effect of dividend taxation on investment) has received more empirical support, notably through Yagan (2015), than the *old view* (which predicts a negative effect of dividend taxation on investment).

5.1 Empirical approach

Treatment and control groups. Since the reforms we analyze concern the taxation of natural persons, the exposure of firms to tax changes depends on their ownership structure at the time of the reform. For instance, firms wholly owned by legal entities are not affected, nor are multinationals owned mostly by non-French-residents. As is standard in this strand of literature, we use an *intent to treat* strategy to identify causal effects of the reform since we do not directly observe the tax status of the firm owners.

The choice of our control group deserves a thorough discussion, since several groups of firms are potentially unaffected by the reform. For instance, listed companies seem to have little sensitivity to the personal income tax on dividends in their distribution policy, and as such constitute an interesting control group with respect to the dividend payment policy. However, their very large size makes them potentially less comparable to the treatment group in terms of real variables such as investment or employment, which are our ultimate estimation targets. In contrast, companies owned largely by legal entities constitute a particularly interesting control group, insofar as they are numerous and of varying

sizes, but *a priori* not directly affected by the personal income tax reform, provided that the personal owners together only hold a minority of the share capital.

We build our treatment and control groups in the following way. We focus on the population of firms having non-zero employment. We then select all legal units owned for at least 50% by natural persons as our treatment group. Conversely, we include all legal units owned for less than 50% by natural persons (that is, for at least 50% by legal entities) as our control group. We further require that firms in our control group are not fiscal subsidiaries nor owned by a single legal entity, in order to avoid mechanical transfers of profits as dividends to the parent company. These restrictions ensure that, in the event of a joint filing of their corporate tax along with other legal units, they can only be the parent company of their fiscal group. We then consolidate our sample by selecting all units within the same fiscal group. We sum all variables that can be summed across units (tangible and intangible assets, turnover,...) and take the value for the parent company for variables that cannot be summed within the group (dividends, financial assets). This consolidation exercise has two main advantages. First, it allows considering firms organized as holdings and linking ultimate owners to real outcomes of the subsidiaries. Second, in our attempt to track flows of money caused by dividend tax reforms, we cancel out book transfers across legal units within a fiscal group and therefore focus on real responses. After the consolidation exercise, we exclude firms whose main entity is purely financial, since the accounting notions we mobilize have very different meanings for these.

To focus on a group of large enough firms with a somewhat comparable size, we exclude firms belonging to the CAC40 index. In our baseline, we also restrict the studied population of firms in the following way. We sort firms according to their assets, and trim the sample so as to exclude the group of the smallest firms amounting to 5% of aggregate dividends. This excludes a very large number of small firms that would otherwise represent a large share of our sample but only

a small share of the economy, therefore ensuring that our individual estimates are economically relevant. Finally, we select only firms which we observe in the tax files at least once before and once after the reform we analyze. We also present results relaxing these restrictions. Appendix Table C2 shows, for different types of outcome, the fraction of aggregate dividends that is captured by our estimation sample. Dividends in the estimation sample represent 86% of aggregate dividends paid to individuals by French firms that are neither finance companies nor CAC40 index constituents.

Because firms registered as limited-liability companies (SARL) are the target of an anti-avoidance scheme increasing the taxation of dividends on top of the PFL reform affecting all firms, we split our sample between these SARL and other firms (which we refer to as SAS)[12], and analyze both groups separately. The SAS group is therefore affected by one reform in 2013 and one in 2018, while in the SARL group, the majority of firms are affected by two dividend tax reforms in 2013 and one in 2018. Within a legal form, firms owned by legal entities tend to be larger than those owned by natural persons. At the same time, SAS owned by natural persons are bigger than SARL owned by natural persons. Therefore, we compare treated SAS to all control firms, but restrict the comparison of treated SARL to control SARL in order to contain size differences.

Assessing the channels: an accounting-based decomposition. To track the corporate responses implemented together with the change in dividend payments, we construct an accounting decomposition to assess which elements were affected as a consequence of the tax reform. Thus, denoting t the reference year and $\Delta_{t-1;t}$ the yearly changes between $t-1$ and t, this decomposition writes:

$$\text{Dividends}_t = C_t - I_t - \Delta_{t-1;t} A_t \tag{2}$$

[12]This group is composed in a vast majority of *Sociétés par actions simplifiées* (SAS) and contains a few *Sociétés anonymes* (SA), notably listed-firms which are not CAC40 members.

The elements of this decomposition are defined as follows. Profits (C_t) are the sum of operating cash flows and financial profits, and represent total profits available to the company's owners. I_t denotes capital expenditures, *i.e.* investment in tangible and intangible fixed assets. Finally ΔA_t is net corporate saving, i.e. the increase in cash holdings less the increase in external financing.

To estimate the elements of the accounting-based decomposition, we estimate a static specification which allows us to summarize more concisely the several margins of adjustment firms might resort to in response to a change in dividend taxation. It writes as follows:

$$Y_{it} = \beta \times \mathbb{1}\{t \geq 2013\} \times T_i + \mathbf{x}_i' \mathbb{1}\{t = d\}\boldsymbol{\delta}_d + \mu_i + \lambda_t + \varepsilon_{it} \qquad (3)$$

where notation is the same as in Equation (1) but where units i are firms instead of households. We also estimate dynamic versions, the results of which are displayed in the Online Appendix.

We scale the variables in the decomposition by firms' assets normalized two years prior to the reform (that is, 2011 for the PFL reform, and 2016 for the PFU reform). We then winsorize ratios in the following way: we replace strictly positive values above the 99*th* percentile of the distribution of non-zero values, and similarly replace all strictly negative values below the 1*st* percentile of the distribution of non-zero values. This method posits that zeros are not candidates for being outliers. It avoids winsorizing in very different ways variables with different shares of zeros. This proves essential in order to obtain summable point estimates in the accounting decomposition we introduce next, when our main variable—dividends—takes value 0 for more than half of the observations.

5.2 Results

Dividend policy. Figure 7 presents the probability to distribute dividends comparing treated and control firms, for both legal forms (SAS and SARL), respectively for the 2013 and the 2018 tax reforms. We observe sharp reactions in all

four cases: as shown in panel b, SARL in particular react very strongly to the PFL tax hike in 2013 as the probability of paying dividends drops by around 12 ppt, corresponding to a 30% drop. These firms however react less strongly to the 2018 PFU tax cut (panel d), since they only display a 2 ppt increase in the first two years. In contrast, SAS firms display more symmetric dividend reactions at the extensive margin, since their probability to distribute dividends drops by 4 ppt because of the 2013 tax hike (panel a) and increases by around 3 ppt after 2018 (panel c).

In order to characterize responses beyond the extensive margin, figure 8 presents the results of "distribution regressions", i.e. estimates obtained using as a dependent variable the probability that dividends exceed a certain threshold of the firm's assets, which we run for varying thresholds. Figure 8 shows, for each reform and group of firms, sets of yearly coefficients from a threshold of 0 (dark purple), which corresponds to the extensive margin of dividend distribution also shown in figure 7, to a threshold of 25% of assets (light orange). The same picture emerges as in the previous figure: SARL firms reacted very strongly to the 2013 reform (panel b), with significant responses observed up to the probability of distributing 20% of a firm's assets in dividends. These firms have a clear but somewhat smaller reaction to the 2018 reform, with most of the response being observed at thresholds lower than 10% of assets. This may simply be explained by the fact that, because of the large reactions to the 2013 reform, few SARL firms were still distributing large dividends before the 2018 reform, especially since the SARL status was less popular among newly created firms in this period. As panel a shows, SAS firms also reacted mostly at thresholds lower than 10% of assets in the 2013 reform. In 2018, however, one can observe very large responses from this group of firms (panel c) at all thresholds, meaning that some firms decide to distribute massive dividends as a share of assets after the reform, while such decisions were rare before the 2018 reform.

An additional point of inquiry is to check that our results are not contaminated by other reforms, and in particular the anti-avoidance scheme affecting SARL with owner-managers, and studied in more detail by Boissel and Matray (2021). We exploit the fact that this reform introduced a kink in the tax rates: only dividends exceeding 10% of the share capital became submitted to SSCs, while those below were kept at the same tax rate.[13] Thus, if this reform affected differentially our treated group of SARL in 2013, one would expect the probability to pay at least $x\%$ of share capital in dividends to drop very sharply for $x \geq 10$. Figure C14 in the online appendix shows the result of static distribution regressions, using the probability to pay more than $x\%$ of the firm's share capital in dividends each year as our dependent variable for various x thresholds, for both reforms, respectively for SAS firms (panels a and c) and SARL firms (panels b and d). We see a sharp but small gap between thresholds below 10% and thresholds above 11% for SARL firms after 2013 (panel b), while there is no such gap for SAS firms (panel a). This gap can be interpreted as a specific reaction to the anti-avoidance scheme. Its magnitude is however very small: the gap between probabilities of paying at least 9% and at least 11% of share capital is around 1.9 ppt, i.e. less than 15% of the overall effect. Interestingly, the effect of the anti-avoidance scheme, which was not lifted in 2018, seems to persist after the second reform: SARL firms largely increase their dividend payments at all thresholds relative to share capital, but one can see a small discontinuity in the increase at the 10% threshold. Although we cannot reject the possibility that SARL firms might have reacted to the combination of both reforms implying tax hikes in 2013, the above result makes us confident that the differential reaction between our treated and control groups is driven by the PFL reform.

[13] As explained in Appendix A.3 in Boissel and Matray (2021), the reform affecting LLCs analysed in their paper only increases taxes on dividends in excess of 10% of the firm's share capital, introducing a kink point in the tax schedule. Thus, the anti-avoidance LLC reform should mostly induce responses at the intensive margin. Boissel and Matray (2021) show that the kink indeed matters, as there is bunching at the 10% threshold after the LLC tax reform.

Investment responses. Turning to investment, we present regression results using yearly non-financial investment scaled by assets two years prior to the reform as our dependent variable, consistently with the variable we later use in the accounting decomposition. Figure 9 plots yearly coefficients and 95% confidence intervals of the dynamic differences-in-differences estimates. Panels (a) and (b) present the impact of the PFL/2013 reform on SAS and SARL firms respectively. Panels (c) to (d) present analogous estimates for the PFU/2018 reform. To give a glimpse of the underlying distribution of investment, graphs are shown with a scale of -.25 to +.25 standard deviations of the variable. SAS firms (panels a and c) display no significant reaction of investment in either case. SARL firms however seem to show small responses to both reforms: in panel b, there is a small dip of investment, which makes the overall post-reform reaction significant, as the accounting decomposition will show. Similarly, there is a small but positive response from SARL firms following the 2018 reform, although with a potential anticipatory effect.

Our results are in line with those found on the 2003 US reform (Yagan, 2015) and the 2006 Swedish reform (Alstadsæter *et al.*, 2017), with no impact of dividend tax reforms on investment found in either case. Indeed, because SAS firms are considerably larger on average than SARL firms (and that listed firms do not react), the bulk of the French economy does not react at all to dividend tax reforms. The part that does react is composed of small firms and exhibits very small responses with respect to the ex ante distribution of the variable (less than a tenth of a standard deviation). Overall, these results imply that dividend tax reforms have no noticeable effect on investment. The fact that we find a slightly negative response from SARL firms affected also by an anti-avoidance scheme is in contrast to the positive effects found by Boissel and Matray (2021). Note however that our estimates are not directly comparable with Boissel and Matray (2021) as we compare, among SARL firms, those more or less exposed to the flat tax repeal due to their owership structure, while Boissel and Matray (2021)

estimate the impact of the anti-avoidance scheme by comparing SARL to SAS. In section 6, we discuss further the economic interpretation one can provide to the small reactions observed among SARL firms.

Accounting decomposition. We now delve into the adjustments made by firms jointly with their dividend policy response. Table 5 presents regression coefficients obtained from a static difference-in-differences method, i.e., estimating the coefficient associated with a variable 'Treatment $\times$ Post-reform period' of each of the variables of the accounting breakdown presented in equation (2), for each group of firms (SAS and SARL) and each reform, over a period ranging from 3 years before the reform to 3 years after. Incidentally, this table allows checking the validity of the accounting breakdown presented above: the sum of the coefficients associated with each of the decomposition variables (combined with the sign associated with each variable in the decomposition) should be equal to the coefficient associated with the dividends paid.

The SAS firms, shown in columns (1) and (2), react a lot more strongly to the 2018 tax cut than to the 2013 tax hike. Their entire response comes from saving: they save more after cutting their dividends post 2013, and dis-save massively after 2018 to pay more dividends. We observe a somewhat different pattern for SARL: they cut their dividends strongly in 2013, but increase them moderately after 2018. We also find an intertemporal shifting phenomenon, in which SARL firms save after the tax hike and dis-save after the tax cut. Yet, this accounts for less than half of the 2013 dividend response among SARL. Distinctively, we observe a very large drop in profits of SARL firms after the tax hike, which accounts for more than two third of the dividend response, as well as a small negative effect on investment equivalent to a third of the dividend response.

These results suggest two main margins of adjustment for firms as they cut their dividends. First, firm owners use corporate saving as a way to shift intertemporally the income they receive. Foregone dividends are stashed in firms'

financial assets, then distributed once dividend taxes go down again. This mechanism seems to be the only one at work among the larger, SAS firms. The decrease in profits observed among SARL firms after 2013 however points to an additional reaction margin: it suggests that firm owners shifted part of their consumption expenses to their firm, thus leading to lower profits. This is difficult to document further with the data at our disposal because consumption at the benefit of the owner is indistinguishable from normal consumption of the firm, which correlates a lot with its activity, and is precisely why it is also difficult for tax authorities to track. Alstadsæter *et al.* (2014) find a similar pattern among closely-held firms in Norway, and also put forward the hypothesis that firm owners are using their firm at their personal benefit. We do not observe profits going up again after the 2018 reform, but we see a relatively small increase in dividends among firms having decreased their profits. This suggests a permanent change of behavior from these entrepreneurs, in which consumption through the firm could have become a long-term substitute to dividends.

6 Discussion

6.1 Economic interpretation

To rationalize firms' behavior with respect to dividend taxation, various theories have been put forward (see for a survey Farre-Mensa *et al.*, 2014), which differ in their prediction of the impact of dividend taxation on dividend payouts and investment. In this section, we discuss our results in light of these theories.

Signaling or agency models. Both signaling (e.g. Bernheim and Wantz, 1995) and agency (e.g. Chetty and Saez, 2010) models rely on a distinction between managers' interest and external shareholders. In these models, dividend payouts are set so as to send a signal about the firm's profitability or to reduce options for managers to engage in wasteful investments. However, this is expected to

happen in large public companies or among private firms with fairly dispersed ownership. We find instead that the corporate response to the two reforms we study is driven primarily by private firms with concentrated ownership and that among them, firms with few shareholders appear to respond more strongly to the reform (see Figure 2c).

Traditional view vs "new view". Like others (e.g. Yagan, 2015; Alstadsæter *et al.*, 2017), we rule out even modest investment responses to the changes in dividend taxes among the firms that account for the bulk of investment, which is at odds with predictions of "traditional" neoclassical models where firms finance investment out of newly issued equity (Poterba and Summers, 1985).

This weak investment response is however consistent with the "new view" (King, 1977), which considers a neoclassical firm financing investment out of retained earnings. In this setting, the relative cost of investment across periods is unaffected by permanent changes in dividend taxes. The new view may not be fully compatible with our results in that it predicts no response of dividend payouts to *permanent changes* in dividend taxes, while we find substantial effects on dividend payments, both at extensive and intensive margins. However, under that view a *temporary increase* in dividend tax rate can cause dividend payments to decline while incentives to reduce investment remain weak. Our results indeed point to adjustments in corporate net savings which are consistent with inter-temporal shifting (see Table 5) and suggestive of agents expecting a policy reversal (Korinek and Stiglitz, 2009).

Several papers have emphasized that each view might apply to different firm types (Alstadsæter *et al.*, 2017), or different stages of the firm's life cycle (Sinn, 1991), and a decrease in payout taxes may decrease the investment rate of large, mature and cash-rich firms relative to smaller, younger, equity-dependent firms (Becker *et al.*, 2013). The moderate but significant response of smaller firms (SARL) (see Table 5) is broadly consistent with this view.

Change in the cost of capital vs change in relative payout taxation. Our results could also be consistent with an alternative explanation, which is that dividend taxation may not affect the cost of capital, but only the relative taxation of alternative ways of liquidating an investment. For owner-managers of closely held firms, there are three such options: paying dividends, selling shares, and consuming through the firm. Since capital gains are taxed in France—as in many countries—at a lower effective rate than dividends, owner-managers always have a low-tax option by retaining earnings within the firm, especially if higher dividend taxation is perceived as temporary, and the cost of capital might then not be strongly affected by dividend tax reforms (Desai and Goolsbee, 2004). However, payout policy might be very sensitive to dividend taxation, as it changes the relative taxation of payouts vs long-term capital gains. In that world, we expect to find very large dividend payout elasticities, and no real investment responses—very close to what we find in both these reforms.[14]

Another factor that might have helped to amplify the dividend response while keeping the cost of capital unaffected is the possibility for owner-managers to use the firm to finance part of their consumption (Gordon and Slemrod, 2000). To the extent that such consumption is a close substitute to dividend-funded consumption, dividends are expected to be extremely reactive to taxes. The evidence in this paper on the negative impact of the 2013 reform on profits for small firms (SARL firms) is consistent with this explanation.

6.2 Implications for fiscal revenues

Our results point to tax elasticities of dividends way in excess of 1 for both reforms. This implies that the tax hike actually increased fiscal revenues, while the tax cut decreased them. Naturally, the overall impact of tax reforms on fiscal revenues will depend on how strong fiscal externalities are.

[14] In support of this explanation, when the French government decided to increase dividend taxation along with capital gains taxes in 2013, entrepreneurs engaged in hard lobbying and capital gains were eventually protected from increased taxation.

The main fiscal externality in our setting is that dividends are paid in part at the expense of future capital gains. In that context, short-run revenue implications may be different from long-run ones, and it could take years before we can measure the true effect of the two reforms on tax revenues. However, future capital gains are closely related to net corporate saving, which we measure in our decomposition exercice. Table 5 shows that the 2013 reform boosted corporate saving, while the 2018 reform reduced it. Given that the rate at which capital gains are taxed is significantly lower than dividend taxes, the fiscal externality of dividend taxation is by construction lower than the direct effect from dividend payout responses. This implies that the 2013 reform has actually decreased tax revenues (reduced income taxation of dividends larger than increased long-term capital gains), while the 2018 reform has only marginally reduced tax revenues, despite a significant drop in marginal tax rates on dividend income.

7 Conclusion

This paper uses newly-accessible tax registry data on French firms and households to shed new light on the old question of whether and how dividends react to changes in tax rates. At the household level, we compute a large tax elasticity of dividends and show that this large elasticity stems from individuals having direct control over the dividend payout policy of firms they own. With firm data we confirm that firms owned by individuals have reacted by cutting dividend payouts when taxes increased, increased financial assets but did not respond in terms of investment. We find suggesting evidence of an increase in firms' spending. After the tax decrease, payouts revert to their initial level, financial assets within firms decrease, and investment is equally not affected. In both tax reforms, we find strong evidence that owner-managers are driving the very large dividend tax elasticity by using their firm as tax shelter from personal taxation.

