Sciences Po

Master in Economics

Master's dissertation

Measuring the impact of the CICE on firms' investments

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Abstract

The CICE, whose annual cost is estimated at 20 billions euros, is a singular policy. Indeed, it aims at reducing labor costs but takes the forms of a fiscal instrument. This measure being dissimilar to previously implemented policies, it is unclear how firms' behaviors will perceive the measure and will react to it, anticipating its effect is difficult. Pre-policy information on the distribution of wages is used to implement an identification strategy in the spirit of difference-in-differences. The actual amount of CICE a firm is eligible to is used to improve the estimator's precision and curtail the attenuation bias resulting from measurement errors. The estimated coefficients tend to indicate that the CICE would have a positive but small, at least in 2013, impact on investments. The placebo tests seem to support this result, but split-sample regressions prove less convincing. Finally, as more data will be available, it will be interesting to test new specifications to test the robustness of results and better understand how the CICE affects firms' investments[1].

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1 Introduction

The CICE, announced in the aftermath of the Gallois report in late 2012, has been one of the most important economic policies implemented in France over the past few years. It has also been one of the most costly, as the *Cour des Comptes* estimated its annual cost to 20 billions euros. The CICE tax credit is a one of a kind policy. Indeed, its first goal it to to re-industrialize the country, by an increase in firms' competitiveness, improved by the investments the measure claims to stimulate. It also aims at reducing unemployment in the short-run. These goals are to be reached through a labor cost reduction measure based on a fiscal instrument, a tax credit. Importantly, its fiscal nature induces a temporal shift as firms pay wages a given year and receive the tax credit the next year. For these reasons, it is quite difficult to predict the effects of the measure as it is unclear how firms will anticipate it and react to it.

The literature predicts that a decrease in taxes should increase investments as it raises the discounted present value of future investments and also because it leaves more liquidity to the firms, that may suffer from credit rationing. However, firms' decisions may be more impacted by the labor cost reduction aspect of the measure and decide to use labor as a substitute for capital. For this reason, a microeconometric analysis of the effect of the CICE on firms' investment spending in 2013 would allow understanding better the policy's transmission channels. Indeed, investment is one of the key components of the policy, as it is supposed to help firms move upmarket and increase their non-price competitiveness.

Datasets concerning firms' employment and financial structure as well as the amounts of CICE they received were recently released for the year 2013. They allow investigating the first effects of the tax credit, which are mostly anticipatory effects. Indeed, firms only veritably benefited from the measure in 2014, when deducing the CICE from their 2013 taxes. Moreover, the policy does not easily lend itself to economic analysis. Indeed, it was implemented all at once nationwide. In addition, a vast majority of firms did benefit from the measure, rendering the use of a control group impossible. Furthermore, the amount of CICE received depends on firms' characteristics and investment decisions, making the treatment variable endogenous. Thence, it was decided not to use the actual amount of CICE deduced from taxes as treatment variable, but rather the intention to treat, which in this case is the amount of CICE the firm is eligible to given its wage structure. However, this does not solve the endogeneity issue as firms can adjust their wage structure.

Two related identification strategies are used to isolate the effect of the CICE on firms' investments. They consist in variants of the classical difference in difference strategy but had to be adapted in the absence of control groups. They bear similarities with difference in difference strategies as they estimate the effect of a policy with panel data and include a treatment variable that ceases being zero the first year of the measure and time and firm fixed effects. However, in the absence of control group, it is the variation in treatment intensity that is exploited to estimate the impact of the measure. Indeed, the treatment variable is continuous and, in the first strategy, is an ex ante proxy for firm exposition to the treatment. In the second strategy, the amount of CICE the firm is eligible to is included in the equation but is instrumented by the ex ante proxy so as to address endogeneity and the attenuation bias that arises in due the first specification.

The estimations conducted on the whole sample uncover a significant positive effect of the CICE on firms' investment spending. The associated placebo tests prove satisfying. However, when ran on sub-sample of firms, estimates corresponding to the CICE show no significant impact. However, their magnitudes remain plausible.

The rest of this dissertation is structured as follows. Section 2 provides background information on the CICE and explains the measure in further details. Section 3 presents the literature investigating the relationships between investment and taxation. Section 4 discusses the data and

the encountered limitations. Section 5 shows descriptive statistics about the CICE and investment, and presents the treatment indicator. Section 6 depicts the identification strategy while Section 7 discusses the results. Section 8 provides insights of possible developments and Section 9 concludes.

2 The CICE in France

2.1 Context

After 2012 French Presidential election, the newly appointed First Minister commissioned an advisory report to Louis Gallois, former CEO of EADS and chairman of SNCF, presenting recommendations to improve the country's industrial competitiveness. Indeed, at that time, France was affected by the European debt crisis, four years after the onset of the 2008 financial crisis. The decline in the economic situation translated on global markets by a decline in French firms' market shares, a decline sharper than in other European countries. Bas et al. (2015) stress that is can only be partially explained by the country's sectorial and geographic specialization. Moreover, in spite of low real interest rates, investment spending was on a downward trend, as well as firms' mark-ups. Furthermore, employment was standing 3 percentage points above its pre-crisis level, at 10.6 percent (Roucher, Kerdrain, Larrieu, Lefebvre (2013)). The report was submitted on November 5th, 2012.

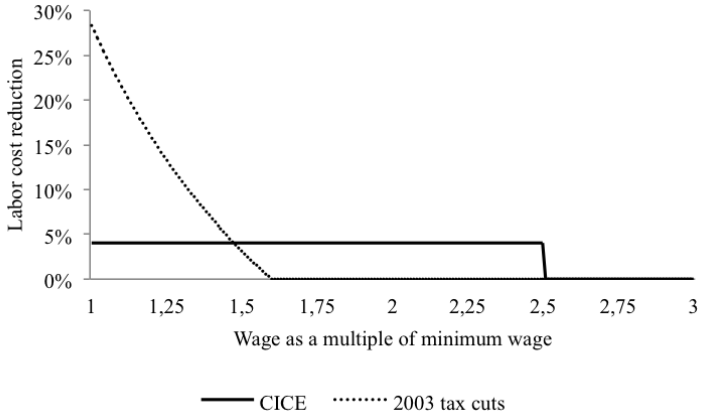
It starts by assessing an accelerating reduction in French industries' competitiveness, which in turn translates into job destructions. Thence, the increased foreign competition would have been responsible for half of job destructions between 2000 and 2007. The relationship between industrial competitiveness and employment is particularly strong as the report states that industry employment has a multiplier effect: each job created in the industry would create, in turn, 3 to 4 jobs in other sectors. After stressing the importance of industrial activities for employment, the report identifies the causes of competitiveness loss over the past years. The author argues that French industries, confronted to competition from higher-end players, who benefit from non-price competitiveness, and to competition from price competitive low-cost players, have tried to preserve it price competitiveness by reducing their profit margins, which in turn lowered investments and total factor productivity, further reducing non price competitiveness.

In this context, the author sees as a crucial matter that the French industries move upmarket, which necessitates improvements of productivity, innovation and services quality. It suggests conducting a supply-side policy, that would sustain economic growth in the short run by stimulating the demand for intermediate consumption and raise potential growth in the longer run. This policy relies on 22 propositions, among which one aiming at creating a "competitiveness shock" and on which the CICE is based. In practice, this competitiveness shock was conceived as a cut in payroll taxes for wages up to 3.5 times the national minimum wage (SMIC), for an estimated cost of 30 billion euros, financed by taxes and cuts in public expenditures. This threshold was chosen so that the measure would affect high value-added sectors, paying higher wages on average. This measured was thought as a way to reduce labor cost and to provide an immediate "breath of fresh air" to French firms. Finally, the report states that the benefits from the measure should be targeted at investment and innovation, as opposed to dividend or wage increases.

2.2 The Measure

In the aftermath of the report, the Prime Minister announced on November 6th, 2012 a series of 35 measures as part of a National Pact for Competitiveness, Growth and Employment, aiming at implementing a package of measure to reinvigorate the economy. The first consist in a Tax Credit

Figure 1: Labor cost reduction due to of CICE and *Allègements Fillon*



Comment: The estimated annual cost of CICE is similar to the one of *Allègements Fillons*, in spite of the differences in rates and eligible wages.

Figure 2: How the CICE works – Example of 2013's CICE

2013	The firm generates revenues and pays its employees		
2014	The firm pays its taxes on 2013 revenues and can benefit from the CICE		
	CASE #1 TAXES ≥ CICE	CASE #2 TAXES ≤ CICE & RESTITUTION	CASE #3 TAXES ≤ CICE & NO RESTITUTION
	The firm pays fewer taxes.	The firm pays no taxes and receives the remaining amount of CICE from the state in 2014.	The firm pays no taxes and will use the remaining amount of CICE when paying its taxes in 2015, 2016 or 2017. If some CICE is remaining in 2017, it will receive the remaining amount.

for Competitiveness and Employment (*Crédit d'Impôt pour la Compétitivité et l'Emploi*, CICE), which came into force on January 1st, 2013. Its many objectives are the following: "boosting business investment, research, innovation, training, new recruitment, investigation of new markets, ecological and energy transition, and reestablishment of working capital". The CICE's nature is ambivalent: it is a labor cost relief policy based on a fiscal tool. Indeed, it is a tax credit whose amount represents 4.0 percent (6.0 percent from 2014 onwards) of the wages less than 2.5 SMIC paid to employees in a given calendar year. This tax credit applies to all businesses subject to taxation on business profits (*Impôts sur les sociétés*, *Impôts sur le revenu*), regardless of their legal form or the nature of their activities, and employ at least one employee. Though, it excludes the *auto-entrepreneur* status. The cost of the measure has been estimated by the *Cour des Comptes* (Court of Auditors) in 2013 at around 20 billion euros per year, which is equivalent to the cost of 2003 social taxes reductions (also known as *Allègements Fillon*), even though they do not target the same wages.

Importantly, the fiscal nature of the measure implies a time lag between the payment of wages and the payment of taxes, when the firm will be able to use the tax credit, usually the following year. Therefore, as the CICE was implement for the first year on the basis of wages paid in 2013, firms benefited from lower taxes only in 2014. When paying its taxes, if the amount of CICE exceeds the amount of taxes, the firm pays no taxes (imputes an amount of CICE equal to its taxes) and, according to some conditions, will benefit from the remainder amount of CICE in 2014 (restitution) or when paying 2015, 2016 or 2017 taxes (deferral). If three years after, in 2017, taxes are still too low compared to the CICE tax credit, then the firm will receive the money. Restitution is available for SMEs (European commission's definition), Young innovative firms (*Jeunes Entreprises Innovantes*), New firms (*Entreprises Nouvelles*), or distressed companies. Given this time line, the effects of the CICE should increase gradually over the years.

Table 1 presents the different modes of consumption of the CICE for 2013 and 2014 (2014 data is incomplete). It shows that about a third of the total amount of CICE has been deferred, which indicates that this amount will add up to future CICE over the years. Moreover, in 2014, the CICE represent 6 percent of eligible wage bill. The two aspects explain why an increase in the effects of the measure is expected.

Table 1: Uses of CICE (situation at July 31st, 2015)

		Imputation	Restitution	Deferral	Total
2013	Number of firms	608,957	524,795	28,682	1,024,427
(4%)	Amount	5.2	2.6	3.4	11.2
	Billion euros	(4.9)	(2.6)	(3.4)	(10.8)
2014	Number of firms	518,403	429,737	98,307	926,82
(6%)	Amount	5.2	2.5	6.5	14.2
	Billion euros	(4.7)	(2.4)	(6.4)	(13.5)

Source: DGFiP – MVC (*France Stratégie* Report)

Comment: 2014 data is not exhaustive. Between parentheses, the amount of CICE given to firms paying corporate taxes (*Impôts sur les sociétés*), as opposed to personal income tax (*Impôts sur le revenu*). Some firms benefited both from imputation and restitution, or imputation and deferral.

Table 2: Amount of CICE (*initialisation*, 2013) and pre-measure investments (2012)

	Number of firms 2012	Number of firms 2013	Mean amount of CICE	Mean investment	Median amount of CICE	Median investment
All	670,243	670,973	14,462	645,679	2,989	6,252
Micro	536,819	496,750	2,741	82,613	1,99	3,212
SMEs	168,807	166,131	23,839	15,800,000	14,3	34,724
ETIs	5,05	5,183	489,34	24,000,000	314,888	2,238,439
Large	224	228	6,883,778	573,000,000	3,050,319	39,000,000

Source: MVC, FARE (intersection MVC, FARE, DADS), only firms with a non-missing value in MVC are reported.

A qualitative analysis of the CICE (Rot and Gautier (2016)) sheds light on how firms perceive the CICE, how they intend to use it and what they think its impact will be. Their first finding is that the CICE is widely used and has become part of the administrative routine of firms and accountants. This success could be attributed to the limited number of requirements that have to be fulfilled to benefit from the measure and the absence of binding constraints. Indeed, even though the law states that the tax credit should be dedicated to investment, training, investigation of new markets, etc., there are no sanctions in case these objectives were not met. The motives invoked for refusing to benefit the tax credit are the fear of tax inspection or tax optimization strategies that

rendered the tax credit negligible. Concerning investments, interlocutors mentioned that, given the amounts at stake, it was difficult to match the tax credit with a particular investment. Rather, it seemed to facilitate already scheduled investment decisions. The tax credit is seen as a fungible resource that would not in itself lead to investments as its amount is often seen by interviewees as small with respect to the firm's investment projects. Table 2 allows grasping the amounts at stake. If looking at the median CICE and investment of SMEs and micro firms, the figures seem to be roughly of the same order. However, when looking at mean investment and mean CICE, the discrepancies between the figures grow much wider. It indicates that only a few firms are responsible for most investment. The skewness of the distribution is also non negligible for the CICE, as mean is above the median, but is smaller. Therefore, the few firms responsible for the bulk of investment tend to receive a CICE amount smaller that other firms, in proportion. Rather, interviewees argued that determinants of investments are firm's characteristics such as earnings, debt, anticipated demand, corporate strategy, etc. while the CICE is rather found to act like a facilitator, a trigger of investment decisions.

The study also reveals that managers did not anticipate the CICE very well and truly became aware of the measure when paying their taxes. This may be explained by the relative uncertainty that lingers concerning the durability of the measure. For example, contrary to the CIR (*Credit d'impôts recherche*, R&D tax credit), the CICE was not included in business plans. Finally, the poor awareness of the measure demonstrated by managers may be due to the fiscal nature of the tax credit. It was generally dealt with by the finance department, in indirect contact with productive or commercial functions of the firm. These weak anticipations are important for a 2013 analysis, as it only captures anticipation effects.

Therefore, due to its hybrid nature, aiming at a reduction in labor cost but implemented through a fiscal instrument, it seems unclear whether or how the 20 billion of CICE will translate into investments, even though they are at the core of the "reindustrialization" policy.

3 Literature Review

3.1 Neoclassical Models of Investment

Evaluating the impact of the CICE on firms' investment spending decisions first relates to the strand of the literature that investigates the determinants of investment and the incidence of taxes. This literature has been widely influenced by two seminal models: the user cost of capital on the one hand (Jorgenson (1963); Hall and Jorgenson (1967)), and the Q-theory on the other hand (Tobin (1969)). These two models are based on the neoclassical theory of factor demand, in which a representative firm maximizes the present discounted value of its expected profits and has access to perfect capital markets.

