



COMPETITIVENESS AND EMPLOYMENT OR WAGE DISTRIBUTION.

WHAT DO WE LEARN FROM THE CORPORATE AND PAYROLL TAX CUTS POLICIES IN FRANCE?

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Competitiveness and employment or wage distribution. What do we learn from the corporate and payroll tax cuts policies in France?¹

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Abstract

In this article, we focus on the link between improving competitiveness on employment and wages. There is a large empirical literature dealing with the consequences of Corporate Tax Cuts and Payroll Tax Reductions. Rarely papers focus on the relation between competitiveness and employment distinguishing exporting firms from others, which is the core of the matter. In a context of a slowdown in price-competitiveness for French firms, while labor cost is large and employment sluggish after the subprime crisis, two large policy measures were implemented in France over 2013-2016 (*CICE* and *Pacte de Responsabilité*) that amounts to 27 billion dollars in 2016. In this article, we evaluate the effect of both policies on employment and wages. We consider a large panel of firms with a large set of information provided by French administrative sources. We use a differences-in-differences approach combined with an instrumental variable identification strategy. Through this financial support, we find positive elasticities of employment and wages to CICE and to the decrease in payroll taxes; they are larger in exporting firms that benefit less from both policies than other firms. This thus shows evidence for large incidence of CTC and PTR in favor of labor, more particularly in exporting firms and all along with the distribution of employment and wages.

Keywords: treatment effect models, labor demand, tax and subsidies, wages, public policy.

JEL Codes: C21, H25, J23, J31, J38.

1. Introduction

This article focuses on the importance of competitiveness for employment and wages, along with the exporting status of firms.

In 2008, and after the subprime crisis, there was an economic contraction of 4.7% between the first quarter of 2008 and the second quarter of 2009 (OECD, 2010). A plunge in global trade

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was another sign of the seriousness of the crisis. Worldwide, the volume of world exports plunged 12 per cent in 2009 while world gross domestic product (GDP) dropped 2 per cent (Forbes, 2010, WTO, 2015). Besides, 2008-2017 period has seen a remarkable backlash against globalization in globalized market economies (OECD, 2017).

Fiscal policies can be used in some situations to respond to the adverse macroeconomic consequences (Romer and Romer, 2010). At the same time, there was growing fiscal competition between governments with policies such as business tax incentives that were implemented to boost employment and wages, like Tax Cuts and Job Acts in the US in 2017 (Auerbach, 2018). Globalization amplifies fiscal policy spillovers, strengthening the case for enhanced policy cooperation in certain areas. In particular, fiscal policy externalities due to greater trade openness and financial globalization are likely to magnify the cross-country effects of policies pursued by individual countries (IMF, 2007).

In France, the *Louis Gallois* report (Gallois, 2012) drew a number of conclusions, the main ones being the deterioration in corporate profit margins and the need to restore competitiveness. Indeed, a significant slowdown in price competitiveness has been observed in French companies, while labor cost is large and sluggish employment after the subprime crisis. The report recommends thus to create a competitiveness shock by transferring a significant portion of social security contributions up to 3.5 times the French minimum wage (*SMIC*), that is about 30 billion euros.

Thus, two large-scale measures were adopted in France, the two largest (in terms of amounts) implemented in 2012 by the French President François Hollande over 2013-2017. First, the “*Pacte national pour la croissance, la compétitivité et l'emploi*” was adopted: it was presented by French Prime Minister Jean-Marc Ayrault's government on November 6, 2012 after the submission of the “*Galois Report on French Competitiveness*” (Gallois, 2012). The “*CICE*” is the main part of it and refers to a decrease in the corporate tax cuts. It came into force on January 1, 2013. The amount of the tax reduction is calculated by applying a uniform rate to all gross salaries below 2.5 *SMIC*. It yearly represents 18 billion euros over 2014-2016. Second, the “*Pacte de responsabilité*” (PR) was introduced on July, 23th 2014. It mainly includes supplementary reduction in Payroll Taxes and is enforced in 2015. The amount given to firms applies decreasingly to wages up to 3.5 times the minimum wage. It represents 9 billion euros in 2016. Overall, in 2016, almost 30 billion dollars were given to French firms, thus almost one and a half GDP percentage point.

Since the end of the 1990s, notably from 2010s, there has been a large and growing strand of literature that deals with the impact of both corporate tax cuts (CTC) and payroll tax reduction (PTR) with the aim to evaluate the efficiency of tax cuts policies worldwide that have been implemented and represent natural experiments. Articles are most the time empirical and focus either on employment, or on wage effects. Concerning employment effects, using often panel data methods and / or instrumental variable strategy, fixed effects literature related to corporate taxes suggest an ambiguous effect of varying CT: positive (Glaeser *et al.*, 2019; Shuai and Chmura, 2013; Ljungqvist and Smolyansky, 2014; Souillard, 2022), null (Carbonnier *et al.*, 2022; Ljungqvist and Smolyansky, 2014; Pham, 2020) or even negative (Kaymak and Schott, 2023). Sometimes these effects are linked to economic situation: CTC would create jobs only in recessions (Ljungqvist and Smolyansky, 2014). This not systematically increase in employment induced by CTC may also be due to the fact it does not directly decrease labor cost. On the other hand, CTC would impact positively wage earnings (Arulampalam *et al.*, 2012; Carbonnier *et al.*, 2022; Dwenger *et al.*, 2019; Fuest *et al.*, 2018; Liu and Altshuler, 2013; Lora and Fajardo-Gonzalez, 2016; McKenzie and Ferede, 2017); to our knowledge, the only exception is Fox and Pyle (2023), who report no effect of TCJA (2017), but in a particular population of workers (employees from banks). Maybe because reduction in payroll taxes

(mainly employers' social contribution) has a direct impact on labor cost, this policy was more often considered by governments as a tool to boost job creation. Thus, literature dealing with evaluation of payroll taxes is far larger than that for corporate tax cuts. A lot of these articles provide (empirical) evidence of positive effects of PTR on employment (Baumgartner *et al.*, 2021; Benzarti and Harjub, 2020; Biro *et al.*, 2022; Bunel and L'Horty, 2012; Kramarz and Philippon, 2001; Kugler and Kugler, 2021; Lobel, 2024; Lora and Fajardo-Gonzalez, 2016; Saez *et al.*, 2019), this effect being sometimes linked to a particular population of workers: low skilled (Benzarti and Harjub, 2020; Biro *et al.*, 2022) or young workers (Saez *et al.*, 2019). Nevertheless, some papers also show zero effects of PTR (Bauer and Riphahn, 2002; Benmarker *et al.*, 2009; Cruces *et al.*, 2010; Gruber, 1997; Hernandez, 2012; Johansen and Klette, 1997; Kim *et al.*, 2022; Korkeamäki and Uusitalo, 2009). On the contrary, and as for CTC, a positive effect of PTR is found in most papers (Benmarker *et al.*, 2009; Cruces *et al.*, 2010; Gruber, 1997; Hamermesh, 1979; Johansen and Klette, 1997; Kim *et al.*, 2022; Korkeamäki and Uusitalo, 2009; Kugler and Kugler, 2021; Lobel, 2024), particularly in cases where no employment effects were found. In rare cases, overall wage earnings were found to be negatively impacted by PTR (Baumgartner *et al.*, 2021; Saez *et al.*, 2019).

Besides, few articles focus on exporting firms. Rare exceptions are works of Bellone *et al.* (2010), Glaeser *et al.* (2019), Lichter *et al.* (2017), or Pieretti and Bourgain (2003). Using French panel data and random effects estimators, Bellone *et al.* (2010) show that firms starting to export display a significant ex ante financial advantage compared to their non-exporting counterparts. Second, we do not find significant improvement in the financial health of firms entering export markets. Considering data from 28 European states members (plus Iceland, Norway and Switzerland) over 2006-2015, and multiple fixed effects estimators, Glaeser *et al.* (2019), show that an increase in corporate statutory tax rate differentials between domestic and foreign firms reduces domestic employment. However, when other taxes are substituted for parafiscal taxes, there may not be any effect on the unemployment rate. Considering employer–employee panel data and controlling for self-selection into exporting and thus taking account for endogeneity concerns (*via* IV), Lichter *et al.* (2017) show that exporting has a significant positive effect on the (absolute value of the) unconditional wage elasticity of labor demand. They further show that the effect is particularly strong for those plants that export a significant share of their output to low- and medium-income countries, hence face relatively more price-elastic product demand. In a theoretical analysis, Pieretti and Bourgain (2003) shows that the stronger the price setting power of domestic firms, the greater the impact of competitiveness on employment is. Thus it may be of interest to distinguish exporting from non-exporting firms, when analyzing the impact of CTC or PTR on employment or wages. Finally, there is hardly any evidence on what happens with CTC or PTR policies distinguishing independent firms from tax groups of companies; particularly considering CTC.

Therefore, there is still room to provide empirical evidence on the effects of corporate tax and social contributions on employment and wages.

In this paper, we focus on two most important economic policy measures of the François Hollande presidency in France over 2013-2016. The first is a reduction in Corporate Taxes in 2013 and 2014, and the second a reduction in Payroll Taxes in 2015 and 2016. Overall, these financial support amounts to 12 billion euros in 2013, 18 billion euros in 2014, and 27 billion euros in 2016. We exploit this natural experiment to test econometrically whether or not improving competitiveness may help to increase employment or boost wages, all along the employment / wage distributions. We consider a large panel of firms with a large set of information provided by French administrative sources. In the framework of an event study, we use a differences-in-differences approach combined with an instrumental variable identification strategy. Our main results are the following. Both CICE and the PTR part of the “*Pacte de*

Responsabilité” impact positively employment and wages, in firms that most benefit from each policy. CTC is often more efficient than PTR. Overall employment effects benefit more particularly to unskilled workers or workers with permanent labor contract, whereas wage effects more often to skilled workers (executives). Exporting firms are more positively impacted by CICE and PTR than non-exporting firms, although they benefit less from both policies. Independent firms are more concerned with employment effects, whereas tax groups of companies are more concerned with wages increases.

This article contributes in several ways to the literature on the effects of tax cuts in businesses on employment and wages. First, through this natural experiment, we provide new empirical evidence on the consequences of variations in corporate tax and social contributions for all employees, or by distinguishing them according to their qualifications or labor contracts. Second, contrary to most (even all?) the existing empirical literature, we are able to separate the effects of the two different kinds of measures that impact firms from different manners in the same econometric framework. Third, on the basis of different strategies of productive units with respect of CTC and PTR, in particular for CTC, we consider separately tax groups of companies and independent firms. Fourth and last, we distinguish exporting firms from non-exporting firms, which is a central focus of our study and of the considered literature on competitiveness; we thus can measure relative incidence of CICE and PR in both kinds of firms.

The remaining of this paper is organized as follows. Section 2 outlines the *CICE* and the “*Pacte de Responsabilité*” programs. In Section 3, we present data at hands and displays features characterizing firms, distinguishing or not exporting and non-exporting units. Section 4 details the identification strategy used to evaluate the impact of both policies. Section 5 presents and Section 6 discusses the results. The final section concludes.

2. The CICE and PR policies

2.1 Policies

Under the of the François Hollande presidency in France (2012-2017), two most important of economic policy measures were adopted over 2013-2016 to that aim. First, there was the adoption of the “*Pacte national pour la croissance, la compétitivité et l'emploi*”. It was presented by French Prime Minister Jean-Marc Ayrault's government on November 6, 2012 after the submission of the “Galois Report on French Competitiveness”. The “CICE” is the main part of it and refers to a decrease in the corporate tax cuts. It came into force on January 1, 2013. The amount of the tax reduction is calculated by applying a uniform rate to all gross salaries below 2.5 *SMIC*. It yearly represents about 18 billion euros over 2014-2016. Second, “*Pacte de responsabilité*” was introduced on July, 23th 2014. It mainly includes supplementary reduction in Payroll Taxes and is enforced in 2015. The amounts given to firms apply decreasingly to wages up to 3.5 times the minimum wage; it represents 9 billion euros in 2016. Overall, in 2016, almost 30 billion dollars were given to French firms, thus almost one and a half GDP percentage points. In what follows, we display the two devices.

3.1.1. The CICE: a decrease in corporate taxes

The Tax Credit for Competitiveness and Employment (so called “*CICE*”) is a corporate tax credit that is given to all French companies with at least one employee that are do not belong to the public industry are subject to tax (issue: associations). The amount of the corporate tax reduction is calculated by applying a uniform rate to all workers with gross wages below 2.5 times the *SMIC* (French minimum wage), by multiplying the given payroll by a rate that is equal

to 4 percent in 2013, 6 percent from 2014. The maximum claim is €2,600 per year and per employee at the 2014 rate ($0.06 \times 2.5 \times 1,445 \times 12 = €2,601$), i.e. considering a full-time worker whose wage corresponds to 2.5 times the French minimum wage. This is a large-scale measure, with an effective claim of 11.2 billion euros in 2013 according to the CICE monitoring committee's report (Comité de suivi du CICE), or a ½ point of GDP. This amount rose to 18.4 billion euros in 2014, or almost one point of GDP (France Stratégie, 2016) and to 20 billion euros in 2017. This massive, general financial aid is not very specific in its use (article 244 quater C of the French General Tax Code). Its purpose is extremely broad. The aim of this policy is for companies to finance “the improvement of their competitiveness, notably through efforts in the areas of investment, research, innovation, training, recruitment, prospecting for new markets...”. The only restrictions: the CICE may “neither finance an increase in the share of distributed profits, nor increase the remuneration of workers exercising management functions in the company”.

This corporate tax credit (CTC) is therefore a general measure. Contrary to existing Payroll Tax Cuts (Fillon law, 2003), it is not very targeted in its use, and massive. The CICE is much less targeted than social contribution reductions. Since 2005, indeed, Payroll Tax Cuts (Fillon law, 2003) apply to low-wage earners from the French minimum wage (*SMIC*) to 1.6 times the *SMIC*, at a decreasing rate. The CICE applies at the same rate to all employees earning up to 2.5 times the *SMIC*. The CICE is a tax credit, not a reduction in Payroll Taxes. Reductions in social contributions apply immediately when the employer pays social security contributions to the French Central Agency of Social Security Organizations (*Acoss-URSSAF*). On the contrary, the *CICE* calculated by *URSSAF* is forwarded to the tax authorities. The amount of tax credit available to the company will only be deducted from corporate income tax the following year.

Depending on its situation, a company can benefit from the CICE at different times, once the claim has been declared. The company must have a positive net income, and the tax paid has to exceed the amount of the tax credit. Otherwise it can only receive a fraction of the CICE. If after three years the company is not subject to corporate tax or income tax, the tax authorities must pay the CICE amount. A company facing financial difficulties can ask the tax authorities for immediate access to the CICE amount due. Since companies have a claim on the tax authorities, they can ask their bank to discount this claim, in order to benefit from the CICE as soon as possible. For this tax cut, a difference exists between the right to the claim and the amount actually consumed. The calculation that is done at the company level (if independent) or at the tax group of companies' level. Contrary to PTR, it is given the next year. It could be advanced in time (pre-financing), more or less delayed (immediate restitution, imputation on the tax or postponement of debt).

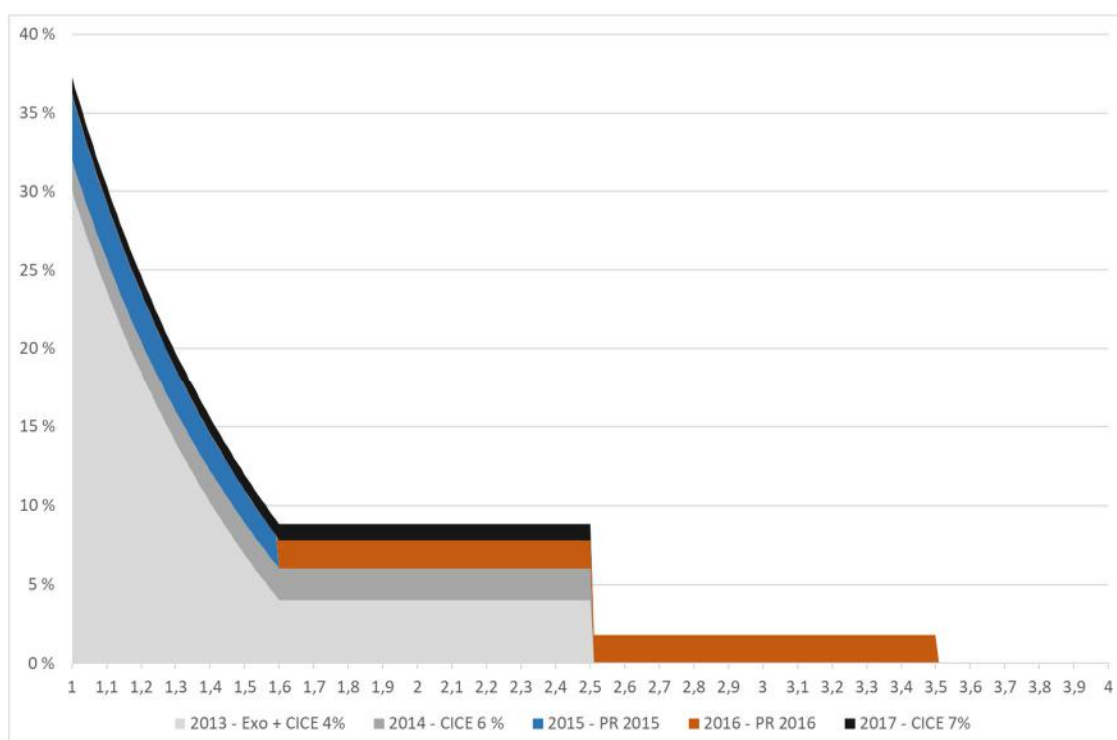
2.1.2. The PR: a further decrease in payroll taxes

Past devices. Payroll tax cuts is an historical French policy to reduce labor cost. Indeed, in 1993, *Juppé law* introduced a linear decrease in PT for wages up to 1.3 times the *SMIC*. The device is called low wages PTR. Then, within the Robien law (1996) framework a larger reduction in payroll taxes is given to firms that reduce working time while they commit on job creations or preservations. In 1998 and 2000, Aubry I and II laws were adopted. Mandatory working time is reduced from 39 to 35 hours a week from 2000. Additional payroll taxes are given to firms if they accept to reduce the working time of their workers (up to 1.8 *SMIC* instead of 1.3 *SMIC* for low wage firms). Finally, Fillon law (2003) aims to merge the two existing devices (WTR payroll tax cuts - Aubry II law - and LW payroll tax cuts (Juppé law, 1993) up to 2005. From 2005, through Fillon law (2003), the maximum amount for workers who earn

the minimum wage (26 percent of their gross wage); this financial support decreases linearly with wages and towards 0 for a remuneration equal to 1.6 times the minimum wage (Figure 1).

Additional PTR. The “*Pacte de responsabilité*” is introduced on January 14th, 2014. In two steps family allowance contributions are reduced by 1.8 percent. First, on January 1st, 2015, for workers whose wage are smaller than 1.6 times the minimum wage (French minimum wage). In particular, no social contributions anymore are paid by the employer at the minimum wage level. Second, from April 1st, 2016, these contributions are extended for all salaries above 1.6 *SMIC* and up to 3.5 *SMIC*. *Amounts.* For a full-time wage earner whose gross salary is €3,000 (twice the *SMIC*) per month in 2016, overall decrease in taxes (CICE + PR) amounts to €2,800 per year. *Effectiveness of the collection of the new payroll tax.* Contrary to the CICE corporate tax cuts, this financial aid is directly given to firms and calculated at the company level (who employ a number of workers whose wages allow the firm to benefit from PTR). Contrary to the CTC through the CICE device, it is available at the end of the year where the wages are paid to works, without any delay.

Figure 1. The scale of the CICE and PR: plotting ratios of CICE (or Payroll Tax Cuts) amounts to overall payroll for each worker against individual wages in terms of the French minimum wage.



Sources: Legifrance (French law system) and authors' computations

2.3. Expected effects (from a theoretical point of view)

Direct or indirect policies

CICE and PR (2013-2016) are two devices to improve competitiveness. However, channels through which production cost of firms are reduced are different. Additional PTR through *PR* is a direct decrease in labor cost. This reduction in labor costs results in a decrease in production costs. On the contrary, the “*CICE*” is an indirect decrease in labor cost (and thus in production costs). Indeed, the impact of the CICE is expected to be felt through three channels

corresponding to three distinct timeframes. A short-term financial channel that can help some companies survive: the CICE has had an impact on companies' cash flow and solvency, by providing them with a new financial resource and improving their profitability in the context of the economic crisis (2013). Then there is a medium-term “labor cost” channel: even if CICE does not fully qualify as decrease in labor cost, the recommendations concerning its accounting treatment (reduction in personnel costs) have reinforced this perception. Last, a long-term profit channel: when companies don't pass on the entire fall in production costs in their prices (or wages), they generate an additional increase in the markup rate.

Reduction in firm taxes and competitiveness

CICE reduces amount of corporate taxes, for those whose profit is positive. It increases cash flow and could be used to increase the part of workers for which firms benefit from CICE. PR reduces directly labor cost for workers and hence increases the part of workers for which firms benefit from PR. Almost all firms benefit from CICE and PR. The benefit of both policies thus relies on the wage structure of firm labor force. Hence, competitiveness increases in firms who benefit more from CICE and PR, notably those who employ a larger part of low (and medium) wages. Previous comments hold considering effect of the policy in closed economy. Considering a small open economy, we can assume that such a policy was not introduced abroad. Because of the worldwide asymmetric shock, we can expect the most important improvement in competitiveness holds for exporting firms.

CTC vs. PTR. Incidence and salience

One other question is the following. Who's going to benefit most from this policy? Statutory incidence maintains that the tax is borne by the one who pays it (Simula and Trannoy, 2009). According to economists, in a general equilibrium framework competitive, market economy where the prices of products and factors are flexible, evolve according to the law of supply and demand, prices can adjust to the variation of the tax. The variation of prices induced by that of taxes leads to a change in the distribution of income, profits and well-being which is the ultimate object of tax incidence. A reduction in corporate tax would be likely to improve the level of real wages in the long run. This result should be kept in mind when discussing the sharing of value added and profits.

Accumulating evidence that suggests that individuals are inattentive to some types of incentive (Chetty, 2011; Chetty *et al.*, 2009)). Inattention and imperfect optimization could be particularly important in the case of taxation, because tax systems are complex and non-transparent in practice (Chetty *et al.*, 2009). Indeed (Carbonnier *et al.*, 2016), corporate tax credit, handled by accounting services, may be less salient than a payroll tax cut when it comes to hiring (benefit tax linkages for social insurance programs are opaque). Reductions in social contributions are effective with each payment of social security contributions, and are therefore both perceived quickly and linked in accounting terms to the wage bill. On the other hand, as has often been repeated in this report, the CICE is perceived much later, up to three years after and at the earliest after one year, *via* a costly pre-financing process.

CTC vs. PTR. Distinguishing different kinds of production units

In the case of a PTR (like for the French “Pacte de responsabilité” for instance), the financial support (that depends on the wage structure) is perceived by the company that hires the eligible employees, and that declares the corresponding payroll to the *Agence Centrale des Organismes de Sécurité Sociale* (French Central Agency of Social Security Organisations). The situation is different for CTC (like the French “CICE”): for independent firms, the same holds as for PTR, whereas, for tax groups of firms, CTC is declared either by the head of the group or one firm of the group, the “declaring” entity receiving the financial aid. *As to the use of tax reduction*, in

the case of reductions in social security contributions, the beneficiary company decides how the financial aid is used. On the contrary, in the case of corporate tax cuts, the company that decides on use of the financial support if the company is independent; on the other hand, the use of the tax credit is more a matter of group strategy than of a decentralized decision within each company of the group.

Other policies before implementation of CICE and PR.

Prior to the introduction of the French “Pacte de Responsabilité” in 2013, a number of measures were put in place that could affect its assessment: the increases in French minimum wage (2010-2014); the annualization of the general “Fillon” (2003) tax exemptions (2011); the inclusion of overtime in the tax base for these exemptions (2012); the reform of taxes on overtime hours (2012); an increase in the social security flat-rate (2012); and a rise in the rate of old-age contribution rate (2012). *Evaluating the effect of CTC and PTR.* Because they affected the cost of labor and net wages before or during the introduction of the CICE, these reforms are likely to have had interfered with the effects specific to the CICE and may have affected companies differently, depending on the composition of their payroll. *Their impacts may be positively or negatively correlated* with the intensity with which companies have benefited from the CICE.

