NBER WORKING PAPER SERIES

DIVIDEND TAXES, FIRM GROWTH, AND THE ALLOCATION OF CAPITAL

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Working Paper 30099
http://www.nber.org/papers/w30099

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
June 2022, Revised June 2023

This paper subsumes and updates “Dividend Taxes and the Allocation of Capital.”. The views expressed herein are those of the author and do not necessarily reflect the views of the National Bureau of Economic Research.The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

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JEL No. G32,H2,H25,H32,O16

ABSTRACT

This paper investigates the 2013 three-fold increase in the French dividend tax rate. Using administrative data covering the universe of firms from 2008- 2017 and a quasi-experimental setting, we find that firms swiftly cut dividend payments and used this tax-induced increase in liquidity to accumulate more capital and labor, resulting in higher revenues. Heterogeneity analyses show that firms with high demand and returns to capital responded most, while no group of treated firms reduced their capital. Our results reject models in which higher dividend taxes increase the cost of capital and show that the tax-induced increase in liquidity relaxes financial constraints, which can reduce capital misallocation.

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An online appendix is available at http://www.nber.org/data-appendix/w30099

Proposals to limit corporate payouts so that firms are left with more free cash-flow for accumulating more capital and labor are regularly in the political debate. When the French center-left party raised the dividend tax rate by a factor of three in 2013, they justified their decision by saying: "*it is fair and legitimate to reward patient and productive investment. We want to incentivize investment rather than dividend payouts.*"[1] The right-wing party in the opposition has since opposed the reform, arguing that increasing the dividend tax rate would disincentivize entrepreneurs to accumulate capital, labor and grow.

At the heart of this debate is the question of the impact of dividend taxes on capital and labor accumulation and its effect on overall output. Dividend taxes can affect overall output via two channels. First, for the *average* firm, a change in the dividend tax rate may lead to either more or less capital accumulation.[2] Second, the dividend tax rate can change the *distribution* of capital across firms, which in the presence of heterogeneous firms will affect the degree of capital misallocation.[3]

In this paper, we provide a novel empirical answer to both elements of this question by exploiting the 2013 reform in France that increased the dividend tax rate from 15.5% to 46%, one of the largest in developed countries in the last forty years. The French reform affected the dividends paid to the entrepreneur and her family for private, closely-held firms with a particular legal status. This type of firm accounts for three-quarters of the population of firms, while the rest of firms remained unaffected.

This clean policy, combined with rich administrative panel data of tax-filings that cover the universe of French corporations and provide detailed balance sheets and income statements over the period 2008–2017, allows us to understand how an increase in the dividend tax rate affects both the level and the distribution of investment across firms.

Our identification relies on ex-ante differences between the two main legal statuses

1. Francois Rebsamen, French senator and one of the most prominent figures of the "Parti Socialiste" (the left-wing party in power), 2012.

2. The effect for the average firm is a priori unclear. Higher dividend taxes can have either no effect, a positive effect, or a negative effect on capital accumulation. We discuss the different theories in the literature review.

3. This would happen if, for instance, an increase in the dividend tax rate leads firms with low returns to capital to accumulate more capital while firms with high returns to capital become more constrained. Note that in this example, if the number of firms with low return to capital is much larger in the economy, we could simultaneously have an increase capital accumulation for the average firm, usually perceived as a positive outcome, *and* an increase in capital misallocation, which would actually reduce aggregate output in the long-run.

chosen by private firms, but it does *not* require firms to either choose a legal status randomly or a common support in the *level* of covariates across firms. It only requires that treated and control firms would have evolved similarly to each other absent the reform. To ensure that our estimates are well-identified, we use two methods. First, we show that key firm outcomes such as dividends and capital accumulation evolve in parallel for treated and control firms in the years leading to the reform and only start to diverge after 2013. Second, we saturate our difference-in-differences estimator with high-dimensional fixed effects to remove as much time-varying unobserved heterogeneity as possible.

Our first set of results confirms that the 2013 tax hike is a large and salient shock for treated firms. We find that firms affected by the reform adjust their behavior along three dimensions. First, firms swiftly reduce their dividends the year of the reform and maintain lower dividends thereafter. Treated firms cut their dividends by 2.6 pp of the firm's initial stock of capital, which represents a 17% drop relative to the pre-reform sample mean and implies an elasticity of the dividend to the tax rate of 0.47.[4] Second, an increasing amount of bunching in dividend distributions appears at the kink introduced in the tax code. Third, while firms existing before the reform do not change their legal status, new firms display important changes consistent with regulatory arbitrage by increasingly opting for the legal status that is not subject to the tax increase.

The drop in dividends implies a sizable increase in free cash-flow relative to the size of treated firms. Our second set of results estimates how entrepreneurs used this extra liquidity and if it affected real outcomes: capital and labor accumulation, firm growth, and probability of firm exit. We find that treated entrepreneurs ended up accumulating more capital, with their stock of total capital increasing by 3% over the post-reform period. This finding is robust to alternative specifications, alternative measures of capital (total or tangible, gross or net of depreciation), and subsamples.

This average increase in total investment over the post-reform period implies an increase on an annual basis of approximately €0.01 for each euro of total capital owned by treated entrepreneurs pre-reform. Given that treated firms increase their undistributed earnings (i.e. cut their paid dividends) by 2.6 pp of total capital, our estimate implies that they use around one third of their tax-induced additional re-

4. Interestingly, this is exactly the elasticity for the 2003 Bush tax cut as estimated in Chetty and Saez (2005) and Yagan (2015).

tained earnings to buy more capital, an elasticity in line with the literature estimating pass-through of cash-flow shocks on capital accumulation.

At the same time as treated entrepreneurs accumulate more capital, they also hire more and provide higher average wages for their employees, while not increasing their own wages. This increase in production factors translates into higher sales and value-added and reduces firms' probability of exit. The magnitude of the observed increase in output relative to the increase in capital and labor is consistent with firms having decreasing return to scale, with an approximate value of returns to scale in line with previous estimates.

We also use differences in the intensity of the exposure to the tax increase (measured by dividend payments pre-reform) within the set of treated firms to show that high dividend payers reacted the most and use the extra liquidity from unpaid dividends to expand the most. This estimation strategy also addresses a remaining threat to identification which is that our results are driven by unobserved shocks across legal status. Our estimates show that the baseline effect can be attributed to the tax reform and not to other concomitant reforms specifically affecting treated firms.

While the average treated firm accumulates more capital, the reform might still lead to a reduction in overall output in the long-run if capital misallocation increases. We offer three pieces of evidence suggesting that this is not the case and that if anything, the higher dividend tax rate reduces the misallocation of capital.

First, we show that the tax-induced increase in capital is concentrated among firms facing new growth opportunities. We proxy growth opportunities by computing the leave-one-out mean of value-added growth post-reform, in the firm's industry-by-local labor market cell. We then sort this measure into terciles and show that treated firms increase their capital more as they face large investment opportunities.

Second, we conduct a similar exercise by sorting firms within industry according to their marginal return to capital pre-reform to estimate how capital misallocation evolves after the reform.[5] We find that the tax increase leads to an increase in the growth of capital accumulation that is over twice as large for firms in the highest tercile of ex-ante marginal return to capital relative to firms in the lowest tercile. For both proxies of expected returns to the new capital, we provide visual evidence of the lack of pre-trends in capital accumulation across the three terciles. The large

5. See Bau and Matray (2020) for a detailed description of the methodology and complete set of references to the literature on capital misallocation.

difference in capital accumulation across treated firms depending on their ex-ante returns to capital and growth opportunities suggests that the average tax-induced increase in capital is coming from firms undertaking valuable investment projects instead of engaging in income-shifting or wasteful investment.

We end our analysis of the possible reallocation effects of the tax increase by focusing on the empirical predictions of the "old view" theory of dividend taxation, which argues that a higher dividend tax rate increases the cost of capital when firms finance their additional capital by issuing equity (e.g., Poterba and Summers, 1983). We compute multiple proxies for the degree of equity-dependence and re-estimate our investment regressions for the subsample of firms most likely to be equity-dependent. Irrespective of the proxy chosen, we fail to find any significant negative effects. Therefore, even among those firms most likely to face an increase in their cost of capital after the dividend tax hike, the reform has no negative impact on their capital accumulation.

In the last part of the paper, we explore additional adjustments in the firm income statement and balance sheet. We first test if treated firms engage in more income-shifting and use other ways to take money out of their firms. We rule out an increase in tax avoidance behaviors by showing that following the reform, treated firms are not more likely to transfer some of their personal consumption to their company, measured using intermediary goods consumption or intermediary services consumption.

Next we consider other balance sheet adjustments on both the liability and asset side. Treated firms use some of the undistributed dividends to extent more credit to their customers and save the rest by increasing their cash-holding. Higher credit extension to treated firms' customers could partially explain faster sales growth for treated firms and higher cash-holding could partially explain the lower probability of exit.

Related Literature. Our work relates to three strands of the literature. First, we contribute to the empirical literature on dividend taxation. Despite a large theoretical literature on this topic, empirical analyses have lagged behind due to the challenge of finding plausible control groups since most reforms of capital gains affect all firms in the economy. The most studied reform is the U.S. 2003 Dividend Tax Cut by the Bush Administration. It has been shown to have an effect for listed firms on: their payout policy (e.g., Chetty and Saez, 2005), their debt financing (Lin and Flannery, 2013), and the quality of mergers and acquisitions (Ohrn and Seegert, 2019). The

reform however did not affect average investment (e.g, Yagan, 2015).

In an international setting, the taxation of dividends at the personal income level is negatively correlated with dividend payments (e.g., Chetty and Saez, 2005; Bach et al., 2019; Isakov, Pérignon, and Weisskopf, 2021). At the firm level, dividend tax cuts have been found to affect the allocation of investment across firms (Becker, Jacob, and Jacob, 2013; ; Moon, 2021), had positive effect on payouts (Bach et al., 2019) and firm productivity (Jacob, 2020). Our paper was the first to study the effect of a very large tax *increase* on the universe of firms and their investment decisions, which is important as responses to tax rate changes are not always symmetric (e.g., Benzarti, Carloni, Harju, and Kosonen, 2020). More recently, Bilicka, Guceri, and Koumanakos (2022) studies a dividend tax increase in Greece during the Global Financial Crisis and finds results consistent with our paper, where treated firms increase their investment, exhibit lower risk of bankruptcy, and have higher sales in the long-run. We also provide novel and in-depth analysis of the reallocation pattern across firms and industries to show that the additional capital likely reduced capital misallocation.

Second, we relate to the theoretical literature on dividend taxation, in particular Sinn (1991) for the neoclassical model of dividend taxation that embeds the "old" and "new" views; Chetty and Saez (2010) for the "agency view"; and Korinek and Stiglitz (2009) for the "intertemporal arbitrage" view. Our results reject the neoclassical model of dividend taxation that concludes that a higher dividend tax rate should either reduce investment and dividends payment or induce no change in both.[6] All the results in our paper about the effects of the tax increase can be explained by models of intertemporal arbitrage. If entrepreneurs expect the tax hike to reverse back in the future, they have an incentive to reduce their dividends and transfer wealth into the future by either investing when profitable opportunities arise or by accumulating cash. The stark differential increase in investment across investment opportunities and returns to capital, combined with a uniform drop in dividends payment are clear evidence of intertemporal arbitrage. These results reject models where entrepreneurs derive utility from investing in pet projects as in the agency

6. The neoclassical model e.g., Sinn, 1991) embodies the distinction between the "old view" and "new view" of dividend taxation. In the "old view" investment will decrease because it is financed with new equity issuance and higher taxes raising the cost of equity (e.g., Harberger, 1962, Feldstein, 1970, Poterba and Summers, 1983). By contrast, in the "new view" higher taxes reduce the marginal return to investment but also reduces the ex-post marginal incentive to distribute payouts by a similar amount, leaving investment and payout unchanged (e.g., King, 1977; Auerbach, 1979; Bradford, 1981).

view. The fact that entrepreneurs do not increase their wage in reaction to a drop in dividends to maintain their total compensation is also consistent with intertemporal arbitrage, as entrepreneurs are better off transferring wealth into the future when the tax rate on dividends will revert, rather than paying themselves a higher labor income on which they are taxed more than capital income.

Finally, because we study how tax-induced increase in available liquidity affect the misallocation of capital, we relate to the literature studying the effect of financial constraints on various types of misallocation (all the references are detailed in Bau and Matray, 2020): misallocation of firms across sectors (e.g., Buera, Kaboski, and Shin, 2011; Midrigan and Xu, 2014), of labor (e.g., Hombert and Matray, 2016; Hombert and Matray, 2019; Hsieh, Hurst, Jones, and Klenow, 2019; Fonseca and Doornik, 2021) of capital within sectors across firms (e.g., Hsieh and Klenow, 2009; Sraer and Thesmar, 2020; Bau and Matray, 2020), of capital within multi-plants firms (Kehrig and Vincent, 2019), of capital over the business cycle (Kehrig, 2015), of bank lending (e.g., Delatte, Matray, and Pinardon Touati, 2020) or of international trade (Xu, 2022).

1 Institutional background and the 2013 reform

1.1 Differences in legal status

This section explains the differences in legal statuses that determine the split between control (SAS) and treated (SARL) firms after the reform.

Firm legal status. Private corporations in France are divided into two legal statuses: "*Société à Responsabilié Limitée*" (SARL) and "*Société Anonyme Simplifiée*" (SAS).[7] They are similar along the following dimensions: they have no minimum number of shareholders, face no restrictions on the amount of nominal equity they issue when created, and guarantee limited liability for their partners up to the amount of the partners' contributions.

There are two main differences between SARL and SAS status. First, SAS offers more flexibility in the design of the company by-laws and easier access to external

7. We omit from the discussion the mandatory legal status for listed firms "*Société Anonyme*" (SA), which accounted for roughly a quarter of the economy in 2012. As explained below, we remove listed firms from the main analysis.

capital markets. Second, SAS managing directors are required by law to be employees of the firm, while SARL managing directors do not face this requirement. This has two implications: (i) SARL managing directors have a different social security regime when they are compensated through wages. They depend on the "independent worker regime" (even if their firm has multiple employees), instead of the standard "general regime" for employees. (ii) SARL managing directors can be paid solely with capital income (dividends) without any labor income (wages), even though this rarely happen in practice.

To ease exposition, in the rest of the text we refer to SARL as "treated firms" and to SAS as "control firms." We describe the finer details about their legal obligations and rights in Appendix A. We discuss the representativeness and external validity of this sample and of the French economy in Appendix D.

Comparison with legal status in the U.S. All firms in our sample pay an entity-level tax, similar to U.S. "C-corps." There is a French equivalent of "S-corps" but unlike in the U.S., this status is highly restrictive and mostly limited to self-employed individuals. Such firms are excluded from our sample as we focus on firms with at least one employee in addition to the entrepreneur.

Takeaway. Except with respect to the employment status of the owner-manager and some differences in ease of access to external finance, treated and control firms are very similar, in particular regarding the taxes and regulation they are subjected to, and are close to U.S. C-corps.

1.2 Taxing dividends in France and the 2013 reform

In this subsection, we detail the French tax system and explain how the policy change in 2013 raised the dividend tax rate from 15.5% to 46% for treated firms.

1.2.1 The situation before the 2013 reform

French dividend taxation. Dividend taxation in France consists of two components. The first component is a payroll tax with a rate around 15% that applies to the gross dividend amount decided yearly during the General Meeting and withheld at source.[8] The second component is a standard progressive personal income tax,

8. It may seem strange for dividends to be subject to a payroll tax. It should be noted however that the payroll tax paid by shareholders is of different nature from the payroll tax on wages, as it

that applies to the "net" dividend after payroll taxes have been paid. In 2012, the year before the reform, the payroll tax rate on dividends was 15.5% for all types of legal entities: SARL (treated) and SAS (control) firms.[9]

Taxes on labor income have the same structure. The gross amount is subject to payroll taxes withheld at source and the net wage is then subject to a personal income tax. The noticeable difference between labor and capital income is that the payroll tax rate on labor income is much higher, around 46%. This large wedge between labor and capital income taxation potentially distorted the composition of managing directors' total compensation in favor of more dividends.

Compensation of managing directors. The incentive for such arbitrage in favor of more dividends existed whether the entrepreneur was the owner-manager of a treated (SARL) or control (SAS) firm. In practice, the vast majority of both treated and control firms' owner-managers still preferred to receive part of their compensation in the form of a wage that is higher than the minimum wage, and treat dividends as the "marginal compensation."[10] We provide a detail discussion of the compensation of SAS and SARL managers in Appendix A.

1.2.2 The 2013 reform

In 2013, Francois Hollande and the center-left party reduced the distortion between capital and labor income for owner-managers of SARL firms by abolishing the distinction between dividends and wages for the dividends paid to owner-managers and all the owner-managers' family members working at the firm. All dividends paid to them have since then been considered as a "wage," and as such, are subject to the same 46% wage payroll tax rate, effectively tripling the dividend tax rate.

The initial focus on SARL firms was mostly motivated by two reasons. First, the government feared that SARL owner-managers were more likely to engage in tax arbitrage since they do not have to be an employee of their own firm, and therefore could have all their compensation in the form of dividends, without paying themselves

does not open rights to future benefits. In this sense, it is more of a "pure" tax rather than a social security "contribution."

9. Share buybacks were typically taxed as dividends rather than capital gains until 2015 (unless they can be explained by past losses that are forcing the firm to shrink), so the dividend tax rate applies to the overall payout (share repurchases + dividends).

10. Estimates from the French statistical office is that less than a quarter of treated firms' owner-managers do not pay themselves a wage.

any wage. Second, even when receiving a wage, owner-managers of SARL firms are associated with a different social security regime than the general one (which covers owner-manager of SAS firms) and the government wanted to reform this specific regime. Later in the Presidency, the government tried to extend the reform to owner-managers of SAS firms but failed to do so, due to stronger lobbying power thanks to a better representations of SAS firm entrepreneurs among French employers' organizations. We discussed the details of the reform and some additional policies adopted around this period in Appendix B.

The reform applies to the dividends paid to the owner-managers of SARL firms and their family members working at the firm. Managers are identified as "owners" if they hold at least 50% of the firm equity either alone or jointly with their family.[11] The focus on owner-managers was justified by the fact that the distinction between dividends and wages is arbitrary when the managing director can decide by herself how to label her compensation, given that she is the majority owner. Therefore, the distinction between dividends and wages did not reflect relative compensation for the risk of the capital invested and for labor effort, but rather was just a legal fiction that facilitated tax optimization.

Control firms (SAS) were left out of the reform. Their payroll tax on dividends remained at 15.5%, providing us with a natural control group that could have been subject to the reform but never was.

By how much did the dividend tax rate increase? The reform only applied to the dividends paid to the owner-managers and their family members working at the firm. Therefore, it is legitimate to wonder by how much the reform really impacted the total dividend taxes paid by SARL (treated) firms and what should be the appropriate treated group. In most of the paper, we assume that *all* SARL firms are exposed to the reform for three reasons. First, over 90% of SARL firms are run by an owner-manager according to the French statistical office (INSEE).

Second, French regulation imposes that dividends are distributed in proportion of each shareholder's capital. This implies for instance that the owner-manager could not increase the dividends to other shareholders without increasing her own and her family's dividends. By definition, she has the majority of the firm's capital so she can decide on her own how much dividends should be paid (even if all the minority

11. The inclusion of family ownership ensures that managing directors of SARL firms could not escape the reform simply by transferring their equity to their spouse, children or relatives.

shareholders would vote together, they could not affect the dividends policy). She also bears the largest cost, since she and her family will receive the largest fraction of dividends paid. Therefore, it seems reasonable to consider that the tax rate that affects the dividends and investment policy is de facto the tax rate that applies to the owner-manager.

Third, even if by definition only the firms paying dividends have to pay the (higher) taxes on dividends, it does not imply that only firms paying dividends before the reform should be considered treated. Indeed, SARL firms might have wanted to pay dividends after the reform, but decided not to due to the higher tax rate. Therefore, any SARL firm that after 2013 would normally have paid dividends is affected by the reform.

Reactions to the reform and expectations of reversal. The decision to raise the payroll tax rate of dividends of treated firms was part of a broader agenda to harmonize the taxation of capital and labor pushed by the newly-elected President. When introduced, the reform was marketed as "permanent" since it was implemented to correct a tax distortion.[12] However, the election of Francois Hollande to the French Presidency came as a surprise and many expected him not to be reelected, which might have created hope that the reform would be abolished in the future. While it is unfortunately impossible to observe managers' expectations at that time, it is worth stressing that President Emmanuel Macron, President Francois Hollande's successor, decided to uphold the alignment of the tax rate between capital and labor income for owner-managers of treated (SARL) firms.

2 Data and empirical strategy

2.1 Firm data

Financial statements and firm legal statuses. We retrieve firm accounting information from tax-files from FARE 2008–2017 (INSEE and DGFIP, 2009–2018). The data contain income statements and balance sheets collected by the Treasury for the entire universe of firms in the economy. These data are used to determine

12. Unlike the the initial setting of the 2003 Bush tax cut, the French experiment had no default expiration date. The U.S. tax cut was originally legislated to expire in 2009, then extended to 2013 and finally made permanent.

tax liability and are audited by the tax authority with significant penalties applied in the case of misreporting, which guarantees the high quality and accuracy of the data used.