The main idea behind the user cost of capital model is that firms base their investment decisions on an arbitrage between the costs and benefits of investing. If there are no adjustment costs, the firm will invest up to the point that the marginal product of capital equals its user cost, which is defined as the cost of using a capital asset for one period. The Q theory, as developed by Tobin (1969), rests on the principle that a firm will invest as long as the market value of an additional unit of capital is above the cost this unit. Tobin's marginal Q being the ratio of the market value to the replacement cost of capital, the firm will invest only if its marginal Q is greater than one. Hayashi (1982) showed that under some assumptions, this ratio is equivalent to the ratio of the firm's market value to the replacement value of its capital stock, which corresponds to the average Q. If the market share prices are correctly valued, i.e. they correctly image all the expectations of future profitability, then the ratio is a sufficient determinant for investment. Also, one advantage

the Q-theory has over the user cost of capital is that it takes into account the cost and time associated with capital replacement. It must be pointed out, however, that these models rely on strong assumptions. The firm's objective is to maximize the value of equity, implying that corporate control issues are assumed away. It operates in competitive markets, under symmetric information, bears no tax and is able to issue as much equity as desired, at an exogenous rate of return that corresponds to the risk-less interest rate. In such a framework characterized by perfect capital markets, external finance from new share issues and internal finance from retained earnings are perfectly substituable. The firms' real decisions are isolated from financial concerns, as in the Modigliani-Miller theorems (Modigliani and Miller (1958); Miller and Modigliani (1961)).

3.2 Taxes and Investment

Both the user cost of capital model and the Q-theory can be adjusted for taxes, and suggest that an increase in corporate taxes will in turn lower investment as well as capital stock. The user cost of capital model has been applied to taxation policies in a paper by Hall and Jorgenson (1967) in which they show that taxes have important effects on the composition of investment. Auerbach (1983) also reformulates the user cost of capital and shows that taxation increases the cost of capital. In a 1992 paper (Auerbach and Hassett (1992)), with his co-author, he studies the impact of tax policy changes in the US on the volatility of investment. Summers (1981) extended the Q-model to include taxation and inflation in order to analyze the general equilibrium dynamics resulting from changes in taxes. His work predicts that a decrease in taxes lowers the rate of return required by corporate investors and raises the level of investment. Cummins, Hassett and Hubbard (1994) use tax reform periods to better identify the determinants of investment decisions. Indeed, Q-models usually have little explanatory power for investment, supposedly because variation in a company's market value does not only capture variation in the firm's fundamentals. Tax reforms are therefore interpreted as natural experiments inducing changes on firms' net return on investment and allow measuring responsiveness of investment to taxes. Also, Caballero et al. (1995) use plant level data's cross-sectional variation to estimate the elasticity of investment to the user cost of capital and conclude that it varies between -0.01 and -2.0 across industries. In a review of the literature, Hasset and Hubbard (2002) suggested that the long-run elasticity of investment to user cost ranges between -0.5 and -1.0. A more recent study by Djankov et al. (2010) exploits cross-country data and show that high effective corporate income taxes are linked to lower investments in manufacturing, but not in services, and a greater reliance on debt. Also, aus dem Moore (2014) exploits a 2006 Belgian tax reform to measure the sensitivity of investment to taxes. Some studies focus on measuring the taxes paid on corporate capital as well as the effective tax rate so as to estimate the rate of return to capital (see Feldstein, Poterba, Mureaux (1983); King and Fullerton (1984); Devereux and Griffith (2003)); others are related to tax competition and tax havens (Slemrod (1990); Hines and Rice (1994); Desai, Foley and Hines (2004) for instance).

3.3 Credit Rationing

Another strand of the literature has focused on the importance of cash flows, which had originally been put aside from the study of determinants of investment as Modigliani-Miller theorems predicted the irrelevance of financial aspects in a firm's investment decision. Indeed, it was assumed that indicators of the availability of internal finance should only affect investment to the extent that they convey information about the firm's future profitability. However, if perfect financial markets are not assumed, the separability between real and financial decisions does not hold, and external and internal sources of finance are not perfect substitutes anymore. This branch of the

literature asks what a firm will do if it receives a cash windfall that is not changing its investment opportunity set, nor its marginal Q. An important notion in this literature is credit rationing. Bester and Hellwig (1987) define credit rationing as follows: "A would-be borrower is said to be rationed if he cannot obtain the loan the he wants even though he is willing to pay the interest that the lenders are asking, perhaps even a higher interest." (Tirole (2006)). Several models have shown that credit rationing, when a model includes frictions affecting the cost of external finance, can be an equilibrium phenomenon.

Several models have explained possible reasons for such an outcome. Stiglitz and Weiss (1981) use adverse selection to build a model in which high interest rates only attract entrepreneurs with excessively risky projects. Jensen and Meckling (1976) base their work on the agency cost of debt, underlying the idea that limited liability will induce equity owners and mangers to engage in too risky projects as they can enjoy the benefits of the projects without bearing the costs. Meyers and Majluf (1984) explain the higher cost of external finance as a lemons premium induced by asymmetries of information. Hart and Moore (1995) model a situation in which managers and shareholders do not systematically have the same objectives, as manager may want to invest in negative present value projects. In turn, investors ration capital so as to prevent bad investments. Holmstrom and Tirole (1997) show that under asymmetric information, moral hazard limits the amount of debt that firms can issue directly and requires that they put their own capital in the project. Banks, through monitoring, can allow less capitalized enterprises to access credit market but at the cost of lower private benefits. Undercapitalized firms cannot access credit. Bernanke, Gertler and Gilchrist (1999) stress the importance of financial frictions and explain in a financial accelerator model that they can amplify the economy's response to shocks as it is more costly for them in to finance investments with external funds.

3.4 Empirics of credit rationing: cash flow sensitivity of investment

A possible implication of financial constraints is that rationed firms should exhibit an excessive cash flow to investment sensitivity. Indeed, from the seminal work of Fazzari et al. (1988), most of the debate on the impact of credit rationing on corporate investment has been centered on the analysis of the response of investment to cash flow. Even though several papers have found a positive relationship between cash flow and investment, this method may be problematic since cash flows may also be correlated with investment opportunities. A wide spread method has been to include Tobin's Q in the specification in order to control for investment opportunities. Though, Tobin's Q as a measure for investment opportunities may not be optimal due to the large volatility of stock markets. In order to overcome this issue, Fazzari et al. (1988) run separate regressions for groups of firms, which are supposed to be constrained to different extents, or not at all. The main purpose of this strategy is to investigate whether the cash flow channel has a larger impact on investment for the most constrained firms. Farrari et al. divide their sample according to dividend payout ratios, which serves as a proxy for financial constraint. Indeed, the authors explain "If information problems in capital markets lead to financing constraints on investment, they should be most evident for the classes of firms that retain most of their income. If internal and external finance are nearly perfect substitutes, however, then retention practices should reveal little about investment by the firm. Firms would simply use external finance to smooth investment when internal finance fluctuates." The empirical results show substantially higher investment to cash flow sensitivity for firms supposed to be more financially constrained. It should be noted that if Tobin's Q is poorly informative about investment opportunities, then cash flow may become more informative. Also, an underlying assumption is that Tobin's Q measurement problems are equally important for all categories of firms. Several studies have followed the same methodology (Chirinko

and Schaller (1995) for instance).

However, Kaplan and Zingales (1997) criticize Fazzari et al. classification method, explaining that a firm's dividend policy is a bad indicator of financial constraints. They build their own classification using quantitative and qualitative data from financial statements so as to identify different credit rationing intensities. They finally demonstrate that likely constrained firms are less sensitive to cash flows than never constrained ones. This questions cash flow sensitivity as being a good indicator of financial constraints. However, it does acknowledge the fact the firms are not insensitive to financial variables. Cleary (1999) corroborates this conclusion and also finds that most constrained firms are the less sensitive to cash flows. Though, Allayannis and Mozumdar (2004) demonstrate that Cleary's (1999) results are widely driven by firms with negative cash flows and that firms under distress have reduced sensitivity. Ericson and Whited (2000) also show that investment sensitivity to cash flow estimates are largely determined by measurement errors in Tobin's Q. More recently, Mizen and Vermeulen (2005) have suggested that firms in industries with healthy financial performances have better access to external funds and respond less to the availability of internal finance when taking investment decisions. Melander (2009) uses reduced form VAR methods to prove that cash flows do have a significant effect on investment, especially for constrained firms and that the cash flow sensitivity is increased in recession periods.

In order to overcome endogeneity issues, empirical investigations have relied on exogenous shocks to external financing capacity as instruments for estimating the cash flow to investment sensitivity. Blanchard et al. (1994) look at firms receiving lawsuit windfalls, which are unrelated to their investment opportunities nor their performances. Lamont (1997) uses data of non-oil firms that are oil companies subsidiaries and whose cash flow or collateral value falls, but whose investment opportunities profitability remains constant to show that cash flows have a causal and positive effect on investment. Rauh (2006) investigates firms' retirement contribution requirement effect on cash flow to show that cash low limitations causes lower investments.

3.5 CICE Evaluation

Concerning the CICE, several studies have already tried to model and anticipate the effects of the CICE on the French economy with a macroeconomic approach. Plane (2012) forecasts a positive effect of the measure of French GDP (0.1 point increase in GDP) and a decline in investments due to the substitution between labor and capital and to demand contraction. He also stresses that investment could be further lowered given that most sectors are in excess of capacity. Ducoudré, Heyer and Plane (2015) analyze inter-sector relative effects and conclude that the CICE seemingly has a positive effect on employment, but a negative impact on value added. Guillou and Treibich (2014) also model the effect of the CICE and anticipate its impact. They compare it to a fiscal devaluation (Farhi et al. (2013)) and stress the importance of conducting a microeconometric assessment of the measure aiming at estimating the strength of transmission mechanisms that would translate the measure into gains in competitiveness.

4 Data

In order to conduct an analysis of the effect of the CICE on investment behaviors of firms, three data sets are exploited. They all provide, or can be used to obtain, information at the firm level. The following sections review their characteristics and discuss the issues encountered.

4.1 FARE

The FARE dataset gathers information at the firm level concerning their balance sheet structure and their income flows. It combines data from the fiscal administration concerning firm's financial statements, data from the annual declaration of social data (DADS, see below) related to employees and survey data collected from a sample of firms and aimed at gathering structural information. It bears noting that the questionnaire addressed to firms has been modified in 2011, and it follows that it may have induced changes in the behavior of respondents and that estimation methods had to be revised. It covers the business sector, except the financial industry and agricultural holdings.

This data set provides balance sheet variables, such as firms' assets, depreciation and amortization, working capital, financial debt, and profit and loss account variables, among which turnover, gross operating surplus, earnings before tax, depreciation and amortization, financing costs, taxes, raw material purchases, etc. From these variables, it is possible to isolate firms' investments, and to build dependent variables and controls.

The time span over which the data set is available is relatively narrow. 2014 data not being available yet means it is not possible to observe investments made in 2014, but only those of 2013. This limitation is not trivial since firms only benefited from the CICE, first announced in November 2012, in 2014, when paying their taxes on 2013 revenues. As a consequence, it is only possible to observe the effect of anticipations of the measure, but not the effects of the tax credit itself. In 2013, only firms benefiting from the advance financing mechanism (*préfinancement*), a piece of information that is not provided, did receive money. Therefore, it will be particularly interesting to extend the identification strategy to year 2014, as the effect will probably be clearer and greater. Furthermore, the first year available in the data set is 2010, which restricts the options for estimating a dynamic model or running placebo regressions.

Also, the sample contains some "profiled" firms (*entreprises profilées*). Indeed, some large groups have transformed their plants into legal units, reporting their income on their own. However, from a statistical point of view, it creates a dichotomy between the economic and the legal concept of firm. In order to provide a better overview of the productive structure, the INSEE (national statistics office) has gathered different legal units (and different SIREN, the identification number) into one entity. However, it has not been done for all datasets. From 2012 onwards, some firms have been "profiled", which complicates the analysis of those firm's evolution over time and the merging of databases.

4.2 DADS, Postes (*Déclarations annualisées de données sociales, Postes*)

The DADS dataset is derived from a reporting formality compulsory for all firms with at least one employee. It is structured at the position level, that is, for each firms, detailed information is provided for each employee for each year from 2010 to 2013. Though, as individuals may work in several firms during a year, the same individual may appear several times in the dataset.

The dataset features variables such as gross remuneration, the number of hours worked, the core activity of the firm, the social category associated with every position, the type of contract (short term, permanent contract, etc.). Therefore, it is possible to estimate the amount of CICE a firm can expect receiving given its wage structure, in spite of some unavoidable imprecisions:

- The position level data is provided annually, while eligibility to the CICE is determined monthly. Consequently, an employee earning 2.4 SMIC during the four first months of the year and 2.6 SMIC during the last eight month gives right to CICE on the basis of the first four months. However, an annual analysis will conclude that no CICE is receivable for this employee.

- The gross remuneration is defined by the INSEE as "all the remunerations received by the employee under his employment contract, before deduction of compulsory contributions". The gross remuneration includes, for example, short-term contract bonuses, which correspond in France to 10 percent of the amounts received as part of the contract. Then, an employee earning 3,000 euros under a three years contract will receive 10,800 euros at the end of the third year and will appear non-eligible in the absence of breakdown between wages and bonuses.

As each employee is matched to the identification number of its firm, it is possible, by grouping observations at the firms level, to compute firm-level statistics, such as average hourly wage, wage bill, eligible wage bill, employment, etc.

4.3 MVC

The MVC dataset, produced by the Public Finance General Directorate (*Direction Générale des Finances Publiques)*, counts five variables concerning the amount of CICE firms are entitled to and received. The five variables are the following:

- *Initialisation*: amount of CICE each firm is eligible to given its wage structure.
- *Augmentation* and *Diminution*: upward and downward adjustments given the evolution of the firm's wage structure.
- *Imputation*: amount of CICE the firms were able to deduce from their corporate taxes.
- *Restitution*: amount of CICE that firms were not able to deduce from their taxes and received from the state (only for eligible firms).

These variables allow deducing a breakdown of the uses of the CICE.

Table 3: Breakdown of the uses of the CICE as reported in the MVC dataset (means and st. dv.)

	Number of firms	*Initialisé*	*Imputé*	*Restitué*	*Reporté*
All	670,973	14,659	6,268	3,495	4,896
		(382,361)	(282,615)	(13,054)	(234,809)
Micro	496,750	2,756	1,064	1,546	146
		(3,225)	(2,068)	(2,251)	(1,847)
SMEs	166,131	24,492	10,351	9,03	5,111
		(33,788)	(21,377)	(17,406)	(24,294)
ETIs	5,183	491,75	204,286	12,954	274,51
		(695,799)	(392,994)	(101,047)	(618,042)
Large	228	6,893,950	3,215,028	30	3,678,892
		(19,150,100)	(14,858,997)	(317)	(234,81)

Note: Only SMEs, young innovative firms, new firms and firms in distress are eligible to restitution, however it is not automatic as a form has to be filled in to benefit from it. The amounts are expressed in euros; standard errors are reported between parentheses. The MVC database only concerns firms paying the corporate income tax (IS). The total amount of initialized CICE is 9,8 billion euros, which is a smaller than reported in table 1. It is due to the loss of observations after merges and to the *profilage* performed by the INSEE.
Source: MVC (intersection of MVC, DADS, FARE, 2013)

The table shows that a large number of firms received a relatively small amount of CICE on average, with about 2,756 euros for micro and 24,492 euros for SMEs, while the amount received by larger firms are, on average ten to hundred times larger, with 288 large firms receiving an amount almost similar to the 496,750 micro firms. These figures reflect the fact that large firms account for a much greater share of employment in the country.