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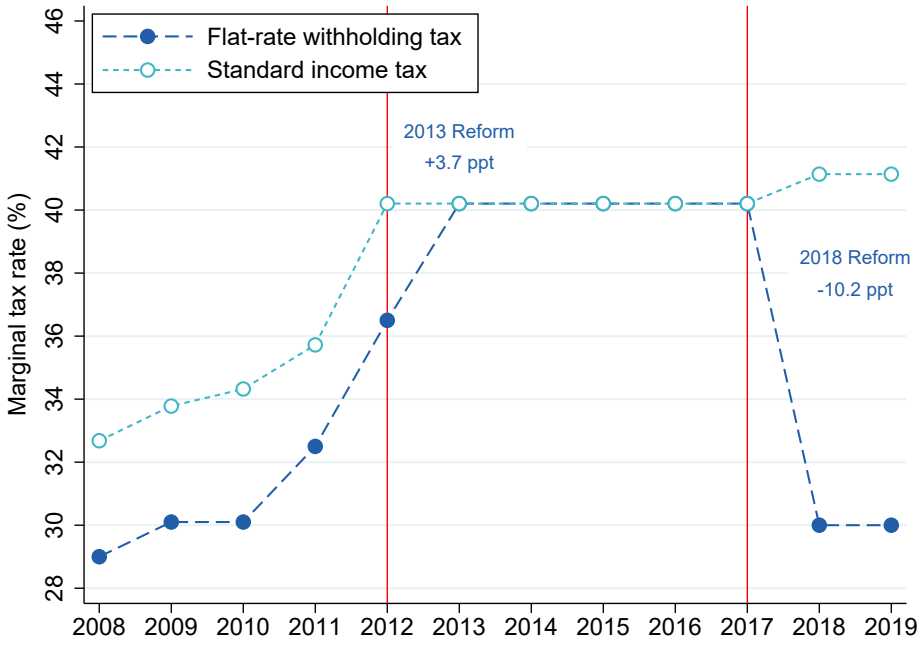
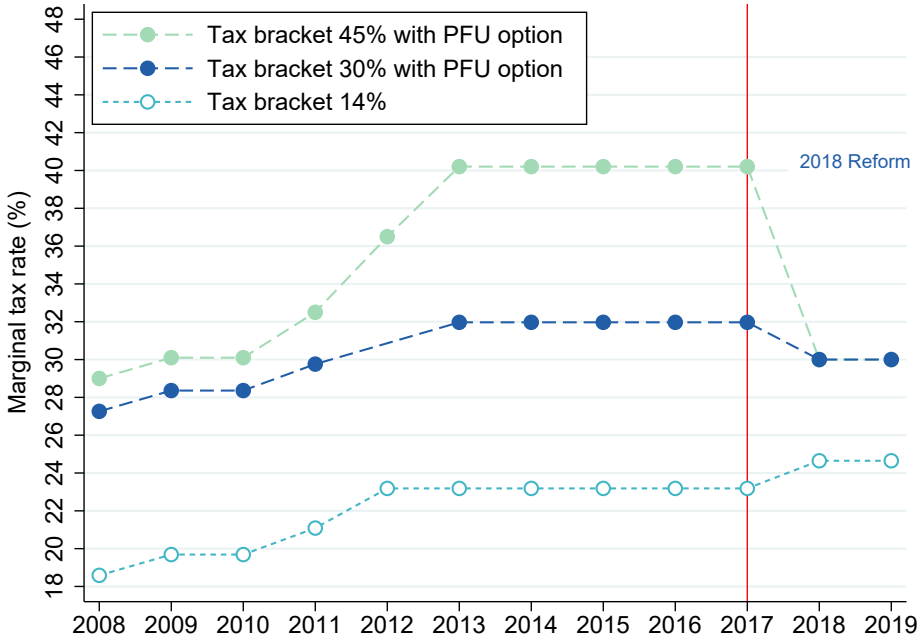
Figure 1: Top marginal tax rates on dividends (2008–2019)

(a) Top marginal income tax (45%) vs flat-rate withholding tax



(b) Lowest marginal tax rate for income tax brackets 45%, 30% and 14%

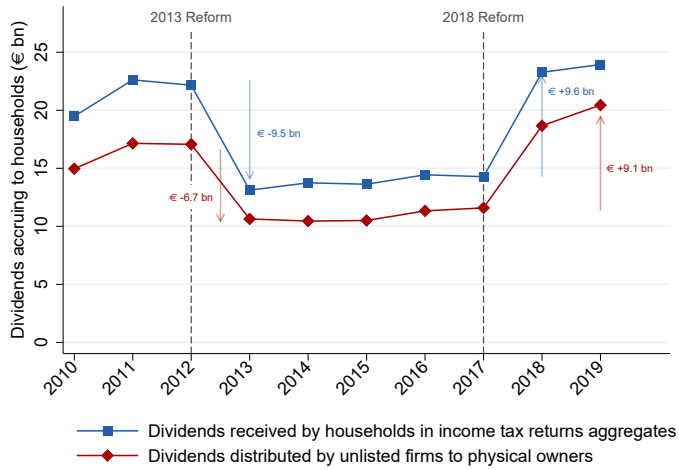


NOTES: Panel (a) shows for each year the top marginal tax rate applicable to dividend income when households opt for the flat-rate withholding tax (PFL/PFU) and when they choose to be taxed under the standard progressive tax schedule. Panel (b) compares the lowest marginal tax rate (i.e., when choosing the best available option between the flat-rate withholding tax and the standard income tax schedule each year) of households in different tax brackets.

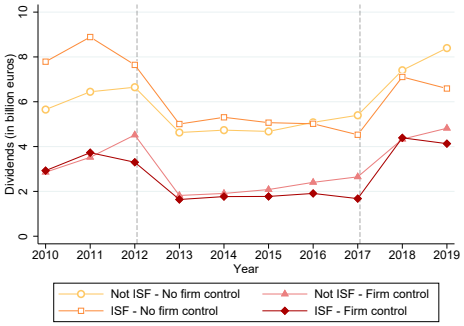
SOURCES: IPP Tax and Benefit Tables.

Figure 2: Aggregate dividends received by households and distributed by firms

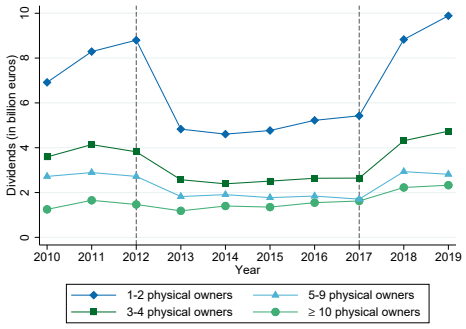
(a) Aggregate dividends received by households (France, 2010–2019)



(b) Decomposition of aggregate dividends received by households according to wealth tax (ISF) status and information on firm control



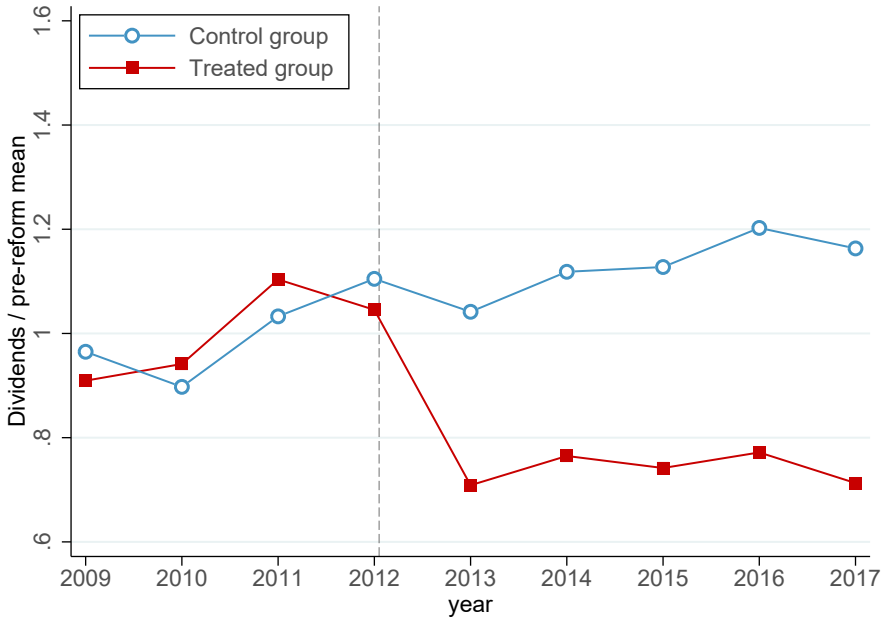
(c) Decomposition of aggregate dividends distributed by unlisted firms according to the number of physical owners



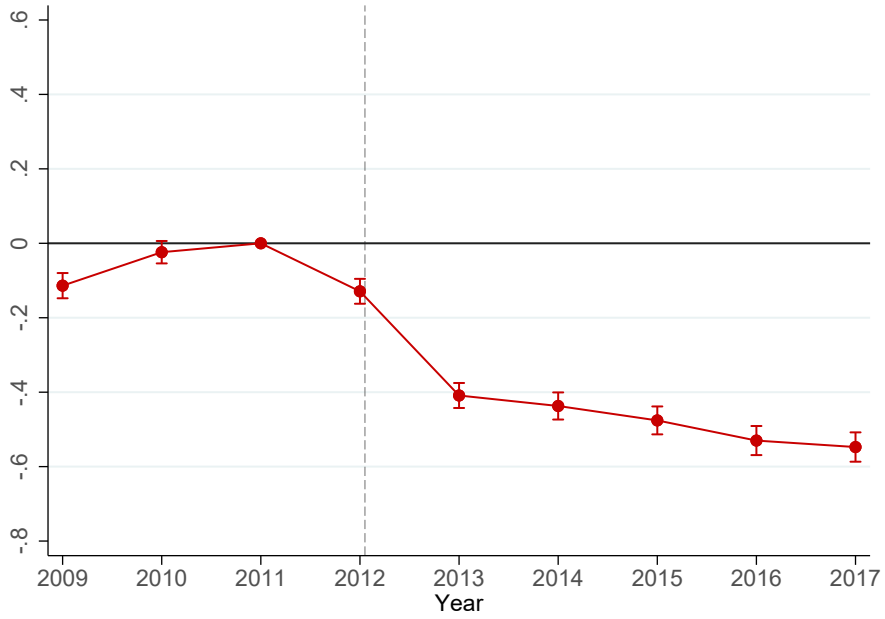
NOTES: Panel (a) represents the evolution of dividends declared by households in the income tax returns (blue circles) and distributed by firms, excluding CAC40 as well as firms at the simplified corporate income tax regime (red diamonds). The dividends series from the National accounts differs from the administrative income tax data because it includes non-taxable dividends from tax-favored savings plans (*Plan d'Epargne en Actions*, PEA) and business income from corporations taxed at the personal income tax. Panel (b) decomposes yearly aggregate dividends received by households according to weather they are wealth tax (ISF) payers, and whether they have definite or suspected control over a firm. Panel (c) decomposes yearly dividends distributed by unlisted firms according to their number of physical owners.
SOURCE: Panel POTE-ISF (DGFiP) 2010-2019 and BIC-IS 2010-2019.

Figure 3: Dividends received by households – control vs treated

(a) Raw averages



(b) Difference-in-difference estimates

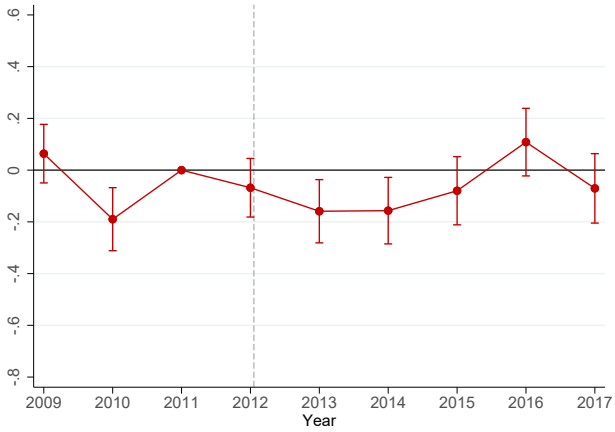


NOTES: The sample is a balanced sample of all households with non-dividend income in the top 0.5% of the population distribution, having received more than €1,500 and paying the wealth tax at least once between 2009 and 2012. Treated households are defined based on their pre-reform tax status , i.e., having opted for the flat-rate withholding tax. Panel (a) represents the evolution of the average dividend over pre-reform mean dividend (defined as the individual's average dividend amount received between 2009 and 2012) for each group.

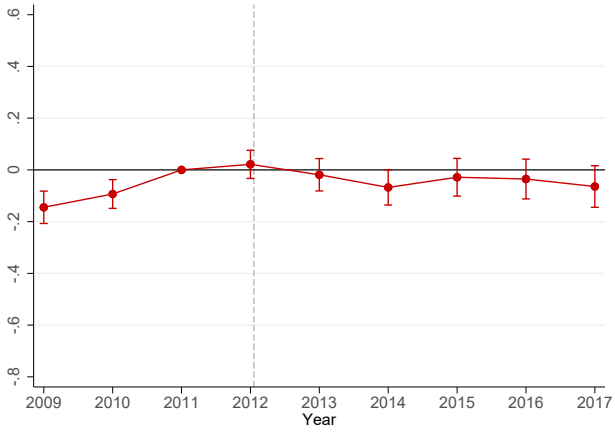
SOURCE: Panel POTE-ISF (DGFiP) 2009-2017.

Figure 4: Difference-in-differences estimates

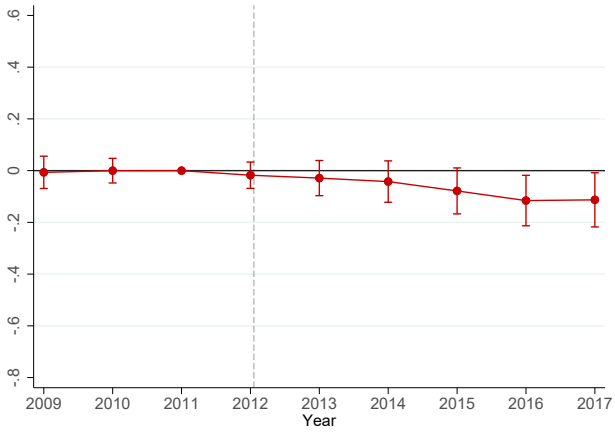
(a) Capital gains



(b) Other capital income



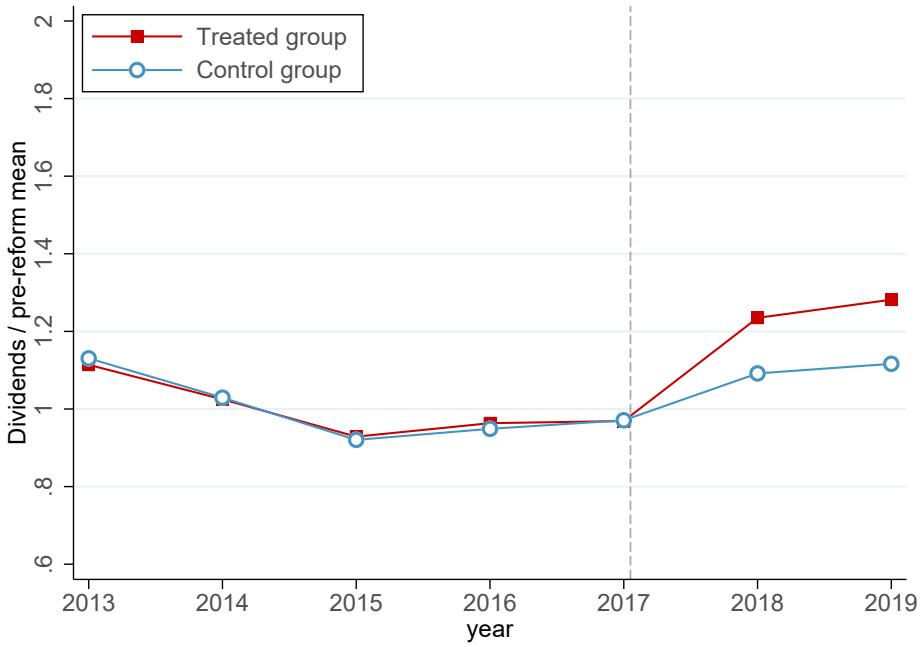
(c) Wage income



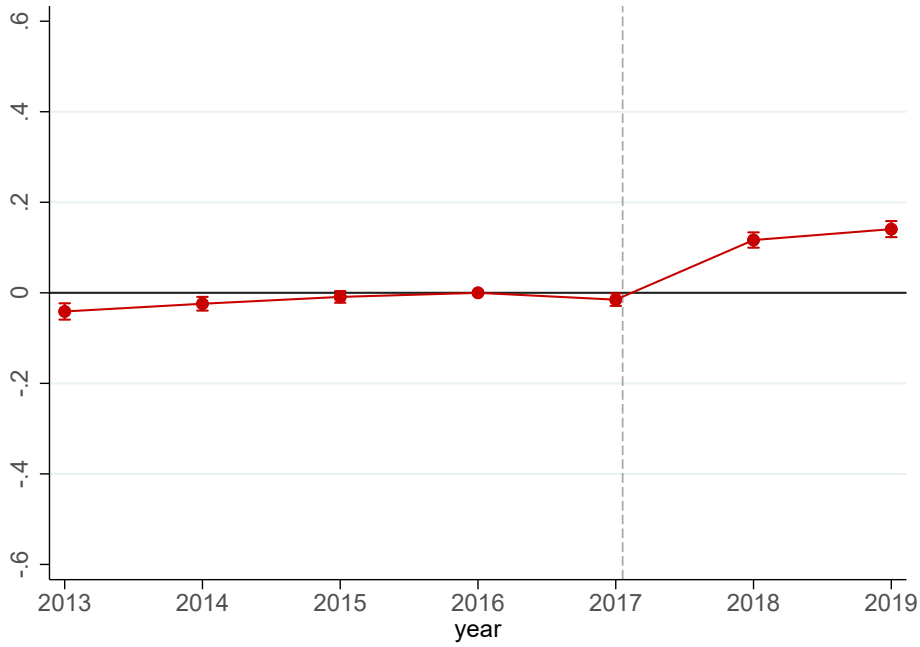
NOTES: The sample is a balanced sample of all households with non-dividend income in the top 0.5% of the population distribution, having received more than €1,500 and paying the wealth tax at least once between 2009 and 2012. Treated households are defined based on their pre-reform tax status , i.e., having opted for the flat-rate withholding tax.
SOURCE: Panel POTE (DGFiP) 2009-2017.

Figure 5: 2018 Reform: Household estimates

(a) Raw averages



(b) Difference-in-differences estimates

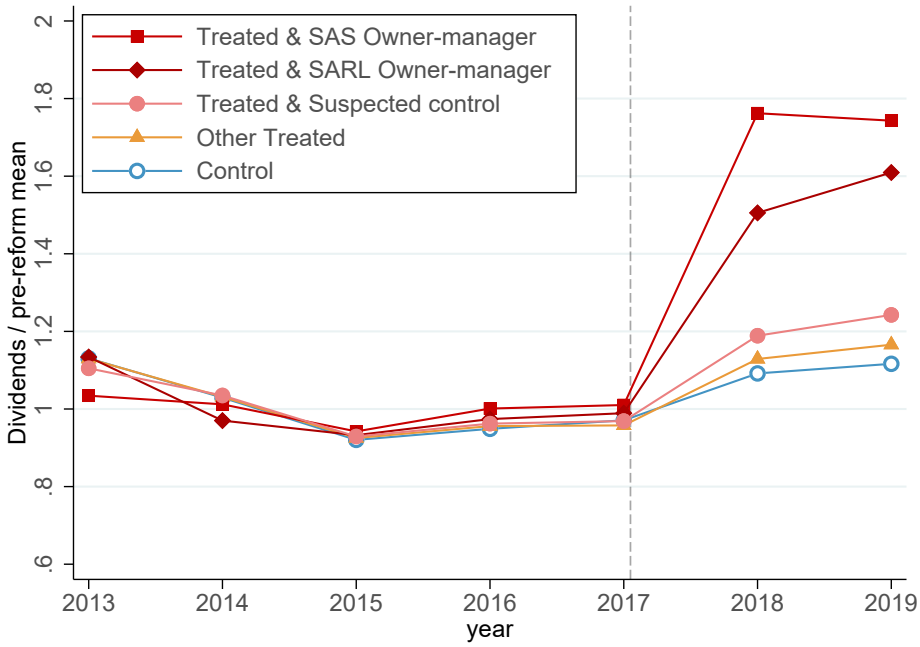


NOTES: The sample is a balanced panel of all households paying the wealth tax at least once between 2013 and 2016 and having received at least once a significant amount (more than €1,500) of dividends between 2013 and 2016. Treated households are defined as households having wage and pensions income pre-reform placing them in the top income tax brackets (above 30%).