Wage data. The wage data comes from matched employer-employee data that reports total wages paid to all employees of the firm who pay social security contributions to the general social security regime. This implies that we do not observe wages paid to owner-managers of SARL firms since they pay social security contributions to the "independent regime." We manage to obtain data on wages paid to owner-managers from a different source, which are available starting in 2008.[13]

Analysis sample. We focus on firms present during the period 2008–2017 and impose that we observe them in 2011 (two years before the reform). Because we are interested in the real effects of the tax reform on capital accumulation, employment and firm growth, we exclude financial firms (naf code 6000–6999) and utilities (naf code 3500–3999) from the analysis. We also drop observations reporting zero or negative assets, total sales, or PPE (property, plants and equipment). All firms in our sample have at least one employee in addition to the owner-manager, implying that all self-employed entrepreneurs are excluded from our analysis. We also remove subsidiaries (i.e., firms held at 100% by a larger entity) and we impose observing the firm at least four years. To improve the overlap between treated and control firms, we cut the sample at the fifth and ninety-fifth percentile of the treated firm size distribution. In Section 4.3, we report robustness of our estimates when we include the universe of firms, including the largest ones and the listed ones.

2.2 Summary statistics

Sample representativeness of the French economy. Our sample accounts for a substantial fraction of the economy, capturing around two-thirds of the employment in private firms, which is the vast majority of the economy in France.[14] In this sample, treated firms represent around half of the economic activity, as shown in Figure D.3 in the Appendix. We report the fraction of treated firms within each main industry in France in Figure 1a, and the distribution of treated firms across industries in Figure

13. The first file is called the "DADS" and the second file is called the "ACOSS" file.

14. This is of comparable orders of magnitude to Yagan (2015) that analyses the Bush tax cut in the U.S. and uses a sample accounting for half of the private employment in the U.S.

1b. Treated firms are present in all industries, usually accounting for more than the majority of firms, and their distribution across industries reflects the distribution of economic activity in France.

Figure 1: Distribution of Treated Firms Across Industries

Share treated within industries

Share of treated across industries

Figure (a) plots the share of firms whose legal status of organization is SARL (treated) over the period 2008–2012 within all 38 main industries in France. Figure (b) plots the share of SARL firms across the different industries over the same period.

Modal firm characteristics. Table 1 reports the descriptive statistics for our sample of treated and control firms before the reform. We scale most variables by total capital in 2011. Total capital is defined as tangible and intangible capital. Tangible capital includes the book value of all property, plants and equipment (PPE) at the end of tax year and intangible capital includes capitalized R&D spending, software, patent licences, goodwill, copyrights, and franchises. Capital accumulation (either total capital or tangible) is measured as the level of capital at time t relative to the firm base level in 2011.

Treated and control firms have similar capital structures (e.g., cash-holding, leverage, trade credit) and proportions of their capital as dividends (15% versus 18%). Control firms are older and more asset-intensive, but they have a large overlap in their age and size distribution with treated firms.[15] We discuss how these factors may matter for identification in Section 2.3.

All firms in the sample are closely held and therefore have limited agency frictions. We discuss how this could affect our interpretations of the results and how it can be

15. We report the cumulative distribution of firm size (using employment) for treated and control firms separately in the Appendix in Figure D.2.

Table 1: Summary Statistics

	Pre-Reform 2008–2012					
	Treated			**Control**		
	Mean	s.d.	p50	Mean	s.d.	p50
Dividend/total capital	0.15	0.4	0.015	0.18	0.44	0.024
Dividend/net income	0.31	0.4	0.11	0.37	0.44	0.19
Investment: total capital	0.09	0.16	0.039	0.068	0.14	0.029
Investment: tangible capital	0.11	0.17	0.054	0.075	0.15	0.033
Age	15	12	13	23	16	20
Asset	720,571	549,986	549,547	1,302,810	723,576	1,184,025
Total capital	296,103	330,892	186,501	483,506	434,125	354,245
Tangible capital	207,243	250,016	122,316	386,389	386,413	258,104
Employee compensation	235,153	212,021	179,909	381,172	329,396	293,450
Employment	8.1	9.9	5.8	14	14	9.9
Revenues	1,096,412	1,083,083	785,934	2,028,740	1,880,357	1,483,798
Debt/assets	0.17	0.16	0.13	0.13	0.15	0.085
Liquidity/assets	0.19	0.17	0.13	0.18	0.17	0.13
Profit margin	0.057	0.061	0.046	0.049	0.064	0.037
Net current asset/revenues	0.15	0.23	0.11	0.2	0.27	0.14
Supplier credit/revenues	0.099	0.075	0.083	0.11	0.078	0.096
Customer credit/revenues	0.15	0.13	0.13	0.16	0.14	0.15
Distinct firms	134,065			23,701		

This table reports summary statistics for the universe of firms pre-reform. Tangible capital corresponds to property, plants and equipment (PPE). Profit margin is defined as EBE/revenues. Investment is the year-to-year change in capital (tangible or total) relative to the previous year. Net current asset is current asset minus current liability. Employment is number of full-time equivalent

linked with theories of dividend taxation in Section 7.

2.3 Empirical strategy

In order to analyze the effect of a change in the dividend tax rate on firm outcomes, we estimate a series of difference-in-differences specifications of the form:

$$\begin{aligned} Y_{i,f,j,c,t} = \beta\ Treated_i \times Post_t + \ \theta_i + \ Age_{i,t} \times \mu_f \\ + \ X_{i,t} \times \mu_f + \ \delta_{j,t} \times \mu_f + \ \gamma_{c,t} \times \mu_f + \ \varepsilon_{i,f,j,c,t} \end{aligned} \tag{1}$$

where $Y_{i,f,j,c,t}$ are various firm outcomes for firm i in industry j, located in area c at calendar year t, which belongs to the cohort of firms f that file their tax early in the year (before September) or late in the year (after September).[16] $Treated_i$ is a

16. 70% of firms file their taxes late in the year. We report robustness analysis when we restrict ourselves to this group in Appendix Table F.2

dummy that equals one if the firm legal status is a SARL. Because the reform might have affected firms' incentives to re-incorporate as a SAS (control), we freeze the legal status before the tax reform.[17]

We measure the accumulation of firm inputs (capital and labor) and output (revenues, value-added) in year t relative to a base year 2011. For instance, we study if the dividend tax hike allowed treated firms to accumulate more capital by looking at the value of capital at time t normalized by its base level in 2011 as the dependent variable.[18] In order to make a euro for euro comparison between the change in undistributed earnings and the growth of (total) capital accumulation, we also scale dividends by total capital in 2011. We winsorize outliers with values three times the interquartile range from the median.[19]

θ_i are firm fixed effects and ensure that we remove time-invariant heterogeneity across firms. $\delta_{j,t}$ are (five-digit) industry by year fixed effects and control for time-*varying* unobserved heterogeneity across industries, such as differences in industry-level business cycles, which may be correlated with firm outcomes. The use of industry-by-year fixed effects forces the parameter of interest β to be identified solely by comparing firms within the *same* industry.[20]

$Age_{i,t}$ is a vector of firm age fixed effects, where age is defined as the difference between the current calendar year and the year of creation of the firm. It ensures that we compare treated and control firms that are at the same point of their life cycle, which is important given the age difference between treated and control firms, and firm capital and labor accumulation policies and growth dynamics varies over

17. In practice, very few firms existing pre-reform change their incorporation status. We discuss how the reform affected the firm's incentive to incorporate as SAS (control) or SARL (treated) in Appendix B for the interested reader.

18. Using capital accumulation still allows us to back out the yearly change (i.e., investment) by computing an annualized growth rate of capital. We can write the change in capital stock between t and t_0 as the cumulative flow change: $\frac{Capital_t}{Capital_{t_0}} = \frac{\sum_{t'=t_0}^{t} [\Delta Capital_{t'}] + Capital_{t_0}}{Capital_{t_0}}$ This implies that we can compute the average annualized increase in capital by using the post period coefficient on capital accumulation.

19. See Chaney, Sraer, and Thesmar (2012) for a recent application of this method. This method has the advantage of defining ex-ante what should be considered an outlier. Results are if anything larger if instead we winsorize at 1% and 99% of the distribution which is standard in the literature. Because the reform shifted the gap between treated and control, we follow Yagan (2015) and winsorize observations within year by using each year's distribution of the outcome and compute percentiles separately for SARL and SAS firms. This method is not well defined for truncated variables such as dividend payments. In this case, we winsorize at 1% and 99%.

20. We use the 5 digit Naf rev2 code that includes 574 distinct industries.

the firm life cycle (e.g., Haltiwanger, Jarmin, Kulick, and Miranda, 2015; Hoberg and Maksimovic, 2021). Finally, we include county-by-year fixed effects $\gamma_{c,t}$ to remove time-varying heterogeneity across local labor markets.[21]

In robustness tests, we include a collection of additional firm-level controls $X_{i,t}$: liquidity (cash over lagged assets), leverage (total debt over lagged assets), profitability (operating income over lagged assets) and firm age-adjusted size (defined as twenty quantiles of revenue by age at the beginning of the sample period). Given that the reform may have a direct impact on many firm characteristics, using time-varying controls would bias the coefficient.[22] We therefore use the pre-reform value of these controls interacted with year fixed effects.

Staggered implementation of the reform. The fiscal administration prorates the tax base over the previous twelve months of the firm fiscal date. This means for instance that firms closing their annual account in March 2013 only pay the new tax rate voted in 2013 on one-fourth of the dividends paid, because only the dividends belonging to January–March are taxed at the new rate, while the rest of the dividends are assigned to the rate for the months of April–December 2012. To account for this lag in when SARL firms are treated, we use the fact that we can observe the month firms close their annual account and define two "fiscal cohorts:" an early cohort if firms close their account before September, and a late cohort otherwise. We consider that SARL firms are treated in 2013 if they belong to the late cohort and in 2014 if they belong to the early cohort.

This implies that our D-i-D may be susceptible to the bias that has recently been identified where the staggered nature of the treatment leads the estimator to make the "forbidden comparison" between late-treated and early-treated units, in addition to the comparison with the control units.[23]

Our baseline specification implements a *within-fiscal-cohort* estimation to remove this potential bias. We interact all the firm controls and fixed effects with a fiscal cohort dummy μ_f. Because our setting has a group of never-treated (the control group of firms with a legal status "SAS") for each cohort of treated, it is possible to ensure that the coefficient of interest is solely estimated by comparing treated (SARL) firms

21. Specifically, we use French "departement," which partitions France into one hundred distinct entities.

22. Commonly referred to as the problem of "bad controls" (e.g., Angrist and Pischke, 2008).

23. See the recent survey of the literature by Chaisemartin and D'Haultfoeuille (2022) or Roth, Sant'Anna, Bilinski, and Poe (2022).

with control (SAS) firms *within* each cohort. Precisely, this specification compares firms that file their taxes between January and September with control firms that file their taxes over the same months, but never compares firms that file their taxes between January and September with firms that file their taxes between October and December. This specification de facto removes bias arising from the staggered nature of the design, as it only compares firms treated in 2013 with never-treated, and firms treated in 2014 with never-treated, but it does not use the comparison between the cohort of firms treated in 2014 with the cohort of firms treated in 2013.[24]

In our preferred specification with pre-reform characteristics fixed effects, the coefficient of interest β is estimated by comparing firms that are at the same point of their life cycle, operating in the same industry, located in the same county, and it measures the relative change in firm outcomes for firms facing a dividend tax rate increase relative to firms not facing this tax increase. Standard errors are clustered at the firm level to account for possible autocorrelation in the error term.

3 Effects on regulatory arbitrage and payouts

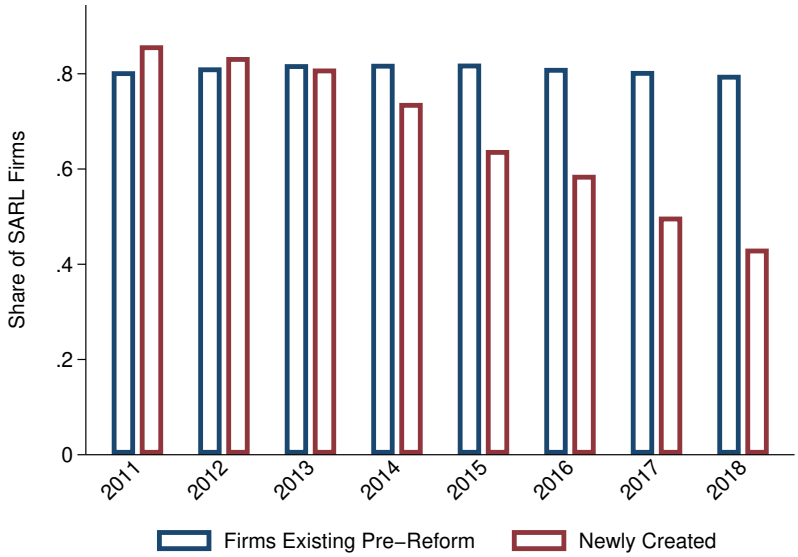
3.1 Regulatory arbitrage

While the reform did not lead to important changes in organizational form for existing firms, it did have a very large impact on the legal status chosen by newly created firms.

Figure 2 shows the evolution of the fraction of firms registered as treated (SARL) for new firms versus those existing before 2013. While the fraction of treated firms stays flat for firms existing before 2013, new firms display important changes consistent with regulatory arbitrage. Over 80% of new firms were created as SARL prior to 2013, but there is a sharp drop in 2014–2015 and this number declines to 40% by 2017. The important lack of response from existing firms may be surprising but is consistent with Gordon and MacKie-Mason (1994), and Giroud and Rauh (2019) that find little shifting of organizational form between C and S-corps in the U.S. in

24. Results are similar if we remove the staggered design by instead assuming that *all* SARL firms are treated in the calendar year 2013 (Table F.1), or if we only focus on the cohort of firms treated in 2013 which accounts for 70% of the sample, among which 75% file their tax in December (Table F.2).

Figure 2: Effect of 2013 Tax Reform on Organisational Form



This figure plots the share of firms whose legal status of organization is SARL (treated) for firms existing prior to the reform and newly created firms after the reform.

response to differential tax rates.[25]

3.2 Effect on payouts

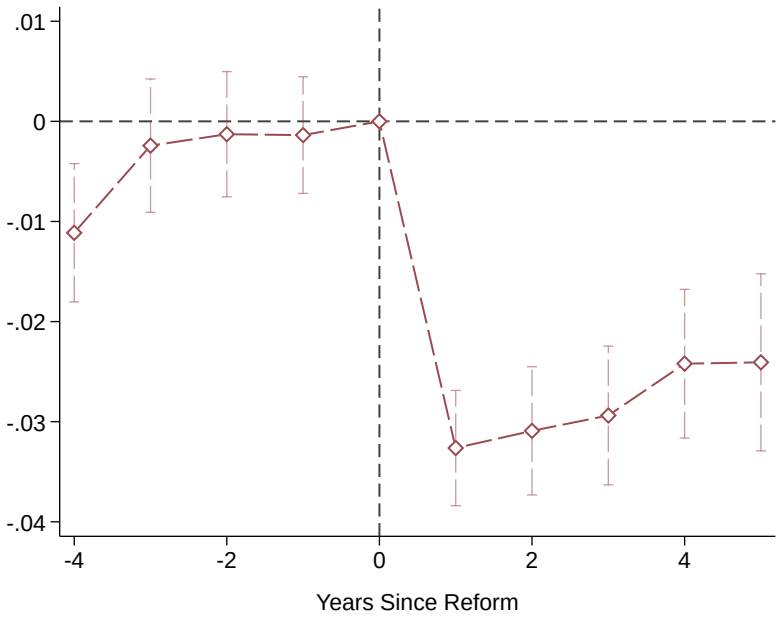
Average reaction. We start by displaying the yearly coefficients of the regression when we include the different sets of fixed effects to provide a visual analysis of the effect of the reform on the ratio of paid dividends in Figure 3.

Three facts are noteworthy. First, prior to the reform, treated and control firms behave similarly, confirming that there is no violation of the "parallel trend" assumption needed for differences-in-differences estimators in the pre-period.[26] Second, treated firms adjust immediately to the increase in the tax rate by abruptly cutting dividends the year of the reform. Third, following the swift drop, treated firms keep paying lower dividends throughout the post period and do not revert.

25. The lack of changes in organizational form for existing firms combined with the large reaction for new firms can be rationalized by important adjustment costs in France that takes two forms: a monetary cost between €5,000 to €10,000, representing around 10% to 25% of the firm net income, and a legal restriction since the law prohibits a legal status change if the change is "purely motivated by the motive to escape or reduce social security contributions" (article L243-7-2).

26. To be precise, the parallel trend assumption requires that, absent of the shock, treated and control firms would have evolved the same way, which is impossible to test in the post period.

Figure 3: Effect of 2013 Tax Reform on Dividend Payments



This figure plots the yearly coefficient and 95% confidence intervals of the event study difference-in-differences estimates in equation (1) of the 2013 dividend tax increase when we include firm, year, firm age, industry and county-by-year, fixed effects, all interacted with a fiscal cohort fixed effect. The dependent variable is dividend payments scaled by total capital in 2011.

We report the average effect and the robustness of the dividend reduction in Table 2. We show that the negative effect of dividend taxation is robust to an array of different fixed effects that removes different time-varying unobserved heterogeneity. Column 1 shows the result with firm, fiscal cohort interacted with calendar year, and fiscal cohort interacted with age fixed effects; column 2 adds industry-by-year fixed effects; column 3 adds county-by-year fixed effects; and column 4 adds additional firm characteristics (size, liquidity, leverage, profitability and size). All the additional controls are interacted with the fiscal cohort dummy to ensure that the staggered design of the reform does not bias the point estimate.

In all cases, the point estimate is stable and firms exposed to the tax hike reduce their dividend payment by €0.026 for each euro of capital in our preferred specification (column 3), implying a 17% drop relative to the pre-reform treated sample mean.

Additional evidence: bunching and anticipatory response. Two additional pieces of evidence show that the reform was salient and that entrepreneurs optimized around it. First, the reform introduced a kink in the tax, leading to the emergence

Table 2: Effect of 2013 Tax Reform on Dividend Payments

Dependent Variable	Dividends			
	(1)	(2)	(3)	(4)
Treated×Post	-0.023***	-0.024***	-0.026***	-0.027***
	(0.0022)	(0.0023)	(0.0023)	(0.0024)
Fixed Effects				
Firm	✓	✓	✓	✓
Year×Fiscal cohort	✓	—	—	—
Age×Fiscal cohort	✓	✓	✓	✓
Industry×Year×Fiscal cohort	—	✓	✓	✓
County×Year×Fiscal cohort	—	—	✓	✓
Size×Year×Fiscal cohort	—	—	—	✓
Leverage×Year×Fiscal cohort	—	—	—	✓
Cash×Year×Fiscal cohort	—	—	—	✓
Profitability×Year×Fiscal cohort	—	—	—	✓
Observations	1,404,803	1,404,803	1,404,803	1,404,724

This table shows the effect of the 2013 dividend tax increase on dividend payments. The dependent variable is dividends scaled by total capital in 2011. All the controls are detailed in Section 2.3 and are defined pre-reform. Standard errors are clustered at the firm level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

of a bunching below the threshold. We provide a detailed explanation of this part of the reform and graphical evidence of the emergence of the bunching in Appendix B.2.

Second, the reform applied differentially for firms that closed their annual accounts in the last fiscal quarter vs. not, which we capture in our estimation with the fiscal cohort fixed effects. In Appendix Figure B.3, we show that firms more affected in 2013 responded faster, while firms for which the new tax rate only applied to part of their dividends in 2013 kept paying more dividends in 2013 and converged to a lower level by around 2.6 p.p. in 2014, consistent with intertemporal tax arbitrage.

Takeaway. Taken together, these results show that the tax hike was both salient and meaningful for treated firms, as the reform led to a large earnings retention. We study how firms used this extra free cash-flow to accumulate more capital, hire more, and grow as a result in Section 4.1, and whether they hold more cash and engage in income shifting in Section 6.

3.3 Elasticity discussion

Estimation of the value of the post-reform tax rate. To estimate the elasticities of different outcome variables with respect to one-minus-the-tax-rate, we can apply the standard elasticity formula:

$$elasticity^{Y_i}_{\tau_{div}} = \Delta Y_i \Big/ \left[(\tau^{new}_{div} - \tau^{old}_{div})/(1 - \tau^{old}_{div}) \right]$$

While we know that the old tax rate τ^{old}_{div} equals 0.155 and we can estimate ΔY_i from reduced form regressions, a challenge arises when defining the value of the new tax rate. Indeed, as discussed in Section 1.2.2, after the reform, dividends are treated as "wages," which changes the very nature of the payroll tax. Before the reform, the payroll tax was a "pure tax," but after the reform the payroll tax became a social security contribution, opening rights to social benefits.

This new link between taxes and social benefits introduces a gap between the nominal tax rate of 46% on the taxed income and the effective tax rate, which should be adjusted by the value of the benefits attached to the social security contribution (SSC). Intuitively, if the government increases the tax rate on entrepreneurs by one euro but returns this euro later as pensions for instance, the taxes have almost not increased. We detail the literature associated with how wage earners incorporate expected social benefits into their labor supply decision in Appendix C.