4. Data and descriptive analysis

4.1. Aim and motivation of the article

The aim of our article is to evaluate of the impact of both the “CICE” (a corporate tax cut) and “PR” (additional payroll tax reductions) that were implemented by the French government over 2013-2016. Our first motivation is to look to what extent an improvement in competitiveness may help to increase in employment or induce a variation in wages. We thus will distinguish workers according to their qualification (or their labor contract). Our second motivation is to see to what extent this couple of policies would be more effective for exporting firms than for other firms, given that these devices were only implemented in France and not abroad. To our knowledge not any similar policy was adopted among the most important exporting competitor countries to France at the same time.

4.2. Data sources

Several kinds of data sources are needed, following the information that is requested. The French tax authorities (*Dgfi*) provide precise information in the MVC (*Mouvements sur Créances; Dgfi*, 2013-2016) database on the amount of the CICE claim that companies benefited from each year since 2013. The *BRC (Bordereaux Récapitulatifs de Cotisations; Acof, 2013-2016)* database is produced by *Acof-Urssaf* (the French Central Agency of Social Security Organisations) and provides information on the amount of employers' contribution exemptions, as well as information on the gross earnings eligible for the CICE (for wages below 2.5 times the French minimum wage), for companies covered by the social security system. The *DADS (Déclaration Annuelle de Données Sociales; Insee, 2009-2016; “jobs” file)* produced by *Insee* (French national statistical institute) provides us with exhaustive information on employment, hours worked, wages and their breakdown by socio-professional category, gender, age and type of labor contract. The *FARE (Fichiers Approchés des Résultats ESANE, 2009-2016)* file produced by *Insee* and *Dgfi* gathers information on company income statements and balance sheets. In particular, it provides information on sales, added value, gross operating surplus, net income, investment and dividends, and enables us to calculate profit margins, economic profitability and apparent labor productivity.

4.3. Measuring the intensity of benefit from the CICE and PR

In this sub-section we present how we identify companies according to whether they benefit more or less from the CICE or the PR. Apparent CICE and PR rates are used as indicators of the extent to which firms benefit more or less from the considered policy.

For the CICE, the indicator is the ratio of the amount of CICE claim (*MVC*) to total payroll amount (*DADS*) computed at the firm level:

$$T_{CICE,t} = \overline{T_{CICE,t}} \times \frac{\sum_i w_{i,2.5,t}}{\sum_i w_{i,2.5,t} + \sum_j w_{j,2.5,t}} \quad (1)$$

with $\overline{T_{CICE,t}} = 0.04$ for $t = 2013$; $\overline{T_{CICE,t}} = 0.06$ for $t \in [2014; 2016]$

Where $w_{i,2.5}$ is the wage of an employee i whose salary is smaller than or equal to 2.5 times the French minimum wage (*SMIC*); $w_{j,2.5}$ is the wage of an employee j whose salary is greater than 2.5 times the *SMIC*.

For the PR PTR, indicators are defined as such. In 2015, the apparent PR rate is:

$$T_{PR,2015} = 1.8 \times \frac{\sum_i w_{i,1.6,2015}}{\sum_i w_{i,1.6,2015} + \sum_j w_{j,1.6,2015}} \quad (2)$$

In 2016, the apparent PR rate is:

$$T_{PR,2016} = 1.8 \times \left(0.25 \times \frac{\sum_i w_{i,1.6,2016}}{\sum_i w_{i,1.6,2016} + \sum_j w_{j,1.6,2016}} + 0.75 \times \frac{\sum_i w_{i,3.5,2016}}{\sum_i w_{i,3.5,2016} + \sum_j w_{j,3.5,2016}} \right) - 1.8 \times \frac{\sum_i w_{i,1.6,2015}}{\sum_i w_{i,1.6,2015} + \sum_j w_{j,1.6,2015}} \quad (3)$$

As for CICE, $w_{i,1.6}$ (resp. $w_{i,3.5}$) is the wage of an employee i whose salary is smaller than or equal to 1.6 (resp. 3.5) times the *SMIC*; $w_{j,1.6}$ (resp. $w_{j,3.5}$) is the wage of an employee j whose salary is greater than 1.6 (resp. 3.5) times the *SMIC*.

Through the wage variable initially available in the DADS (*S_BRUT* for gross wages), payroll includes more remuneration components than those included in the French minimum wage, *i.e.* *SMIC* (notably profit-sharing and employee participation). More recently, in the DADS dataset, from 2016, a gross salary variable (*BRUT_S*) contains the same remuneration elements as those of the minimum wage (*SMIC*). *Ins  e* has agreed to add this new variable to the DADS made available to researchers as of 2016, but not on earlier versions. In addition to the social gross amount (*BRUT_S*), the DADS data set for 2016 contains the gross tax amount and the CSG basis. One suggested solution is to recalculate a gross salary from the net salary (*S_NET*), which unlike *S_BRUT* does not include employee participation but includes the part of the profit-sharing not invested in a PEE (company savings plan), PEI (intercompany savings plan) or PERCO (collective retirement savings plan). Through this work we can compute the amounts of CICE and of PR for every employee the company.

4.4. Matching and sample restrictions

We thus merge our five files provided by our data sources. The matching rate varies from 60% to 72% in term of the number of firms, and from 77% to 89% with regard to the total wage bill.

Sample restrictions as to the scope of firms studied were applied through imposing some filters. As to eligibility to CICE, only companies subject to corporate income tax are included in the MVC file. This means that public-sector companies are not included, nor are not-for-profit companies. In addition, small companies are often subject to specific tax regimes (flat-rate, simplified real or simplified micro-social regime with income tax). MVC files only list companies subject to corporate income tax. For this reason, we have considered companies with 5 or more employees. Companies belonging to the agricultural industry are affiliated to another social security scheme (*MSA*) and therefore do not appear in the *AcoSS-URSSAF BRC* files. We have therefore also dropped all companies belonging to the agricultural industry from our sample. Moreover, some information were missing for some variables: companies in the insurance and finance industries are under-represented in FARE, and the variables measuring their activity are quite different from those of companies in other industries. We have therefore not considered these companies. Until 2014, the issue of retrocession of the CICE received by temporary employment companies to their customers was not clear-cut. Consequently, in 2013 and early 2014, the use made of the CICE by temporary employment companies was unclear. Again, we did not select these companies. We also excluded from the sample all companies belonging to multinational corporations established in France. Indeed, to study the effects of the CICE and the PR on the employment or wages of these entities, it would be necessary to have access to their consolidated financial statements, encompassing those of all the multinational's companies, whether located in France or abroad. This is not the case with the statistical sources used in this paper.

Some sample restrictions were imposed as to consistency of information between sources at company level. As to CTC between sources, we also dropped companies for which the amount of the CICE is higher (in absolute value) than 50% in one source than in the other (BRC / MVC). As to employment and wage bill, we consider only those companies for which the information is consistent between the three sources BRC, DADS and FARE. In fact, some employees of certain large national companies still have civil servant status. Consequently, the DADS employment level may be lower than that of the other two sources. We therefore retain companies with an employment gap of less than 100% and greater than -50%. This condition only applies to companies with more than 20 employees. We eliminate companies whose financial ratios show extreme values (below the 1st percentile or above the 99th percentile of their distribution within firms for a given year).

Other filters were also considered. As to extreme amounts for CICE and PR rates, and given that, in theory, the CICE rate (ratio of CTC amount to wage bill at the firm level) has a maximum value (4% in 2013, 6% over 2014-2016), we do not consider companies with an apparent CICE rate of over 5% in 2013 and 8% over 2014-2016. We do the same job for the PR rate (ratio of PTR to wage bill).

On the basis of these restrictions, our final sample is composed of perennial companies over the period from 2009 to 2016. This sample is of a sufficiently long size and compatible with the availability and consistency of the data sources (same scope as time goes on – notably industries).

4.5. Distinguishing tax groups of companies from independent firms

As mentioned in the previous section, the CICE claim is made by a one firm belonging to the group, either the head of the group or another company, but not by all the companies in the group. The CTC that benefit to the group is not necessarily received by a particular firm (according to its payroll eligible to CICE). Tax groups are often also groups in the economic sense. In such cases, the use of the CICE is more a question of group strategy than of a decentralized decision within each company of the group. As a result, since we want to evaluate

at the same time the effects of the CICE and the PR, we consider two distinct sets of analyses: one is carried on at the level for independent firms, and the other for (tax) groups of firms.

To build of a sample of (tax) groups of firms, we use a new data source, the *Dgfp*'s *PERIM* (*Périmètre des groupes fiscaux*) database, which describes the scope of tax groups year by year since 2005. We have selected the companies belonging to a tax groups that were perennial over 2009-2016. This enabled us to reconstitute the “core” of perennial tax groups, *i.e.* where we only include companies in the (tax) group that are perennial over 2009-2016. We then aggregate data from DADS, FARE and MVC at the level of perennial (tax) groups.

In the end, we get two distinct samples over 2009-2016. The first is composed of 112,515 independent firms (out of them 28,805 export). The second is composed of 4,119 groups of firms (out of them 1,568 export⁵).

4.6. CICE, PR and employment or wages

4.6.1. Independent firms

First, as expected, there was an increase in the apparent CICE rate between 2013 and 2014 (from 2.74% to 4.11), consistent with the increase in the theoretical rate (Table 1a). Then it remains stable in 2015. As well from 2015, the implementation of the PR with the first component of the PTR policy led to an increase in the apparent exemption rate for employer contributions (+0.66 pp). With the implementation of the second component of the PR from April 2016, a new increase in PTR is observed (+0.58 pp). Exporting firms benefit less both from CICE and PR than other firms, because the part of high wage earnings is there larger in those firms.

Table 1a. CICE corporate tax cut and PR payroll tax reduction. Independent firms, following their exporting status.				
Policy indicator \ Year	2013	2014	2015	2016
	All independent firms			
CICE rate	2.74%	4.11%	4.02%	2.63%
PR (variation in the PTR rate)			+0.66pp	+0.58pp
	Exporting independent firms			
CICE rate	2.39%	3.53%	3.44%	2.39%
PR (variation in the PTR rate)			+0.48pp	+0.62pp
	Non exporting independent firms			
CICE rate	3.02%	4.57%	4.51%	4.94%
PR (variation in the PTR rate)			+0.81pp	+0.54pp
Sources: BRC (Acos), DADS-FARE (Insee) and MVC (Dgfp).				
Scope: 112,515 independent firms (of which 28,805 export) employing 5 workers or more, perennial over 2009-2016.				

Second, among all independent firms, between before and after the introduction of the two measures of the CICE (decrease of corporate taxes) and the PR (increase in the reduction of employer contributions), over the period 2013-2016, the number of people employed grew less rapidly than over the period 2010-2012 (Table 1b). However, this decline is greater in non-exporting companies than in other companies, so that employment increases by an additional 1.31 percentage points in exporting companies compared with the others between before and after the introduction of the CICE and the PR. Moreover, while they were slightly less favorable for exporting companies the dynamics of employment growth became more favorable for exporting companies with the introduction of the CICE and the PR.

⁵ In our data, a company is considered an exporting company in a given year if its export turnover is non-zero.

Table 1b. Evolution of employment between before and after the implementation of CICE and PR. Independent firms, following their exporting status.				
Exporting status \ Period		2010-2012	2013-2016	Difference : Before-After
All independent firms		2.58%	0.58%	-1.99pp
Exporting independent firms		2.32%	1.24%	-1.09pp
Non exporting independent firms		2.72%	0.32%	-2.40pp
Difference Exporting-Non exporting		-0.40pp	0.91pp	1.31pp
Sources: BRC (Acos), DADS-FARE (Insee) and MVC (Dgfp).				
Scope: 112,515 independent firms (of which 28,805 export) employing 5 workers or more, perennial over 2009-2016.				

Third, let's now have a look at wage earnings (Table 1d). Between before and after the introduction of the two first components of the CICE (lower corporation tax) and the PR (increased reduction in employer contributions), between 2013 and 2016, annual wages per head increased less rapidly than over 2010-2012. This slowdown is more marked in non-exporting companies than in others, with the result that annual wages per head rose by an additional 0.34 percentage points in exporting companies compared with others between before and after the introduction of the CICE and PR. Furthermore, while the dynamics of growth in annual wages was slightly less favorable in exporting companies, there is no longer any difference in this respect between the two types of independent companies after the introduction of the policies.

Table 1d. Evolution of average wages between before and after the implementation of CICE and PR. Independent firms, following their exporting status.				
Exporting status \ Period		2010-2012	2013-2016	Difference : Before-After
All independent firms		5.25%	2.11%	-3.15pp
Exporting independent firms		3.08%	2.35%	-0.73pp
Non exporting independent firms		3.35%	2.28%	-1.07pp
Difference Exporting-Non exporting		-0.27pp	0.07pp	0.34pp
Sources: BRC (Acos), DADS-FARE (Insee) and MVC (Dgfp).				
Scope: 112,515 independent firms (of which 28,805 export) employing 5 workers or more, perennial over 2009-2016.				

4.6.2. Tax groups of companies

First, the apparent CICE rate increased between 2013 and 2014 (from 2.36 to 3.70%), consistent with the increase in the theoretical rate, then stagnated (2015)⁶ in tax groups of companies (Table 2a). We thus have the same findings as for independent firms (IF), in spite of lower apparent rate, because of higher wages on average in tax groups of companies than in independent firms. As for independent firms, from 2015, the rate of apparent exemption from employer contributions increases. As well, the implementation of the second component of the PR in April 2016 led to a (but lower) increase in PTR in 2016. We thus have the same findings as for IF. However; there was a higher increase in PTR in 2016 than in 2015, in contrast to

⁶ It fell in 2016, certainly because of a drop in the mass of eligible wages, or in employment.

independent firms, mainly because the 2nd component of PR targeted at employees with higher wages, more present in TGC than in IF.

Table 2a. CICE corporate tax cut and PR payroll tax reduction. Tax fiscal groups, following their exporting status.

Policy indicator \ Year	2013	2014	2015	2016
All independent firms				
CICE rate	2.36%	3.70%	3.04%	2.59%
PR (variation in the PTR rate)			+0.38pp	+0.67pp
Exporting independent firms				
CICE rate	2.31%	3.59%	3.00%	2.51%
PR (variation in the PTR rate)			+0.31pp	+0.71pp
Non exporting independent firms				
CICE rate	2.54%	4.12%	3.17%	5.02%
PR (variation in the PTR rate)			+0.58pp	+0.53pp

Sources: BRC (Acoss), DADS-FARE (Insee) and MVC (Dgfp).
Scope: 4,119 tax fiscal groups (of which 1,568 export) composed of firms employing 5 workers or more, perennial over 2009-2016.

Second, for overall TGC, unlike independent firms, between before and after the introduction of the two tax measures of CICE (lower corporate tax) and PR (increased reduction in employer contributions), over the period 2013-2016, the number of people employed grew faster than over the period 2010-2012 (Table 2b). While this increase was particularly marked in exporting TGC, positive employment growth rate slows down in non-exporting TGC between before and after the introduction of the two policies. Employment rose by a further 3.96 percentage points in exporting TGC compared with non-exporting TGC between before and after the introduction of the policies. While employment growth was slightly weaker in non-exporting TGC, it remains much more favorable in exporting TGC with the policy.

Table 2b. Evolution of employment between before and after the implementation of CICE and PR. Tax fiscal groups, following their exporting status.

Exporting status \ Period	2010-2012	2013-2016	Difference : Before-After
All tax fiscal groups	1.54%	2.47%	0.93pp
Exporting tax fiscal groups	1.70%	3.82%	2.12pp
Non exporting tax fiscal groups	1.21%	-0.64%	-1.84pp
Difference Exporting-Non exporting	0.49pp	4.45pp	3.96pp

Sources: BRC (Acoss), DADS-FARE (Insee) and MVC (Dgfp).
Scope: 4,119 tax fiscal groups (of which 1,568 export) composed of firms employing 5 workers or more, perennial over 2009-2016.

Third, contrary to the number of people employed, between before and after the introduction of the two tax measures of the CICE (lower corporate tax) and the PR (increased reduction in employer contributions), over the period 2013-2016, the rate of increase in annual wages per head fell compared to the period 2010-2012 (Table 2d). This slowdown is slightly less marked in exporting than in non-exporting TGC. Overall, wages rose slightly, by 0.07 percentage points more in exporting TGC than in non-exporting TGC, between before and after the introduction of both policies. On the other hand, the trend in annual salaries per capita was more or less the same for the exporting or non-exporting TGC, both before and after the introduction of the CICE and PR.

Table 2d. Evolution of average wages between before and after the implementation of CICE and PR. Tax fiscal groups, following their exporting status.

Exporting status \ Period	2010-2012	2013-2016	Difference : Before-After
All tax fiscal groups	2.87%	1.90%	-0.98pp
Exporting tax fiscal groups	2.64%	1.80%	-0.85pp
Non exporting tax fiscal groups	3.33%	2.41%	-0.92pp
Difference Exporting-Non exporting	-0.69pp	-0.62pp	0.07pp

Sources: BRC (Acos), DADS-FARE (Insee) and MVC (Dgfi).

Scope: 4,119 tax fiscal groups (of which 1,568 export) composed of firms employing 5 workers or more, perennial over 2009-2016.

5. Identification strategy

5.1. Presentation

Our aim is to evaluate the impact of both the CICE and PTR part of the PR implemented by the French government over 2013-2016. To identify this effect, we make use of econometrics of evaluation, considering the Rubin model (Rubin, 1974). Contrary to structural approaches, it does not require to specify behaviors of economic agents before estimating the impact of the policy. It only focuses on estimating the effect of the policy (*i.e.* combination of structural parameters) and is thus (apparently) less demanding in terms of assumptions. It relies on the comparison between the situation where the individual benefit from the policy and that where he / she would not have benefitted from it. In this framework, in our article estimate the effect of the CICE and PR policies (treatment variables) on employment and wages (outcome variables) for firms (or tax groups of companies) that effectively benefit from the policy (average treatment effect on the treated).

5.2. Issues

5.2.1. No “natural” control group

The situation in terms of employment and wages where the firm would not have benefitted from the CICE and the PR although it effectively benefitted from either of them is never observed (counterfactual situation). Usually econometricians use a group of firms that do not benefit from the policy when it is implemented (control group). Such a control group does not exist for CICE and PR. Indeed, almost all firms benefit from both policies. From January 1, 2013, the CICE is a general policy with a very broad wage base that applies to virtually all companies, *i.e.* all those firms employing people earning 2.5 times the *SMIC* or less: only 6% of companies did not benefit from the CICE at all (and they have very specific characteristics). As to the PR, while in 2015 it only applied to companies employing workers earning less than 1.6 times the *SMIC*, in 2016 the measure was extended to employees earning up to 3.5 times the *SMIC*, well beyond the threshold beyond which the aid linked to the CICE vanishes.

Although the CICE is a general measure, it is also a targeted measure, aimed at salaries up to 2.5 times the French minimum wage. While it affects almost all companies, it does not affect them with the same intensity. Some companies will benefit strongly from the CICE, while others will benefit only marginally. A low-wage company will benefit from the maximum tax credit rate (its apparent CICE rate is equal to 6% in 2014), while a company with a high proportion of employees paid over 2.5 times the *SMIC* will benefit less from the CICE. At the extreme, the apparent CICE rate is zero for companies with no employees paid below 2.5 times

the *SMIC*. The same holds for PR (at least at the end of 2016). The CICE and PR are general policies, but are also both more or less targeted. We use these variations in CICE and PR intensity among firms for evaluation purposes (Florens *et al.*, 2008).

5.2.2. Selection bias

Selection on observed variables

CICE and PR are not randomized experiments. Indeed, firms may also differ according characteristics, other than only by the fact they benefit greatly or little from the CICE and the PR. Simple difference in outcome variables (employment / wages) do not necessarily reflect causal effect of both policies. We thus have to control for selection bias.

Multiple regression framework makes it possible to reason all other things equal, and to neutralize the effect of compositional differences between groups of companies that benefit more or less from the policies. We aim at neutralizing them by introducing control variables into econometric regressions. To proceed, we include in our econometric regressions a set of (lagged) variables provided by our dataset: management indicators from FARE, and indicators on the structure of employment from the DADS; dummies to account for sectoral effects or effects related to the size of businesses.

Prior to the introduction of the French “*Pacte de Responsabilité*” in 2013, a number of measures were put in place that could affect its assessment: increases in French minimum wage (2010-2014); the annualization of the general “Fillon” (2003) tax exemptions (2011); the inclusion of overtime in the tax base for these exemptions (2012); the reform of taxes on overtime hours (2012); increase in the social security flat-rate (2012); rise in the rate of old-age contribution rate (2012).

To neutralize the effects of reforms preceding the implementation of the CICE, particularly changes in the minimum wage and those in general social contribution exemptions, we added an additional control variable: the Apparent Exemption Rate (AER, which is the ratio between the total amount of exemptions and the contribution base of the general system).

Selection on unobserved variables

Unobserved variables that are not time-varying can also co-determine the structure of wages and the evolution of employment in companies, like for instance, the personal characteristics of the company director, the organization of work within the company, and the nature of production techniques. It is important to control for these sources of heterogeneity too, in order to measure the causal effect of the treatment. We use fixed effects models, *ie.* regressions that include a firm (or group of firms) unobserved component to describe the outcome variable. We thus consider differences-in-differences estimates (Ashenfelter and Card, 1985).

However, the intensity of exposure to these policies is also determined by the explained variable that are of interest to us (employment and wages). For example, a highly competitive company can be expected to be a strong creator of jobs and to pay high wages more frequently. In this case, its exposure to the CICE will be low. Instrumenting the intensity of CICE (Auten and Carroll, 1999), considering as instrumental variables, intention to treatment variables, *ie.* CICE and PR rates computed on the basis of payroll measured before the enforcement of both CTC and PTR policies. We thus give estimate provided by combining diff-in-diff model with an instrumental variable method. A question remains: when are simulated CICE and PR rates to be used as instruments? Before the implementation of the first of the two policies! To be able to test for over identification, we consider two sets of instruments: 2011 and 2012 for employment (overall or categories); or 2010 and 2011 for wages (overall or categories).

5.2.3. Common trend assumption

Considering DID estimates as reliable coefficients to uncover causal effects of both CICE and PR requires that, in absence of the policy, and conditional to the considered of control variables, the evolution in outcome variables (employment or wages) would have been the same in groups of firms that effectively benefit most from the CICE or the PR than that one that prevails and was experimented in the reference group (that benefit less or even not from the policy).

Although if we control for a large set of variables, considering also a model that describe the outcome variable including an unobserved firm time non-varying component, and instrumenting the benefit from CICE and PR, this assumption might not be checked. To increase the probability for this hypothesis to be checked, we add lagged levels of control variables in the differentiated model. Hence, we use diff-in-diff model with an instrumental variable method, augmented with the control for lagged levels of economic and financial indicators.

5.2.4. Non-constant effects for control variables

Control variables may affect (*ceteris paribus*) outcome variables in a different manner at time goes on. Imposing time non-varying coefficients for some groups of control variables may bias our estimator (omitted variable). On the other hand, including time-varying coefficient may decrease sharply the number of degrees of freedom.

We thus tested the temporal stability of the coefficients associated with control variables. Because of a potential sharp decrease in the degrees of freedom linked to such an operation, we only distinguished time-varying coefficients when it was justified. The results of this test showed that the hypothesis of temporal stability of the parameters is only rejected for the business size categories. Therefore, we allowed only the parameters associated with the business size categories to vary over time.

5.2.5. Evaluating at the same time impacts for CICE and PR

Evaluating CICE and PR is only possible the year where theoretical rate of CICE and PR change. Thus, identifying effects of both policies is feasible: in 2013 and 2014 for CICE; in 2015 (and 2016) for PR.

Is it possible to estimate the effects of both CICE and PTR part of the PR separately? Additional PTR were enforced from January, 1st 2015, although firms still benefit from the CICE. Given that firms benefit potentially from both CICE and PR at the same time (at least in 2015 and 2016), we consider a uniform framework to evaluate the impact of both policies.