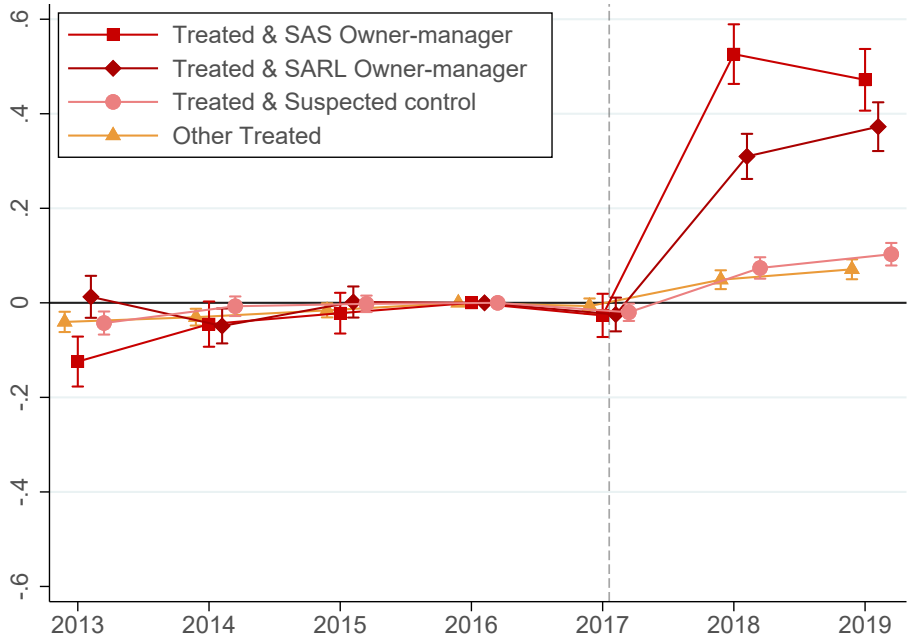
SOURCE: Panel POTE (DGFiP) 2013-2019.

Figure 6: 2018 Reform: Household estimates by degree of firm control

(a) Raw averages



(b) Difference-in-differences estimates

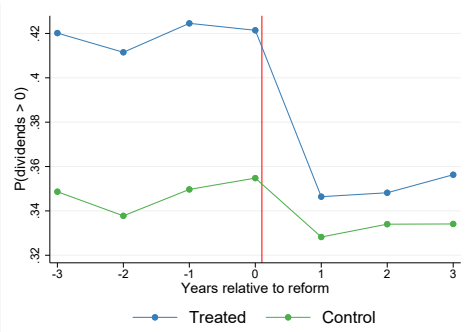


NOTES: The sample is a balanced panel of all households paying the wealth tax at least once between 2013 and 2016 and having received at least once a significant amount (more than €1,500) of dividends between 2013 and 2016.Treated households are defined as households having wage and pensions income pre-reform placing them in the top income tax brackets (above 30%).

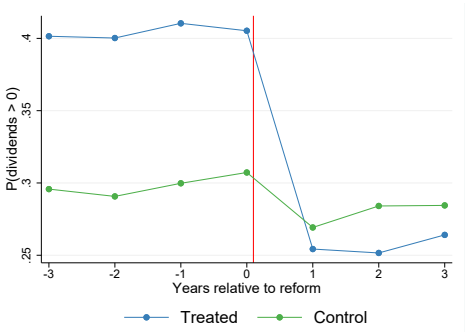
SOURCE: Panel POTE (DGFiP) 2013-2019.

Figure 7: Impact on the probability to distribute dividends of the 2013 tax hike (PFL)

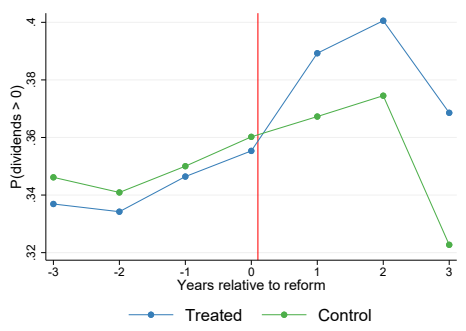
(a) SAS: Yearly averages, 2013 reform



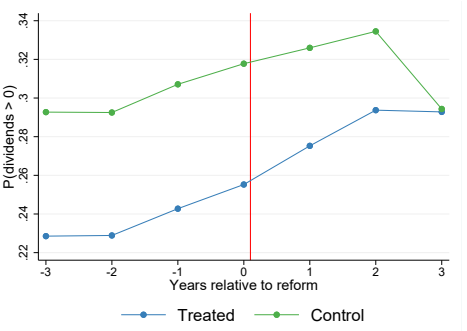
(b) SARL: Yearly averages, 2013 reform



(c) SAS: Yearly averages, 2018 reform



(d) SARL: Yearly averages, 2018 reform

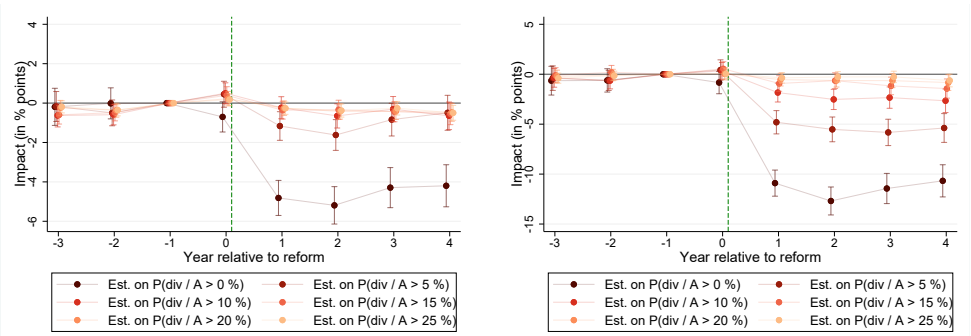


NOTES: The variable studied is the probability to pay dividends to shareholders each year between 2009 (year -3 w.r.t the PFL reform) and 2015 (year +3 w.r.t the PFL reform). Panels (a) and (b) represent annual averages of this variable in treated and control groups, respectively for SAS and SARL firms, around the 2013 PFL reform, while panel (c) and (d) show the corresponding averages around the PFU reform. The treatment group is composed of companies owned by natural persons for at least 50%, the control group is composed of companies owned by natural persons for at less than 50% and neither fiscally integrated nor wholly owned by a legal person. Additional details and restrictions on the sample are outlined in the data section.Additional details and restrictions on the sample are outlined in section 5.
SOURCES : Files BIC-RN, FDG, PERIM, LIFI, DADS Postes.

Figure 8: Impact on the probability to distribute more than $x\%$ of assets in dividends, for several values of x

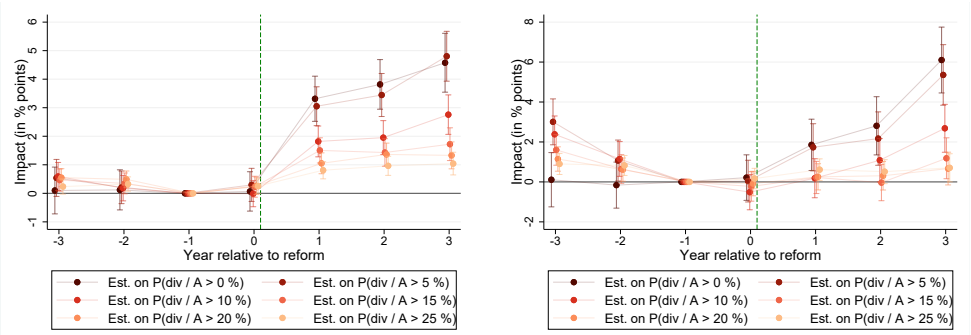
(a) SAS: DiD, 2013 reform

(b) SARL: DiD, 2013 reform



(c) SAS: DiD, 2018 reform

(d) SARL: DiD, 2018 reform



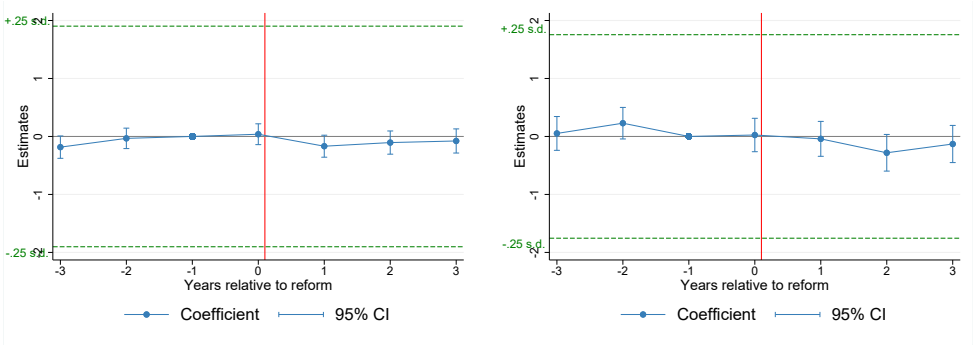
NOTES: The variables studied are the probability to pay dividends larger than $x\%$ of assets, for various thresholds of x. Panels (a) to (b) represent regression coefficients obtained by dynamic difference-differences for the 2013 reform, while panels (c) to (d) represents analogous estimates for the 2018 reforms. Robust standard errors clustered at the firm level are used to build the confidence intervals (95%). The treatment group is composed of companies owned by natural persons for at least 50%, the control group is composed of companies owned by natural persons for at less than 50% and neither fiscally integrated nor wholly owned by a legal person. Additional details and restrictions on the sample are outlined in the data section. Regressions include sector (NAF 2-digits), within sector turnover and profitability (share of value added) deciles, age (four categories) and exercise closing month, all interacted with year fixed-effects, as control variables.Additional details and restrictions on the sample are outlined in section 5.

SOURCES : Files BIC-RN, FDG, PERIM, LIFI, DADS Postes.

Figure 9: Impact of the 2013 tax hike (PFL) and 2018 tax cut (PFU) on investment

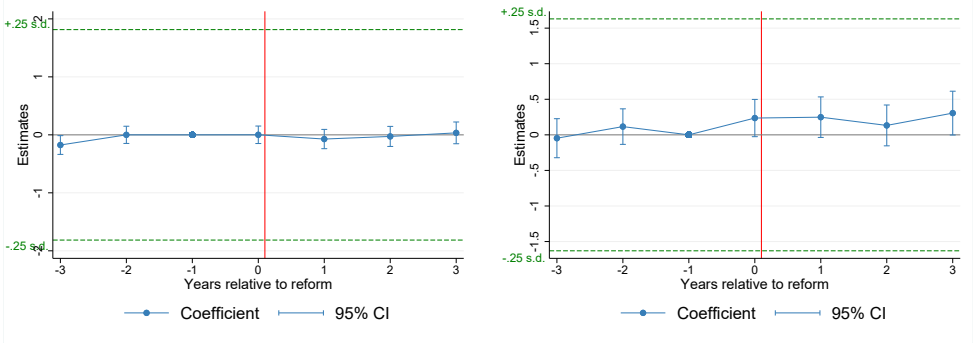
(a) SAS: DiD, 2013 reform

(b) SARL: DiD, 2013 reform



(c) SAS: DiD, 2018 reform

(d) SARL: DiD, 2018 reform



NOTES: The variable studied is non-financial investment ($\Delta_{t-1;t}$ fixed assets) scaled by overall assets measured 2 years prior to the reform. Panels (a) to (b) represent regression coefficients obtained by dynamic difference-differences for the 2013 reform, while panels (c) to (d) represents analogous estimates for the 2018 reform. Robust standard errors clustered at the firm level are used to build the confidence intervals (95%). The treatment group is composed of companies owned by natural persons for at least 50%, the control group is composed of companies owned by natural persons for at less than 50% and neither fiscally integrated nor wholly owned by a legal person. Additional details and restrictions on the sample are outlined in the data section. Regressions include sector (NAF 2-digits), within sector turnover and profitability (share of value added) deciles, age (four categories) and exercise closing month, all interacted with year fixed-effects, as control variables.

SOURCES : Files BIC-RN, FDG, PERIM, LIFI, DADS Postes.

Table 1: Summary statistics of household data (2013 reform, 2011 baseline)

A. Treatment vs Control Groups

	Treated Group				*Control Group*			
	Mean	Median	1st decile	9th decile	*Mean*	Median	1st decile	9th decile
Age (main respondent)	60.7	61.0	48.0	73.0	62.9	62.0	50.0	78.0
Size of tax unit (fiscal shares)	2.1	2.0	1.0	3.0	2.1	2.0	1.0	3.0
Taxable income (k€)	759.7	392.8	177.4	1,347.6	363.9	247.3	127.9	627.6
Labor income (k€)	185.7	128.1	0.0	411.2	131.8	35.3	0.0	357.3
Dividends (k€)	292.4	62.8	0.2	600.1	21.1	4.5	0.1	42.4
Capital gains (k€)	76.0	0.0	0.0	12.3	26.4	0.0	0.0	6.4
Other capital income (k€)	28.4	5.8	0.1	58.6	14.6	3.5	0.1	29.6
Owner-manager or some firm control	0.73	1.0	0.0	1.0	0.64	1.0	0.0	1.0
Owner-manager SAS firm	0.14	0.0	0.0	1.0	0.03	0.0	0.0	0.0
Owner-manager SARL firm	0.16	0.0	0.0	1.0	0.11	0.0	0.0	1.0
Some control	0.64	1.0	0.0	1.0	0.59	1.0	0.0	1.0
Number of observations	12,232				16,244			

B. Split of Treatment Group

	SAS owner-managers				*SARL owner-managers*			
	Mean	Median	1st decile	9th decile	*Mean*	Median	1st decile	9th decile
Age (main respondent)	56.8	56.0	46.0	68.0	55.8	56.0	46.0	65.0
Size of tax unit (fiscal shares)	2.2	2.0	1.0	3.0	2.3	2.0	1.0	3.0
Taxable income (k€)	1,079.4	520.7	215.4	1,782.2	695.0	413.2	201.8	1,195.0
Labor income (k€)	243.7	187.9	56.6	443.8	234.0	185.2	30.0	451.2
Dividends (k€)	557.0	156.0	0.1	1,100.1	268.3	78.3	0.4	524.0
Capital gains (k€)	140.5	0.0	0.0	9.8	62.3	0.0	0.0	7.1
Other capital income (k€)	32.4	5.2	0.0	61.1	20.4	4.3	0.0	36.8
Number of observations	1,731				1,904			
	Some control				*Other*			
	Mean	Median	1st decile	9th decile	*Mean*	Median	1st decile	9th decile
Age (main respondent)	61.8	62.0	49.0	74.0	64.0	64.0	52.0	77.0
Size of tax unit (fiscal shares)	2.1	2.0	1.0	3.0	2.1	2.0	1.0	3.0
Taxable income (k€)	755.3	370.1	168.7	1,368.5	635.5	367.0	172.4	1,172.0
Labor income (k€)	172.4	99.7	0.0	402.2	148.8	79.4	0.0	372.3
Dividends (k€)	258.7	46.3	0.2	498.5	221.2	50.0	0.2	501.0
Capital gains (k€)	79.7	0.0	0.0	19.2	43.9	0.0	0.0	9.4
Other capital income (k€)	30.3	6.1	0.1	63.3	28.0	7.0	0.2	61.3
Number of observations	5,325				3,272			

NOTES: These summary statistics correspond to the sample used to estimate the impact of the 2013 reform. The reference year pre-reform is 2011. The sample is a balanced panel of all households paying the wealth tax at least once between 2009 and 2012, with non-dividend income in the top 0.5% of the population distribution and having received at least once a significant amount (more than €1,500) of dividends between 2009 and 2012. Size of tax unit corresponds to the number of "fiscal shares" (i.e., 1 for each adult, and 0.5 for each child up to two, and 1 for each additional child above two). "Some firm control" is identified using by exemptions from the wealth tax return for family control of the firm (cells CB, CD, CH, CI and CJ).
SOURCES: POTE panel files, 2011; ISF-IFI 2011.

Table 2: Summary statistics of household data (2018 reform, 2016 baseline)

A. Treatment vs Control Groups

	Treated Group				*Control Group*			
	Mean	Median	1st decile	9th decile	*Mean*	Median	1st decile	9th decile
Age (main respondent)	67.3	67.0	52.0	84.0	67.9	68.0	51.0	86.0
Size of tax unit (fiscal shares)	2.1	2.0	1.0	3.0	2.1	2.0	1.0	3.0
Taxable income (k€)	304.8	152.0	67.0	529.9	130.8	80.1	31.4	248.2
Labor income (k€)	100.8	23.1	0.0	256.1	13.3	0.0	0.0	51.4
Dividends (k€)	54.1	5.6	0.0	110.8	26.6	4.1	0.0	58.1
Capital gains (k€)	88.7	0.0	0.0	19.3	20.0	0.0	0.0	12.6
Other capital income (k€)	6.3	0.9	0.0	11.9	4.8	1.1	0.0	10.9
Owner-manager or some firm control	0.57	1.0	0.0	1.0	0.52	1.0	0.0	1.0
Owner-manager SAS firm	0.07	0.0	0.0	0.0	0.03	0.0	0.0	0.0
Owner-manager SARL firm	0.11	0.0	0.0	1.0	0.08	0.0	0.0	0.0
Some control	0.49	0.0	0.0	1.0	0.47	0.0	0.0	1.0
Number of observations	75,095				52,212			

B. Split of Treatment Group

	SAS owner-managers				*SARL owner-managers*			
	Mean	Median	1st decile	9th decile	*Mean*	Median	1st decile	9th decile
Age (main respondent)	59.5	59.0	48.0	71.0	58.8	59.0	49.0	69.0
Size of tax unit (fiscal shares)	2.3	2.0	1.0	3.0	2.3	2.0	1.0	3.0
Taxable income (k€)	532.2	281.0	114.4	941.6	361.3	227.5	104.6	593.4
Labor income (k€)	87.0	61.2	19.9	162.1	80.5	60.0	21.8	151.0
Dividends (k€)	177.4	38.0	0.0	400.0	60.0	12.6	4.0	150.5
Capital gains (k€)	103.7	0.0	0.0	15.6	48.3	0.0	0.0	12.9
Other capital income (k€)	4.9	0.5	0.0	8.0	2.4	0.3	0.0	4.9
Number of observations	5,039				7,941			
	Some control				*Other*			
	Mean	Median	1st decile	9th decile	*Mean*	Median	1st decile	9th decile
Age (main respondent)	66.8	67.0	51.0	83.0	70.9	71.0	56.0	87.0
Size of tax unit (fiscal shares)	2.0	2.0	1.0	3.0	1.9	2.0	1.0	2.5
Taxable income (k€)	340.4	150.2	62.8	615.6	223.3	127.9	64.7	375.1
Labor income (k€)	106.6	12.2	0.0	266.2	65.5	0.0	0.0	193.0
Dividends (k€)	50.9	5.1	1.0	100.0	36.4	4.8	0.0	70.5
Capital gains (k€)	113.9	0.0	0.0	31.4	43.5	0.0	0.0	11.6
Other capital income (k€)	7.0	0.9	0.0	12.6	5.5	1.0	0.0	11.3
Number of observations	29,657				32,458			

NOTES: These summary statistics correspond to the sample used to estimate the impact of the 2018 reform. The reference year pre-reform is 2016. The sample includes all households paying the wealth tax at least once between 2013 and 2016. Treated households have pre-reform taxable income in the top brackets (30% and above), while control households have taxable income that puts them in the lower 14% bracket. To be included in the sample all households need to report at least once dividend income in the pre-reform years (2013-2016) above 1,500 euros. Size of tax unit corresponds to the number of "fiscal shares" (i.e., 1 for each adult, and 0.5 for each child up to two, and 1 for each additional child above two). "Some firm control" is identified using by exemptions from the wealth tax return for family control of the firm (cells CB, CD, CH, CI and CJ).

