NBER WORKING PAPER SERIES

DIVIDEND TAXES AND THE ALLOCATION OF CAPITAL

Charles Boissel
Adrien Matray

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

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

This paper was previously circulated under the title: ``Higher Dividend Taxes? No Problem! Evidence from France." We are deeply indebted toward David Thesmar for numerous discussions and support and to Chenzi Xu. We would like to thank Liran Einav (Editor), four anonymous referees, Antoine Bozio, Denis Gromb, Ulrich Hege, Johan Hombert, Thomas Piketty, James Poterba, Emmanuel Saez, Antoinette Schoar, Stefanie Stantcheva, Danny Yagan, Owen Zidar, Eric Zwick and various seminar, brown-bag and conference participants at HEC-Paris, Paris School of Economics, EIEF-Einaudi, Toulouse School of Economics, MIT Sloan, Kellogg Northwestern, UCLA Anderson, UCLA Econ, Berkeley, NBER SI Corporate Finance 2019, NBER SI Public Economics 2019, AFA 2020, Wharton, LBS, Imperial, Boston College, Boston University, Oxford Said Business School, TSE, NES Moscow, MIT Sloan, NYU Stern, Rochester Business School. Matray gratefully acknowledges financial support from the Griswold Center for Economic Policy Studies and the Louis A. Simpson Center for the Study of Macroeconomics. Desislava Tartova provided stellar research assistance. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

Dividend Taxes and the Allocation of Capital
Charles Boissel and Adrien Matray
NBER Working Paper No. 30099
June 2022
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 invest more. Heterogeneity analyses show that firms with high demand and returns on capital responded most while no group of firms cut their investment. Our results reject models in which higher dividend taxes increase the cost of capital and show that the tax-induced increase in liquidity relaxes credit constraints, which can reduce capital misallocation.

Charles Boissel
cproton@protonmail.com

Adrien Matray
Bendheim Center for Finance
Princeton University
20 Washington Road
Princeton, NJ 08540
and NBER
amatray@princeton.edu

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 investing and hiring more 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 invest.

At the heart of this debate is the question of the impact of dividend taxes on corporate investment 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 investment.[2] Second, the dividend tax rate can change the *distribution* of investment 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 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.

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 investment. 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 increase their investment more 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 in the average investment rate, usually perceived as a positive outcome, *and* an increase in capital misallocation, which would actually reduce aggregate output in the long-run.

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 investment 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 3 p.p. of the firm's capital, which represents a 16% drop relative to the pre-reform sample mean and implies an elasticity of the dividend to the tax rate of 0.43.[4] Second, an increasing 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: employment, investment, and firm performance. We find that treated entrepreneurs ended up hiring more and paid their employees more, but did not increase their own wages. The largest effect is on capital accumulation, as treated entrepreneurs increase their investment by about 0.9 p.p. of capital, a 15% increase relative to the pre-reform sample mean. This finding is robust to alternative specifications, investment measures (total or tangible, gross or net of depreciation) and subsamples.

Given that treated firms increase their undistributed earnings (i.e. cut their paid dividends) by 3 p.p. of capital and increase investment by 1 p.p. of capital, our estimate implies that they reinvested *one third* of their tax-induced additional retained earnings, an elasticity in line with the literature estimating pass-through of cash-flow shocks on investment. This increase in investment translates into higher sales and value-added without lowering firm productivity or affecting the probability of exit.

A remaining threat to identification would be that our results are driven by

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

unobserved shocks across legal status. We address this problem by exploiting differences in the intensity of the exposure to the tax increase, using the large variation in dividend payment pre-shock. We split the treated and control groups into high and low-dividend payers before the reform and compare firms with the *same* legal status by including treated-by-year fixed effects in our specification. Doing so produces similar point estimates and implies that almost all of 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 increases its investment, 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 investment is concentrated among firms facing new investment opportunities. We proxy investment opportunities by computing the leave-one-out mean of investment 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 investment more only when they face large investment opportunities. By contrast, treated firms with limited investment opportunities do not invest more than control firms.

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 investment rate that is four times as large for firms in the highest tercile of ex-ante marginal return to capital relative to firms in the lowest tercile. The absence of difference between treated and control firms with low investment opportunities and low ex-ante returns to capital shows that firms are not willing to waste their undistributed earnings when facing limited expected returns. This provides further evidence that the average tax-induced increase in investment is not coming from firms 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 investment by issuing equity (e.g., Poterba and Summers, 1983). We compute multiple proxies for the degree of equity-dependence and reestimate our investment regressions for the subsample of firms most likely

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

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 investment.

In the last part of the paper, we track how the remaining two-thirds of unpaid dividends that are not invested are allocated. 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 balance sheet adjustments on both the liability (e.g., debt) and asset (e.g., cash holding) side. Treated firms increase their gross working capital by an amount almost equal to the remaining tax-induced undistributed dividends. The increase in gross working capital is essentially split between cash holding and customer credits. Higher credit extension to treated firms' customers could partially explain faster sales growth for treated firms. Current liabilities, by contrast, remain unchanged.

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 is 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). We also

provide novel and in-depth analysis of the reallocation pattern across firms and industries to show that the additional investment decreased 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 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)

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).

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 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 practise.

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.

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.

Take away. 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, 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 practise, 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

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 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.

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 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.

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.

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).[12]

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 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.[13] 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,

12. We find an even higher number for the subset of the sample that we can match to Amadeus-Bureau Van Dick (BvD) where we can observe information on shareholder composition and managerial team (Appendix E).

13. 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.

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 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.[14]

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 investment, 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 to observe the firm at least four years.[15]

To improve the overlap between treated and control firms, we cut the sample at the ninety-fifth percentile of the size distribution. We also cut firms at the

14. The first file is called the "DADS" (Insee 2009–2018) and the second file is called the "ACOSS" file (Insee 2009–2018).

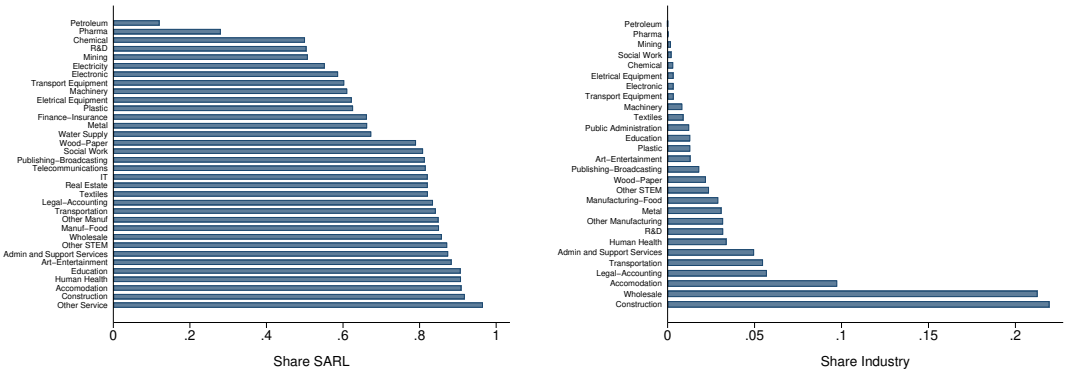
15. Results are virtually unchanged without these different restrictions.

fifth percentile to remove the smallest firms to restrict attention to corporations operating at substantial scale. In Section 4.1, we report robustness of all our estimates when we include the universe of firms, including the largest ones and the listed ones and show that our point estimates remain similar.

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.[16] In this sample, treated firms represent around half of the economic activity, as shown in Figure A.6 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 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



(a) Share treated within industries (b) 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 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,

16. 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.

patent licences, goodwill, copyrights, and franchises. Investment is defined as the change in the stock of capital (total or just tangible).

Treated and control firms have similar investment rates and capital structures (cash-holding and leverage), and they pay out similar proportions of their capital as dividends (19% versus 21%). The similarities in leverage, liquidity, and dividend ratios also suggest that there are no systematic differences in how financially constrained they are. Control firms are more asset-intensive, but they have a large overlap in their size distribution with treated firms.[17]

Despite their large similarities, a remaining threat would be that the SAS legal status is chosen by entrepreneurs who tend to grow more with the aggregate economy, which would imply that the investment of control firms vary more with the business cycle. We deal with this issue by computing the annualized size growth of all firms pre-reform, and split this variable into quartiles that we interact with year fixed effects.

The inclusion of these fixed effects ensures that the effect of the tax increase is identified by comparing firms that are exposed to similar size-specific time-varying shocks, and vary in the same way with the aggregate business cycle. Similar *trends* before the reform between the two types of firms is the only condition required for identification, which we demonstrate graphically later in Figures 3 and 4.

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 linked with theories of dividend taxation in Section 7. Since firms in the sample are private, it is difficult to know their exact shareholder composition. For a subset of firms (around 40%), it is nonetheless possible to obtain this information by using historical data from Amadeus (BvD). We explain exactly how we clean these data in Appendix E. We find that treated and control firms have the same shareholder composition and that for this subsample, 95% of SARL (treated) firms are run by an owner-manager (i.e. a CEO owning over 50% of the shares), which is very close to the number estimated by the French statistical office for the whole population of SARL firms.

17. We report the cumulative distribution of firm size (using employment) for treated and control firms separately in the Appendix in Figure A.5.

Table 1: Summary Statistics

	Pre-Reform 2008–2012					
	Treated			**Control**		
	Mean	s.d.	p50	Mean	s.d.	p50
Dividend / Capital	0.22	0.57	0.021	0.25	0.62	0.027
Dividend / Net income	0.31	0.40	0.11	0.37	0.45	0.19
Asset	722,895	551,668	551,221	1,309,195	722,824	1,193,283
Tangible Capital	208,042	251,249	122,646	387,336	386,735	259,246
Employee compensations	236,191	214,525	180,224	386,131	335,812	297,094
Employment	8.18	10.0	5.85	13.7	14.5	10
Net Income / Capital	0.068	0.40	0.016	0.073	0.64	0.012
Liquidity / Capital	0.16	0.38	0.047	0.18	0.41	0.049
Debt / Capital	0.18	1.20	0.046	0.15	1.00	0.032
Total investment / Capital	0.075	0.15	0.050	0.059	0.17	0.032
Tangible investment / Capital	0.058	0.099	0.045	0.037	0.092	0.028
Net Current Asset / Capital	0.18	0.48	0.055	0.21	0.52	0.072
Supplier Credit / Capital	0.15	0.33	0.047	0.17	0.36	0.053
Supplier Credit / Capital	0.22	0.51	0.063	0.26	0.56	0.071
Distinct firms	135,235			24,540		

This table reports summary statistics for the universe of firms pre-reform. Capital is defined as tangible capital (property, plant and equipment) plus intangible capital (R&D, software, etc.). Employment is number of full-time equivalent

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:

$$Y_{i,j,c,t} = \beta\, Treated_i \times Post_t + X_{i,t} + \theta_i + Size\ Growth\ Bin_{i,t} + \delta_{j,t} + \gamma_{c,t} + \varepsilon_{i,j,c,t} \quad (1)$$

where $Y_{i,j,c,t}$ are various firm outcomes for firm i in industry j, located in area c at year t normalized in most cases by total capital in 2011 (to prevent changes in the denominator from driving our regression coefficients). $Treated_i$ is a 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.[18]

$Post_t$ takes the value one after 2013 for firms that close their annual account during the last fiscal trimester and one after 2014 for firms that close earlier.[19] This is because when a firm pays an annual dividend, the fiscal administration prorates

18. In practise, 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.

19. In practise, this account for 70% of firms and results are similar if we just use a dummy equal to one in 2013.

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 for the months of April–December 2012.

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]

Because investment is particularly volatile and SARL (treated) and SAS (control) firms' growth might covary differentially with the business cycle, we include in the baseline specification *Size Growth Bin*$_{i,t}$, which is a vector of pre-reform annualized size growth quartile-by-year fixed effects. This set of fixed effects ensures that we are estimating the effect of the reform by comparing firms that have been on the same growth trajectory and covary in the same way with the aggregate economy. This filters out potential correlated shocks between the reform and baseline propensity to grow across different legal status. 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) and profitability (operating income over lagged assets). Given that the reform may have a direct impact on many firm characteristics, using time-varying controls would bias the coefficient.[22] We address this problem by using the pre-reform value of these controls interacted with year fixed effects.

In our preferred specification with pre-reform characteristics fixed effects, the coefficient of interest β is estimated by comparing firms operating in the same industry, located in the same county, controlling for differential size trends, 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.

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

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

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

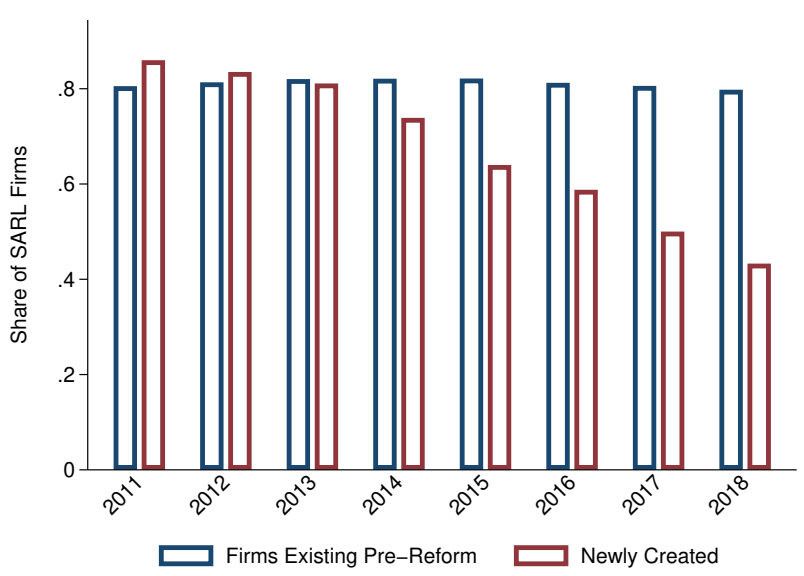
3 Effects on regulatory arbitrage and payouts

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 response to differential tax rates.[23]

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.