According to Bozio, Breda, and Grenet (2018), a large fraction of French SSC (if not the majority) are actually not true "contributions," because the amount of benefits received does not equate one-for-one the amount of money paid.[27] Based on the work done by the French Institut des Politiques Publiques (IPP), the value of retirement contributions for treated owner-managers in our sample is around 20% of the taxed income. This gives us a lower bound for the effective increase in the dividend tax rate. If owner-managers fully value the benefits associated with retirement contribution, their payroll tax rate following the 2013 reform would see an increase from 15.5% to 26% (= 46% − 20%). If they fully discount the benefits, their effective tax rate would increase to 46%. This could happen if they do not value the benefits, do not believe the government will honor them or do not understand the linkage between their taxes and the benefits. Therefore, even in the case of a perfect valuation of their future benefits, the new tax rate of treated firms is 26% (the net-of-tax dividends plus

27. This is the case for instance for health care, child care benefits, etc.

the benefits associated with the contribution), a 10 p.p. increase relative to prior to the reform.

Elasticity of dividends. Below we offer three cases. First, if we assume that treated entrepreneurs do not value the benefits associated with SSC, the effective new tax rate is 46%, implying an elasticity of dividend reaction to one-minus-the-tax-rate of 0.47,[28] which is exactly the elasticity estimated for the U.S. following the 2003 dividend tax-cut by Chetty and Saez (2005) and Yagan (2015) of 0.47.

Second, if we assume a valuation of half of the benefit, as in Finkelstein, Hendren, and Luttmer (2019), the elasticity would be 0.66.[29] Third, if we assume entrepreneurs fully value the benefits associated to their SSC, the elasticity is well over 1.5. This implies in economic terms that for every 1% increase in the dividend tax rate, entrepreneurs cut their dividends by 1.5%, which is a much higher magnitude than those estimated so far. In the rest of the paper, we report elasticities assuming that the new effective tax rate is 46%, which provides a lower bound for the structural elasticities.

4 Real effects: input accumulation and firm growth

There are two opposing channels through which a higher dividend tax rate can affect capital and employment. First, as we find in Section 2, higher dividend taxes make dividend payments less desirable and leave treated firms with higher retained earnings that they can use these to finance the acquisition of more capital and labor.

Second, higher dividend taxes can increase the user cost of capital, which negatively affects capital accumulation for firms that finance their marginal capital with new equity and use the returns to pay dividends (the "old view" of dividend taxation). This is particularly likely for young firms and cash-constrained firms with limited access to bank credit (e.g., Sinn, 1991).

4.1 Average effect on capital accumulation

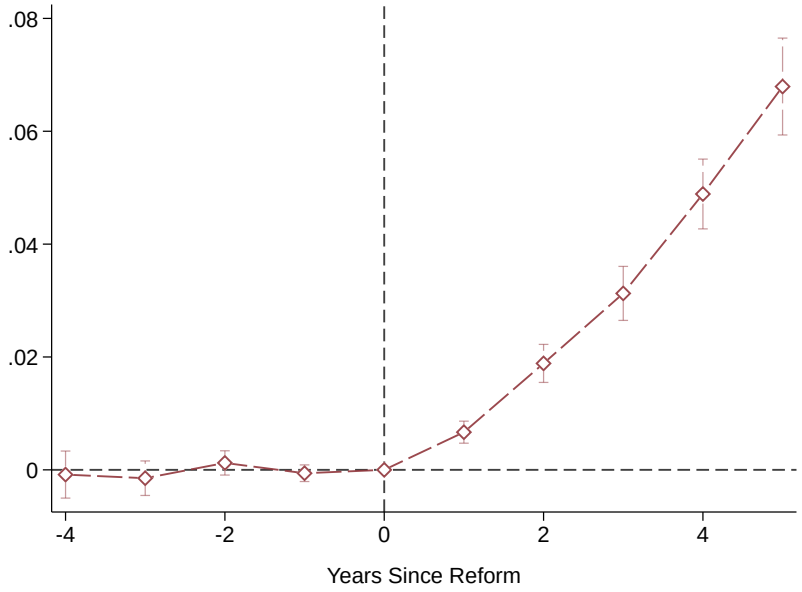
We first study the impact of the reform on capital accumulation. Figure 4 plots the yearly coefficients and 95% confidence intervals of the differences-in-differences event

28. $(0.026/0.15)/(\tau_{div}^{new}\text{-}0.155/0.845) = 0.47$

29. The benefits are equal to 20%, so a valuation of half would be 10%, implying a new effective tax rate of 46%-10% = 36%, which gives the elasticity of $(0.026/0.15)/[(0.36\text{-}0.155)/0.845] = 0.71$

studies estimation of equation 1 of the tax's impact on capital accumulation each year relative to 2011, and shows the results when using our preferred specification with age, industry-by-year and county-by year fixed effects, all interacted with fiscal cohorts fixed effects. Prior to the reform, treated and control firms accumulate capital at the same pace, providing visual evidence of the absence of differential pre-trends before the shock. This similarity breaks after the reform when treated firms start to accumulate capital faster, and do so in a steady way, consistent with the fact that treated firms cut their dividend permanently and therefore have extra funds to invest every year.

Figure 4: Effect of 2013 Tax Reform on Capital Accumulation



This figure plots the yearly coefficients and 95% confidence intervals of the difference-in-differences estimates in equation (1) of the 2013 dividend tax increase when we include firm, year, firm age, industry and county-by-year, fixed effects, all interacted with a fiscal cohort fixed effect. The dependent variable is total capital in t scaled by total capital in 2011.

Table 3 shows the point estimates across different specifications for the different measures of capital (total, tangible, gross, net). Panel A shows the results when we use gross capital and Panel B the results for net capital, which accounts for book depreciation. In all cases, we find that the dividend tax hike leads treated firms to accumulate more capital. For all measures of capital, there is a similar pattern where the point estimate is smaller when we only include firm, year, and age fixed

effects (columns 1 and 5). The magnitude increases when we include industry×fiscal cohort×year fixed effects (column 2 and 6) that force the comparison to be solely between SARL and SAS firms *within* the same industry. Given that the share of treated (SARL) firms varies a lot across industries (Figure 1), not including industry-by-year fixed effects implies de facto that the effect of reform is mostly estimated in this case by comparing capital accumulation in SARL-intensive industries vs. not. Since capital dynamics fluctuates widely across industries, it is reasonable that the effect of the reform is attenuated when we do not include these fixed effects Including county-by-year has no effect, while controlling for additional firm ex-ante characteristics only slightly reduces the effect.

In terms of economic magnitudes and focusing on our preferred specification with age, industry and county fixed effects (column 3), treated firms accumulate 3% more total gross capital over the period that follows the dividend tax hike. This accumulation is even larger if we focus on tangible capital (column 7). The results are similar in Panel B when we account for book depreciation.

Table 3: Effect on Capital Accumulation

Dependent Variable	Total Capital				Tangible Capital			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Panel A: Gross Capital				
Treated×Post	0.017***	0.030***	0.030***	0.033***	0.035***	0.042***	0.042***	0.043***
	(0.0022)	(0.0022)	(0.0023)	(0.0023)	(0.0024)	(0.0026)	(0.0026)	(0.0026)
				Panel B: Net Capital				
Treated×Post	0.013***	0.023***	0.024***	0.023***	0.027***	0.043***	0.045***	0.046***
	(0.0046)	(0.0048)	(0.0048)	(0.0048)	(0.0067)	(0.0069)	(0.0069)	(0.0070)
Fixed Effects								
Firm	✓	✓	✓	✓	✓	✓	✓	✓
Year×Fiscal cohort	✓	—	—	—	✓	—	—	—
Age×Fiscal cohort	✓	✓	✓	✓	✓	✓	✓	✓
Industry×Year×Fiscal cohort	—	✓	✓	✓	—	✓	✓	✓
County×Year×Fiscal cohort	—	—	✓	✓	—	—	✓	✓
Size×Year×Fiscal cohort	—	—	—	✓	—	—	—	✓
Leverage×Year×Fiscal cohort	—	—	—	✓	—	—	—	✓
Cash×Year×Fiscal cohort	—	—	—	✓	—	—	—	✓
Profitability×Year×Fiscal cohort	—	—	—	✓	—	—	—	✓
Observations	1,404,803	1,404,803	1,404,803	1,404,803	1,404,803	1,404,803	1,404,803	1,404,803

This table shows the effect of the 2013 dividend tax increase on capital accumulation relative to the firm's base level in 2011. Total capital includes tangible (property, plant and equipment) and intangible (software, patents, licences) capital. All the controls are detailed in Section 2.3 and are defined pre-reform. Standard errors are clustered at the firm level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

4.2 Discussion of magnitudes

Treated firms increase their gross total capital over the sample period by 3% relative to their stock of capital in 2011. This implies an increase of approximately, on an annualized basis, €0.01 for each euro of total capital they own in 2011.[30] In the rest of the paper, we use this annualized change in capital accumulation as our definition of average annual investment.

Prior to 2013, firms invest €0.09 per euro of lagged capital, so assuming a new dividend tax rate of 46%, the elasticity of annualized total capital growth relative to one-minus-the-tax rate of 32%.[31]

A more natural way to interpret the economic magnitude of this tax-induced change in capital accumulation is to look at the elasticity between the extra free cash-flow coming from the drop in dividends paid and the additional investment. This is also the relevant elasticity in models of intertemporal tax arbitrage, as the value of the change in dividends determines how much extra money the entrepreneur has to invest (if she decreased dividends) or by how much she needs to cut investment (if she increased dividends). On average, firms reduce their annual payouts by €0.026 per euro of capital stock in 2011, while increasing their annual capital stock by €0.01 per euro of 2011 capital stock. This implies a pass-through of this "retained earnings shock" of 0.38, roughly around a third.

To gauge the magnitude of this pass-through of one third, we compare it with the existing literature estimating the pass-through of cash-flow shocks to investment. Previous estimates exploit different sources of variation from different sets of firms and shocks, but subject to these caveats, the comparison suggests that our estimate is large but not implausible. Lamont (1997) finds that for every $1 in oil cash-flow, non-oil investment rises by $0.12. Rauh (2006) finds an elasticity of 0.6 by exploiting a discontinuity in funding rules for defined benefit pension plans. Gan (2007) and Chaney, Sraer, and Thesmar (2012) find an increase in investment of $0.12 and $0.06 for every $1 increase in firm collateral value, respectively, and the literature overall finds investment cash-flow coefficients of around $0.15.[32] Therefore, the elasticity of

30. The post period coefficient of 0.03 is the weighted average estimated impact on capital accumulation in each post-period year (e.g., 0.01 the first year, 0.02 the first two years, etc). Since we have five years of data after the reform, it is the average effect mid-way through at three years.

31. The elasticity is estimated as follows: (0.01/0.09)/[(0.46-0.155)/0.845]

32. More precisely, Gan (2007) and Chaney, Sraer, and Thesmar (2012) use shocks to borrowing capacity rather than pure cash-flow shocks, but they still provide orders of magnitude that can be

0.37 appears in the middle of the cash-flow shock to investment sensitivity estimated by the literature.

Even if the tax increase leads to higher *quantity* of capital, it does not tell us anything about the *quality* of this extra capital accumulated, i.e. whether it is economically profitable or essentially "wasteful," which is a classic caveat of the literature studying firm capital accumulation. Two sets of results suggest that treated firms use the tax-induced increase in unpaid dividends to seize profitable new opportunities rather than engaging in wasteful capital accumulation. First, we look at the consequence of this tax reform on the growth and performance of the average treated firm in Section 4.4. Second, we explore the heterogeneity in capital accumulation response as a function of new opportunities and average marginal return to capital in Section 5.1.

4.3 Within-treatment heterogeneity and identification

We argue that the key channel linking the dividend tax hike and capital accumulation is that the tax hike reduces incentives for treated entrepreneurs to pay dividends, thereby freeing up additional internal funds that can be used to accumulate more capital. This suggests that within the group of treated (SARL) firms, those that were paying more dividends prior to the reform are likely to be more affected. This provides a natural new source of variation to tighten identification while focusing on the channel of higher retained earnings.

Our identification does not require firms to randomly choose their legal status but only requires that treated and control groups have parallel trends absent the shock. We provide graphical evidence that they have no differential trends before the shock in Figure 3 and Figure 4. However, it is still possible that even within the same age, local labor market, and industry group, SARL (treated) firms were exposed to other additional regulatory shocks after 2013 that would explain the divergence between treated and control firms post reform.

To address this potential threat to identification and to provide more evidence on the channel of higher retained earnings, we use variation *within* SARL firms in the intensity of exposure to the reform. We sort firms based on how much dividends they paid on average before the reform and split firms into two groups, high and

useful to think about the size of the effect.

low-dividend payers pre-reform along the sample median. We then use SARL firms with low-dividend payment pre-reform as a new control group and therefore compare firms with the *same legal status*. Such a strategy controls for all the additional differences specific to SARL firms that could potentially explain their different investment behaviors after 2013 that are not related to the dividend tax reform studied in this paper.

To implement this strategy, we create a dummy variable "*High-dividends pre-reform*" that takes the value one if the ratio of firm's pre-reform mean dividend over capital is above the sample median and zero otherwise, and we interact all explanatory variables and fixed effects with this dummy. We then re-run our main regressions as:

$$\begin{aligned} Y_{i,f,j,c,t} = \beta\ & Treated_i \times Post \times High\ Dividends_i + \theta_i \\ & + High\ Dividends_i \times \delta_{j,t} \times \mu_f + \ High\ Dividends_i \times \gamma_{c,t} \times \mu_f \\ & + High\ Dividends_i \times Age_{i,t} \times \mu_f + Treated_i \times \lambda_t \times \mu_f + \ \varepsilon_{i,f,j,c,t} \end{aligned} \tag{2}$$

Since we now use within-treated-group variation (between ex-ante high and low-dividend payers), we can include a set of fixed effects treated-by-year to account for time-varying unobserved heterogeneity across firm legal status and ensure that the parameter of interest β is solely estimated by comparing firms with the same legal status. In this case, β gives the marginal difference in outcomes between high-dividend paying treated firm relative to low-dividend paying treated firms.[33]

Table 4 reports the results. In the odd columns we show the effect when we only compare treated and control groups using the baseline specification (equation 1). In the even columns, we only use within treated group variation, across high and low-dividend payers pre-reform (equation 2). For each outcome (dividends, total capital, tangible capital), the interaction *Treated*×*Post*×*High-Dividend*$_i$ is highly significant and either of larger magnitude (for dividends, column 2) or around a third of the magnitude as the baseline coefficient. This implies that the baseline effect is driven by firms more exposed to the reform that were paying more dividends prior to the tax hike, which attenuates the risk that our results are driven by other concurrent shocks that could have differentially affected SARL (treated) or SAS (control) firms.

33. Note that in this case, we can no longer estimate *Treated*×*Post* as it is colinear with the treated-by-year fixed effects. $Post \times High\ Dividends_i$ is also not estimated as it is colinear with the interaction $High\ Dividends_i$ and the year fixed effects.

Table 4: Effect of 2013 Tax Reform: Within Treated Group Comparison

Dependent Variable	Dividends		Total Capital		Tangible Capital	
	(1)	(2)	(3)	(4)	(5)	(6)
Treated×Post	-0.026***		0.030***		0.042***	
	(0.0023)		(0.0023)		(0.0026)	
Treated×Post×High-dividend		-0.051***		0.013***		0.012**
		(0.0044)		(0.0045)		(0.0051)
Fixed Effects						
Firm	✓	✓	✓	✓	✓	✓
Age×Fiscal cohort	✓	✓	✓	✓	✓	✓
Industry×Year×Fiscal cohort	✓	✓	✓	✓	✓	✓
County×Year×Fiscal cohort	✓	✓	✓	✓	✓	✓
Treated×Year×Fiscal cohort	—	✓	—	✓	—	✓
Observations	1,404,803	1,402,651	1,404,803	1,402,651	1,404,803	1,402,651

This table shows the effect of the 2013 dividend tax increase on dividends and capital accumulation. Odd columns (1, 3, 5) report the baseline effects, even columns (2, 4, 6) reports the results when we estimate the effect of the reform *within* the treated group. *High-dividend* is a dummy variable that equals one if the average of dividend payments (measured as dividends over capital) before the reform is above to the sample median. All the fixed effects are interacted with the dummy *High-dividend*. *Treated*×*Post* is no longer estimated as it is absorbed with the new set of treated-by-fiscal cohort-by-year fixed effects. Standard errors are clustered at the firm level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Additional robustness. We report all the robustness tests in the Appendix. First, we report the raw evolution for dividends and total capital accumulation in Figures F.2 and F.3 respectively.

Second, we show that we obtain similar conclusions when we use different samples (Table F.3). We progressively increase the sample from above (removing only the top 1%, 5%) and below (removing the bottom 1%, 5%) as well as keeping the whole sample, and we find that the dividend tax hike continues to have a positive effect on firm capital accumulation. The point estimates attenuate, pointing to the fact that it becomes progressively more difficult to find a plausible set of treated firms at the top of the size distribution.[34]

Third, we repeat our identification strategy using variation within treated firms, across ex-ante high vs. low dividend payers using the universe of firms (Table F.4). We find very similar point estimates to the ones in Table 4.

Fourth, we reproduce our different main results with a sample of firms that are present throughout the sample period to remove the effect of differential exit in Table

34. In the case of listed firms, it is impossible by construction since listed firms cannot have a SARL legal status.

A9. Results are unaltered.

4.4 Average effect on firm growth

Having shown that the dividend tax hike significantly increases firm capital accumulation, we now examine if treated entrepreneurs also accumulate more labor, and how these changes in input translate into changes in firm output.

Table 5 reports the results when we estimate the effect of the reform on input accumulation (capital and labor), output (revenues, value-added), productivity, and the probability for the firm to exit during the sample period. Firms exposed to the dividend tax hike use the tax-induced increased in undistributed dividends to build more capital by 3% (column 1) and increase their number of employees by 3.1% (column 2). This leads to an increase in firm revenue by 1.6%, and a similar increase of firm's value added by 2%. The marginal productivity decreases slightly (column 5), which is expected if firms are financially constrained and exhibit decreasing return to scale. Indeed, in this case, firms invest first in projects with the highest returns (where the associated productivity is high), with each new marginal project yielding a lower marginal return.[35]

In column 6, we look at the probability the firm disappears from the sample in year $t+1$ and find that a higher dividend tax rate does reduces the likelihood of exit. To estimate this linear probability model, we keep the firm in the data until 2017 (even if it exited before) and create the dummy variable *Exit* that equals one for all years after the firm exited. This result is consistent with the drop in firm risk, as the remaining undistributed dividends not reinvested are essentially stored as cash (Table 9).[36]

Taken together, the results show a consistent picture of firms exposed to the dividend tax hike using the extra undistributed dividend to accumulation more capital and labor, which fosters their revenues, and survival likelihood.

Discussion of firm production function parameters. An important benefit of looking side-by-side at how capital, employment and output varies together is that

35. Note that this does *not* mean that firms invest in wasteful projects that have a negative net present value (NPV). It simply implies that firms have a pecking order where they invest first in the projects with the highest NPV, implying that any new project undertaken has a lower NPV relative to the previous ones.

36. We reproduce the analysis within treated firms between high and low dividend-payers pre-reform on this set of outcomes in Table F.7.

Table 5: Effect on Input Accumulation and Firm Growth

Dependent Variable	Total capital	Employment	Sales	VA	Productivity	Exit
	(1)	(2)	(3)	(4)	(5)	(6)
Treated×Post	0.030***	0.031***	0.016***	0.020***	-0.0064***	-0.028***
	(0.0023)	(0.0020)	(0.0021)	(0.0025)	(0.0019)	(0.0021)
Fixed Effects						
Firm	✓	✓	✓	✓	✓	✓
Age×Fiscal cohort	✓	✓	✓	✓	✓	✓
Industry×Year×Fiscal cohort	✓	✓	✓	✓	✓	✓
County×Year×Fiscal cohort	✓	✓	✓	✓	✓	✓
Observations	1,404,803	1,400,215	1,404,803	1,404,803	1,400,198	1,685,238

This table shows the effect of the 2013 dividend tax increase on firm input accumulation and output growth. All the level outcomes (total capital, employment, sales, value-added are defined the value in t relative to the firm's baseline in 2011. In column 6, *Exit* is a dummy variable that equals one if the firm exited the sample in year t+1. It contains more observations because to estimate the likelihood of exit, we keep the firm in the data until 2017 (even if it exited before). Standard errors are clustered at the firm level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

it allows us to back out the firm return to scale, which we can then compare to existing parameters in the literature. Assuming firms have a Cobb-Douglas production function of the form $F(K, L) = A(K^{\alpha}L^{1-\alpha})^{\theta}$ with capital share α around 1/3 and labor share $(1 - \alpha)$ of 2/3, the increase in inputs caused by the reform implies an approximation for the coefficient of returns to scale between 0.62 and 0.82 depending on whether we measure output elasticities using revenues (+1.6%, column 3) or using value-added (+2%, column 4).[37]

The value of this coefficient is around standard values of returns to scale and to the one Garicano, Lelarge, and Van Reenen (2016) estimates using the same data of French firms over the period 1995–2007 and to previous estimations from Basu and Fernald (1997) or Atkinson and Kehoe (2005).[38]

Additional firm outcomes: earnings. We study the effect on owner-manager and employee compensation in Table 6. In column 1, we repeat the result on employment. In column 2, we report the effect for the average (arcsin-log) earnings of employees and find an increase by 2%. This increase in wages corresponds to the wage of employees, not including the entrepreneur. In columns 3–4, we focus specifically on the earnings of CEOs, which includes owner-managers of treated firms. This raises two challenges.