SOURCES: POTE panel files, 2016; ISF-IFI 2016. SOURCES: POTE panel files, 2016; ISF-IFI 2016.

Table 3: Descriptive statistics for treatment and control groups in 2011

(a) SAS firms

	(1) Treatment group				(2) Control group			
	Mean	Median	1st decile	9th decile	Mean	Median	1st decile	9th decile
Workforce	44.19	12	2	57	146.4	17	3	163
Assets (k€)	7820.4	1627.5	369.9	9132.5	93868.8	2880.2	388.1	39195.2
Equity (k€)	2954.6	492.5	47.39	3535.6	17173.6	600.3	-30.80	10862.0
Value added (k€)	2233.4	643.7	114.9	3237.8	9032.0	901.6	83.66	9788.4
Value added over assets	0.501	0.396	0.122	0.966	0.440	0.323	0.0582	0.906
Wagebill over assets	0.310	0.231	0.0702	0.607	0.280	0.187	0.0403	0.583
Investment over assets	0.0186	0.00526	-0.0124	0.0734	0.0199	0.00600	-0.00937	0.0776
Net corporate savings over assets	-0.0128	0.00403	-0.166	0.121	-0.0297	-0.00386	-0.209	0.115
Dividends (k€)	106.4	0	0	189.4	894.7	0	0	420
Div. over assets	0.0255	0	0	0.0767	0.0251	0	0	0.0794
Sh. firms w/ dividends > 0	0.393	0	0	1	0.319	0	0	1
Age	22.85	21	6	43	20.39	17	4	41
% phys. shareholders	0.945	1	0.732	1	0.0780	0.0000239	0	0.313
Observations	42,327				16,700			

(b) SARL firms

	(1) Treatment group				(2) Control group			
	Mean	Median	1st decile	9th decile	Mean	Median	1st decile	9th decile
Workforce	7.875	5	1	16	17.32	7	2	32
Assets (k€)	833.3	460.1	118.4	1719.3	2780.8	901.5	187.6	4300.3
Equity (k€)	276.9	125.6	4.583	607.4	676.7	164.7	-67.52	1121.6
Value added (k€)	381.0	243.6	54.32	803.0	906.9	336.4	49.95	1587.5
Value added over assets	0.640	0.526	0.186	1.209	0.532	0.390	0.0911	1.101
Wagebill over assets	0.422	0.325	0.104	0.831	0.351	0.231	0.0580	0.756
Investment over assets	0.0146	0.00372	-0.0152	0.0716	0.0150	0.00331	-0.0119	0.0710
Net corporate savings over assets	-0.000743	0.0140	-0.173	0.151	-0.0186	0.00353	-0.202	0.137
Dividends (k€)	19.72	0	0	50	68.26	0	0	100
Div. over assets	0.0280	0	0	0.0899	0.0270	0	0	0.0909
Sh. firms w/ dividends > 0	0.345	0	0	1	0.264	0	0	1
Age	14.17	11	4	28	15.87	13	4	32
% phys. shareholders	0.980	1	1	1	0.0745	0	0	0.312
Observations	226,481				5,497			

NOTES: These tables present statistics (mean, median, 1st and last decile) on the characteristics of the companies in the treatment and control groups of SAS and SARL respectively. The variables are winsorized at percentiles 1 and 99 according to the methodology defined in the data section. The treatment group is composed of companies owned by natural persons for at least 50%, the control group is composed of companies owned by natural persons for at less than 50% and neither fiscally integrated nor wholly owned by a legal person. Additional details and restrictions on the sample are outlined in the data section.

SOURCES: Industrial and commercial benefits file - normal regime (BIC-RN), group declaration file (FDG), tax group perimeters (PERIM), financial link surveys and files (LIFI), annual social data declarations (DADS Postes), self-employed database (BNS).

Table 4: Descriptive statistics for treatment and control groups in 2016

(a) SAS firms

	(1) Treatment group				(2) Control group			
	Mean	Median	1st decile	9th decile	Mean	Median	1st decile	9th decile
Workforce	27.80	7	1	41	122.5	16	3	132
Assets (k€)	5882.7	970.4	173.8	7027.7	88919.1	3105.2	457.1	36226.3
Equity (k€)	2679.1	313.5	20.46	2942.5	15121.5	722.9	-6.249	10560.4
Value added (k€)	1628.9	386.5	59.72	2309.6	8157.4	926.4	96.11	8616.4
Value added over assets	0.522	0.408	0.112	1.036	0.422	0.314	0.0574	0.870
Wagebill over assets	0.327	0.237	0.0652	0.664	0.266	0.180	0.0382	0.553
Investment over assets	0.0156	0.00442	-0.0141	0.0735	0.0168	0.00546	-0.0100	0.0736
Net corporate savings over assets	0.00332	0.0162	-0.162	0.156	-0.0162	0.00472	-0.188	0.123
Dividends (k€)	70.88	0	0	100	708.5	0	0	403.2
Div. over assets	0.0255	0	0	0.0798	0.0260	0	0	0.0825
Sh. firms w/ dividends > 0	0.309	0	0	1	0.321	0	0	1
Age	19.87	16	3	43	21.61	18	5	45
% phys. shareholders	0.957	1	0.800	1	0.0758	0	0	0.310
Observations	65,413				21,374			

(b) SARL firms

	(1) Treatment group				(2) Control group			
	Mean	Median	1st decile	9th decile	Mean	Median	1st decile	9th decile
Workforce	7.598	5	1	15	17.39	7	2	30
Assets (k€)	944.3	497.8	125.6	1942.3	3029.0	991.7	224.0	4621.5
Equity (k€)	369.7	159.0	9.871	782.3	883.4	209.5	-65.25	1310.9
Value added (k€)	395.5	237.0	53.61	798.4	948.8	359.3	58.64	1658.7
Value added over assets	0.591	0.474	0.164	1.132	0.506	0.384	0.0909	1.022
Wagebill over assets	0.406	0.306	0.0961	0.808	0.332	0.230	0.0552	0.690
Investment over assets	0.00985	0.00280	-0.0168	0.0609	0.0122	0.00284	-0.0120	0.0612
Net corporate savings over assets	0.0145	0.0248	-0.133	0.150	-0.00427	0.0120	-0.173	0.142
Dividends (k€)	9.152	0	0	20	55.26	0	0	123
Div. over assets	0.0109	0	0	0.0285	0.0285	0	0	0.0964
Sh. firms w/ dividends > 0	0.185	0	0	1	0.269	0	0	1
Age	15.87	13	5	30	17.20	15	4	34
% phys. shareholders	0.980	1	1	1	0.0727	0	0	0.302
Observations	228,754				5,907			

NOTES: These tables present statistics (mean, median, 1st and last decile) on the characteristics of the companies in the treatment and control groups of SAS and SARL respectively. The variables are winsorized at percentiles 1 and 99 according to the methodology defined in the data section. The treatment group is composed of companies owned by natural persons for at least 50%, the control group is composed of companies owned by natural persons for at less than 50% and neither fiscally integrated nor wholly owned by a legal person. Additional details and restrictions on the sample are outlined in the data section.

SOURCES: Industrial and commercial benefits file - normal regime (BIC-RN), group declaration file (FDG), tax group perimeters (PERIM), financial link surveys and files (LIFI), annual social data declarations (DADS Postes), self-employed database (BNS).

Table 5: Regression coefficients on the accounting decomposition – static difference-in-differences

		SAS		SARL	
Dep. Var.		**2013 Reform** (1)	**2018 Reform** (2)	**2013 Reform** (3)	**2018 Reform** (4)
Dividends		-0.176***	0.637***	-0.707***	0.240***
		(0.0453)	(0.0474)	(0.0773)	(0.0816)
Profits	(+)	0.0176	0.0764	-0.528***	0.0462
		(0.109)	(0.105)	(0.177)	(0.172)
Investment	(-)	-0.0818	0.0122	-0.228**	0.144*
		(0.0622)	(0.0553)	(0.0937)	(0.0866)
Net corporate savings	(-)	0.299**	-0.529***	0.389*	-0.405**
		(0.129)	(0.121)	(0.201)	(0.197)
Number of firms		50,320	61,787	143,007	120,766
Number of observations		328,562	390,527	933,436	771,222

NOTES: This table presents regression coefficients of a static diff-in-diff, using as our dependent variable each variable of the accounting breakdown presented in equation (2), as covariate of interest an interaction 'treatment × post reform period', and including different sets of fixed-effects. Coefficients should be interpreted as cents per euro of assets. Column (1) presents the estimates exploiting the 2013 reform (with 2011 as baseline year), while column (2) presents the results for the 2018 reform (with 2016 the baseline year). Standard-errors are clustered at the firm-level and indicated in parentheses. The treatment group is composed of companies owned by natural persons for at least 50%, the control group is composed of companies owned by natural persons for at less than 50% and neither fiscally integrated nor wholly owned by a legal person. Additional details and restrictions on the sample are outlined in the data section. Regressions include sector (NAF 2-digits), within sector turnover and profitability (share of value added) deciles, age (four categories) and exercise closing month, all interacted with year fixed-effects, as control variables.
SOURCES: Files BIC-RN, FDG, LIFI, DADS Postes.

Table 6: Dividend-tax elasticities – 2SLS estimations

	2013 Reform	**2018 Reform**
All treated	13.39	2.06
	(0.55)	(0.28)
Owner-manager	21.02	9.37
	(1.18)	(0.66)
Non owner-manager	9.48	1.38
	(0.60)	(0.29)

NOTES:
SOURCES: POTE, ISF-IFI.

(For Online Publication)

Appendix to

Follow the money!
Why dividends overreact to flat-tax reforms

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December 2021

This appendix presents further details for the taxation of capital income in France over the period of study (Appendix A), on the administrative tax data used in the paper (Appendix B), and additional results (Appendix C).

A Capital income taxation in France (2008–2020)

A.1 Income taxation in France before 2013

From 2008 to 2012, capital income is subject to a dual tax system in France. Such income can either be included in the calculation of net taxable income in order to be taxed on the progressive income tax scale or be taxed on the PFL at a flat rate. Whatever the tax option, the level of taxation of dividends has generally increased during this period as a result of several reforms described later in this section.

Personal income tax. During the period 2008 to 2012, several legislative changes led to an increase in the taxation of dividends taxed on the progressive scale. Dividends subject to the scale are eligible for deductions (a lump-sum allowance and a proportional allowance), in particular to correct the problem of double taxation of dividends – associated with the coexistence of income tax and corporation tax. In 2010, a tax credit to which dividends were entitled was abolished. This tax credit was 50 % of the amount declared, and capped at 115 euros (230 euros for a couple). Also in 2010, the marginal tax rate on the last bracket of the scale increased from 40 to 41%. In 2012, a new tranche is added, increasing the marginal tax rate to 45% for tax households whose net taxable income per tax share exceeds 150 000 euros. For taxpayers affected by these two reforms, these changes also imply an increase in the level of taxation of dividends under the progressive scale.

Optional flat-rate taxation of dividends. The Finance Act for 2008 [A.1] establishes an optional flat-rate withholding tax applicable to dividends. A flat-rate withholding tax in full discharge already existed before 2008 for other types of capital income such as income from fixed-income investment products. The PLF rate applicable to dividends is 18% at its inception and gradually increases between 2008 and 2012. The PLF rate increases from 18% to 19% in 2011 and to 21% in 2012 (24% for capital income other than dividends, i.e., interest on bonds and debt securities in particular). Apart from these parametric reforms, the taxation of the PFL has not undergone any major changes.

Other tax reforms. A series of reforms also affect the taxation of dividends from 2008 to 2012, regardless of taxpayers' choice between the scale and the

[A.1] Law No. 2007-1822 of 24 December 2007 on the Finance for 2008, article 10.

Table A1: Evolution of tax parameters related to dividend taxation in France (2008–2012)

	Standard allowance	Proportional allowance for dividends	Tax credit on dividends	Optional flat-rate tax (PFL)	Social contributions
2008	1 525 €	40 %	50 %	18 %	11.0 %
2009	1 525 €	40 %	50 %	18 %	12.1 %
2010	1 525 €	40 %		18 %	12.1 %
2011	1 525 €	40 %		19 %	13.5 %
2012		40 %		21 %	15.5 %

NOTE : The standard allowance is doubled in the case of a couple. The dividend tax credit is capped at 115 euros for a single person and 230 euros for a couple. The rate of social security contributions indicated in the table corresponds to the rate at 31 December of the year, in the event of changes during the year. From 1^{er} January 2011 to 1^{st} November 2011, social security contributions amount to 12.3%. The increase in social security contributions to 15.5% will take effect from 1^{st} July 2012. The social security tax rate indicated for 2013 corresponds to the general case and does not include the case of the majority managers of SARL subject to social security contributions (see sections A.3).

SOURCE : IPP tax and benefit table, [link to webpage].

PLF. The 2011 Finance Act creates an Exceptional Contribution on High Income (CEHR). This contribution is progressive and based on the benchmark tax income. Its rate is 3% on income between 250 000 and 500 000 euros (500 000 and 1 000 000 euros for a couple) and 4% on income above 500 000 euros (1 000 000 euros for a couple). Since the tax base of this contribution is the reference tax income, it includes all dividends, whether they are taxed on the scale or on the PFL.

Social security contributions on capital income also increase from 2009 to 2012. The overall tax rate applicable to dividends increases from 11% in 2009 to 15.5% in 2012 (see table A1).

A.2 The 2013 reform

In order to understand the effects of the abolition of the PFL in 2013 and the introduction of the dividend scale, it is important to understand the two systems that existed before this reform and the arbitration that was available to taxpayers.

- **Option 1 : the PFL**
  In the event of a PFL election, dividends are taxed in a *flat-rate* manner, i.e. the rate applied is unique and does not depend on the household's level of resources. The PFL is also *liberative* of income tax, as it replaces the payment of this tax. The PFL is deducted at source by the banking

institution when the dividends are received. However, dividends taxed on the PFL must be declared when filing the annual income tax return, in order to be included in the calculation of the reference tax income. Only persons whose tax residence is established in France can opt for the PFL. In addition, certain distributed income is subject to mandatory taxation on the scale[A.2].

- **Option 2 : the progressive tax scale**
  In the event of an option for the scale, dividends are taxed at a progressive rate with other types of income (labor income, business income, replacement income etc.). Progressive taxation means that the *marginal* tax rate (the rate applied to an additional euro) increases with the household's total income. With this option, and depending on the legislation in force, it is possible to benefit from deductions, the marital and family quotient, tax credits and reductions (see table A1). It is also possible to deduct certain expenses, such as collection fees. The payment of tax on dividends is then made the year following their collection, after having filed the tax return.

It is important to underline the optional nature of the PFL: each taxpayer is free to choose this method of taxation or not, under the constraint of the rules mentioned above. The option is exercised upstream with the banking institution. It is final, in the sense that the choice of taxation method cannot be changed during the year. However, it is possible to change the option from one year to the next. The option may also be partial: the taxpayer may choose to tax part of his dividends on the scale and part on the PFL (in the case of a partial option, the taxpayer loses the benefit of the allowances). Due to the optional nature of the PFL, not all taxpayers are affected by the mandatory dividend scale in 2013.

Between the PFL and the scale, the most financially advantageous option may vary depending on the amount of dividends declared by a household, the level of its taxable income and other parameters (such as the amount of tax credits or reductions for which that household is eligible, or the nature of the dividends it receives). The equations A.1 and A.2 represent in a simplified way the arbitration faced by a taxpayer. We illustrate this arbitrage in the case of 2012 income and related legislation. The CEHR is ignored in this illustration, which affects the dividend tax rate in the same way regardless of the option chosen.

[A.2] This includes dividends from exempt profits distributed by listed real estate investment companies (SIICs) and by investment companies with a preponderance of real estate with variable capital (SPPICAV) since 2011, taxable income from unlisted securities held in a PEA, distributed income taken into account in determining the taxable profit of an industrial, commercial, craft or agricultural company or a liberal profession and taxable distributed income following a correction by the tax authorities.

By choosing the PFL, dividends are taxed at 21 % for the PFL and 15.5 % for social security contributions, i.e. at an overall effective rate of 36.5 %. By choosing the scale, dividends are taxed at a rate that varies according to the bracket in which the taxable income is located and at 15.5 % for social security contributions. Assuming that dividends are eligible for the 40 % allowance, the effective overall marginal tax rate varies from 15.5 % (in the case of the 0 % tranche that only pays social security contributions) to 41.1 % (in the case of the 45 % tranche). According to this simplified calculation, the option for the PFL is only financially attractive for tax households whose total income puts them in the 41 or 45 % bracket. In more complex cases (e.g. presence of tax reductions), the scale may remain tax-efficient for some tax households. In theory, the PFL should therefore concern few taxpayers because only 1.2 % of tax households have a net taxable income per unit that places them in the last two brackets of the income tax scale in 2012 (see table A2). Moreover, not all of these taxpayers receive dividends.

$$T(D) = (\tau^{PFL} + \tau^{PS}) \times D \tag{A.1}$$

$$T(D) = \tau^{bareme} \times \max(0, (1 - \delta^p) \times D - \gamma \times D - \delta^f) + \tau^{PS} \times D \tag{A.2}$$

where τ^{PFL} , is the PFL rate

where τ^{PS}, is the overall level of social security contributions

where δ^f, is the lump-sum abatement

where δ^p, is the proportional abatement

where γ, is the rate of deductible social contributions (CSG)

The 2013 Finance Act removes the PFL option for dividends paid on or after January 1, 2013. This applies also for the vast majority of capital income although some fixed income investment products can still be subject to a 24% PFL under conditions. In addition, life insurance products can also always be subject to a PFL, on option. Finally, certain fixed-income investment products are subject to a mandatory flat-rate withholding tax. Dividends are taxed in two stages. First of all, they are still subject to a flat-rate withholding tax of 21%. Maintaining a withholding tax avoids a cash hole for public finances. Then, dividends are taxed within the progressive income tax schedule when the annual income tax return is filed. The non-dischargeable flat-rate withholding tax (also referred to as the PFLN for *prélèvement forfaitaire non libératoire* in French)

Table A2: Distribution of tax units in 2012 across brackets of the progressive income tax schedule

	Number of tax units	% of total
Non subject to income tax	8 741 670	23,8%
5,5 % bracket	8 866 253	24,1%
14 % bracket	14 827 094	40,4%
30 % bracket	3 877 237	10,6%
41 % bracket	350 123	1,0%
45 % bracket	57 659	0,2%
Total	36 720 036	100,0%

SOURCE : Annuaire Statistique 2013, Tableau 219, DGFiP; FELIN 2012, DGFiP. NOTE : The brackets indicate the theoretical maximal marginal tax rate faced by tax units. In practice, there are many other features of the income tax system that impact tax rates. This results in almost half of the households not paying the income tax.

paid is deducted from the final amount of income tax. If the amount paid is too high in relation to the tax due, the excess tax paid is returned to the taxpayer in the form of a tax credit. In total, the reform increases the level of dividend taxation for taxpayers who previously opted for the PFL and who were in the top income tax brackets.