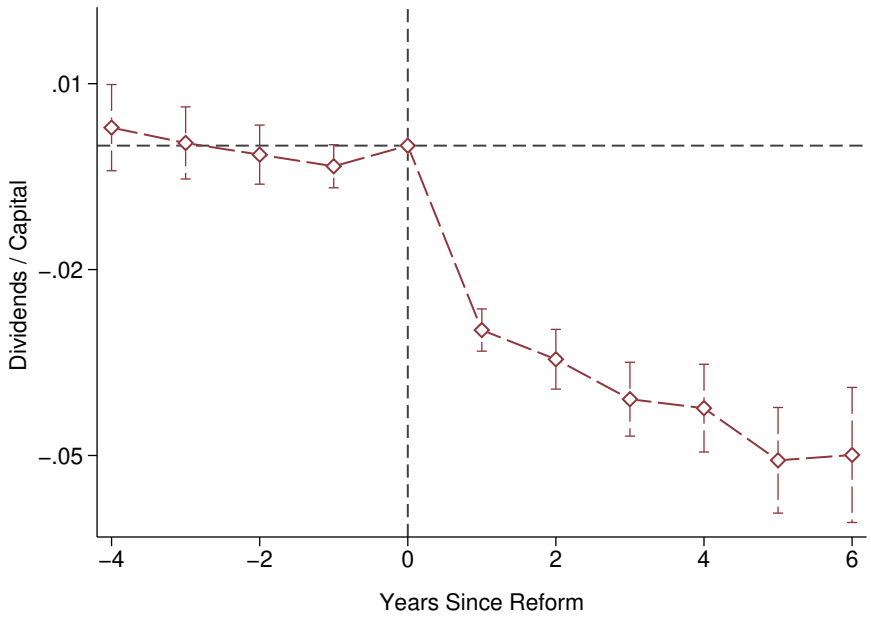
23. The lack of changes in organizational form for existing firms combined with the large reaction for new firms can be rationalized by important adjustment costs in France that takes two forms: a monetary cost between €5,000 to €10,000, representing around 10% to 25% of the firm net income, and a legal 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).

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.[24] 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.

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 estimator in equation (1) of the 2013 dividend tax increase. The dependent variable is 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 and size growth bin-by-year fixed effects, column 2 adds industry-by-year fixed effects, column 3 adds county-

24. 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.

Table 2: Effect of 2013 Tax Reform on Dividend Payments

Dependent Variable	Dividends / Capital			
	(1)	(2)	(3)	(4)
Treated×Post	-0.033***	-0.030***	-0.031***	-0.030***
	(0.0023)	(0.0023)	(0.0024)	(0.0023)
Fixed Effects				
Firm	✓	✓	✓	✓
Size growth× Year	✓	✓	✓	✓
Industry × Year	—	✓	✓	✓
County × Year	—	—	✓	✓
Time Varying Controls	—	—	—	✓
Observations	1,410,567	1,410,567	1,410,567	1,410,557

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. Size growth is pre-reform annualized growth of capital ranked into quartile. In column 3, "county" corresponds to the French administrative division "département" that partitions France into one hundred distinct entities. In column 4, we include time-varying controls for liquidity (cash over lagged assets), leverage (total debt over lagged assets) and profitability (operating income over lagged assets). We use the baseline level of these variables pre-shock and interact them with year fixed effects. Standard errors are clustered at the firm level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

by-year fixed effects and column 4 adds time-varying controls (liquidity, leverage and profitability).

In all cases, the point estimate is stable and firms exposed to the tax hike reduce their dividend payment by around €0.030 for each euro of capital, implying a 16% drop relative to the pre-reform sample mean.

Additional evidence: bunching and anticipatory response. Two additional evidence show that the reform was salient and that entrepreneurs optimize around it. First, the reform introduced a kink in the tax, leading to the emergence of a bunching below the threshold. We provide a detail 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. In Appendix 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 -3 p.p. in 2014, consistent with intertemporal tax arbitrage.

Take away. 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 and invested and hired more

in Section 4, 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:

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

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.[25] 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.[26] 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

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

26. We are deeply indebted to Antoine Bozio for his detail explanation of the arcania of the French contribution system and for producing all the statistics from the IPP.

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

Elasticity of dividends. Note that while the complication associated with estimating the effective new tax rate can change the magnitude of the elasticity, it does not bias our reduced form estimates in any way, so in all the tables we report the reduced forms results rather than the implied elasticity. Readers can apply their own assumed tax change as it is perceived by treated entrepreneurs to the raw estimates as they see fit and compute their preferred elasticity.

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 0.43,[28] which is close to 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 (0.16)/[(0.36-0.155)/0.845] = 0.67.[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: investment and firm performance

There are two opposing channels through which a higher dividend tax rate can affect investment 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 larger investments or to pay their employees more.

27. If they value retirement benefits at half their true value, as in Finkelstein, Hendren, and Luttmer (2019), their effective tax rate would increase to 36%.

28. $(0.16)/(\tau_{div}^{new}\text{-}0.155/0.845) = 0.43$

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%

Second, higher dividend taxes can increase the user cost of capital, which negatively affects investment for firms that finance their marginal investment with new equity and use the return to investments 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 investment and employment

Employment. We study the effect of employment and owner-manager and employee compensation in Table 3. In column 1, we report the effect on employment (in logs) and finds that it increases by 2.5%. In column 2, we report the effect for average the earnings of employees and find an increase by 2.1%. 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.

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 exploiting the fact that in 2013, the Social Security administration reported the value of earnings using both definition. We then assume that the ratio 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. We now explore those effects on investment.

Table 3: Effect on Employment and Earnings

Dependent Variable	Employment	Earnings by		
		Employees	CEO-1	CEO-2
	(1)	(2)	(3)	(4)
Treated×Post	0.025***	0.021***	0.0088	-0.0041
	(0.0018)	(0.0013)	(0.0075)	(0.0049)
Fixed Effects				
Firm	✓	✓	✓	✓
Size growth× Year	✓	✓	✓	✓
Industry × Year	✓	✓	✓	✓
County × Year	✓	✓	✓	✓
Observations	1,409,167	1,372,426	864,738	1,380,663

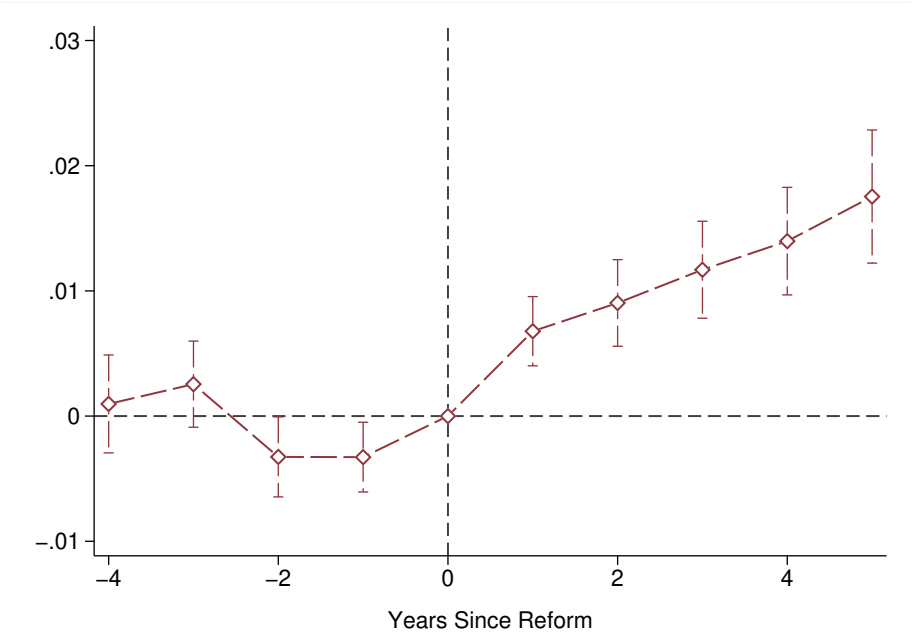
This table shows the effect of the 2013 dividend tax increase on employment and earnings. All variables are in logs. Employment is full-time equivalent. In column (2), employee earnings corresponds to the average employee total compensation (including social security payment), excluding the entrepreneur 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.

Investment. For both total and tangible investment, we compute the gross and net change, with net defined as book value minus depreciation, and we scale ev-

erything by firm's capital.

Figure 4 plots the yearly coefficients and 95% confidence intervals of the differences-in-differences event studies estimation of equation 1 of the tax's impact on investment. The differential investment of treated and control firms fluctuates around zero in the years before the reform, providing visual evidence of the absence of differential pre-trends before the shock. Investment by treated firms increases progressively relative to control firms the years after the tax hike and picks at a 2 p.p. higher level five years after the reform.

Figure 4: Effect of 2013 Tax Reform on Investment



This figure plots the yearly coefficients and 95% confidence intervals of the difference-in-differences estimator in equation (1) of the 2013 dividend tax increase. The dependent variable is total investment scaled by capital in 2011.

Table 4 shows that our results are robust across different specifications and for the different measures of investment. Panel A shows the results when we use gross investment and Panel B the results for net investment. In all cases, we find a positive, precisely estimated effect of the dividend tax increase on investment. The dividend tax hike leads treated firms to increase their total investment by an amount between €0.0077 (column 1) and €0.0016 (column 3) for every euro of capital, which represents an increase of around 14% relative to the pre-reform mean of €0.072 per euro of capital. We find a similar result for tangible investment, which increases by €0.0060 (column 5) for every euro of capital, a 11% increase relative to its pre-reform sample mean of €0.053 per euro of capital. In Panel

B, we report the estimates after accounting for book depreciation and again find similar, albeit smaller, point estimates across all different specifications, both for tangible and total investment.

Assuming a new dividend tax rate of 46% and focusing on total investment, the dividend tax increase has an effect of +€0.010 per euro of capital, with a standard error of €0.0012, relative to the pre-reform sample mean of €0.072 per euro of capital. This implies an elasticity of total investment relative to one-minus-the-tax rate of 38%, with a 95% confidence interval between 30% to 48%.[30]

Table 4: Effect on Investment

Dependent Variable	Total Investment			Tangible Investment		
	(1)	(2)	(3)	(4)	(5)	(6)
			Panel A: Gross Investment			
Treated×Post	0.0077***	0.010***	0.016***	0.0044***	0.0060***	0.0093***
	(0.0011)	(0.0012)	(0.0012)	(0.00080)	(0.00084)	(0.00083)
			Panel B: Net Investment			
Treated×Post	0.0076***	0.0086***	0.013***	0.0056***	0.0059***	0.0089***
	(0.00096)	(0.00099)	(0.00099)	(0.00069)	(0.00071)	(0.00071)
Fixed Effects						
Firm	✓	✓	✓	✓	✓	✓
Size growth× Year	✓	✓	✓	✓	✓	✓
Industry × Year	—	✓	✓	—	✓	✓
County × Year	—	✓	✓	—	✓	✓
Time Varying Controls	—	—	✓	—	—	✓
Observations	1,405,436	1,405,436	1,405,426	1,405,453	1,405,453	1,405,443

This table shows the effect of the 2013 dividend tax increase on investment. Total investment includes tangible (property, plant and equipment) and intangible (software, patents, licences) investment. Net investment is total investment minus depreciation. Pre-reform sample means for the dependent variables are 0.072 (total gross investment), 0.053 (tangible gross investment), 0.007 (total net investment) and -0.0003 (tangible net investment). All variables are scaled by total capital in 2011. Time-varying controls are: liquidity (cash over lagged assets), leverage (total debt over lagged assets) and profitability (operating income over lagged assets). Time-varying controls are the value of the control before the shock interacted with year fixed effects. Standard errors are clustered at the firm level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Within-treatment identification. 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 size growth bin, local labor market

30. The elasticity is estimated as follows: (0.010/0.072)/(0.3/0.845). The confidence interval is obtained by replacing 0.010 by 0.010 +/- 1.9 times the standard error of 0.0012.

and industry, 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, we exploit variation *within* SARL firms in the intensity of exposure to the reform. We sort firms based on how much dividends they paid before the reform and split firms into two groups, high and low-dividend payers pre-reform. We can 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 compute the average amount of dividends paid before the reform for the treated group of firms and split firms along the sample median. 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:

$$\begin{aligned} Y_{i,j,c,t} = \beta\ & Treated_i \times Post \times High\ Dividends_i + \theta_i \\ & + High\ Dividends_i \times \delta_{j,t} + \ High\ Dividends_i \times \gamma_{c,t} \\ & + High\ Dividends_i \times Size\ Growth\ Bin_{i,t} + Treated_i \times \lambda_t + \ \varepsilon_{i,j,c,t} \end{aligned}$$

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.[31]

Table 5 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 exploit within treated group variation, across high and low-dividend payers pre-reform. For each outcome (dividends, total investment, employment), the interaction *Treated*×*Post*×*High-Dividends*$_i$ is highly significant and either of larger magnitude (for dividends, column 2) or around half

31. 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.

the magnitude (for investment column 4, and for employment column 6) as the baseline coefficient. This implies that all the baseline effect is driven by firms more exposed to the reform that were paying more dividends prior to the tax hike, which strongly attenuates the risk that our results are driven by other concurrent shocks that could have differentially affected SARL (treated) or SAS (control) firms.