This table shows clearly that the intention to treat (*initialisation*) is different from the actual treatment (*imputation* and *restitution*), which depends on the firm's behavior. Indeed, the actual level of CICE received depends on the pre-tax earnings, themselves depending on the investment spending of the firm, and on the eligibility to (and willingness of the firms to benefit from) the restitution. The intention to treat can be seen as the amount of treatment prescribe by the state to a given firm, while the actual treatment depends on the behavior of the firms.

It also explicitly depicts that the measure's impact should gradually increase over the year, as deferred amounts of 2013 CICE will be added to the amount of CICE calculated based on 2014, 2015, etc. firms' results.

In order to proceed to the analysis, the three datasets are merged. Only firms at the intersection of the three files are kept (therefore dropping firms absent in 2013). Firms for which *initialisation* is a missing variable are also dropped. As a consequence, in the absence of profiling matrices, profiled firms, which are not matched with the same serial number in the three databases, are excluded from the analysis. Although the INSEE mentions that it only concerns about forty firms, their magnitude is not negligible. The dataset counts 670,973 firms in 2013, 670,243 in 2012, 628,675 in 2011 and 584,673 in 2010.

5 Descriptive statistics

5.1 Intensity of the treatment

The metric chosen to measure the intention to treat is the amount of CICE to wage bill ratio. As both the actual CICE to wage bill ratio and the calculated CICE to wage bill ratio will be used to identify the effects of the CICE, it is paramount that there is significant variation in the treatment indicator and that the calculated CICE, used as a proxy for the intention to treat is proximate to the actual CICE. Indeed, the identification strategy uses the difference in treatments to disentangle the effect of the CICE on firms. The more variation in the treatment intensity, the more precise the estimation.

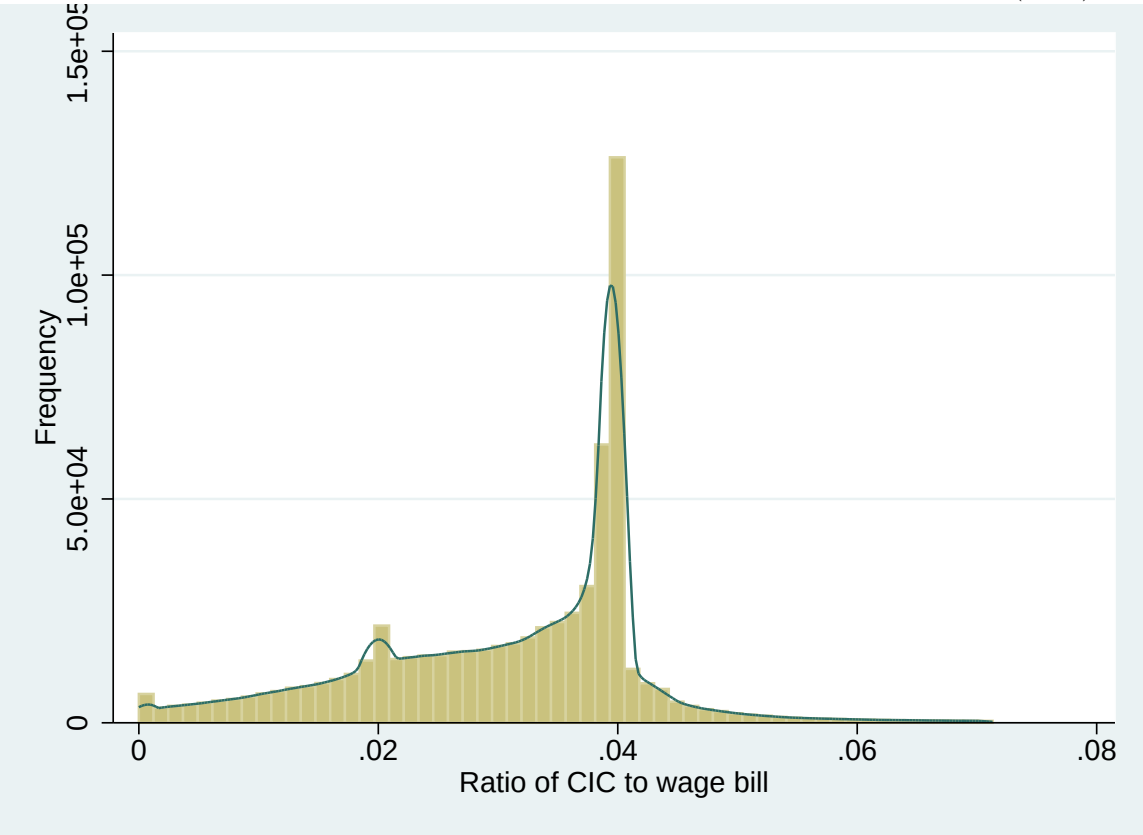
The actual intention to treat is defined as follows:

$$CICE_{ist}^{actual} = \left(\sum_{j \in k} w_{jist} h_{jist} \right)^{-1} initialisation_{ist} \tag{1}$$

where $CICE_{ist}^{actual}$ is the actual CICE ratio of firm i in sector s and year t. w_{kist} and h_{kist} denote respectively hourly wages and hours worked for worker k employed in firm i of sector s at time t. $initialisation_{ist}$ corresponds to the *initialisation* of the CICE, drawn from the MVC database.

Figure 3 presents a bar diagram and the kernel density of the actual CICE to wage bill ratio. While the ratio is not uniformly distributed between 0 and 4 percent, we do observe significant variations across the sample, which is important for the identification strategy as it exploits the variations in the intention to treat. We see a large concentration of firms close to 4 percent, meaning a vast majority of these firms' employees are paid less than 2.5 SMIC. Some firms' ratio

Figure 3: Histogram and kernel distribution of the CICE to wage bill ratio (2013)



Source: DADS, MVC (intersection of DADS, MVC, FARE)

Table 4: Descriptive statistics for the actual CICE to wage bill ratio (2013)

	Observations	Mean	P5	P25	P50	P75	P95
All	670,973	3.4%	0.8%	2.3%	3.5%	3.9%	4.6%
Micro	496,750	3.6%	1.0%	2.5%	3.7%	4.0%	4.7%
SMEs	166,131	2.8%	0.5%	1.9%	2.8%	3.6%	4.1%
ETIs	5,183	2.1%	0.1%	1.1%	2.0%	2.8%	3.7%
Large	228	2.1%	0.0%	0.6%	1.4%	2.5%	3.5%

Source: MVC, DADS (intersection of the MVC, FARE, DADS)

is greater than 4 percent, which reflects measurement errors, however, we do observe a large drop in observations after 4 percent, which is a positive sign.

Table 4 suggests that firms are differently exposed to the treatment according to their sizes. Indeed, half of micro firms have a CICE ratio greater that 3.7 percent, while only 5 percent of large enterprises benefit from a CICE that represents more than 3.5 percent of their wage bill. This reflects the fact that large firms offer better wages on average.

Given that the DADS dataset provides information for each position for years 2010 to 2013, with the limitations mentioned earlier, it is possible to compute the hypothetical amount of CICE each firm would have been entitled to, had the CICE been introduced before.

The calculated CICE ratio, derived from firm's wage structure, is computed as follows:

$$CICE_{ist}^{calc} = \left(\sum_{l \in k} w_{list} h_{list} \right)^{-1} \sum_{j \in k} w_{jist} h_{jist} \mathbf{1}(w_{jist} < 2.5 \times MinWage_t) \tag{2}$$

where $CICE_{ist}^{calc}$ is the calculated CICE ratio for firm i in sector s in year t based on DADS information. w_{kist} and h_{kist} denote respectively hourly wages and hours worked for worker k employed in firm i in sector s at time t.

Because the minimum wage has increased over the years, annual minimum wage if defined as a weighted average of each month's minimum wage. Here again, the computations are annual while eligibility to the CICE is monthly, inducing measurement errors.

Table 5: Descriptive statistics for the calculated CICE to wage bill ratio (2013)

	Observations	Mean	P5	P25	P50	P75	P95
All	670,973	3.5%	1.1%	3.2%	4.0%	4.0%	4.0%
Micro	496,750	3.6%	1.3%	2.2%	4.0%	4.0%	4.0%
SMEs	166,131	3.0%	0.8%	2.5%	3.4%	4.0%	4.0%
ETIs	5,183	2.4%	0.4%	1.6%	2.8%	3.4%	3.9%
Large	228	1.9%	0.1%	0.6%	1.8%	3.0%	3.8%

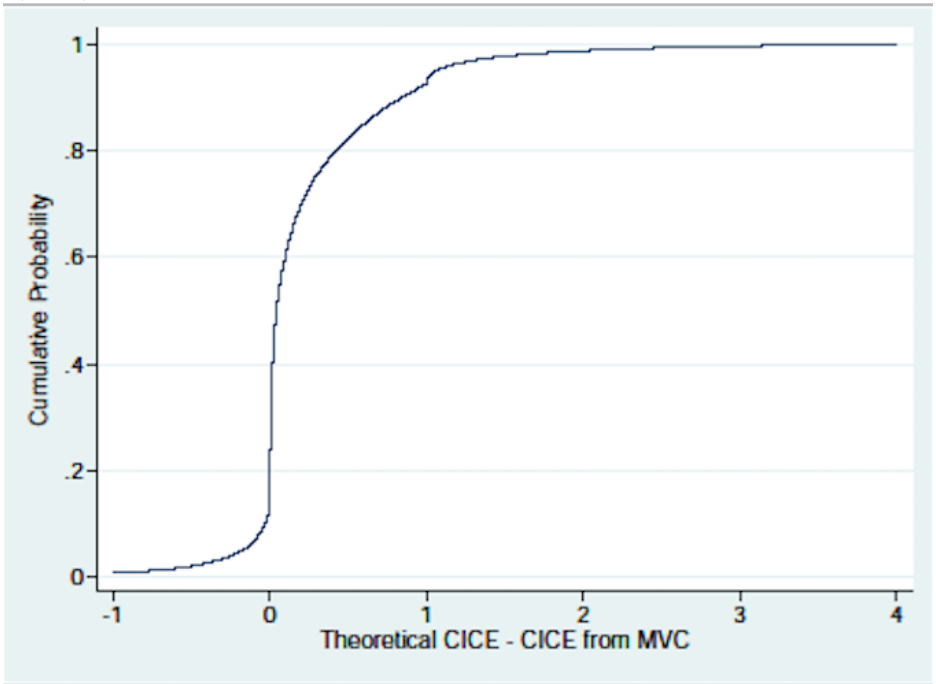
Source: DADS (intersection of MCV, FARE, DADS)

Table 5 provides calculated CICE to wage bill ratio presents the same patterns as before, with small firms benefiting relatively more from the measure: half of them have all of their employees eligible to the CICE. However, the distribution of the calculated CICE to wage bill ratio is more skewed, more calculated ratios being close to 4 percent. Indeed, in the total sample, more than half of firms have their CICE ratio at 4 percent. This indicates that the calculation method overestimates the number of eligible wages while underestimating the number of non-eligible wages.

Figure 4 illustrates that most of deviations between the actual and the calculated CICE are around zero (ten to eighty first percent of the distribution), but also suggests that many calculated observations overestimate the amount of CICE a firm could receive. Indeed, the last fifth of the distribution displays important deviations.

The regressions in table 6 show that the calculated and the actual CICE are very correlated since the variations of the calculated CICE with some controls invariably predicts more than 90 percent of the variation of the actual CICE ($R^2 = 0.92$), regardless of the controls added in the regression. Moreover, the coefficients associated with the calculated CICE lie between 0.8 and 0.9, nearly implying proportionality between the two measures.

Figure 4: Cumulative distribution function of the differences between the calculated CICE and the actual CICE (2013)



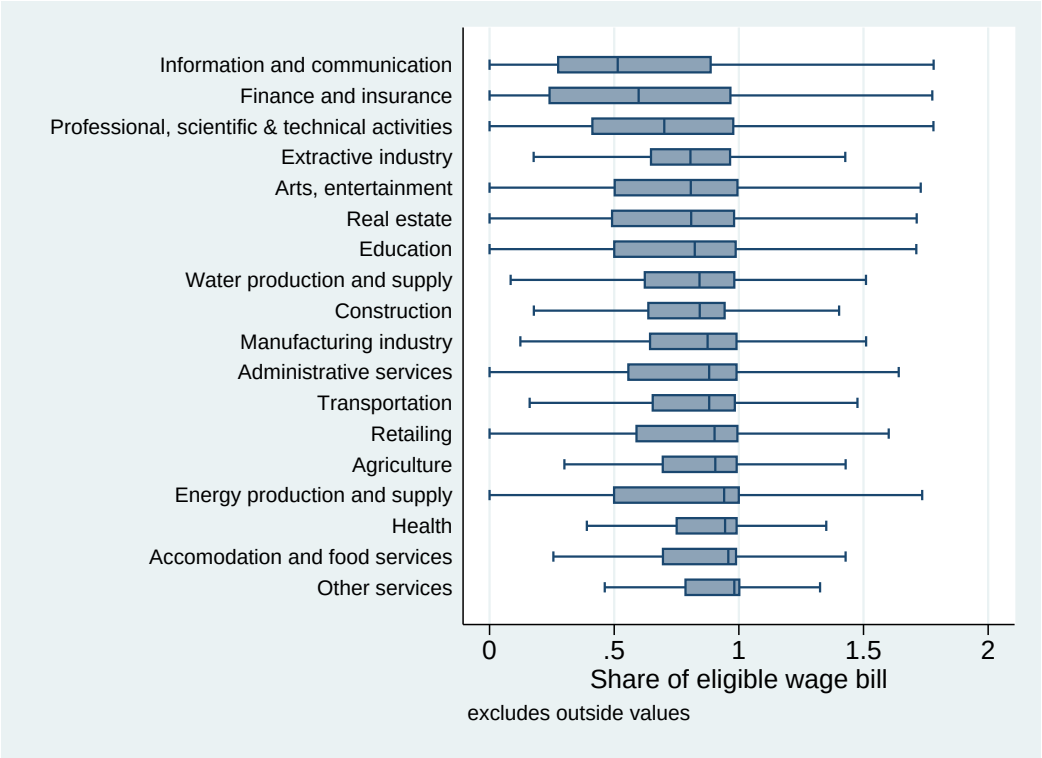
Source: DADS, MVC (intersection of DADS, MVC, FARE)

Table 6: Regression of 2013 actual CICE on 2013 calculated CICE and firms' characteristics

	2013 Actual CICE			
2013 Calculated CICE	0.833	0.873	0.872	0.873
	(265.04)**	(793.80)**	(794.57)**	(795.24)**
Wage bill	0.047			
	(15.70)**			
Mean hourly wage		-0.100		-0.117
		(37.53)**		(20.88)**
Median hourly wage			-0.093	0.019
			(31.44)**	(3.07)**
Turnover	0.094	0.113	0.111	0.113
	(91.86)**	(106.32)**	(105.04)**	(106.16)**
R^2	0.92	0.92	0.92	0.92
N	668,223	668,222	668,223	668,222

Source: DADS, FARE, MVC (intersection of MCV, FARE, DADS)

Figure 5: Boxplots of share of eligible wages by sector (2013)



Source: DADS, MVC (intersection of DADS, MVC, FARE)

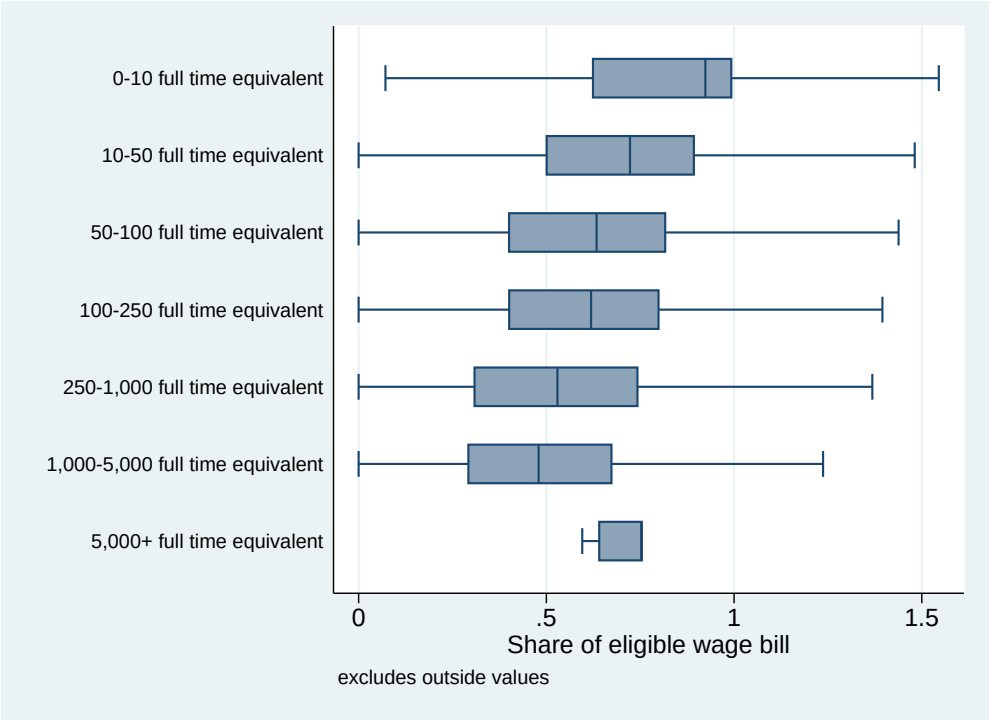
From then on, it is possible to analyze the repartition of the CICE across sectors, sizes, and ages.