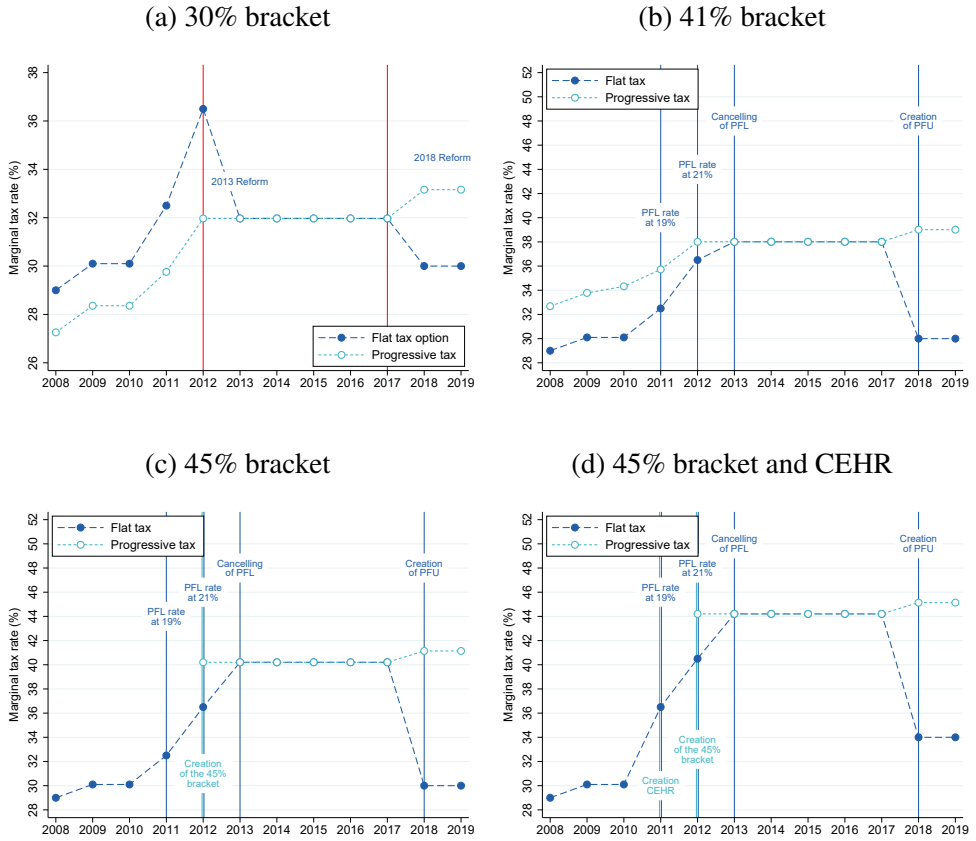
A.3 Anti-avoidance scheme for SARL managers (2013)

Until 2012, dividends are subject to income tax and social security contributions on financial income. However, dividends are not subject to social security contributions because they are not considered as business income. Social security contributions on financial income are non-contributory contributions.

The table A1 shows the evolution of the social security tax rates to which dividends are subject from 2009 to 2013. In 2012, dividends are subject to the CSG at a rate of 8.2 %, the CRDS at a rate of 0.5 %, the social levy at a rate of 5.4 %, the additional social levy contribution (CAPS) at a rate of 0.3 % and the additional contribution to finance the RSA (CAPS-RSA) at a rate of 1.1 %. The overall rate of social security contributions on dividends is thus 15.5 % in 2012. Social security contributions on dividends are deducted at the time of payment of the dividend, from its gross amount (*à la source* in French). In the event of taxation of dividends on the progressive income tax scale, part of the CSG is deductible from the tax.

From 2013, dividends received by the majority managers of limited liability companies (SARL which are the French equivalent of LLCs) are also subject to social security contributions for the amount exceeding the threshold of 10 % of

Figure A1: The evolution of marginal tax rates on dividends (2008–2019)



NOTES: Each sub-figure shows, for a specific case of household, the evolution of the marginal tax rate for the two options: the progressive income tax schedule and the flat tax option (for the years such an option exists). These rates are computed by considering households with no tax credits or tax reductions, and assuming there is no SARL manager in the household. These marginal tax rates are computed using the TAXIPP microsimulation model.
The Figure A1b shows the case of a household whose total fiscal income, after all tax deductions, is in the 41% bracket of the progressive income tax schedule (between 70,830 and 150,000 euros in 2012 for instance). The Figure A1c shows the case of a household whose total fiscal income, after all tax deductions, is in the 45% bracket of the progressive income tax schedule (higher than 150,000 euros in 2012 for instance). The Figure A1d shows the case of a household whose total fiscal income, after all tax deductions, is in the 45% bracket of the progressive income tax schedule, and also in the scope of the CEHR.
SOURCE: TAXIPP 1.0.

the company's share capital. This reform is specific, in that it only applies to certain taxpayers and certain types of companies. In fact, the SARL is the most frequently chosen status: 77 % of French companies take the form of a SARL in 2012 (Boissel and Matray, 2021). The legal framework of SARL does not require the majority manager to be an employee of the company. Before 2013, the majority manager can therefore choose to be remunerated only in dividends

rather than in salary, thus avoiding the payment of social security contributions. Boissel and Matray (2021) note that in 2012, a manager is taxed at 15.5 % in terms of overall social security contributions if he chooses to receive dividends, while he is taxed at around 46 % if he receives salaries. The 2013 reform aims to reduce this arbitrage opportunity by harmonising the tax rates of the various options.

A.4 Tax treatment of share buybacks

The taxation of income distributed by a company to its shareholders depends on how it is distributed. A company may choose to pay dividends to shareholders but also to buy back its own shares. Prior to 2015, gains from share repurchases are taxed under a system known as hybrid. The taxable base of this income corresponds to the difference between the repurchase price of the shares and the initial purchase price. Initially, the difference between the amount of the contributions included in the nominal value of the repurchased securities and the initial acquisition price is treated as a capital gain and taxed accordingly. Then, the difference between the repurchase price of the shares and the amount of these contributions is treated as distributed income and therefore taxed in the same way as a dividend.

When asked about a priority constitutionality issue (QPC No. 2014-404) on the subject, the Constitutional Council ruled in June 2014 that the gains from a share buyback are in reality entirely comparable to gains on disposal. Article 88 of the Amending Finance Act No. 2014-1655 of 29 December 2014 for 2014 amends the General Tax Code accordingly. Share repurchases made since 1 January 2015 are taxed according to the capital gains tax system, i.e. the progressive income tax scale, as are dividends. However, income treated as capital gains benefits from a deduction that varies according to the length of the holding period. In 2015, the deduction for the duration of the ordinary holding period is 50 % for a security held for at least two years and less than eight years, and 65 % for a security held for at least eight years. The enhanced holding period allowance, which applies under conditions in the case of SME securities, is 50 % for securities held for at least one year and less than four years, 65 % for securities held for at least four years and less than eight years, and 85 % for securities held for at least eight years. This allowance is generally more advantageous than the 40 % allowance for dividends. The 2015 reform could therefore encourage companies to remunerate their shareholders in the form of share buybacks rather than dividends.

A.5 The 2018 reform to capital income taxation

The 2018 Finance Act revisits the 2013 reform of mandatory dividend taxation on the scale, and reintroduces the possibility of flat-rate taxation of capital income with the creation of the single flat-rate tax (PFU).

A.5.1 The one-time flat-rate levy

Like the PFL that preceded it from 2008 to 2013, the PFU allows, on option, to be taxed at a flat-rate of 12.8 %, in full discharge of the progressive scale tax. In addition to this tax, there are social security contributions, which have been taxed at 17.2 % since 2018. In total, dividends are then taxed at 30 %. The tax rate of the PFU (12.8 %) is much lower than the rate of the PFL (which has varied between 18 % and 21 % during its existence). The SFP should thus be the most financially advantageous option for a larger fraction of taxpayers than the LFP was.

In practical terms, dividends were subject to a mandatory 21 % non-dischargeable flat-rate withholding tax (NTFP) since 2013. This levy is maintained and its rate is now 12.8 %. Dividends must then be declared at the time of the annual income tax return in order to be taxed, at the choice of a flat rate of 12.8 % or the progressive income tax schedule. Unlike the LFP, all taxpayers are subject to a flat-rate withholding tax and the option between the scale and the SOP is only exercised at the time of the annual income tax return. In order to opt for the schedule, the taxpayer must check the *2OP* box on Form 2042. The SOP is therefore designed as the default option for the taxation of capital income from 2018 onwards. In the event of an option for the scale, taxpayers benefit from the 40 % allowance and the deductibility of part of the CSG.

While the reform of the SFP may seem symmetrical to the 2013 reform that abolished the LFP, several factors put this into perspective. The magnitude of the 2018 tax shock (- 7.4 percentage points of marginal tax rate) is almost twice as high as that of 2013 (+ 3.0 percentage points). Moreover, as indicated above, the number of taxpayers affected by the PFU-related tax reduction in 2018 could be much higher than the number of taxpayers affected by the 2013 reform. Only about 115,000 tax households declared a positive amount of dividends taxed to the PFL in 2012, i.e. 0.3 % of tax households. Sources: National declarations 2042, 2012.

A.5.2 The possibilities of income shifting in 2018

The introduction of the SOP widens the gap in the level of taxation between different types of income, in particular between wage income and dividends.

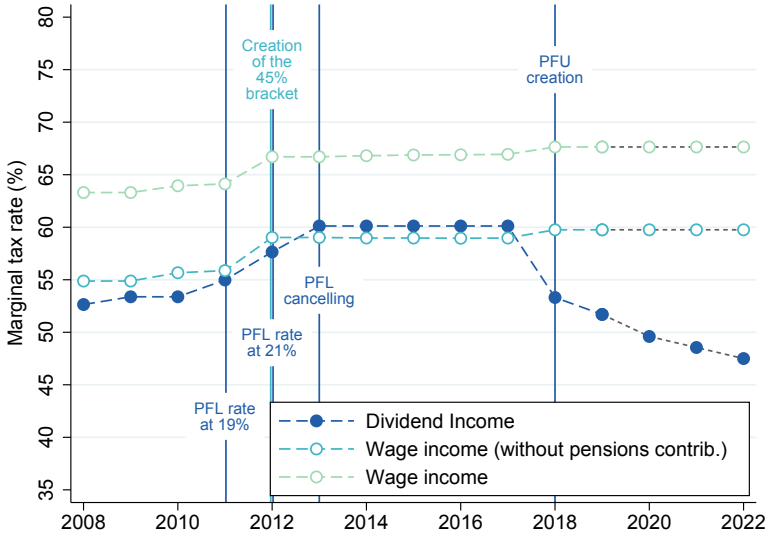
The higher the gap between the taxation of wages and the taxation of dividends, the more it is in the interest of executives and employees of companies with room for manoeuvre in allocating their income between these two categories to remunerate themselves in the form of the least taxed income (the so-called " income shifting " phenomenon). The graph A2 represents the evolution of the maximum marginal tax rates applicable to wages and dividends, taking into account social and income taxes, but also social contributions and corporation tax. With regard to wages, the graph represents the total marginal tax rate as well as the marginal tax rate excluding pension contributions, which can be considered as savings rather than a tax.

The 2013 reform reduced the gap between marginal taxation of wages and dividends. Excluding pension contributions, the marginal tax rate on dividends becomes even higher than that on wages. This creates an incentive for executives with this power to pay themselves more in salaries than in dividends. However, the tax gap remains small before and after the reform. The 2018 reform, on the other hand, has a significant effect on incentives to be paid in dividends rather than wages. The tax gap between wages and dividends falls from - 1.7 to + 6.4 percentage points. This gap is expected to widen until 2022 due to the gradual reduction in the corporate tax rate from 33.33 % in 2018 to 25 % in 2022.

Based on the Swedish model, an amendment to the finance bill for 2018 was introduced by Senator Albéric de Montgolfier (No. I-625 of 24 November 2017) in an attempt to limit these optimisation behaviours. This anti-abuse amendment consisted, in the case of senior executives holding more than 10 % of the voting rights, in capping the UFP's profit to the portion of income not exceeding 10 % of the share capital and the shareholder's current account. The amendment was voted in the Senate but deleted by the National Assembly's Finance Committee, in particular on the grounds that this measure would undermine companies' flexibility in setting the timing of dividend payments. Unlike the Swedish system, this amendment did not allow shareholders to register future dividend rights when the annual amount of dividends was below the ceiling. The effect of the 2018 reform on the gap between dividend and wage taxation, and the absence of anti-abuse measures, suggest that the 2018 reform could have more income displacement effects than the 2013 dividend scale.

However, the potential incentives to shift income to dividends can be reduced by the introduction of withholding tax in 2019. Dividends were already subject to withholding tax and are not affected by this reform. Salary incomes have been deducted at source since 2019. In order to avoid income taxation in 2019 for 2019 (as a withholding tax) and 2018 (under the old tax system), wage income in 2018 is not taxed. In practice, the 2019 income tax on 2018 income

Figure A2: Changes in taxes on dividends and wage income (2008–2022)



NOTES: The marginal rates represented are marginal rates applied to super gross income (gross income plus employer contributions, if any). They correspond to the case of a single person without children, employee, manager, contributor to the general social security system, not benefiting from any credit or tax reduction, and having annual taxable income between four and eight times the social security ceiling. The marginal dividend rate includes corporate income tax, social security contributions and income tax (assuming that the individual opts for the flat-rate tax in the years when this option is possible, i.e. from 2088 to 2012 and from 2018 onwards). The marginal rate on wages includes social contributions, social contributions and income tax (the amount of income in this case being high, the 10 % deduction on wages is capped in his case and the individual is in the last bracket of the scale). The marginal rate on wages excluding pension contributions corresponds to the same marginal rate as that described above minus the amount of social contributions financing pensions. This rate is the same for an individual with incomes between 4 and 8 Social Security ceilings as for an individual with incomes above 8 Social Security ceilings. Projections from 2019 to 2022 are based on announced corporate tax rates and assuming no change in the rest of the tax base.

is calculated according to the usual methods. Then, the tax fraction associated with the income in the new withholding tax field is returned in the form of the tax credit modernisation of the recovery (CIMR). Thus, the introduction of withholding tax may provide, for 2018 only, more incentives to receive wages rather than dividends, in the opposite direction to the shift that can be expected from the SFP. Nevertheless, this possibility should be put into perspective, insofar as only so-called non-exceptional income is eligible for the White Year and the assessment of the exceptional nature of the remuneration of company directors is reinforced. Any portion of 2018 income exceeding the maximum of 2015,

2016 and 2017 income shall be considered exceptional, unless it is established retrospectively that 2019 income is higher than 2018 income.

B Additional details on data

B.1 Household-level data

At the household level, the analysis relies on French administrative data coming from two exhaustive files: the panel of all personal income tax returns (POTE) and the panel of all wealth tax returns (ISF-IFI). In this section, we describe in detail the two data sources exploited as well as how we used it to define the variables of interest and to identify the main sub-groups for the analysis.

B.1.1 Description of the panel of income tax returns (POTE)

The POTE is an administrative database containing the information of all households' personal income tax returns which is produced by the French tax authority (*Direction générale des finances publiques*, DGFiP) and available to researchers upon request.

Population coverage In France, nearly all households need to fill in an income tax return and provide it to the fiscal authority on a yearly basis. Tax filling is mandatory for individuals who either live in France, have their main professional activity located in France, live abroad but receive French income or turned 18 and are not part of their parents' household anymore. Since 2018, the income tax is withheld in France but households still have to fill in a tax return and correct informations if needed. Note that tax filling is mandatory even if households are not taxable. In fact, since 2013, more than half of the households who fill in a tax return data end up not paying the income tax. The data are therefore almost exhaustive of any household receiving dividends in France. Overall, in 2018, the POTE file has 38,487,937 observations.

Data production The POTE files are produced on a yearly basis by the administration. The POTE of year N contains information on households situation as of $12/31/N$ with income earned during year N. Households fill in the tax return data each year, between May and June, and send it to the fiscal administration, either by paper or electronically. Therefore the information of POTE N is only available to the administration in May or June of $N + 1$. The income tax return is composed of several forms, each of them containing different boxes

that must be filled if relevant. The main form is the tax return form n°2042[A.3] where households declare their personal information (name, address, birthdate, contact information, marital status, family composition) as well as the main income earned (e.g. wages, pensions, unemployment benefits...). There are other specific forms to fill in for households in specific situation (e.g. self-employed, eligible to some specific tax deductions, with specific types of capital income or capital gains). Once the tax return data are received by the tax authority, they are treated in order to produce the POTE. In the end, the POTE file contains one variable for each box of the income tax forms (e.g. income, family situation...) as well as some intermediate variables computed by the administration (e.g. income tax, taxable income...). Overall, in 2018, there were 3,880 variables in the POTE.

Observation unit The observation unit is the fiscal household (or tax unit), which is composed of an individual, its spouse (as defined by a marriage or a civil union, named PACS for *Pacte Civil de Solidarité* in French) and its dependant persons (children or persons with disabilities living under the same roof). Children are counted as dependants persons if they are below 18 or if they have disabilities, whatever their age. For children below 21 (or below 25 if they are enrolled students), they can choose whether to be counted as dependants within their parents' household or to become a separate fiscal household. Even though households make a single tax declaration, the POTE file provides some information at the individual level too as some types of individual income (e.g. wages, self-employed incomes, pensions...) have to be declared separately in the tax return form. Households are identified by a unique *ad hoc* household identifier (the $FIP18\_c$).

Panelization of the data There is one POTE file by year. Using the household identifier, it is possible to follow households over time and to build a panel for years 2006 to 2019. In some very specific cases, households cannot be track down the whole period. This can happen when a new household is created during the period, because a child is not anymore considered as a dependant person and has to fill its own tax return. In this case, a new household identifier is attributed to this new household. Conversely, when the last member of a household dies, the household disappear from the tax return file. Each household appears each year only once, except in some very specific cases (when one

[A.3]The forms change every year according to changes in the fiscal legislation. They are available on the website of the tax authority: https://www.impots.gouv.fr/portail/formulaire/2042/declaration-des-revenus.

member of a couple dies during the year but the other is still alive, when one of the children turn 18 during the year). In 2018, this represented only ... % of all households.

Confidentiality of the data Researchers have access to an anonymized version of these data, where all mentions of first and last name has been removed, as well as of the precise address of households. The household identifier is build in such way that it does not enable to identify households. Given the confidential nature of the data, the access to the data by researchers is restricted. Researchers must send a detailed application to the *Comité du secret statistique* (Committee for Statistical Confidentiality) explaining the specific research project they are planning to work on, which data they plan to use and how. Researchers must obtain the approval of the data producers as well as of the Committee. Once access is approved, researchers will only have access to the data through a secure remote access process developed and managed by the Secure Access Data Center (CASD). The process includes connecting on a specific device, named SD-box, which identifies researchers by fingerprints identification. Then, data are accessed within a specific project which is confined in a secure environment with its own server allowing the user to access and process the data but without any possibility to connect to the Internet and to import or export files without a thorough check by the CASD team. In particular, the law forbids any export of the raw data or of outputs (e.g., means, regressions etc.) made using less than 11 tax units.

B.1.2 Description of the Panel of Wealth tax returns (ISF-IFI)

The ISF-IFI file is an administrative database containing the information of households' wealth tax returns which is produced by the French tax authority (*Direction générale des finances publiques*, DGFiP) and available to researchers upon request.

Population coverage In France, households possessing significant wealth are subject to a wealth tax since 1982[A.4]. Tax filling is mandatory for households with a wealth above a given threshold and who either are French fiscal residents[A.5] or have wealth located in France. In that latter case, the taxable wealth

[A.4]The wealth tax was called *Impôt sur les Grandes Fortunes* (IGF) from 1982 to 1986, then *Impôt de Solidarité sur la Fortune* (ISF) from 1989 to 2017 and is now called the *Impôt sur la Fortune Immobilière* (IFI) since 2018.

[A.5]The tax authority considers as a French fiscal resident any household, whatever the nationality of its member, who belong to one of the following categories; households whose perma-

will only be constituted of the wealth located in France. The wealth threshold to declare at the wealth tax have varied during the period following changes in the tax schedule. This means that the population covered by the ISF-IFI file has not been constant over the period. In 2010, the threshold was 790,000 euros and all households above that threshold had to fill in a detailed declaration (form n°2725). As described in Table B3, there were about 590,000 households filling the return in 2010. As of 2011, households with taxable wealth below 1.3 billion euros were not taxable anymore and thus did not fill in the wealth tax return anymore. In 2011, the number of households drop to about 290,000 due to this change in the tax schedule. The second main change in the population covered by the ISF-IFI file is due to the 2018 reform which canceled the global wealth tax (ISF) and replaced it by a wealth tax only on real estate, making financial assets non-taxable. As a result, the number of households filling a wealth tax return decreased from about 350,000 in 2017 to about 130,000 in 2018.