Table 5: Effect on Investment: Within Treated Group Comparison

Dependent Variable	Dividends		Total Investment		Employment	
	(1)	(2)	(3)	(4)	(5)	(6)
Treated×Post	-0.031***		0.010***		0.025***	
	(0.0024)		(0.0012)		(0.0018)	
Treated ×Post × High Dividends		-0.064***		0.0048**		0.0081***
		(0.0034)		(0.0023)		(0.0026)
Fixed Effects						
Firm	✓	✓	✓	✓	✓	✓
Size growth× Year	✓	✓	✓	✓	✓	✓
Industry × Year	✓	✓	✓	✓	✓	✓
County × Year	✓	✓	✓	✓	✓	✓
Treated × Year	—	✓	—	✓	—	✓
Observations	1,410,567	1,407,866	1,406,087	1,403,711	1,409,167	1,404,796

This table shows the effect of the 2013 dividend tax increase on dividends and investment. 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-dividends pre-reform* 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.

Robustness. We report all the robustness tests in the Appendix. First, we estimate event studies for all the different outcomes, with different levels of fixed effects (from just firm-by-year to the fully saturated specification) in Appendix F.2. We also report the raw evolution for dividends and investment in Figure A.11 and A.12 respectively. Overall, the results are very stable and do not depend on the inclusion of certain fixed effects.

Second, we test the sensitivity of the results to different sample selection. We start with the universe of firms, including publicly listed firms, and estimate equation 1 for dividends and total investment and report the results in Appendix Table A.7. We then progressively restrict the sample either from below (removing the bottom 5%) or from above (removing the top 1%, then top 10%). Across all sample selections, the results are very stable.

Third 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 A9. Results are unaltered.

Fourth, we test for possible lumpiness in investment. For different thresholds of investment, we create a dummy equal to one if the firm investment experiences a "jump" above this threshold to test the extensive margin, and then separately estimate the intensive margin when we observe a jump and when we do not. Table A6 shows evidence of lumpiness.

4.2 Discussion of magnitudes

The elasticity of investment with respect to the change in taxes is meaningful. We estimate that a 1% change in the tax rate causes treated firms to increase their investment by 0.38%.

A more natural way to interpret the economic magnitude of this tax-induced change in investment 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 payouts by €0.03 per euro of capital while increasing their investment by roughly €0.01 per euro of capital, implying a pass-through of this "retained earnings shock" of 0.3.

To gauge the magnitude of this pass-through of 0.3, 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 0.30 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 investment, it does not tell us anything about the *quality* of this investment, i.e. whether these new investments

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 useful to think about the size of the effect.

are economically profitable or essentially "wasteful," which is a classic caveat of the literature studying firm investment. Two set of results suggest that treated firms use the tax-induced increase in unpaid dividends to seize profitable new investment opportunities rather than engaging in wasteful investment. First, we look at the consequence of this tax reform on the performance of the average treated firm in Section 4.3. Second, we explore the heterogeneity in investment response as a function of new investment opportunities and average marginal return to capital in Section 5.1.

4.3 Effect on firm performance

We investigate how the increase in dividend taxes and investment affects firm performance in Table 6. Following the tax hike, sales (column 1) and value-added (column 2) of treated firms increase by 1.9% and 2.1% respectively, while productivity, if anything, slightly increases (column 3).

In column 4, 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) 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).

5 Reallocation of investment across firms

In this section, we explore heterogeneity in the investment 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 average investment masks large reallocation of investment across firms in favor of inefficient firms with limited investment opportunities or firms with investments generating low returns to capital.

5.1 Profitable or wasteful investment?

Investment opportunities. To test if investment opportunities affect the way treated entrepreneurs react to the reform, we use a classic leave-one-out approach

Table 6: Effect on Firm Performance

Dependent Variable	Log(Sales)	Log(VA)	Productivity	Prob(exit)
	(1)	(2)	(3)	(4)
Treated×Post	0.019***	0.021***	0.0046***	-0.016***
	(0.0016)	(0.0019)	(0.0014)	(0.0017)
Fixed Effects				
Firm	✓	✓	✓	✓
Size growth× Year	✓	✓	✓	✓
Industry × Year	✓	✓	✓	✓
County × Year	✓	✓	✓	✓
Observations	1,413,788	1,413,788	1,409,155	1,698,941

This table shows the effect of the 2013 dividend tax increase on firm performance. In column 3, *Productivity* is defined as the residual of the regression log(value-added) on capital and labor (in logs). In column 4 *Exit* is a dummy variable that equals one if the firm exited the sample in year t+1. Column 5 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. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

and compute the investment growth rate post-reform at the industry-by-county level. We then sort firms into terciles of investment opportunities and reestimate 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 investment to the tax shock across the three bins. While a change in the dividend tax rate has no effect for firms facing the lowest investment opportunities (column 1), the difference becomes significant and economically meaningful between the two groups of entrepreneurs when investment opportunities increase (columns 2 and 3). Relative to control entrepreneurs, treated entrepreneurs increase their investment by an extra 1.7% of their capital (column 3), which represents an increase of 19% relative to the pre-reform sample mean investment of these firms.[33]

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

33. The difference across terciles is statistically significant at least at the 5%.

Table 7: Sensitivity of Investment Results

Dependent Variable	Investment					
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	0.0026	0.0094***	0.017***	0.0052***	0.0095***	0.012***
	(0.0018)	(0.0019)	(0.0023)	(0.0017)	(0.0017)	(0.0026)
Fixed Effects						
Firm	✓	✓	✓	✓	✓	✓
Size growth× Year	✓	✓	✓	✓	✓	✓
Industry × Year	✓	✓	✓	✓	✓	✓
County × Year	✓	✓	✓	✓	✓	✓
Observations	468,565	468,852	467,960	469,241	467,952	466,718

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 MRPK (construction explained in Section 5.1. Standard errors are clustered at the firm level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

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 an industry share the same α_j^k, $\frac{Revenue_{it}}{K_{it}}$ is a within-industry measure of MRPK. 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 (the last year prior to the tax change). We then sort firms into terciles within each industry and reestimate 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 investment 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 investment 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 increasing their investment by 1.2% of capital, four times more than firms in the first tercile.

Note that because all the effects are estimated with size growth bin-by-year fixed effects and MRPK is computed within industries, it is unlikely that our effects are driven by the fact that firms with limited capital (for instance because they are in industries with mostly intangible capital like consulting) react more to the reform and have higher MRPK.

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).[34]

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.[35] 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 invest.

Our results strongly suggest that the tax-induced increase in investment 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 do not expand their investment more relative to low-dividend payers when investment opportunities are low, or when the expected returns to investment are low. These two results imply that entrepreneurs are not willing to waste their undistributed earnings, 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 and increase more their wasteful investment, the intertemporal tax arbitrage

34. 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).

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

view predicts the opposite.[36] Table A.10 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. In Appendix Table A.11, we test whether we find a differential response based on how closely-held the firm is for a subsample of firms that we can match with information on their shareholder composition. We find no difference in investment and dividend responses for firms with no outside shareholders relative to firms with at least one shareholder not from the family of owner-manager.[37]

It is important to stress that while the reform led to a reallocation of investment 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 investment for treated entrepreneurs and potentially reduced their well-being. However, our results show that in partial equilibrium, the reform leads to new investments that are likely to have been profitable and that therefore increase the amount of wealth created by treated firms.

While so far the reallocation of investment 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,

36. 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.

37. We want to stress that we have limited variations since the vast majority of firms are held almost at 100% by the family of the manager. Nonetheless, this still provide no support in favor of the agency view.

leading to lower investment 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 of space, we report the empirical results and discuss the detail of the construction in Appendix G. We reestimate 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 investment.

Overall, the distributive effects of the reform point to a reallocation of investment 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 investment of the average firm and for the reallocation of investment across firms.

6 Additional margins of adjustments

Since treated firms after the tax hike reduce their dividend payments and only reinvest a third of it, two-thirds remain "missing." In this section, we leverage the detailed data from the tax-files to track where the additional undistributed money flows.

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.[38]

38. 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.

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 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.

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 fraction of euros of revenues transformed to euros of value-added.[39]

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. Most coefficients are precisely estimated zeros. Therefore, the hypothesis of "income-shifting" appears to have limited support in the data.[40]

39. We do not scale by 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 intermediary goods.

40. 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.

Some of the investment results might be consistent with this income-shifting hypothesis, but we view this interpretation as implausible. For instance, if the owner-manager buys a company car, it will be recorded in the data as an investment. However, this explanation would imply that treated firms should increase their investment irrespective of their ex-ante level of MRPK or their ex-post investment opportunities, in particular when they used to pay a lot of dividends before the tax-hike. The fact that entrepreneurs facing the tax increase prefer to leave the cash in the firm instead of investing suggests that while not impossible, these types of wasteful investments are unlikely to have increased after the reform.

Table 8: No Evidence of Income-Shifting

Dependent variable / Sales	Intermediate Goods	Intermediate Services	Raw Materials	Value-added
	(1)	(2)	(3)	(4)
Treated×Post	-0.00067**	0.00034	0.00072**	-0.00071**
	(0.00032)	(0.00026)	(0.00033)	(0.00034)
Fixed Effects				
Firm	✓	✓	✓	✓
Size growth× Year	✓	✓	✓	✓
Industry × Year	✓	✓	✓	✓
County × Year	✓	✓	✓	✓
Observations	1,413,788	1,413,788	1,413,788	1,413,788
Mean LHS	.21	.12	.25	.42

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 sales. Standard errors are clustered at the firm level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

6.2 Balance sheet adjustments

Entrepreneurs of treated firms are reinvesting only a fraction of their undistributed dividends and do not seem to shift part of their consumption to take money out from their firm without paying taxes. Therefore, the remainder of the undistributed dividends should accumulate in the firm balance sheet as gross working capital, either in the form of liquidity (defined as cash and short-term investment) or in the form of credit to their customers.[41] They could also use this extra cash to repay their suppliers faster, increasing their net working capital (gross working capital minus short-term liabilities).

41. Owner-managers could also decide to produce more and store the extra products as inventories, but this accounts for a small fraction of a firm's working capital.

To trace out the change in net working capital, we estimate equation (1) with different dependent variables, where each dependent variable is an item of the firm balance sheet scaled by capital. We also decompose and report the *Post* dummy into four dummies for each year after the reform to see if undistributed earnings accumulate over time.

Table 9 reports the results. Column 1 reports the effect for net working capital. If all these undistributed dividends were used to expand the firm's working capital or to reduce its short-term liabilities, we should observe a constant increase of this item over time, which is precisely what we see. This expansion in net working capital is driven for the largest part by the accumulation of liquidity (column 2). Over time, treated firms continuously increase their liquidity, which increased on average by 8.4 p.p. 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 lagged sales. We find that while treated firms appear to obtain slightly more credit from their suppliers, the point estimate is very small. At the same time, treated firms extend even more credit to their customers such that in net, treated firms increase their credit to other firms in the economy.

Table 9: Balance Sheet Adjustments

Dependent variable	Net Working Capital/ Capital	Liquidity/ Capital	Supplier Debt/ Capital	Customer Debt/ Capital	Supplier Debt/ Sales	Customer Debt/ Sales
	(1)	(2)	(3)	(4)	(5)	(6)
Treated×Post	0.10***	0.084***	0.032***	0.080***	-0.00011	0.0020***
	(0.014)	(0.010)	(0.0073)	(0.011)	(0.00029)	(0.00037)
Fixed Effects						
Firm	✓	✓	✓	✓	✓	✓
Size growth× Year	✓	✓	✓	✓	✓	✓
Industry × Year	✓	✓	✓	✓	✓	✓
County × Year	✓	✓	✓	✓	✓	✓
Observations	1,404,803	1,405,070	1,404,806	1,405,236	1,413,788	1,413,788

This table shows the effect of the 2013 dividend tax increase on the firm balance sheet. Net working capital is defined as gross working capital (liquidity plus account receivables plus inventory) minus short-term liabilities. Liquidity 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 lagged sales. 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 investment 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 drop in investment, in contradiction with the increase in investment 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 unambiguously support the intertemporal tax arbitrage view. Firms cut their dividends uniformly, but only use the additional retained earnings to invest more when they have profitable investment opportunities. 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 reinvesting it. 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 investment 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 country (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).[42] In the case of a tax increase

42. 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.

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 A.12, 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 panel A of Table 7 that the increase in investment only happens for firms facing 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 counterbalance 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.[43]

7.3 Evolution of investment 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

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

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 no profitable investment projects (which explains why they are distributing dividends) toward firms with profitable investment projects. 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 this 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 with no investment opportunities do not increase their investment but 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 no investment opportunities to firms with investment opportunities, 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 increase its investment. For every €1 of dividend not distributed, treated firms reinvested €0.3. This increase for the average firm was also accompanied by a positive reallocation of investment 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 investment without sacrificing the quality, leading to a reduction in capital misallocation in the economy.

References

Alstadsæter, Annette, Martin Jacob, and Roni Michaely. 2017. "Do dividend taxes affect corporate investment?" *Journal of Public Economics* 151:74–83.

Angrist, JD, and JS Pischke. 2008. *Mostly harmless econometrics: An empiricist's companion.* March.

Auerbach, Alan. 1979. "Wealth Maximization and the Cost of Capital." *Quarterly Journal of Economics* 93 (3): 433–446.

Bach, Laurent, Antoine Bozio, Brice Fabre, Arthur Guillouzouic, Claire Leroy, and Clement Malgouyres. 2019. "Follow the money! Combining household and firm-level evidence to unravel the tax elasticity of dividends." *Working Paper,* 1–44.

Baker, Malcolm, Stefan Nagel, and Jeffrey Wurgler. 2007. "The effect of dividends on consumption." *Brookings Papers on Economic Activity,* no. 1, 231–276.