5.3. Estimated equations

5.3.1. Overall sample

For the overall sample of productive units (independent firms or tax corporate groups, we consider the following differentiated reduced equation (IV second stage):

$$\begin{aligned} \Delta \ln(Y_{i,t}) = & \alpha + \sum_{Q=2}^4 \beta_{Q,2013} I_Q(\overline{\text{Tx_cice}_{i,2013}}) + \sum_{Q=2}^4 \beta_{Q,2014} I_Q(\overline{\Delta \text{Tx_cice}_{i,2014}}) + \\ & + \sum_{Q=2}^4 \beta_{Q,2015} I_Q(\overline{\text{Tx_PR}_{i,2015}}) + \sum_{Q=2}^4 \beta_{Q,2016} I_Q(\overline{\Delta \text{Tx_PR}_{i,2016}}) + \gamma_1 \Delta X_{i,t-1} + \gamma_2 X_{i,t-1} + \\ & + \gamma_3 TEA_{i,t-1} + \sum_s \delta_s I_s(\text{secteur}_i) + \sum_l \theta_l I_l(\text{taille}_{i,t-1}) + \varepsilon_{i,t} \end{aligned} \quad (4)$$

Where $I_Q(\overline{\text{Tx_cice}_{i,2013}})$, $I_Q(\overline{\Delta\text{Tx_cice}_{i,2014}})$, $I_Q(\overline{\text{Tx_PR}_{i,2015}})$ and $I_Q(\overline{\Delta\text{Tx_PR}_{i,2016}})$ are provided by first stage IV regressions and correspond to predicted probabilities for a firm to belong in quartile Q of benefit from CICE, for 2013 and 2014, and from PR, for 2015 and 2016.⁷

Since outcome variables refer to logarithms of continuous variables, and to uncover the effect for the overall economy, we consider weighted regressions for our second step, using lagged outcome variable (employment, wage), as a relevant weight.

5.3.2. Measuring effects for exporting and non-exporting firms

As mentioned above, our main interest is to evaluate to what extent improving competitiveness may help productive units to create jobs or increase wages. The advanced question is so: do CICE and PR benefit more to exporting firms than to other firms? We thus consider a new set of estimates on the basis of the following equation, the differentiated reduced equation (IV second stage) being:

$$\begin{aligned} \Delta \ln(Y_{i,t}) = & \alpha + \sum_{Q=2}^4 \beta_{Q,2013,\text{exp}} I_Q(\overline{\text{Tx_cice}_{i,2013} * \text{exp}}) + \sum_{Q=2}^4 \beta_{Q,2013,n\text{exp}} I_Q(\overline{\text{Tx_cice}_{i,2013} * n\text{exp}}) \\ & + \sum_{Q=2}^4 \beta_{Q,2014,\text{exp}} I_Q(\overline{\Delta\text{Tx_cice}_{i,2014} * \text{exp}}) + \sum_{Q=2}^4 \beta_{Q,2014,n\text{exp}} I_Q(\overline{\Delta\text{Tx_cice}_{i,2014} * n\text{exp}}) \\ & + \sum_{Q=2}^4 \beta_{Q,2015,\text{exp}} I_Q(\overline{\text{Tx_PR}_{i,2015} * \text{exp}}) + \sum_{Q=2}^4 \beta_{Q,2015,n\text{exp}} I_Q(\overline{\text{Tx_PR}_{i,2015} * n\text{exp}}) \\ & + \sum_{Q=2}^4 \beta_{Q,2016,\text{exp}} I_Q(\overline{\Delta\text{Tx_PR}_{i,2016} * \text{exp}}) + \sum_{Q=2}^4 \beta_{Q,2016,n\text{exp}} I_Q(\overline{\Delta\text{Tx_PR}_{i,2016} * n\text{exp}}) \\ & + \gamma_1 \Delta X_{i,t-1} + \gamma_2 X_{i,t-1} + \gamma_3 TEA_{i,t-1} + \sum_s \delta_s I_s(\text{secteur}_i) + \sum_l \theta_l I_l(\text{taille}_{i,t-1}) + \varepsilon_{i,t} \end{aligned} \quad (5)$$

For IV first stage regressions, predicted variables refer to firms belonging in quartile Q of benefit from CICE or PR for (non) exporting firms.

5.3.3. Falsification tests and diff-in-diff-in-diff

The difference-in-differences method we used assumes that the hypothesis of a common trend for the outcome variables holds. A common way to verify this hypothesis is to conduct a falsification test (sometimes also called a placebo test), which involves simulating the effects of the CICE before its actual implementation. Given our framework to estimate the effect of CICE and PR, these falsification / placebo tests can be implemented either in 2012 (resp. in 2011) since it requires using instruments provided by year 2010 and 2011 (resp. 2009 and 2010):

⁷ Given that CICE (resp. PR) already exists in 2013 (resp. in 2016), quartile of intensity for benefiting from the policy are computed on the difference in the CICE between 2014 and 2013 (resp. in the PR between 2016 and 2015).

$$\begin{aligned}
\Delta \ln(Y_{i,t,YF}) = & \alpha + \sum_{Q=2}^4 \beta_{Q,2013,YF} I_Q(\overline{\text{Tx_cice}_{i,2013,YF}}) + \sum_{Q=2}^4 \beta_{Q,2015,YF} I_Q(\overline{\text{Tx_PR}_{i,2015,YF}}) \\
& + \sum_{Q=2}^4 \beta_{Q,2016,YF} I_Q(\overline{\Delta \text{Tx_PR}_{i,2016,YF}}) + \gamma_1 \Delta X_{i,t-1} + \gamma_2 X_{i,t-1} + \\
& + \gamma_3 TEA_{i,t-1} + \sum_s \delta_s I_s(\text{secteur}_i) + \sum_l \theta_{l,t} I_l(\text{taille}_{i,t-1}) + \varepsilon_{i,t}
\end{aligned} \tag{6}$$

where YF (either 2011 or 2012) refers to the year considered for falsification. CICE is only simulated for the part in 2013 (because of collinearity). If distinguishing exporting and non-exporting firms, a more complete equation is considered.

What if falsification tests are not concluding? The large number of control variables at the level introduced in the estimated equation may notably help accounting for potential specific trend differences. However, it is possible this to be not sufficient. Our DID combined to IV variables method potentially does not identify the effects of CICE and PR. Modeling the outcome variable by considering not only a fixed unobserved individual effect over time, but also an unobserved individual trend. This model is called a fixed effects model with individual random trends (Heckman and Hotz, 1989; Polachek and Kim, 1994). This method involves accounting for the specific trends in the outcome variable. Adopting this model means modeling the relative variation of the outcome variable (or the absolute variation of its logarithm) using an unobserved firm-specific effect that is fixed over time, u_i :

$$\begin{aligned}
\Delta \ln(Y_{i,t}) = & \alpha + \sum_{Q=2}^4 \beta_{Q,2013} I_Q(\overline{\text{Tx_cice}_{i,2013}}) + \sum_{Q=2}^4 \beta_{Q,2014} I_Q(\overline{\Delta \text{Tx_cice}_{i,2014}}) + \\
& + \sum_{Q=2}^4 \beta_{Q,2013} I_Q(\overline{\text{Tx_PR}_{i,2015}}) + \sum_{Q=2}^4 \beta_{Q,2014} I_Q(\overline{\Delta \text{Tx_PR}_{i,2016}}) + \gamma_1 \Delta X_{i,t-1} + \gamma_2 X_{i,t-1} + \\
& + \gamma_3 TEA_{i,t-1} + \sum_s \delta_s I_s(\text{secteur}_i) + \sum_l \theta_{l,t} I_l(\text{taille}_{i,t-1}) + u_i + \varepsilon_{i,t}
\end{aligned} \tag{7}$$

For the estimation of such a model to be valid, it is necessary to have a long observation period for the individuals considered, in this case, the companies. Studies from the late 1990s that used this method often had statistical data characterized by a more or less long temporal dimension: 8 years for Heckman and Hotz (1989); 9 years for Papke (1994); 20 years for Hoxby (1996); 21 years for Friedberg (1998). In the case of studying the effects of the CICE on employment, wages, implementing such a method is interesting, but it requires having statistical data for the concerned companies over a long period. For our main DID-IV estimates, we consider the 2009-2016 sample for which data sources are available and consistent. It may not be enough to allow testing for trends. Indeed, since we use lagged information from one period for the controls and the model is estimated in differences, we have 6 years (2011-2016) for estimating the model. In our case, where the outcome variables can be strongly affected by the economic context, this reduced time dimension could pose a problem, especially given the unfavorable economic conditions since 2008, in particular in France.

Therefore, to estimate the equation of our triple difference model, we consider a second set of perennial companies or TGC over the period (2004-2016), in order to cover (at least) one business cycle. Corresponding samples are composed of 69,200 independent firms and 1,562 tax groups of companies. We are fully aware of what extending the study period implies, *ie.* a selection of companies, with far fewer firms than in the main sample: 69,200 companies and 1,562 tax groups of (with 5 or more employees);

Another challenge posed by constructing such a sample stems from the use of statistical data prior to 2009, with sources whose format and/or scope may have changed: the version of DADS before 2009 and the large format was particularly characterized by a more limited scope and thus a smaller number of companies for each year. Regarding FARE, the year the current version was launched was marked by a smaller set of information (for example, missing data on investment). These elements help explain the differences in size between the two samples, beyond the company demographics. Before 2008, only FICUS contained information on company activities. However, we are fully aware of all of this, but this allows us to have richer information, which can help us implement the estimation of the DDD model. In the end, the two distinct samples over 2004-2016 are composed: for independent firms, of 69,200 independent firms (out of them 28,805 export); for tax groups of firms, of 1,562 (out of them 1,568 export).

Conducting falsification tests raises real challenges. Indeed, the condition of the absence of other treatments or economic policy measures that could potentially affect employment, wages, and all the outcome variables is not satisfied during the period preceding the implementation of the CICE (2011-2012). Before 2013, a number of measures were put in place that could affect its assessment: increases in French minimum wage (2010-2014); the annualization of the general “Fillon” (2003) tax exemptions (2011); the inclusion of overtime in the tax base for these exemptions (2012); the reform of taxes on overtime hours (2012); an increase in the social security flat-rate (2012); and a rise in the rate of old-age contribution rate (2012).

Finally, what kind of estimation strategy given all those difficulties? For employment and wages, in priority, we consider falsification tests in 2012. For categories of employment, in priority, we consider falsification tests in 2011.

To conduct falsification tests, it is important to carefully select the period during which they are carried out. The choice of the test period may also depend on the outcome variable being considered. For example, for some time periods, the economic policy measures mentioned earlier may offset each other on aggregated variables, but not on disaggregated variables. The annualization of payroll tax reductions on low wages had a positive impact on labor costs. This measure mainly affects companies with a high proportion of employees paid at the minimum wage, *i.e.*, those most exposed to the CICE. A falsification test conducted in 2011 is therefore likely to falsely show a negative impact on employment for companies most exposed to the CICE. In 2012, three economic policy measures were simultaneously implemented: the revaluation of the minimum wage (*SMIC*), the repeal of the *TEPA* law, and the increase in the social security contribution. The first two measures mainly affect companies most exposed to the CICE, while the last one affects those least exposed to the CICE. Moreover, it cannot be excluded that both groups (treated: most exposed to the CICE and control: least exposed to the CICE) experienced shocks of similar magnitude. By using a difference-in-differences model, the effects of these two shocks should, in part, offset each other, unlike the situation in 2011, where the only shock affecting the treated group was not compensated by a similar shock in the control group. Thus, for overall aggregated variables (employment, wages), we prefer the 2012 estimation period to perform the falsification tests.

In contrast, for decompositions of total employment (by qualification, type of contract, age, gender, or type of employment) and hours worked (thus excluding the repeal of the *TEPA* law), we prefer the 2011 period, where the shocks affecting disaggregated employment are fewer. Moreover, the inclusion of the apparent employer social contribution reduction rate as a control variable allows us to account for the effect of the annualization of payroll tax reductions on low wages in 2011. Thus, for disaggregated variables (employment or wages), we prefer the 2011 estimation period to perform the falsification tests.

Our estimation strategy is the following. We run econometric regressions distinguishing both the short and the long samples. Then we consider results obtained by DID-IV estimator applied to the 2009-2016 sample if falsification test is conclusive. If it is not the case, we applied the DID-IV estimator to the sample 2004-2016. If the falsification test is still inconclusive we consider a within estimator applied to the differentiated model (diff-in-diff-in-diff IV estimator).

6. Results

6.1. Independent firms

6.1.1. Employment

Table 3a reports econometric results of estimations that evaluate the impact of both CICE and PR policies on employment in the whole set of independent firms. The CICE and PR increase employment only in the companies that benefited the most, located in the highest quartile, where employment increased compared to the first quartile. Indeed, for companies who benefit most from CICE (Q4), the effects were moderate in 2013 (coefficient of 0.825, significance at 8.7%) and stronger in 2014 (coefficient of 2.894, significance at less than 1%) with the implementation of the measure (increase in the theoretical CICE rate from 4% to 6% of the gross wages of employees earning less than 2.5 times the minimum wage), while the average apparent CICE rate rose from 3.99% in 2013 to 6.17%. Ultimately, for the companies that benefited the most, the elasticity of employment to the CICE was 0.361 in 2013 but 1.966 in 2014, reflecting the fact that the measure became permanent starting in 2014. The implementation of the first part of the PR in 2015 (which overlaps with the CICE starting at that date), in the form of an increase in the apparent exemption rate, also increased employment in the most benefiting companies compared to the less benefiting ones (elasticity of 0.947, significance at 1.6%), *while the TEA increased by 1.58 percentage points*. The elasticity of employment to the first part of the PR in 2015 (0.707) is higher than that to the CICE in 2013 (0.362), but lower than that of employment to the CICE in 2014 (1.968).

We now turn to results of the evaluation of the impact of CICE and PR, distinguishing between exporting and non-exporting firms (Table 3b). CICE and PR impact more favorably employment in exporting firms than in non-exporting firms, with greater elasticity than when the impact is estimated than over the whole set of firms. Indeed, to our knowledge not any similar policy was adopted among the most important exporting competitor countries to France. As a consequence, we consider that companies abroad do not benefit from CICE and PR. Thus, control group is not concerned by both policies and we should get greater elasticities for exporting firms.

In 2013, the CICE would have positively impacted employment for the former group, in the companies that benefited the most (compared to the least benefiting ones) – with a coefficient of 2.132 at 0.8%. However, no effect is detected for the non-exporting companies that benefited the most. In 2014, the increase in the theoretical CICE rate from 4% to 6% applied to the gross wage bill of employees earning up to 2.5 times the minimum wage or less helped increase employment in the companies that benefited the most, both for independent exporting and non-exporting companies, with the effect not being significantly different (coefficients of 2.986 and 3.449 significant at 5% or less, with an increase in the CICE rate of 2.20 vs. 2.17 points in the Q4 companies). The implementation of the PR in 2015 resulted in an increase in employment only in the most benefiting independent exporting companies (coefficient of 1.887, significant at less than 1%), with no effect observed in non-exporting companies. Furthermore, the elasticity of employment to the CICE is stronger in independent exporting companies than in

non-exporting ones in 2013 (0.892 vs. 0.282, not significantly different from 0 in the latter case), but not significantly different in 2014 (1.94 vs. 2.46). Moreover, the elasticity of average employment to the first part of the PR is stronger in the most benefiting exporting companies than in non-exporting results (1.396 vs. 0.547).

Outcome variable			Average employment	Blue collar workers	Employees	White collar workers	Fixed-term contracts	Open-ended contracts
CICE	CICE 2013	Q2	-0,928* (0.050)	-0,363 (0.685)	4,114 (0.293)	-0,019 (0.990)	0,494 (0.969)	1,044 (0.167)
		Q3	0,25 (0.674)	-1,068 (0.275)	-4,721 (0.248)	-4.977** (0.015)	43.451*** (0.000)	-1,523 (0.222)
		Q4	0.825* (0.087)	3.570*** (0.001)	2,779 (0.169)	17.488*** (0.000)	36.297*** (0.000)	3.051*** (0.000)
	CICE 2014	Q2	0,731 (0.308)	0,752 (0.844)	-0,444 (0.867)	-3,743* (0.075)	-3,749 (0.649)	-0,878 (0.333)
		Q3	-0,224 (0.863)	-2,410 (0.522)	3,275 (0.335)	-8,85* (0.072)	12,296* (0.069)	-0,544 (0.730)
		Q4	2.894*** (0.000)	3,124 (0.302)	-1,170 (0.689)	20.066*** (0.000)	2,121 (0.696)	2.954*** (0.002)
Pacte de responsabilité	PR1 (first part)	Q2	0,006 (0.986)	-0,169 (0.846)	2.937*** (0.006)	-0,241 (0.786)	9,557* (0.059)	0,475 (0.269)
		Q3	-0,142 (0.796)	1.967*** (0.001)	2,271* (0.095)	2.624*** (0.004)	19.282*** (0.000)	-0,711 (0.315)
		Q4	0.947** (0.016)	2.410*** (0.002)	4.458*** (0.000)	5.700*** (0.000)	19.948*** (0.000)	1.726*** (0.001)
	PR2 (second part)	Q2	-2.004** (0.019)	2,402 (0.277)	-2,172 (0.200)	2,709 (0.546)	9.323*** (0.003)	-0,767 (0.487)
		Q3	-1.761*** (0.008)	-0,227 (-0.857)	-5.332*** (0.001)	0,001 (1.000)	-1,110 (0.740)	-1,385 (0.108)
		Q4	-2.485*** (0.002)	1,463 (0.270)	-10.817*** (0.000)	3,359 (0.213)	1,338 (0.716)	-0,423 (0.612)
Elasticities	CICE 2013	Q2	-0,707* (0.132)	-0,276 (-0.563)	3,133 (-2,49)	-0,014 -2.625**	0,376 22.916***	0,795 1.338***
		Q3	0,362* (0.901)	1.566*** (0.926)	1,219 (-0,547)	7.671*** -4.611*	15.922*** -4.619	1.338*** -1.082
		Q4	0,901 (-0,195)	0,926 -1.638	-0,547 2.227	-4.611* -6.017*	-4.619 10.721*	-1.082 -0.474
	CICE 2014	Q2	1.968*** (0.012)	2,124 (-0,334)	-0,795 5.813***	13.642*** -0.477	1,442 18.915**	2.008*** 0.94
		Q3	0,012 (-0,152)	-0,334 2.107***	5.813*** 5.3*	-0.477 2.81***	18.915** 20.65***	0.94 -0.761
		Q4	0.707** (0.006)	1.8*** (0.006)	3.329*** (0.290)	4.257*** (0.833)	14.898*** (0.089)	1.289*** (0.104)
Falsification test (1) : 12 inst 10-11	CICE 2013	Q2	-0,604 (0.604)	4,753* (0.066)	1,372 (0.539)	1,289 (0.360)	10,402 (0.399)	1,92 (0.258)
		Q3	1,580 (0.560)	9,274* (0.056)	-1,705 (0.620)	.474 (0.854)	18,536 (0.280)	4,351 (0.279)
		Q4	2,579 (0.314)	13.529*** (0.008)	1,868 (0.585)	12.792*** (0.000)	14,011 (0.361)	6,903* (0.071)
	PR1 (first part)	Q2	.998 (0.401)	-5,253 (0.155)	-1,219 (0.626)	-2,043 (0.219)	-1,220 (0.904)	-1,523 (0.372)
		Q3	1,145 (0.746)	-12,104 (0.144)	3,309 (0.519)	-1,062 (0.744)	-8,868 (0.709)	-4,845 (0.347)
		Q4	-10,855 (0.295)	-36.897** (0.019)	-2,448 (0.802)	-4,367 (0.455)	-37,038 (0.309)	-23,093 (0.142)
	PR2 (second part)	Q2	-10,261* (0.079)	-20.674*** (0.006)	-5,571 (0.290)	-1,148 (0.833)	-21,105 (0.089)	-14,468 (0.104)
		Q3	-9,088 (0.246)	-22.796** (0.020)	-1,950 (0.761)	-3,986 (0.404)	-26,849 (0.152)	-16,209 (0.171)
		Q4	-7,581 (0.354)	-27.301** (0.025)	-4,538 (0.570)	-4,867 (0.324)	-29,705 (0.331)	-17,321 (0.163)
	CICE 2014	Q2	-1,451* (0.071)	4,710* (0.079)	10,264 (0.216)	1,175 (0.547)	-5,975 (0.273)	.318 (0.802)
		Q3	-1,175 (0.489)	8,065 (0.102)	-5,041 (0.707)	1,891 (0.671)	-10,449 (0.201)	-1,484 (0.552)
		Q4	2.418** (0.047)	12.383*** (0.003)	2,265 (0.853)	17.196*** (0.000)	-5,669 (0.443)	2,931 (0.228)
Falsification test (1) : 11 inst 09-10	PR1 (first part)	Q2	1,572* (0.085)	-8.444** (0.024)	.144 (0.985)	-5.033*** (0.004)	3,153 (0.540)	1,712 (0.241)
		Q3	2,655 (0.129)	-16.652** (0.038)	-31,643 (0.094)	-4,292 (0.216)	5,308 (0.648)	-906 (0.783)
		Q4	-7,705 (0.839)	-28.230** (0.027)	-42,247 (0.168)	-10,445* (0.098)	10,022 (0.593)	-3,705 (0.514)
	PR2 (second part)	Q2	-3,080 (0.226)	-8,351 (0.178)	-21,372 (0.243)	-4,585 (0.409)	5,744 (0.586)	-5,287 (0.192)
		Q3	-1,902 (0.447)	-13,141* (0.082)	-64.104*** (0.004)	.856 (0.850)	7,117 (0.557)	-8,754* (0.052)
		Q4	-5,569 (0.846)	-20.337** (0.040)	-46,555* (0.063)	-1,630 (0.737)	10,263 (0.470)	-5,568 (0.246)
	Overidentification (2)		0.4903	0.0008***	0.3985	0.1276	0.3828	0.001***
	Weak instruments (3)		11.44 (4)	10,475	12,871	4,024	5,97	10,62
	Number of firms		112,449	83,408	51,131	51,131	54,598	111,878

Sources: BRC (Acoss), DADS-FARE (Insee) and MVC (Dgfp).

Scope: 115,359 firms employing 5 workers or more over, perennial over 2009-2016 and which do not belong to a fiscal group.

Notes: Instrumental variable estimated coefficients (p-value within parentheses). Treatment variables: quartiles of apparent CICE tax credit rate in 2013, of its variation between 2013 and 2014 in 2014; quartiles of the PR1 (resp. PR2) payroll tax cuts in 2015 (resp. in 2016). (1) Falsification (placebo) test in 2012 for overall firm average wage, in 2011 for socio professional category. (2) H0: (instruments are not correlated with the error term). (3) H0: (instruments are not correlated with the treatment). Instruments: quartiles of simulated treatment using past total firm payroll (years 2011 and 2012). Dependent variables of estimated equations are in differences in logarithms of the considered outcome variable. (4) Highest p-value maximum for excluded instruments (first stage of instrumental variables estimation). In bold: significant coefficients, at a 5 percent or smaller than 5 percent level. ***, ** and * : significant coefficient at a 1, 5 or 10 percent levels.

Reading: In 2014, in independent firms from the fourth quartile of the apparent PR rate, the increase in average employment is 2.894 percentage points greater than in the group of firms from the first quartile; the difference is significant at a 1 percent level. The corresponding elasticity is 1.968 and relate the estimated coefficient to the corresponding value of the difference in average apparent rate between the 4th and 1st quartile of the apparent CICE rate distribution. For 2014, in independent firms, the average variation in the apparent CICE rate between 2013 and 2014 are 0.67 in the first quartile, 1.51 in the second, 1.81 in the third and 2.21 in the last.