Data production The ISF-IFI file is a large panel file updated annually with the information of the wealth tax return of a given year. For a given year N, households declare their taxable wealth as of $1/1/N$ between May and June of year N by filling the wealth tax return. The declared information includes taxable wealth split in different asset categories (e.g. housing, lands, stocks, cash etc.) as well as some other informations necessary to perform the wealth tax computation (e.g. total amount of taxes paid and income earned during the previous year, deductible expenses like charitable donations...).However, as of 2011, households with taxable wealth below 3 billion euros[A.6] are allowed to declare in a "simplified" tax return[A.7] which requires less detailed information than the detailed form. In particular, for households fillling the simplified tax return we observe their total taxable wealth but we cannot know the share of this wealth that comes from financial wealth (e.g. stocks). In the end, the ISF-IFI file contains one variable for each box of the wealth tax forms.

nent address is in France, households who have a non-auxiliary professional activity in France, households having its main economic interests in France, households working for the public sector abroad and not paying personal income tax there.

[A.6] From 2013 to 2017, the criteria to fill in the simplified tax return was to have a taxable wealth lower than 2.7 billion euros.

[A.7] For a year, in 2011, the simplified tax return was a separate form (form n°2725-A). In 2012, the form was replaced by a specific set of boxes in the personal income tax return form n°2042. Forms since 2011 are available on the tax authority's website: https://www.impots.gouv.fr/portail/formulaire/2725/impot-de-solidarite-sur-la-fortune

Observation unit The observation unit for the ISF-IFI file differs from the one in POTE. Indeed, the wealth tax legislation defines the tax unit for the wealth tax as a unit composed of an individual, its partner (including non-married and non-PACSed couples) and children below 18. This definition differs from the one used by the personal income tax legislation (see above). Households are identified by a unique *ad hoc* household identifier (the $FIP18_c$).

Panelization of the data & Merge with POTE The ISF-IFI file contains panel data as it has one observation per yearly tax return. The household identifier $FIP18_c$ in the ISF-IFI file is supposed to allow merging the wealth tax return data with the personal income tax return data (POTE). Due to difference in population coverage (e.g foreigners owning assets located in France), as well as differences in the definition of the tax unit, the merge is not complete. In 2018, out of the 132,722 households filling a wealth tax return, 96% of them could be linked to their personal income tax return using the common household identifier.

Confidentiality of the data The process to access the ISF-IFI confidential data is the same as the one described above for the POTE file.

B.1.3 Description of the main variables used

At the household level, the main outcomes of interest are the following:

- **Dividend**
  Dividend income are declared yearly by households on the main tax form n°2042, whether they are taxed at the progressive income tax schedule or at the flat-tax, and even when they have already been subject to a withholding tax. For years 2006 to 2012, we define dividend income as the sum of all equity and dividend income subject to the flat-rate withholding tax (*"revenus des actions et parts soumis au prélèvement libératoire"* declared in box *2DA* of the form n°2042) and the other equity and dividend income (*"revenus des actions et parts"* declared in box *2DC* of the form n°2042). For years 2013 to 2019, we define dividend income as simply the equity and dividend income declared in the *2DC* box, as the form does not distinguish between the two types anymore. Declared dividends are raw dividends, without deduction of any tax deductions or taxes already paid on these income.

- **Other capital income**
  Other capital income include revenues from life-insurance contracts and

from fixed interests products whether French or foreign (*"produits d'assurance-vie et de capitalisation soumis au prélèvement libératoire de 7,5%"* declared in box *2DH*, *"produits de placement soumis aux prélèvements libératoires autres que ceux indiqués lignes 2DA et 2DH"* declared in box *2EE*, *Intérêts et autres revenus assimilés* declared in box *2TR* and *"Produits des contrats d'assurance-vie et de capitalisation d'une durée d'au moins 6 ou 8 ans ."* declared in box *2CH*, *"produits de placement à revenu fixe inférieurs à 2 000 euros taxables sur option à 24%"* declared in box *2FA* of the form n°2042) as well as the taxable share of income from stock savings plan (PEA) (box *2FU*). It also includes capital income distributed by firms located in low-tax foreign juridictions (i.e. juridictions where the corporate income tax liability is lower than the third of what it would be in France) declared in box *2GO*. Most of the other income are taxed at a progressive rate before and after 2013 and some of them (e.g. box *2FA*) are eligible to a flat-tax even after 2013.

- **Capital gains**
  Capital gains are declared to the tax authority by households once they have been realized (box *3VG* of the form n°2042). The outcome of interest is the net taxable capital gain. In particular, we account for any pas losses that can deducted (declared in box *3VH* of the form n°2042). We also account for gains of self-employed individuals (declared in the specific form n°2042 C PRO).

- **Wage income**
  We define wage income as the total net income of the household which includes the income of both spouses (boxes *1AJ* and *1BJ* of the form n°2042) as well as the income of SARL owner-manager and of other controlling owner-managers (see Section B.1.4).

B.1.4 Identification of households controlling a firm

The empirical analysis conducted investigates the differential responses of treated households to both tax reforms depending on whether or not they have the control over a firm's decisions. While the data do not link directly households to firms they manage or own, we infer this status by using information declared in the tax return data. This allows us to construct four treatment groups: treated that are owner-managers of SARL, treated that are owner-managers of other types of firms (SAS), treated that have some degree of control over a firm and treated that have no declared control over a firm.

Identification of SARL owner-manager. Before 2017, wage income received by owner-managers had to be declared in the general "Wage income" category (boxes *1AJ*, *1BJ*, *1CJ*, *1DJ*). As of 2017, owner-managers of SARL firms have to declare the wage they pay themselves separately (boxes *1GB*, *1HB*, *1IB*, *1JB*)[A.8] which allows us to identify these owner-managers, conditionally on them being paid at least partially in wages. France moved to a withheld income tax in 2018, and the tax administration necessitated this separate declaration in order to be able to operate two different ways of withholding the income tax. Standard wage income are subject to a withholding directly applied by the employer before paying the employee. Wages from owner-managers of SARL (who are considered as self-employed by the fiscal authorities) are subject to a down payment directly collected on their personal bank account. It is therefore a permanent change in the tax return and allows us to spot SARL owner-managers over the 2017-2019 period. For the 2013 reform, we do not observe pre-reform whether a household is a SARL owner-manager. We instead use as a proxy the 2017 status. Given that our sample is quite old on average, it is likely that our proxy underestimates the true fraction of SARL owner-managers in 2013, as some of them might have retired by 2017.

Identification of SAS owner-manager. In 2018 and 2019, following the introduction of the withheld personal income tax, the tax administration required households to declare whether they own and have control over firms. This requirement has been made in order to avoid income shifting (see Appendix A.3 for more details on the anti-avoidance scheme) from these households in 2018—a de facto untaxed year (referred to as "année blanche" in French). Any wage income received from a company owned by the household's members or their close family members (spouse, children, parents, siblings)[A.9] in 2018 has to be declared in the specific boxes *1AN*, *1BN*, *1GN*, *1HN*. A SARL owner-manager should therefore declare her wage in both the SARL-specific box and the owner-manager specific box. We therefore label as owner-managers of a SAS firm,

[A.8] The SARL owner-manager wage income are actually declared in the same boxes than several other types of income, namely fees received by insurance agents, copyright income, funding received by public researchers working temporarily for a company that promote their research. We still label any household declaring a positive amount in these boxes as owner-manager of an SARL, as the other cases are believed to represent very few cases.

[A.9] It should be noted that this definition of controlling a firm is broader than the one observed for SARL owner-manager, because it includes not only direct owners but also relatives of direct owners. However, as we are interested in identifying households with control over a firm, and not only majority ownership, it seems plausible to include close relatives in the group of people with the ability to control, to some extent, the firm's decisions.

households who declare wages in the owner-manager specific box mentioned but not in the SARL-specific box.

Identification of households with some control over a firm. We also use information from the wealth tax files (ISF-IFI) to identify households that do not include a firm's owner-manager but have, to a lesser extent, some degree of control over a firm. Households subject to the wealth tax can benefit from several tax exemptions—whether total or partial—on specific types of assets and thus have to declare these assets separately from the rest of their wealth. This information is only available for households filling the detailed wealth tax return and thus, for a significant share of households, we cannot observe this information. We label as households with some control over a firm the ones that declare, at least once pre-reform, holding assets in at least one of the following categories:

- Shares of firms in which individuals pursues their main professional activity which do not qualify for the business assets exemption (box *CD*)
- Shares held by employees or corporate officer of a firm (box *1CL*)
- Shares of family firms with a collective retention commitment ("*pacte Dutreil*") of at least 6 years (box *1CB*)
- Shares held following the takeover of a firm by its employees (box *1CH*)
- Shares held in a holding that owns a firm qualifying for the business assets exemption[A.10] (box *1CI*)
- Shares representing more than 50% of total wealth (box *1CJ*)
- Shares of SMBs (box *1CK*)

B.2 Firm-level data

[A.10] Assets held that relates to the main professional activity of taxpayers are fully exonerated from the wealth tax. In some cases, it also applies to individuals using a holding scheme for their personal business.

Table B3: Number of observations per year in the ISF-IFI file

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
ISF detailed tax return (form n°2725)	454,565	526,376	564,104	558,464	590,339	63,499	55,925	82,771	90,646	95,126	98,993	101,191	.	.	.
ISF simplified tax return (form n°2042)	.	.	.	.	.	223,825	233,351	228,994	240,073	247,661	251,898	255,122	.	.	.
IFI tax return (form n°2042-IFI)	.	.	.	.	.	.	.	.	.	.	.	.	132,722	139,149	143,337
Total number of households	454,565	526,376	564,104	558,464	590,339	287,324	233,351	311,765	330,719	342,787	350,891	356,313	132,722	139,149	143,337

NOTES: This table presents the number of households filling the wealth tax return by year and by types of tax return forms used.

SOURCES : ISF-IFI 2006-2020.

C Additional results

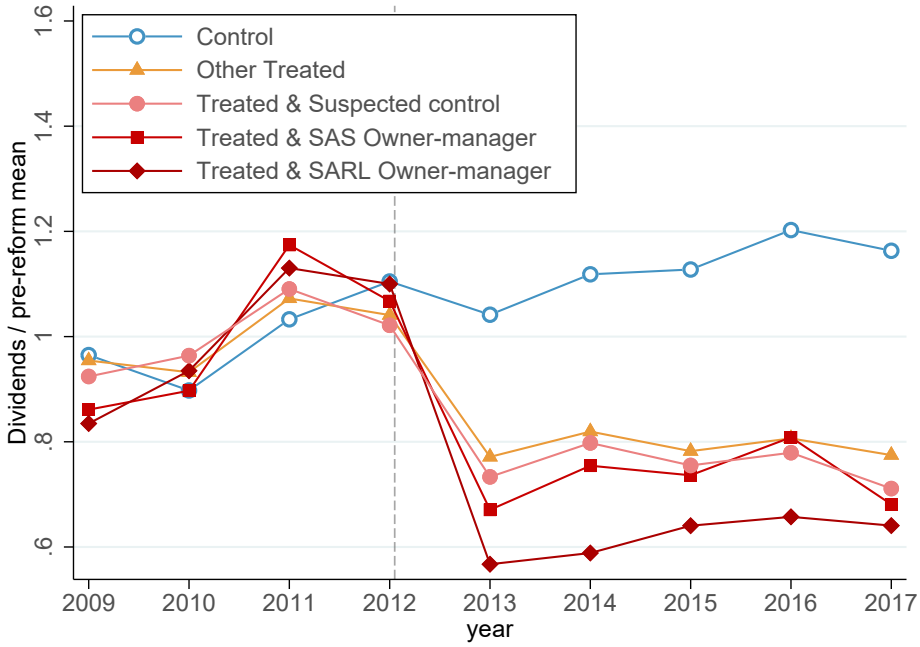
In this section, we present additional results not included in the main text.

Figure C1 presents the estimates of the 2013 reform distinguishing households along the degree of firm control, while Figure C2 splits the sample between those household having owner-manager status and those who do not. Figure C3 presents a variant of Figure 4c with a restriction on households whose main respondent is aged below 53. Figures C2 to C5 presents alternative household-level estimations with alternative splits of the treatment groups for the 2018 reform.

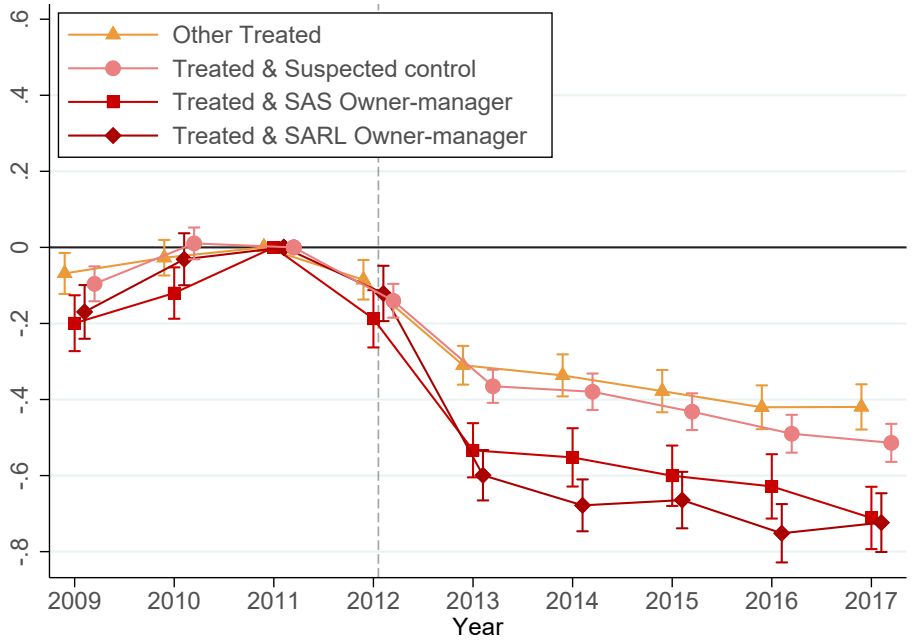
The other tables and figures present additional results at the firm-level.

Figure C1: 2013 Reform: Household estimates by degree of firm control

(a) Dividend income received: high tax bracket vs low tax bracket



(b) Difference-in-differences estimates

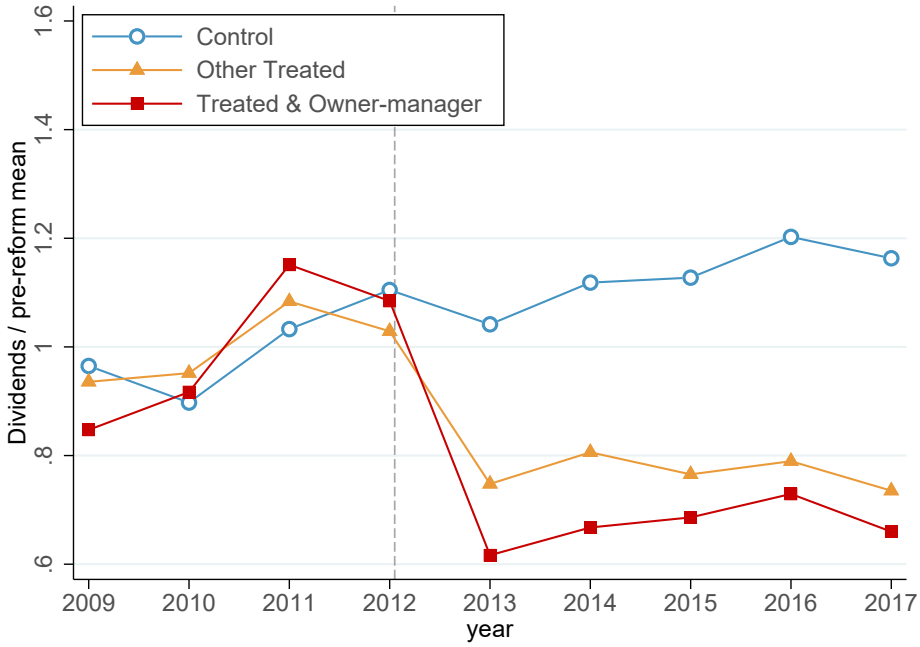


NOTES: The sample is a balanced panel of all households paying the wealth tax at least once between 2009 and 2012, belonging to the top 0.5% of the non-dividend income distribution and having received at least once a significant amount (more than €1,500) of dividends between 2009 and 2012. Treated households are defined based on their pre-reform tax status , i.e., having opted for the flat-rate withholding tax.

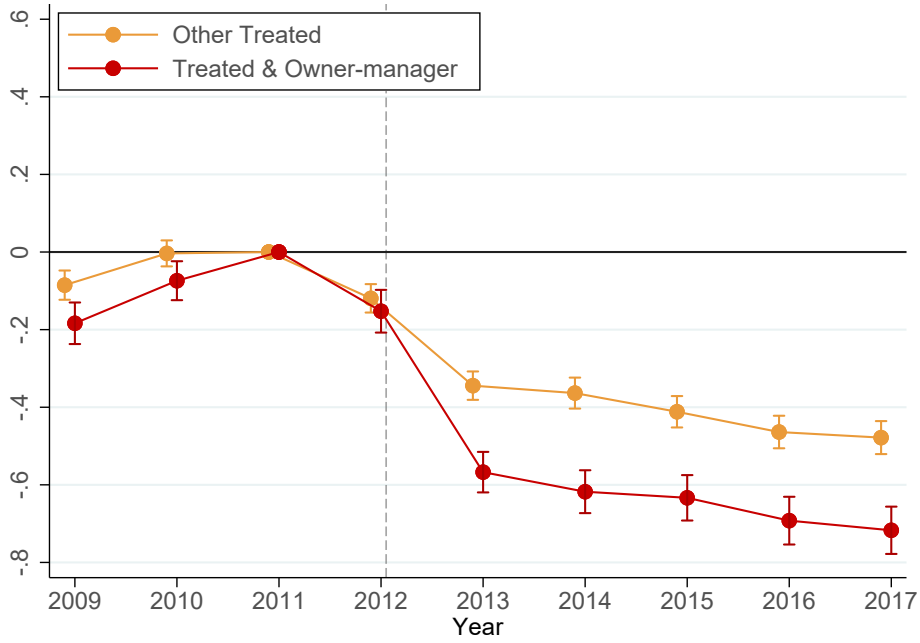
SOURCE: Panel POTE (DGFiP) 2009-2017.

Figure C2: 2013 Reform: Household estimates – owner-manager vs others

(a) Dividend income received: high tax bracket vs low tax bracket



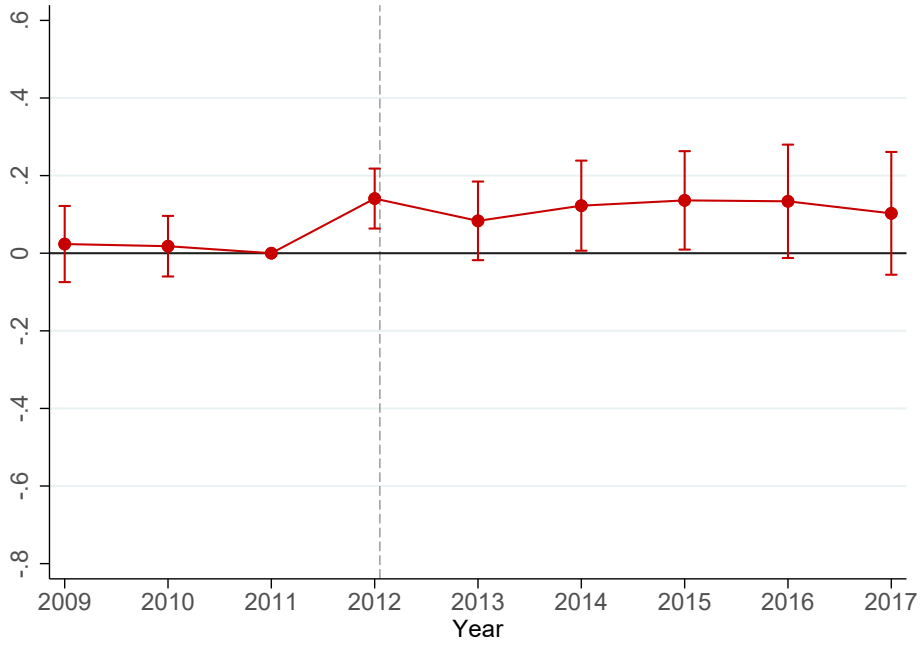
(b) Difference-in-differences estimates



NOTES: The sample is a balanced panel of all households paying the wealth tax at least once between 2009 and 2012, belonging to the top 0.5% of the non-dividend income distribution and having received at least once a significant amount (more than €1,500) of dividends between 2009 and 2012. Treated households are defined based on their pre-reform tax status , i.e., having opted for the flat-rate withholding tax.