Bau, Natalie, and Adrien Matray. 2020. "Misallocation and Capital Market Integration: Evidence from India." *NBER Working Paper.*

Becker, Bo, Marcus Jacob, and Martin Jacob. 2013. "Payout taxes and the allocation of investment." *Journal of Financial Economics* 107 (1): 1–24.

Benzarti, Youssef, Dorian Carloni, Jarkko Harju, and Tuomas Kosonen. 2020. "What Goes Up May Not Come Down: Asymmetric Incidence of Value-Added Taxes." *Journal of Political Economy* 128 (12): 4438–4474.

Bosch, Nicole, and Bas van der Klaauw. 2012. "Analyzing female labor supply — Evidence from a Dutch tax reform." *Labour Economics* 19 (3): 271–280.

Bozio, Antoine, Thomas Breda, and Julien Grenet. 2018a. "Tax-Benefit Linkage and Incidence of Social Security Contributions : Evidence from France." *Working Paper.*

Bradford, David F. 1981. "The incidence and allocation effects of a tax on corporate distributions." *Journal of Public Economics* 15 (1): 1–22.

Buera, Francisco, Joseph Kaboski, and Yongseok Shin. 2011. "Finance and Development: A Tale of Two Sectors." *American Economic Review* 101 (5): 1964–2002.

Chaney, Thomas, David Sraer, and David Thesmar. 2012. "The Collateral Channel: How Real Estate Shock Affect Corporate Investent." *American Economic Review* 102 (6): 2381–2409.

Chetty, Raj, and Emmanuel Saez. 2005. "Dividend taxes and corporate behavior: Evidence from the 2003 dividend tax cut." *Quarterly Journal of Economics* 120 (3): 791–833.

———. 2010. "Dividend and Corporate Taxation in an Agency Model of the Firm." *American Economic Journal: Economic Policy* 2 (3): 1–31.

De la O, Ricardo. 2020. "The effect of buybacks on capital allocation." *Working Paper.*

Delatte, Anne Laure, Adrien Matray, and Noemie Pinardon Touati. 2020. "Private Credit Under Political Influence: Evidence from France." *Working Paper.*

Feldstein, Martin S. 1970. "Corporate Taxation and Dividend Behaviour." *Review of Economic Studies* 37 (1): 57–72.

Finkelstein, Amy, Nathaniel Hendren, and Erzo F. P. Luttmer. 2019. "The Value of Medicaid: Interpreting Results from the Oregon Health Insurance Experiment." *Journal of Political Economy* 127 (6): 2836–2874.

Fonseca, Julia, and Bernardus Van Doornik. 2021. "Financial Development, Labor Markets, and Aggregate Productivity: Evidence from Brazil." *Journal of Financial Economics,* no. forthcoming.

Gan, Jie. 2007. "Collateral, debt capacity, and corporate investment: Evidence from a natural experiment." *Journal of Financial Economics* 85 (3): 709–734.

Gelber, Alexander M, Adam Isen, and Jae Song. 2016. "The Effect of Pension Income on Elderly Earnings: Evidence from Social Security and Full Population Data." *Working Paper.*

Giroud, Xavier, and Joshua Rauh. 2019. "State Taxation and the Reallocation of Business Activity: Evidence from Establishment-Level Data." *Journal of Political Economy* 127 (3): 1262–1316.

Gordon, Roger, and Joel Slemrod. 1998. "Are"Real" Responses to Taxes Simply Income Shifting Between Corporate and Personal Tax Bases?" *NBER Working Paper.*

Gordon, Roger H, and Jeffrey K MacKie-Mason. 1994. "Tax distortions to the choice of organizational form." *Journal of Public Economics* 55 (2): 279–306.

Gourio, François, and Jianjun Miao. 2010. "Firm Heterogeneity and the Long-Run Effects of Dividend Tax Reform." *American Economic Journal: Macroeconomics* 2 (1): 131–168.

Harberger, Arnold. 1962. "The Incidence of the Corporation Income Tax." *Journal of Political Economy* 70 (3): 215–240.

Hombert, Johan, and Adrien Matray. 2016. "The Real Effects of Lending Relationships on Innovative Firms and Inventor Mobility." *Review of Financial Studies* 30 (7): 2413–2445.

———. 2019. "Technology Boom, Labor Reallocation, and Human Capital Depreciation." *Working Paper,* 1–42.

Hsieh, Chang-Tai, Erik Hurst, Charles I Jones, and Peter J Klenow. 2019. "The Allocation of Talent and U.S. Economic Growth." *Econometrica* 87 (5): 1439–1474.

Hsieh, Chang-Tai, and Peter J Klenow. 2009. "Misallocation and manufacturing TFP in China and India." *Quarterly Journal of Economics* 124 (4): 1403–1448.

Insee. 2015. "Déclarations annuelle de données sociales : fichiers Salariés - 2012." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.137.1404.V1.

Insee. 2016g. "Déclarations annuelle de données sociales : fichiers Salariés - 2008." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.137.1544.V1.

———. 2016h. "Déclarations annuelle de données sociales : fichiers Salariés - 2009." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.137.1545.V1.

———. 2016i. "Déclarations annuelle de données sociales : fichiers Salariés - 2010." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.137.1546.V1.

———. 2016j. "Déclarations annuelle de données sociales : fichiers Salariés - 2011." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.137.1547.V1.

———. 2016k. "Déclarations annuelle de données sociales : fichiers Salariés - 2013." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.137.1503.V1.

———. 2016l. "Déclarations annuelle de données sociales : fichiers Salariés - 2014." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.137.1988.V1.

———. 2017b. "Déclarations annuelle de données sociales : fichiers Salariés - 2015." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.137.2467.V1.

———. 2018a. "Base non salariés - 2008." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.320.2563.V1.

———. 2018b. "Base non salariés - 2009." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.320.2564.V1.

———. 2018c. "Base non salariés - 2010." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.320.2565.V1.

———. 2018d. "Base non salariés - 2011." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.320.2566.V1.

———. 2018e. "Base non salariés - 2012." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.320.2567.V1.

———. 2018f. "Base non salariés - 2013." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.320.2568.V1.

———. 2018g. "Base non salariés - 2014." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.320.2569.V1.

———. 2018h. "Base non salariés - 2015." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.320.2742.V1.

———. 2019a. "Base non salariés - 2016." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.320.3121.V1.

———. 2019b. "Base Tous Salariés : fichiers Salariés - 2016." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.137.3040.V2.

Insee. 2020b. "Base non salariés - 2017." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.320.3337.V1.

———. 2020c. "Base Tous Salariés : fichiers Salariés - 2017." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.137.3290.V1.

Insee and Ministère Des Finances (DGFiP). 2013. "Fichier approché des résultats d'Esane - 2011." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.42.860.V1.

———. 2014a. "Fichier approché des résultats d'Esane - 2008." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.42.551.V1.

———. 2014b. "Fichier approché des résultats d'Esane - 2009." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.42.552.V1.

———. 2014c. "Fichier approché des résultats d'Esane - 2010." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.42.124.V1.

———. 2014d. "Fichier approché des résultats d'Esane - 2012." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.42.1026.V1.

———. 2014e. "Fichier de comptabilité unifié dans SUSE - 2007."

———. 2015a. "Fichier approché des résultats d'Esane - 2013." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.42.1027.V1.

———. 2016a. "Fichier approché des résultats d'Esane - 2014." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.42.1268.V1.

———. 2017a. "Fichier approché des résultats d'Esane - 2015." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.42.2697.V1.

———. 2018a. "Fichier approché des résultats d'Esane - 2016." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.42.2697.V1.

———. 2019a. "Fichier approché des résultats d'Esane - 2017." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.42.3127.V1.

Isakov, Dušan, Christophe Pérignon, and Jean-Philippe Weisskopf. 2021. "What If Dividends Were Tax-Exempt? Evidence from a Natural Experiment." *Review of Financial Studies.*

Jacob, Martin. 2020. "Dividend Taxes, Employment, and Firm Productivity." *Working Paper.*

Kaplan, Steven, and Luigi Zingales. 1997. "Do Investment-Cash Flow Sensitivities Provide Useful Measures of Financing Constraints?" *Quarterly Journal of Economics* 112 (1): 169–215.

Kehrig, Matthias. 2015. "The Cyclical Nature of the Productivity Distribution." *Working Paper.*

Kehrig, Matthias, and Nicolas Vincent. 2019. *Good Dispersion, Bad Dispersion.* NBER Working Paper 25923. National Bureau of Economic Research, June.

King, Mervyn A. 1977. *Public policy and the corporation* [in English]. Cambridge studies in applied econometrics ; no. 3. New York: Wiley.

Korinek, Anton, and Joseph Stiglitz. 2009. "Dividend taxation and intertemporal tax arbitrage." *Journal of Public Economics* 93 (1): 142–159.

Lamont, Owen. 1997. "Cash Flow and Investment: Evidence from Internal Capital Markets." *Journal of Finance* 52 (1): 83–109.

Lin, Leming, and Mark J Flannery. 2013. "Do personal taxes affect capital structure? Evidence from the 2003 tax cut." *Journal of Financial Economics* 109 (2): 549–565.

Midrigan, Virgiliu, and Daniel Yi Xu. 2014. "Finance and Misallocation: Evidence from Plant-Level Data." *American Economic Review* 104 (2): 422–458.

Moon, Terry S. 2021. "Capital Gains Taxes and Real Corporate Investment." *Working Paper.*

Ohrn, Eric, and Nathan Seegert. 2019. "The impact of investor-level taxation on mergers and acquisitions." *Journal of Public Economics* 177:104038.

Poterba, James, and Lawrence Summers. 1983. "Dividend taxes, corporate investment, and 'Q'." *Journal of Public Economics* 22 (2): 135–167.

Rauh, Joshua. 2006. "Investment and Financing Constraints: Evidence from the Funding of Corporate Pension Plans." *Journal of Finance* 61 (1): 33–71.

Ring, Marius. 2020. "Wealth Taxation and Household Saving: Evidence from Assessment Discontinuities in Norway." *Working Paper.*

Sinn, Hans-Werner. 1991. "The Vanishing Harberger Triangle." *Journal of Public Economics* 45 (3): 271–300.

Sraer, David Alexandre, and David Thesmar. 2020. "How to Use Natural Experiments to Measure Misallocation." *Working Paper.*

Xu, Chenzi. 2022. "Reshaping Global Trade: The Immediate and Long-Run Effects of Bank Failures." *Quarterly Journal of Economics - forthcoming.*

Yagan, Danny. 2015. "Capital Tax Reform and the Real Economy: The Effects of the 2003 Dividend Tax Cut." *American Economic Review* 105 (12): 3531–3563.

Online Appendix

Definition of variables

Variable	Definition
Productivity	Residual from the regression value-added on capital and labor (all in logs), estimated separately for each 2 digit industries
Total investment	Total Capital$_t$ -Total Capital$_{t-1}$
Tangible investment	Tangible Capital$_t$ -Tangible Capital$_{t-1}$
Total capital	Tangible capital + Intangible capital
Tangible capital	property, plants and equipment
Liquidity	cash + short-term investment
Net working capital	Current assets - current liabilities

Additional construction detail for some variables

All the code for the construction is available online and a detailed readme file explains how to get access to the data. The local labor market comes from the file Insee (2020) and is matched with firms using the city ("code commune") unique identifier. Subsidiaries are identified by using the dataset Lifi 2012–2017 (INSEE and DGFIP, 2013–2018) and "Enquete Lifi" 2008–2012 (INSEE, 2009–2013). The dataset allow to identify firms belonging to a business group to determine the ownership structure using a yearly survey of business groups by INSEE called "Enquête Liaisons Financieres (LIFI)." It covers all economic activities. Since 1998, the survey has been cross-checked with information from Bureau Van Dijk.

The data to produce the evolution of the number of new firms in Figure A.10 come from SIRENE 2007–2019 (INSEE, 2008–2020).

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.[44] 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.[45]

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

45. 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."

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 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.[46]

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

46. 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.

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.[47].

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) .

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

Dependent Variable	log(CEO Wage)		Dividend / Capital	
	(1)	(2)	(3)	(4)
SARL firm	-0.28***	-0.27***	-0.029***	-0.014***
	(0.0063)	(0.0066)	(0.0046)	(0.0026)
Fixed Effects				
Size× Year	—	✓	—	✓
Industry × Year	—	✓	—	✓
County × Year	—	✓	—	✓
Observations	584,559	584,559	593,939	593,939

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.

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

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.[48] 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 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.[49]

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.[50] The article reports that they lobbied Emmanuel Macron, then Secretary of Treasury (Minister of Economics and Finance), that finally man-

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

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

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

aged 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.[51] 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.[52]

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.[53] 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

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

52. 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.

53. 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.

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.[54]

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. 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 A.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.[55] Therefore, to be able to visualize the bunching, we restrict the sample

54. 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.

55. 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

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 A.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.[56] 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 A.2, we display the bunching analysis when we do not cut the distribution 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.