Table 3b. Evaluating the effect of the CICE and PR on employment across independent businesses. Sample: 2009-2016. Distinguishing exporting from non exporting firms.																															
Coefficients				Coefficients				Coefficients				Coefficients				Coefficients															
Average employment DADS (inst 2011-2012)				Average employment DADS (inst 2010-2011)				Fixed term contracts (inst 2011-2012)				Open-ended contracts (inst 2011-2012)				Blue collar workers (inst 2010-2011)				Employees (inst 2010-2011)											
CICE	2013	Q2	EXP	-1.131** (0.090)	2013	Q2	EXP	-0.907 (0.215)	CICE	2013	Q2	EXP	19.126 (0.223)	2013	Q2	EXP	0.534 (0.679)	CICE	2013	Q2	EXP	-1.673 (0.148)	2013	Q2	EXP	-0.149 (0.948)	CICE	2013	Q2	EXP	-0.896 (0.573)
CICE	2013	Q3	EXP	-0.025 (0.982)	2013	Q3	EXP	-0.032 (0.654)	CICE	2013	Q3	EXP	24.182* (0.059)	2013	Q3	EXP	-1.841 (0.593)	CICE	2013	Q3	EXP	-0.296 (0.943)	2013	Q3	EXP	-0.796 (0.570)	CICE	2013	Q3	EXP	-1.796 (0.573)
CICE	2013	Q4	EXP	2.132*** (0.008)	2013	Q4	EXP	2.327*** (0.017)	CICE	2013	Q4	EXP	54.469*** (0.000)	2013	Q4	EXP	4.599*** (0.008)	CICE	2013	Q4	EXP	-1.096 (0.485)	2013	Q4	EXP	-0.839 (0.639)	CICE	2013	Q4	EXP	-0.003 (0.993)
CICE	2013	Q1	EXP	-0.018 (0.315)	2013	Q1	EXP	-0.034 (0.117)	CICE	2013	Q1	EXP	-0.034 (0.566)	2013	Q1	EXP	-0.034 (0.599)	CICE	2013	Q1	EXP	-0.034 (0.599)	2013	Q1	EXP	-0.034 (0.599)	CICE	2013	Q1	EXP	-0.034 (0.599)
CICE	2013	Q2	EXP	-0.424 (0.595)	2013	Q2	EXP	-0.408 (0.622)	CICE	2013	Q2	EXP	-0.408 (0.595)	2013	Q2	EXP	-0.408 (0.595)	CICE	2013	Q2	EXP	-0.408 (0.595)	2013	Q2	EXP	-0.408 (0.595)	CICE	2013	Q2	EXP	-0.408 (0.595)
CICE	2013	Q3	EXP	0.593 (0.321)	2013	Q3	EXP	0.593 (0.321)	CICE	2013	Q3	EXP	0.593 (0.321)	2013	Q3	EXP	0.593 (0.321)	CICE	2013	Q3	EXP	0.593 (0.321)	2013	Q3	EXP	0.593 (0.321)	CICE	2013	Q3	EXP	0.593 (0.321)
CICE	2013	Q4	EXP	0.593 (0.321)	2013	Q4	EXP	0.593 (0.321)	CICE	2013	Q4	EXP	0.593 (0.321)	2013	Q4	EXP	0.593 (0.321)	CICE	2013	Q4	EXP	0.593 (0.321)	2013	Q4	EXP	0.593 (0.321)	CICE	2013	Q4	EXP	0.593 (0.321)
CICE	2014	Q2	EXP	-0.371 (0.719)	2014	Q2	EXP	-0.584 (0.628)	CICE	2014	Q2	EXP	-2.955 (0.739)	2014	Q2	EXP	-1.654 (0.217)	CICE	2014	Q2	EXP	-1.737 (0.724)	2014	Q2	EXP	-3.945 (0.562)	CICE	2014	Q2	EXP	-0.333 (0.910)
CICE	2014	Q3	EXP	3.019 (0.204)	2014	Q3	EXP	2.844 (0.373)	CICE	2014	Q3	EXP	5.018 (0.330)	2014	Q3	EXP	5.018 (0.330)	CICE	2014	Q3	EXP	5.018 (0.330)	2014	Q3	EXP	5.018 (0.330)	CICE	2014	Q3	EXP	5.018 (0.330)
CICE	2014	Q4	EXP	2.986** (0.050)	2014	Q4	EXP	4.169** (0.024)	CICE	2014	Q4	EXP	7.763 (0.078)	2014	Q4	EXP	7.763 (0.078)	CICE	2014	Q4	EXP	7.763 (0.078)	2014	Q4	EXP	7.763 (0.078)	CICE	2014	Q4	EXP	7.763 (0.078)
CICE	2014	Q1	EXP	1.531* (0.081)	2014	Q1	EXP	1.348 (0.140)	CICE	2014	Q1	EXP	1.216 (0.179)	2014	Q1	EXP	1.216 (0.179)	CICE	2014	Q1	EXP	1.216 (0.179)	2014	Q1	EXP	1.216 (0.179)	CICE	2014	Q1	EXP	1.216 (0.179)
CICE	2014	Q2	EXP	-0.081 (0.391)	2014	Q2	EXP	-0.147 (0.391)	CICE	2014	Q2	EXP	-0.162 (0.391)	2014	Q2	EXP	-0.162 (0.391)	CICE	2014	Q2	EXP	-0.162 (0.391)	2014	Q2	EXP	-0.162 (0.391)	CICE	2014	Q2	EXP	-0.162 (0.391)
CICE	2014	Q3	EXP	3.442*** (0.001)	2014	Q3	EXP	3.664*** (0.000)	CICE	2014	Q3	EXP	5.522 (0.003)	2014	Q3	EXP	5.522 (0.003)	CICE	2014	Q3	EXP	5.522 (0.003)	2014	Q3	EXP	5.522 (0.003)	CICE	2014	Q3	EXP	5.522 (0.003)
PR	2015	Q2	EXP	0.386 (0.330)	2015	Q2	EXP	0.782 (0.316)	PR	2015	Q2	EXP	7.882 (0.205)	2015	Q2	EXP	7.882 (0.205)	PR	2015	Q2	EXP	7.882 (0.205)	2015	Q2	EXP	7.882 (0.205)	PR	2015	Q2	EXP	7.882 (0.205)
PR	2015	Q3	EXP	0.702 (0.443)	2015	Q3	EXP	0.727 (0.443)	PR	2015	Q3	EXP	18.609** (0.023)	2015	Q3	EXP	18.609** (0.023)	PR	2015	Q3	EXP	18.609** (0.023)	2015	Q3	EXP	18.609** (0.023)	PR	2015	Q3	EXP	18.609** (0.023)
PR	2015	Q4	EXP	1.882*** (0.001)	2015	Q4	EXP	1.942*** (0.002)	PR	2015	Q4	EXP	16.266*** (0.003)	2015	Q4	EXP	16.266*** (0.003)	PR	2015	Q4	EXP	16.266*** (0.003)	2015	Q4	EXP	16.266*** (0.003)	PR	2015	Q4	EXP	16.266*** (0.003)
PR	2015	Q1	EXP	-0.365 (0.403)	2015	Q1	EXP	-0.361 (0.408)	PR	2015	Q1	EXP	10.809** (0.034)	2015	Q1	EXP	10.809** (0.034)	PR	2015	Q1	EXP	10.809** (0.034)	2015	Q1	EXP	10.809** (0.034)	PR	2015	Q1	EXP	10.809** (0.034)
PR	2015	Q2	EXP	0.942 (0.416)	2015	Q2	EXP	0.951 (0.440)	PR	2015	Q2	EXP	19.864*** (0.000)	2015	Q2	EXP	19.864*** (0.000)	PR	2015	Q2	EXP	19.864*** (0.000)	2015	Q2	EXP	19.864*** (0.000)	PR	2015	Q2	EXP	19.864*** (0.000)
PR	2015	Q3	EXP	0.707 (0.114)	2015	Q3	EXP	0.776* (0.083)	PR	2015	Q3	EXP	19.699*** (0.000)	2015	Q3	EXP	19.699*** (0.000)	PR	2015	Q3	EXP	19.699*** (0.000)	2015	Q3	EXP	19.699*** (0.000)	PR	2015	Q3	EXP	19.699*** (0.000)
PR	2015	Q4	EXP	-1.628 (0.171)	2015	Q4	EXP	-1.148 (0.158)	PR	2015	Q4	EXP	13.672*** (0.002)	2015	Q4	EXP	13.672*** (0.002)	PR	2015	Q4	EXP	13.672*** (0.002)	2015	Q4	EXP	13.672*** (0.002)	PR	2015	Q4	EXP	13.672*** (0.002)
PR	2016	Q2	EXP	-2.633*** (0.002)	2016	Q2	EXP	-2.719*** (0.002)	PR	2016	Q2	EXP	-7.716* (0.077)	2016	Q2	EXP	-7.716* (0.077)	PR	2016	Q2	EXP	-7.716* (0.077)	2016	Q2	EXP	-7.716* (0.077)	PR	2016	Q2	EXP	-7.716* (0.077)
PR	2016	Q3	EXP	-2.887 (0.054)	2016	Q3	EXP	-4.765 (0.053)	PR	2016	Q3	EXP	-11.117 (0.043)	2016	Q3	EXP	-11.117 (0.043)	PR	2016	Q3	EXP	-11.117 (0.043)	2016	Q3	EXP	-11.117 (0.043)	PR	2016	Q3	EXP	-11.117 (0.043)
PR	2016	Q4	EXP	-2.447** (0.015)	2016	Q4	EXP	-2.487** (0.013)	PR	2016	Q4	EXP	7.595** (0.040)	2016	Q4	EXP	7.595** (0.040)	PR	2016	Q4	EXP	7.595** (0.040)	2016	Q4	EXP	7.595** (0.040)	PR	2016	Q4	EXP	7.595** (0.040)
PR	2016	Q1	EXP	-0.755 (0.461)	2016	Q1	EXP	-0.783 (0.421)	PR	2016	Q1	EXP	4.788 (0.361)	2016	Q1	EXP	4.788 (0.361)	PR	2016	Q1	EXP	4.788 (0.361)	2016	Q1	EXP	4.788 (0.361)	PR	2016	Q1	EXP	4.788 (0.361)
PR	2016	Q2	EXP	-2.505*** (0.007)	2016	Q2	EXP	-2.583** (0.005)	PR	2016	Q2	EXP	7.124 (0.138)	2016	Q2	EXP	7.124 (0.138)	PR	2016	Q2	EXP	7.124 (0.138)	2016	Q2	EXP	7.124 (0.138)	PR	2016	Q2	EXP	7.124 (0.138)
Elasticities				Elasticities				Elasticities				Elasticities				Elasticities															
Average employment DADS (inst 2011-2012)				Average employment DADS (inst 2010-2011)				Fixed term contracts (inst 2011-2012)				Open-ended contracts (inst 2011-2012)				Blue collar workers (inst 2010-2011)				Employees (inst 2010-2011)											
CICE	2013	Q2	EXP	-0.8*	2013	Q2	EXP	-0.641	2013	Q2	EXP	13.522	2013	Q2	EXP	0.378	2013	Q2	EXP	-1.183	2013	Q2	EXP	-0.105							
CICE	2013	Q3	EXP	-0.013	2013	Q3	EXP	-0.318	2013	Q3	EXP	-0.926	2013	Q3	EXP	-0.279	2013	Q3	EXP	-0.459	2013	Q3	EXP	-0.199							
CICE	2013	Q4	EXP	0.892***	2013	Q4	EXP	0.974***	2013	Q4	EXP	22.789**	2013	Q4	EXP	1.924***	2013	Q4	EXP	-0.481	2013	Q4	EXP	0.638							
CICE	2013	Q1	EXP	-0.538	2013	Q1	EXP	-0.903	2013	Q1	EXP	-8.486	2013	Q1	EXP	-0.826	2013	Q1	EXP	0.145	2013	Q1	EXP	-1.384							
CICE	2013	Q2	EXP	0.245	2013	Q2	EXP	0.236	2013	Q2	EXP	30.278**	2013	Q2	EXP	-0.826	2013	Q2	EXP	0.145	2013	Q2									

Sources: BRC (Acosse), DADS-FARE (Insee) and MVC (Dgfp).

Scope: 115,359 firms employing 5 workers or more over, perennial over 2009-2016 and which do not belong to a fiscal group.

In 2015, the implementation of the first part of the PR would have impacted both fixed-term (FTC) and permanent (OEC) employment for the independent companies that benefited the most from the measure (and possibly also for companies in Q3 for fixed-term employment).

The positive impacts of the CICE and PR on OEC and FTC would have benefitted more to exporting than to non-exporting firms (Table 3b). Indeed, when distinguishing between exporting and non-exporting companies, it can be seen that the CICE increased fixed-term employment (FTC) in 2013 for the companies that benefited the most from the CICE (Q4), regardless of whether they were exporters or not. However, the corresponding elasticity is higher in independent exporting companies than in non-exporting ones. The first part of the PR also impacted fixed-term employment in 2015 for companies (in Q3 and) Q4, both for exporters and non-exporters. Unlike the case of the CICE in 2013, the corresponding elasticities are slightly higher in non-exporting companies than in exporting ones, although this difference is not necessarily significantly different from zero (in Q4 for instance). Regarding permanent employment (OEC), the CICE would have had a greater impact on the most benefiting exporting companies than on the others in 2013, and also in 2014. Similarly, employment would have been more responsive to the first part of the PR in the most benefiting independent exporting companies than in those that do not.

Employment by qualification

In order to analyze the effect of the CICE and PR on employment along the salary distribution, we focus on the effect of the CICE on employment by qualification, distinguishing between blue-collar workers, employees, and executives. Since falsification tests are not validated for the sample 2009-2016 considering DD-IV identification strategy, findings are provided by those obtained for the 2004-2016, either considering DD-IV (for employees; Table 3c), or TD-IV (for blue- and white-collar workers, Table 3e) estimates. Indeed, regarding blue-collar workers, considering triple difference estimations, the CICE would have had a positive effect in the most heavily benefiting independent companies in 2013 (elasticity equal to 1.253) and even more so in 2014 (elasticity equal to 3.506, Table 3e). The implementation of the PR in 2015 also benefits worker employment in companies in Q4 (and to a lesser extent in Q3) with an elasticity of 1.897, which is lower than that of worker employment under the CICE. Regarding employees, the CICE would have had no effect on their employment, regardless of the level of benefit from the measure, both in 2013 and 2014 (Table 3c). However, the employment level of employees would have increased in 2015 in the most heavily benefiting independent companies from the PR due to the implementation of the first part of the measure; the corresponding elasticity is 2.931 when considering the estimates on the 2004-2016 sample. Finally, the CICE would have positively impacted the employment of executives in the companies that most heavily benefit from it, both in 2013 and 2014, with a comparable elasticity (Table 3e). However, the PR would have had no impact on executive employment, regardless of the degree of benefit from the measure.

Table 3c. Evaluating the effect of the CICE and PR on employment across all independent businesses. Sample 2004-2016.

Outcome variable			Average employment	Blue collar workers	Employees	White collar workers	Fixed-term contracts	Open-ended contracts	
CICE	CICE 2013	Q2	-1.135** (0.048)	-0,477 (0,652)	1,053 (0,744)	-3.535** (0.037)	13,393 (0.390)	0,445 (0.561)	
		Q3	-0,396 (0.509)	-1,642 (0,101)	-5,008 (0,246)	-3.634* (0.087)	22.010** (0.042)	-0,941 (0.429)	
		Q4	0,237 (0.585)	1,714 (0,105)	-2,394* (0,058)	13.828*** (0.000)	40.288*** (0.000)	1.999*** (0.002)	
	CICE 2014	Q2	-0,509 (0.582)	4,399 (0,065)	-0,041 (0,988)	-7.051*** (0.006)	-8,972 (0.490)	-2,379* (0.068)	
		Q3	-0,184 (0.874)	-3,043 (0,349)	1,841 (0,454)	-6,631 (0.118)	13,769* (0.069)	-0,372 (0.803)	
		Q4	2.533*** (0.005)	5,771*** (0,007)	-1,475 (0,480)	18.500*** (0.000)	-2,849 (0.707)	2.036* (0.082)	
	Pacte de responsabilité	PR (first part)	Q2	0,338 (0.416)	-1,421 (0,223)	1,673 (0,190)	-0,672 (0.547)	-1,631 (0.827)	0,005 (0.992)
			Q3	-0,502 (0.527)	1,929*** (0,004)	0,608 (0,508)	1,549 (0.129)	8.124* (0.075)	-0,547 (0.596)
			Q4	0.898** (0.017)	0,778 (0,310)	2,931*** (0,007)	4.521*** (0.005)	9.724*** (0.001)	0,466 (0.450)
		PR (second part)	Q2	-0,798 (0.425)	2,618 (0,197)	0,625 (0,811)	-12.164** (0.016)	2,228 (0.524)	0,034 (0.979)
			Q3	-1,047 (0.204)	2,241 (0,138)	-4,020* (0,082)	-8.668*** (0.009)	2,017 (0.580)	-0,975 (0.345)
			Q4	-1.390* (0.075)	2,947 (0,072)	-8,178*** (0,001)	-6.037* (0.081)	-2,012 (0.628)	-0,406 (0.642)
Elasticity	CICE 2013	Q2	-0,911* (0.425)	-0,383 (0,197)	0,801 (0,811)	-2,837** (0.016)	10,75 (0.524)	0,357 (0.979)	
		Q3	-0,218 (0.105)	-0,906 (0,758)	-2,64 (0.05)	-2,004* (0.111)	12.138** (0.006)	-0,519 (0.883)	
		Q4	0,105 (0.666)	0,758 (0,176)	-1,05* (0.05)	6.111*** (0.000)	17,806*** (0.000)	0,883*** (0.000)	
	CICE 2014	Q2	-0,666 (0.723)	-1,769 (0,038)	-0,05 (0.577)	-9,22*** (0.000)	-11,731 (0.011)	-3,111* (0.011)	
		Q3	-0,166 (0.723)	-2,739 (0,038)	1,605 (0.577)	-4,475 (0.143)	12,396* (0.011)	-0,335 (0.011)	
		Q4	1,71*** (0.000)	3,895*** (0.000)	-1,005 (0.000)	12,486*** (0.000)	-1,923 (0.000)	1,374* (0.000)	
	PR (first part)	Q2	0,723 (0.574)	-3,038 (0,206)	3,577 (0.695)	-1,437 (0.172)	-3,487 (0.292)	0,011 (0.626)	
		Q3	-0,574 (0.697**)	2,206*** (0,004)	0,695 (0.143)	1,772 (0.000)	9,292* (0.000)	-0,226 (0.000)	
		Q4	0,697** (0.014)	0,604 (0.143)	2,274*** (0.001)	3,508*** (0.000)	7,544*** (0.000)	1,321*** (0.000)	
Falsification tests (1) 2012 inst 10 et 11	CICE 2013	Q2	-1,415*** (0.014)	3,232 (0,143)	2,237 (0,231)	-0,829 (0.665)	11,3 (0.522)	0,519 (0.615)	
		Q3	-0,274 (0.659)	4,322 (0,262)	.001 (0.999)	-0,971 (0.702)	24,271** (0.037)	-0,579 (0.771)	
		Q4	0,096 (0.659)	7,552* (0,071)	1,215 (0.635)	11,639*** (0.000)	-2,794 (0.718)	2,722 (0.143)	
	PR (first part)	Q2	0,121 (0.773)	-4,245 (0,136)	-3,265 (0,131)	-1,049 (0.593)	-4,038 (0.659)	-0,513 (0.612)	
		Q3	-0,44 (0.391)	-8,179 (0,198)	-460 (0,198)	1,771 (0.641)	8.318* (0.092)	-0,635 (0.802)	
		Q4	0,088 (0.907)	-14,888 (0,181)	.902 (0.909)	-5,807 (0.277)	8,564** (0.014)	-3,309 (0.575)	
	PR (second part)	Q2	-0,495 (0.703)	-5,671 (0,209)	1,274 (0,882)	-7,348 (0.185)	-1,708 (0.726)	-0,685 (0.827)	
		Q3	-1,802 (0.091)	-5,424 (0,412)	3,838 (0,325)	-7,951* (0.075)	1,778 (0.754)	0,516 (0.913)	
		Q4	-0,749 (0.925)	-9,845 (0,250)	-117 (0,981)	-8.169* (0.089)	-1,678 (0.754)	-0,529 (0.908)	
	Falsification tests (2) 2011 inst 09-10 (fin de document)	CICE 2013	Q2	-1,593* (0.052)	3,781 (0,155)	5,316 (0,396)	-0,682 (0.816)	94,675 (0.883)	-0,358 (0.778)
			Q3	-0,574 (0.600)	9,633** (0,028)	-1,658 (0,804)	-2,737 (0,514)	45,095 (0.851)	-0,336 (0.825)
			Q4	0,069 (0.950)	9,723** (0,026)	.713 (0,929)	8,329*** (0.006)	-5,656 (0.984)	1,530 (0.384)
		PR (first part)	Q2	1,12 (0.180)	-9,561** (0,011)	-5,245 (0,361)	-2,807 (0,224)	-367,703 (0.907)	0,561 (0.659)
			Q3	2,557* (0.099)	-15,432** (0,044)	-14,883 (0,271)	-0,532 (0.885)	77,771 (0.957)	1,229 (0.641)
			Q4	2,2 (0.366)	-22,566* (0,057)	-11,681 (0,436)	2,415 (0,682)	-19,877 (0.955)	2,101 (0.554)
		PR (second part)	Q2	-1,661 (0.209)	-7,914* (0,061)	-7,981 (0,228)	-4,362 (0,394)	-426,501 (0.923)	-3,727 (0.126)
			Q3	-0,802 (0.590)	-8 (0,200)	-13,627 (0,133)	-3,859 (0.390)	531,213 (0.912)	0,182 (0.937)
			Q4	0,63 (0.720)	-18,256** (0,039)	-18,186 (0,180)	-0,671 (0.891)	-229,011 (0.904)	-1,186 (0.682)
Overidentification (2)			0.000***	0.000***	0.071*	0.007**	0.000***	0.000***	
Weak instruments (3)			.	.	2.574	2.231	na	na	
Number of firms			69200	46310	50403	29107	33137	68371	

Sources: BRC (Acoss), DADS-FARE (Insee) and MVC (Dgfiip).
Scope: 70,874 firms employing 5 workers or more over, perennial over 2009-2016 and which do not belong to a fiscal group.
Notes: instrumental variable estimated coefficients (p-value within parentheses). Treatment variables: quartiles of apparent CICE tax credit rate in 2013, of its variation between 2013 and 2014 in 2014; quartiles of the PR1 (resp. PR2) payroll tax cuts in 2015 (resp. in 2016). (1) Falsification (placebo) test in 2012 for overall firm average wage, in 2011 for socio professional category. (2) H0: (instruments are not correlated with the error term). (3) H0: (instruments are not correlated with the treatment). Instruments: quartiles of simulated treatment using past total firm payroll (years 2011 and 2012). Dependent variables of estimated equations are in differences in logarithms of the considered outcome variable. (4) Highest p-value maximum for excluded instruments (first stage of instrumental variables estimation). In bold: significant coefficients, at a 5 percent or smaller than 5 percent level. ***, ** and * : significant coefficient at a 1, 5 or 10 percent levels.
Reading: In 2015, in independent firms from the fourth quartile of the apparent PR rate, the increase in average employment is 0.898 percentage points greater than in the group of firms from the first quartile; the difference is significant at a 5 percent level. The corresponding elasticity is 0.697 and relate the estimated coefficient to the corresponding value of the difference in average apparent rate between the 4th and 1st quartile of the apparent CICE rate distribution. For 2015, in independent firms,

Table 3e. Evaluating the effect of the CICE and PR on employment across all independent businesses. Sample 2004-2016. Diff-in-c