Figure 5 represents box plots of the share of eligible wage bill over sectors in 2013. Box plots present the median value (inside the box), while the edges of the box are the 25th and the 75th percentile. Finally, the horizontal line links the lower and upper adjacent value, defined as the largest (smallest) observation that is less than (greater than) the third quartile (first quartile) plus (minus) 1.5 times the inter-quartile ratio. It suggests that firms in the services sectors are, on average, more expose to the measure, as their share of eligible wage is higher. Conversely, sectors such as ICTs, finance and insurance, professional, scientific and technical activities exhibit a lower median exposition to the measure. Though, the exposition to the measure varies greatly in these categories, as the inter-quartile ratio is larger.

Figure 6 depicts the intensity of exposition to the measure per size category. It appears that the smaller the firm, the higher its share of eligible wage bill. This is particularly true for micro firms, whose share of eligible wage bill comes close to 90 percent. Very large firms (more than 5,000 full time equivalents) seem relatively more exposed to the measure than other large firms.

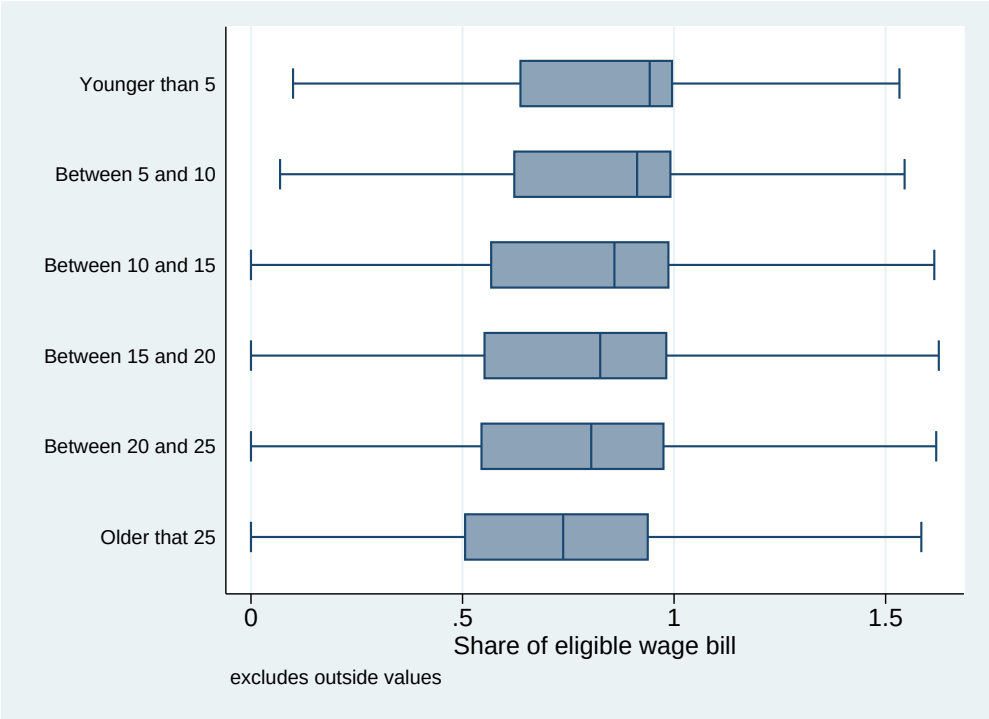
Figure 7 shows the share of eligible wage bill per age category. It appears clearly that young firms are relatively more exposed to the measure than older firms. All in all, these graphs suggest that a typical firm benefiting heavily from the service sector is small, young and belongs to the services sector.

Figure 6: Boxplots of share of eligible wages by size (2013)



Source: DADS, MVC (intersection of DADS, MVC, FARE)

Figure 7: Boxplots of share of eligible wages by age (2013)



Source: DADS, MVC (intersection of DADS, MVC, FARE)

Table 7: Descriptive statistics about investment (2013)

	Observations	Mean	P5	P25	P50	P75	P95
All	670,973	659,123	0	280	4,854	27,725	313,123
Micro	496,750	74,086	0	0	2,395	13,023	94,648
SMEs	166,131	472,178	0	6,726	30,744	116,320	889,087
ETIs	5,183	28,500,000	17,597	507,327	1,868,380	6,644,931	51,500,000
Large	228	620,000,000	766,501	11,900,000	40,400,000	153,000,000	19,400,000,000

Source: FARE (intersection of DADS, FARE, MCV)
Note: Figures are reported in euros.

Table 8: Descriptive statistics about investment ratio (investments as share of firm's assets) (2013)

	Observations	Mean	P5	P25	P50	P75	P95
All	670,973	10.9%	0.0%	0.1%	0.3%	12.9%	60.3%
Micro	496,750	9.6%	0.0%	0.0%	2.2%	12.1%	63.2%
SMEs	166,131	14.5%	0.0%	0.2%	5.2%	14.5%	51.2%
ETIs	5,183	16.2%	0.7%	3.2%	6.5%	13.0%	41.0%
Large	228	18.1%	1.5%	4.9%	8.3%	15.0%	51.6%

Source: FARE (intersection of DADS, FARE, MCV)

5.2 Investments

Table 7 and 8 show that, in each category, a few firms amount for the bulk of investments. The mean invariably stands above the median in each category by a factor of 10 at least (Table 7).

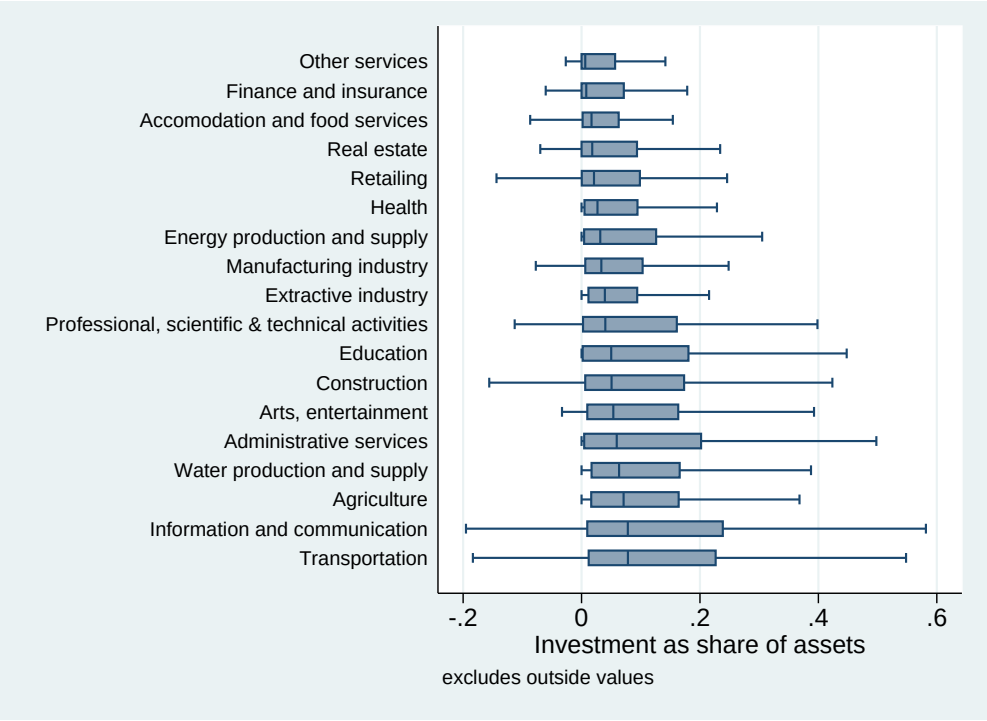
When put in relation with table 4, tables 7 and 8 suggest that the firms investing the most, large enterprises, are also the ones that receive less CICE (in terms of wage bill). It can also be noticed that investments are particularly heterogeneous among micro firms: more than a quarter of them are not investing at all while the top 5 percent of micro firms exhibits large investments compared to other categories. It probably reflects that, among small firms, some invest because they are young and aim at growing larger.

Figure 8 depicts the investment to fixed asset ratio for different economic sectors. It can be noticed that the sectors investing the most (with respect to their median) are also those exhibiting the largest dispersion in investment ratios. Overall, transportation and CITs are the sectors investing the most, followed by agriculture and energy production and supply. On the other hand, sectors in which investment is the weakest are mostly services sectors (retailing, accommodation and food services, other services, etc.), relying more on labor than capital.

Figure 9 shows the investment to fixed asset ratio for different size categories. Smaller firm's investment ratios are much more dispersed than those of larger firms, however, the median ratio of micro firms is the closest to zero. In SMEs (10 to 250 full time equivalents), the median investment ratio is stable over size categories. However, they are less and less dispersed. Also, very large firms (more than 5,000 full time equivalents) tend to invest relatively more than other large firms.

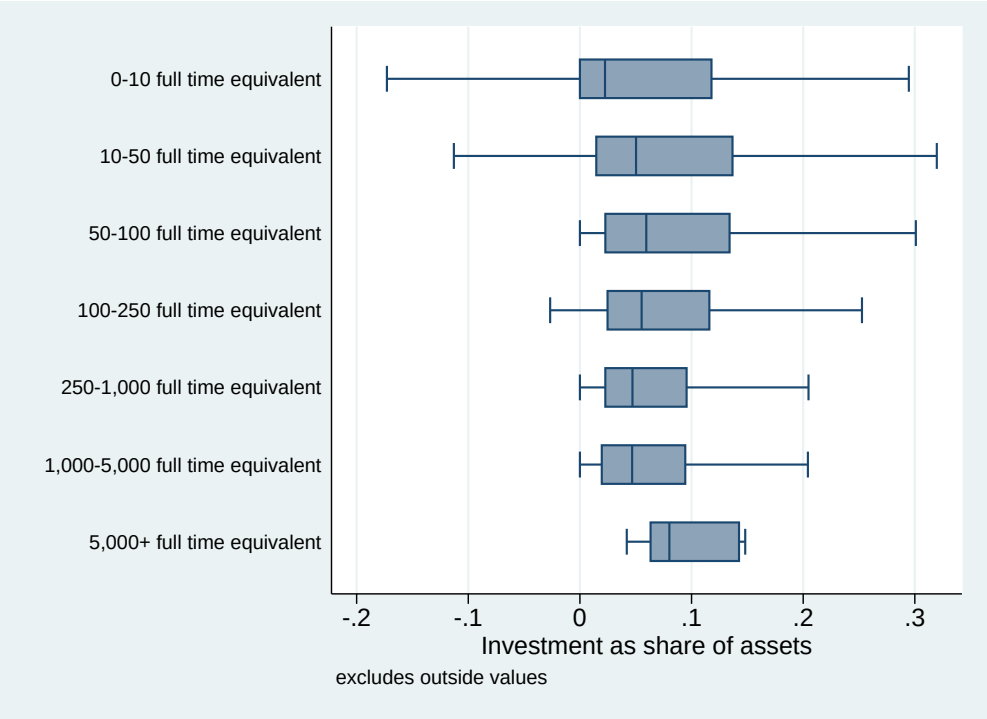
Figure 10 illustrates the investment to fixed asset ratio for different ages. Only focusing on median investment may lead to conclude that all firms invest similarly, regardless of their age. However, the boxplots show that young firms' investment ratio, while close to zero for most of them, remains very heterogeneous. The top quartile of young firms is investing, in proportion of their assets, significantly more than other firms. The older the firm, the less skewed the distribution

Figure 8: Boxplots of investment ratio by sector (2013)



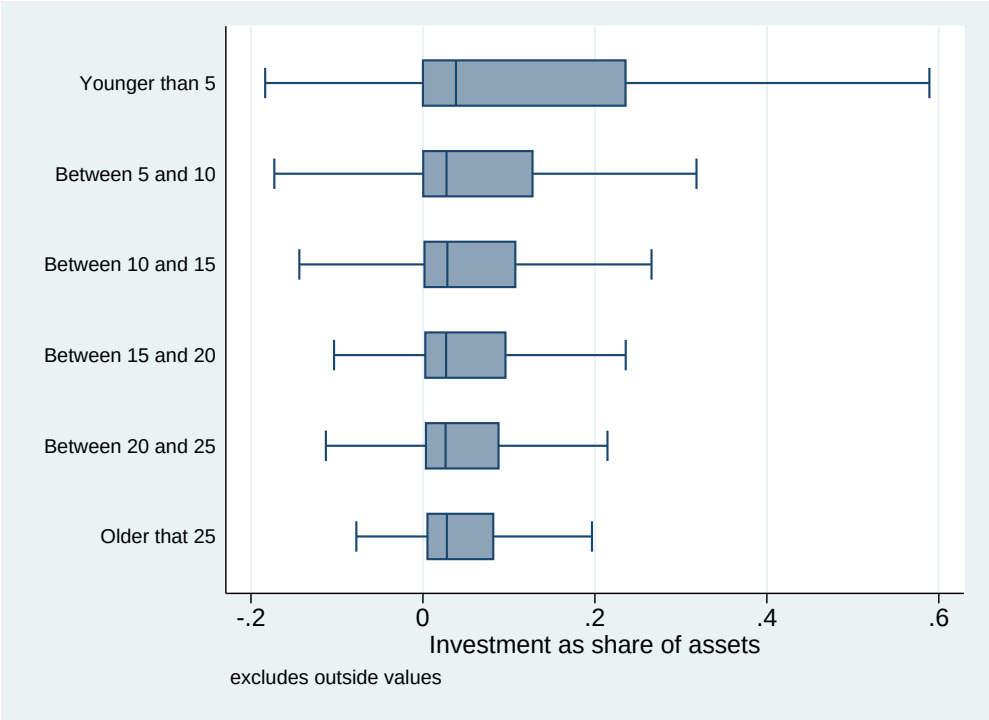
Source: DADS, MVC (intersection of DADS, MVC, FARE)

Figure 9: Boxplots of investment ratio by size (2013)



Source: DADS, MVC (intersection of DADS, MVC, FARE)

Figure 10: Boxplots of investment ratio by age (2013)



Source: DADS, MVC (intersection of DADS, MVC, FARE)

of investment ratio.