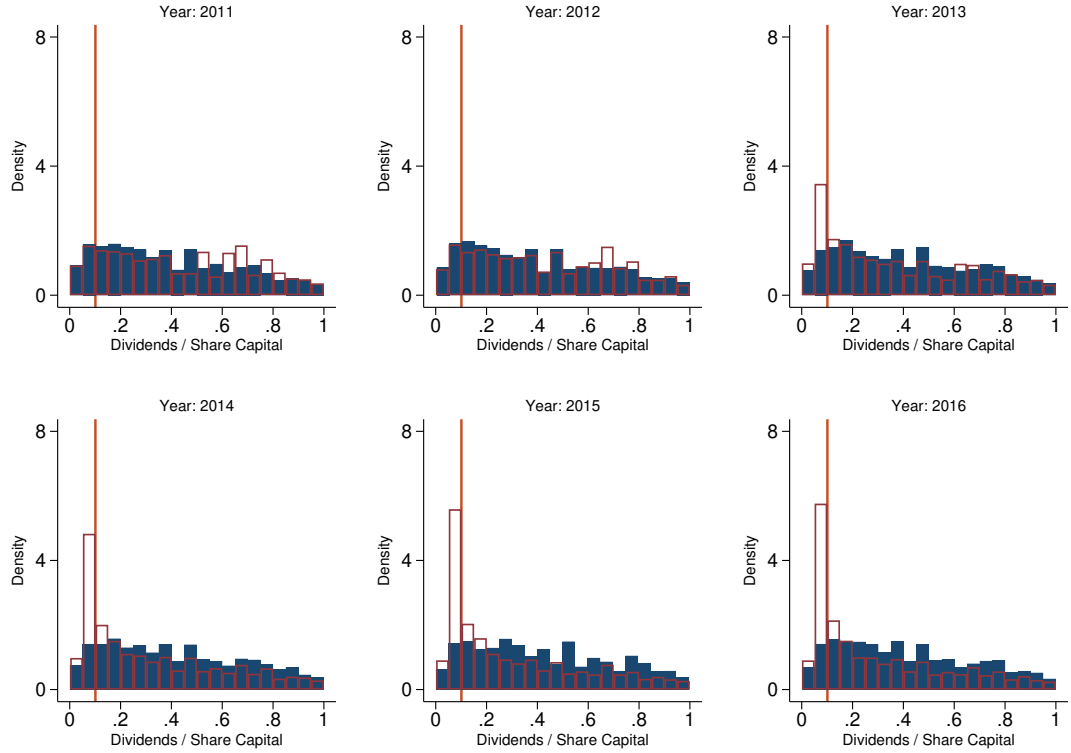
- Dividends are decided the day of the Shareholders General Meeting, who meet when the firm closes its annual account.

- 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 for months of April–December 2012.

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.

56. 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 A.1: Dividend Payment Around the 10% Threshold of Share Capital

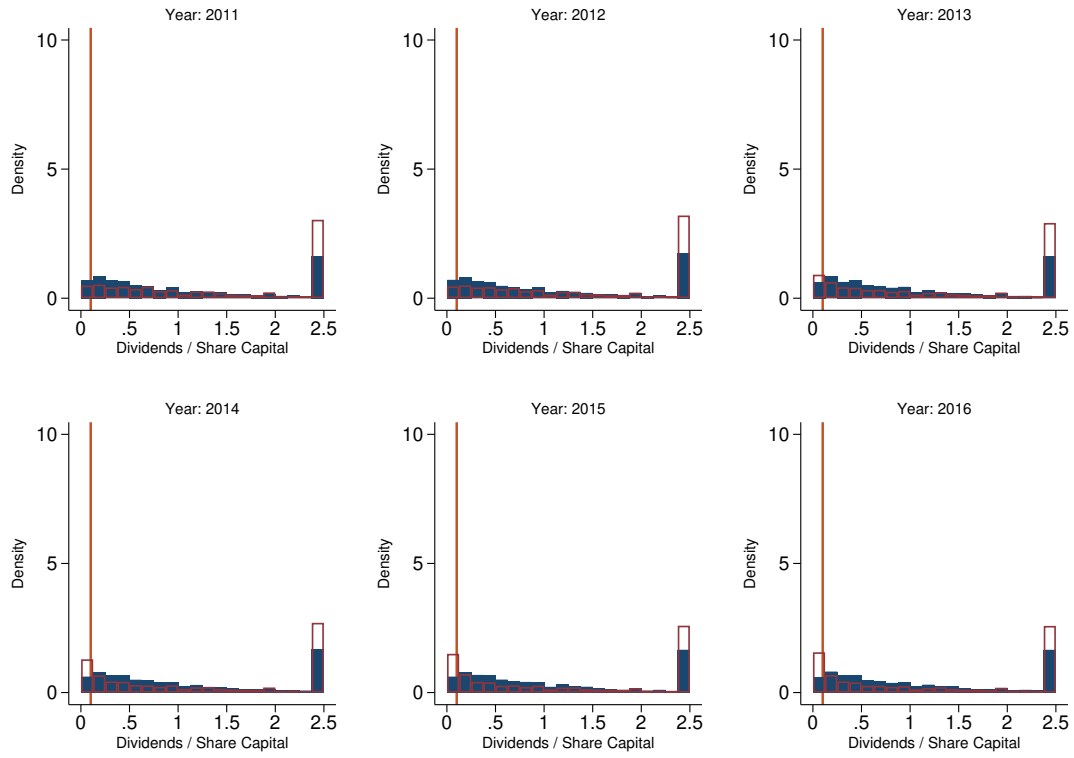


The figure plots the distribution of the ratio of dividends over share capital for the years 2011–2016 when we restrict the distribution to firms paying some dividends, but paying less than 100% of the firm's share capital. The x-axis is the ratio dividend/share capital (in percentage). The y-axis is 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.

This creates essentially two groups of firms. First, firms that close their annual account in December and can react to the announcement in November 2012 (but have a very short window for doing so), which will be able to pay the lower rate on all of their 2012 dividends. However, these firms will have to pay the new tax rate on *all* the dividends paid in 2013. Second, firms that close their annual account before the fiscal month of December (i.e., January–November). These firms could not adjust their dividend payments in 2012 since it was decided before the law is introduced. In 2013, they will only pay part of the new tax rate, and fully the new tax rate in 2014.

To test if we observe a differential reaction, we estimate our baseline regression but split firms between those that close their annual account before November, and those that close their annual account after. Figure A.3 reports the results. We find that indeed, while the group of firms that close their annual account before November paid more dividends in 2013 and only reached the lowest level of

Figure A.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).

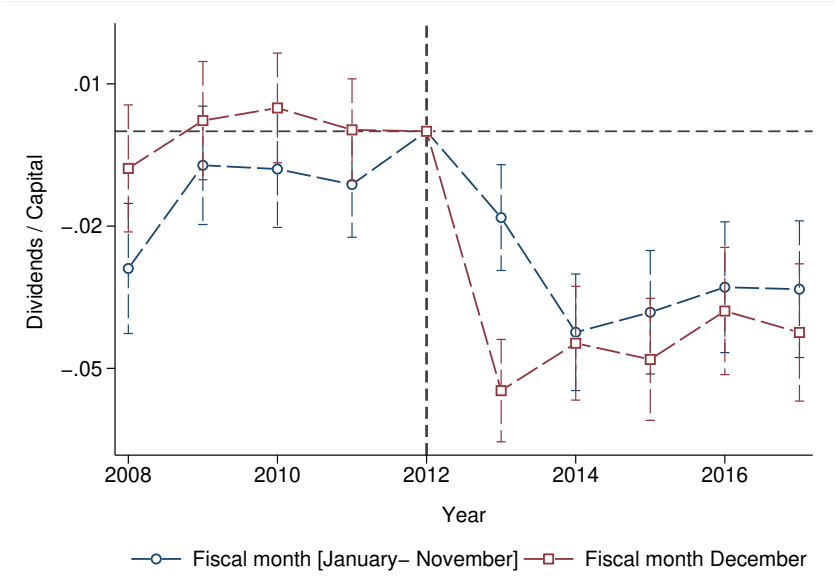
dividends payment in 2014, firms that have to pay the new tax rate on the total amount of dividends paid adjusted their dividends immediately in 2013.

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

Figure A.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 estimator 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.

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 5 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 com-

plementary 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.[57]

D.1 Share of French Economy

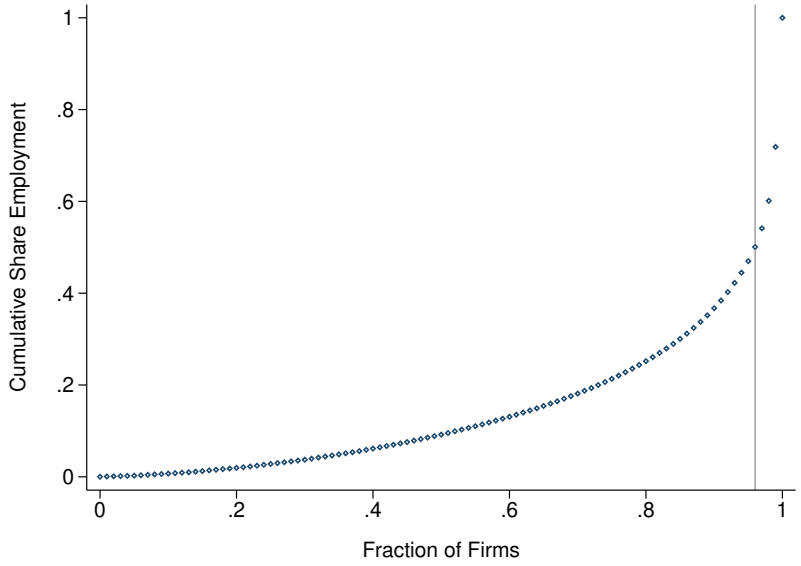
In Figure A.4, we plots the cumulative density function of firms by size. In Figure A.5, we plot the cumulative distribution of firm size (using employment) for treated and control firms separately. In Figure A.6, we plots the shares of employment, investment and value-added of by treated firms in the sample.

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 A.7). We find the same similarity when looking at the sectoral composition (Figure A.8).

57. 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 A.4: 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.

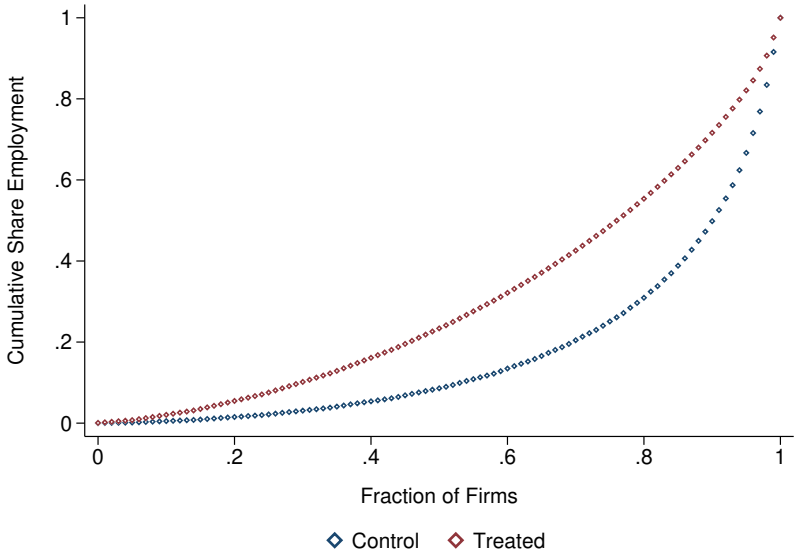
Eurostat, the European statistical office in charge of harmonizing data across European countries, produces many statistics to help us understand how France compares to the rest of Europe. We use data from structural business statistics (SBS), which gathers administrative data from members of the European 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 A.7 shows the distribution when we sort countries in ascending order of the share of small firms in the economy.

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 A.8 and find very similar distributions in economic

Figure A.5: Firm Size Distribution: Treated vs. Control



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

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.[58] 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 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}.

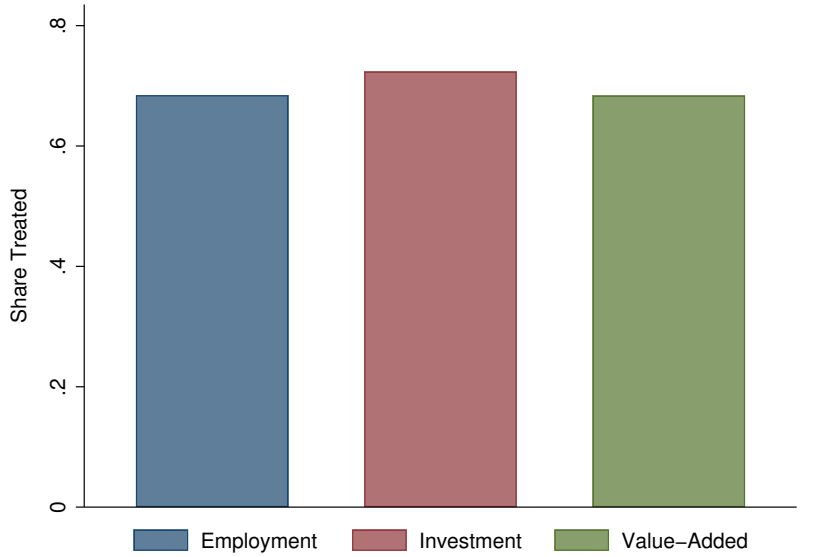
To estimate the value of β, we can simply estimate the following equation:

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

where $Rank$ is the position of the firm in the distribution and $Size$ is the number

58. See Axtell (2001) for the U.S.; Fujiwara, Di Guilmi, Aoyama, Gallegati, and Souma (2004) for Europe; and Figure A.9 for a replication of the distribution in our sample.