Outcome variable		Average employment *	Blue collar workers	Employees	White collar workers	Fixed-term contracts	Open-ended contracts		
CICE	CICE 2013	Q2	-1.245** (0.035)	-1,702 (0.121)		-2,052 (0.240)	9,609 (0.605)	0,41 (0.605)	
		Q3	-1.195** (0.047)	-2.854*** (0.005)		-1,987 (0.340)	17,868* (0.087)	-1,316 (0.250)	
		Q4	-0,478 (0.301)	2.834*** (0.005)		9.073*** (0.001)	45.539*** (0.000)	1.483*** (0.026)	
	CICE 2014	Q2	-0,793 (0.363)	0,717 (0.746)		-3,543 (0.170)	-18,31 (0.212)	-2.355** (0.044)	
		Q3	-0,991 (0.346)	-3,356 (0.130)		-4,466 (0.277)	8,58 (0.259)	0,041 (0.975)	
		Q4	0,915 (0.292)	5.194*** (0.005)		10.464** (0.023)	8,844 (0.294)	0,586 (0.586)	
Pacte de responsabilité	PR (first part)	Q2	0,21 (0.593)	-1,573 (0.164)		0,379 (0.728)	-1,857 (0.818)	-0,352 (0.471)	
		Q3	-0,681 (0.177)	1.494** (0.028)		0,535 (0.692)	8,586* (0.087)	-0,319 (0.690)	
		Q4	0,118 (0.766)	2.445*** (0.001)		2,396 (0.150)	15.256*** (0.000)	0,074 (0.901)	
	PR (second part)	Q2	-1,035 (0.315)	-0,223 (0.897)		-8,234 (0.118)	-0,217 (0.956)	0,279 (0.849)	
		Q3	-1,031 (0.200)	-0,754 (0.518)		-2,578 (0.457)	-2,941 (0.440)	-0,851 (0.415)	
		Q4	-1,304 (0.105)	0,211 (0.855)		-1,427 (0.691)	-9.155** (0.033)	0,433 (0.653)	
Elasticity	CICE 2013	Q2	-0.999**	-1,366		-1,647	7,713	0,329	
		Q3	-0.659***	-1.574***		-1,096	9,854*	-0,726	
		Q4	-0,211	1.253***		4.01***	20.126***	0.655**	
	CICE 2014	Q2	-1,037	0,938		-4,633	-23,941	-3.079**	
		Q3	-0,892	-2,265		-3,014	7,724	0,037	
		Q4	0,618	3.506***		7.062**	5,969	0,396	
PR (first part)	Q2	-0,449	-3,363		0,81	-3,971	-0,753		
	Q3	-0,779	1.709**		0,612	9,82*	-0,365		
	Q4	0,092	1.897***		1,859	11.837***	0,057		
Falsification tests (2) 2012 inst 10-11 (fin de document)	CICE 2013	Q2	2,017 (0.036)	4,081 (0.256)		-2,263 (0.368)	-9,606 (0.185)	-1,721 (0.171)	
		Q3	1,689 (0.347)	7,664 (0.182)		-5,572* (0.057)	-12,590 (0.158)	-1,772 (0.452)	
		Q4	2,69 (0.130)	11.916** (0.047)		5,802* (0.054)	-2,966 (0.729)	0,346 (0.882)	
	PR (first part)	Q2	-2.976*** (0.009)	-8,468* (0.062)		-0,879 (0.691)	-4,552 (0.540)	-1,159 (0.421)	
		Q3	-3,9 (0.143)	-12,989 (0.160)		4,340 (0.321)	-5,611 (0.697)	-4,937 (0.170)	
		Q4	-9,052* (0.077)	-23,643 (0.102)		1,878 (0.762)	-3,184 (0.862)	-3,572 (0.563)	
	PR (second part)	Q2	-3,906 (0.224)	-10,228* (0.057)		3,310 (0.597)	-3,717 (0.621)	4,071 (0.305)	
		Q3	-3,005 (0.412)	-12,968 (0.119)		0,891 (0.863)	3,853 (0.712)	0,274 (0.957)	
		Q4	-5,327 (0.191)	-20,334* (0.082)		2,450 (0.629)	-2,657 (0.862)	-0,924 (0.857)	
	CICE 2013	Q2	2,017 (0.036)	4,081 (0.256)		2,633 (0.315)	-9,606 (0.185)	-1,721 (0.171)	
		Q3	1,689 (0.347)	7,664 (0.182)		-5,572* (0.057)	-12,590 (0.158)	-1,772 (0.452)	
		Q4	2,69 (0.130)	11.916** (0.047)		5,802* (0.054)	-2,966 (0.729)	0,346 (0.882)	
Falsification tests (2) 2011 inst 09-10 (fin de document)	PR (first part)	Q2	-2.976*** (0.009)	-8,468* (0.062)		-0,956 (0.675)	-4,552 (0.540)	-1,159 (0.421)	
		Q3	-3,9 (0.143)	-12,989 (0.160)		4,340 (0.321)	-5,611 (0.697)	-4,937 (0.170)	
		Q4	-9,052* (0.077)	-23,643 (0.102)		1,878 (0.762)	-3,184 (0.862)	-3,572 (0.563)	
	PR (second part)	Q2	-3,906 (0.224)	-10,228* (0.057)		-0,020 (0.998)	-3,717 (0.621)	4,071 (0.305)	
		Q3	-3,005 (0.412)	-12,968 (0.119)		0,891 (0.863)	3,853 (0.712)	0,274 (0.957)	
		Q4	-5,327 (0.191)	-20,334* (0.082)		2,450 (0.629)	-2,657 (0.862)	-0,924 (0.857)	
	CICE 2013	Q2	2,017 (0.036)	4,081 (0.256)		2,633 (0.315)	-9,606 (0.185)	-1,721 (0.171)	
		Q3	1,689 (0.347)	7,664 (0.555)		-5,572* (0.308)	-12,590 (0.158)	-1,772 (0.452)	
		Q4	2,69 (0.130)	-5,542* (0.050)		-1,566 (0.649)	-2,966 (0.729)	0,346 (0.882)	
	Falsification tests (2) 2012 inst 09-10 (fin de document)	PR (first part)	Q2	-2.976*** (0.009)	4,408* (0.090)		0,973 (0.707)	-4,552 (0.540)	-1,159 (0.421)
			Q3	-3,9 (0.143)	-12,989 (0.160)		2,801 (0.479)	-5,611 (0.697)	-4,937 (0.170)
			Q4	-9,052* (0.077)	7,614 (0.227)		-1,623 (0.831)	-3,184 (0.862)	-3,572 (0.563)
PR (second part)		Q2	-3,906 (0.224)	5,465 (0.159)		-0,617 (0.944)	-3,717 (0.621)	4,071 (0.305)	
		Q3	-3,005 (0.412)	3,501 (0.407)		-4,013 (0.553)	3,853 (0.712)	0,274 (0.957)	
		Q4	-5,327 (0.191)	7,689 (0.143)		-1,466 (0.834)	-2,657 (0.862)	-0,924 (0.857)	
Overidentification (2)		0.3110***	0.0112		0.0992*	0.881	0.014		
Weak instruments (3)		3,279 (4)	8,582		2,238	1,232	2,779		
Number of firms		69199	46130		28763	32566	68361		
Autre placebo		OK en 11				OK en 12			

Sources: BRC (Acos), DADS-FARE (Insee) and MVC (Dgip).
Scope: 70,874 firms employing 5 workers or more over, perennial over 2009-2016 and which to not belong to a fiscal group.
Notes: Instrumental variable estimated coefficients (p-value within parentheses). Treatment variables: quartiles of apparent CICE tax credit rate in 2013, of its variation between 2013 and 2014 in 2014; quartiles of the PR1 (resp. PR2) payroll tax cuts in 2015 (resp. in 2016). (1) Falsification (placebo) test in 2012 for overall firm average wage, in 2011 for socio professional category. (2) H0: (instruments are not correlated with the error term). (3) H0: (instruments are not correlated with the treatment). Instruments: quartiles of simulated difference using past total firm payroll (years 2011 and 2012). Dependent variables of estimated equations are in differences in logarithms of the considered outcome variable. (4) Highest p-value maximum for excluded instruments (first stage of instrumental variables estimation). In bold: significant coefficients, at a 5 percent or smaller than 5 percent level. ***, ** and * : significant coefficient at a 1, 5 or 10 percent levels.
Reading: In 2013, in independent firms from the fourth quartile of the apparent CICE rate, the increase in the employment level of white collar workers is 9.073 percentage points greater than in the group of firms from the first quartile; the difference is significant at a 1 percent level. The corresponding elasticity is 4.000 and relate the estimated coefficient to the corresponding value of the difference in average apparent rate between the 4th and 1st quartile of the apparent CICE rate distribution. For Tests de falsification pour l'emploi agrégé et le nombre d'heures en 2012.
Tests de falsification pour les catégories d'emploi en 2011.

Distinguishing exporting from other firms, the falsification tests are validated considering DD-IV on the sample 2009-2016 for employment of blue-collar workers and employees (Table 3b), and considering DD-IV on the sample 2004-2016 for employment of white-collar workers (Table 3d). For blue-collar workers, we have a greater and positive sensitivity of employment to PR in exporting firms. The same holds for employees and PR (but still no effect for CICE). It is the contrary for executives as to both CICE and PR. Indeed, we no longer detect any effect of the CICE in 2013 and 2014 on the employment of blue-collar workers if we separate exporting and non-exporting companies (except at 10% for non-exporters). On the other hand,

Table B4. Evaluating the effect of the CICE and PR on employment across independent businesses: Sample 2004-2016. Distinguishing exporting from non-exporting firms. (Coefficients)																											
Average employment DADS (inst 2011-2012)				Average employment DADS (inst 2010-2011)				Fixed term contracts (inst 2011-2012 - or 2010-2011)				Open-ended contracts (2011-2012 mais P.2012 ps.)				Blue collars (inst 2010-2011) (inst2011-2012 mais P. 1-466)				Employees (inst 2010-2011) (ou inst 2011-2012)				White Collars (inst 2011-2012) (ou 2010-2011 mais P. 2-985)			
			Coefficients				Coefficients				Coefficients				Coefficients				Coefficients				Coefficients				Coefficients
CICE 2013	Q2		-0.726 (0.384)	Q2		-0.734 (0.234)				Q2		-0.51 (0.05)	Q2		-0.58 (0.138)	Q2		-0.46 (0.11)	Q2		-0.65 (0.272)	Q2		-0.88 (0.094)	Q2		-0.88 (0.094)
	Q3	EXP	-0.8 (0.412)	Q3	EXP	-0.962 (0.469)				Q3	EXP	-2.814 (0.469)	Q3	EXP	-2.408 (0.469)	Q3	EXP	-1.503 (0.469)	Q3	EXP	-2.602 (0.303)	Q3	EXP	-2.16 (0.303)	Q3	EXP	-0.216 (0.303)
	Q4		1.531** (0.052)	Q4		1.235 (0.143)				Q4		53.284** (0.008)	Q4		4.956** (0.004)	Q4		0.239 (0.080)	Q4		2.633 (0.273)	Q4		12.411** (0.008)	Q4		12.411** (0.008)
	Q1	NEXP	-1.324** (0.091)	Q1	NEXP	-3.229** (0.015)				Q1	NEXP	39.031** (0.006)	Q1	NEXP	3.18 (0.052)	Q1	NEXP	2.81 (0.059)	Q1	NEXP	2.14 (0.318)	Q1	NEXP	2.14 (0.318)			
	Q2		1.173 (0.082)	Q2		0.975 (0.079)				Q2		32.89** (0.001)	Q2		3.78 (0.632)	Q2		0.218 (0.521)	Q2		4.63 (0.172)	Q2		4.63 (0.172)			
	Q3	NEXP	-0.199 (0.099)	Q3	NEXP	-0.209 (0.099)				Q3	NEXP	0.000 (0.070)	Q3	NEXP	0.000 (0.150)	Q3	NEXP	-0.009 (0.395)	Q3	NEXP	3.028 (0.174)	Q3	NEXP	32.25** (0.008)			
	Q4		-1.274 (0.340)	Q4		-0.633 (0.340)				Q4		2.662 (0.177)	Q4		4.191 (0.078)	Q4		1.531 (0.343)	Q4		2.693** (0.008)	Q4		2.693** (0.008)			
	CICE 2014	Q2	EXP	-1.332 (0.514)	Q2	EXP	-1.332 (0.276)				Q2	EXP	-2.726 (0.113)	Q2	EXP	-2.724 (0.132)	Q2	EXP	-0.984 (0.768)	Q2	EXP	17.754 (0.166)	Q2	EXP	4.136 (0.409)	Q2	EXP	4.136 (0.409)
Q3			4.386** (0.011)	Q3		4.486** (0.011)				Q3		2.477 (0.084)	Q3		3.16 (0.182)	Q3		0.34 (0.508)	Q3		8.14 (0.168)	Q3		8.14 (0.168)			
Q4			0.137 (0.276)	Q4		0.664 (0.011)				Q4		-15.705 (0.435)	Q4		-2.016 (0.107)	Q4		1.539 (0.358)	Q4		1.844 (0.176)	Q4		1.844 (0.176)			
Q1		NEXP	-1.4773 (0.308)	Q1	NEXP	-1.863 (0.231)				Q1	NEXP	12.788 (0.298)	Q1	NEXP	5.945 (0.722)	Q1	NEXP	-2.316 (0.363)	Q1	NEXP	5.987 (0.008)	Q1	NEXP	5.987 (0.008)			
Q2			2.708*** (0.006)	Q2		3.62*** (0.006)				Q2		3.62*** (0.011)	Q2		2.038 (0.112)	Q2		1.779 (0.163)	Q2		25.500** (0.008)	Q2		25.500** (0.008)			
Q3			0.54 (0.059)	Q3		0.524 (0.059)				Q3		10.8** (0.052)	Q3		1.895** (0.052)	Q3		2.814** (0.052)	Q3		2.137 (0.008)	Q3		2.137 (0.008)			
Q4		EXP	-0.521 (0.059)	Q4	EXP	-0.524 (0.059)				Q4	EXP	0.524 (0.059)	Q4	EXP	1.895** (0.052)	Q4	EXP	2.814** (0.052)	Q4	EXP	2.137 (0.008)	Q4	EXP	2.137 (0.008)			
Q1			1.431** (0.017)	Q1		1.434** (0.017)				Q1		4.967 (0.429)															

Table 3d. Evaluating the effect of the CICE and PR on employment across independent businesses. Sample: 2004-2016. Distinguishing exporting from non exporting firms.

		Coefficients				Coefficients				Coefficients				Coefficients			
Average employment DADS (inst 2011-2012)		Average employment DADS (inst 2010-2011)		Fixed term contracts (inst 2011-2012 - or 2010-2011)		Open-ended contracts (2011-2012 main P4 2012-2013)		Blue collars (inst 2010-2011) (inst 2011-2012 main P1)		Employees (inst 2010-2011) (ou inst 2011-2012)		White Collars (inst 2011-2012) (ou 2011-2012 main P1)					
CICE	2013	Q2	Q3	EXP	Q2	Q3	EXP	Q2	Q3	EXP	Q2	Q3	EXP	Q2	Q3	EXP	Q2
		0.184 (0.359)	0.038 (0.460)		0.254 (0.362)	0.062 (0.460)		0.211 (0.313)	0.061 (0.313)		0.448 (0.448)	0.215 (0.313)		0.215 (0.313)	0.215 (0.313)		0.215 (0.313)
		1.431** (0.032)	1.735 (0.032)		1.431** (0.032)	1.735 (0.032)		1.431** (0.032)	1.735 (0.032)		1.431** (0.032)	1.735 (0.032)		1.431** (0.032)	1.735 (0.032)		1.431** (0.032)
		0.015 (0.051)	0.015 (0.051)		0.015 (0.051)	0.015 (0.051)		0.015 (0.051)	0.015 (0.051)		0.015 (0.051)	0.015 (0.051)		0.015 (0.051)	0.015 (0.051)		0.015 (0.051)
		0.173 (0.360)	0.173 (0.360)		0.173 (0.360)	0.173 (0.360)		0.173 (0.360)	0.173 (0.360)		0.173 (0.360)	0.173 (0.360)		0.173 (0.360)	0.173 (0.360)		0.173 (0.360)
CICE	2014	Q2	Q3	EXP	Q2	Q3	EXP	Q2	Q3	EXP	Q2	Q3	EXP	Q2	Q3	EXP	Q2
		0.184 (0.359)	0.038 (0.460)		0.254 (0.362)	0.062 (0.460)		0.211 (0.313)	0.061 (0.313)		0.448 (0.448)	0.215 (0.313)		0.215 (0.313)	0.215 (0.313)		0.215 (0.313)
		1.431** (0.032)	1.735 (0.032)		1.431** (0.032)	1.735 (0.032)		1.431** (0.032)	1.735 (0.032)		1.431** (0.032)	1.735 (0.032)		1.431** (0.032)	1.735 (0.032)		1.431** (0.032)
		0.015 (0.051)	0.015 (0.051)		0.015 (0.051)	0.015 (0.051)		0.015 (0.051)	0.015 (0.051)		0.015 (0.051)	0.015 (0.051)		0.015 (0.051)	0.015 (0.051)		0.015 (0.051)
		0.173 (0.360)	0.173 (0.360)		0.173 (0.360)	0.173 (0.360)		0.173 (0.360)	0.173 (0.360)		0.173 (0.360)	0.173 (0.360)		0.173 (0.360)	0.173 (0.360)		0.173 (0.360)
PR	2015	Q2	Q3	EXP	Q2	Q3	EXP	Q2	Q3	EXP	Q2	Q3	EXP	Q2	Q3	EXP	Q2
		0.184 (0.359)	0.038 (0.460)		0.254 (0.362)	0.062 (0.460)		0.211 (0.313)	0.061 (0.313)		0.448 (0.448)	0.215 (0.313)		0.215 (0.313)	0.215 (0.313)		0.215 (0.313)
		1.431** (0.032)	1.735 (0.032)		1.431** (0.032)	1.735 (0.032)		1.431** (0.032)	1.735 (0.032)		1.431** (0.032)	1.735 (0.032)		1.431** (0.032)	1.735 (0.032)		1.431** (0.032)
		0.015 (0.051)	0.015 (0.051)		0.015 (0.051)	0.015 (0.051)		0.015 (0.051)	0.015 (0.051)		0.015 (0.051)	0.015 (0.051)		0.015 (0.051)	0.015 (0.051)		0.015 (0.051)
		0.173 (0.360)	0.173 (0.360)		0.173 (0.360)	0.173 (0.360)		0.173 (0.360)	0.173 (0.360)		0.173 (0.360)	0.173 (0.360)		0.173 (0.360)	0.173 (0.360)		0.173 (0.360)

Sources: BRC (Acos), DADS-FARE (Insee) and MVC (Dgfp).

Scope: 70,874 firms employing 5 workers or more over, perennial over 2009-2016 and which to not belong to a fiscal group.

Notes: instrumental variable estimated coefficients (p-value within parentheses). Treatment variables: quartiles of apparent CICE tax credit rate in 2013, of it variation between 2013 and 2014 in 2014; quartiles of the PR1 (resp. PR2) payroll tax cuts in 2015 (resp. in 2016). (1) Falsification (placebo) test in 2012 for overall firm average wage, in 2011 for socio professional category. (2) H0: (instruments are not correlated with the error term). (3) H0: (instruments are not correlated with the treatment). Instruments: quartiles of simulated treatment using past total firm payroll (years 2011 and 2012). Dependent variables of estimated equations are in differences in logarithms of the considered outcome variable. (4) Highest p-value maximum for excluded instruments (first stage of instrumental variables estimation). In bold: significant coefficients, at a 5 percent or smaller than 5 percent level. ***, ** and * : significant coefficient at a 1, 5 or 10 percent levels.

Reading: In 2015, in independent firms from the fourth quartile of the apparent PR rate, the increase in average employment is 0.898 percentage points greater than in the group of firms from the first quartile; the difference is significant at a 5 percent level. The corresponding elasticity is 0.697 and relate the estimated coefficient to the corresponding value of the difference in average apparent rate between the 4th and 1st quartile of the apparent CICE rate distribution. For 2015, in independent firms, the average variation in the apparent PR rate between 2014 and 2015 are 0.70 in the first quartile, 1.47 in the second, 1.82 in the third and 2.19 percentage points in the last.

6.1.2. Wages

Overall

The CICE would have had an overall effect on full-time equivalent (FTE) wages only in 2013 in the companies that benefited the most, and the PR had no effect. When considering wages per individual, we see that the CICE would have benefited exporting companies more, while the PR benefited only exporting companies (Tables 4d and e). Indeed, since the falsification tests do not pass, we cannot detect any credible effect of the CICE on annual wages per individual. When considering full-time equivalent (FTE) wages, a positive effect is indeed highlighted in the companies that benefited the most (Table 4e). No effect of the PR on the average wage per FTE is highlighted.

Distinguishing exporting from other firms, not any conclusion can be made considering full-time equivalent wage. On the contrary, when considering wages per individual (Table 4d), we see that the CICE would have benefited exporting companies more, while the PR benefited only exporting companies, and only for companies that benefit more from both policies.

Table 4e. Evaluating the effect of the CICE and PR on wage earnings across all independent businesses. Sample 2004-2016. Diff-in-diff-in-diff.

Outcome variable			Average wage	Full time average wage	Blue collar wage	Employees' wage	White collar wage		
CICE	2013	Q2	1.751*** (0.000)	3,104* (0.054)	-0,357 (0.656)	-0,807 (0.464)	2,246 (0.184)		
			1,565*** (0.000)	2,695 (0.170)	0,829 (0.223)	0,339 (0.725)	4,239** (0.012)		
		Q3	2.694*** (0.000)	6,035*** (0.000)	-2,704*** (0.001)	-0,087 (0.906)	1,996 (0.359)		
	2014		Q2	0,351 (0.508)	-2,979 (0.372)	0,173 (0.904)	-0,997 (0.671)	-0,248 (0.894)	
		Q3		1.417** (0.026)	0,73 (0.745)	-0,145 (0.899)	1,254 (0.318)	5,151 (0.122)	
		Q4	1.704*** (0.002)	2,239 (0.175)	-2,046 (0.112)	-2,436* (0.065)	2,896 (0.461)		
	Pacte de responsabilité		PR (first part)	Q2	0.827*** (0.004)	0,168 (0.901)	1,456*** (0.002)	-1,408 (0.122)	1,366 (0.154)
		1.279*** (0.000)			3,449 (0.139)	1,068** (0.017)	2,609*** (0.002)	0,419 (0.742)	
		Q3		2.280*** (0.000)	1,504 (0.157)	1,358*** (0.001)	-0,052 (0.936)	4,693*** (0.000)	
PR (second part)			Q2	0.619 (0.481)	1,017 (0.400)	1,488* (0.063)	6,942** (0.040)	3,580* (0.068)	
		Q3		1.516** (0.015)	0,32 (0.818)	0,905 (0.431)	-0,145 (0.897)	-0,349 (0.785)	
		Q4	0,517 (0.325)	0,377 (0.667)	-1,369 (0.266)	-1,947* (0.068)	1,865* (0.086)		
Elasticities			CICE 2013	Q2	1.405***	2,491*	-0,287	-0,648	1,803
		Q3		0,863***	1,486	0,457	0,187	2,338**	
		Q4		1.191***	2,667***	-1,195***	-0,038	0,882	
	CICE 2014	Q2	0,459	-3,895	0,226	-1,304	-0,324		
		Q3	1,276**	0,657	-0,131	1,129	4,637		
		Q4	1,15***	1,511	-1,381	-1,644*	1,955		
	PR 2015	Q2	1,768***	0,359	3,113***	-3,011	2,921		
		Q3	1,463***	3,945	1,222**	2,984***	0,479		
		Q4	1,769***	1,167	1,054***	-0,04	3,641***		
Falsification test (1)	CICE 2013	Q2	-2.145*** (0.006)	-21,711 (0.460)	-1,322 (0.576)	1,565 (0.391)	-1,772 (0.368)		
			-3.780*** (0.001)	-28,411 (0.339)	-1,704 (0.679)	2,667 (0.304)	1,443 (0.517)		
		Q3	-3.399*** (0.004)	-35,749 (0.313)	-3,178 (0.461)	1,997 (0.463)	2,496 (0.401)		
			Q4	1.266 (0.144)	12,851 (0.183)	1,775 (0.639)	2,858 (0.190)	0,54 (0.786)	
		PR1		2.246 (0.152)	105,706 (0.360)	5,55 (0.438)	5,774 (0.122)	6,754 (0.177)	
			Q4	5.307* (0.056)	112,004 (0.245)	2,875 (0.812)	7,772 (0.227)	-8,087 (0.199)	
	PR2	Q2	4.201** (0.016)	-8,112 (0.828)	-3,515 (0.546)	-1,538 (0.703)	-15.366** (0.024)		
			5.572*** (0.005)	80,825 (0.231)	-0,397 (0.957)	-0,619 (0.890)	-7,148 (0.168)		
		Q3	7.394*** (0.002)	82,259 (0.202)	0,594 (0.953)	2,454 (0.655)	-10,496*** (0.005)		
			Overidentification (2)		0.05028**	0.0000***	0.1217	0,0613*	0,0024***
		Weak instruments (3)			1,318 (4)	1,273	9,533	1,303	1,497
				Number of firms		71417.27273	71409.36364	42097.09091	45957.54545	29084.36364

Sources: BRC (Acoss), DADS-FARE (Insee) and MVC (Dgfiip).

Scope: 70,874 independent firms employing 5 workers or more over, perennial over 2004-2016, and that do not belong to a fiscal group.

Notes: instrumental variable estimated coefficients (p-value within parentheses). Treatment variables: quartiles of apparent CICE tax credit rate in 2013, of its variation between 2013 and 2014 in 2014; quartiles of the PR1 (resp. PR2) payroll tax cuts in 2015 (resp. in 2016). (1) Falsification (placebo) test in 2012 for overall firm average wage, in 2011 for socio professional category. (2) H0: (instruments are not correlated with the error term). (3) H0: (instruments are not correlated with the treatment). Instruments: quartiles of simulated treatment using past total firm payroll (years 2010 and 2011). Dependent variables of estimated equations are in differences in logarithms of the considered outcome variable. (4) Highest p-value maximum for excluded instruments (first stage of instrumental variables estimation). In bold: significant coefficients, at a 5 percent or smaller than 5 percent level. ***, ** and * : significant coefficient at a 1, 5 or 10 percent levels.