SOURCE: Panel POTE (DGFiP) 2009-2017.

Figure C3: 2013 Reform: Difference-in-differences estimates for wage income (Age below 53)

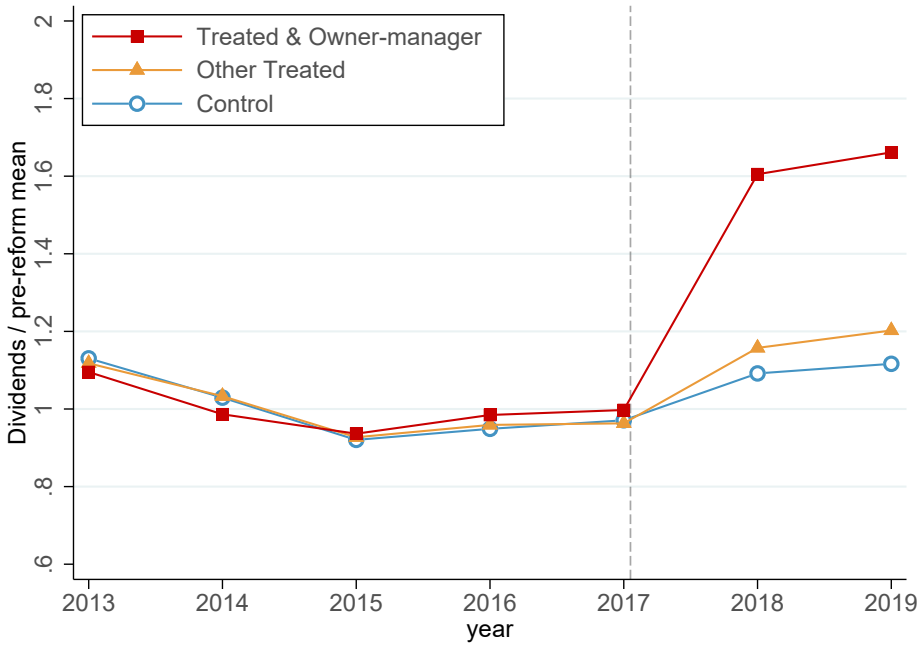


NOTES: The sample includes all households paying the wealth tax at least once in 2009-2012, with non-dividend income in the top 0.5% of the population distribution.

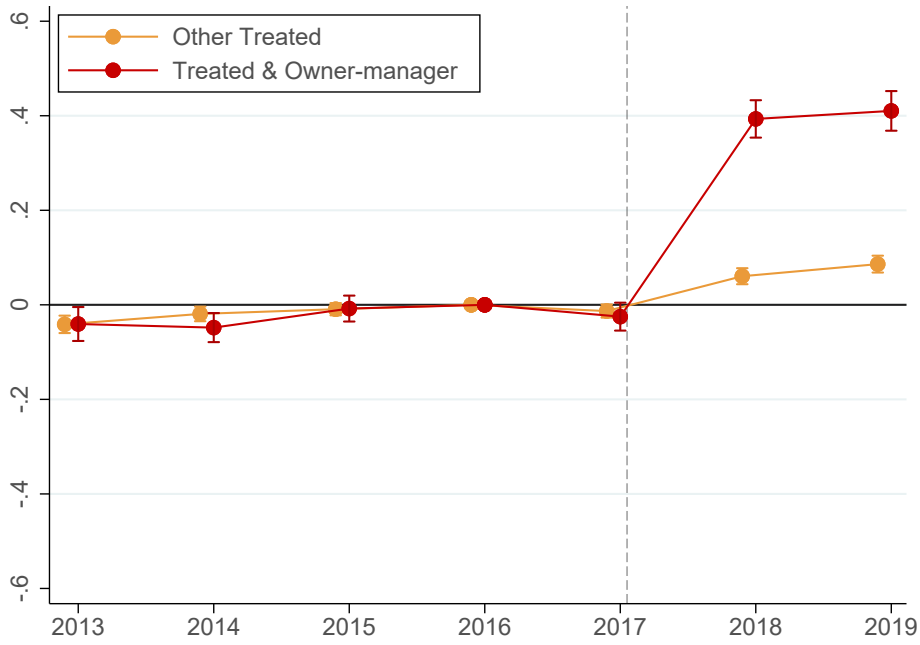
SOURCE: Panel POTE (DGFiP) 2009-2019.

Figure C4: 2018 Reform: Household estimates by degree of firm control

(a) Dividend income received: high tax bracket vs low tax bracket



(b) Difference-in-differences estimates

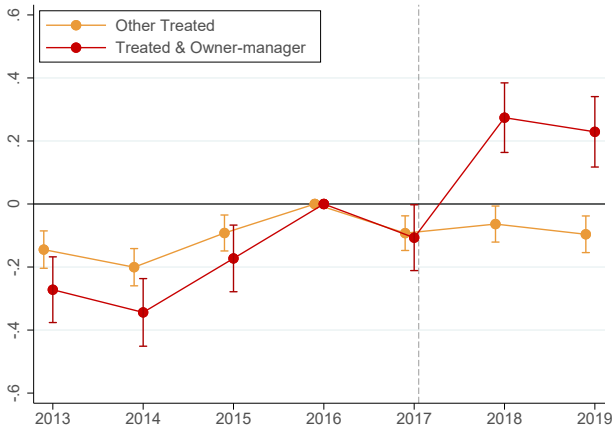


NOTES: The sample is a balanced panel of all households paying the wealth tax at least once between 2013 and 2017 and having received at least once a significant amount (more than €1,500) of dividends between 2013 and 2017. Treated households are defined based on pre-2018 reform, i.e., having wage and pensions income placing them in the top income tax brackets (above 30%).

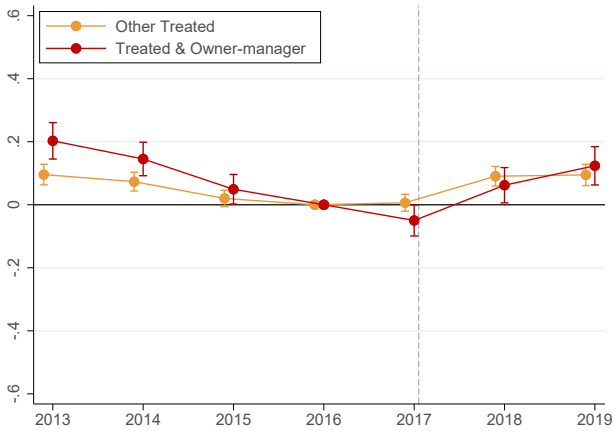
SOURCE: Panel POTE (DGFiP) 2013-2019.

Figure C5: 2018 Reform: Difference-in-differences estimates for other outcomes

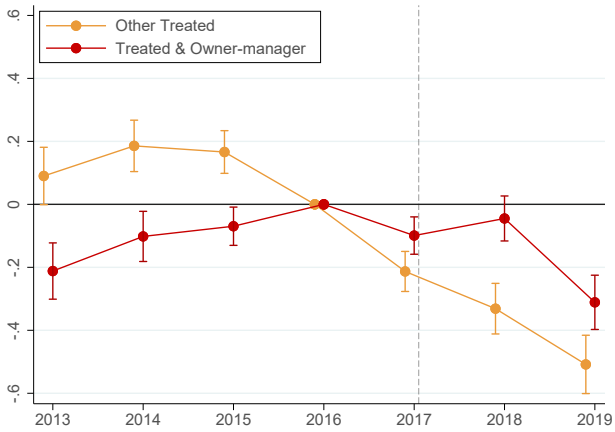
(a) Capital gains



(b) Other capital income



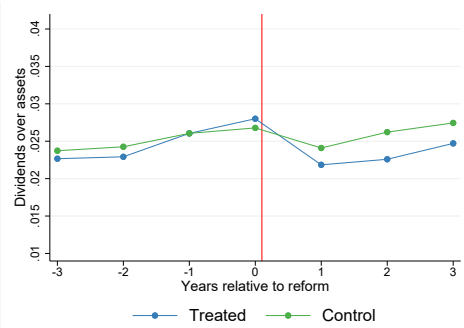
(c) Wage income



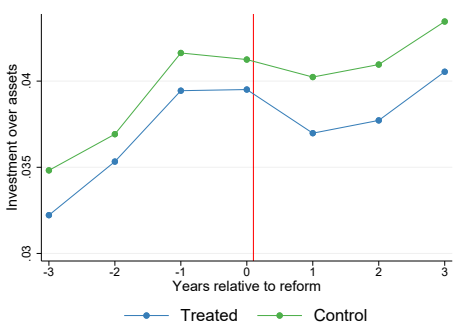
NOTES: The sample is a balanced panel of all households paying the wealth tax at least once between 2013 and 2017, having received at least once a significant amount (more than €1,500) of dividends between 2013 and 2017.
SOURCE: Panel POTE (DGFiP) 2009-2017.

Figure C6: Impact of the 2013 tax hike (PFL) within SAS on the accounting decomposition variables: annual averages

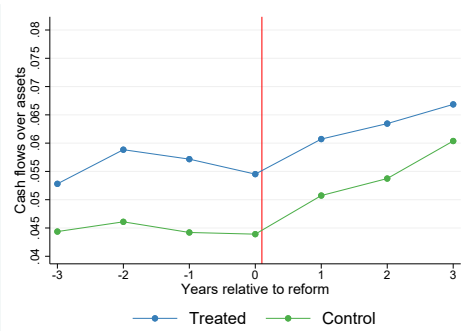
(a) Dividends over assets



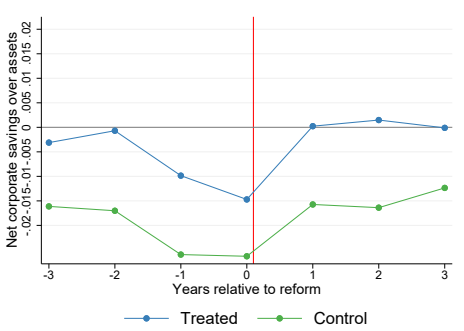
(b) Investment over assets



(c) Profits over assets

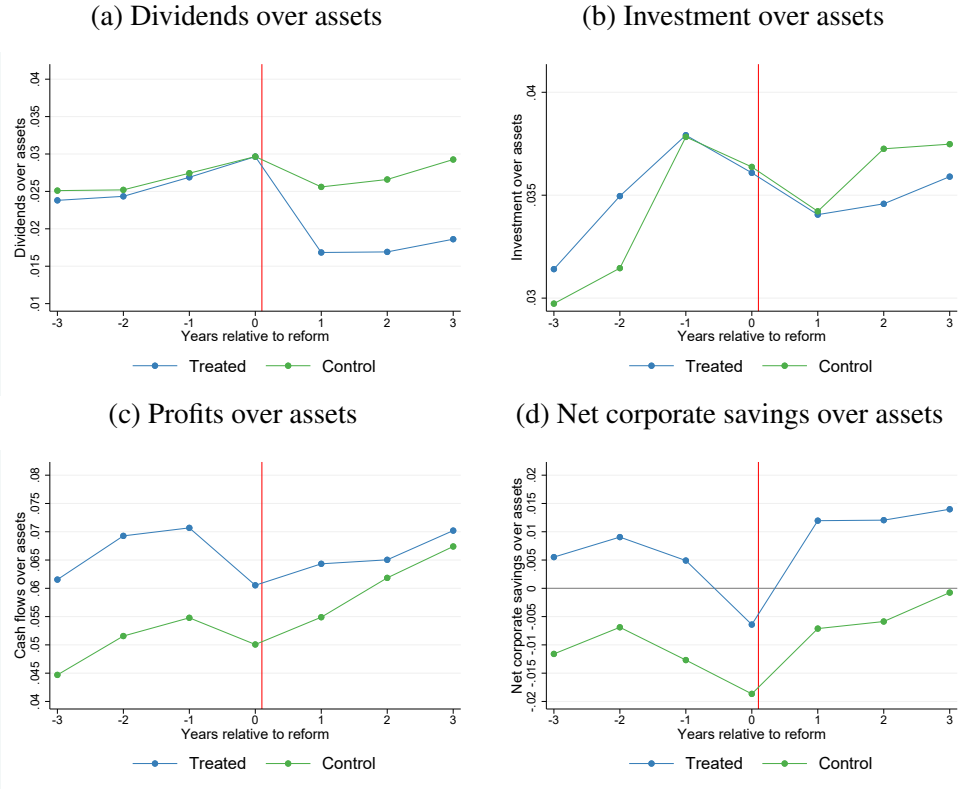


(d) Net corporate savings over assets



NOTES: Panels (a) to (d) represent averages of each of the variables in the accounting decomposition for the SAS firm population, each year between 2014 (year -3 w.r.t the PFL reform) and 2020 (year +3 w.r.t the PFL reform). Panel (a) represents dividends over assets, panel (b) investment over assets, panel (c) profits over assets and panel (d) net corporate savings over assets. The treatment group is composed of companies owned by natural persons for at least 50%, the control group is composed of companies owned by natural persons for at less than 50% and neither fiscally integrated nor wholly owned by a legal person. Additional details and restrictions on the sample are outlined in the data section.
SOURCES : Files BIC-RN, FDG, PERIM, LIFI, DADS Postes.

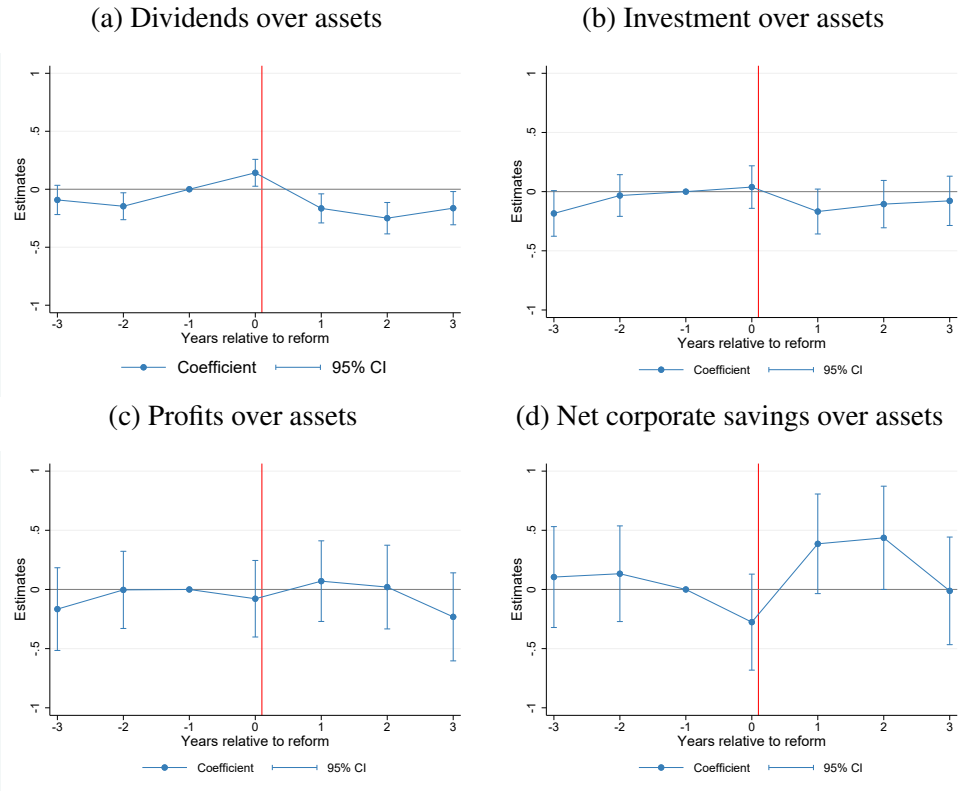
Figure C7: Impact of the 2013 tax hike (PFL) within SARL on the accounting decomposition variables: annual averages



NOTES: Panels (a) to (d) represent averages of each of the variables in the accounting decomposition for the SARL firm population, each year between 2009 (year -3 w.r.t the PFL reform) and 2015 (year +3 w.r.t the PFL reform). Panel (a) represents dividends over assets, panel (b) investment over assets, panel (c) profits over assets and panel (d) net corporate savings over assets. The treatment group is composed of companies owned by natural persons for at least 50%, the control group is composed of companies owned by natural persons for at less than 50% and neither fiscally integrated nor wholly owned by a legal person. Additional details and restrictions on the sample are outlined in the data section. Regressions include sector (NAF 2-digits), within sector turnover and profitability (share of value added) deciles, age (four categories) and exercise closing month, all interacted with year fixed-effects, as control variables.

SOURCES : Files BIC-RN, FDG, PERIM, LIFI, DADS Postes.

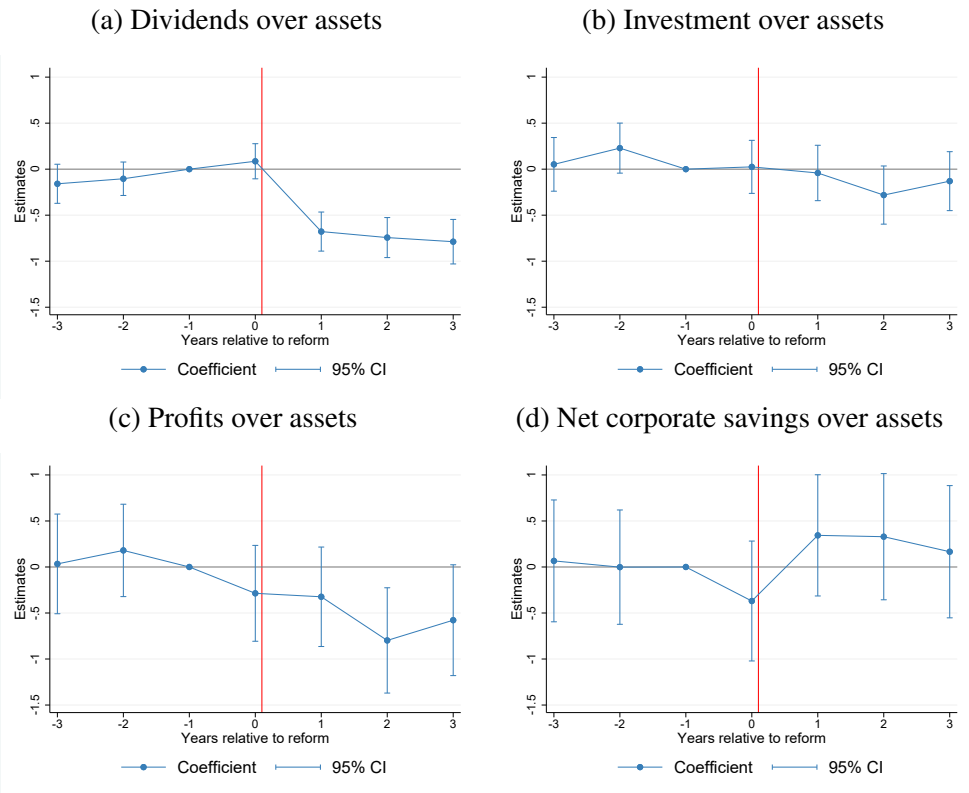
Figure C8: Impact of the 2013 tax hike (PFL) within SAS on the accounting decomposition variables: dynamic difference-in-differences



NOTES: Panels (a) to (d) represent difference-in-differences estimates using each variable in the accounting decomposition as dependent variable for the SAS firm population, regressed on time to treatment dummies from 2009 (year -3 w.r.t the PFL reform) to 2015 (year +3 w.r.t the PFL reform). Panel (a) represents dividends over assets, panel (b) investment over assets, panel (c) profits over assets and panel (d) net corporate savings over assets. The treatment group is composed of companies owned by natural persons for at least 50%, the control group is composed of companies owned by natural persons for at less than 50% and neither fiscally integrated nor wholly owned by a legal person. Additional details and restrictions on the sample are outlined in the data section. Regressions include sector (NAF 2-digits), within sector turnover and profitability (share of value added) deciles, age (four categories) and exercise closing month, all interacted with year fixed-effects, as control variables.