Compared to the boxplots illustrating the share of eligible wages, it seems that sectors the most exposed to the measure are the services, while, except for CITs and transportation services, they are also the sectors investing the least. Concerning the size, the firms investing the most are typically SMEs or very large firms. Overall, they are also most intensely exposed to the measure. Similarly, young firms are very exposed to the treatment and are also investing a lot.

6 Identification strategy

Measuring the effects of the CICE is complicated by the absence of control group. Indeed, the measure was implemented at the national level all at once, with a vast majority of firms being eligible to the measure. Moreover, the *de facto* absence of constraints encouraged firms to massively resort to the CICE. However, not all firms are exposed to the treatment to the same extent. The identification strategies use the variation in exposition to the CICE induced by firms' wage structure as a quasi-experiment to examine the impact of the measure on firms' investment decisions.

The first method bears similarities with the methodology implemented by Draca, Machin and Van Reenen (2008) in a study of the impact of an increase of the minimum wage in the United Kingdom on firm's profitability and with a Crepon and Desplatz (2001) study of the effects of a labor tax cuts in France on firms. The modeling strategy resembles a difference-in-differences, as implemented in Draca et al. (2008), but instead of defining two groups, one heavily affected by the measure and one weakly affected, to run the difference-in-differences, a continuous difference-in-differences variable is included, as well as controls and time and firm fixed effects. The first difference consists in comparing firms' investments before and after the implementation of the mea-

sure. Indeed, the indicator of the treatment takes the value 0 in years 2010 to 2012 and the value of the CICE ratio depicted above in 2013. The second difference does not consist in comparing affected and unaffected firms, but rather to study differences in outcome of firms impacted differently by the measure.

However, the treatment indicator cannot take the value of the 2013 actual CICE, at least not without instrumentation. As a matter of fact, in 2013, firms have agency on the intensity of the treatment: they may anticipate the measure and adjust their workforce and the wages they pay accordingly, rendering it endogenous. Therefore, the indicator of the treatment is defined as an *ex ante* proxy of the intention to treat. The *ex ante* proxy of the intensity of the treatment is measured by the ability of the firm to benefit from the measure in the year before the implementation of the policy, before its announcement (the measure was announced in November 2012, however, downward wage rigidities and the time required to hire new employees allow assuming firms did not adjust their wage structure according to the measure in 2012. Plus, details about eligibility were only gradually disclosed). In this case, the wage structure of 2012, quite persistent in time, is used to determine to what extent the firm will benefit from the CICE.

$$\ln(Inv_{ist}) = \theta \mathbf{1}(year = 2013) \times CICE^{calc}_{ist-1} + \gamma X'_{ist-1} + u_i + a_{st} + e_{ist} \tag{3}$$

where Inv_{ist} are investments of firm i in sector s and year t, $CICE^{calc}_{ist-1}$ is the calculated *ex ante* CICE proxy, X'_{it-1} is a series of controls, u_i are firm fixed effects, and a_{st} are sector×year fixed effects.

The drawback of this approach is that, as a result of evolutions in the salary structures and measurement errors, using an *ex ante* proxy inevitably introduces imprecisions in the explanatory variable, which is likely to cause an attenuation bias. As a consequence, the estimator will be biased toward 0, underestimate the 'true' effect of the measure. This bias is increasing in the variance of the measurement error.

In order to mitigate this problem, a second identification strategy is tested. The main idea remains the same, but 2013 investment is regressed on the 2013 actual CICE ratio while instrumenting the latter with past characteristics of the firms, among which the CICE ratios calculated from the DADS dataset for the year 2010 to 2012. These instruments are valid since firms and sector fixed effects are included in the equation, therefore capturing the unobserved heterogeneity associated with firms and sectors that may also be correlated with past firm's characteristics. Moreover, given the rigidity of the production structure of the firm, they are likely to be correlated with present characteristics.

$$\ln(Inv_{ist}) = \beta \mathbf{1}(year = 2013) \times CICE^{actual}_{ist} + \delta X'_{ist-1} + u_i + a_{st} + e_{ist} \tag{4}$$

where Inv_{ist} are investments of firm i in sector s and year t, $CICE^{actual}_{ist-1}$ is the actual CICE ratio, X'_{it-1} is a series of controls, u_i are firm fixed effects, and $a_{s(i)t}$ are sector×year fixed effects.
The CICE ratio is instrumented as follows:

$$CICE^{actual}_{ist} = \theta \sum_{j \in 1,2,3} CICE^{calculated}_{ist-j} + \gamma X'_{ist-1} + u_i + a_{st} + e_{ist} \tag{5}$$

In the spirit of Crépon et Desplatz (2001), a series of control is added in the equation in order to capture firms' characteristics that may also impact their investments decisions. The first is the

turnover, as it allows controlling for the size (in a financial manner) and economic performance of the firm. Its effect may be positive as well as negative. A firm whose economic results are good may want to invest more to develop its activities. A large turnover may also be the sign that the firm's activity is already well developed and may not require new investments. The value-added, defined as the production value minus intermediate consumption represents the extent to which the activity of the firm generates value. A positive relationship between value-added and investments is expected. Though, as a high value-added may reflect the qualification of the employees, the share of executives (*cadres et professions intellectuelles supérieures*) is also included in the equations. Also, the share of workers (*ouvriers* and *employés*) is included, as the firm may want to replace low-skilled workers by capital. To account for the wage structure, the median hourly wage and the workforce in included. Considering the costs of the firm, raw material and merchandise purchases are included and expected to be negatively correlated with investments. Earnings before interests and taxes (EBIT) reflect the profit generated by operating activities and takes into account the depreciation and amortization policy of the firm. It should be positively related to investments. The margin rate also represents the firm's environment, particularly in terms of price competition. The turnover to asset ratio expresses the efficiency of assets in terms of turnover generated. It is expected to have a positive impact on investment. Two financial indicators are also included: the interests born by the firm in terms of turnover as well as its financial debt in terms of turnover. Both of them are expected to hinder investments as high interest rates make them more costly and because banks may be reluctant to lend money to an already heavily indebted firm. Finally, in an augmented specification, controls reflecting changes in these indicators are included as they may suggest that the firm is growing and may want to invest. The working capital requirement, defined as the difference between current assets and current liabilities indicates the financial resources the firm needs to engage in its operating activity. An increase in working capital requirements generally indicates more stringent cash constraints for the firm and is therefore expected to hinder investments.

In order the check that the estimates of the treatment indicator are not picking-up a relationship between changes in investment and initial large amount of employees paid under 2.5 SMIC or that diverging trends are at work between differently affected groups of firms, pseudo-experiments are carried in the pre-policy period. That is, the same specifications are tests, but as if the measure had been implemented in 2012 instead of 2013. The resulting estimates should be close to 0 and not significant. It should be noted that the augmented specification cannot be subject to a falsification test given that only four years of data are available.

The placebo test for the non-instrumented specification is the following:

$$\ln(Inv_{ist}) = \beta \mathbf{1}(year = 2012) \times CICE^{calc}_{ist-1} + \delta X'_{ist-1} + u_i + a_{st} + e_{ist} \tag{6}$$

Where year 2013 is not included.
The placebo test for the instrumented specification is the following:

$$\ln(Inv_{ist}) = \beta \mathbf{1}(year = 2012) \times CICE^{calc}_{ist} + \delta X'_{ist-1} + u_i + a_{st} + e_{ist} \tag{7}$$

Instrumented by:

$$CICE^{calc}_{ist} = \theta \sum_{j \in 1,2} CICE^{calculated}_{ist-j} + \gamma X'_{ist-1} + u_i + a_{st} + e_{ist} \tag{8}$$

Where year 2013 is not included either.

It should be noted that this estimation strategy assumes that firms are affected by the treatment only directly. In particular, it is unaffected by the measure through other firms it may trade with. It also does not account for the financing of the measure nor its effect on aggregate demand for instance.

7 Results

The table page 25-26 presents the coefficients derived from the estimation of the various specifications. The dependent variable is the log of investments.

Column 1: The first column shows the results of the first identification strategy. The treatment variable consists in the 2012 calculated CICE ratio and all the controls are from 2012. The coefficient for the *ex ante* proxy of the CICE are highly significant and takes the value 1.52. It means that, if for instance a firm's CICE ratio rises from 2 percent to 3 percent, everything else equal, investment would increase by 1.52 percent. Though, an increase of the CICE ratio by 1 percentage point is a already large variation, which is not likely to happen with everything else remaining unchanged. More realistically, a change in 0.1 percentage point of the CICE ratio would induce (according to this specification) a 0.15 percent change in firms' investments, on average. Therefore, the magnitude of the effect remains small.

Some controls are significant, with a plausible sign, while others are not. Turnover seems to decrease investments, possibly because it reflects that the firm has reached an advanced stage of its development and invests relatively less. The EBIT is weakly but positively correlated with investments. The margin's sign is more unexpected but may indicate a lower competition on the firm's market segment, only moderately encouraging the firm to increase its productivity by investing more. The coefficient associated with raw material purchases is significant and negative, as expected. The R^2 is high (0.72), indicating that the specification succeeds in explaining more than 70 percent of investments' variance.

Column 2: The second column presents the results of the augmented version of the first identification strategy. The coefficient associated with the treatment intensity has increased and is now 1.98. This increase may be explained by an omitted variable bias resulting from the non-inclusion of a variable that is negatively correlated with the treatment variable and positively correlated with investments, or conversely. According to these estimates, the increase in the CICE ratio, everything else equal, by 1 percentage point will generate 1.98 percent more investments.

Among the added controls, three of them are significant: change in EBIT, change in workforce and change in working capital. Earnings before interests and taxes positively impacts investment while increases in workforce and in working capital requirements have a negative impact. The signs of the coefficients associated with the change in EBIT and in working capital are those expected. However, the negative sign associated with an increase in workforce is more surprising since investments are generally accompanied with a growth strategy that may imply recruiting. Turning to already included controls, turnover and EBIT are still very significant, as well as the positive coefficient associated with the share of executives. The R^2 is larger than in the previous specification (0.79).

Column 3: Coefficients are derived from the falsification test. The coefficient associated with treatment intensity is insignificant and relatively close to 0 (-0.36), which tends to reinforce the results. Indeed, in indicates that the treatment variable is not picking-up a correlation between investment and initial characteristics associated with a high treatment intensity nor capturing pre-policy diverging trends in terms of investment between heavily and weakly treated firms. Con-

cerning the estimates associated with the control variables, they are insignificant or of expected signs. It would be interesting to run a falsification test on the first specification with dynamic controls and see whether the coefficient associated with the false treatment variable is closer to 0.

The last three columns correspond to the instrumented specifications; the first stage regressions are presented in table 25 to 28 of the Appendix.

Column 4: It shows the estimates derived from the instrumental specification with only static controls. The coefficient associated with the treatment variable is significant and higher than the one of the first column (2.35 vs. 1.52), which tends to confirm the presence of an attenuation bias due to measurement errors in the non-instrumented specification (first column of the table). In this case, an increase of the CICE ratio by 1 percentage point, holding everything equal, would increase investments by 2.35 percent. Concerning the controls, they are either not significant or of the expected sign.

Turning to the first stage regression associated with this specification (Table 13, column 1, Appendix), the calculated lags of the CICE ratio are highly significant and positively correlated with the actual CICE ratio. Concerning the other variables, value added, turnover, median hourly wage and share of executive have a very small but negative and significant effect on the strength of the intention to treat. To the contrary, EBIT, the turnover to assets ratio, the margin, the workforce and the share of workers have weak but significantly positive relationship with the intention to treat. Other characteristics are not significant. It elicits that firms with a higher workforce, a larger share of workers, a low median wage and a low turnover tend to be more heavily treated than other firms. Overall, it should be noted that the R^2 is very close to one (0.94), indicating that the instrumentation is robust.

Column 5: The estimates of column 5 are derived from the estimation of the instrumented specification with additional change controls. The coefficient associated with the treatment variable is higher (2.77) in the augmented instrumented specification, as it was the case for the augmented non-instrumented specification. In this case, the coefficient's interpretation is the following: an increase by 1 percentage point of the CICE ratio, everything else remaining constant, is associated with a 2.77 percent increase in investments. The controls' coefficients exhibits only minor changes compared to column 2, which indicates that the specification is stable.

The first stage regression (Table 13, column 2, Appendix) provides coefficient very similar to the first stage regression in column 1. Indeed, the dynamic variables are not significant, or display a very small coefficient (change in value added). The selection into treatment seems to rely more heavily on employment, wage and size characteristics. The R^2 is also very close to 1 (0.94).

Column 6: Finally, the placebo test for the instrumental variables specification yields a non-significant and close to 0 coefficient for the false treatment variable. Again, and for similar reasons as before, this result reinforces the coefficients previously obtained and tend to confirm the positive impact the CICE may have on investment. This absence of significance is not caused by the weakness of the instrument as the first stage regression (Table 13, column 3, Appendix) displays a particularly high R^2 (0.98) with past CICE ratio, median wage, share of executive, value added and turnover being strongly significant.

Split sample regressions, by size

In order to investigate in further details the impact of the CICE on firms' investment decisions, split-sample regressions of the same specifications were estimated by firm's size. Three categories are defined: micro firms, SMEs and large firms (see tables 10 to 12 in Appendix).