37. This is obtained by computing: $\theta = \Delta Y/[\Delta A + \alpha \times \Delta K + (1 - \alpha) \times \Delta L]$.

38. Garicano, Lelarge, and Van Reenen (2016) reports coefficients between 0.793 and 0.86, Basu and Fernald (1997) reports $\theta = 0.8$, and Atkinson and Kehoe (2005) reports $\theta = 0.85$

First, the occupation code corresponding to "CEO" is not present for all firms in the matched employer-employee data. In this case, we identify the CEO as the worker with the highest wage in the firm for control firms. Second, the definition of the earnings of owner-manager of treated firms changed with the reform. The information comes from Social Security data and the reform precisely considered dividends of SARL firms to be a "wage" subject to the same payroll tax. As a result, the earnings reported for SARL owner-managers solely include wage up to 2012, but include wage plus dividends after 2012, creating a mechanical increase in the earnings of owner-managers of treated firms. We deal with this problem by using the fact that in 2013, the Social Security administration reported the value of earnings using both definitions. We then assume that the ratio of wage over dividends remains constant after 2013 and divide total earnings by this ratio after the reform.

In column 3, we report the value when we focus on CEOs we can identify in the matched employer-employee data with the occupation code "2." In column 4, we also include a CEO as the employee with the highest wage in the firm for control firms, so that all firms in the data have one worker identified as CEO. Irrespective of the definition, we find no effect of the reform on the owner-managers' wage in treated firms. The fact that wage payments do not increase one-for-one with the decrease in dividend payments can have two explanations. First, the reform simply aligned the tax status of dividends with the one of wages. This implies that the tax rates are the same and that the taxes paid on dividends and wages are both considered social contributions that opens the same rights to the same social benefits. Therefore, owner-managers of treated firms are now indifferent between the two forms compensation, but should not prefer to pay themselves in wages. Second, if owner-managers of treated firms anticipate that the reform will be reversed in the future, as in models of intertemporal tax arbitrages (e.g., Korinek and Stiglitz, 2009), they should not increase their wages but instead transfer resources into the future, either by investing more or by holding more cash. Even if managers are hand-to-mouth and cannot absorb a drop in their total compensation, they are better off simply not changing their dividend policy, rather than decreasing their dividends and increasing their wage. Increasing their wage as they decrease their dividends would result in the same marginal tax rate (46%), and would imply additional administrative costs to reverse the decision once the tax rate goes down in the future.

The absence of one-for-one shifts from dividend payments to wage payments to

the treated entrepreneur implies that the tax-induced decrease in dividend payments translates into higher free cash-flows that the firm can use to hire or invest more.

Table 6: Effect on Employment and Earnings

Dependent Variable	Employment	Mean Earnings for		
		Employee	CEO-1	CEO-2
	(1)	(2)	(3)	(4)
Treated×Post	0.031***	0.022***	-0.00051	-0.016**
	(0.0020)	(0.0019)	(0.011)	(0.0065)
Fixed Effects				
Firm	✓	✓	✓	✓
Age×Fiscal cohort	✓	✓	✓	✓
Industry×Year×Fiscal cohort	✓	✓	✓	✓
County×Year×Fiscal cohort	✓	✓	✓	✓
Observations	1,400,215	1,363,761	861,823	1,371,976

This table shows the effect of the 2013 dividend tax increase on earnings and firm exit. Employment is full time equivalent. In column (2), employee earnings corresponds to the average employee total compensation (including social security payment), excluding the entrepreneur of the firm. In column (3), the CEO is identified for control firms if one employee in the matched employer-employee data as an occupation code "2." In column (4), we also identify a CEO using the highest paid employee. For treated firms, we adjust the total compensation that includes dividends after 2013 by applying the adjustment coefficients from the French statistical office, available in 2013. Standard errors are clustered at the firm level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

5 Reallocation of capital across firms

In this section, we explore heterogeneity in the capital accumulation response to shed light on the potential reallocation of capital happening across firms. The reform could have negative consequences in the long run for total output if the positive increase in capital masks large reallocation of capital across firms in favor of inefficient firms with limited investment opportunities or firms with low marginal returns to capital.

5.1 Profitable or wasteful capital accumulation?

Investment opportunities. To test if investment opportunities affect the way treated entrepreneurs react to the reform, we use a classic leave-one-out approach and compute the growth rate of value-added post-reform at the industry-by-county

level. We then sort firms into terciles of investment opportunities and re-estimate equation 1 over each sub-sample.

Columns 1 to 3 of Table 7 reports the results and shows a linear increase in the sensitivity of capital accumulation to the tax shock across the three bins. Relative to control entrepreneurs, treated entrepreneurs end up with a capital stock 1.6% larger in the first tercile of investment opportunities, but with a stock 4.5% larger if they are in the largest tercile, which is three times larger.[39]

Table 7: Heterogeneous Response: Misallocation

Dependent Variable	Total capital					
Cross-section	Investment Opportunity			Pre-Reform MRPK		
Bin	1^{st}	2^{nd}	3^{rd}	1^{st}	2^{nd}	3^{rd}
	(1)	(2)	(3)	(4)	(5)	(6)
Treated×Post	0.017***	0.026***	0.045***	0.018***	0.029***	0.043***
	(0.0038)	(0.0040)	(0.0042)	(0.0030)	(0.0037)	(0.0046)
Fixed Effects						
Firm	✓	✓	✓	✓	✓	✓
Age×Fiscal cohort	✓	✓	✓	✓	✓	✓
Industry×Year×Fiscal cohort	✓	✓	✓	✓	✓	✓
County×Year×Fiscal cohort	✓	✓	✓	✓	✓	✓
Observations	447,144	447,150	447,137	467,634	467,053	466,564

This table shows the effect of the 2013 dividend tax increase on investment. In columns 1 to 3, firms are sorted by their investment opportunities. We compute investment opportunity by using a leave-one out mean at the industry-county level of investment over the post period and sort firms into terciles, such that the first tercile is made of firms with the lowest investment opportunities and the last tercile is made of firms with the highest investment opportunities. In columns 4 to 6, firms are sorted by their mean MRPK, defined as the average revenues over total capital between 2008 and 2012. Standard errors are clustered at the firm level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Marginal returns on capital. Another approach to study if the reform led to wasteful investment is to examine how the misallocation of capital evolves after the reform. To do so, we follow the framework introduced by Bau and Matray (2020) and sort firms prior to the reform according to their level of marginal return to capital. We then test if the reform has differential effects for firms with a high level of marginal return to capital (MRPK), namely firms that are likely to be capital constrained.

Under the assumption that firms' production functions are Cobb-Douglas, the firm MRPK is equal to $MRPK = \frac{\partial Revenue_{it}}{\partial K_{it}} = \alpha_j^k \frac{Revenue_{it}}{K_{it}}$. Provided that all firms in

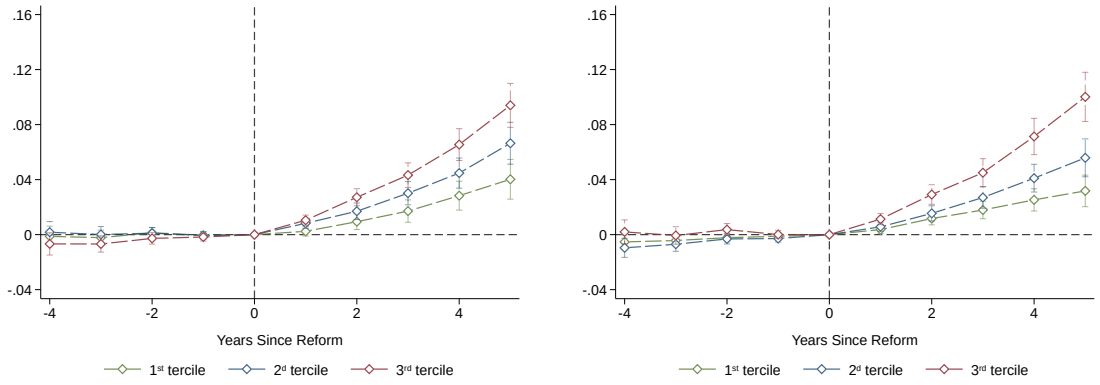
39. The difference across terciles is statistically significant at the 1% level.

a group share the same α_j^k, $\frac{Revenue_{it}}{K_{it}}$ is a within-group measure of MRPK, which we define at the 2-digit by treated level and sort firms into terciles within each group. To determine whether firms had a high or low MRPK prior to the reform, we average each firm's values of MRPK over 2008–2012. We then re-estimate equation 1 over each sub-sample.

Columns 4 to 6 of Table 7 report the results. We find that the tax increase has a positive effect on capital accumulation for treated firms throughout the distribution of MRPK, but more importantly, this effect increases linearly with the level of ex-ante MRPK. In particular, the difference in capital accumulation response between firms with a very high level of MRPK (column 3) relative to a low level of MRPK is economically large, with firms in the last tercile ending up with a stock of capital 4.2% bigger, 2.3 times more than firms in the first tercile.

Figure 5 plots the dynamics of the capital accumulation results sorted by investment opportunities and ex-ante MRPK. Panel (a) shows the dynamics of capital accumulation for all three terciles of investment opportunities and panel (b) does the same for the three terciles of ex-ante MRPK. Prior to the reform, firms in all three terciles have the same rate of capital accumulation, but then firms in the highest tercile (both of investment opportunities or MRPK) accumulate capital at a faster pace.

Figure 5: Heterogeneous Response: Misallocation



(a) Investment opportunities (b) MRPK

This figure plots the yearly coefficients and 95% confidence intervals of the difference-in-differences estimates of the 2013 dividend tax increase. The dependent variable is total capital in t scaled by total capital in 2011 and regressions are estimated separately on each of the three sub-samples. In panel (a), the sample is split by tercile of investment opportunities, computed with a leave-one-out approach of the growth rate of value-added post-reform at the industry-by-county level. In panel (b), the sample is split by tercile of average MRPK pre-reform (2008–2012).

5.2 Wasteful investment or intertemporal arbitrage?

Our results for the average firm are inconsistent with the neoclassical model of dividend taxation, whether it is the "old view" or the "new view," as the new view predicts no reaction and the old view predicts a decrease of both dividend payments and investment. Two theories can explain the pattern of decrease in dividend payments and increase in investment: the agency view of Chetty and Saez (2010) and the intertemporal tax arbitrage view of Korinek and Stiglitz (2009).[40]

These two theories differ in the types of marginal investment funded by the undistributed dividends. In Chetty and Saez (2010), managers have exhausted investments that are profitable, and the extra investment is wasteful. In Korinek and Stiglitz (2009), managers in equilibrium can prefer to pay dividends before having exhausted all profitable investments.[41] When a tax increase happens and they view it as temporary, they will reduce dividends today and transfer resources into the future when the tax increase will be reversed and they can distribute large payouts. This transfer can happen either by holding more cash, or if good investment opportunities arise, by using the extra free cash-flows to accumulate more capital.

Our results suggest that the tax-induced increase in capital is not wasteful. If that were the case, we should find a similar increase irrespective of the local investment opportunities or the ex-ante level of MRPK. By contrast, we show that high dividend paying firms that decrease their dividends a lot after the reform accumulate much more capital when their investment opportunities and expected returns to capital are high. These two results imply that entrepreneurs use their undistributed earnings to increase their capital when it is profitable to do so, consistent with the intertemporal tax arbitrage view.

We provide further evidence in favor of the intertemporal tax arbitrage view by studying the cross-sectional response of dividends. While the agency view would predict that firms with less profitable investments should reduce their dividends more

40. Note that in Chetty and Saez (2010), the problem is modelled as an agency cost whereby managers have a private benefit for investing in their "pet projects" that reduces the profitability of the firm. While this theory is not immediately appropriate for our setting since by design, treated firms are always firms run by a managing director who is also the majority shareholder and therefore faces very limited agency costs, it is possible to slightly reformulate the model in Chetty and Saez (2010) by assuming that entrepreneurs derive non-pecuniary benefits from being their own boss. For instance, they may want to run a firm that is bigger than the size that would maximize profits).

41. This is reminiscent for instance of the findings in Kaplan and Zingales (1997) that shows that many firms paying dividends report facing credit constraints.

and increase more their wasteful investment, the intertemporal tax arbitrage view predicts the opposite.[42] Table F.8 in the Appendix report the results when we look at the cross-section of investment opportunities (columns 1–3) or the cross-section of pre-reform MRPK. In both cases, we find that if anything, firms with higher investment opportunities and higher pre-reform MRPK cut their dividends more. We view the differentiated response on investment and dividends as strong evidence against the agency view and in support of the intertemporal arbitrage view.

It is important to stress that while the reform led to a reallocation of capital toward firms with higher investment opportunities and higher marginal return to capital, we are *not* saying that the reform increased the entrepreneurs' *welfare*. By definition, the increase in the dividend tax rate reduces the choice set of treated entrepreneurs by making the payment of dividends to themselves more expensive. Therefore, it changed the allocation of earnings between dividends and capital for treated entrepreneurs and potentially reduced their well-being. However, our results show that in partial equilibrium, the reform leads to more capital being accumulated that is likely to have been profitable and that therefore increase the amount of wealth created by treated firms.

While so far the reallocation of capital across firms points toward a positive effect of the reform on economic efficiency, one last important group of firms might still experience heightened financial constraints: equity-dependent firms. This could be problematic in the long-run as these firms tend to be younger and more dynamic, which might decrease efficiency in the long-run (e.g., Gourio and Miao, 2010, Alstadsæter, Jacob, and Michaely, 2017). We explore this possibility below.

5.3 Looking for the old view

According to the old view of dividend taxation, a higher tax rate on dividends should increase the user cost of capital if the marginal source of funding is equity, leading to slower capital accumulation for equity-dependent firms. We create five different proxies to identify firms more likely to be equity-dependent: quartile of age (1), size (2), probability for the firm to issue equity in the future (3), fraction of capital in 2012 that was financed by equity (4), and number of equity issuance (5). In the interest

42. In Korinek and Stiglitz (2009), all firms facing an increase in the dividend tax rate cut their dividends first, and then transfer resources into the future either by holding more cash, or by investing if profitable investment opportunities emerge.

of space, we report the empirical results and discuss the detail of the construction in Appendix G. We re-estimate our regressions on capital for the subsample of firms most likely to be equity-dependent. Irrespective of the proxy chosen, we fail to find any significant negative effects. Therefore, even among those firms most likely to face an increase in their cost of capital after the dividend tax hike, the reform has a positive impact on their accumulation of capital.

Overall, the distributive effects of the reform point to a reallocation of capital toward firms with higher investment opportunities and higher marginal return to capital, with no negative effects for equity-dependent firms. All these results indicate that the increase in the dividend tax rate has both a positive effect for the growth of capital of the average firm and for the reallocation of capital across firms.

6 Additional margins of adjustments

In this section, we use the detailed data from the tax-files to see if the dividend tax hike affected other aspects of the firm behavior.

6.1 Tax avoidance

Because the tax reform only affected entrepreneurs owning at least 50% of the capital of the treated firm type, treated entrepreneurs have substantial control over the way firm spending is allocated and therefore have a larger ability to engage in income-shifting between corporate and personal income (e.g., Gordon and Slemrod, 1998). In particular, owner-managers of closely-held firms can reduce their tax base by purchasing private consumption goods and services through their firm rather than paying themselves a dividend first and then buying the goods or services.[43]

Regulatory barriers. Even though the majority owner has some leeway to engage in income-shifting, this practise is extremely regulated in France. In particular, even if the CEO fully owns her company, there is still a clear legal distinction between the company's best interest and the CEO's personal and private interests. In particular, by using the company as her personal bank account, the owner-manager is exposed

43. Classic examples of such behaviors include declaring the personal housing rent as a "work office" or personal dinners as "work dinners." Another would be that the CEO can no longer pay a dividend to buy a fancy car that impresses her friends, but she could use the cash to redesign the lobby of her firm to impress the same friends.

to the risk of "misappropriation of corporate assets" (*abus de biens sociaux*), as she is no longer acting in the "company's best interests under all circumstances." Such behavior is liable to a term of imprisonment of five years and a fine of €375,000. Should the company be on the verge of bankruptcy, the CEO also becomes personally liable for the losses of the company and no longer benefits from limited liability protection (article L.241-3 4).

This regulation also applies in the case where the entrepreneur would try to use her firm assets as collateral to secure a *personal* loan, implying that it is not possible for treated entrepreneurs to extract money out of their firm using this behavior, as no bank in France would take the legal risk.

Table 8: No Evidence of Income-Shifting

Dependent variable / Revenues	Intermediate Goods	Intermediate Services	Raw Materials	Value-added
	(1)	(2)	(3)	(4)
Treated×Post	-0.00096**	0.00094*	0.00036	-0.00060
	(0.00046)	(0.00048)	(0.00037)	(0.00050)
Fixed Effects				
Firm	✓	✓	✓	✓
Age×Fiscal cohort	✓	✓	✓	✓
Industry×Year×Fiscal cohort	✓	✓	✓	✓
County×Year×Fiscal cohort	✓	✓	✓	✓
Observations	1,404,803	1,404,803	1,404,803	1,404,803

This table shows the effect of the 2013 dividend tax increase on different types of intermediate consumption by the firm. Intermediate services include rents, consulting, vehicle rental etc. Each variable is scaled by contemporaneous revenues. Standard errors are clustered at the firm level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Evidence from cash-flow statements. While constrained by law, entrepreneurs may still engage in some income-shifting, which can be detected from the cash-flow statement of the firm. The French tax-files do not report detailed itemized spending, but they do provide the amount spent on "raw materials," "intermediary consumption of goods," and "intermediary consumption of services" (which includes office rent, cars rentals, external consultants, etc.).

We express each variable as a percentage of the firm revenue since the income-shifting hypothesis would predict an "abnormal" increase in intermediary consumption relative to what the business used to need to produce one euro of sales. This

increase in intermediary consumption should lead to a decrease in the share of value-added relative to revenues.[44]

For each variable, we estimate equation 1 and report the results in Table 8. Whether it is intermediate goods (column 1), intermediate services (column 2), raw materials (column 3) or value-added over revenues (column 4), we do not find any meaningful change. While intermediate services is positive, the increase is only of €0.00096 per euro of revenues, and intermediate goods decreases by a similar amount, leaving value-added as a fraction of sales unchanged. Therefore, the hypothesis of "income-shifting" appears to have limited support in the data.[45]

Some of the capital accumulation results might be consistent with this income-shifting hypothesis, but we view this interpretation as unlikely to explain most of our results. For instance, if the owner-manager buys a company car, it will be recorded in the data as an extra capital. However, this explanation would imply that treated firms should accumulate more capital irrespective of their ex-ante level of MRPK or their ex-post investment opportunities. The fact that entrepreneurs facing the dividend tax hike accumulate capital at a much faster pace when returns are higher, and that this capital accumulation is in line with equivalent increase in labor and output suggests that while not impossible, these types of wasteful investments are unlikely to have increased after the reform.

6.2 Balance sheet adjustments

Entrepreneurs facing a tax hike who engage in intertemporal tax arbitrage want to transfer resources into the future, either by buying more factors of production (Section 4.1), or by saving the undistributed dividends in the form of cash (Korinek and Stiglitz, 2009). We now explore the possibility of greater accumulation of cash-holdings, as well as the extension of more customer credit that could partially explain why treated firms are growing.

To do so, we estimate equation (1) with different dependent variables, where each

44. We do not scale by total capital in 2011 as in the other specifications because as we have shown, treated firms are growing due to the reform so this will create a mechanical increase in their consumption of intermediate goods.

45. The absence of results does not imply that French entrepreneurs are particularly virtuous. It simply means that following the tax hike, they do not engage in *more* income-shifting. It is well possible that before the reform they were optimizing as much as possible and have simply no more leeway after the tax increased.

dependent variable is an item of the firm balance sheet scaled by total capital in 2011 or contemporaneous revenues.

Table 9 reports the results. Column 1 starts by reporting the effect of the reform on net current assets, which is essentially composed of credit to customers and cash-holding, net of the current liabilities (mostly credit to suppliers). We find an increase over the post-reform period of the net current assets, primarily driven by the accumulation of cash (column 2) and to a lesser degree by the extension of more credit to the firms' customers (column 4), while supplier credit is barely affected (column 3). In order to see if firms actively change the management of their customers and suppliers' credit, in columns 5 and 6 we scale supplier debt and customer debt by the firm's current revenues. We find that treated firms reimbursed their suppliers slightly faster (although the point estimate is very small) and extended more credit to their customers for each euro of revenues generated, such that on net, treated firms increased their credit to other firms in the economy.

Table 9: Balance Sheet Adjustments

Dependent variable	Net current asset/ Capital	Cash/ Capital	Supplier Debt/ Capital	Customer Debt/ Capital	Supplier Debt/ Revenues	Customer Debt/ Revenues
	(1)	(2)	(3)	(4)	(5)	(6)
Treated×Post	0.084***	0.056***	0.0086***	0.032***	-0.00083**	0.0013**
	(0.0066)	(0.0035)	(0.0025)	(0.0037)	(0.00036)	(0.00051)
Fixed Effects						
Firm	✓	✓	✓	✓	✓	✓
Age×Fiscal cohort	✓	✓	✓	✓	✓	✓
Industry×Year×Fiscal cohort	✓	✓	✓	✓	✓	✓
County×Year×Fiscal cohort	✓	✓	✓	✓	✓	✓
Observations	1,404,803	1,404,803	1,404,803	1,404,803	1,404,803	1,404,803

This table shows the effect of the 2013 dividend tax increase on the firm balance sheet. Net current asset is defined as gross current capital (cash-holding plus account receivables plus inventory) minus short-term liabilities. cash-holding is the sum of cash and cash-equivalents (marketable securities, commercial paper, Treasury bills). In columns 1 to 4, each variable is scaled by total capital in 2011. In columns 5 and 6 the denominator is the firm's current revenues. Standard errors are clustered at the firm level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

7 Discussion of theory

7.1 Theories of dividend taxation

As discussed before, our results are inconsistent with the new view of dividend taxation that predicts no change in dividend payment and capital in reaction to a change in the dividend tax rate. They are also inconsistent with the old view that predicts a drop in dividend payment, but also a slower accumulation of capital, in contradiction with the acceleration in capital accumulation we find.