SOURCES : Files BIC-RN, FDG, PERIM, LIFI, DADS Postes.

Figure C9: Impact of the 2013 tax hike (PFL) within SARL on the accounting decomposition variables: dynamic difference-in-differences

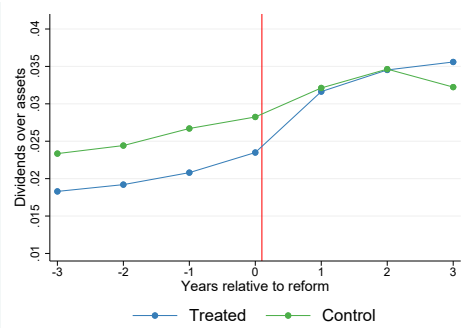


NOTES: Panels (a) to (d) represent difference-in-differences estimates using each variable in the accounting decomposition as dependent variable for the SARL firm population, regressed on time to treatment dummies from 2009 (year -3 w.r.t the PFL reform) to 2015 (year +3 w.r.t the PFL reform). Panel (a) represents dividends over assets, panel (b) investment over assets, panel (c) profits over assets and panel (d) net corporate savings over assets. The treatment group is composed of companies owned by natural persons for at least 50%, the control group is composed of companies owned by natural persons for at less than 50% and neither fiscally integrated nor wholly owned by a legal person. Additional details and restrictions on the sample are outlined in the data section. Regressions include sector (NAF 2-digits), within sector turnover and profitability (share of value added) deciles, age (four categories) and exercise closing month, all interacted with year fixed-effects, as control variables.

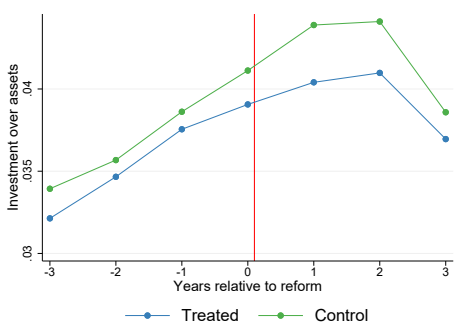
SOURCES : Files BIC-RN, FDG, PERIM, LIFI, DADS Postes.

Figure C10: Impact of the 2018 tax cut (PFU) within SAS on the accounting decomposition variables: annual averages

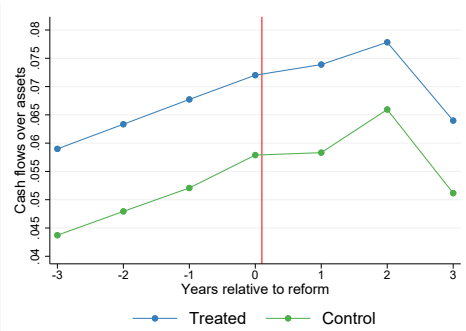
(a) Dividends over assets



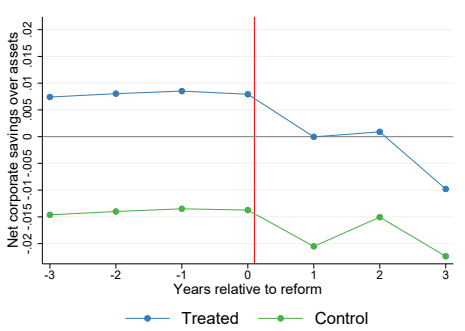
(b) Investment over assets



(c) Profits over assets



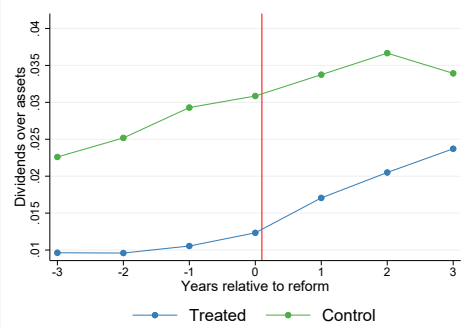
(d) Net corporate savings over assets



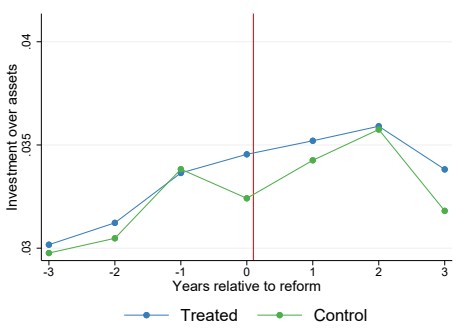
NOTES: Panels a to d represent averages of each of the variables in the accounting decomposition for the SAS firm population, each year between 2014 (year -3 w.r.t the PFU reform) and 2020 (year +3 w.r.t the PFU reform). Panel (a) represents dividends over assets, panel (b) investment over assets, panel (c) profits over assets and panel (d) net corporate savings over assets. The treatment group is composed of companies owned by natural persons for at least 50%, the control group is composed of companies owned by natural persons for at less than 50% and neither fiscally integrated nor wholly owned by a legal person. Additional details and restrictions on the sample are outlined in the data section.
SOURCES : Files BIC-RN, FDG, PERIM, LIFI, DADS Postes.

Figure C11: Impact of the 2018 tax cut (PFU) within SARL on the accounting decomposition variables: annual averages

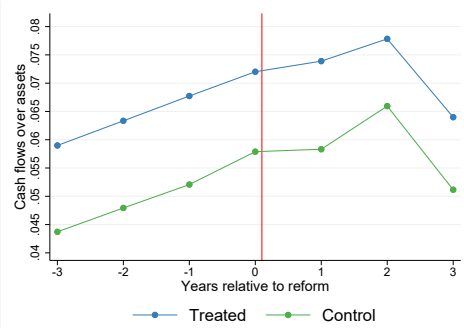
(a) Dividends over assets



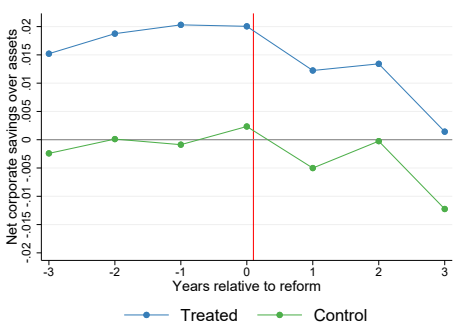
(b) Investment over assets



(c) Profits over assets



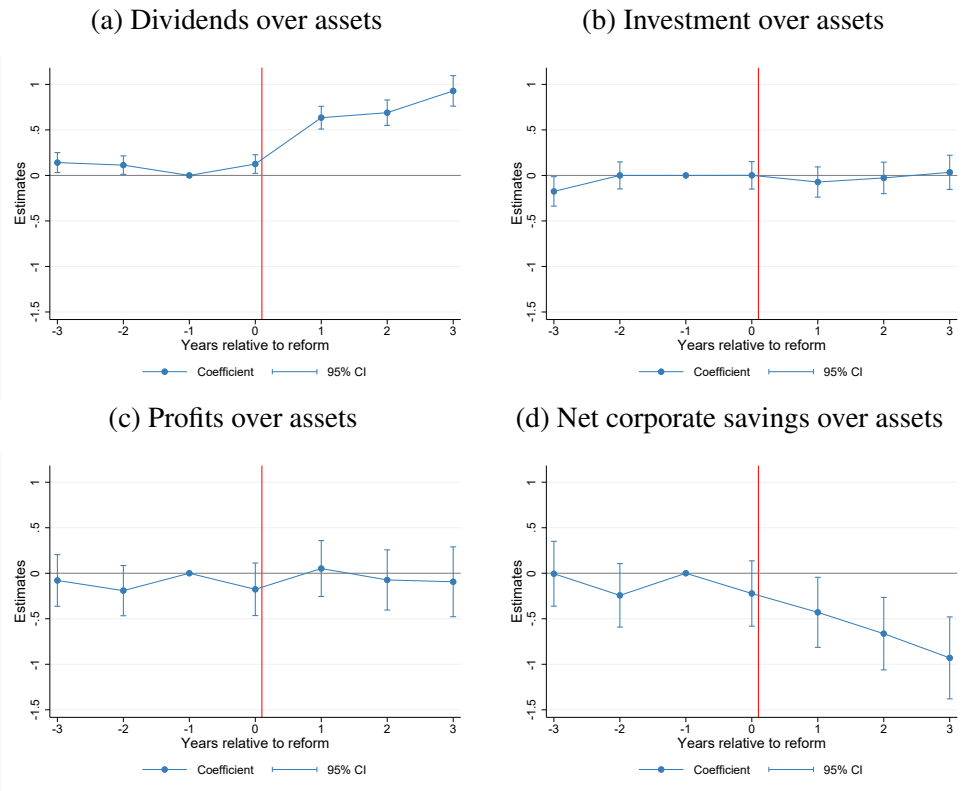
(d) Net corporate savings over assets



NOTES: Panels (a) to (d) represent averages of each of the variables in the accounting decomposition for the SARL firm population, each year between 2014 (year -3 w.r.t the PFU reform) and 2020 (year +3 w.r.t the PFU reform). Panel (a) represents dividends over assets, panel (b) investment over assets, panel (c) profits over assets and panel (d) net corporate savings over assets. The treatment group is composed of companies owned by natural persons for at least 50%, the control group is composed of companies owned by natural persons for at less than 50% and neither fiscally integrated nor wholly owned by a legal person. Additional details and restrictions on the sample are outlined in the data section.

SOURCES : Files BIC-RN, FDG, PERIM, LIFI, DADS Postes.

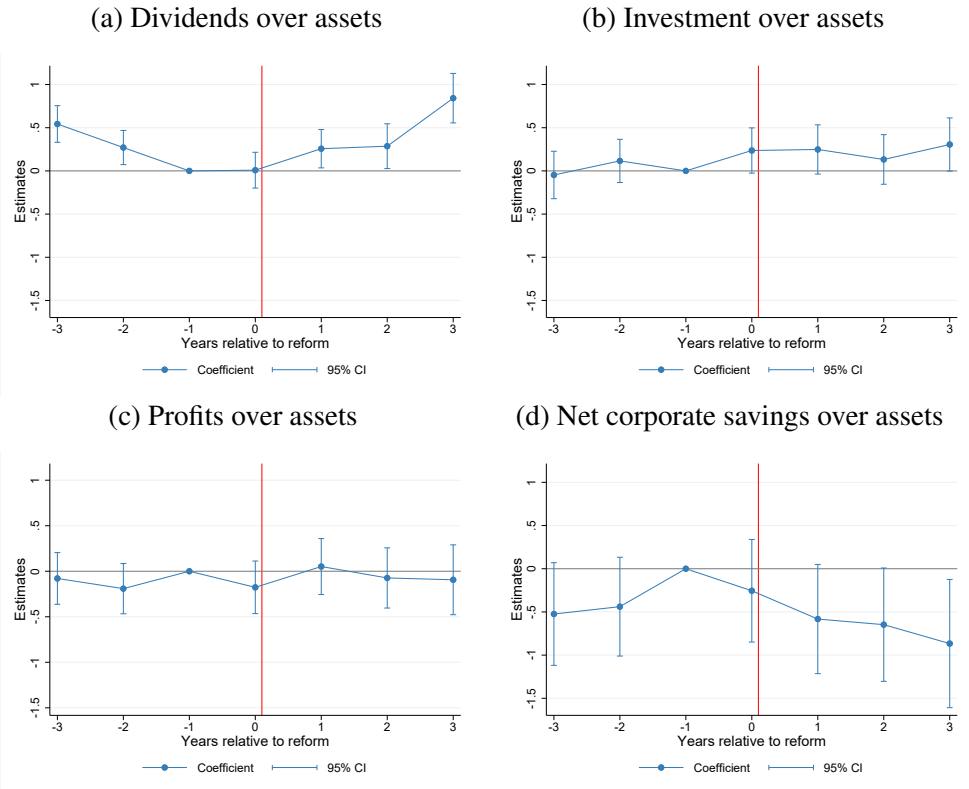
Figure C12: Impact of the 2018 tax cut (PFU) within SAS on the accounting decomposition variables: difference-in-differences



NOTES: Panels (a) to (d) represent difference-in-differences estimates using each variable in the accounting decomposition as dependent variable for the SAS firm population, regressed on time to treatment dummies from 2014 (year -3 w.r.t the PFU reform) to 2020 (year +3 w.r.t the PFU reform). Panel (a) represents dividends over assets, panel (b) investment over assets, panel (c) profits over assets and panel (d) net corporate savings over assets. The treatment group is composed of companies owned by natural persons for at least 50%, the control group is composed of companies owned by natural persons for at less than 50% and neither fiscally integrated nor wholly owned by a legal person. Additional details and restrictions on the sample are outlined in the data section. Regressions include sector (NAF 2-digits), within sector turnover and profitability (share of value added) deciles, age (four categories) and exercise closing month, all interacted with year fixed-effects, as control variables.

SOURCES : Files BIC-RN, FDG, PERIM, LIFI, DADS Postes.

Figure C13: Impact of the 2018 tax cut (PFU) within SARL on the accounting decomposition variables: difference-in-differences

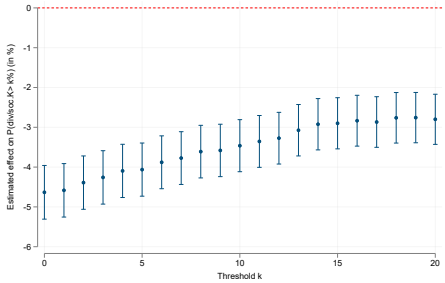


NOTES: Panels a to d represent difference-in-differences estimates using as dependent variable each of the variables in the accounting decomposition for the SARL firm population, regressed on time to treatment dummies from 2014 (year -3 w.r.t the PFU reform) to 2020 (year +3 w.r.t the PFU reform). Panel (a) represents dividends over assets, panel (b) investment over assets, panel (c) profits over assets and panel (d) net corporate savings over assets. The treatment group is composed of companies owned by natural persons for at least 50%, the control group is composed of companies owned by natural persons for at less than 50% and neither fiscally integrated nor wholly owned by a legal person. Additional details and restrictions on the sample are outlined in the data section. Regressions include sector (NAF 2-digits), within sector turnover and profitability (share of value added) deciles, age (four categories) and exercise closing month, all interacted with year fixed-effects, as control variables.

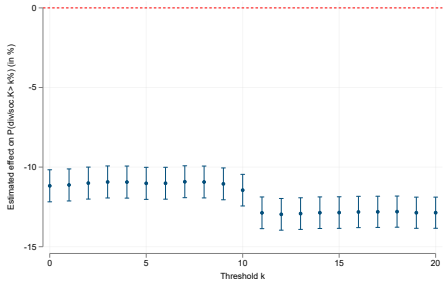
SOURCES : Files BIC-RN, FDG, PERIM, LIFI, DADS Postes.

Figure C14: Impact of the 2013 reform on the probability to distribute dividends for more than x% of social capital: static difference-in-differences estimates

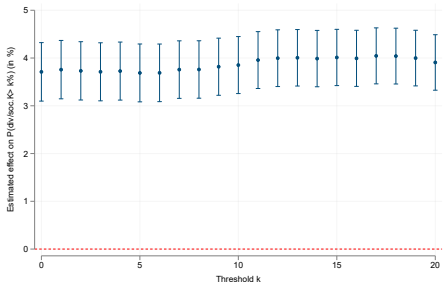
(a) SAS, 2013 reform



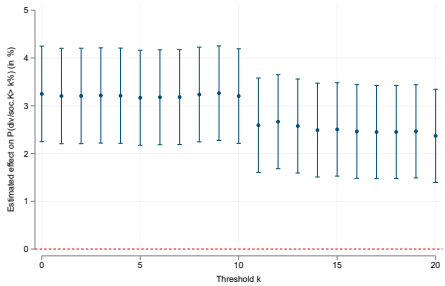
(b) SARL, 2013 reform



(c) SAS, 2018 reform



(d) SAS, 2018 reform



NOTES: The variables studied are the probability to pay dividends for more than x% of a firm's social capital pre-reform, for various thresholds x. The figure represents static difference-in-differences estimates for SARL firms: the points represent the estimated coefficients, the lines the confidence interval measured at the risk threshold of 5%. The treatment group is composed of companies owned by natural persons for at least 50%, the control group is composed of companies owned by natural persons for at less than 50% and neither fiscally integrated nor wholly owned by a legal person. Additional details and restrictions on the sample are outlined in the data section.

SOURCES : Files BIC-RN, FDG, PERIM, LIFI, DADS Postes.

Table C1: Locating where the estimating sample fits in the overall distribution of firm size

(a) SAS firms

	Treated firms				Control firms			
Quantiles (1000)	250th	500th	750th	990th	250th	500th	750th	990th
Turnover	554	785	915	995	787	923	976	1000
Value-added	569	793	914	995	747	913	974	1000
Assets	548	779	910	994	732	912	975	1000
Number of employees	548	770	911	995	750	908	971	1000
Number of observations	48,973				12,208			

(b) SARL firms

	Treated firms				Control firms			
Quantiles (1000)	250th	500th	750th	990th	250th	500th	750th	990th
Turnover	317	498	688	947	442	680	849	996
Value-added	334	515	699	951	385	630	834	996
Assets	329	514	705	955	394	640	844	996
Number of employees	334	486	687	956	415	646	829	996
Number of observations	242,269				6,194			

NOTES: This table presents where the estimating sample (control and treated firms), respectively for SAS (panel a) and SARL firms (panel b) are located with respect to the overall distribution of firm size. To that end, we compute 1000 quantiles in the *overall* firm population in 2011 with respect to several measure of firm size (value-added, turnover, assets and employment). We then report the distribution of these quantiles among treated and control group. By definition the distribution of quantiles in the overall population is uniform. In case the distribution of the treated group is similar to the overall population, the x-th quantile among treated firms will be equal to x (i.e., uniform distributed). In case the x-th quantile is superior (resp. inferior) to x, it means the distribution of the variable described is shifted to the right (resp. left) among treated firms with respect to the overall population of firms, i.e., that treated firms tend to be larger (resp. smaller). The treatment group is composed of companies owned by natural persons for at least 50%, the control group is composed of companies owned by natural persons for at less than 50% and neither fiscally integrated nor wholly owned by a legal person. Additional details and restrictions on the sample are outlined in the data section.

SOURCES: Industrial and commercial benefits file - normal regime (BIC-RN), group declaration file (FDG), tax group perimeters (PERIM), financial link surveys and files (LIFI), annual social data declarations (DADS Postes), self-employed database (BNS).

Table C2: Share of the estimating sample in overall aggregates as of 2011

	Estimation sample (%)	Treated (%)	Controls (%)
Assets	61	25	37
Turnover	58	29	29
Value-added	58	32	25
Workforce	61	37	24
EBITDA	55	29	26
Dividends	55	31	24
Dividends paid to individuals	86	82	3.3

NOTES: This table presents descriptive statistics regarding the weight of the estimating sample with respect to the overall French private sector (excluding financial firms and the CAC40 stock exchange) as measured by the sum across corporate income tax returns for year 2011.

SOURCES : Files BIC-RN, FDG, LIFI, DADS Postes.