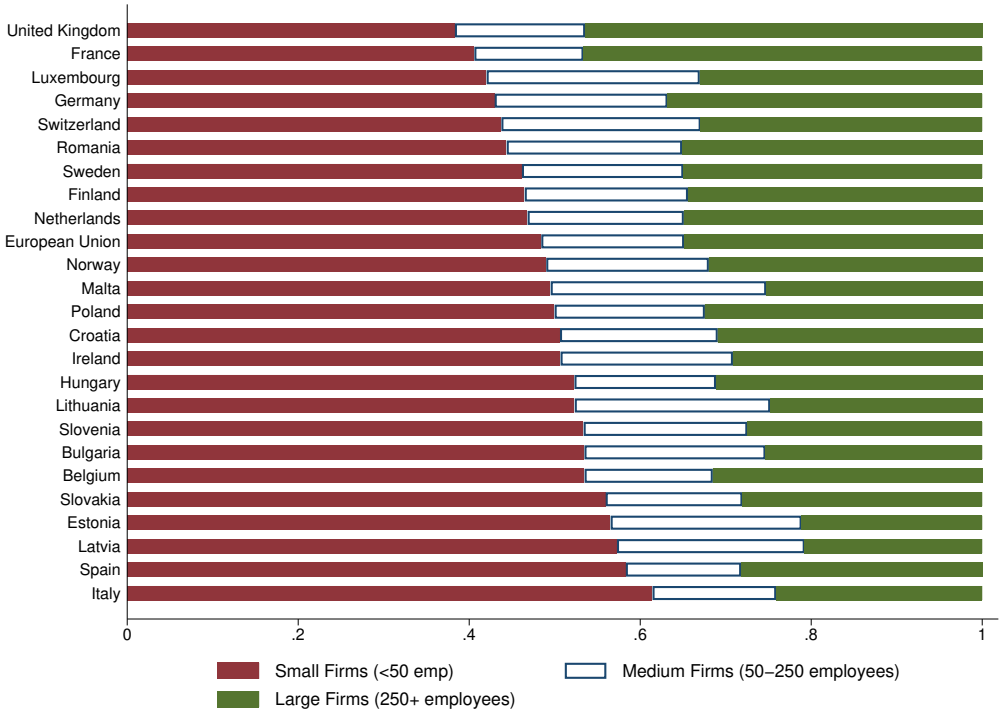
Figure A.6: Share Treated Firms



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

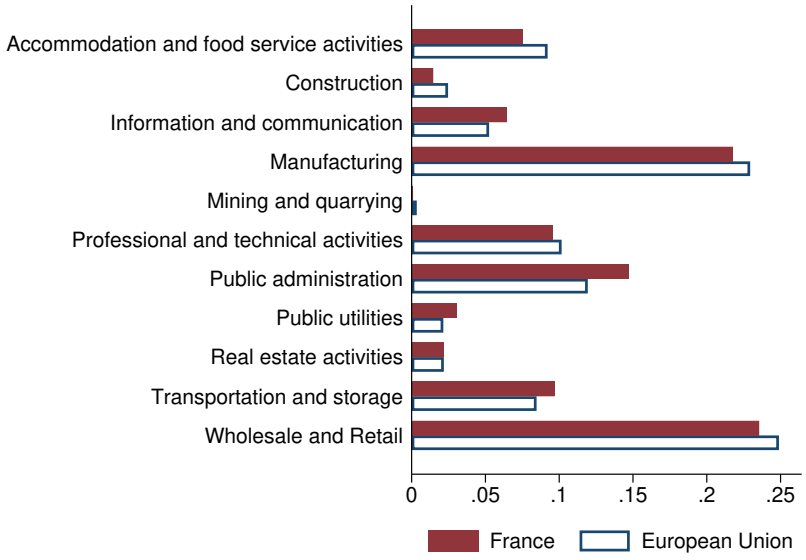
of employees. When the slope (or power law exponent) is equal to one, we say that the distribution follows a Zipf's law, based on a name of the Harvard linguist who first gathered evidence of the existence of such distribution. To estimate the relation for France, I follow Axtell (2001) who estimates 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 A.7: Firm Size Distribution in Europe



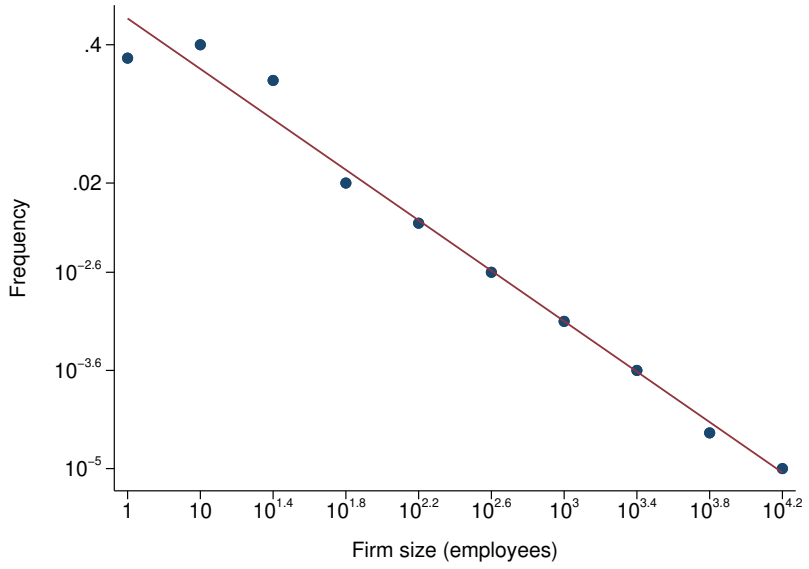
This figure plots the distribution of firm size across different European countries. Data comes from Eurostat.

Figure A.8: 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.

Figure A.9: Firm Size Distribution: Zipf's Law for France



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

E Shareholder Data

SARL firms are affected by the reform if the manager owns, jointly with its family, at least 50% of the equity. We use the shareholder data in Amadeus to assess how often this is is the case.

We start with the shareholder data using the Amadeus CD of 2012 to ensure that we are not missing some firms.[59] The data are at the firm-individual level and reports the share of stocks that a given individual owns of the firm. Bureau (2020)

BvD compiles information about shareholder composition and managerial team from a variety of sources. Because the coverage is far from perfect (around 40% of firms) and the data accuracy about the exact shareholder composition is likely to be lower than for the administrative tax files, we view this information as mostly suggestive and do not use it in our analysis.

We start by summing all the stocks and dropping firms for which we cannot recover at least 90% of the total equity. This removes 25% of the firms in the Amadeus data, leaving us with roughly 30% of the firms in the French economy. We then need to construct the total holding at the family level, as the reform defines "majority owner" not at the shareholder level but at the family level. To do so, we exploit the fact that the data provides the name of the shareholder as well as her type (e.g. "individual" or "government owned"). We extract the last name of each individual for individual shareholders and sum the amount of equity at the family level.[60]

As an example, we can see in the data that the firm with the siren 016650343 has four shareholders: Hubert Chassy (holding 24% of the firm), Bernard Chassy (holding 20% of the firm), Michel Chassy (holding 16%) and Patrick Chassy (holding 40%). So while individually, none of them are the majority shareholder, the Chassy family together owns 100% of the firm.

This procedure allows us to identify firms with a majority shareholder (defined at the family level). Around 95% of firms in our sample have a majority owner. Note that this not necessarily imply that 95% of SARL are affected by the reform, as it could be the case (even though quite unlikely) that the family owners have appointed a *professional* manager who is outside the family. To test

59. One well-known problem with Amadeus data is that it suffers from serious survivorship bias as Bureau Van Dick (BvD) removes firms that have been inactive in the dataset after 10 years. Using the 2012 CD implies that inactive firms will be kept up to 2022 ensuring the analysis of firms around the reform does not suffer from the survivorship bias.

60. We consider shareholders are individuals if they belong to the following categories: "Employees/Managers/Directors", "One or more named individuals or families", "Self ownership."

if this is the case or not, we need to merge the shareholder data with another dataset which reports all the top management composition of the firm, including their title (which contains 4101 distinct categories) and their names. We harmonize the function and consider that someone is a manager if she belongs to one of the following categories: business manager, associate business manager director, president, associate business manager, co-business manager, business operate, partner, chairman of the board of directors, chairman of the executive board, chief executive officer, independent director, member of the board and president, director, associate business manager. For all firms we are able to identify at least one person who is potentially the true manager of the firm.

We then match on the name with the shareholder data to check if the name of the manager appears also among the name of shareholders (and therefore if the firm is run by an *owner*-manager). Because name matching is always tricky and subject to error, the procedure we use is the following. We start by cleaning obvious typos in first name as much as possible (e.g. "Ardien" or "Adrine" becomes "Adrien".) and then compare all firms in the shareholder data with all firms in the manager data and use string distance.

We then match these data with our sample coming from the tax-files. We manage to match slightly over 40% of observations. We report below some statistics for shareholders. The bottom line is that consistent with the statistics reported by the French statistical office, the over 95% of SARL firms is operated by an owner-manager, meaning that the approximation of using *all* SARL as the treated group is not an important source of noise.

Table A.3: Summary Statistics on Shareholders

	SARL			**SAS**		
	Mean	s.d.	p50	Mean	s.d.	p50
Nb of shareholders	4.54	3.10	4	4.52	2.9	4
Largest shareholder	0.71	0.26	70	0.69	0.25	69
HHI Share	0.67	0.29	0.58	0.65	0.22	0.60
Has a majority owner	0.96	0.20	1	0.92	0.22	1
Has an owner-manager	0.95	0.18	1	0.88	0.22	1

This table reports summary statistics for firms for which we can identify their shareholders. Data from Amadeus BvD. "Largest shareholder" is the fraction of shares own by the largest shareholder. "HHI share" is the HHI of shares across all the shareholders of the firm.

F 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).[61] 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 **??** 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 **??** that the increase in investment only happens for firms facing 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 counterbalance the higher tax rate by producing more. The effect on firm investment will therefore depend on whether the income or substitution effect

61. 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.

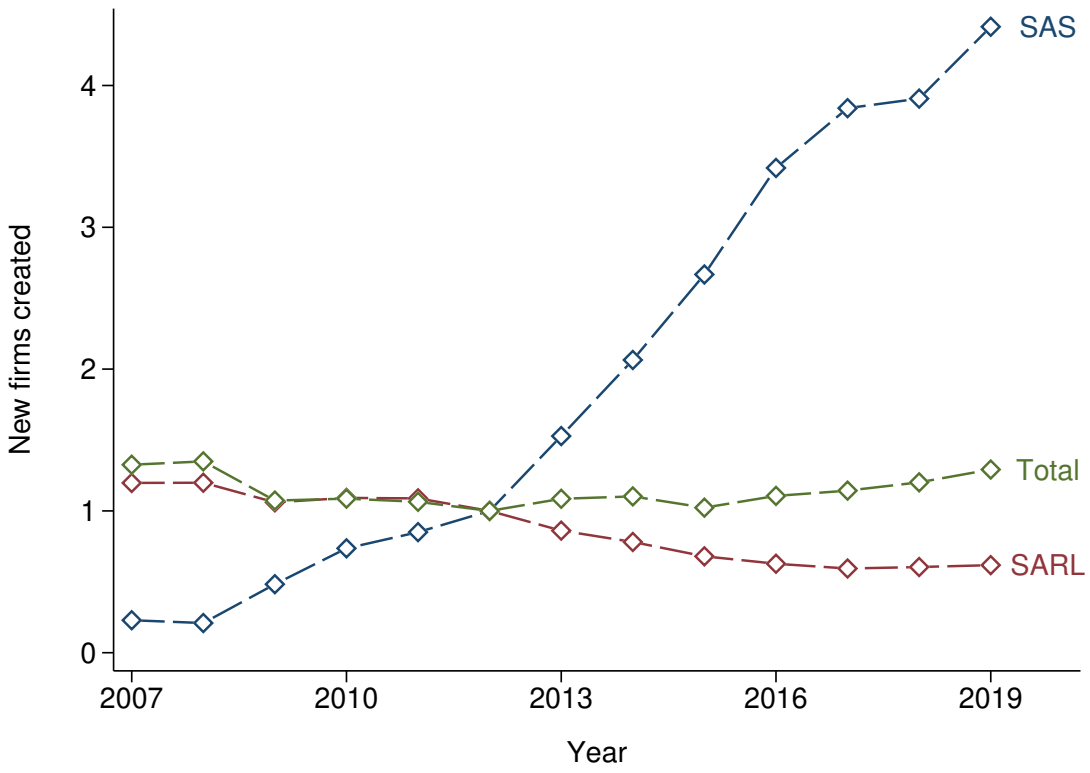
dominates. If owner-managers of SARL firms have a lot of committed consumption for instance, they might prefer to invest more to increase the firm future cash-flows to be able to meet their consumption, despite the increase in the tax rate. While it is usually assumed in the public finance literature that the substitution effect dominates, some recent papers have found evidence that in other contexts the income effect dominates.[62]

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

Appendix Tables and Figures

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

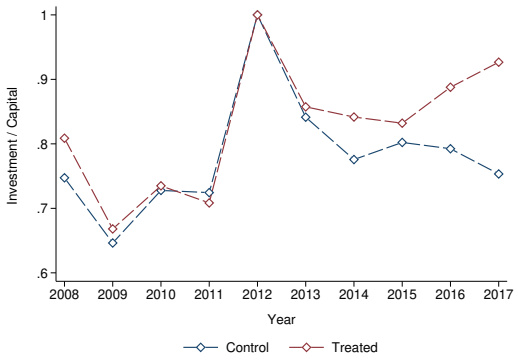
Figure A.10: Effect of 2013 Tax Reform on Firm Entry



This figure plots the evolution of the number of firms created, normalized in 2012 (the year prior to the reform).

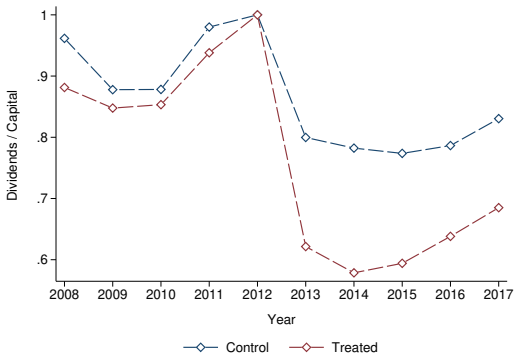
We show the evolution of the two principal outcomes in the paper for treated and control separately: total investment and dividends. To simplify the reading, we normalize to one the level for treated and control separately in 2012.