The same specifications are estimated for each sub-sample of firms; however, none of the coefficients associated with the treatment variable is significant. Nonetheless, a few remarks are worth

Table 9: All firms

	Non-Inst.	Non-Inst.	Non-Inst. Placebo	Instrumented	Instrumented	Inst. Placebo
2012 Calculated CICE	1.517***	1.980***				
	(0.325)	(0.375)				
2011 Placebo CICE			-0.361			
			(0.353)			
2013 Actual CICE				2.345***	2.768***	
				(0.441)	(0.504)	
2012 Placebo CICE						-0.347
						(0.434)
Turnover, in log	-0.311***	-0.127***	-0.398***	-0.310***	-0.126***	-0.399***
	(0.00672)	(0.0140)	(0.00896)	(0.00672)	(0.0140)	(0.00895)
Value added	0.000000813	-0.0000171	0.00000392	0.000000979	-0.0000170	0.00000392
	(0.00000575)	(0.0000107)	(0.00000778)	(0.00000574)	(0.0000107)	(0.00000778)
EBIT	0.0000616***	0.0000581***	0.0000565***	0.0000614***	0.0000579***	0.0000565***
	(0.00000957)	(0.0000151)	(0.0000115)	(0.00000955)	(0.0000151)	(0.0000115)
Turnover to assets ratio	2.50e-10	-3.89e-09	1.65e-09	2.47e-10	-3.88e-09	1.65e-09
	(1.49e-09)	(3.48e-09)	(1.75e-09)	(1.49e-09)	(3.50e-09)	(1.75e-09)
Margin	-0.0000343*	-0.0000200	0.0000721	-0.0000345*	-0.0000201	0.0000720
	(0.0000163)	(0.0000357)	(0.0000471)	(0.0000163)	(0.0000357)	(0.0000470)
Workforce	-0.000270	-0.000425	-0.000660*	-0.000271	-0.000425	-0.000660*
	(0.000154)	(0.000272)	(0.000264)	(0.000153)	(0.000271)	(0.000264)
Merchandise to turnover	-0.00130	-0.0104	-0.00262	-0.00131	-0.0104	-0.00263
	(0.00141)	(0.0286)	(0.00185)	(0.00141)	(0.0286)	(0.00185)

Table 11: All firms (continued)

	Non-Inst.	Non-Inst.	Non-Inst. Placebo	Instrumented	Instrumented	Inst. Placebo
Raw material to turnover	-0.00154**	-0.00128	-0.00326***	-0.00155**	-0.00128	-0.00326***
	(0.000527)	(0.000946)	(0.000730)	(0.000528)	(0.000944)	(0.000730)
Interests to turnover ratio	-0.00223	0.00878	0.00234	-0.00223	0.00878	0.00234
	(0.00178)	(0.0145)	(0.00756)	(0.00177)	(0.0145)	(0.00756)
Debt to turnover ratio	0.0000281	-0.000753	-0.0000601	0.0000281	-0.000751	-0.0000600
	(0.0000337)	(0.000904)	(0.000127)	(0.0000334)	(0.000904)	(0.000127)
Share of workers	0.00278	0.00121	0.0315	0.00268	0.00415	0.0314
	(0.0149)	(0.0252)	(0.0207)	(0.0149)	(0.0253)	(0.0207)
Share of executives	0.0256	0.0839*	0.0287	0.0244	0.0839*	0.0289
	(0.0210)	(0.0362)	(0.0290)	(0.0210)	(0.0362)	(0.0290)
Median hourly wage, log	0.00548	-0.0166	0.0172	0.00228	-0.0235	0.0182
	(0.0154)	(0.0249)	(0.0220)	(0.0154)	(0.0249)	(0.0220)
Change in turnover		0.00000647			0.00000629	
		(0.0000161)			(0.0000161)	
Change in value added		0.0000281			0.0000276	
		(0.0000386)			(0.0000385)	
Change in EBIT		4.00e-15***			4.01e-15***	
		(5.45e-16)			(5.61e-16)	
Change in workforce		-0.00541**			-0.00542**	
		(0.00202)			(0.00203)	
Change in working capital rq.		-3.36e-15***			-3.34e-15***	
		(3.21e-17)			(3.22e-17)	
Observations	1172092	669864	719894	1172092	669864	719894
R^2	0.718	0.788	0.787	0.718	0.788	0.787

Clustered standard errors in parentheses

Note: All regressions include firm fixed effects along with sector and year fixed effects.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

mentioning.

First, we observe patterns similar to those previously noticed: the second column coefficient is higher that the one in the first column for SMEs and large firms. The same applies for the coefficient of column 5 compared to column 4. Adding change controls seems to raise the coefficient associated with the control variable. This is however not true in the case of micro firms.

Second, the coefficients of the instrumented specifications are always higher that those obtained from estimating the non-instrumented specifications. This indicates that the IV estimations do mitigate the attenuation bias due to measurement errors when using an *ex ante* proxy for the intention to treat.

The coefficients associated with the treatment variable are significantly higher for large firms than for SMEs and micro firms. Even though the coefficients are not significant and should not be relied on, it tends to indicate that the treatment may be more effective on large firms, maybe because of better anticipation of the measure or because of the absence of financial constraints (as in 2013, the CICE has no 'tangible' effects).

Finally, the coefficients associated with false treatment variables in placebo tests are systematically below the other estimates, tend to be close to zero and are not significant. However, they take quite different values (-0.90 for the IV placebo of SMEs and 1.18 for the IV placebo of large firms), which may indicate that the controls do not perfectly capture the pre-existing relationships between investments and characteristics making a firms prone to being largely exposed to the measure or that they fail to take diverging trends into account. For these reasons, it will be particularly interesting to run a placebo test with a specification including change controls, which may capture underlying trends.

All in all, even though the results tend to indicate a small but significant effect of the CICE on investments, the robustness checks are not completely convincing and split sample results are not significant.

8 Next Steps

8.1 Sensitivity to cash flow

In order to better understand in what way the CICE may affect investment decisions and in the light of the investment literature, the cash-flow channel could be studied into greater details.

In the neo-classical literature, taxes are supposed to affect investment decision because they lower the return on capital employed, diminishing the firm's present discounted value of future profits. Therefore, lowering taxes may render previously unprofitable investments profitable again, thus stimulating firms' investment spending. The neo-classical framework rests on a perfect financial market assumption, from which are also derived the Modigliani-Miller theorems, stating that the way investments are financed (by internal or external financing) is irrelevant to explain investments.

Under perfect financial market, the CICE could affect investment by increasing the present discounted value of investments, as follows:

$$\frac{\partial Investment}{\partial CICE} = \frac{\partial Investment}{\partial InvProfitability} \times \frac{\partial InvProfitability}{\partial CICE} \tag{9}$$

However, the assumption of perfect financial markets has often been relaxed to introduce frictions. From then on, cash inside the firm is not a perfect substitute of cash outside the firm anymore. Indeed, some firms may face credit rationing and are not, or imperfectly, able to rely on external financing. Therefore, even before the tax decrease, the firm wanted to invest in profitable projects, but could not. To them, less taxes means above all more liquidity.

Under imperfect financial market, the CICE could affect investment through cash flow as follows:

$$\frac{\partial Investment}{\partial CICE} = \frac{\partial Investment}{\partial CashFlow} \times \frac{\partial CashFlow}{\partial CICE} \tag{10}$$

Building on aus dem Moore (2014), a simple dynamic model of investment including cash flows could be estimated for different subsamples of firms sorted by size in order to see whether, for some firms, investment is more sensitive to cash flow. The model is the following:

$$\begin{aligned}\ln(Inv_{ist}) = {} & \alpha + \beta_1 \ln(Inv_{ist-1}) \\ & + \beta_2 CashFlow_{ist} + \beta_3 CashFlow_{ist-1} \\ & + \beta_4 Debt_{ist-1} + \beta_5 Debt_{ist-2} \\ & + \beta_6 TurnoverGrowth_{ist} + \beta_7 TurnoverGrowth_{ist-1} \\ & + \beta_8 Taxes_{ist} + \beta_9 Taxes_{ist-1} \\ & + \beta_{10} Size_{ist} + firm_i + sector_s + year_t + e_{ist}\end{aligned}$$

Cash flows are defined as net earnings, plus taxes, plus depreciation and amortizations, plus net capital gains, minus the change in working capital requirements. It is then expressed as a share of shareholders funds. Debt corresponds to financial debt over shareholder funds, taxes are the corporate taxes and size is measured as the log value of total assets. It should be noted that the variable shareholder funds is not provided in the FARE dataset. Instead, it can be measured by a proxy obtained by subtracting all available variables from the liability side of the balance sheet. However, shareholder funds being at the denominator of several variables, it is likely to induce large measurement errors. Alternatively, instead of shareholder funds, turnover could be used at the denominator. Moreover, estimating this kind of model correctly would require at least six years of data.

Several specifications could be tested. First, OLS with sector and year dummies and OLS with sector, year and firm dummies could be estimated. Given the reverse causality at work and the dynamic nature of the model estimated, these specifications are both biased, in different directions however, which interestingly provide boundaries between which good estimate should lie. Indeed, the OLS estimator suffers from a bias due to the correlation between the lagged investment variable and the firm's unobserved heterogeneity nested in the error term; the estimate is upward biased. The OLS estimator in the presence firm dummies, which is equivalent to the within estimator, is also biased because the lag of investment is correlated with the average error term; this bias, also known as the Nickell bias, is negative. Then, GMM estimators could be implemented. First, difference GMM transforms the model using first differences and instruments endogenous and lagged variables with their past values. They are good instruments since they are correlated with the first-differenced variables, but not with the first differenced error terms, assuming they are serially uncorrelated. The system GMM follows a similar estimation method, but instead of using only one lag to instrument each variable, it also uses the level equation that is instrumented with first differenced lags. It also requires assuming that first-differenced instruments used to estimate the level equation should not be correlated with unobserved firm effects.

Nils aus dem Moore's conclusion is that, in Belgium, cash flow has a greater impact on small and medium firms' investments than it has on large firms. This seems to indicate that small firms tend to be financially constrained while large firms are not. This result is not surprising as some works (Gertler and Gilchrist (1994); Oliner and Rudebusch (1996); Vermeulen (2002)) showed that size could be regarded as an important determinant of financial constraints. This statement, however, must be regarded with caution, as there is a debate in the literature about whether cash flow

sensitivity is a good proxy for credit constraints (see Fazzari et al. (1988); Kaplan and Zingales (1997, 2000) for instance). Also, Mizen and Vermeulen (2005) stress that it is difficult to know whether firms are small because they are credit constrained or credit constrained because they are small. For all these reasons, the estimations could not be used to make causal inferences. Rather, the goal would be to provide some stylized facts about the cash flow sensitivity of firms in France that may help understand how the CICE affects investments by increasing their cash flow.

8.2 Increase in the effect of the policy

When data will be available for more time periods, it will be interesting to use similar strategies to see how treatment effects vary over time. The specification used by Autor (2003) could be slightly modified to adapt the CICE policy. In each period before 2013, the treatment variable would take the value of the calculated CICE ratio, with, expectedly, coefficients close to zero. In 2013 onwards, the treatment variable would take the value of the actual CICE ratio. This specification would allow checking the validity of the placebo experiments while displaying the take-up of the measure.

$$\ln(Inv_{ist}) = \sum_{a<2013} \beta_t \mathbf{1}(t=a) \times CICE^{calc}_{isa} + \sum_{b\geq 2013} \beta_t \mathbf{1}(t=b) \times CICE^{actual}_{isb} + \delta X'_{ist-1} + u_i + a_{st} + e_{ist}$$

where Inv_{ist} are investments of firm i in sector s and year t, $CICE^{actual}_{ist-1}$ is the actual CICE ratio, $CICE^{calc}_{ist-1}$ is the actual CICE ratio, X'_{it-1} is a series of controls, u_i are firm fixed effects, and $a_{s(i)t}$ are sector×year fixed effects.
The CICE ratio is instrumented as follows:

$$CICE_{ist} = \theta \sum_{j<t} CICE_{isj} + \gamma X'_{ist-1} + u_i + a_{st} + e_{ist}$$

$CICE_{ist}$ and $CICE_{isj}$ can be any past CICE ratio (actual or calculated).

8.3 Robustness checks

To check the robustness of the results, several specifications could be tested. First, as suggested above, the specification with dynamic controls could be tested is 2009 data were made available. Also, the Acoss (*Agence central des organismes de sécurité sociale*) dataset, which centralizes firms' social declarations, features the CICE fiscal base for most of French firms. It would allow checking whether the estimates are robust to a change of dataset.

An alternative method could consist in a matching strategy. Distinct groups, differing by their exposition to the treatment, may be constituted based on their *ex ante* characteristics and made comparable by a matching procedure. This method would not have to rely on only two groups, as in Draca, Machin and Van Reenen (2008); several 'doses' of treatment may be identified, as, for instance, in Joffe and Rosenbaum (1999). In this case, groups are defined arbitrarily, and an ordinal logit model is used. To avoid deciding arbitrarily on a threshold between two or more groups, another method allots each treatment level its own propensity score (Imbens (2000)). Each propensity score is used separately to estimate the distribution of outcomes that would have been observed, had all the observed firms received this treatment dose.

8.4 Indirect treatment

Finally, this study has assumed that firms only benefited from the tax credit in a direct manner. However, that may not hold true, as some firm's large suppliers may have used the tax credit to lower their output prices for example. It could be interesting to reformulate the identification strategy to take these effects into account. In the spirit of Miguel and Kremer (2004), it would be interesting to take possible positive externalities into account by analyzing trade relationships between firms and include in the specification the intensity of the treatment received by the suppliers. For example, suppliers may be divided into categories according to the importance in terms of cost of their output in the production process of the firms. If a firm needs a lot of wood to make its final product, and that its wood suppliers are heavily exposed to the CICE, it should appear in the equation.

$$\begin{aligned}\ln(Inv_{ist}) = {} & \beta \mathbf{1}(year = 2013) \times CICE_{ist}^{actual} \\ & + \gamma_1 \frac{1}{J} \sum_{j=1}^{J} CICE_{jst}^{actual} \\ & + \gamma_2 \frac{1}{K} \sum_{k=1}^{K} CICE_{kst}^{actual} \\ & + \delta X'_{ist-1} + u_i + a_{st} + e_{ist}\end{aligned}$$

where j firms are i firm's large suppliers, and k firms are i firm's smaller suppliers.
The CICE ratio is instrumented as follows:

$$CICE_{ist}^{actual} = \theta \sum_{j \in 1,2,3} CICE_{ist-j}^{calculated} + \gamma X'_{ist-1} + u_i + a_{st} + e_{ist} \tag{11}$$

This method relies on the assumption that the firm has no agency on its suppliers, which are independent productive entities. Therefore, their CICE ratio is considered as exogenous to firm i.

8.5 Other

Other topics related to the effects of the CICE on investment spending would deserve further investigations. First, it would be interesting to break down investments in categories, and see whether the CICE fostered some types of investment more than others. Indeed, the FARE datasets distinguishes many types of investments: tangible, intangible and financial investments, but also, among tangible investments: land, buildings, transport equipment, tooling, etc. It would be particularly interesting to split the sample into different categories of labor intensity to see whether investment in tooling is higher in labor-intensive industries, in other words, whether low-skilled labor has been replaced by machinery. Conversely, the tax credit being indexed on relatively lower wages, it may disincentive labor-intensive industries to invest.

Another issue is the survival rate of firms. In a few years from now, when several years of data will be available, it will be interesting to identify the impact of the CICE on the survival rate of firms. In the shorter-run, it could be interesting to focus on firms' working capital requirements. They have certainly been increasing because of deterioration in trade receivables collection during the crisis, and some firms may have used the tax credit to finance their operating cycle.

9 Conclusion

The CICE has been implemented nationwide in 2013 in order to foster competitiveness through productivity gains and to reduce unemployment. One of the key objectives of this policy is to stimulate investments, as they are considered as the mean to increase productivity in the medium term. For this reason, this dissertation investigates the impact of the CICE on firms' investment decisions.

Given that firms made extensive use of the measure and that is was implemented nation wide, all at once, it is not possible to estimate its impact by comparing a treatment group and a control group. Therefore, a difference in differences framework has been modified to exploit the variations in treatment intensity across firms, rather than exploiting the differences between treated and untreated. In order to control for the endogeneity of the continuous treatment variable, two different specifications have been used. The first one uses an *ex ante* proxy for the intensity of the measure based on past firms' characteristics. The second one uses the actual treatment intensity but instruments it with the ex ante proxy, allowing to curtail the attenuation bias resulting from measurement errors in the proxy's computation.

A positive and significant effect, however small, of the CICE on investment is found when looking at the whole sample of firms. The placebo tests seem to confirm this result. Split-sample regressions suggest that the CICE affects differently firms of different sizes. Though, these split-sample estimates are not significant and the falsification tests coefficients are not as close to zero as before. For this reason, it would be interesting to access 2009 data in order to run placebo tests of specifications including change variables.

Finally, many more aspects related to the effects of the CICE on investment remain to be investigated. For example, it would be stimulating to understand the channels through which the tax credits leads to investments. Moreover, it would be interesting to study whether the trade offs of firms between capital and labor is more favorable to one of these factors. The indirect exposition to the measure, through the supply chain could also be analyzed in order to better capture the exposition of the firm to the treatment.

10 References

Allayannis, G., & Mozumdar, A. (2004). The impact of negative cash flow and influential observations on investment–cash flow sensitivity estimates. Journal of Banking & Finance, 28(5), 901-930.