Reading: In 2014, in independent firms from the fourth quartile of the apparent CICE rate, the increase in the average wage of white collar workers is 6.797 percentage points greater than in the group of firms from the first quartile; the difference is significant at a 5 percent level. The corresponding elasticity is 4.587 and relate the estimated coefficient to the corresponding value of the difference in average apparent rate between the 4th and 1st quartile of the apparent CICE rate distribution. For 2014, in independent firms, the average variation in the apparent CICE rate between 2013 and 2014 are 0.71 in the first quartile, 1.47 in the second, 1.82 in the third and 2.19 percentage points in the last.

Table 4d. Evaluating the effect of the CICE and PR on wage earnings across independent businesses. Sample: 2004-2016. Distinguishing exporting from non exporting firms.															Coefficients															Coefficients															Coefficients															Coefficients																													
Average wage (inst 2010-2011)															Full time equivalent average wage (inst 2010-2011)															Blue collar wage (inst 2010-2011)															Employees' wage (inst 2010-2011)															White collar wage (inst 2010-2011). NB : contrairement															White collar wage (inst 2011-2012). NB : comme en														

6.1.2. Wage by qualification

Considering the whole set of firms, only the CICE would have positively impacted FTE annual wages for workers (firms from Q4) and employees (Q3), whereas both CICE and PR increase FTE wages for executives (Q4). These effects would be more due for exporting firms for blue-collar workers; the contrary holds for white collar workers. Indeed, only the first part of the PR would have increased the wages of workers, particularly in the companies that benefited the most from the measure (Table 4a). The CICE would still not have any effect on the annual salary per FTE of employees (Table 4e). On the contrary, the PR would have positively impacted their salary in independent companies in the third quartile. The wages of executives would have been positively affected by both measures (Table 4c). The CICE would have had a positive effect only in 2013 on the salary of managers in companies in the second and, even more so, in the third quartile. The salary of managers would have been even more sensitive to the CICE in 2014 in the companies that benefited the most from the measure. The first part of the PR would also have impacted the salary of managers in the companies that benefited the most.

Distinguishing exporting from non-exporting firms, for blue-collars, we can indeed observe the impact of the implementation of the first part of the PR in 2015 on both types of companies, with this sensitivity being slightly more pronounced (but not significantly different) in exporting companies. Nothing can be said for employees. For executives, finally, we observe the effects of the CICE in the companies that benefited the most from the CICE (Q2 and Q4) and the PR (Q4), but only in non-exporting companies.

Table 4a. Evaluating the effect of the CICE and PR on wage earnings across all independent businesses. Sample: 2009-2016.

Outcome variable			Average wage	Full time average wage	Blue collar wage	Employees' wage	White collar wage	
CICE	2013	Q2	1.542*** (0.000)	1.393*** (0.000)	-0,027 (0.967)	-1,827 (0.115)	0,92 (0.462)	
		Q3	0.767** (0.024)	1.309*** (0.000)	0,097 (0.894)	-0,905 (0.398)	5.340*** (0.001)	
		Q4	1.850*** (0.000)	2.519*** (0.000)	-0,082 (0.919)	-0,208 (0.794)	1,026 (0.630)	
		Q2	0,298 (0.471)	0,441 (0.409)	0,611 (0.626)	1,186 (0.544)	3.650** (0.037)	
		Q3	-0,033 (0.956)	-1,305** (0.043)	-2.233* (0.068)	-3,791* (0.083)	-2,891 (0.497)	
		Q4	1.082** (0.013)	1.994*** (0.000)	1,398 (0.232)	1,729 (0.280)	9.968*** (0.006)	
	2014	Q2	0,481* (0.053)	0,012 (0.951)	0.964** (0.036)	0,313 (0.648)	1.667** (0.037)	
		Q3	0,45 (0.108)	0,198 (0.444)	0,088 (0.815)	0,782 (0.285)	0,209 (0.756)	
		Q4	0.814** (0.047)	0,282 (0.127)	1.023** (0.038)	-0,939 (0.115)	2.090* (0.070)	
		Q2	1.401** (0.048)	0.038 (0.944)	-1.210 (0.317)	1.422 (0.199)	-2,48 (0.607)	
		Q3	1.975*** (0.000)	0.273 (0.511)	-1.272 (0.268)	1.613 (0.132)	1,875 (0.555)	
		Q4	1.671*** (0.000)	0.132 (0.721)	-1.316 (0.192)	-1.560 (0.134)	-0.909 (0.785)	
Elasticities	CICE 2013	Q2	1.174***	1.061***	-0,021	-1,392	0,701	
		Q3	0.405***	0.69***	0,051	-0,477	2.816***	
		Q4	0.812***	1.105***	-0,036	-0,091	0,45	
			0,367	0,543	0,753	1,461	4.497*	
	CICE 2014	Q2	-0,029	-1.138**	-2,034*	-3,305*	-2.521	
		Q3	0.736***	1.356***	0,95	1,176	6.777***	
		Q4	0.952*	0,024	1.908***	0,619	3.299**	
			0,482	0,302	0,094	0,837	0,224	
	PR (first part)	Q2	0.608**	0,148	0.764**	-0,701	1.561*	
		Q3	-0.612	-0.003	-0.117	-2.067*	-0.680	
		Q4	0.130	(0.991)	(0.892)	(0.061)	(0.616)	
			-0.714	0.506	-0.533	-1.776	3.305*	
Falstification test (1) : 12 inst 09-10	CICE 2013	Q2	0.275	(0.397)	(0.708)	(0.278)	(0.087)	
		Q3	1.434*	0.704	1.838	.898	6.180***	
		Q4	(0.051)	(0.145)	(0.157)	(0.605)	(0.000)	
		Q2	0.316	0.501	2.026	4.487***	1.980	
		Q3	(0.584)	(0.271)	(0.112)	(0.001)	(0.123)	
		Q4	4.365***	1.518*	3.310	4.216*	0.117	
	PR (first part)	Q2	(0.000)	(0.051)	(0.121)	(0.057)	(0.962)	
		Q3	3.809**	2.795**	3.928	6.081	-3.275	
		Q4	(0.046)	(0.033)	(0.282)	(0.210)	(0.402)	
		Q2	0.379	0.967	-0.496	2.394	-7.171	
		Q3	(0.814)	(0.405)	(0.845)	(0.502)	(0.137)	
		Q4	3.780**	1.507	0.470	.883	-3.050	
	PR (second part)	Q2	(0.034)	(0.142)	(0.851)	(0.795)	(0.352)	
		Q3	3.806**	2.410**	0.558	5.279	-0.885	
		Q4	(0.025)	(0.042)	(0.860)	(0.185)	(0.794)	
		Overidentification (2)		0.4293	0.000***	0.8552	0,074	0.9042
		Weak instruments (3)		8.529 (4)	8,556	9.272	3.025	1.649
		Number of firms		112449	112412	83408	92846	51131

Sources: BRC (Acos), DADS-FARE (Insee) and MVC (Dgfi).

Scope: 115,359 firms employing 5 workers or more over, perennial over 2009-2016 and which do not belong to a fiscal group.

Notes: instrumental variable estimated coefficients (p-value within parentheses). Treatment variables: quartiles of apparent CICE tax credit rate in 2013, of its variation between 2013 and 2014 in 2014; quartiles of the PR1 (resp. PR2) payroll tax cuts in 2015 (resp. in 2016). (1) Falsification (placebo) test in 2012 for overall firm average wage, in 2011 for socio professional category. (2) H0: (instruments are not correlated with the error term). (3) H0: (instruments are not correlated with the treatment). Instruments: quartiles of simulated treatment using past total firm payroll (years 2010 and 2011). Dependent variables of estimated equations are in differences in logarithms of the considered outcome variable. (4) Highest p-value maximum for excluded instruments (first stage of instrumental variables estimation). In bold: significant coefficients, at a 5 percent or smaller than 5 percent level. ***, ** and * : significant coefficient at a 1, 5 or 10 percent level.

Reading: In 2015, in independent firms from the fourth quartile of the apparent PR rate, the increase in wages of blue collar workers is 1.028 percentage points greater than in the group of firms from the first quartile; the difference is significant at a 1 percent level. The corresponding elasticity is 0.645 and relate the estimated coefficient to the corresponding value of the difference in average apparent rate between the 4th and 1st quartile of the apparent PR rate distribution. For 2015, in independent firms, the average levels of apparent PR rates are 0.23 in the first quartile, 0.73 in the second, 1.16 in the third and 1.57 in the last.

Table 4c. Evaluating the effect of the CICE and PR on wage earnings across all independent businesses. Sample 2004-2016.

Outcome variable			Average wage	Full time average wage	Blue collar wage	Employees' wage	White collar wage		
CICE	2013	Q2	1.417*** (0.000)	1,236*** (0,000)	-0,367 (0,611)	-0,042 (0,965)	2,715** (0,050)		
			Q3	0,3313 (0.325)	0,921*** (0,003)	-1,634** (0,028)	-1,836 (0,106)	4,214*** (0,005)	
		Q4		1.867*** (0.000)	2,295*** (0,000)	-0,675 (0,365)	1,764*** (0,008)	2,634 (0,174)	
			2014	Q2	-0,3212 (0.514)	-0,305 (0,569)	-0,658 (0,549)	0,5 (0,776)	0,593 (0,695)
		Q3			-0,275 (0.617)	-0,799 (0,136)	-2,913*** (0,009)	-1,678 (0,218)	0,109 (0,963)
				Q4	0,4072 (0.390)	1,294*** (0,003)	0,51 (0,657)	0,314 (0,808)	6,797** (0,043)
	Pacte de responsabilité	PR (first part)			Q2	0,1163 (0.666)	0,166 (0,486)	0,656 (0,243)	-0,098 (0,909)	1,058 (0,197)
			Q3	0,361 (0.340)		0,082 (0,659)	0,002 (0,995)	1,735*** (0,005)	-0,0333 (0,975)
				Q4	0,6676 (0.226)	0,395* (0,059)	0,832 (0,114)	-0,189 (0,749)	2,869*** (0,006)
			PR (second part)		Q2	0,879 (0,341)	-0,654 (0,324)	0,017 (0,991)	1,571 (0,265)	-0,415 (0,930)
				Q3		2,4525*** (0,000)	1,132** (0,037)	-1,139 (0,438)	1,975 (0,141)	-1,001 (0,747)
					Q4	1,3873*** (0,008)	-0,016 (0,971)	0,579 (0,651)	-2,806** (0,025)	-0,146 (0,964)
Elasticities		CICE 2013		Q2		1,137*** 0,183	0,992*** 0,508**	-0,295 -0,901**	-0,034 -1,012	2,179** 2,324***
			Q4	0,825***	1,014***	-0,298	0,78***	1,164	
			CICE 2014	Q2	-0,42	-0,399	-0,86	0,654	0,775
		Q3		-0,248	-0,719	-2,622***	-1,511	0,098	
		Q4		0,275	0,873***	0,344	0,212	4,587**	
		PR (first part)	Q2	0,249	0,355	-0,52	-0,21	2,262	
	Q3		0,413	0,094	0,002	1,984***	-0,038		
	Q4		0,518	0,306*	-0,772	-0,147	2,226***		
	Falsification test (1) : 2012 inst 09-10	CICE 2013	Q2	-0,044 (0.921)	-0,129 (0.784)	.253 (0.825)	-4.023*** (0.002)	1,414 (0.330)	
				Q3	-0,179 (0.767)	-0,430 (0.474)	-0,917 (0.559)	-5.085*** (0.005)	3.314* (0.088)
			Q4		0,511 (0.476)	0,055 (0.922)	0,641 (0.684)	-3.392** (0.043)	3,410 (0,164)
				PR (first part)	Q2	0,536 (0.565)	.695 (0.171)	1.707 (0.223)	6.703*** (0.000)	-0,662 (0.697)
Q3			2.745*** (0.004)			2.122*** (0.007)	4.045 (0.103)	9.336*** (0.000)	-1,843 (0.354)
			Q4		3,634 (0.400)	4.621*** (0.000)	5.022 (0.149)	12.038*** (0.002)	1,198 (0.863)
PR (second part)		Q2			1,122 (0.400)	1.825** (0.049)	-.893 (0.658)	2.197 (0.325)	4,365 (0.598)
			Q3	2,548* (0.077)	2.965*** (0.001)	.783 (0.724)	1.399 (0.574)	7,387 (0.268)	
		Q4		3.089** (0.040)	4.048*** (0.000)	.681 (0.811)	8.187*** (0.007)	6,614 (0.349)	
		Overidentification (2)			0.000***	0.000***	0.000***	0.5057	0.2517
		Weak instruments (3)			.	.	.	6.865	6.087
Number of firms			69199	69199	42279	46093	26671		
Autre placebo							OK en 2012		

Sources: BRC (Acos), DADS-FARE (Insee) and MVC (Dgfi).

Scope: 70,874 independent firms employing 5 workers or more over, perennial over 2004-2016, and that do not belong to a fiscal group.

Notes: instrumental variable estimated coefficients (p-value within parentheses). Treatment variables: quartiles of apparent CICE tax credit rate in 2013, of it variation between 2013 and 2014 in 2014; quartiles of the PR1 (resp. PR2) payroll tax cuts in 2015 (resp. in 2016). (1) Falsification (placebo) test in 2012 for overall firm average wage, in 2011 for socio professional category. (2) H0: (instruments are not correlated with the error term). (3) H0: (instruments are not correlated with the treatment). Instruments: quartiles of simulated treatment using past total firm payroll (years 2010 and 2011). Dependent variables of estimated equations are in differences in logarithms of the considered outcome variable. (4) Highest p-value maximum for excluded instruments (first stage of instrumental variables estimation). In bold: significant coefficients, at a 5 percent or smaller than 5 percent level. ***, ** and * : significant coefficient at a 1, 5 or 10 percent levels.

Reading: In 2014, in independent firms from the fourth quartile of the apparent CICE rate, the increase in the average wage of white collar workers is 6.797 percentage points greater than in the group of firms from the first quartile; the difference is significant at a 5 percent level. The corresponding elasticity is 4.587 and relate the estimated coefficient to the corresponding value of the difference in average apparent rate between the 4th and 1st quartile of the apparent CICE rate distribution. For 2014, in independent firms, the average variation in the apparent CICE rate between 2013 and 2014 are 0.71 in the first quartile, 1.47 in the second, 1.82 in the third and 2.19 percentage points in the last.

6.2. Tax groups of firms

6.2.1. Employment

Overall

The CICE and PR would not have any impact on employment, whether considering all tax groups of firms (Table 5c), or distinguishing exporting or non-exporting tax groups of companies (Table 5d). Considering the whole sample of tax groups of companies, neither the CICE nor the PR would have any effect on total employment, neither in 2013, nor in 2014 or 2015 (Table 5c). However, it should be noted that there are few GF in 2009-2016 (4,100) and even fewer in 2004-2016 (1,562). The elasticity of employment to the first part of the PR in 2015 (0.707) is higher than that to the CICE in 2013 (0.362), but lower than that of employment to the CICE in 2014 (1.966).

Both in 2013 and in 2014, the CICE would have had no impact on overall employment, regardless of the extent of the CICE benefit (Table 5d).

Table 5c. Evaluating the effect of the CICE and PR on employment across all tax groups of companies. Sample 2004-2016.

Outcome variable			Average employment	Blue collar workers	Employees	White collar workers	Fixed-term contracts	Open-ended contracts		
CICE	CICE 2013	Q2	-7,339 (0,490)	-8,531 (0,775)	-7,584 (0,463)	-6,542 (0,556)	-3,641 (0,855)	-5,381 (0,614)		
		Q3	-1,376 (0,739)	-3,74 (0,879)	-3,618 (0,577)	-9,583 (0,320)	-16,879 (0,348)	-3,061 (0,544)		
		Q4	-7,153 (0,365)	-4,889** (0,022)	-14,114* (0,062)	-2,062 (0,903)	1,861 (0,949)	-5,998 (0,468)		
		Q2	3,718 (0,357)	7,933 (0,114)	5,532 (0,542)	-9,831 (0,235)	11,928 (0,246)	10,163 (0,403)		
	CICE 2014	Q3	4,812 (0,497)	-9,442 (0,417)	4,645 (0,587)	-16,708 (0,706)	12,746 (0,254)	0,073 (0,995)		
		Q4	-6,985 (0,379)	2,317 (0,502)	-7,126 (0,506)	20,261 (0,436)	5,447 (0,655)	7,788 (0,625)		
		Pacte de responsabilité	PR (first part)	Q2	-15,272 (0,301)	-0,585 (0,612)	-3,724 (0,838)	-7,6 (0,406)	-3,394 (0,857)	-12,966 (0,357)
				Q3	-3,655 (0,427)	-0,533 (0,794)	4,998 (0,658)	3,763 (0,406)	-3,551 (0,682)	-1,566 (0,751)
Q4	-1,906 (0,582)			-0,533 (0,482)	5,216 (0,668)	7,961 (0,355)	5,971 (0,561)	-1,758 (0,669)		
PR (second part)	Q2		2,958 (0,727)	6,967 (0,364)	7,268 (0,355)	-3,356 (0,854)	17,405 (0,109)	5,512 (0,580)		
	Q3		-13,603* (0,086)	-14,175 (0,174)	-35,472** (0,014)	-14,702 (0,182)	4,646 (0,690)	-18,76** (0,032)		
	Q4		-,512 (0,917)	7,972 (0,311)	-0,021 (0,997)	-2,025 (0,801)	37,944** (0,041)	3,426 (0,527)		
Elasticity	CICE 2013	Q2	-4,774	-5,549	-4,933	-4,255	-2,368	-3,5		
		Q3	-0,666	-1,809	-0,224	-4,636	-8,166	-1,481		
		Q4	-2,788	-1,906**	-1,41	-0,125	0,725	-2,338		
	CICE 2014	Q2	4,194	8,949	6,241	-11,09	13,456	11,465		
		Q3	3,966	-7,782	-0,447	-0,194	10,505	0,06		
		Q4	-3,441	1,141	2,288	9,98	2,683	3,836		
	PR (first part)	Q2	-27,405	-1,05	-6,683	-13,638	-6,09	-23,267		
		Q3	-3,77	-0,55	5,156	3,882	-3,663	-1,615		
Q4		-1,454	-0,406	3,978	6,071	4,554	-1,341			
Falsification tests (1) : 12 inst 10-11	CICE 2013	Q2	-.580 (0.925)	-5.986 (0.825)	-1.836 (0.838)	11.093 (0.225)	33.120 (0.240)	-1.903 (0.780)		
		Q3	-6.406 (0.668)	3.097 (0.956)	-27.363 (0.201)	-3.583 (0.845)	36.859 (0.375)	-7.954 (0.645)		
		Q4	-2.234 (0.888)	9.225 (0.877)	-17.299 (0.452)	.350 (0.989)	49.512 (0.256)	-3.118 (0.865)		
	PR (first part)	Q2	-19.094 (0.206)	6.366 (0.929)	2.045 (0.906)	-31.531** (0.046)	-26.047 (0.509)	-16.607 (0.330)		
		Q3	3.462 (0.861)	24.414 (0.826)	-2.741 (0.935)	.575 (0.979)	-104.147 (0.268)	7.754 (0.718)		
		Q4	57.233 (0.243)	35.352 (0.866)	32.543 (0.520)	98.834 (0.106)	-124.084 (0.195)	61.065 (0.275)		
	PR (second part)	Q2	62.617* (0.072)	27.209 (0.751)	48.916 (0.160)	89.240* (0.075)	-10.244 (0.825)	65.871* (0.090)		
		Q3	80.568** (0.020)	43.812 (0.679)	19.918 (0.506)	134.362*** (0.003)	-76.122* (0.055)	83.525** (0.029)		
		Q4	65.120 (0.122)	56.619 (0.745)	20.420 (0.622)	91.430* (0.069)	-101.122 (0.155)	70.356 (0.140)		
	Falsification tests (1) : 11 inst 09-10	CICE 2013	Q2	-10.591 (0.086)	-4.956 (0.736)	-6.799 (0.518)	-8.038 (0.464)	37.749 (0.572)	-10.579 (0.146)	
			Q3	-12.828 (0.225)	24.690 (0.578)	-17.131 (0.198)	19.749 (0.398)	19.587 (0.782)	-23.519 (0.249)	
			Q4	-17.787 (0.197)	30.985 (0.626)	-18.380 (0.309)	30.373 (0.275)	31.054 (0.674)	32.928 (0.134)	
PR (first part)		Q2	29.377 (0.089)	-65.212 (0.570)	48.893 (0.188)	.402 (0.972)	122.887 (0.519)	32.928 (0.131)		
		Q3	38.520 (0.242)	-107.081 (0.558)	59.190 (0.237)	-52.000 (0.459)	57.178 (0.665)	51.205 (0.194)		
		Q4	52.448 (0.197)	-132.316 (0.563)	79.177 (0.209)	-45.928 (0.571)	57.951 (0.796)	66.402 (0.146)		
PR (second part)		Q2	17.145 (0.261)	-16.964 (0.629)	24.723 (0.252)	26.279 (0.579)	19.550 (0.883)	14.759 (0.316)		
		Q3	9.641 (0.672)	-30.830 (0.546)	3.644 (0.914)	-38.010 (0.563)	-143.969 (0.515)	18.461 (0.429)		
		Q4	41.752 (0.203)	-116.061 (0.529)	72.797 (0.179)	-33.376 (0.561)	126.046 (0.620)	51.289 (0.167)		
Overidentification (2)			0.7980	.	.	.	.	.
Weak instruments (3)			0.248 (4)	0.221	0.222	0,943	0.523	0.225		
Number of firms			1562	1332	1333	1077	1125	1552		

Sources: BRC (Acoss), DADS-FARE (Insee) and MVC (Dgfp).

Scope: 1,568 fiscal groups employing 5 workers or more over, perennial over 2004-2016.

Notes: instrumental variable estimated coefficients (p-value within parentheses). Treatment variables: quartiles of apparent CICE tax credit rate in 2013, of its variation between 2013 and 2014 in 2014; quartiles of the PR1 (resp. PR2) payroll tax cuts in 2015 (resp. in 2016). (1) Falsification (placebo) test in 2012 for overall firm average wage, in 2011 for socio professional category. (2) H0: (instruments are not correlated with the error term). (3) H0: (instruments are not correlated with the treatment). Instruments: quartiles of simulated treatment using past total firm payroll (years 2011 and 2012). Dependent variables of estimated equations are in differences in logarithms of the considered outcome variable. (4) Highest p-value maximum for excluded instruments (first stage of instrumental variables estimation). In bold: significant coefficients, at a 5 percent or smaller than 5 percent level. ***, ** and * : significant coefficient at a 1, 5 or 10 percent levels.

Reading: In 2013, in fiscal groups from the fourth quartile of the apparent CICE rate, the increase in the employment level of fixed term contracts is 1.861 percentage points greater than in the fiscal groups from the first quartile; the difference is not significant. The corresponding elasticity is 0.725 and relate the estimated coefficient to the corresponding value of the difference in average apparent rate between the 4th and 1st quartile of the apparent CICE rate distribution. For 2013, in fiscal groups, the average levels in the apparent CICE rate are 1.37 in the first quartile, 2.90 in the second, 3.43 in the third and 3.93 percentage points in the last.