Figure A.11: Evolution of Investment: Treated vs. Control



The figure plots the evolution of investment scaled by capital for control and treated firms, normalized in 2012.

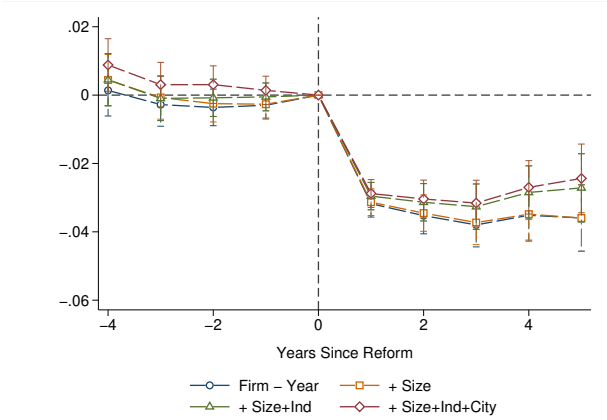
Figure A.12: Evolution of Dividends: Treated vs. Control



The figure plots the evolution of dividends scaled by capital for control and treated firms, normalized in 2012.

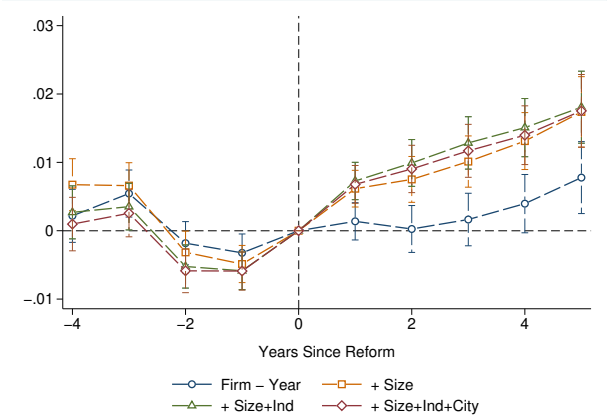
F.2 Event studies

Figure A.13: Yearly Response: Dividends



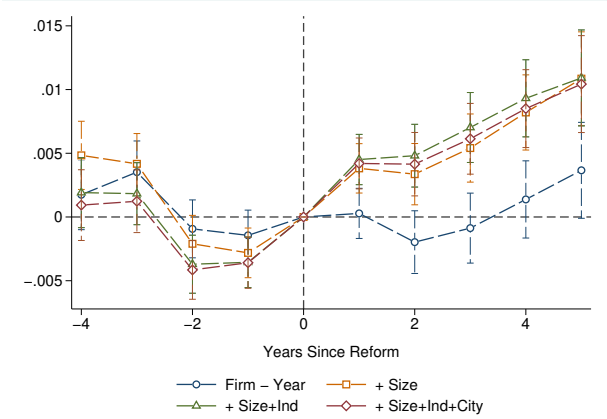
This figure plots the yearly coefficient and their 95% confidence intervals of the event study difference-in-differences estimator in equation (1) of the 2013 dividend tax increase. The dependent variable is scaled by total capital in 2011. The blue dot is the specification estimated only with firm and year fixed effects, the square orange is the specification estimated with firm and pre-reform size quartile-by-year fixed effects, the green triangle are the results estimated with firm, pre-reform size-by-year and industry-by-year and finally the red diamond are estimated with all fixed effects including city-by-year fixed effects.

Figure A.14: Yearly Response: Total investment



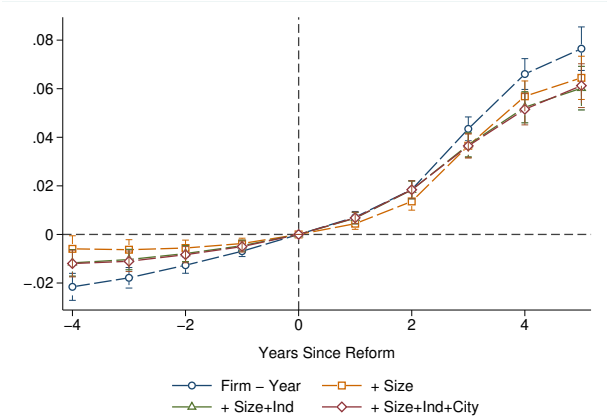
This figure plots the yearly coefficient and their 95% confidence intervals of the event study difference-in-differences estimator in equation (1) of the 2013 dividend tax increase. The dependent variable is scaled by total capital in 2011. The blue dot is the specification estimated only with firm and year fixed effects, the square orange is the specification estimated with firm and pre-reform size quartile-by-year fixed effects, the green triangle are the results estimated with firm, pre-reform size-by-year and industry-by-year and finally the red diamond are estimated with all fixed effects including city-by-year fixed effects.

Figure A.15: Yearly Response: Tangible investment



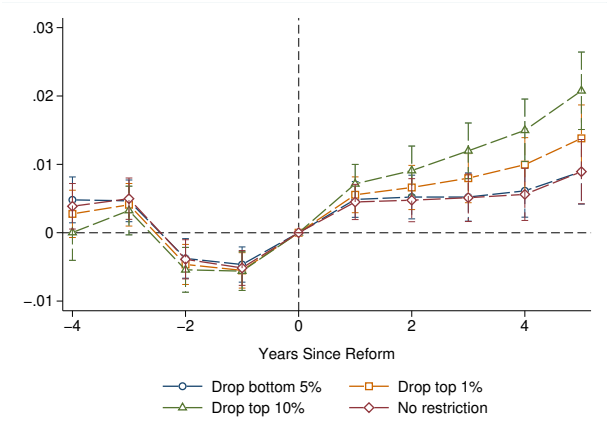
This figure plots the yearly coefficient and their 95% confidence intervals of the event study difference-in-differences estimator in equation (1) of the 2013 dividend tax increase. The dependent variable is scaled by total capital in 2011. The blue dot is the specification estimated only with firm and year fixed effects, the square orange is the specification estimated with firm and pre-reform size quartile-by-year fixed effects, the green triangle are the results estimated with firm, pre-reform size-by-year and industry-by-year and finally the red diamond are estimated with all fixed effects including city-by-year fixed effects.

Figure A.16: Yearly Response: Employment



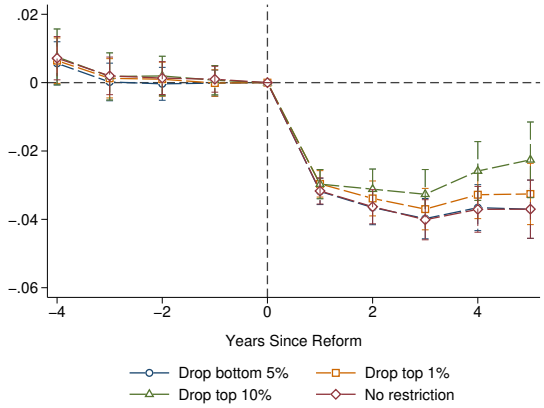
This figure plots the yearly coefficient and their 95% confidence intervals of the event study difference-in-differences estimator in equation (1) of the 2013 dividend tax increase. The dependent variable is log employment. The blue dot is the specification estimated only with firm and year fixed effects, the square orange is the specification estimated with firm and pre-reform size quartile-by-year fixed effects, the green triangle are the results estimated with firm, pre-reform size-by-year and industry-by-year and finally the red diamond are estimated with all fixed effects including city-by-year fixed effects.

Figure A.17: Yearly Response: Total Investment, Different Samples



This figure plots the yearly coefficient and their 95% confidence intervals of the event study difference-in-differences estimator in equation (1) of the 2013 dividend tax increase. The blue dot is the sample when we drop the bottom 5% of the asset distribution, the square orange is when we drop the top 1% of the asset distribution, the green triangle is when we drop the top 10% of the distribution, and finally the red diamond is when we do no restrict the sample at all.

Figure A.18: Yearly Response: Dividends, Different Samples



This figure plots the yearly coefficient and their 95% confidence intervals of the event study difference-in-differences estimator in equation (1) of the 2013 dividend tax increase. The blue dot is the sample when we drop the bottom 5% of the asset distribution, the square orange is when we drop the top 1% of the asset distribution, the green triangle is when we drop the top 10% of the distribution, and finally the red diamond is when we do no restrict the sample at all.

F.3 Summary Statistic: Dividends Paying vs. Not

Table A.4: Summary Statistics: Dividends Paying Firms

	Pre-Reform 2009–2012					
	Treated			**Control**		
	Mean	s.d.	p50	Mean	s.d.	p50
Dividend / Capital	0.33	0.59	0.11	0.35	0.62	0.11
Dividend / Net income	0.51	0.39	0.43	0.56	0.41	0.50
Other Firm Characteristics						
Asset	761,156	552,436	595,054	1,344,030	708,997	1,250,161
Tangible Capital	212,491	246,976	128,835	383,761	367,966	265,602
Employee compensations	253,536	214,066	198,007	389,422	312,703	308,840
Employment	8.42	9.19	6.10	13.7	13.8	10.2
Net Income / Capital	0.097	0.46	0.026	0.11	0.74	0.021
Liquidity / Capital	0.20	0.41	0.067	0.21	0.44	0.067
Debt / Capital	0.15	1.16	0.041	0.10	0.83	0.027
Total investment / Capital	0.081	0.13	0.058	0.055	0.13	0.036
Tangible investment / Capital	0.064	0.094	0.052	0.041	0.085	0.033
Net Current Asset / Capital	0.20	0.48	0.068	0.23	0.51	0.083
Supplier Credit / Capital	0.13	0.30	0.044	0.15	0.33	0.049
Supplier Credit / Capital	0.22	0.49	0.069	0.25	0.52	0.076

This table reports summary statistics for the universe of firms pre-reform. Capital is defined as tangible capital (property, plant and equipment) plus intangible capital (R&D, software, etc.). Employment is number of full-time equivalent

Table A.5: Summary Statistics: Firms Paying No Dividends

	Pre-Reform 2009–2012					
	Treated			**Control**		
	Mean	s.d.	p50	Mean	s.d.	p50
Dividend / Capital	0	0	0	0	0	0
Dividend / Net income	0	0	0	0	0	0
Other Firm Characteristics						
Asset	669,495	546,136	487,516	1,255,817	740,374	1,113,655
Tangible Capital	201,833	256,968	114,069	392,816	413,805	250,873
Employee compensations	211,982	212,815	156,330	381,087	368,379	279,332
Employment	7.85	11.1	5.50	13.8	15.5	9.75
Net Income / Capital	0.029	0.30	0.0054	0.025	0.43	0.0028
Liquidity / Capital	0.12	0.34	0.026	0.14	0.36	0.027
Debt / Capital	0.23	1.24	0.056	0.22	1.21	0.044
Total investment / Capital	0.067	0.16	0.038	0.064	0.21	0.026
Tangible investment / Capital	0.049	0.11	0.034	0.031	0.10	0.021
Net Current Asset / Capital	0.15	0.48	0.036	0.19	0.53	0.052
Supplier Credit / Capital	0.17	0.37	0.053	0.19	0.41	0.060
Supplier Credit / Capital	0.23	0.54	0.054	0.28	0.62	0.061

This table reports summary statistics for the universe of firms pre-reform. Capital is defined as tangible capital (property, plant and equipment) plus intangible capital (R&D, software, etc.). Employment is number of full-time equivalent

F.4 Non-linearity

To test for the existence of lumpy investment, we run a test inspired by Cooper and Haltiwanger (2006) and report the results in Table A.6. For different thresholds of investment, we create a dummy equal to one if the firm investment experiences a "jump" above this threshold (columns 1, 4, 7 and 10) to test the extensive margin, and then estimate separately the intensive margin when we observe a jump (columns 2, 5, 8, 11) and when we do not (columns 3, 6, 9, 12). We choose investment thresholds at 6% as this is the mean in our sample, 9% which roughly corresponds to the 75^{th} percentile, 12% (twice the mean) and 15% (75^{th} percentile conditioning on investment being positive).

We find evidence of investment lumpiness, particularly once we look at investment jump above 12% (columns 7–12). The probability to observe a jump increases by 4.9% (column 7) for investment above 12%, and increases by 6.5% for investment greater than 15%. By contrast, there is essentially no significant effect on the intensive margin, suggesting that a large part of our results on investment are consistent with investment being lumpy. Of course, we want to be careful here, as using lower threshold of investment to define jumps show that both the extensive and the intensive margin play a role (e.g., column 3 and 4).