Auerbach, A. J., Aaron, H. J., & Hall, R. E. (1983). Corporate taxation in the United States. Brookings Papers on Economic Activity, 1983(2), 451-513. Auerbach, A. J. (2002). Taxation and corporate financial policy. Handbook of public economics, 3, 1251-1292.

Auerbach, A. J., & Hassett, K. (1992). Tax policy and business fixed investment in the United States.Journal of public Economics, 47(2), 141-170. Aus dem Moore, N. (2014). Corporate Taxation and Investment–Evidence from the Belgian ACE Reform.

Autor, H. (2003). Outsourcing at will: The contribution of unjust dismissal doctrine to the growth of employment outsourcing. Journal of Labor Economics, January.

Bas, M., Fontagné, L., Martin, P., & Mayer, T. (2015). À la recherche des parts de marché perdues. Notes du conseil d'analyse économique, (4), 1-12. Bernanke, B. S., Gertler, M., & Gilchrist, S. (1999). The financial accelerator in a quantitative business cycle framework. Handbook of macroeconomics, 1, 1341-1393.

Bertrand, M., Duflo, E., & Mullainathan, S. (2002).How much should we trust differences-in-differences estimates? (No. w8841). National Bureau of Economic Research.

Bester, H., & Hellwig, M. (1987). Moral hazard and equilibrium credit rationing: An overview of the issues(pp. 135-166). Springer Berlin Heidelberg.

Blanchard, O. J., Lopez-de-Silanes, F., & Shleifer, A. (1994). What do firms do with cash windfalls?.Journal of financial economics, 36(3), 337-360.

Caballero, R. J., Eduardo M. R. A. Engel, Haltiwanger, J. C., Woodford, M., & Hall, R. E.. (1995). Plant-Level Adjustment and Aggregate Investment Dynamics.

Chirinko, R. S., & Schaller, H. (1995). Why does liquidity matter in investment equations?. Journal of Money, Credit and Banking, 27(2), 527-548.

Cleary, S. (1999). The relationship between firm investment and financial status. The Journal of Finance, 54(2), 673-692.

Crépon, B., & Desplatz, R. (2001). Une nouvelle évaluation des effets des allégements de charges sociales sur les bas salaires suivi de commentaires de Yannick L'Horty et Guy Lacroix. Economie et statistique, 348(1), 3-34.

Cour des Comptes, "Le financement de la branche famille, Mission d'évaluation et de contrôle des lois de financement de la Sécurité sociale", second cahier, 2013.

Cummins, Jason G., Kevin A. Hassett, and R. Glenn Hubbard. 1996. "Tax Reforms and Investment: A Cross-Country Comparison." Journal of Public Economics, 62 (1-2): 237-273.

Desai, M. A., Foley, C. F., & Hines, J. R. (2004). A multinational perspective on capital structure choice and internal capital markets. The Journal of Finance,59(6), 2451-2487.

Desai, Mihir A., C. Fritz Foley, and James R. Hines Jr. 2004b. "Foreign Direct Investment in a World of Multiple Taxes." Journal of Public Economics, 88(12): 2727-2744.

Devereux, M. P., & Griffith, R. (2003). Evaluating tax policy for location decisions. International Tax and Public Finance, 10(2), 107-126.

Djankov, S., Ganser, T., McLiesh, C., Ramalho, R., & Shleifer, A. (2008). The effect of corporate taxes on investment and entrepreneurship (No. w13756). National Bureau of Economic Research.

Draca, M., Machin, S., & Van Reenen, J. (2008). Minimum wages and firm profitability (No. w13996). National Bureau of Economic Research.

Ducoudre, B., Heyer, E., & Plane, M. (2015). Que nous apprennent les données macro-sectorielles sur les premiers effets du CICE? Evaluation pour la période 2014-2015 T2 (No. 2015-29). Sciences Po.

Erickson, T., & Whited, T. M. (2000). Measurement error and the relationship between investment and q.Journal of political economy, 108(5), 1027-1057.

Farhi, E., Gopinath, G., & Itskhoki, O. (2013). Fiscal devaluations. The review of economic studies, rdt036.

Fazzari, S. M., Hubbard, R. G., Petersen, B. C., Blinder, A. S., & Poterba, J. M. (1988). Financing constraints and corporate investment. Brookings papers on economic activity, 1988(1), 141-206.

Feldstein, M. S., & Feenberg, D. R. (1983). Alternative tax rules and personal saving incentives: Microeconomic data and behavioral simulations. In Behavioral Simulation Methods in Tax Policy Analysis (pp. 173-210). University of Chicago Press.

France Stratégie (2015). Comité de suivi du Crédit d'impôt pour la compétitivité et l'emploi, september.

Guillou, S., & Treibich, T. (2014). Le CICE: que peut-on en attendre en termes de compétitivité?. Note de l'OFCE, 41, 19.

Hayashi, F. (1982). Tobin's marginal q and average q: A neoclassical interpretation. Econometrica: Journal of the Econometric Society, 213-224.

Hines Jr, J. R. (2005). Corporate taxation and international competition. Ross School of Business Paper, (1026).

Hines Jr, J. R., & Rice, E. M. (1990). Fiscal paradise: Foreign tax havens and American business (No. w3477). National Bureau of Economic Research.

Holmstrom, B., & Tirole, J.. (1997). Financial Intermediation, Loanable Funds, and the Real Sector. The Quarterly Journal of Economics, 112(3), 663–691.

Hubbard, R. G. 1998." Capital Market Imperfections and Investment.". Journal of Economic Literature, 193-225.Imbens, G. W. (2000). The role of the propensity score in estimating dose-response functions. Biometrika, 87(3), 706-710.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. Journal of financial economics,3(4), 305-360.

Jorgenson, D. W. (1963). Capital theory and investment behavior. The American Economic Review, 53(2), 247-259.

Hall, R. E., & Jorgenson, D. W. (1967). Tax policy and investment behavior. The American Economic Review, 57(3), 391-414.

Kaplan, S. N., & Zingales, L. (1997). Do investment-cash flow sensitivities provide useful measures of financing constraints?. The Quarterly Journal of Economics, 169-215.

Kaplan, S. N., & Zingales, L. (2000). Investment-cash flow sensitivities are not valid measures of financing constraints (No. w7659). National Bureau of Economic Research.

King, M. A., & Fullerton, D. (1984). The taxation of income from capital: a comparative study of the United States, the United Kingdom, Sweden, and Germany. NBER Books.

Lamont, O. (1997). Cash flow and investment: Evidence from internal capital markets. The Journal of Finance, 52(1), 83-109.

Melander, O. (2009). The effect of Cash Flow on investment: an empirical Test of the balance Sheet Channel.

Miguel, E., & Kremer, M. (2004). Worms: identifying impacts on education and health in the presence of treatment externalities. Econometrica, 72(1), 159-217. Miller, M. H., & Modigliani, F.. (1961). Dividend Policy, Growth, and the Valuation of Shares. The Journal of Business, 34(4), 411–433.

Mizen, P., & Vermeulen, P. (2005). Corporate Investment and Cash flow sensitivity: What drives the Relationship?.

Modigliani, F., & Miller, M. H. (1958). The cost of capital, corporation finance and the theory of investment. The American economic review, 48(3), 261-297.

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. Journal of financial economics, 13(2), 187-221.

Plane, M. (2012). Évaluation de l'impact économique du crédit d'impôt pour la compétitivité et l'emploi (CICE). Revue de l'OFCE, (7), 141-153.

Rauh, J. D. (2006). Investment and financing constraints: Evidence from the funding of corporate pension plans. The Journal of Finance, 61(1), 33-71.

Roodman, D. (2006). How to do xtabond2: An introduction to difference and system GMM in Stata.Center for Global Development working paper, (103).

Roucher, D. N. Kerdrain , S. Larrieu, G. Lefebvre. (2013) En 2012, l'activité se contracte dans la zone euro ; L'économie française à l'arrêt.

Slemrod, J. B. (1990). Tax effects on foreign direct investment in the United States: Evidence from a cross-country comparison. In Taxation in the global economy (pp. 79-122). University of Chicago Press.

Stiglitz, J. E., & Weiss, A. (1981). Credit rationing in markets with imperfect information. The American economic review, 71(3), 393-410.

Summers, L. H. (1981). Inflation, taxation, and corporate investment: a q-theory approach. Brookings Papers on Economic Activity

Tirole, J. (2006). The theory of corporate finance. Princeton University Press Princeton and Oxford.

Tobin, J.. (1969). A General Equilibrium Approach To Monetary Theory. Journal of Money, Credit and Banking, 1(1), 15–29.

11 Appendix

11.1 Split-sample regressions (pages 36-41)

11.2 First-stage regressions (pages 42-45)

Table 13: Micro Firms

	Non-Inst.	Non-Inst.	Non-Inst. Placebo	Instrumented	Instrumented	Inst. Placebo
2012 Calculated CICE	0.616	0.666				
	(0.441)	(0.523)				
2011 Placebo CICE			0.305			
			(0.476)			
2013 Actual CICE				1.074	0.817	
				(0.669)	(0.784)	
2012 Placebo CICE						0.573
						(0.634)
Value added	0.0000292*	-0.000128	0.0000475***	0.0000292*	-0.000128	0.0000476***
	(0.0000118)	(0.000129)	(0.0000104)	(0.0000118)	(0.000128)	(0.0000104)
Turnover, in log	-0.427***	-0.142***	-0.506***	-0.427***	-0.142***	-0.506***
	(0.00974)	(0.0232)	(0.0123)	(0.00974)	(0.0232)	(0.0123)
EBIT	0.00121***	0.00121***	0.00127***	0.00121***	0.00121***	0.00127***
	(0.000115)	(0.000186)	(0.000167)	(0.000115)	(0.000186)	(0.000167)
Turnover to assets	1.06e-10	-3.62e-09	2.05e-09	9.73e-11	-3.63e-09	2.05e-09
	(3.39e-09)	(3.97e-09)	(2.95e-09)	(3.39e-09)	(3.98e-09)	(2.95e-09)
Margin	-0.0000178	0.0000396	0.0000771	-0.0000179	0.0000396	0.0000774
	(0.0000223)	(0.0000376)	(0.0000484)	(0.0000223)	(0.0000377)	(0.0000485)
Workforce	-0.00168	-0.0213***	-0.000692	-0.00169	-0.0214***	-0.000694
	(0.00109)	(0.00419)	(0.00171)	(0.00110)	(0.00419)	(0.00171)
Merchandise to turnover	-0.00255	-0.202***	-0.00182	-0.00256	-0.202***	-0.00181
	(0.00137)	(0.0459)	(0.00327)	(0.00137)	(0.0459)	(0.00327)
Raw material to turnover	-0.00879	-0.0184**	-0.00288	-0.00881	-0.0184**	-0.00289
	(0.00690)	(0.00650)	(0.00814)	(0.00690)	(0.00650)	(0.00814)

Table 15: Micro Firms - Continued

	Non-Inst.	Non-Inst.	Non-Inst. Placebo	Instrumented	Instrumented	Inst. Placebo
Interests to turnover	-0.00573	0.00401	0.0350	-0.00575	0.00404	0.0350
	(0.00420)	(0.0148)	(0.0217)	(0.00420)	(0.0148)	(0.0217)
Debt to turnover	-0.000198*	-0.000680	-0.00138*	-0.000198*	-0.000681	-0.00138*
	(0.0000804)	(0.00145)	(0.000596)	(0.0000807)	(0.00145)	(0.000597)
Share of workers	0.000527	-0.00863	0.0315	0.000543	-0.00751	0.0317
	(0.0164)	(0.0283)	(0.0230)	(0.0164)	(0.0283)	(0.0230)
Share of executives	0.0190	0.0831*	0.0302	0.0185	0.0828*	0.0301
	(0.0237)	(0.0419)	(0.0328)	(0.0237)	(0.0419)	(0.0328)
Median hourly wage, log	0.0200	-0.0109	0.0209	0.0187	-0.0134	0.0205
	(0.0175)	(0.0291)	(0.0252)	(0.0175)	(0.0291)	(0.0251)
Change in value added		-0.0000357			-0.0000358	
		(0.0000321)			(0.0000322)	
Change in turnover		-0.000132			-0.000133	
		(0.000109)			(0.000109)	
Change in EBIT		3.96e-15***			3.97e-15***	
		(6.02e-16)			(6.07e-16)	
Change in Workforce		0.000351			0.000459	
		(0.00744)			(0.00745)	
Change in working capital rq.		-3.34e-15***			-3.34e-15***	
		(3.64e-17)			(3.66e-17)	
Observations	762379	402884	452734	762379	402884	452734
R^2	0.614	0.697	0.698	0.614	0.697	0.698

Clustered standard errors in parentheses

Note: All regressions include firm fixed effects along with sector and year fixed effects.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 17: SMEs

	Non-Inst.	Non-Inst.	Non-Inst. Placebo	Instrumented	Instrumented	Inst. Placebo
2012 Calculated CICE	0.480	0.761				
	(0.570)	(0.630)				
2011 Placebo CICE			-0.946			
			(0.642)			
2013 Actual CICE				1.021	1.296	
				(0.722)	(0.799)	
2012 Placebo CICE						-0.902
						(0.723)
Value added	-0.0000116	-0.0000269	-0.0000175	-0.0000115	-0.0000270	-0.0000175
	(0.0000117)	(0.0000145)	(0.0000190)	(0.0000116)	(0.0000145)	(0.0000190)
Turnover, in log	-0.262***	-0.213***	-0.337***	-0.262***	-0.212***	-0.337***
	(0.0144)	(0.0261)	(0.0201)	(0.0144)	(0.0260)	(0.0201)
EBIT	0.000145***	0.000145***	0.000141***	0.000145***	0.000145***	0.000141***
	(0.0000171)	(0.0000213)	(0.0000209)	(0.0000171)	(0.0000213)	(0.0000209)
Turnover to assets	1.12e-10	-1.61e-08	1.46e-09	1.16e-10	-1.60e-08	1.46e-09
	(1.13e-09)	(9.52e-09)	(1.91e-09)	(1.13e-09)	(9.52e-09)	(1.91e-09)
Margin	-0.0000920***	-0.0000779***	0.000187	-0.0000921***	-0.0000780***	0.000187
	(0.0000133)	(0.0000141)	(0.000241)	(0.0000133)	(0.0000141)	(0.000241)
Workforce	-0.000415	-0.00136**	-0.00118	-0.000417	-0.00136**	-0.00118
	(0.000330)	(0.000499)	(0.000607)	(0.000330)	(0.000498)	(0.000607)
Merchandise to turnover	-0.00440	-0.125	0.0101	-0.00426	-0.125	0.00998
	(0.0389)	(0.0744)	(0.0583)	(0.0390)	(0.0744)	(0.0582)
Raw material to turnover	-0.00204**	-0.00178	-0.0594***	-0.00204**	-0.00179	-0.0594***
	(0.000726)	(0.0102)	(0.0158)	(0.000726)	(0.0102)	(0.0158)