While both the intertemporal tax arbitrage view (Korinek and Stiglitz, 2009) and a modified version of the "agency view" (Chetty and Saez, 2010) are consistent with our results, we show in Section 5.2 that the results support the intertemporal tax arbitrage view. Firms accumulate far more capital post tax hike when they have profitable investment opportunities or ex-ante high marginal revenues return to capital. Otherwise, they transfer resources into the future by storing the undistributed earnings in the form of cash. The fact that owner-managers do not raise their wage to compensate for the decrease in dividends is also consistent with this theory. Indeed, if entrepreneurs expect the tax to reverse in the future, it is better for them to transfer resources in the future when the tax rate will go down, rather than paying themselves more wage on which they will be taxed 46% anyway.

The intertemporal arbitrage view relies on the fact that in equilibrium, many firms pay dividends despite being financially constrained, i.e. do not leave enough liquidity in their firm balance sheet to overcome financial frictions when profitable investment opportunities arise. This implies that the value of one euro outside the firm is perceived as higher than one euro inside the firm. Two very different classes of models help to explain this fact: rational and behavioral.

The rational explanation can come in multiple forms. First, it could simply be that entrepreneurs value consumption today more than tomorrow or are facing personal liquidity shocks that make them prefer consuming the wealth produced by their firm rather than accumulating more capital and labor. Second, leaving too much money inside the firm might be costly due to agency frictions. While at face value it seems unlikely to be an important determinant in our setting as the CEO of the firm is also the majority owner, a more subtle (but similar) mechanism could be at play based on intra-household bargaining. If for instance the capital is owned by the family but only one member works in the firm, this potentially reintroduces a

form of separation between ownership and management, and the family members not working at the firm but owning it might prefer not to leave too much cash in it. Other possible explanations are that imperfections in risk markets that may result in households being even more credit rationed than firms, or simply the accumulated retained earnings tax, which punishes firms for holdings excessive cash balances.

Two more behavioral explanations can also rationalize our results. First, entrepreneurs may make systematic errors when anticipating future investment opportunities and in this case could underestimate their future needs for liquidity, or relatedly suffer from managerial myopia. Second, entrepreneurs may display a "hyperbolic discount factor," implying they will overvalue consumption today (paying dividends) over accumulating more capital for the future. In this case, a higher dividend tax rate will be a solution to restore the proper arbitrage between consumption and savings.

Disentangling these different hypotheses would require additional data that unfortunately are often not available and more than one paper. We leave these questions open for future research. In practise, it is also likely that a combination of all these explanations are at play in the data.

7.2 Comparison with other studies

Drawing comparisons across different countries, types of firms, and specificities of tax reforms is always heroic. One simple explanation is that institutional contexts are sufficiently different that they will produce different results. While always possible, we think it is unlikely to account for much of the discrepancies as the French economy and tax system is relatively similar to other OECD countries (see Appendix D).

Four main reasons can probably explain our results. First, and most importantly, our reform is a rare case of tax increase. In the context of intertemporal tax arbitrage, the effect of the tax rate is potentially asymmetric. Indeed, in the case of a tax decrease, firms would want to increase their dividend payments while the tax rate is lower. The change in tax rate does not affect the structural profitability of projects, but firms would have to cut investment if they are resource constrained. However, if firms have enough cash, or have cheap access to external capital, they could maintain their investment rate and pay more dividends at the same time, consistent with results in Yagan (2015).[46] In the case of a tax increase however, the increase in free cash-

46. Note that the Bush-tax cut happened during a period where interest rates where historically

flow coming from the unpaid dividends can be directly used to invest more when unexpected investment opportunities appear.

Second, most empirical studies have looked at listed firms, or firms that are unlikely to be financially constrained. Our sample of private, closely-held firms can pay dividends and have high marginal return to capital at the same time. In Appendix Table F.9, we show that our sample of private firms have on average a higher MRPK than French listed firms. Taking the results of Table 7 at face value that firms reinvest their extra unpaid dividends only if they have high return to capital, this would imply that we should find a smaller investment response if the reform were extended to listed firms.

Third, related to this difference in firm characteristics, the average entrepreneur in our sample is likely to be less sophisticated than the average CEO of a large, listed firm, implying that she might have a harder time anticipating future investment opportunities. In particular given that this period in Europe was characterized by sluggish growth caused by the European Sovereign debt crisis, entrepreneurs with expectations of low investment opportunities would have ended up not saving enough and paying themselves dividends instead. This explanation is consistent with our results in Table 7 that the effect of the reform has a larger increase on capital for firms with higher demand post reform and higher expected return to capital.

Fourth, the dividends paid to firms affected by our reform are with certainty used to pay the owner-manager of the firm. This means that the increase in the dividend tax rate is really an increase in the CEO compensation tax rate, who can counterbalance the higher tax rate by producing more. The effect on firm factor of production (capital and labor) accumulation to produce more will therefore depend on whether the income or substitution effect dominates. If owner-managers of SARL firms have a lot of committed consumption for instance, they might prefer to increase the firm future cash-flows to be able to meet their consumption by accumulating more capital and labor, despite the increase in the tax rate. While it is usually assumed in the public finance literature that the substitution effect dominates, some recent papers have found evidence that in other contexts the income effect dominates.[47]

low, which could explain why firms were able to not reduce their investment *and* increase their dividends at the same time.

47. See for instance, Ring (2020) in Norway, Gelber, Isen, and Song (2016) in the US, Bosch and Klaauw (2012) in the Netherlands.

7.3 Evolution of capital misallocation

The question of how the misallocation of capital evolves is to a large degree a general equilibrium question. It is therefore important to stress that our research design cannot, by construction, answer this question because it relies on a partial equilibrium difference-in-differences approach.

The payment of dividends can have positive reallocation effects if the money distributed by the firm to its shareholders is then reinvested into firms with higher returns to capital (Gourio and Miao, 2010; De la O, 2020). In this respect, dividend payments can be seen as an efficient way to reallocate resources away from firms with low return to capital (which explains why they are distributing dividends) toward firms with higher return to capital. Liquidity can transit across firms through two channels: shareholders directly reinvesting their dividends into a new firm, or depositing them into their saving accounts, which then increases banks' credit supply.

Therefore, dividend payments can improve the allocation of capital under three main conditions. First, the dividends paid must be reinvested and not consumed. Second, firms that are paying dividends must have lower marginal return to capital than firms not paying dividends. And third, the investors who receive the dividends (whether it is the individual shareholder or the bank that benefits from an expansion of its deposits) must be able to identify firms with a high marginal return to capital.

If all these conditions are met, constraining dividend payments by increasing the dividend tax rate will necessarily lead to an increase in capital misallocation. There are reasons to believe that it is unlikely to be the case in our setting.

First, households largely consume cash payouts (Baker, Nagel, and Wurgler, 2007), probably even more so in our case given that the dividends are an important part of the entrepreneurs' compensation.

Second, treated firms reinvest two to four times less their unpaid dividends when they face lower demand or have lower return to capital, and instead accumulate cash in their balance sheet, which is then saved in a deposit account. This implies that from the perspective of a bank, the *level* of deposits it can use to extend credit has not changed, only the *composition* (from individual deposits to firm deposits). In this respect, liquidity is still flowing from firms with low return to capital to firms with high return to capital via the channel of firm deposits.

Finally, the reform leads treated firms with high returns to capital to invest more, which in partial equilibrium implies a reduction in misallocation. Therefore, it seems

plausible that the reform overall increases output both by leading not only the average firm to invest more, but also by improving the allocation of investment across firms.

8 Conclusion

The capital share of income for individuals at the top of the income distribution has increased continuously over the last four decades. At the same time, it is becoming harder to clearly distinguish between labor income and capital income, in particular for business owners.

The effects of the distortions introduced by a tax wedge between capital and labor income is therefore more pressing than ever. France decided to align taxation on one form of capital income (dividends) in 2013, which resulted in a three-fold increase in the dividend tax rate. We show that led treated firms to swiftly cut their dividend payments, resulting in higher liquidity retention.

Such tax-induced liquidity retention led the average treated firm to accumulate more capital, with treated firms reinvesting a third of the tax-induced increase in undistributed dividends. Firms exposed to the tax hike simultaneously accumulated more labor. This joint increase in production factor allowed treated firms to generate more revenues.

The faster accumulation of capital for the average firm was also accompanied by a positive reallocation of capital across firms, in favor of firms with high investment opportunities and firms with high expected returns to capital, and it did not increase financial constraints for equity-dependent firms. Taken together, our results suggest that the tax increase led firms to increase the quantity of capital without sacrificing the quality, leading to a reduction in capital misallocation in the economy.

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Appendix

Definition of variables

Variable	Definition
Productivity	Residual from the regression revenues on total capital and labor (all in logs), filtering out industry-year shocks
Total capital	Tangible capital + Intangible capital
Tangible capital	Property, plants and equipment
Liquidity	cash + short-term investment
Net working capital	Current assets - current liabilities
Profit margin	EBITDA/revenues
Leverage	Debt/lagged assets
Cash (control)	Liquidity/lagged assets

A Detailed differences across SAS and SARL

A.1 Firm differences

The differences and similarities between SAS and SARL can be summarized by the table below.

Table A.1: Main Legal Differences Between Treated and Control Firms

	SARL (Treated)	**SAS** (Control)
Owner-managers	**Majority-owner not employed**	**Employee**
Spouse status	Spouse collaborator	Employee
By-laws	Pre-defined	Completely flexible
Types of Shares	Ordinary	Different share classes possible
# of Shareholders	Limited to 100	No max
Bonds Issuance	Audit necessary + $\geq$ 3 year	No condition

As we explained in Section 1.2.2, the main difference regarding the owner-managers is that SAS managing directors are required by law to be employees of the firm, while SARL managing directors do not face this requirement. The status of the spouse also differs. While the spouse of a SARL owner-managers can benefit from the status of "spouse collaborator," which makes him/her eligible for social security benefits without having to be an employee (i.e. no need for a wage or a work contract), this is not the case for the spouse of a SAS managing director.

Because there are many family firms in France, in particular among SMEs, this notion of "spouse collaborator" makes the SARL legal status attractive.

Regarding the design of the by-laws and access to outside finance, the differences are the following:

- By-laws are "pre-defined" for SARL firms. This makes it particularly appealing for instance for entrepreneurs with potential shareholders / associates that they do not necessarily trust, or for unsophisticated entrepreneurs. SARL by-laws are almost "plug and play" and do not require a lawyer to design them.

- As a consequence, while SARL firms are constrained to only issuing ordinary shares, SAS firms can issue all type of share classes (e.g. preferred, ordinary).

- SAS also have an easier access to the bond market. They can issue warrants and convertible bonds, which SARL cannot, and face no restrictions on bond issuance, while SARL must have existed for at least 3 years and have an auditor to issue bonds.

- Finally, SAS firms face no restriction on the number of shareholders while SARL are capped at one hundred. In practise this constraint rarely binds as firms that need to have a large base of shareholders, for instance in prevision of an IPO, adopt the legal status "SA".

What these differences reflect is that how the reform affected the incentives to incorporate as a SAS or a SARL firm is complicated. Indeed, the optimal decision depends on the specificities of the entrepreneur (family, numbers and age of kids, total compensation, etc.) and it is not obvious that "on average," one solution dominates.

Why did entrepreneurs prefer the SARL status before the tax reform? There are multiple reasons for why the SARL status was preferred despite the lower flexibility regarding access to external financing.

First, the taxation of total compensation might be advantageous for SARL owner-managers when they paid themselves mostly in dividends. Second, the pension regime is different, with managers of SARL firms pay their payroll taxes to the "independent regime" and face lower social contributions (but also lower attached benefits), while managers of SAS firms pay their payroll taxes to the "general" regime. Third, the SARL status provides the possibility for the spouse of the owner-manager to work in the firm and be eligible for social benefits, without having to pay a wage.[48] Fourth, the lack of by-laws flexibility can be appealing for many entrepreneurs who do not have legal background and are worried they could be deceived by their other shareholders.[49]

A.2 Managers compensation: SAS vs. SARL

To study the compensation of managers in SAS and SARL, we merge wage data from the DADs, which allows to identify employees whose social contributions are paid to the general regime, and data from the ACOSS file, to identify owner-managers of SARL who pay social contribution to the independent regime. We identify CEO of SAS firms as the highest employee paid if we cannot find one CEO from the occupation variable. We set the wage of SARL owner-managers to zero if we observe the firm pays dividends but does not report any wage in the ACOSS file.

Prior to the reform, the unconditional average wage for a SARL owner-manager is €27.000 when including owner-managers with no wage, and €47.000 if we restrict to managers who pay themselves a wage. The wage of the CEO of a SAS is €62.000. While purely based on the tax arbitrage between wage and dividend payroll tax rate, managing directors would have incentives to pay themselves mostly in dividends (implying no wage for owner-managers of SARL m and the minimum legal for SAS managers), this is not what we observe in the data. The reason is that there are other motives determining the mix wage-dividends than just the tax arbitrage. The two main ones are the following.

First, the payroll taxes paid on dividends is a "pure tax" and does not grant any right to social benefits, while the payroll tax on wages is a social security contribution, which the OECD defines a social security contribution as "compulsory payments

48. The spouse only has to pay the social contribution that would be associated with wage the employer would have paid.

49. This is actually a point that is commonly raised in the different blogs or articles for aspiring entrepreneurs that explains the differences in legal status, with a majority of them advising for the SARL status in case the entrepreneur is not "legally sophisticated."

paid to general government that confer *entitlement* to receive a future social benefit. Setting part of their compensation in the form of a wage and paying a social security contribution will therefore allow the owner-manager and her family to access various social insurance benefits such as health care, child care benefits, rights to retirement. As the generosity of these social insurance benefits increase (although not one-for-one) with the amount of social contribution paid, owner-managers might have incentives to set the level of their wage above the minimum wage, to achieve the social security contribution that would provide them with the social security rights they desire and use dividends to pay themselves the rest of their compensations.[50]

Second, dividend payments are regulated along two dimensions: (i) dividends can never exceed the net income from previous accounting exercises, net of all past losses (if any) and amortization of various expenses, and (ii) dividends have to be split among shareholders in proportion to their equity holding, implying that large dividend payments to the owner-manager will trigger large dividend payments to the other shareholders. The fact that firms are not allowed to distribute dividends if they make losses (unlike for wages) in particular, would make entrepreneurs facing "consumption commitments" such as a mortgage to repay to prefer to set for themselves a baseline level of wage to cover these commitments.[51].

In Table A.2, we provide a formal analysis of the difference in wages and dividends paid between SAS and SARL firms. We report the results of a regression estimated over the pre-reform period, showing the difference in average wage, dividend paid and ratio of dividends over wage between SAS and SARL firms. Because SAS and SARL firms might differ along their size or sectoral composition, we show the results with and without different fixed effects that controls for the heterogeneity across groups. It is important to note that dividends are the total dividends paid by firms and *not* the dividends paid directly to the managing-director. We find that on average, CEOs (owner-managers) of SARL firms are paid around 30% less than CEOs in SAS firms (columns 1–2). We also find that SARL firms pay more dividends, once we control for differences in industry, size and localization (column 4) .

50. Most French websites for entrepreneurs discussing the arbitrage between having a compensation in wages or dividends advocate a mix for the entrepreneur's compensation for this specific reason.

51. For theoretical and empirical evidence that consumption commitments lead individuals to become risk-averse, see Chetty and Szeidl, 2007

Table A.2: SAS - SARL CEOs Pre-Reform

Dependent Variable	log(CEO Wage)		Dividend / Capital	
	(1)	(2)	(3)	(4)
SARL firm	-0.28***	-0.24***	-0.027***	-0.020***
	(0.0064)	(0.0069)	(0.0033)	(0.0019)
Fixed Effects				
Age×Fiscal cohort	—	✓	—	✓
Industry×Year×Fiscal cohort	—	✓	—	✓
County×Year×Fiscal cohort	—	✓	—	✓
Observations	580,866	580,866	590,206	590,206

This table shows the difference between SAS and SARL firms for the period 2008–2011. In columns 1–2, we use the inverse hyperbolic sine transformation of the log function (e.g., Burbidge, Magee, and Robb, 1988; MacKinnon and Lonnie, 1990), defined as: $log[X + (X^2 + 1)^{1/2}]$ for wages to handle cases where the CEO does not report any wage. Standard errors are clustered at the firm level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

B Discussion of the reform

B.1 Why did the reform only impact SARL firms?

There are two main reasons the reform only affected SARL firms:

Reform of independent workers' status. The first one is related to the status of the owner-manager and the social benefits regime to which she contributes. As explained previously, SARL owner-managers are legally treated as independent workers, whereas SAS and SA managers are employees. As a consequence, they do not share the same social benefits regime. Independent workers contribute to the "*Régime Social des Indépendants*" (RSI), whereas employees contribute to the French standard regime ("*Régime Général de la Securité Sociale*"). Furthermore, in 2009 another category of independent French workers, the "*professions libérales*" (high skill self-employed) experienced the same change in taxation on their own dividends that affected SARL owner-managers in 2012.[52] One year after the 2012 reform, it was finally extended to another category of independent workers, the agricultural workers. The relationship between these three reforms is that they all concerned independent workers paying social contributions to the same RSI regime.

Lobbying power. The second explanation lies in the bargaining power of SARL owner-managers versus SA and SAS ones. As described in the paper, SA and SAS

52. French "*professions libérales*" include lawyers, doctors, notaries, etc.

firms are, on average, bigger than SARL firms. In turn SA and SAS firms are more likely to have a higher lobbying power. This appears clearly in 2015 when a parliamentary amendment to extend the tax reform to SA and SARL was rejected following intense lobbying by France's two main employers' organisations. In 2014, a French deputy proposed an amendment to the social security funding law to enlarge the reform to SA and SAS firms which was also ultimately rejected. The amendment specifically stipulates that its aim was to reduce fiscal optimization of SA and SAS owner-managers while ensuring equity between them and SARL owner-managers.[53]

From an article in the leading French newspaper *Le Monde*, we learn that its rejection was the result of an intense lobbying campaign by the two french employers' organizations.[54] The article reports that they lobbied Emmanuel Macron, then Secretary of Treasury (Minister of Economics and Finance), that finally managed to convince President Francois Hollande to ask the parliament to withdraw the amendment. The underlying explanation is that SA and SAS firms are better represented among those two organizations than were SARL firms.

Subsequent reactions to the reform. The exclusion of SA and SAS firms from the scope of the reform, as well as the sharp increase in taxation, created a strong opposition to it. An opposition group of SARL owner-managers, calling themselves "the sheeps," lobbied against it but ultimately failed.[55] The election of Emmanuel Macron generated some hope that the reform would be abolished but it has remained in place.

Interaction with taxation around liquidation. The reform did not affect the taxation regarding liquidation and both SARL and SAS firms are exposed to the same taxation. Shareholders can decide to liquidate their firms and share the remaining assets once all the obligations have been paid. Before any distribution, they have to pay a special tax ("*droit de partage*") of 2.5% of the net value of assets. The distribution of the remaining money is then taxable at the appropriate dividend tax rate.[56]

53. Amendment 876 to the 2015 *Loi de Finance pour le Financement de la Sécurité Sociale*

54. https://www.lemonde.fr/politique/article/2014/10/30/comment-le-gouvernement-a-cede-au-patronat-sur-la-taxation-des-dividendes_4515630_823448.html

55. https://www.lemonde.fr/economie/article/2012/10/18/apres-les-pigeons-les-chefs-d-entreprises-moutons-du-rs_1776814_3234.html

56. This means in particular that following the change in the dividend tax rate for treated firms, the new tax rate will apply, implying that shareholders of treated firms cannot reduce their taxes by liquidating their firm.

B.2 Details of the reform and kink

The new tax rate did not apply to 100% of the dividends paid, but actually only applied to for dividends accounting for more than 10% of the firm book value of share capital owned by the manager and her family. This created incentives for treated entrepreneurs to restrict their dividends at this threshold.

The new tax rate did not apply to 100% of the dividends paid, but actually only kicked in for dividends accounting for *more* than 10% of the firm nominal share capital owned by the manager and her family.[57] Below this threshold, the payroll tax rate remains at 15.5%. The rational for this kink was that the total compensation of an entrepreneur is a mix of compensation for the labor (and as such should be taxed like any wage) and compensation for the capital (and as such should be taxed like all other capital income). Therefore, the reform essentially introduced the notion that above a certain amount, dividends could not be considered as compensating the capital invested by the entrepreneur (hence the ratio set relative to the value of equity owned by the entrepreneur) but instead, was necessarily the remuneration of labor.