Table S4. Evaluating the effect of the CICE and PR on employment across groups of companies. Sample: 2004-2016. Distinguishing exporting from non exporting firms.																																		
Coefficients										Coefficients																								
Average employment DADS (inst 2011-2012)					Fixed term contracts (inst 2011-2012 - ou 2010-2011)					Open-ended contracts (inst 2011-2012 ou 2010-2011)					Blue collars (inst 2010-2011)					Employees (2010-2011 PR passe pas v 4.9% - NB					White Collars (inst 2011-2012 ou 2010-2011 - PR pas									
Q2					Q2					Q2					Q2					Q2					Q2					Q2				
CICE	2013	Q2	EXP	-8.278 (0.468)	2013	Q2	EXP	0.22 (0.580)	2013	Q2	EXP	2013	Q2	EXP	2013	Q2	EXP	2013	Q2	EXP	2013	Q2	EXP	2013	Q2	EXP								
				3.679 (0.502)				3.326 (0.580)																										
				-4.814 (0.658)				-4.814 (0.658)																										
				3.039 (0.574)				8.974 (0.338)																										
				1.005 (0.849)				16.184 (0.953)																										
				4.427 (0.456)				0.255 (0.963)																										
				2.532 (0.580)				5.377 (0.584)																										
				3.679 (0.502)				3.326 (0.580)																										
CICE	2014	Q2	EXP	-4.874 (0.658)	2014	Q2	EXP	13.097 (0.338)	2014	Q2	EXP	2014	Q2	EXP	2014	Q2	EXP	2014	Q2	EXP	2014	Q2	EXP	2014	Q2	EXP								
				3.039 (0.574)				8.974 (0.338)																										
				1.005 (0.849)				16.184 (0.953)																										
				4.427 (0.456)				0.255 (0.963)																										
				2.532 (0.580)				5.377 (0.584)																										
				3.679 (0.502)				3.326 (0.580)																										
				-4.874 (0.658)				13.097 (0.338)																										
				3.039 (0.574)				8.974 (0.338)																										
PR	2015	Q2	EXP	-4.874 (0.658)	2015	Q2	EXP	13.097 (0.338)	2015	Q2	EXP	2015	Q2	EXP	2015	Q2	EXP	2015	Q2	EXP	2015	Q2	EXP	2015	Q2	EXP								
				3.039 (0.574)				8.974 (0.338)																										
				1.005 (0.849)				16.184 (0.953)																										
				4.427 (0.456)				0.255 (0.963)																										
				2.532 (0.580)				5.377 (0.584)																										
				3.679 (0.502)				3.326 (0.580)																										
				-4.874 (0.658)				13.097 (0.338)																										
				3.039 (0.574)				8.974 (0.338)																										
PR	2016	Q2	EXP	-4.874 (0.658)	2016	Q2	EXP	13.097 (0.338)	2016	Q2	EXP	2016	Q2	EXP	2016	Q2	EXP	2016	Q2	EXP	2016	Q2	EXP	2016	Q2	EXP								
				3.039 (0.574)				8.974 (0.338)																										
				1.005 (0.849)				16.184 (0.953)																										
				4.427 (0.456)				0.255 (0.963)																										
				2.532 (0.580)				5.377 (0.584)																										
				3.679 (0.502)				3.326 (0.580)																										
				-4.874 (0.658)				13.097 (0.338)																										
				3.039 (0.574)				8.974 (0.338)																										

Sources: BRC (Acoss), DADS-FARE (Insee) and MVC (Dgflip).

Scope: 1,568 fiscal groups employing 5 workers or more over, perennial over 2004-2016.

Notes: Instrumental variable estimated coefficients (p-value within parentheses). Treatment variables: quartiles of apparent CICE tax credit rate in 2013, of its variation between 2013 and 2014 in 2014; quartiles of the PR1 (resp. PR2) payroll tax cuts in 2015 (resp. in 2016). (1) Falsification (placebo) test in 2012 for overall firm average wage, in 2011 for socio professional category. (2) H0: (Instruments are not correlated with the error term). (3) H0: (Instruments are not correlated with the treatment). Instruments: quartiles of simulated treatment using past total firm payroll (years 2011 and 2012). Dependent variables of estimated equations are in difference in logarithms of considered outcome variables. (4) Significant p-value maximum for excluded instruments (first stage of instrumental variables estimation). In bold: significant coefficients, at a 5 percent or smaller than 5 percent level. ***, ** and * : significant coefficient at a 1, 5 or 10 percent levels.

Reading: In 2013, in fiscal groups from the fourth quartile of the apparent CICE rate, the increase in the employment level of fixed term contracts is 1.861 percentage points greater than in the fiscal groups from the first quartile; the difference is not significant. The corresponding elasticity is 0.725 and relate the estimated coefficient to the corresponding value of the difference in average apparent rate between the 4th and 1st quartile of the apparent CICE rate distribution. For 2013, in fiscal groups, the average levels in the apparent CICE rate are 1.37 in the first quartile, 2.90 in the second, 3.43 in the third and 3.93 percentage points in the last.

Impact on employment characterized by fixed-term contracts and open-ended contracts

Overall, the CICE positively impacted the employment of fixed-term contracts (FTC) in the year of its implementation only, 2013, in particular in most benefiting TGC. The implementation of the first part of the PR would have increased the employment of fixed-term contracts (FTC).

Indeed, the CICE positively impacted the employment of fixed-term contracts (FTC) in the year of its implementation, 2013 (Table 5a). This effect concerns the tax groups in the second and fourth quartiles of the CICE rate distribution, and even the third quartile. In 2014, no effect of the CICE on fixed-term contract (FTC) employment is detected. In 2015, the implementation of the first part of the PR would have increased fixed-term contract (FTC) employment in the tax groups of the third quartile in terms of the benefit from the measure, although the effect is only significant at 8.8%. Besides, neither of the two measures would have led to an increase in permanent contract (OEC) employment, regardless of the year or the extent of the benefit from the measure considered (Table 5c).

Distinguishing exporting from non-exporting TGC, for fixed-term contracts (FTC), we see that the effect of the CICE detected for the tax groups in the third quartile of the measure's distribution is only found for exporting tax groups (Table 5b). A positive effect in Q2 is also observed in non-exporting tax groups, but it is only significant at 6% (Table 5d). There is still no effect neither for exporting nor for non-exporting TGC of both the CICE or the PR on OEC.

Table 5a. Evaluating the effect of the CICE and PR on employment across all tax groups of companies.

Outcome variable			Average employment	Blue collar workers	Employees	White collar workers	Fixed-term contracts	Open-ended contracts
CICE	CICE 2013	Q2	-1,726	25,749***	-24,899*	0,563	26,994**	-4,738
			(0,709)	(0,010)	(0,059)	(0,939)	(0,030)	(0,292)
		Q3	0,195	26,247***	-5,786	1,791	12,201*	-3,375
			(0,966)	(0,002)	(0,465)	(0,739)	(0,083)	(0,524)
		Q4	-1,296	18,297**	-13,109	5,328	37,518**	-0,133
			(0,783)	(0,042)	(0,196)	(0,412)	(0,048)	(0,980)
	CICE 2014	Q2	-4,279	6,79	-37,017	-27,582*	-8,314	-0,603
			(0,540)	(0,359)	(0,197)	(0,070)	(0,623)	(0,958)
		Q3	-0,632	-0,72	-10,208	9,054	7,088	-0,278
			(0,947)	(0,954)	(0,448)	(0,121)	(0,537)	(0,984)
		Q4	6,884	24,078	28,107	-11,075	-6,135	17,564
			(0,695)	(0,363)	(0,455)	(0,732)	(0,773)	(0,549)
Pacte de responsabilité	PR1 (first part)	Q2	-14,725**	5,259	-1,82	-13,647**	-2,075	-12,347*
			(0,030)	(0,140)	(0,901)	(0,039)	(0,874)	(0,077)
		Q3	-7,647*	3,928	-6,409	-11,725*	15,397*	-7,445
			(0,085)	(0,275)	(0,624)	(0,055)	(0,088)	(0,177)
		Q4	-3,33	7,389*	1,17	0,943	8,857	-1,782
			(0,288)	(0,064)	(0,913)	(0,886)	(0,317)	(0,631)
	PR2 (second part)	Q2	-16,226	0,361	58,251	-8,228	-14,086	-12,011
			(0,306)	(0,952)	(0,152)	(0,518)	(0,684)	(0,345)
		Q3	-10,951	-16,998*	-77,765*	-8,306	59,266	-4,487
			(0,201)	(0,084)	(0,093)	(0,610)	(0,317)	(0,689)
		Q4	-13,117*	-3,665	-6,078	-16,24	-14,215	-15,812
			(0,068)	(0,528)	(0,829)	(0,145)	(0,652)	(0,074)
Elasticities	CICE 2013	Q2	-1,091	16,279***	-15,741*	0,356	17,066**	6,993
		Q3	0,096	12,887***	-2,841	0,879	5,991*	-1,657
		Q4	-0,508	7,178**	-5,143	2,09	14,718**	-0,052
	CICE 2014	Q2	-4,633	7,351	-40,078	-29,863*	-9,001	-0,653
		Q3	-0,51	-0,581	-8,237	7,306	5,72	-0,224
		Q4	2,993	10,47	12,221	-4,816	-2,668	7,637
	PR1 (first part)	Q2	-26,311**	9,397	-3,252	-24,385**	-3,708	-22,062*
		Q3	-7,649*	3,929	-5,746	-11,728*	15,401*	-7,447
		Q4	28,769	5,506*	0,872	0,703	6,6	-1,328
Falsification test (1) : 12 inst 10-11	CICE 2013	Q2	9.819	-1.478	-4.859	11.512	12.678	4.940
			(0.110)	(0.796)	(0.484)	(0.338)	(0.259)	(0.263)
			12.666	-5.643	-13.072	13.272	8.286	8.294
			(0.127)	(0.548)	(0.117)	(0.377)	(0.518)	(0.167)
		Q3	20.422**	-8.919	-2.049	19.543	18.731	15.870**
			(0.039)	(0.368)	(0.841)	(0.297)	(0.189)	(0.034)
			-9.671	5.833	11.680	-18.302	3.989	-6.931*
			(0.229)	(0.627)	(0.181)	(0.220)	(0.737)	(0.052)
		Q4	-41.774	35.020	.513	-85.019*	-52.053	-15.961
			(0.219)	(0.188)	(0.986)	(0.087)	(0.144)	(0.210)
			-51.564	67.974	9.230	-77.195	-57.503	-10.621
			(0.483)	(0.218)	(0.773)	(0.159)	(0.147)	(0.617)
	PR1 (first part)	Q2	1.781	34.283	13.667	27.753	-7.564	15.556
			(0.789)	(0.377)	(0.298)	(0.439)	(0.771)	(0.301)
		Q3	-40.495	55.840	-6.855	-59.143	-71.022*	2.309
			(0.465)	(0.291)	(0.822)	(0.247)	(0.050)	(0.905)
		Q4	-35.408	69.393	7.008	-44.296	-36.028	2.156
			(0.552)	(0.200)	(0.756)	(0.334)	(0.240)	(0.910)
PR2 (second part)	Q2	1.781	34.283	13.667	27.753	-7.564	15.556	
		(0.789)	(0.377)	(0.298)	(0.439)	(0.771)	(0.301)	
	Q3	-40.495	55.840	-6.855	-59.143	-71.022*	2.309	
		(0.465)	(0.291)	(0.822)	(0.247)	(0.050)	(0.905)	
	Q4	-35.408	69.393	7.008	-44.296	-36.028	2.156	
		(0.552)	(0.200)	(0.756)	(0.334)	(0.240)	(0.910)	
Falsification test (1) : 11 inst 09-10	CICE 2013	Q2	4.011	-1.111	-32.417*	6.876	8.005	-8.412*
			(0.437)	(0.831)	(0.062)	(0.533)	(0.567)	(0.075)
			2.343	2.133	-54.403**	7.156	-6.711	-15.089***
			(0.701)	(0.782)	(0.039)	(0.624)	(0.647)	(0.010)
		Q3	.475	15.509	-65.441**	17.683	15.029	-22.782**
			(0.957)	(0.224)	(0.025)	(0.366)	(0.480)	(0.023)
			-6.636	-2.213	42.353	-4.948	-20.635	11.807
			(0.378)	(0.875)	(0.128)	(0.762)	(0.227)	(0.127)
		Q4	-6.173	-6.754	82.501**	4.591	6.757	23.445**
			(0.526)	(0.748)	(0.042)	(0.814)	(0.772)	(0.012)
			-8.846	-36.835	96.566**	-21.258	-12.786	29.036*
			(0.530)	(0.252)	(0.045)	(0.406)	(0.725)	(0.070)
	PR1 (first part)	Q2	4.084	-19.637	15.056	-5.775	-17.154	11.831
			(0.602)	(0.378)	(0.211)	(0.702)	(0.522)	(0.228)
		Q3	2.695	-23.626	12.005	-11.414	.180	10.770
			(0.730)	(0.274)	(0.270)	(0.426)	(0.994)	(0.272)
		Q4	-4.764	-25.701	90.011*	-5.777	-2.643	25.309**
			(0.683)	(0.329)	(0.053)	(0.794)	(0.932)	(0.046)
PR2 (second part)	Q2	4.084	-19.637	15.056	-5.775	-17.154	11.831	
		(0.602)	(0.378)	(0.211)	(0.702)	(0.522)	(0.228)	
	Q3	2.695	-23.626	12.005	-11.414	.180	10.770	
		(0.730)	(0.274)	(0.270)	(0.426)	(0.994)	(0.272)	
Q4	-4.764	-25.701	90.011*	-5.777	-2.643	25.309**		
	(0.683)	(0.329)	(0.053)	(0.794)	(0.932)	(0.046)		
Overidentification (2)			-	-	-	-	-	-
Weak instruments (3)			0,358 (4)	0,39	0,531	0,337	0,562	0,333
Number of firms			4100	3321	3885	2802	2768	4090

Sources: BRC (Acoss), DADS-FARE (Insee) and MVC (Dgfp).

Scope: 4,102 fiscal groups employing 5 workers or more over, perennial over 2009-2016.

Notes: instrumental variable estimated coefficients (p-value within parentheses). Treatment variables: quartiles of apparent CICE tax credit rate in 2013, of its variation between 2013 and 2014 in 2014; quartiles of the PR1 (resp. PR2) payroll tax cuts in 2015 (resp. in 2016). (1) Falsification (placebo) test in 2012 for overall firm average wage, in 2011 for socio professional category. (2) H0: (instruments are not correlated with the error term). (3) H0: (instruments are not correlated with the treatment). Instruments: quartiles of simulated treatment using past total firm payroll (years 2011 and 2012). Dependent variables of estimated equations are in differences in logarithms of the considered outcome variable. (4) Highest p-value maximum for excluded instruments (first stage of instrumental variables estimation). In bold: significant coefficients, at a 5 percent or smaller than 5 percent level. ***, ** and * : significant coefficient at a 1, 5 or 10 percent levels.

Reading: In 2013, in fiscal groups from the fourth quartile of the apparent CICE rate, the increase in employment of blue collar workers is 18.297 percentage points greater than in the fiscal groups from the first quartile; the difference is significant at a 5 percent level. The corresponding elasticity is 7.178 and relate the estimated coefficient to the corresponding value of the difference in average apparent rate between the 4th and 1st quartile of the apparent CICE rate distribution. For 2013, in fiscal groups, the average variation in the apparent CICE rate is 1.44 in the first quartile, 3.02 in the second, 3.48 in the third and 3.99 in the last.

Table 5c. Evaluating the effect of the CICE and PR on employment across all tax groups of companies. Sample 2004-2016.

Outcome variable			Average employment	Blue collar workers	Employees	White collar workers	Fixed-term contracts	Open-ended contracts		
CICE	CICE 2013	Q2	-7,339 (0,490)	-8,531 (0,775)	-7,584 (0,463)	-6,542 (0,556)	-3,641 (0,855)	-5,381 (0,614)		
		Q3	-1,376 (0,739)	-3,74 (0,879)	-3,618 (0,577)	-9,583 (0,320)	-16,879 (0,348)	-3,061 (0,544)		
		Q4	-7,153 (0,365)	-4,889** (0,022)	-14,114* (0,062)	-2,062 (0,903)	1,861 (0,949)	-5,998 (0,468)		
		Q2	3,718 (0,357)	7,933 (0,114)	5,532 (0,542)	-9,831 (0,235)	11,928 (0,246)	10,163 (0,403)		
	CICE 2014	Q3	4,812 (0,497)	-9,442 (0,417)	4,645 (0,587)	-16,708 (0,706)	12,746 (0,254)	0,073 (0,995)		
		Q4	-6,985 (0,379)	2,317 (0,502)	-7,126 (0,506)	20,261 (0,436)	5,447 (0,655)	7,788 (0,625)		
		Pacte de responsabilité	PR (first part)	Q2	-15,272 (0,301)	-0,585 (0,612)	-3,724 (0,838)	-7,6 (0,406)	-3,394 (0,857)	-12,966 (0,357)
				Q3	-3,655 (0,427)	-0,533 (0,794)	4,998 (0,658)	3,763 (0,406)	-3,551 (0,682)	-1,566 (0,751)
Q4	-1,906 (0,582)			-0,533 (0,482)	5,216 (0,668)	7,961 (0,355)	5,971 (0,561)	-1,758 (0,669)		
Q2	2,958 (0,727)			6,967 (0,364)	7,268 (0,355)	-3,356 (0,854)	17,405 (0,109)	5,512 (0,580)		
PR (second part)	Q3		-13,603* (0,086)	-14,175 (0,174)	-35,472** (0,014)	-14,702 (0,182)	4,646 (0,690)	-18,76** (0,032)		
	Q4		-512 (0,917)	7,972 (0,311)	-0,021 (0,997)	-2,025 (0,801)	37,944** (0,041)	3,426 (0,527)		
	Elasticity		CICE 2013	Q2	-4,774	-5,549	-4,933	-4,255	-2,368	-3,5
				Q3	-0,666	-1,809	-0,224	-4,636	-8,166	-1,481
Q4		-2,788		-1,906**	-1,41	-0,125	0,725	-2,338		
CICE 2014		Q2	4,194	8,949	6,241	-11,09	13,456	11,465		
		Q3	3,966	-7,782	-0,447	-0,194	10,505	0,06		
		Q4	-3,441	1,141	2,288	9,98	2,683	3,836		
PR (first part)		Q2	-27,405	-1,05	-6,683	-13,638	-6,09	-23,267		
		Q3	-3,77	-0,55	5,156	3,882	-3,663	-1,615		
	Q4	-1,454	-0,406	3,978	6,071	4,554	-1,341			
Falsification tests (1) : 12 inst 10-11	CICE 2013	Q2	-580 (0,925)	-5,986 (0,825)	-1,836 (0,838)	11,093 (0,225)	33,120 (0,240)	-1,903 (0,780)		
			-6,406 (0,668)	3,097 (0,956)	-27,363 (0,201)	-3,583 (0,845)	36,859 (0,375)	-7,954 (0,645)		
		Q3	-2,234 (0,888)	9,225 (0,877)	-17,299 (0,452)	350 (0,989)	49,512 (0,256)	-3,118 (0,865)		
			Q4	-19,094 (0,206)	6,366 (0,929)	2,045 (0,906)	-31,531** (0,046)	-26,047 (0,509)	-16,607 (0,330)	
		PR (first part)	Q3	3,462 (0,861)	24,414 (0,826)	-2,741 (0,935)	575 (0,979)	-104,147 (0,268)	7,754 (0,718)	
			Q4	57,233 (0,243)	35,352 (0,866)	32,543 (0,520)	98,834 (0,106)	-124,084 (0,195)	61,065 (0,275)	
	PR (second part)	Q2	62,617* (0,072)	27,209 (0,751)	48,916 (0,160)	89,240* (0,075)	-10,244 (0,825)	65,871* (0,090)		
		Q3	80,568** (0,020)	43,812 (0,679)	19,918 (0,506)	134,362*** (0,003)	-76,122* (0,055)	83,525** (0,029)		
		Q4	65,120 (0,122)	56,619 (0,745)	20,420 (0,622)	91,430* (0,069)	-101,122 (0,155)	70,356 (0,140)		
		Falsification tests (1) : 11 inst 09-10	CICE 2013	Q2	-10,591 (0,086)	-4,956 (0,736)	-6,799 (0,518)	-8,038 (0,464)	37,749 (0,572)	-10,579 (0,146)
					-12,828 (0,225)	24,690 (0,578)	-17,131 (0,198)	19,749 (0,398)	19,587 (0,782)	-23,519 (0,249)
				Q3	-17,787 (0,197)	30,985 (0,626)	-18,380 (0,309)	30,373 (0,275)	31,054 (0,674)	32,928 (0,134)
Q4	29,377 (0,089)				-65,212 (0,570)	48,893 (0,188)	402 (0,972)	122,887 (0,519)	32,928 (0,131)	
PR (first part)	Q3			38,520 (0,242)	-107,081 (0,558)	59,190 (0,237)	-52,000 (0,459)	57,178 (0,665)	51,205 (0,194)	
	Q4			52,448 (0,197)	-132,316 (0,563)	79,177 (0,209)	-45,928 (0,571)	57,951 (0,796)	66,402 (0,146)	
PR (second part)	Q2		17,145 (0,261)	-16,964 (0,629)	24,723 (0,252)	26,279 (0,579)	19,550 (0,883)	14,759 (0,316)		
	Q3		9,641 (0,672)	-30,830 (0,546)	3,644 (0,914)	-38,010 (0,563)	-143,969 (0,515)	18,461 (0,429)		
	Q4		41,752 (0,203)	-116,061 (0,529)	72,797 (0,179)	-33,376 (0,561)	126,046 (0,620)	51,289 (0,167)		
	Overidentification (2)		0.7980	-	-	-	-	-		
	Weak instruments (3)		0.248 (4)	0.221	0.222	0.943	0.523	0.225		
	Number of firms		1562	1332	1333	1077	1125	1552		

Sources: BRC (Acosss), DADS-FARE (Insee) and MVC (Dgfiip).

Scope: 1,568 fiscal groups employing 5 workers or more over, perennial over 2004-2016.

Notes: instrumental variable estimated coefficients (p-value within parentheses). Treatment variables: quartiles of apparent CICE tax credit rate in 2013, of it variation between 2013 and 2014 in 2014; quartiles of the PR1 (resp. PR2) payroll tax cuts in 2015 (resp. in 2016). (1) Falsification (placebo) test in 2012 for overall firm average wage, in 2011 for socio professional category. (2) H0: (instruments are not correlated with the error term). (3) H0: (instruments are not correlated with the treatment). Instruments: quartiles of simulated treatment using past total firm payroll (years 2011 and 2012). Dependent variables of estimated equations are in differences in logarithms of the considered outcome variable. (4) Highest p-value maximum for excluded instruments (first stage of instrumental variables estimation). In bold: significant coefficients, at a 5 percent or smaller than 5 percent level. ***, ** and * : significant coefficient at a 1, 5 or 10 percent levels.

Reading: In 2013, in fiscal groups from the fourth quartile of the apparent CICE rate, the increase in the employment level of fixed term contracts is 1.861 percentage points greater than in the fiscal groups from the first quartile; the difference is not significant. The corresponding elasticity is 0.725 and relate the estimated coefficient to the corresponding value of the difference in average apparent rate between the 4th and 1st quartile of the apparent CICE rate distribution. For 2013, in fiscal groups, the average levels in the apparent CICE rate are 1.37 in the first quartile, 2.90 in the second, 3.43 in the third and 3.93 percentage points in the last.

Employment by qualification

Considering the whole set of TGC, there is a positive effect of CICE on employment for blue collar workers only in 2013; the PR also increases employment of blue-collar workers in 2015 for the most benefiting TGC. No effect at all of any of the two policies on the number of jobs neither for employees nor for executives. Indeed, the CICE positively impacted worker employment in the year of its implementation, 2013, in the tax groups that benefited the most (but also for Q2 and Q3; Table 5a). No effect is detected in 2014. In 2015, as with the IF, the implementation of the first part of the PR would have increased worker employment in the tax groups that benefited the most from the measure, although the effect remains modest. On the other hand, the employment of employees would not have been affected by either of the two policy measures (Table 5c). Regarding executives, the same applies to the employment of executives (Table 5a).

Distinguishing exporting and non-exporting TGC, the effects of the CICE in 2013 for blue-collar workers across all tax groups is observed throughout the distribution of the apparent CICE rate (from the second to the fourth quartile) for exporting tax groups (Table 5b). For non-exporters, the effect is limited to the tax groups in the second quartile. The absence of an effect of the CICE or the PR on the number of employees across all tax groups is also observed in both exporting and non-exporting tax groups. For executives, the same holds.