Table A.6: Test of Lumpy-Investment

Investment jump threshold	6%			9%			12%			15%		
Dependent variable	Jump> 0	Investment		Jump> 0	Investment		Jump> 0	Investment		Jump> 0	Investment	
Conditioning on jump		Yes	No		Yes	No		Yes	No		Yes	No
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Treated×Post	0.023***	0.015***	0.00050	0.028***	0.016***	0.00052	0.036***	0.014***	0.00037	0.062***	0.0052	0.00047
	(0.0052)	(0.0033)	(0.00063)	(0.0061)	(0.0042)	(0.00060)	(0.0070)	(0.0051)	(0.00058)	(0.0094)	(0.0077)	(0.00057)
Fixed Effects												
Firm	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Size growth× Year	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Industry × Year	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
County × Year	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	1,406,087	446,376	959,711	1,406,087	355,031	1,051,056	1,406,087	291,141	1,114,946	1,406,087	188,267	1,217,820

This table shows the effect of the 2013 dividend tax increase on investment. In columns 1, 4, 7 and 10, the dependent variable is a dummy that equal one if the investment is above a certain threshold (6%, 9%, 12% and 15% in columns 1, 4, 7 and 10 respectively). The other columns test the intensive margin of investment when we observe a jump or not. The dependent variable it total investment scaled by capital. Standard errors are clustered at the firm level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

F.5 Other robustness

Table A.7: Robustness

	Investment	Dividends	Sample
Treated×Post	.0052***	-.037***	No restriction
	(.0011)	(.0021)	
Treated×Post	.0054***	-.036***	Drop bottom 5%
	(.0022)	(.0022)	
Treated×Post	.0078***	-.033***	Drop top 1%
	(.0022)	(.0022)	
Treated×Post	.011***	-.030***	Drop top 10%
	(.0013)	(.0025)	

This table shows the effect of the 2013 dividend tax increase for different sample selections. All specifications are estimated as equation 1 with size bin, 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 A.8: Average Results: Firms Not Exiting

Dependent Variable	Dividends	Total Investment	Tangible Investment	Sales	Productivity
	(1)	(2)	(3)	(4)	(5)
Treated×Post	-0.033***	0.012***	0.0083***	0.023***	0.0070***
	(0.0027)	(0.0014)	(0.00095)	(0.0018)	(0.0017)
Fixed Effects					
Firm	✓	✓	✓	✓	✓
Size growth× Year	✓	✓	✓	✓	✓
Industry × Year	✓	✓	✓	✓	✓
County × Year	✓	✓	✓	✓	✓
Observations	1,077,838	1,075,331	1,075,364	1,079,625	1,079,437

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 A.9: 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	0.0092***	0.014***	0.018***	0.0056***	0.012***	0.015***
	(0.0022)	(0.0023)	(0.0028)	(0.0019)	(0.0019)	(0.0030)
Fixed Effects						
Firm	✓	✓	✓	✓	✓	✓
Size growth× Year	✓	✓	✓	✓	✓	✓
Industry × Year	✓	✓	✓	✓	✓	✓
County × Year	✓	✓	✓	✓	✓	✓
Observations	331,581	331,638	331,619	358,854	357,922	356,922

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 A.10: Sensitivity of Dividends Response

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	-0.021***	-0.026***	-0.049***	-0.011***	-0.016***	-0.061***
	(0.0029)	(0.0035)	(0.0055)	(0.0021)	(0.0030)	(0.0062)
Fixed Effects						
Firm	✓	✓	✓	✓	✓	✓
Size growth× Year	✓	✓	✓	✓	✓	✓
Industry × Year	✓	✓	✓	✓	✓	✓
County × Year	✓	✓	✓	✓	✓	✓
Observations	468,882	469,043	469,024	470,352	469,481	468,485

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 A.11: Cross-Sectional Results: Agency Conflicts

Dependent Variable	Dividends		Total Investment		log(employment)	
	(1)	(2)	(3)	(4)	(5)	(6)
Treated ×Post × High Dividends Pre-Reform	-0.031***	-0.031***	0.097***	0.099***	0.028***	0.030***
	(.0024)	(.0024)	(.0013)	(.0014)	(.0018)	(.0017)
Treated ×Post × Non family shareholders		0.0032		-0.0011		0.0012
		(.0046)		(.0015)		(.0018)
Fixed Effects						
Firm	✓	✓	✓	✓	✓	✓
Size× Year	✓	✓	✓	✓	✓	✓
Industry × Year	✓	✓	✓	✓	✓	✓
County × Year	✓	✓	✓	✓	✓	✓
Treated × Year	—	✓	—	✓	—	✓
Observations	564,226	564,226	564,226	564,226	564,226	564,226

This table shows the effect of the 2013 dividend tax increase on dividends, investment and log(employment). The sample is restricted to firms that are matched with the shareholder data from Amadeus BvD. Odd columns (1, 3, 5) report the average results . In even columns (2, 4, 6), we sort firms based on the ratio dividend over CEO wage. The dummy *Non Family Shareholders* takes the value one if we identify at least one shareholder that is not of the family of owning the majority of the firm equity. All the fixed effects are interacted with the new variable. Standard errors are clustered at the firm level. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table A.12: 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.[63]

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 A.13. 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 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

63. 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.

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 A.14).

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 A.15 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 A.16). 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.[64]

64. 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 A.10).

Table A.13: Cross Sectional Results: Age and Size

Dependent variable	Investment				
Bin	1^{st}	2^{nd}	3^{rd}	4^{th}	5^{th}
	(1)	(2)	(3)	(4)	(5)
	Cross Section: Size				
Treated×Post	0.0052	0.012***	0.0085***	0.015***	0.011***
	(0.0035)	(0.0031)	(0.0028)	(0.0026)	(0.0023)
Fixed Effects					
Firm	✓	✓	✓	✓	✓
Industry × Year	✓	✓	✓	✓	✓
Size × Year	✓	✓	✓	✓	✓
County × Year	✓	✓	✓	✓	✓
Observations	282,352	282,074	281,654	280,777	279,230
	Cross Section: Age				
Treated×Post	0.0069*	0.012***	0.0071***	0.0071***	0.0051***
	(0.0040)	(0.0036)	(0.0028)	(0.0022)	(0.0016)
Fixed Effects					
Firm	✓	✓	✓	✓	✓
Industry × Year	✓	✓	✓	✓	✓
Size × Year	✓	✓	✓	✓	✓
County × Year	✓	✓	✓	✓	✓
Observations	313,090	252,162	282,929	280,748	277,158

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 A.14: 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 Investment		
Treated×Post	0.015***	0.0053**	0.00027	0.000040	0.0054**
	(0.0032)	(0.0028)	(0.0025)	(0.0024)	(0.0026)
Fixed Effects					
Firm	✓	✓	✓	✓	✓
Industry × Year	✓	✓	✓	✓	✓
Size × Year	✓	✓	✓	✓	✓
County × Year	✓	✓	✓	✓	✓
Observations	279,833	281,578	281,712	281,400	277,835
			Tangible Investment		
Treated×Post	0.0095***	0.0041**	0.00082	-0.00015	0.0021
	(0.0023)	(0.0020)	(0.0018)	(0.0017)	(0.0017)
Fixed Effects					
Firm	✓	✓	✓	✓	✓
Industry × Year	✓	✓	✓	✓	✓
Size × Year	✓	✓	✓	✓	✓
County × Year	✓	✓	✓	✓	✓
Observations	279,847	281,582	281,717	281,409	277,869

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 A.15: 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 Investment		
Treated×Post	0.0017	0.0097***	0.0048**	0.011***	0.022***
	(0.0024)	(0.0021)	(0.0024)	(0.0026)	(0.0033)
Fixed Effects					
Firm	✓	✓	✓	✓	✓
Size growth× Year	✓	✓	✓	✓	✓
Industry × Year	✓	✓	✓	✓	✓
County × Year	✓	✓	✓	✓	✓
Observations	292,302	295,481	269,315	272,419	276,570
			Tangible Investment		
Treated×Post	0.0012	0.0060***	0.0028	0.0087***	0.010***
	(0.0017)	(0.0016)	(0.0018)	(0.0019)	(0.0021)
Fixed Effects					
Firm	✓	✓	✓	✓	✓
Size growth× Year	✓	✓	✓	✓	✓
Industry × Year	✓	✓	✓	✓	✓
County × Year	✓	✓	✓	✓	✓
Observations	292,308	295,494	269,318	272,430	276,605

This table shows the effect of the 2013 dividend tax increase when firms are sorted by the fraction of capital in 2012 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 A.16: Equity Dependence: Number of Equity Issuances

	2009–2016		2003–2016		
# equity issuances	0	1	0	1	2
	(1)	(2)	(3)	(4)	(5)
			Total Investment		
Treated×Post	0.0067***	0.012***	0.0062***	0.0079***	0.023***
	(0.0017)	(0.0016)	(0.0020)	(0.0017)	(0.0029)
Fixed Effects					
Firm	✓	✓	✓	✓	✓
Size growth× Year	✓	✓	✓	✓	✓
Industry × Year	✓	✓	✓	✓	✓
County × Year	✓	✓	✓	✓	✓
Observations	572,526	833,629	487,815	632,111	286,229
			Tangible Investment		
Treated×Post	0.0038***	0.0073***	0.0042***	0.0046***	0.013***
	(0.0013)	(0.0011)	(0.0014)	(0.0012)	(0.0019)
Fixed Effects					
Firm	✓	✓	✓	✓	✓
Size growth× Year	✓	✓	✓	✓	✓
Industry × Year	✓	✓	✓	✓	✓
County × Year	✓	✓	✓	✓	✓
Observations	572,526	833,629	487,815	632,111	286,229

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.

References

Auerbach, Alan, and Kevin Hassett. 2003. "On the marginal source of investment funds." *Journal of Public Economics* 87 (1): 205–232.

Axtell, Robert. 2001. "Zipf Distribution of U.S. Firm Sizes." *Science* 293 (5536): 1818–1820.

Bozio, Antoine, Thomas Breda, and Julien Grenet. 2018b. "Tax-Benefit Linkage and Incidence of Social Security Contributions : Evidence from France." *Working Paper.*

Burbidge, John, Lonnie Magee, and Leslie Robb. 1988. "Alternative Transformations to Handle Extreme Values of the Dependent Variable." *Journal of the American Statistical Association* 83 (401): 123–127.

Bureau, Van Dick. 2020. "Amadeus [dataset]. Princeton Library [distributor] BvD [producer]. Years 2008–2017."

Chetty, Raj, and Adam Szeidl. 2007. "Consumption Commitments and Risk Preferences." *Quarterly Journal of Economics* 122 (2): pp. 831–877.

Cooper, Russell, and John Haltiwanger. 2006. "On the Nature of Capital Adjustment Costs." *Review of Economic Studies* 73 (3): 611–633.

Eurostat. 2020a. "Annual enterprise statistics for special aggregates of activities (NACE Rev. 2) [dataset]. Eurostat [producer]. https://ec.europa.eu/eurostat/web/structural-business-statistics/data/database (last accessed February 10, 2020)."

———. 2020b. "Persons employed in the non-financial business economy by size class of employment [dataset]. Eurostat [producer]. https://ec.europa.eu/eurostat/databrowser/view/tin00148/default/table?lang=en (last accessed February 10, 2020)."

Fujiwara, Yoshi, Corrado Di Guilmi, Hideaki Aoyama, Mauro Gallegati, and Wataru Souma. 2004. "Do Pareto–Zipf and Gibrat laws hold true? An analysis with European firms." *Physica A: Statistical Mechanics and its Applications* 335 (1): 197–216.

Gabaix, Xavier. 2016. "Power Laws in Economics: An Introduction." *Journal of Economic Perspectives* 30 (1): 185–206.

Gruber, Jonathan. 1997. "The Incidence of Payroll Taxation: Evidence from Chile." *Journal of Labor Economics* 15 (S3): S72–S101.

Insee. 2012a. "Enquête Liaisons financières entre sociétés - 2008." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.272.149.V1.

———. 2012b. "Enquête Liaisons financières entre sociétés - 2009." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.272.150.V1.

———. 2013a. "Créations d'entreprises - 2009." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.182.568.V1.

Insee. 2013b. "Créations d'entreprises - 2010." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.182.569.V1.

———. 2013c. "Enquête Liaisons financières entre sociétés - 2010." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.272.164.V1.

———. 2013d. "Enquête Liaisons financières entre sociétés - 2011." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.272.729.V2.

———. 2014. "Créations d'entreprises - 2011." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.182.1127.V1.

———. 2016a. "Créations d'entreprises - 2007." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.182.1753.V1.

———. 2016b. "Créations d'entreprises - 2008." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.182.1794.V1.

———. 2016c. "Créations d'entreprises - 2012." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.182.1754.V1.

———. 2016d. "Créations d'entreprises - 2013." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.182.1755.V1.

———. 2016e. "Créations d'entreprises - 2014." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.182.1756.V1.

———. 2016f. "Créations d'entreprises - 2015." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.182.1757.V2.

———. 2017a. "Créations d'entreprises - 2016." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.182.2391.V2.

———. 2018i. "Créations d'entreprises - 2017." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.182.2528.V2.

———. 2019c. "Créations d'entreprises - 2018." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.182.2867.V2.

———. 2020a. "Base Communale des Zones d'Emploi 1990 [dataset]. Insee [producer]. https://www.insee.fr/fr/statistiques/fichier/2114596/zones_emploi90.zip (last accessed February 10, 2020)."

———. 2020d. "Créations d'entreprises - 2019." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.182.3285.V2.

Insee and Ministère Des Finances (DGFiP). 2015b. "Liaisons financières entre sociétés - 2012." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.44.936.V2.

———. 2016b. "Liaisons financières entre sociétés - 2013." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.44.1161.V1.

Insee and Ministère Des Finances (DGFiP). 2016c. "Liaisons financières entre sociétés - 2014." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.44.2040.V2.

———. 2017b. "Liaisons financières entre sociétés - 2015." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.44.2405.V1.

———. 2018b. "Liaisons financières entre sociétés - 2016." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.44.2700.V2.

———. 2019b. "Liaisons financières entre sociétés - 2017." *Centre d'Accès Sécurisé aux Données (CASD)*, http://doi.org/10.34724/CASD.44.3058.V1.

MacKinnon, James, and Magee Lonnie. 1990. "Transforming the Dependent Variable in Regression Models." *International Economic Review* 31 (2): 315–39.

Malgouyres, Clément, and Thierry Mayer. 2018. "Exports and labor costs: evidence from a French policy." *Review of World Economics* 154 (3): 429–454.

Saez, Emmanuel, Manos Matsaganis, and Panos Tsakloglou. 2012. "Earnings Determination and Taxes: Evidence From a Cohort-Based Payroll Tax Reform in Greece." *Quarterly Journal of Economics* 127 (1): 493–533.

Saez, Emmanuel, Benjamin Schoefer, and David Seim. 2019. "Payroll Taxes, Firm Behavior, and Rent Sharing: Evidence from a Young Workers' Tax Cut in Sweden." *American Economic Review* 109 (5): 1717–1763.