To give a simplified example, consider an owner-manager of a treated firm with a share capital worth €100,000 who owns 100% of her company. In 2013, she receives a dividend of €50,000. She will have to pay the following payroll taxes:

$$15.5\% \times \overbrace{10,000}^{\text{10\% of €100,000 share capital}} + \overbrace{46\%}^{\text{post reform dividend tax rate}} \times 40,000 = \ 19,950$$

Her net dividend is then 50,000-19,950= €30,050, on which she has to pay a personal income tax. Before the reform, the payroll tax would have been: 15.5%×50,000 = €7,500 instead of €19,950.[58]

While this can create an incentive for owner-managers to increase the amount of nominal share capital in the company, it is important to note that the value of share capital determines the shareholders' financial liability in case of a default of the firm.

57. The inclusion of the shares owned by the family to determine whether the managing director owns a majority of the firm's shares prevents owner-managers from simply transferring the shares to their family members and as such escaping the reform.

58. Dividends paid to the other minority shareholders remains taxed at 15.5%. While creating a difference in the effective tax rate of dividends among shareholders, note that it is illegal to pay different amount of dividends to different shareholders. Therefore, it seems reasonable to assume that the tax rate of the majority shareholder is the most important in setting the level of dividend policies.

As such, if shareholders want to benefit from limited liability protection, they have an incentive to keep the value of the share capital to its minimum. We also directly test if treated firms increase their share capital after the reform and find no difference between treated and control firms. This can also be explained by the fact since we are looking at private firms, increasing the amount of share capital is difficult for these firms as there is no centralized market on which they can issue new equities.

It is important to note that share capital is *not* equivalent to total equity but only accounts for a subset of it. In particular, there is *no mechanical relation* between investment or retained earnings and share capital. Firms can increase their investment and accumulate more retained earnings without it having any effect on the amount of share capital in the firm.

In Figure B.1, we plot the distribution of dividends scaled by share capital for the sample of firms paying dividends. A large fraction of firms either pay no dividends, or pay dividends in proportion much higher than 100% of the firm share capital.[59] Therefore, to be able to visualize the bunching, we restrict the sample to firms paying at least some dividends but less than 100% of the firm's share capital. We reproduce the figure when we do not restrict the value of dividends paid in Appendix, Figure B.2.

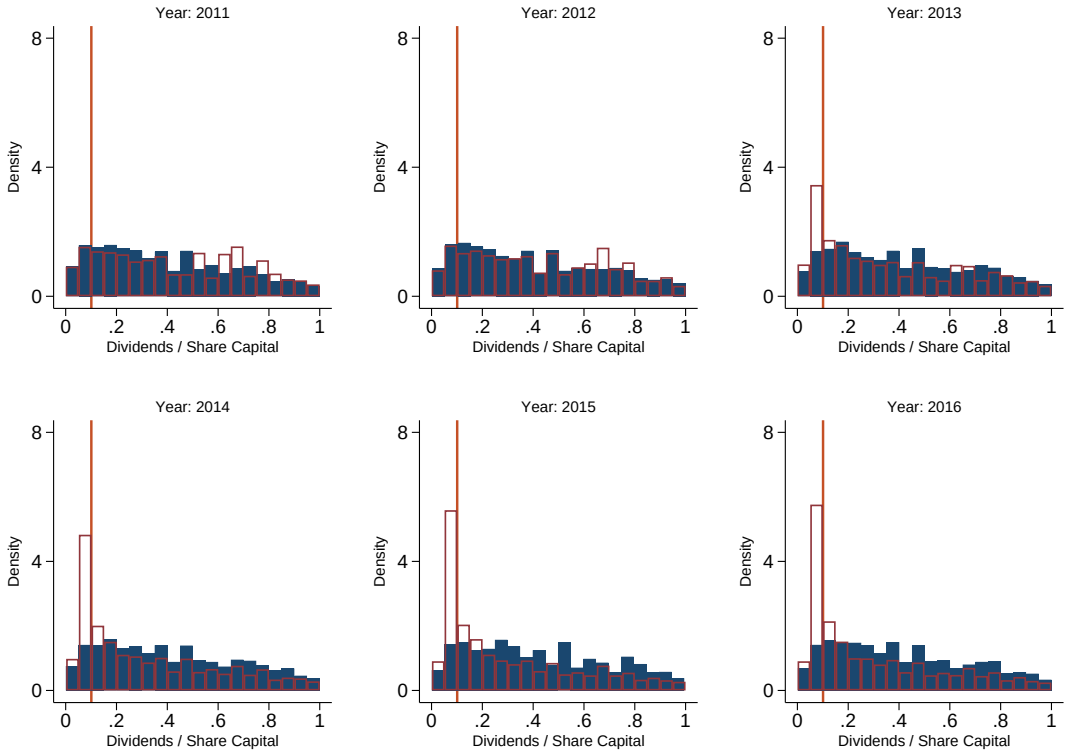
The distribution of dividends is similar among treated and control firms and the ratio is evenly distributed across the different values until 2012. Starting in 2013, we observe a bunching right below the 10% threshold for the firms affected by the tax reform, while the distribution for firms not affected remains stable. Consistent with the idea that agents do not immediately understand the subtleties of the new tax regime, the fraction of treated entrepreneurs who bunch at the threshold increases slowly over time and peaks after four years.[60] While the bunching reaction might seem large, it is important to stress that the vast majority of firms paying dividends are paying much more than 10% of their share capital, and therefore are still exposed to the dividend tax increase.

In Figure B.2, we display the bunching analysis when we do not cut the distri-

59. While this number might seem high, it is important to stress that the accounting definition of "share capital" is *not* equivalent to the definition of equity in corporate finance. Share capital is only the book value of capital brought by the different shareholders to create the firm and determine their financial liability in case of a default of the firm. The more standard definition of equity in corporate finance is defined as: equity = share capital + reserves + retained earnings.

60. Treated entrepreneurs may have an incentive to also increase the value of their firm share capital, but we find essentially no change in the data post reform.

Figure B.1: Dividend Payment Around the 10% Threshold of Share Capital



The figure plots the distribution of the ratio of dividends over share capital for the years 2011–2016 when we restrict the distribution to firms paying some dividends, but paying less than 100% of the firm's share capital. The x-axis is the ratio dividend/share capital (in percentage). The y-axis is the density of firms in a specific bin of dividend/share capital. "Treated" firms are firms affected by the 2013 tax reform on all dividends paid for a value above 10% of the firm's share capital (SARL) and "Control" firms are not affected (SAS). Control firms are in filled bars, treated firms are the empty bars.

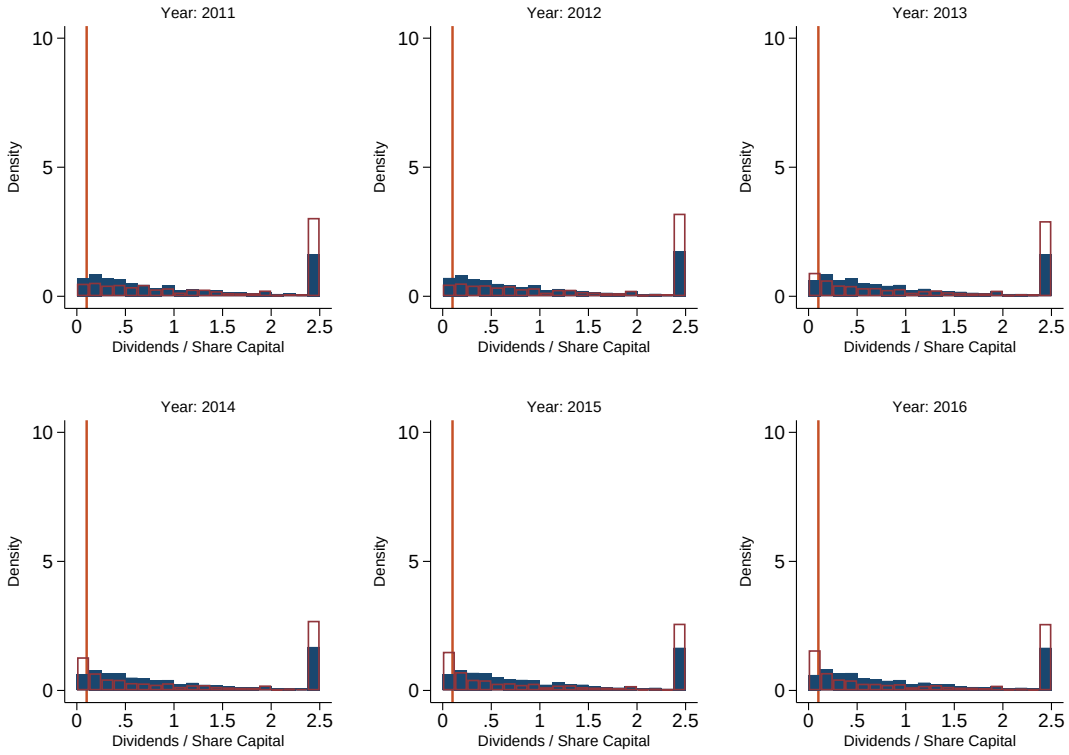
bution on the right at the 60% of share capital threshold, but instead winsorize the data at 2.5 times.

B.3 Intertemporal shifting

When studying whether firms could adjust their dividends, it is important to stress several elements that constrained this possibility:

- The election of Francois Hollande in May 2012 came largely as a surprise, and this specific reform was not part of his election platform. The law was introduced in November 2012, and affected dividends paid starting the 1^{st} of January 2013.

Figure B.2: Dividend Payment Around the 10% Threshold of Share Capital

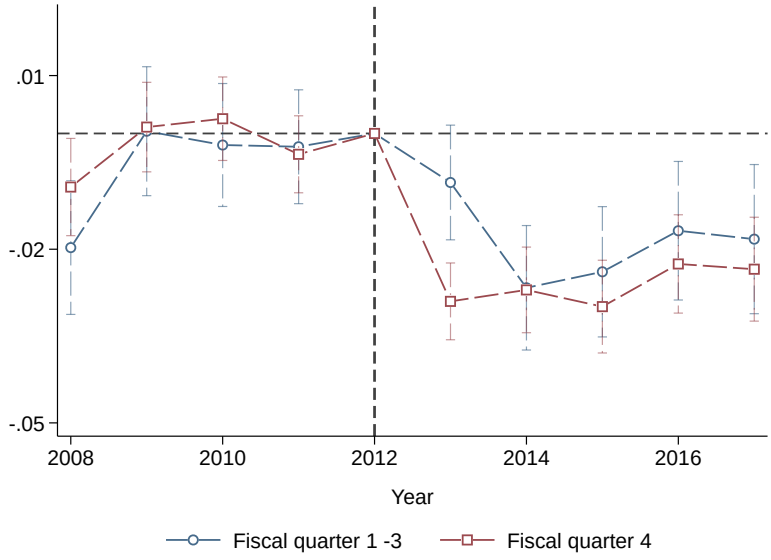


The figure plots the distribution of the ratio of dividends over share capital for the years 2011–2016 when we restrict the distribution to firms paying some dividends and winsorize the data at 2.5 times firm's share capital. The x-axis is the ratio dividend/share capital (in percentage). The y-axis is the fraction of firms in a specific bin of dividend/share capital. "Treated" firms are firms affected by the 2013 tax reform on all dividends paid for a value above 10% of the firm's share capital (SARL) and "Control" firms are not affected (SAS).

- Dividends are decided the day of the Shareholders General Meeting, who meet when the firm closes its annual account.
- When a firm pays an annual dividend, the fiscal administration prorates the tax over the previous twelve months of the firm fiscal date. This means for instance that firms closing their annual account in March 2013 only pay the new tax rate on one-fourth of the dividends paid, because only the dividends belonging to January-March are taxed at the new rate, while the rest of the dividends are assigned to the rate old for months of April–December 2012.

This creates essentially two groups of firms. An early cohort if firms close their account before September, and a late cohort otherwise. We consider that SARL firms are treated in 2013 if they belong to the late cohort and in 2014 if they belong to the early cohort. To test if we observe a differential reaction, we estimate our baseline regression but split firms between these two cohorts. Figure B.3 reports the results. We find that indeed, the late cohort paid more dividends in 2013 and only reached the lowest level of dividends payment in 2014, while the early fiscal cohort of firms that have to pay the new tax rate on a larger part of their 2013 dividends adjusted their dividends immediately in 2013.

Figure B.3: Effect of 2013 Tax Reform on Dividends Payment: Anticipation



This figure plots the yearly coefficient and their 95% confidence intervals of the event study difference-in-differences estimates in equation (1) of the 2013 dividend tax increase. The dependent variable is scaled by total capital in 2011. The blue round is the group of firms that close their annual account before November. The red square is the group of firms that close their annual account between November and December.

B.4 Additional reforms around this period

Following the election of Francois Hollande, several reforms related to the taxation of individuals and firms were implemented. The three main reforms are:

- The cancellation of the flat tax on capital income. Following the reform, all types of capital income (dividends, bonds and capital gains) became taxed through the progressive income tax schedule only while before that, it was

possible for individual to opt in for a flat-tax. This reform led to an increase in the marginal rate faced by the most affluent households and could potentially explain why aggregate dividends went down after 2013. From 2008 to 2012, taxpayers receiving dividends have the choice between progressive income tax and a flat-rate withholding tax called *Prélevement forfaitaire obligatoire* or PFL in France. The 2013 reform abolishes the PFL and reintroduces dividends into the progressive income tax schedule, leading to a potential increase in the level of taxation for some (well-off) taxpayers. In 2018, the introduction of the single flat-rate tax (PFU) optionally re-establishes a system of flat-rate taxation of capital income and in particular dividends.

- The government also implemented a tax credit aimed at boosting competitiveness and employment, named the CICE (standing for Competitiveness and Employment Tax Credit or *Crédit d'impôt pour la compétitivité et l'emploi* in French), which is explained in detailed in Malgouyres and Mayer (2018). This tax credit is set proportional to the share of the wage-bill paid to workers under a certain threshold (2.5 times the national minimum wage). Each firm receives a transfer of 4% (raised to 6% since 2014) of the total wagebill that is under the threshold.

- Finally, the 2013 Social Security reform also reduced owner-managers their professional expense deduction. Prior to 2013, they were able to deduct 10% of professional expense from their taxable income, which got removed by the reform.

While concomitant to the reform analyzed in this paper, these two reforms are unlikely to be important source of biases for two reasons.

First, as they are not specific to a particular legal status and as such, both treated *and* control firms are affected in the same way. They do, however, strengthen the importance of having a tight control group and therefore justify the inclusion of multiple fixed effects in the baseline specification even more.

Second, we show in Table 4 that we find very similar results when, instead of exploiting the distinction between SARL and SAS, we exploit *within* legal status differences and compare high dividend payer SARL to low dividend payer SARL and include legal status×year fixed effects, to net out any additional differences existing between SARL and SAS.

C Discussion of tax incidence

How should wage earners incorporate expected social benefits into their labor supply decision? Early empirical studies have found that social security contributions (SSC) are fully shifted to employees (e.g. Gruber, 1997), implying in our setting a full valuation of the benefit. This idea has recently been challenged by Saez, Matsaganis, and Tsakloglou (2012) and Saez, Schoefer, and Seim (2019) which find, in Greece and Sweden, a full incidence on capital rather than labor.

Bozio, Breda, and Grenet (2018) uses French data and social security contribution reforms to show that the incidence of a SSC marginal rate change depends on the degree of tax-benefit linkage. In many countries such as France, a large fraction of the SSC (if not the majority) is actually not a true "contribution," in the sense that the amount of benefits received does not equate one-for-one the amount of money paid. This is the case for instance for health care, child care benefits, etc. Other contributions have imperfect relationships with future benefits (e.g., main pension scheme, unemployment insurance), while some specific SSCs have very strong linkage (e.g., complementary pension schemes). For contributions with little tax–benefit linkage, Bozio, Breda, and Grenet (2018) estimate a precise zero incidence on labor, while they found a precise full incidence when the linkage is strong.

Value of benefits in the French system. The retirement contribution for treated entrepreneurs is around 20% (17.7% for the main contribution, with complementary pension schemes that can go up to 7%). While 7% is the maximum complementary possible, only a minority reach this maximum, hence the average being around 20%.

Subjective valuation of social benefits. The literature on the extent to which individuals value the benefits guaranteed by the government is very limited. The best estimate we have comes from Finkelstein, Hendren, and Luttmer (2019) who, using the Oregon Medicaid Experiment, estimate the recipients value Medicaid benefits at around 50%. Since this estimation of the benefits valuation by recipients is made in a very specific context: Medicaid in the U.S. and might therefore not be representative for French entrepreneurs.

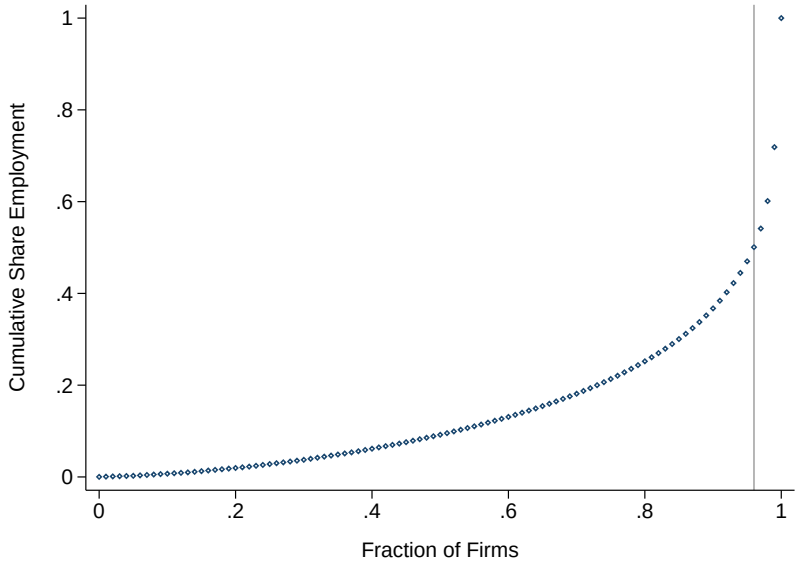
D External Validity

How much do our results apply to other contexts? Countries are different on multiple dimensions and applying results from one country to another is always a heroic exercise. Nonetheless, while the modal firm in this study might seem small relative to previous studies looking at (mostly listed) firms in the U.S., our final sample is representative of the French economy and the French economy is representative of most other developed countries.[61]

D.1 Share of French Economy

In Figure D.1, we plots the cumulative density function of firms by size. In Figure D.2, we plot the cumulative distribution of firm size (using employment) for treated and control firms separately. In Figure D.3, we plots the shares of employment, investment and value-added by treated firms in the sample.

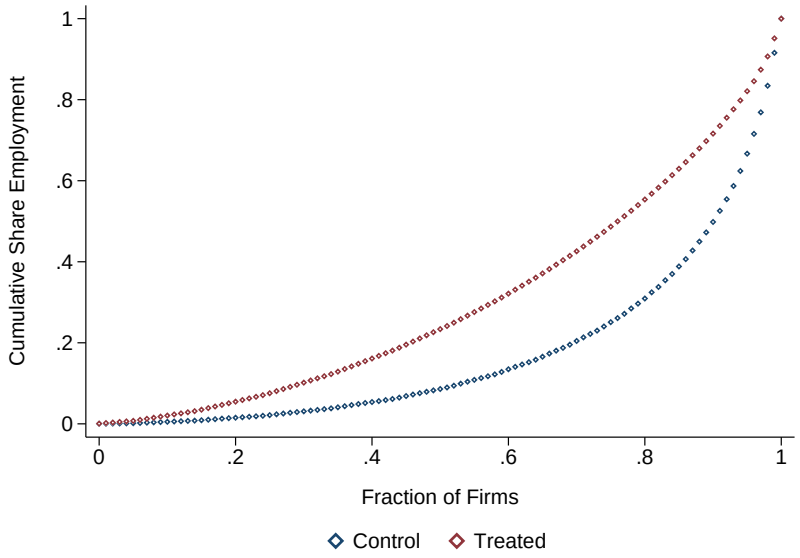
Figure D.1: Firm Size Distribution



This figure plots the cumulative distribution of firm size for all private firms in the French economy in 2011. The grey line indicates the 95^{th} percentile.

61. The U.S. is an exception in the OECD given the size of its economy relative to other countries. Using GDP in dollars, in 2019 the U.S. was 7 times larger than France and the U.K., 5 times larger than Germany, 10 times larger than Italy, and 16 times larger than Spain.

Figure D.2: Firm Size Distribution: Treated vs. Control



The figure plots the cumulative distribution of firm size between treated and control in 2009.

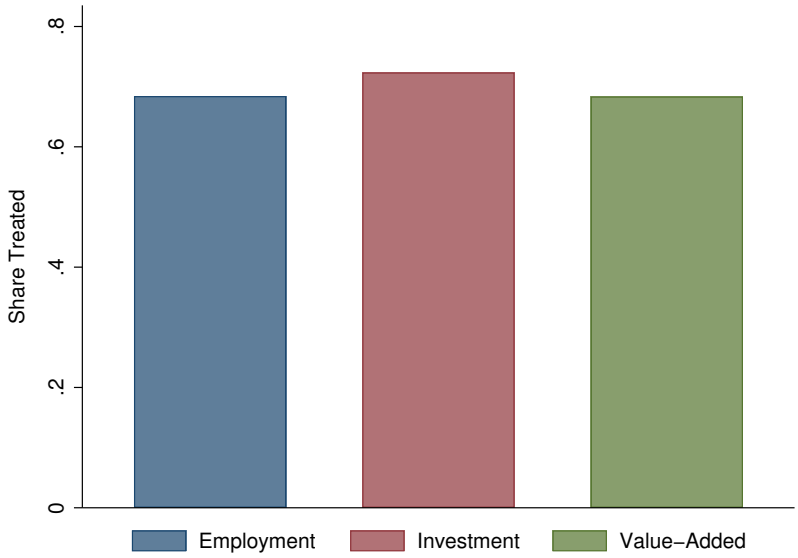
D.2 Comparison with Europe

We provide two set of analyses to support the idea that France is comparable to other OECD countries. First, using data from Eurostat, we show France has a similar distribution of small firms (fewer than 50 employees) and medium firms (between 50 and 250 employees) as other European countries (Figure D.4). We find the same similarity when looking at the sectoral composition (Figure D.5).