Table 19: SMEs - Continued

	Non-Inst.	Non-Inst.	Non-Inst. Placebo	Instrumented	Instrumented	Inst. Placebo
Interests to turnover	-0.00419***	0.00869	-0.00757**	-0.00418***	0.00887	-0.00757**
	(0.000946)	(0.0480)	(0.00267)	(0.000949)	(0.0480)	(0.00267)
Debt to turnover	0.0000857*	-0.000700	0.000147***	0.0000854*	-0.000711	0.000147***
	(0.0000376)	(0.00291)	(0.0000393)	(0.0000377)	(0.00291)	(0.0000393)
Share of workers	-0.0207	0.0125	-0.0226	-0.0204	0.0132	-0.0221
	(0.0383)	(0.0609)	(0.0539)	(0.0383)	(0.0609)	(0.0538)
Share of executives	0.0315	0.0844	0.00892	0.0321	0.0855	0.00967
	(0.0500)	(0.0780)	(0.0721)	(0.0500)	(0.0779)	(0.0721)
Median hourly wage, log	-0.0124	-0.0610	0.0239	-0.0132	-0.0629	0.0258
	(0.0360)	(0.0524)	(0.0525)	(0.0360)	(0.0523)	(0.0524)
Change in value added		0.0000738***			0.0000736***	
		(0.0000139)			(0.0000139)	
Change in turnover		-0.0000209			-0.0000231	
		(0.000106)			(0.000106)	
Change in EBIT		8.69e-15			8.15e-15	
		(1.01e-14)			(1.02e-14)	
Change in Workforce		-0.00637			-0.00637	
		(0.00343)			(0.00343)	
Change in working capital rq.		0.00000223*			0.00000221*	
		(0.000000879)			(0.000000864)	
Observations	364882	232768	223372	364882	232768	223372
R^2	0.728	0.794	0.797	0.728	0.794	0.797

Clustered standard errors in parentheses

Note: All regressions include firm fixed effects along with sector and year fixed effects.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 21: Large firms

	Non-Inst.	Non-Inst.	Non-Inst. Placebo	Instrumented	Instrumented	Inst. Placebo
2012 Calculated CICE	6.828	8.068				
	(3.610)	(4.536)				
2011 Placebo CICE			1.106			
			(5.423)			
2013 Actual CICE				8.925	10.20	
				(5.648)	(6.283)	
2012 Placebo CICE						1.183
						(5.629)
Value added	0.00000505	0.0000183	-0.00000409	0.00000482	0.0000177	-0.00000406
	(0.00000432)	(0.0000126)	(0.00000676)	(0.00000628)	(0.0000126)	(0.00000674)
Turnover, in log	-0.280**	-0.346	-0.424***	-0.283*	-0.344	-0.424***
	(0.0857)	(0.355)	(0.124)	(0.127)	(0.354)	(0.124)
EBIT	0.00000403	-0.00000516	0.00000415	0.00000414	-0.00000460	0.00000410
	(0.00000517)	(0.0000135)	(0.00000654)	(0.00000592)	(0.0000135)	(0.00000656)
Turnover to assets	2.36e-09	-1.07e-09	4.67e-09	3.26e-09	3.64e-09	4.73e-09
	(3.16e-08)	(5.31e-08)	(1.18e-08)	(1.41e-08)	(5.34e-08)	(1.18e-08)
Margin	-0.00273	0.0307	-0.00814**	-0.00272	0.0297	-0.00814**
	(0.00302)	(0.0380)	(0.00299)	(0.00278)	(0.0365)	(0.00300)
Workforce	-0.000351*	-0.000507*	-0.000231	-0.000345	-0.000492	-0.000232
	(0.000157)	(0.000254)	(0.000238)	(0.000193)	(0.000256)	(0.000238)
Merchandise to turnover	0.233	0.302	0.949	0.263	0.317	0.948
	(0.411)	(0.643)	(0.740)	(0.458)	(0.647)	(0.740)

Table 23: Large - Continued

	Non-Inst.	Non-Inst.	Non-Inst. Placebo	Instrumented	Instrumented	Inst. Placebo
Raw material to turnover	-0.563	-0.779	-0.154	-0.567	-0.832	-0.158
	(0.518)	(0.694)	(0.664)	(0.456)	(0.693)	(0.665)
Interests to turnover	0.432	1.005	5.525	0.397	0.967	5.524
	(1.031)	(2.672)	(8.590)	(2.654)	(2.696)	(8.589)
Debt to turnover	-0.00688	0.00667	-0.0348	-0.00685	0.00689	-0.0348
	(0.00522)	(0.0307)	(0.0398)	(0.0126)	(0.0311)	(0.0398)
Share of workers	0.864*	1.331	0.471	0.862	1.348	0.470
	(0.346)	(0.730)	(0.608)	(0.496)	(0.738)	(0.608)
Share of executives	0.434	0.435	-0.340	0.441	0.505	-0.341
	(0.435)	(1.224)	(0.773)	(0.692)	(1.232)	(0.773)
Median hourly wage, log	-0.0465	0.247	-0.0714	-0.0924	0.172	-0.0766
	(0.295)	(0.462)	(0.478)	(0.310)	(0.460)	(0.479)
Change in value added		-0.000588			-0.000634	
		(0.00135)			(0.00138)	
Change in turnover		0.000000245			7.78e-08	
		(0.00000390)			(0.00000394)	
Change in EBIT		-0.000160			-0.000185	
		(0.000284)			(0.000282)	
Change in Workforce		-0.00308			-0.00287	
		(0.00306)			(0.00315)	
Change in working capital		0.0000894			0.0000850	
		(0.0000893)			(0.0000897)	
Observations	5291	3582	2982	5291	3582	2982
R^2	0.824	0.857	0.862	0.824	0.857	0.862

Clustered standard errors in parentheses

Note: All regressions include firm fixed effects along with sector and year fixed effects.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 25: First stage - All firms

	Instrumented	Instrumented	Inst. Placebo
2012 Calculated CICE	0.402***	0.399***	
	(0.00330)	(0.00349)	
2011 Calculated CICE	0.191***	0.196***	
	(0.00348)	(0.00371)	
2010 Calculated CICE	0.163***	0.163***	
	(0.00289)	(0.00297)	
2011 Placebo CICE			0.589***
			(0.00302)
2010 Placebo CICE			0.252***
			(0.00298)
Value added	-6.03e-08***	-6.34e-08*	-6.98e-08***
	(1.41e-08)	(2.46e-08)	(1.76e-08)
Turnover, in log	-0.000247***	-0.000686***	-0.000276***
	(0.0000188)	(0.0000532)	(0.0000224)
EBIT	6.78e-08***	8.62e-08**	3.50e-08
	(1.59e-08)	(2.91e-08)	(2.15e-08)
Turnover to assets	1.31e-22***	1.27e-22***	-1.10e-12
	(1.32e-24)	(1.44e-24)	(1.49e-12)
Margin	5.37e-08**	6.19e-08**	-0.000000106
	(1.91e-08)	(2.11e-08)	(9.87e-08)
Workforce	0.00000119*	0.00000110	0.000000578
	(0.000000475)	(0.000000842)	(0.00000104)
Merchandise to turnover	0.00000147	0.0000459	-0.0000100**
	(0.00000243)	(0.0000311)	(0.00000312)
Raw material to turnover	0.00000133	0.00000151	-0.00000626
	(0.00000118)	(0.00000227)	(0.00000322)
Interests to turnover	-0.00000134	-0.0000119	-0.00000436
	(0.00000516)	(0.0000376)	(0.00000968)
Debt to turnover	-5.22e-09	0.000000232	0.000000164
	(9.79e-08)	(0.00000231)	(0.000000161)
Share of workers	0.000149**	-0.00119***	-0.0000571
	(0.0000531)	(0.000112)	(0.0000645)
Share of executives	-0.000643***	-0.00261***	-0.00172***
	(0.0000784)	(0.000166)	(0.000122)
Median hourly wage, log	-0.000278***	-0.000136	-0.000737***
	(0.0000554)	(0.000110)	(0.0000831)
Change in value added		0.000000222*	
		(0.000000105)	
Change in turnover		6.74e-08	
		(3.59e-08)	
Change in EBIT		2.84e-18	
		(9.88e-18)	
Change in Workforce		-0.00000611	
		(0.00000527)	
Change in working capital		-1.43e-18	
		(1.22e-18)	
Observations	1562682	994540	1038610
R^2	0.936	0.939	0.981

Standard errors in parentheses

Note: All those regressions contain firm fixed effects along with sector and year fixed effects.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 26: First stage - Micro Firms

	Instrumented	Instrumented	Inst. Placebo
2012 Calculated CICE	0.369***	0.367***	
	(0.00379)	(0.00403)	
2011 Calculated CICE	0.185***	0.188***	
	(0.00392)	(0.00423)	
2010 Calculated CICE	0.144***	0.144***	
	(0.00333)	(0.00347)	
2011 Placebo CICE			0.562***
			(0.00352)
2010 Placebo CICE			0.235***
			(0.00347)
Value added	-5.31e-08	-0.000000953**	-0.000000136
	(3.28e-08)	(0.000000350)	(0.000000129)
Turnover, in log	-0.000151***	-0.000428***	-0.000241***
	(0.0000234)	(0.0000778)	(0.0000297)
EBIT	0.000000146	0.00000135**	-0.000000202
	(0.000000120)	(0.000000443)	(0.000000180)
Turnover to assets	1.42e-22***	1.42e-22***	2.09e-12
	(1.76e-24)	(2.13e-24)	(6.73e-12)
Margin	6.42e-08***	7.71e-08***	-9.95e-08
	(1.87e-08)	(1.95e-08)	(9.24e-08)
Workforce	0.00000677	0.0000840***	-0.00000246
	(0.00000432)	(0.0000140)	(0.00000571)
Merchandise to turnover	0.00000300	0.0000265	-0.00000971*
	(0.00000286)	(0.0000689)	(0.00000378)
Raw material to turnover	0.00000439	-0.0000125	-0.00000941
	(0.00000830)	(0.0000273)	(0.00000480)
Interests to turnover	0.000000311	-0.0000589	-0.00000864
	(0.0000148)	(0.0000346)	(0.0000462)
Debt to turnover	-0.000000323	0.00000222	0.000000219
	(0.000000386)	(0.00000260)	(0.00000103)
Share of workers	0.0000649	-0.00154***	-0.0000375
	(0.0000580)	(0.000123)	(0.0000700)
Share of executives	-0.000499***	-0.00267***	-0.00145***
	(0.0000877)	(0.000189)	(0.000137)
Median hourly wage, log	-0.000237***	0.0000360	-0.000704***
	(0.0000628)	(0.000126)	(0.0000939)
Change in value added		0.000000205	
		(0.000000190)	
Change in turnover		0.000000911**	
		(0.000000301)	
Change in EBIT		2.99e-18	
		(1.06e-17)	
Change in workforce		-0.000165***	
		(0.0000270)	
Change in working capital		-1.43e-18	
		(1.23e-18)	
Observations	1121094	692090	739172
R^2	0.935	0.938	0.980

Clustered standard errors in parentheses
Note: All regressions include firm fixed effects along with sector and year fixed effects.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 27: First stage - SMEs

	Instrumented	Instrumented	Inst. Placebo
2012 Calculated CICE	0.468***	0.459***	
	(0.00631)	(0.00671)	
2011 Calculated CICE	0.176***	0.190***	
	(0.00690)	(0.00733)	
2010 Calculated CICE	0.166***	0.158***	
	(0.00544)	(0.00551)	
2011 Placebo CICE			0.669***
			(0.00538)
2010 Placebo CICE			0.240***
			(0.00533)
Value added	-6.31e-09	4.84e-08	-4.60e-08
	(1.26e-08)	(3.90e-08)	(2.47e-08)
Turnover, in log	-0.000291***	-0.000718***	-0.000189***
	(0.0000352)	(0.000103)	(0.0000409)
EBITDA	-2.09e-08	-6.27e-08	-4.81e-08
	(2.48e-08)	(5.01e-08)	(3.51e-08)
Turnover to assets	-6.60e-12***	-4.26e-11	-2.04e-12*
	(1.61e-12)	(2.63e-11)	(9.59e-13)
Margin	0.000000134***	0.000000139***	-0.000000845
	(3.65e-08)	(2.32e-08)	(0.000000930)
Workforce	0.00000682***	0.00000625**	0.00000309*
	(0.00000118)	(0.00000217)	(0.00000128)
Merchandise to turnover	-0.000172	0.000135	-0.000183
	(0.000150)	(0.000270)	(0.000168)
Raw material to turnover	-0.00000503*	-0.00000181	0.00000221
	(0.00000220)	(0.0000422)	(0.0000372)
Interests to turnover ratio	-0.00000405	-0.000192	-0.00000345*
	(0.00000263)	(0.000117)	(0.00000173)
Debt to turnover ratio	0.000000151	0.0000114	-0.000000191***
	(0.000000142)	(0.00000710)	(2.74e-08)
Share of workers	0.000358**	-0.000126	0.000417*
	(0.000133)	(0.000265)	(0.000163)
Share of executives	-0.000948***	-0.00239***	-0.00195***
	(0.000159)	(0.000319)	(0.000252)
Median hourly wage, log	-0.000328**	-0.000731***	-0.000869***
	(0.000108)	(0.000210)	(0.000174)
Change in value added		0.000000181*	
		(8.25e-08)	
Change in turnover		0.00000117**	
		(0.000000441)	
Change in EBIT		1.12e-17	
		(1.92e-17)	
Change in Workforce		0.00000377	
		(0.0000100)	
Change in working capital		1.98e-08*	
		(9.45e-09)	
Observations	395284	260680	246962
R^2	0.948	0.949	0.988

Clustered standard errors in parentheses
Note: All regressions include firm fixed effects along with sector and year fixed effects.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 28: First stage - Large Firms

	Instrumented	Instrumented	Inst. Placebo
2012 Calculated CICE	0.372***	0.384***	
	(0.0628)	(0.0710)	
2011 Calculated CICE	0.140*	0.144	
	(0.0709)	(0.0814)	
2010 Calculated CICE	0.224***	0.207**	
	(0.0629)	(0.0654)	
2011 Placebo CICE			0.705***
			(0.0626)
2010 Placebo CICE			0.274***
			(0.0622)
Value added	-1.64e-08	-1.11e-08	-3.01e-08
	(2.53e-08)	(3.47e-08)	(1.95e-08)
Turnover, in log	0.000506	0.000216	-0.00000674
	(0.000329)	(0.000820)	(0.000154)
EBIT	2.16e-08	1.14e-08	3.40e-08
	(2.24e-08)	(3.48e-08)	(1.83e-08)
Turnover to assets	-8.30e-11	-3.23e-10	-5.55e-11*
	(5.25e-11)	(1.79e-10)	(2.29e-11)
Margin	0.00000118	0.00000697	0.00000119
	(0.00000566)	(0.00000577)	(0.00000288)
Workforce	-0.000000197	-0.000000660	0.000000952
	(0.000000647)	(0.000000943)	(0.000000591)
Merchandise to turnover	-0.00265	-0.00222	0.00117
	(0.00186)	(0.00314)	(0.00193)
Raw material to turnover	0.00181	0.00566	0.00312
	(0.00219)	(0.00388)	(0.00273)
Interests to turnover	0.00366	0.00346	-0.00275
	(0.00284)	(0.00275)	(0.00541)
Debt to turnover	-0.00000908	0.0000213	0.00000812
	(0.0000145)	(0.0000907)	(0.0000269)
Share of workers	0.000393	-0.000798	0.000427
	(0.00149)	(0.00282)	(0.00125)
Share of executives	-0.00236	-0.00614*	-0.000368
	(0.00173)	(0.00271)	(0.00151)
Median hourly wage, log	0.00181	0.00254	-0.00113
	(0.00117)	(0.00228)	(0.00108)
Change in value added		0.00000548	
		(0.00000472)	
Change in turnover		1.15e-08	
		(8.45e-09)	
Change in EBIT		0.00000238*	
		(0.000000937)	
Change in Workforce		-0.0000242	
		(0.0000125)	
Change in working capital		0.000000417	
		(0.000000263)	
Observations	5503	3788	3102
R^2	0.939	0.943	0.996

Clustered standard errors in parentheses
Note: All regressions include firm fixed effects along with sector and year fixed effects.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$