Eurostat, the European statistical office in charge of harmonizing data across European countries, produces many statistics to help us understand how France compares to the rest of Europe. We use data from structural business statistics (SBS), which gathers administrative data from members of the European Union and are used as a source of information to understand the detailed structure, economic activity and performance of businesses across the European Union (see **Eurostat˙ind** (**Eurostat˙ind**) and **Eurostat˙size** (**Eurostat˙size**)).

We start by plotting the distribution of firm size for each European economy, which can be split into three categories: small firms (fewer than 50 employees), medium firms (between 50 and 250 employees) and large firms (over 250 employees). Figure D.4 shows the distribution when we sort countries in ascending order of the share of small firms in the economy.

Figure D.3: Share Treated Firms



This figure plots plots the shares of employment, investment and value-added by treated firms in the sample.

Two facts appear. First, the distribution of small and medium firms across countries is pretty similar, with small firms accounting for around 45% of the distribution in the EU. Second, France's fraction of small (40%) and medium (20%) firms is very representative, implying that conclusions draw on the French economy when looking at the population of small and medium size firms are likely to be valid for a large part of the European economy.

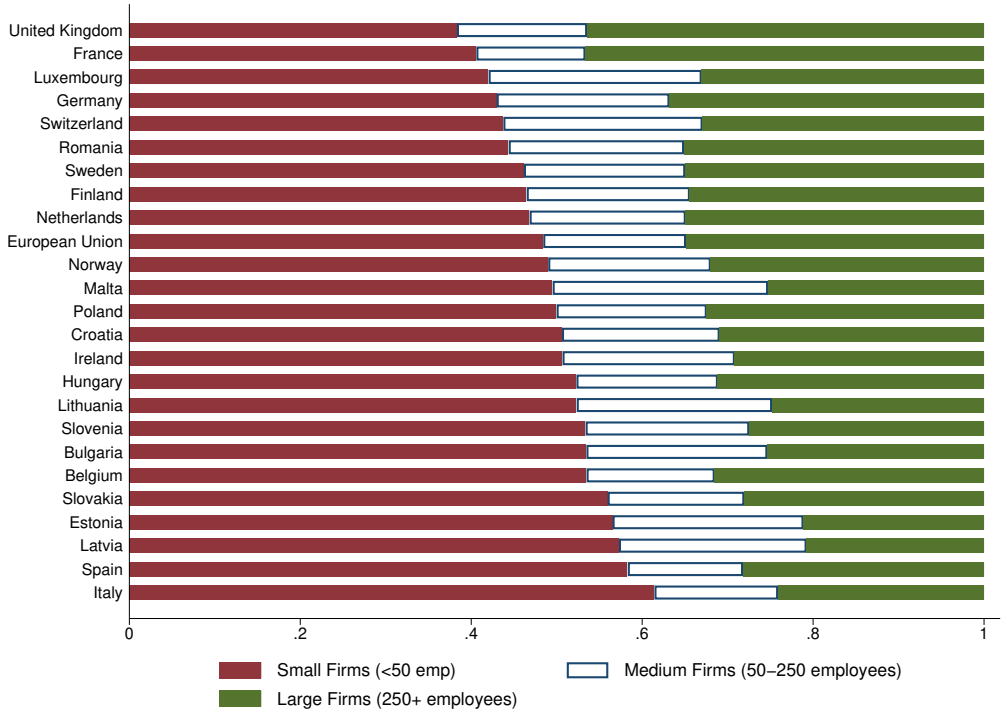
We can also examine the sectoral composition of France and the average of the European Union in Figure D.5 and find very similar distributions in economic production.

D.3 Firm Size Distribution and Zipf's Law

Second, we show that the French economy, like other advanced economies, has a very similar firm size distribution as the U.S. economy that follows Zipf's law.[62] This empirical regularity implies that there is a mechanical link between the size of the country and the average firm size (e.g. Gabaix, 2016). Since the U.S. is an outlier in

62. See Axtell (2001) for the U.S.; Fujiwara et al. (2004) for Europe; and Figure D.6 for a replication of the distribution in our sample.

Figure D.4: Firm Size Distribution in Europe



This figure plots the distribution of firm size across different European countries. Data comes from Eurostat.

the overall size of the its economy, it is also actually an outlier in its average firm size. However, once "adjusted" for the size of the overall economy, the U.S. and French economies are very similar.

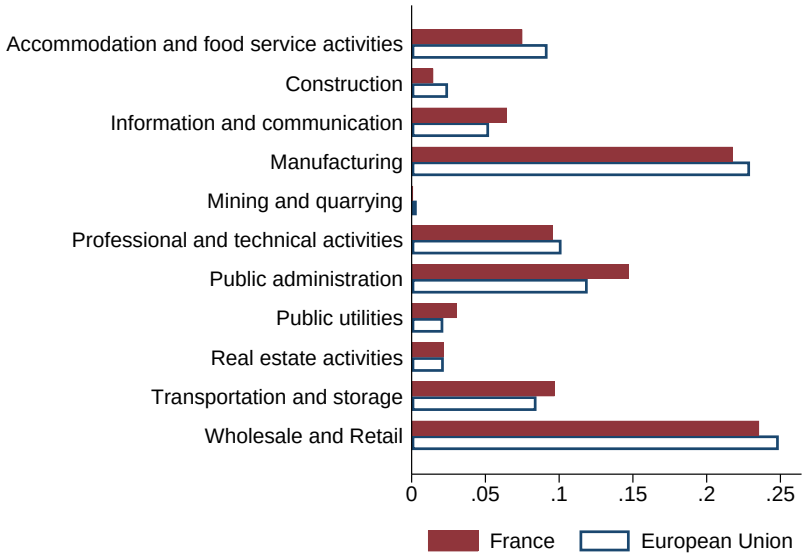
A well established empirical regularity in economics (and in other disciplines) is that the distribution of different variables follows a power law (see Gabaix (2016) for an overview). Power laws take the form $Y = aX^{\beta}$, where β is called the power law exponent. Such laws imply that if X is multiplied by a factor of 10, then Y is multiplied by a factor 10^{β}.

To estimate the value of β, we can simply estimate the following equation:

$$log(Rank) = \alpha + \beta \; log(Size)$$

where $Rank$ is the position of the firm in the distribution and $Size$ is the number of employees. When the slope (or power law exponent) is equal to one, we say that the

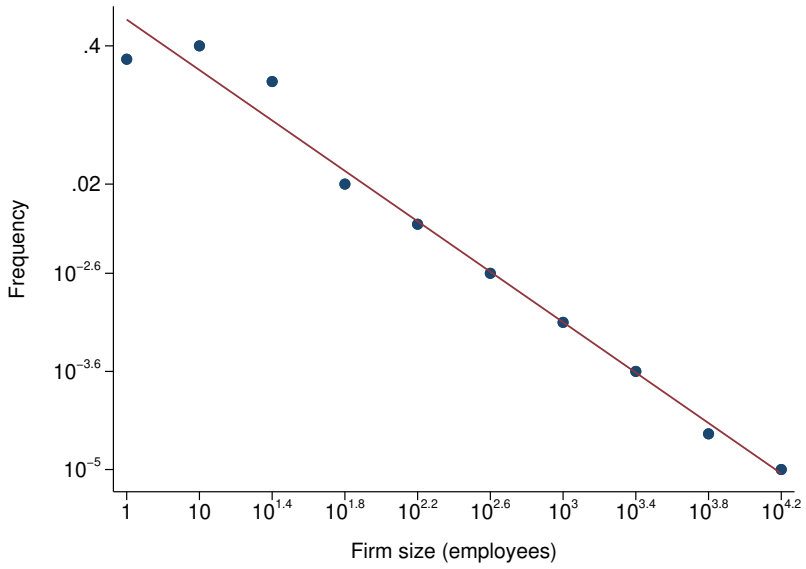
Figure D.5: Sectoral Composition: France vs Europe



This figure plots the distribution of economic activities across sectors for France and the average of the E.U. Data comes from Eurostat.

distribution follows a Zipf's law, based on a name of the Harvard linguist who first gathered evidence of the existence of such distribution. To estimate the relation for France, I follow Axtell (2001) who estimates it for the U.S. and put firms in "bins" according to their size as measured by their number of employees. I then regress the log rank on log size and obtain a β of -1.026 (s.e. = .107 and $R^2 = 0.92$), very close to the slope estimated by Axtell who finds β = -1.059.

Figure D.6: Firm Size Distribution: Zipf's Law for France



This figure plots the log frequency over log size of firms in France for 2009.

E Comparison with other studies

First, and most importantly, our reform is a rare case of tax increase. In the context of intertemporal tax arbitrage, the effect of the tax rate is potentially asymmetric. Indeed, in the case of a tax decrease, firms would want to increase their dividend payments while the tax rate is lower. The change in tax rate does not affect the structural profitability of projects, but firms would have to cut investment if they are resource constrained. However, if firms have enough cash, or have cheap access to external capital, they could maintain their investment rate and pay more dividends at the same time, consistent with results in Yagan (2015).[63] In the case of a tax increase however, the increase in free cash-flow coming from the unpaid dividends can be directly used to invest more when unexpected investment opportunities appear.

Second, most empirical studies have looked at listed firms, or firms that are unlikely to be financially constrained. Our sample of private, closely-held firms can pay dividends and have high marginal return to capital at the same time. In Appendix Table 7, we show that our sample of private firms have on average a higher MRPK than French listed firms. Taking the results of Table 7 at face value that firms reinvest their extra unpaid dividends when they have high return to capital, this would imply that we should find a smaller investment response if the reform were extended to listed firms.

Third, related to this difference in firm characteristics, the average entrepreneur in our sample is likely to be less sophisticated than the average CEO of a large, listed firm, implying that she might have a harder time anticipating future investment opportunities. In particular given that this period in Europe was characterized by sluggish growth caused by the European Sovereign debt crisis, entrepreneurs with expectations of low investment opportunities would have ended up not saving enough and paying themselves dividends instead. This explanation is consistent with our results in Table 7 showing that capital accumulation is higher for firms with high investment opportunities post reform.

Fourth, the dividends paid to firms affected by our reform are with certainty used to pay the owner-manager of the firm. This means that the increase in the dividend tax rate is really an increase in the CEO compensation tax rate, who can counter-

63. Note that the Bush-tax cut happened during a period where interest rates where historically low, which could explain why firms were able to not reduce their investment *and* increase their dividends at the same time.

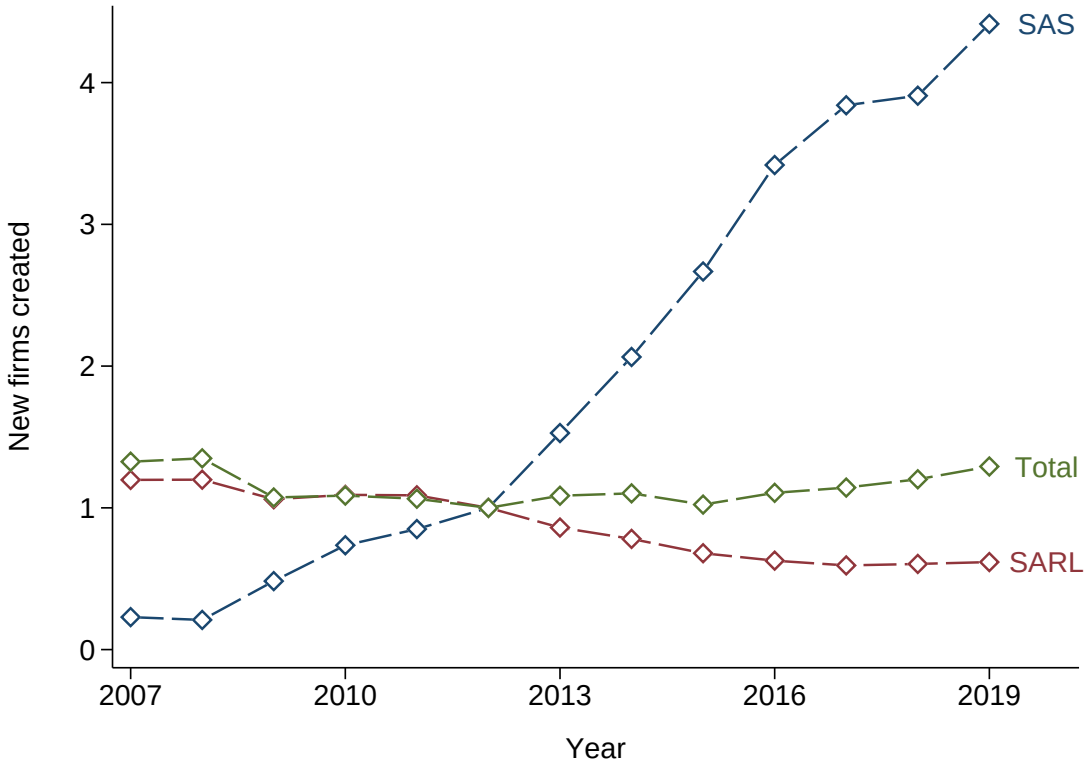
balance the higher tax rate by producing more. The effect on firm investment will therefore depend on whether the income or substitution effect dominates. If owner-managers of SARL firms have a lot of committed consumption for instance, they might prefer to invest more to increase the firm future cash-flows to be able to meet their consumption, despite the increase in the tax rate. While it is usually assumed in the public finance literature that the substitution effect dominates, some recent papers have found evidence that in other contexts the income effect dominates.[64]

64. See for instance, Ring (2020) in Norway, Gelber, Isen, and Song (2016) in the US, Bosch and Klaauw (2012) in the Netherlands.

F Additional Tables and Figures

F.1 Evolution of the number of new firms by legal status

Figure F.1: Effect of 2013 Tax Reform on Firm Entry



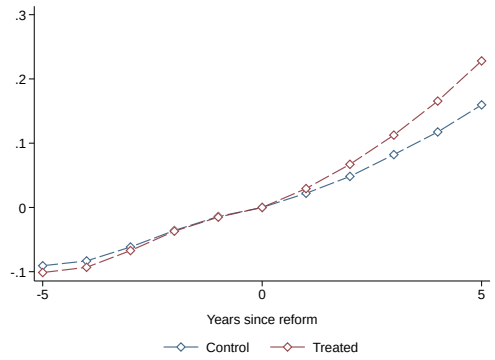
This figure plots the evolution of the number of firms created, normalized in 2011 (the year prior to the reform).

F.2 Event studies

F.2.1 Evolution of treated vs. controls

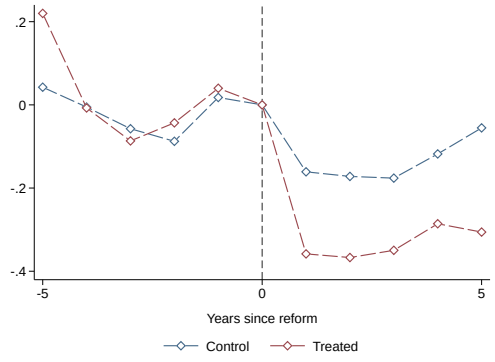
We show the evolution of the two principal outcomes in the paper for treated and control separately: total capital and dividends. Because firms are treated in 2013 if they belong to the fiscal cohort of firms that file their taxes after September and in 2014 if they belong to the fiscal cohort of file that file their taxes before September, we first normalize the time to be zero at they year prior to the shock *within each fiscal cohort.* We filter an age fixed effect and normalize each variable to be at zero at the year of the reform for each cohort.

Figure F.2: Evolution of Total Capital: Treated vs. Control



The figure plots the evolution of total capital accumulation ($Total\ capital_t / Total\ capital_{2011}$) for control and treated firms.

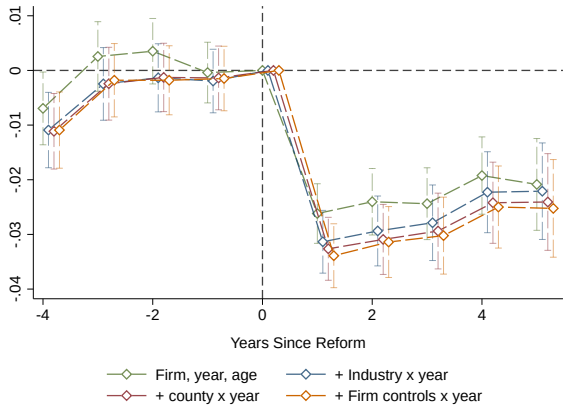
Figure F.3: Evolution of Dividend: Treated vs. Control



The figure plots the evolution of dividends for control and treated firms, normalized by total capital in 2011.

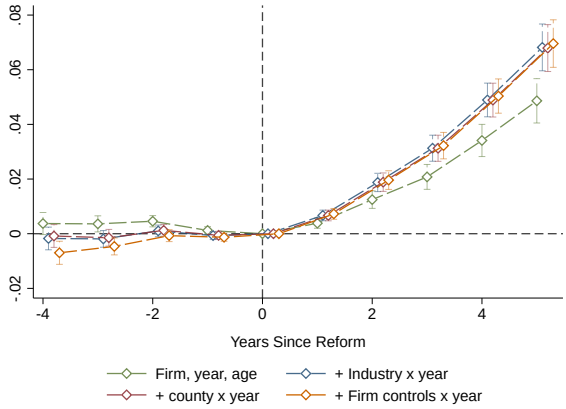
F.2.2 Event study D-i-D: alternative fixed effects

Figure F.4: Yearly Response: Dividends



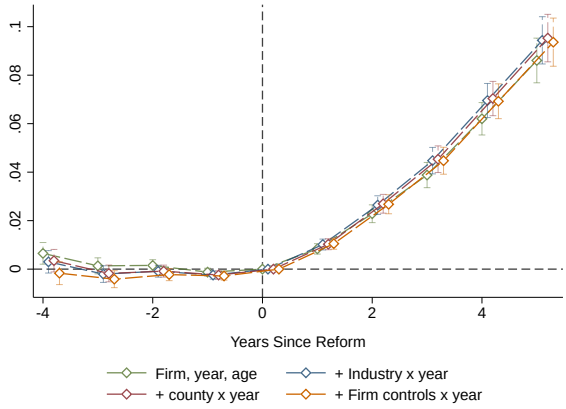
This figure plots the yearly coefficient and their 95% confidence intervals of the event study difference-in-differences estimates in equation (1) of the 2013 dividend tax increase. The dependent variable is scaled by total capital in 2011. The baseline specification only includes firm, year and age fixed effects. We then progressively add more fixed effects: industry, county and additional firm controls (leverage, liquidity, profit margin and size) interacted with year fixed effects. All the fixed effects are also interacted with a fiscal cohort dummy and variables are defined in Section 2.3.

Figure F.5: Yearly Response: Total Capital Accumulation



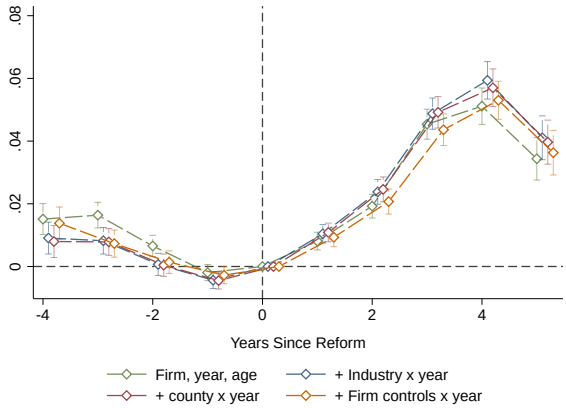
This figure plots the yearly coefficient and their 95% confidence intervals of the event study difference-in-differences estimates in equation (1) of the 2013 dividend tax increase. The dependent variable is total capital in t scaled by total capital in 2011. The baseline specification only includes firm, year and age fixed effects. We then progressively add more fixed effects: industry, county and additional firm controls (leverage, liquidity, profit margin and size) interacted with year fixed effects. All the fixed effects are also interacted with a fiscal cohort dummy and variables are defined in Section 2.3.

Figure F.6: Yearly Response: Tangible Capital Accumulation



This figure plots the yearly coefficient and their 95% confidence intervals of the event study difference-in-differences estimates in equation (1) of the 2013 dividend tax increase. The dependent variable is tangible capital at time t scaled by tangible capital in 2011. The baseline specification only includes firm, year and age fixed effects. We then progressively add more fixed effects: industry, county and additional firm controls (leverage, liquidity, profit margin and size) interacted with year fixed effects. All the fixed effects are also interacted with a fiscal cohort dummy and variables are defined in Section 2.3.

Figure F.7: Yearly Response: Employment



This figure plots the yearly coefficient and their 95% confidence intervals of the event study difference-in-differences estimates in equation (1) of the 2013 dividend tax increase. The dependent variable is employment at time t scaled by employment in 2011. The baseline specification only includes firm, year and age fixed effects. We then progressively add more fixed effects: industry, county and additional firm controls (leverage, liquidity, profit margin and size) interacted with year fixed effects. All the fixed effects are also interacted with a fiscal cohort dummy and variables are defined in Section 2.3.

F.3 Other robustness

Table F.1: Robustness: Assume all Firms are Treated in 2013

	Dividends	Total capital	Tangible capital
	(1)	(2)	(3)
Treated×Post	-0.025***	0.028***	0.040***
	(0.0023)	(0.0022)	(0.0025)
Fixed Effects			
Firm	✓	✓	✓
Age×Fiscal cohort	✓	✓	✓
Industry×Year×Fiscal cohort	✓	✓	✓
County×Year×Fiscal cohort	✓	✓	✓
Observations	1,404,803	1,404,803	1,404,803

This table shows the effect of the 2013 dividend tax increase when we assume that all SARL are treated by the tax hike in 2013, which de facto removes the staggered design. All specifications are estimated as equation 1 with, county and industry by-year-fixed effects. Standard errors are clustered at the firm level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table F.2: Robustness: restriction to fiscal cohort treated in 2013

	Dividend	Total capital	Tangible capital
	(1)	(2)	(3)
Treated×Post	-0.029***	0.030***	0.043***
	(0.0028)	(0.0026)	(0.0030)
Fixed Effects			
Firm	✓	✓	✓
Age×Fiscal cohort	✓	✓	✓
Industry×Year×Fiscal cohort	✓	✓	✓
County×Year×Fiscal cohort	✓	✓	✓
Observations	1,000,042	1,000,042	1,000,042

This table shows the effect of the 2013 dividend tax increase when we restrict ourselves to the fiscal cohort of firms paying their taxes after September. In this case, all SARL firms are treated in 2013. All specifications are estimated as equation 1 with, county and industry by-year-fixed effects. Standard errors are clustered at the firm level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table F.3: Robustness: sample restriction

	Dividend	Total capital	Tangible capital
	(1)	(2)	(3)
		Sample: baseline	
Treated×Post	-0.026***	0.024***	0.035***
	(0.0023)	(0.0025)	(0.0027)
		Sample: remove top 5%	
Treated×Post	-0.025***	0.022***	0.033***
	(0.0024)	(0.0025)	(0.0028)
		Sample: remove top 1% - bottom 1%	
Treated×Post	-0.025***	0.017***	0.029***
	(0.0021)	(0.0023)	(0.0025)
		Sample: remove top 1%	
Treated×Post	-0.025***	0.016***	0.028***
	(0.0021)	(0.0023)	(0.0025)
		Sample: no restriction	
Treated×Post	-0.026***	0.0065***	0.019***
	(0.0021)	(0.0022)	(0.0024)

This table shows the effect of the 2013 dividend tax increase for different sample selections. All specifications are estimated as equation 1 with all the firm controls, county and industry by year fixed effects. Restrictions are based on the asset distribution in 2012 and include both listed and private firms. Standard errors are clustered at the firm level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table F.4: Within Treated Group Comparison: Full Sample

Dependent Variable	Dividends		Total Capital		Tangible Capital	
	(1)	(2)	(3)	(4)	(5)	(6)
Treated×Post	-0.027***		0.0061***		0.019***	
	(0.0021)		(0.0022)		(0.0024)	
shock_divQ2_2		-0.051***		0.011***		0.010**
		(0.0040)		(0.0044)		(0.0048)
Fixed Effects						
Firm	✓	✓	✓	✓	✓	✓
Age×Fiscal cohort	✓	✓	✓	✓	✓	✓
Industry×Fiscal cohort×Year	✓	✓	✓	✓	✓	✓
County×Fiscal cohort×Year	✓	✓	✓	✓	✓	✓
Other firm controls×Fiscal cohort×Year	✓	✓	✓	✓	✓	✓
Treated×Fiscal cohort×Year	—	✓	—	✓	—	✓
Other firm controls×Fiscal cohort×Year	✓	✓	✓	✓	✓	✓
Observations	1,822,379	1,821,430	1,803,334	1,803,334	1,803,334	1,803,334

This table reproduces the within treated-across dividend payer identification strategy of Table 4, but using the universe of firms (including the largest firms and listed firms). Odd columns (1, 3, 5) report the baseline effects, even columns (2, 4, 6) reports the results when we estimate the effect of the reform *within* the treated group. *High-dividend* is a dummy variable that equals one if the average of dividend payments (measured as dividends over capital) before the reform is above to the sample median. All the fixed effects are interacted with the new variable. *Treated*×*Post* is no longer estimated as it is absorbed with the new set of treated-by-year fixed effects. Standard errors are clustered at the firm level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table F.5: Average Results: Firms Not Exiting

Dependent Variable	Dividends	Total Capital	Tangible Capital	Employment	Sales	Productivity
	(1)	(2)	(3)	(4)	(5)	(6)
Treated×Post	-0.027***	0.038***	0.052***	0.037***	0.022***	-0.0052**
	(0.0027)	(0.0027)	(0.0031)	(0.0024)	(0.0025)	(0.0021)
Fixed Effects						
Firm	✓	✓	✓	✓	✓	✓
Age×Fiscal cohort	✓	✓	✓	✓	✓	✓
Industry×Year×Fiscal cohort	✓	✓	✓	✓	✓	✓
County×Year×Fiscal cohort	✓	✓	✓	✓	✓	✓
Observations	1,074,808	1,074,808	1,074,808	1,074,612	1,074,808	1,074,582

This table shows the effect of the 2013 dividend tax increase when we restrict to firms not exiting. Standard errors are clustered at the firm level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table F.6: Cross-Sectional Results: Firms Not Exiting

Dependent Variable	Total Investment					
	Investment Opportunity Bin			MRPK Bin		
	1^{st}	2^{nd}	3^{rd}	1^{st}	2^{nd}	3^{rd}
	(1)	(2)	(3)	(4)	(5)	(6)
Treated×Post	0.034***	0.032***	0.040***	0.023***	0.036***	0.056***
	(0.0045)	(0.0048)	(0.0049)	(0.0036)	(0.0044)	(0.0057)
Fixed Effects						
Firm	✓	✓	✓	✓	✓	✓
Age×Fiscal cohort	✓	✓	✓	✓	✓	✓
Industry×Year×Fiscal cohort	✓	✓	✓	✓	✓	✓
County×Year×Fiscal cohort	✓	✓	✓	✓	✓	✓
Observations	348,675	348,672	348,673	358,005	357,405	356,866

This table shows the effect of the 2013 dividend tax increase when we restrict to firms not exiting. Standard errors are clustered at the firm level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table F.7: Within Treated Group Comparison: Additional Outcomes

Dependent Variable	Employment		Revenues		Value-added		Productivity		Exit	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Treated×Post	0.031***		0.017***		0.021***		-0.0076***		-0.028***	
	(0.0020)		(0.0021)		(0.0025)		(0.0019)		(0.0021)	
Treated×Post×High-dividend		0.0086**		0.0039		0.013***		-0.0059		-0.0089**
		(0.0041)		(0.0043)		(0.0050)		(0.0038)		(0.0042)
Fixed Effects										
Firm	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Age×Fiscal cohort	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Industry×Year×Fiscal cohort	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
County×Year×Fiscal cohort	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Treated×Year×Fiscal cohort	—	✓	—	✓	—	✓	—	✓	—	✓
Observations	1,402,630	1,400,488	1,405,066	1,405,066	1,405,066	1,405,066	1,400,472	1,400,472	1,687,379	1,683,488

This table shows the effect of the 2013 dividend tax increase. Odd columns report the baseline effects, even columns reports the results when we estimate the effect of the reform *within* the treated group. *High-dividend* is a dummy variable that equals one if the average of dividend payments (measured as dividends over capital) before the reform is above to the sample median. All the fixed effects are interacted with the dummy *High-dividend*. *Treated*×*Post* is no longer estimated as it is absorbed with the new set of treated-by-fiscal cohort-by-year fixed effects. Standard errors are clustered at the firm level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table F.8: Heterogeneity of Dividends Response by Expected Returns to Capital

Dependent Variable	Dividends					
Cross-section	Investment Opportunity			Pre-Reform MRPK		
Bin	1^{st}	2^{nd}	3^{rd}	1^{st}	2^{nd}	3^{rd}
	(1)	(2)	(3)	(4)	(5)	(6)
Treated×Post	-0.028***	-0.021***	-0.033***	-0.0053***	-0.011***	-0.059***
	(0.0040)	(0.0040)	(0.0046)	(0.0014)	(0.0028)	(0.0064)
Fixed Effects						
Firm	✓	✓	✓	✓	✓	✓
Age×Fiscal cohort	✓	✓	✓	✓	✓	✓
Industry×Year×Fiscal cohort	✓	✓	✓	✓	✓	✓
County×Year×Fiscal cohort	✓	✓	✓	✓	✓	✓
Observations	434,473	434,475	434,466	468,092	467,543	467,016

This table shows the effect of the 2013 dividend tax increase on dividend policies when firms are sorted by their investment opportunities (columns 1–3) and pre-reform marginal return to investment. We compute investment opportunity by using a leave-one out mean at the industry-county level of investment over the post period and sort firms into terciles, such that the first tercile is made of firms with the lowest investment opportunities and the last tercile is made of firms with the highest investment opportunities. We compute marginal return to capital as revenue over capital. We then sort firms into terciles within each industry Standard errors are clustered at the firm level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table F.9: MRPK: Comparison Listed and Private Firms

Dependent variable	MRPK (continuous)				MRPK>Industry Median				MRPK∈Industry Tercile = 3			
Industry level					2-digit	3-digit	4-diit	5-digit	2-digit	3-digit	4-diit	5-digit
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Listed	-2.62***	-2.84***	-3.01***	-3.04***	-0.044*	-0.065***	-0.075***	-0.076***	-0.064**	-0.096***	-0.11***	-0.11***
	(0.42)	(0.29)	(0.27)	(0.27)	(0.024)	(0.013)	(0.011)	(0.0099)	(0.030)	(0.016)	(0.014)	(0.013)
Fixed Effects												
Industry (2-digit)	✓	—	—	—	✓	—	—	—	✓	—	—	—
Industry (3-digit)	—	✓	—	—	—	✓	—	—	—	✓	—	—
Industry (4-digit)	—	—	✓	—	—	—	✓	—	—	—	✓	—
Industry (5-digit)	—	—	—	✓	—	—	—	✓	—	—	—	✓
Observations	1,199,512	1,199,512	1,199,512	1,199,512	1,199,512	1,199,512	1,199,512	1,199,512	799,677	799,678	799,677	799,973

This table shows the difference in MRPK measured as value-added over capital for the pre-reform period (up to 2013). *Listed* is a dummy equal to one if the firm is listed or if it is a subsidiary of a listed firm. In columns 5–8, the dependent variable is a dummy equal to one if the firm MRPK is above the industry median. In columns 9–12, the dependent variable is a dummy equal to one if the firm MRPK is in the last tercile of industry distribution. The second tercile is omitted so that the comparison is between the first and last tercile. We vary the industry level to compute the distribution and indicate the level used in the line "Industry level". Standard errors are clustered at the industry level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

G Cross section of equity-dependence

In addition to the usual challenge of finding empirical proxies for the dependence on equity funding, our setting presents another reason for why we might not find an effect on equity dependent firms. As explained in Section 1.2.2, the increase in dividend taxes only reduce the after-tax returns on equity for the owner-managers and working members of her family. This implies that in theory, external capital providers could invest in the firm without facing a reduction in their after-tax returns on equity. We think however that this problem is limited for two reasons. First, the tax increase applies to entrepreneurs holding more than 50% of the firm equity. Since it is not possible by law to discriminate dividend payments among shareholders, any increase in dividends would have to be paid in majority to the owner-manager, on which she will have to pay the extra tax. Since she can set the dividend policy by herself (as she is the majority owner), it seems reasonable to assume that her tax-rate is the tax-rate faced by the firm in general. Second, for most of these firms, the main capital provider is the entrepreneur herself, sometimes helped by her family who will have to pay the new tax rate as well if they work for the firm. So it is plausible the reform affected the cost of equity both indirectly and directly.[65]

With these limitations in mind, we create five different proxies to identify firms more likely to be equity-dependent. In the interest of space, we report the empirical results in Appendix G.

First, we split firms along bins of age. In firm life cycle models (Sinn, 1991), young firms start life cash-constrained and finance investment via equity issuance before becoming mature and generating enough cash-flows to finance their investment internally. We estimate equation 1 separately for each quintile of age and report the point estimate for each bin in Table G.1. For each quintile, the reform always has a precise, positive effect. Second, we do a similar exercise with size and again find very similar point estimates.

Our third proxy is the probability that a firm issues equity, following Auerbach and Hassett (2003). We create a dummy *New Equity Issuance* that equals one if we observe a positive change in equity between t and $t+1$ over the pre-reform period. We then predict the probability of the firm issuing new equity by estimating a linear

65. The notion the tax increase would discourage entrepreneurs to invest more in their firms was also the main argument of the opponents against the reform in France.

probability model, where we regress the variable *New Equity Issuance* on a set of firm controls. We then split the sample into quintiles and again estimate equation 1 on these subsamples and failed to find any drop in investment, even for the firms most likely to be more equity-dependent (Table G.2).

Fourth, we compute the fraction of capital that has been financed by equity prior to the reform by summing up all equity issuance (including the amount of equity at creation) and dividing it by the value of total capital (tangible and intangible) in 2012. A large fraction of firms relied substantially on equity to finance their previous investment, with the last quintile of the distribution having a ratio of equity issued over capital equal to 1.15, implying that for every euro of productive capital, the firm issued €1.15 equity. Table G.3 shows that across these different bins, the effect of the tax increase on investment is always positive and statistically significant.

Fifth, we look at the number of times a firm issues equity during the sample period (Table G.4). We split the sample into firms that never issue equity and firms with one or more issues. We also compute the number of equity issuances over a longer time period (2004–2017). As with other proxies of equity-dependence, we find that a higher dividend tax rate always increases investment for the various subsamples.

Truly measuring equity-dependent firms is impossible for any empiricist and we have to rely on imperfect proxies. Yet taken together, these results are inconsistent with the "old view" theory of dividend taxation that predicts that young, equity-dependent firms should reduce their investment following an increase in the dividend tax rate.[66]

66. There is one final group of equity-dependent firms that might have been negatively affected by the reform: new firms discouraged from being created after the reform. We do not explore this "extensive margin" in this paper because it would require a completely different estimation strategy, and we leave this question for future research. Two reasons suggest that the reform did not affect entry significantly. First, new firms could always incorporate under the SAS legal status, which they increasingly do so after 2013 (Figure 2). Second, when plotting the evolution of the total number of new firms created, we find no obvious drop after 2013, which is explained by the fact that the number of new firms created as SAS increased much faster than the decline in new firms created as SARL (Figure F.1).

Table G.1: Cross Sectional Results: Age and Size

Dependent variable	Total capital				
Bin	1^{st}	2^{nd}	3^{rd}	4^{th}	5^{th}
	(1)	(2)	(3)	(4)	(5)
	Cross Section: Size				
Treated×Post	0.039***	0.060***	0.050***	0.068***	0.059***
	(0.0097)	(0.0069)	(0.0056)	(0.0048)	(0.0038)
Fixed Effects					
Firm	✓	✓	✓	✓	✓
Age×Fiscal cohort	✓	✓	✓	✓	✓
Industry×Year×Fiscal cohort	✓	✓	✓	✓	✓
County×Year×Fiscal cohort	✓	✓	✓	✓	✓
Observations	280,964	280,966	280,953	280,963	280,957
	Cross Section: Age				
Treated×Post	0.034***	0.049***	0.035***	0.023***	0.020***
	(0.0073)	(0.0075)	(0.0059)	(0.0045)	(0.0035)
Fixed Effects					
Firm	✓	✓	✓	✓	✓
Age×Fiscal cohort	✓	✓	✓	✓	✓
Industry×Year×Fiscal cohort	✓	✓	✓	✓	✓
County×Year×Fiscal cohort	✓	✓	✓	✓	✓
Observations	312,832	251,942	282,612	280,545	276,872

This table shows the effect of the 2013 dividend tax increase when firms are sorted by size pre-reform (first row) or by age (second row). We estimate equation 1 for each group separately. Standard errors are clustered at the firm level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table G.2: Equity Dependence: Probability of Issuing Equity

Bin probability equity issuance	1^{st}	2^{nd}	3^{rd}	4^{th}	5^{th}
	(1)	(2)	(3)	(4)	(5)
			Total Capital		
Treated×Post	0.035***	0.032***	0.041***	0.047***	0.048***
	(0.0063)	(0.0058)	(0.0054)	(0.0047)	(0.0043)
Fixed Effects					
Firm	✓	✓	✓	✓	✓
Age×Fiscal cohort	✓	✓	✓	✓	✓
Industry×Year×Fiscal cohort	✓	✓	✓	✓	✓
County×Year×Fiscal cohort	✓	✓	✓	✓	✓
Observations	280,131	280,136	280,126	280,140	280,115
			Tangible Capital		
Treated×Post	0.049***	0.051***	0.051***	0.058***	0.056***
	(0.0073)	(0.0067)	(0.0061)	(0.0054)	(0.0049)
Fixed Effects					
Firm	✓	✓	✓	✓	✓
Age×Fiscal cohort	✓	✓	✓	✓	✓
Industry×Year×Fiscal cohort	✓	✓	✓	✓	✓
County×Year×Fiscal cohort	✓	✓	✓	✓	✓
Observations	280,131	280,136	280,126	280,140	280,115

This table shows the effect of the 2013 dividend tax increase when firms are sorted by their probability to issue equity. This probability is estimated by regressing a dummy *New Equity Issuance* that equals one if we observe a positive change in equity between t and $t+1$ over the pre-reform period onto profitability and lagged profitability, leverage and lagged leverage, investment and lagged investment, size log asset), industry, age bin, local labor market fixed effects. Standard errors are clustered at the firm level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table G.3: Equity Dependence-Fraction of Capital Financed Through Equity

Bin of Equity Issued / Capital$_{2012}$	1^{st}	2^{nd}	3^{rd}	4^{th}	5^{th}
Value within bin	.023	.065	.14	.31	1.5
	(1)	(2)	(3)	(4)	(5)
			Total Capital		
Treated×Post	0.012***	0.031***	0.027***	0.032***	0.040***
	(0.0045)	(0.0048)	(0.0048)	(0.0053)	(0.0051)
Fixed Effects					
Firm	✓	✓	✓	✓	✓
Age×Fiscal cohort	✓	✓	✓	✓	✓
Industry×Year×Fiscal cohort	✓	✓	✓	✓	✓
County×Year×Fiscal cohort	✓	✓	✓	✓	✓
Observations	292,122	296,118	260,017	280,891	275,655
			Tangible Capital		
Treated×Post	0.032***	0.042***	0.036***	0.039***	0.054***
	(0.0055)	(0.0054)	(0.0055)	(0.0060)	(0.0058)
Fixed Effects					
Firm	✓	✓	✓	✓	✓
Age×Fiscal cohort	✓	✓	✓	✓	✓
Industry×Year×Fiscal cohort	✓	✓	✓	✓	✓
County×Year×Fiscal cohort	✓	✓	✓	✓	✓
Observations	292,122	296,118	260,017	280,891	275,655

This table shows the effect of the 2013 dividend tax increase when firms are sorted by the fraction of capital in 2011 financed by equity since the firm entered in the dataset starting in 1994. The first line indicates the average of equity issued / capital within each bin. We estimate equation 1 for each group separately for total investment and tangible investment both scaled by total capital in 2011. Standard errors are clustered at the firm level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table G.4: Equity Dependence: Number of Equity Issuances

	2009–2016		2003–2016		
# equity issuances	0	1	0	1	2
	(1)	(2)	(3)	(4)	(5)
			Total Capital		
Treated×Post	0.017***	0.036***	0.020***	0.020***	0.062***
	(0.0034)	(0.0031)	(0.0038)	(0.0034)	(0.0051)
Fixed Effects					
Firm	✓	✓	✓	✓	✓
Age×Fiscal cohort	✓	✓	✓	✓	✓
Industry×Year×Fiscal cohort	✓	✓	✓	✓	✓
County×Year×Fiscal cohort	✓	✓	✓	✓	✓
Observations	572,054	832,749	488,633	631,726	284,444
			Tangible Capital		
Treated×Post	0.030***	0.048***	0.034***	0.030***	0.077***
	(0.0038)	(0.0035)	(0.0044)	(0.0039)	(0.0058)
Fixed Effects					
Firm	✓	✓	✓	✓	✓
Age×Fiscal cohort	✓	✓	✓	✓	✓
Industry×Year×Fiscal cohort	✓	✓	✓	✓	✓
County×Year×Fiscal cohort	✓	✓	✓	✓	✓
Observations	572,054	832,749	488,633	631,726	284,444

This table shows the effect of the 2013 dividend tax increase when firms are sorted by the number of instances of equity issued over the period 2009–2016 (columns 1–2) or the period 2003–2016 (columns 3–5). In columns 1 and 2, we split the sample between firms that never issued equity (column 1) or issued once or more than once (column 2). In columns 3–5, we split into no issue (column 3), one issue (column 4) or two or more issues (column 5). We estimate equation 1 for each group separately for total investment and tangible investment both scaled by total capital in 2011. Standard errors are clustered at the firm level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.