Table 5b. Evaluating the effect of the CICE and PR on employment across tax groups of companies. Sample: 2009–2016. Distinguishing exporting from non exporting groups

Coefficients		Average employment (inst 2010-2012)		Coefficients		Fixed term contracts (inst 2010-2012)		Coefficients		Open-ended contracts (inst 2010-2012)		Coefficients		Blue collars (inst 2010-2012)		Coefficients		Employees (inst 2010-2012)		Coefficients		White collars (inst 2010-2012)	
CICE 2013	Q2	-1.222 (0.727)	Q2	-0.061 (0.989)	Q2	0.078 (0.115)	Q2	-1.485 (0.393)	Q2	-13.619*** (0.002)	Q2	-24.561 (0.201)	Q2	1.457 (0.844)									
	Q3	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP										
	Q4	1.114 (0.463)	Q4	5.498 (0.510)	Q4	1.001 (0.011)	Q4	EXP	EXP	EXP	EXP	EXP	EXP										
	Q4	2.442 (0.430)	Q4	7.887 (0.276)	Q4	5.675 (0.460)	Q4	2.781 (0.890)	Q4	26.655*** (0.007)	Q4	32.239 (0.044)	Q4	4.055 (0.515)									
	Q4	4.442 (0.430)	Q4	8.802 (0.273)	Q4	86.711** (0.066)	Q4	2.876 (0.644)	Q4	26.655*** (0.029)	Q4	37.604 (0.158)	Q4	1.975 (0.246)									
	Q4	-0.163 (0.935)	Q4	-7.118 (0.463)	Q4	4.952 (0.813)	Q4	1.661 (0.213)	Q4	EXP	EXP	EXP	EXP	EXP									
	Q4	2.079 (0.722)	Q4	4.432 (0.509)	Q4	36.492 (0.277)	Q4	0.872 (0.753)	Q4	5.438 (0.775)	Q4	2.189 (0.448)	Q4	4.539 (0.739)									
	Q4	5.997 (0.296)	Q4	8.285 (0.244)	Q4	4.607 (0.876)	Q4	-11.111 (0.403)	Q4	EXP	EXP	EXP	EXP	EXP									
	Q4	5.651 (0.541)	Q4	1.538 (0.842)	Q4	12.794 (0.405)	Q4	11.187 (0.472)	Q4	EXP	EXP	EXP	EXP	EXP									
	Q4	8.817 (0.612)	Q4	2.141 (0.771)	Q4	14.723 (0.245)	Q4	-14.485 (0.241)	Q4	-7.207 (0.741)	Q4	18.064 (0.045)	Q4	2.601 (0.156)									
CICE 2014	Q2	-7.098 (0.422)	Q2	-0.502 (0.954)	Q2	-1.854 (0.072)	Q2	-3.145 (0.226)	Q2	-22.915 (0.029)	Q2	-75.787 (0.209)	Q2	-26.127 (0.018)									
	Q3	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP										
	Q4	10.196 (0.507)	Q4	9.544 (0.661)	Q4	9.544 (0.598)	Q4	1.887 (0.748)	Q4	EXP	EXP	EXP	EXP	EXP									
	Q4	25.277 (0.113)	Q4	25.277 (0.500)	Q4	12.459 (0.717)	Q4	12.459 (0.273)	Q4	EXP	EXP	EXP	EXP	EXP									
	Q4	17.611** (0.032)	Q4	-17.385** (0.008)	Q4	26.748 (0.008)	Q4	-14.213* (0.077)	Q4	7.387** (0.058)	Q4	15.282 (0.264)	Q4	14.366 (0.054)									
	Q4	8.931** (0.080)	Q4	9.227** (0.079)	Q4	9.265 (0.252)	Q4	9.265 (0.160)	Q4	EXP	EXP	EXP	EXP	EXP									
	Q4	9.178 (0.095)	Q4	8.661 (0.883)	Q4	4.388 (0.842)	Q4	4.388 (0.959)	Q4	EXP	EXP	EXP	EXP	EXP									
	Q4	4.897 (0.086)	Q4	-5.871 (0.086)	Q4	30.344 (0.110)	Q4	5.964 (0.139)	Q4	EXP	EXP	EXP	EXP	EXP									
	Q4	-2.401 (0.448)	Q4	-2.488 (0.457)	Q4	8.678 (0.478)	Q4	6.612 (0.876)	Q4	EXP	EXP	EXP	EXP	EXP									
	Q4	-1.138 (0.295)	Q4	1.397 (0.308)	Q4	1.447 (0.726)	Q4	1.447 (0.765)	Q4	EXP	EXP	EXP	EXP	EXP									
PR 2015	Q2	-28.219 (0.310)	Q2	-28.226 (0.310)	Q2	31.134 (0.388)	Q2	18.813 (0.374)	Q2	6.517 (0.253)	Q2	131.245 (0.409)	Q2	-1.1472 (0.609)									
	Q3	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP										
	Q4	5.504 (0.714)	Q4	5.699 (0.721)	Q4	-153.098 (0.449)	Q4	-15.926 (0.986)	Q4	EXP	EXP	EXP	EXP	EXP									
	Q4	-19.914 (0.071)	Q4	19.784 (0.072)	Q4	17.955 (0.623)	Q4	17.955 (0.588)	Q4	EXP	EXP	EXP	EXP	EXP									
	Q4	2.703 (0.791)	Q4	3.176 (0.792)	Q4	14.245 (0.172)	Q4	14.245 (0.988)	Q4	EXP	EXP	EXP	EXP	EXP									
	Q4	13.117 (0.569)	Q4	13.688 (0.569)	Q4</																		

Sources: BRC (Acosse), DADS-FARE (Insee) and MVC (Dgfiip).

Scope: 4,102 fiscal groups employing 5 workers or more over, perennial over 2009-2016.

Notes: Instrumental variable estimating coefficients (p-value within parentheses). Treatment variables: quartiles of apparent CICE tax credit rate in 2013, of its variation between 2013 and 2014 in 2014; quartiles of the PR1 (resp. PR2) payroll tax cuts in 2015 (resp. in 2016). (1) Falsification (placebo) test in 2012 for overall firm average wage, in 2011 for socio professional category. (2) H0: (instruments are not correlated with the error term). (3) H0: (instruments are not correlated with the treatment). Instruments: quartiles of simulated treatment using past total firm payroll (years 2011 and 2012). Dependent variables of estimated equations are in differences in logarithms of the considered outcome variable. (4) Highest p-value maximum for excluded instruments (first stage of instrumental variables estimation). In bold: significant coefficients, at a 5 percent or smaller than 5 percent level. ***, ** and *: significant coefficient at a 1, 5 or 10 percent levels.

Reading: In 2013, in fiscal groups from the fourth quartile of the apparent CICE rate, the increase in employment of blue collar workers is 18.297 percentage points greater than in the fiscal groups from the first quartile; the difference is significant at a 5 percent level. The corresponding elasticity is 7.178 and relate the estimated coefficient to the corresponding value of the difference in average apparent rate between the 4th and 1st quartile of the apparent CICE rate distribution. For 2013, in fiscal groups, the average variation in the apparent CICE rate is 1.44 in the first quartile, 3.02 in the second, 3.48 in the third and 3.99 in the last.

6.2.2. Wages

Neither CICE nor the PR would have impacted average wages. On the other hand, a positive effect of the CICE is found for exporting tax groups (Q2), and for non-exporting tax groups (Q3). Neither the CICE nor the PR would have had an effect on the wages of workers across all tax groups; the wages of employees would have increased under the effect of the CICE in the tax groups (Q2); as well, an increase of wages is implied by implementation of CICE in the fourth quartile.

Whether considering the wage per individual or per full-time equivalent (FTE), neither the CICE nor the PR would have had a positive effect on the average annual salary (Table 6c). The CICE would have had a positive effect for exporting tax groups in the second quartile of the CICE rate distribution, and for non-exporting tax groups in the third quartile (Table 6b). No other effect of the CICE or the PR is detected for the rest of the period.

Table 6c. Evaluating the effect of the CICE and PR on wage earnings across all tax groups of companies. Sample 2004-2016.

Outcome variable			Average wage	Full time average wage	Blue collar wage	Employees' wage	White collar wage
CICE	2013	Q2	0,293	-0,413	1,628	-1,591	-2,18
			(0,850)	(0,811)	(0,514)	(0,592)	(0,452)
		Q3	0,763	1,17	-0,081	-1,985	3,289
			(0,653)	(0,508)	(0,969)	(0,415)	(0,450)
		Q4	1,273	1,559	-1,705	3,533	1,473
			(0,586)	(0,438)	(0,645)	(0,379)	(0,811)
	2014	Q2	-4,174	-4,124*	0,653	13,263***	-5,143
			(0,097)	(0,077)	(0,866)	(0,008)	(0,303)
		Q3	5,295	3,467	-5,193	6,792	17,085
			(0,341)	(0,397)	(0,399)	(0,276)	(0,184)
		Q4	-8,808*	-6,680*	-0,748	-2,612	-13,242
			(0,067)	(0,079)	(0,854)	(0,722)	(0,279)
Pacte de responsabilité	PR (first part)	Q2	2,089	1,85	-2,925	-2,080	2,344
			(0,277)	(0,337)	(0,059)	(0,547)	(0,441)
		Q3	2,233	1,157	-2,446*	1,916	1,718
			(0,063)	(0,328)	(0,069)	(0,364)	(0,487)
		Q4	0,144	-0,089	-2,759	-0,275	2,514
			(0,891)	(0,937)	(0,130)	(0,893)	(0,467)
	PR (second part)	Q2	1,051	-0,676	5,427	0,889	2,996
			(0,668)	(0,772)	(0,318)	(0,635)	(0,560)
		Q3	-0,366	-0,245	-2,377	-2,807	9,075
			(0,814)	(0,855)	(0,457)	(0,328)	(0,106)
		Q4	0,099	-1,998	-4,493	-9,658*	-8,837
			(0,961)	-0,219	(0,881)	(0,059)	(0,171)
Elasticities	CICE 2013	Q2	0,191	-0,269	1,059	-1,035	-1,418
		Q3	0,369	0,566	-0,039	-0,96	1,591
		Q4	0,496	0,608	-0,665	1,377	-0,175
	CICE 2014	Q2	-4,709	-4,652*	0,737	14,962***	-5,802
		Q3	4,364	2,857	-4,28	5,598	-0,25
		Q4	-4,339*	-3,298*	-0,368	-1,287	-6,523
	PR (first part)	Q2	3,749	3,32	-5,249	-0,982	4,206
		Q3	-0,286	1,194	-2,523*	1,977	1,772
		Q4	0,11	-0,068	-2,104	-0,21	1,917
Falsification test (1) : 12 inst 09-10	CICE 2013	Q2	-2.494	-2.843	0.157	1.411	2.227
			(0.180)	(0.250)	(0.963)	(0.727)	(0.729)
		Q3	-3.470	-3.894	-2.097	-3.941	-3.319
			(0.266)	(0.336)	(0.699)	(0.663)	(0.826)
		Q4	-3.652	-2.522	-3.592	-3.963	-3.006
			(0.259)	(0.566)	(0.549)	(0.673)	(0.876)
	PR (first part)	Q2	0.762	5.088*	5.234	5.339	-15.631*
			(0.749)	(0.074)	(0.275)	(0.319)	(0.060)
		Q3	4.215	4.733	13.877	.997	-28.133
			(0.517)	(0.501)	(0.254)	(0.922)	(0.284)
		Q4	13.537	17.570	8.081	18.993	59.433
			(0.177)	(0.220)	(0.742)	(0.313)	(0.436)
	PR (second part)	Q2	9.926	16.778	-10.348	14.611	85.790
			(0.228)	(0.113)	(0.584)	(0.170)	(0.268)
		Q3	11.018	11.480	-2.081	7.884	72.062
			(0.150)	(0.291)	(0.916)	(0.446)	(0.290)
		Q4	11.004	16.610	-2.489	11.601	63.933
			(0.199)	(0.157)	(0.911)	(0.386)	(0.353)
Overidentification (2)			0.5353	0.6498	.	0.3164	.
Weak instruments (3)			0.286 (4)	0.263	0.368	0.380	0.217
Number of firms			1,562	1,562	1,139	1,277	983

Sources: BRC (Acosss), DADS-FARE (Insee) and MVC (Dgfp).

Scope: 1,568 fiscal groups employing 5 workers or more over, perennial over 2004-2016.

Notes: instrumental variable estimated coefficients (p-value within parentheses). Treatment variables: quartiles of apparent CICE tax credit rate in 2013, of its variation between 2013 and 2014 in 2014; quartiles of the PR1 (resp. PR2) payroll tax cuts in 2015 (resp. in 2016). (1) Falsification (placebo) test in 2012 for overall firm average wage, in 2011 for socio professional category. (2) H0: (instruments are not correlated with the error term). (3) H0: (instruments are not correlated with the treatment). Instruments: quartiles of simulated treatment using past total firm payroll (years 2010 and 2011). Dependent variables of estimated equations are in differences in logarithms of the considered outcome variable. (4) Highest p-value maximum for excluded instruments (first stage of instrumental variables estimation). In bold: significant coefficients, at a 5 percent or smaller than 5 percent level. ***, ** and * : significant coefficient at a 1, 5 or 10 percent levels.

Reading: In 2014, in fiscal groups from the second quartile of the apparent CICE rate, the increase in the average wage of employees is 13.263 percentage points greater than in the group of firms from the first quartile; the difference is significant at a 5 percent level. The corresponding elasticity is 14.962 and relate the estimated coefficient to the corresponding value of the difference in average apparent rate between the 2nd and 1st quartile of the apparent CICE rate distribution. For 2014, in fiscal groups, the average variation in the apparent CICE rate between 2013 and 2014 are 0.60 in the first quartile, 1.48 in the second, 1.81 in the third and 2.63 percentage points in the last.

Table 6b. Evaluating the effect of the CICE and PR on wage earnings across independent businesses. Sample: 2009-2016. Distinguishing exporting from non exporting firms.

Table 6b. Evaluating the effect of the CICE and PR on wage earnings across independent businesses. Sample: 2009-2016. Distinguishing exporting from non exporting firms.																			
Coefficients						Coefficients						Coefficients							
Average wage (inst 2010-2011)				Full time average wage (inst 2011-2012)				Blue collars (inst 2010-2011)				Employees' wage (inst 2010-2011)				White collar wage (inst 2010-2011)			
CICE 2013	Q2	2.3144 (0.180)		Q2	8.104** (0.034)		Q2	5.618 (0.120)		Q2	-2.468 (0.876)		Q2	2.294 (0.432)					
	Q3	1.527 (0.415)	EXP	Q3	1.662 (0.602)	EXP	Q3	4.498 (0.118)	EXP	Q3	-6.002 (0.630)	EXP	Q3	-4.156 (0.405)					
	Q4	-0.268 (0.913)		Q4	11.944 (0.349)		Q4	1.702 (0.668)		Q4	17.478 (0.402)		Q4	10.07** (0.015)					
	Q2	-4.527 (0.132)		Q2	-0.945 (0.807)		Q2	2.643 (0.494)		Q2	-13.455 (0.210)		Q2	-5.175 (0.497)					
	Q3	4.617 (0.31)	NEXP	Q3	9.814** (0.050)	NEXP	Q3	0.107 (0.986)	NEXP	Q3	2.424 (0.673)	NEXP	Q3	3.151 (0.680)					
	Q4	-0.297 (0.906)		Q4	1.534 (0.644)		Q4	3.876 (0.435)		Q4	2.529 (0.746)		Q4	-1.893 (0.888)					
CICE 2014	Q2	2.128 (0.439)		Q2	1.813 (0.696)		Q2	-4.289 (0.320)		Q2	-56.427 (0.746)		Q2	6.482 (0.389)					
	Q3	-2.883 (0.351)	EXP	Q3	12.657 (0.348)	EXP	Q3	-10.174** (0.045)	EXP	Q3	18.016 (0.436)	EXP	Q3	-5.751 (0.195)					
	Q4	-2.982 (0.343)		Q4	-5.585 (0.372)		Q4	4.255 (0.480)		Q4	0.076 (0.997)		Q4	-11.586 (0.218)					
	Q2	-4.35 (0.391)		Q2	-5.687 (0.691)		Q2	-6.021 (0.543)		Q2	-33.473 (0.526)		Q2	2.669 (0.687)					
	Q3	8.628 (0.310)	NEXP	Q3	28.759 (0.264)	NEXP	Q3	15.911 (0.424)	NEXP	Q3	-1.866 (0.949)	NEXP	Q3	4.509 (0.805)					
	Q4	-12.739 (0.268)		Q4	-40.781 (0.252)		Q4	-17.823 (0.463)		Q4	-22.147 (0.417)		Q4	1.475 (0.954)					
PR 2015	Q2	0.556 (0.753)		Q2	-0.410 (0.902)		Q2	-0.715 (0.639)		Q2	16.958 (0.523)		Q2	-3.859 (0.361)					
	Q3	0.852 (0.582)	EXP	Q3	4.275 (0.270)	EXP	Q3	1.168 (0.390)	EXP	Q3	4.123 (0.639)	EXP	Q3	5.295* (0.094)					
	Q4	-2.063 (0.172)		Q4	-2.450 (0.412)		Q4	-2.384 (0.372)		Q4	9.076 (0.430)		Q4	-9.443 (0.150)					
	Q2	-0.625 (0.610)		Q2	1.394 (0.486)		Q2	0.287 (0.864)		Q2	3.255 (0.695)		Q2	-2.145 (0.445)					
	Q3	0.254 (0.817)	NEXP	Q3	1.274 (0.538)	NEXP	Q3	0.309 (0.863)	NEXP	Q3	9.388 (0.365)	NEXP	Q3	-5.385 (0.101)					
	Q4	1.046 (0.490)		Q4	2.162 (0.352)		Q4	1.982 (0.219)		Q4	9.057 (0.299)		Q4	-2.8 (0.462)					
PR 2016	Q2	3.334 (0.633)		Q2	-26.798 (0.263)		Q2	1.39 (0.557)		Q2	92.17 (0.461)		Q2	-3.144 (0.694)					
	Q3	4.293 (0.394)	EXP	Q3	19.362 (0.196)	EXP	Q3	-5.847** (0.042)	EXP	Q3	-100.696 (0.333)	EXP	Q3	6.911 (0.568)					
	Q4	2.521 (0.468)		Q4	1.862 (0.798)		Q4	1.034 (0.696)		Q4	28.034 (0.380)		Q4	3.717 (0.642)					
	Q2	0.986 (0.673)		Q2	4.503 (0.523)		Q2	3.509 (0.476)		Q2	5.188 (0.639)		Q2	3.139 (0.553)					
	Q3	5.061** (0.021)	NEXP	Q3	1.757 (0.604)	NEXP	Q3	-5.714* (0.069)	NEXP	Q3	-2.398 (0.902)	NEXP	Q3	5.805 (0.246)					
	Q4	-3.706 (0.323)		Q4	-5.166 (0.201)		Q4	0.179 (0.941)		Q4	9.197 (0.684)		Q4	0.181 (0.974)					

Elasticities				Elasticities				Elasticities				Elasticities				Elasticities			
Average wage (inst 2010-2011)				Full time average wage (inst 2011-2012)				Blue collars (inst 2010-2011)				Employees' wage (inst 2010-2011)				White collar wage (inst 2010-2011)			
CICE 2013	Q2		1.446	Q2		5.063**	Q2		3.51	Q2		-1.542	Q2		1.433				
	Q3	EXP	0.754	Q3	EXP	0.82	Q3	EXP	2.22	Q3	EXP	-2.963	Q3	EXP	-2.051				
	Q4		-0.105	Q4		4.669	Q4		0.665	Q4		6.832	Q4		3.936**				
	Q2		-3.012	Q2		-0.629	Q2		1.759	Q2		-8.953	Q2		-3.444				
	Q3	NEXP	2.275	Q3	NEXP	4.836**	Q3	NEXP	0.053	Q3	NEXP	1.194	Q3	NEXP	1.558				
	Q4		-0.118	Q4		0.612	Q4		1.546	Q4		1.009	Q4		-0.755				
	Q2		2.22	Q2		1.892	Q2		0.475	Q2		-58.874	Q2		6.763				
	Q3	EXP	-2.221	Q3	EXP	9.751	Q3	EXP	-7.838**	Q3	EXP	13.88	Q3	EXP	-4.415				
CICE 2014	Q4		-1.252	Q4		-2.345	Q4		1.787	Q4		0.232	Q4		-4.866				
	Q2		-5.914	Q2		-7.732	Q2		-8.186	Q2		-45.51	Q2		3.629				
	Q3	NEXP	8.628	Q3	NEXP	28.758	Q3	NEXP	15.911	Q3	NEXP	-1.866	Q3	NEXP	4.509				
	Q4		-6.569	Q4		-21.029	Q4		-9.191	Q4		-11.42	Q4		0.761				
	Q2		1.001	Q2		-0.738	Q2		-1.288	Q2		30.543	Q2		-6.95				
	Q3	EXP	0.855	Q3	EXP	4.291	Q3	EXP	1.172	Q3	EXP	4.139	Q3	EXP	5.315*				
	Q4		-1.572	Q4		-1.866	Q4		1.816	Q4		6.914	Q4		-7.194				
	Q2		-1.356	Q2		3.046	Q2		0.627	Q2		7.113	Q2		-4.687				
R1 (first part)	Q3	NEXP	0.252	Q3	NEXP	1.263	Q3	NEXP	0.306	Q3	NEXP	9.305	Q3	NEXP	-5.337				
	Q4		0.77	Q4		1.592	Q4		1.46	Q4		6.67	Q4		-2.062				

Falsification tests			Falsification tests			Falsification tests			Falsification tests			Falsification tests			
Average wage (inst 2010-2011)			Full time average wage (inst 2011-2012)			Blue collars (inst 2010-2011)			Employees' wage (inst 2010-2011)			White collar wage (inst 2010-2011)			
CICE 2012 inst -2	Q2	-2.182 (0.625)	2012 inst -2	Q2	-7.511 (0.491)	2012 inst -2	Q2	0.587 (0.880)	2012 inst -2	Q2	16.976** (0.012)	2012 inst -2	Q2	-3.876 (0.612)	
	Q3	EXP		-2.937 (0.524)	EXP		-4.429 (0.701)	EXP		-0.959 (0.869)	EXP		24.5*** (0.004)	EXP	-17.519 (0.122)
	Q4	-8.323 (0.133)		Q4	0.546 (0.973)		Q4	-2.133 (0.713)		Q4	17.896** (0.025)		Q4	-6.526 (0.588)	
	Q2	-2.174 (0.811)		Q2	0.041 (0.998)		Q2	-0.467 (0.968)		Q2	-14.004 (0.118)		Q2	-21.896* (0.069)	
	Q3	NEXP		-8.841 (0.449)	Q3		-0.394 (0.983)	Q3		-9.014 (0.620)	Q3		25.079** (0.049)	Q3	29.571 (0.111)
	Q4	-6.027 (0.589)		Q4	1.186 (0.951)		Q4	-5.191 (0.781)		Q4	-26.620** (0.039)		Q4	47.287** (0.031)	
	Q2	4.744 (0.142)		Q2	18.153 (0.203)		Q2	4.281 (0.381)		Q2	-6.477 (0.506)		Q2	7.632 (0.395)	
	Q3	EXP		14.204 (0.223)	Q3		39.807 (0.247)	Q3		5.37 (0.652)	Q3		-18.173 (0.357)	Q3	38.835** (0.038)
PR1 2012- inst -2	Q4	18.107 (0.032)	PR1 2012- inst -2	Q4	2.686 (0.883)	PR1 2012- inst -2	Q4	12.582 (0.236)	PR1 2012- inst -2	Q4	-13.038 (0.315)	PR1 2012- inst -2	Q4	17.801 (0.479)	
	Q2	-2.596 (0.655)		Q2	-31.921 (0.254)		Q2	-3.361 (0.884)		Q2	13.012 (0.237)		Q2	-15.907 (0.228)	
	Q3	NEXP		15.128 (0.324)	Q3		-14.058 (0.663)	Q3		14.432 (0.569)	Q3		24.014 (0.089)	Q3	-32.566 (0.210)
	Q4	18.871 (0.241)		Q4	-6.079 (0.854)		Q4	16.539 (0.552)		Q4	35.535* (0.058)		Q4	-54.247 (0.166)	
	Q2	-4.002 (0.743)		Q2	-46.224 (0.225)		Q2	5.437 (0.689)		Q2	4.211 (0.845)		Q2	-53.122 (0.143)	
	Q3	EXP		13.378 (0.106)	Q3		-14.156 (0.503)	Q3		6.129 (0.625)	Q3		12.568 (0.298)	Q3	-15.693 (0.588)
	Q4	11.158 (0.099)		Q4	-9.532 (0.544)		Q4	12.54 (0.303)		Q4	-12.055 (0.285)		Q4	-20.005 (0.482)	
	Q2	NEXP		5.573 (0.262)	Q2		10.191 (0.282)	Q2		2.747 (0.741)	Q2		12.206 (0.126)	Q2	-12.934 (0.510)
PR2 2012- inst -2	Q3	8.251 (0.278)	PR2 2012- inst -2	Q3	21.604 (0.292)	PR2 2012- inst -2	Q3	13.351 (0.211)	PR2 2012- inst -2	Q3	3.211 (0.822)	PR2 2012- inst -2	Q3	-26.366 (0.262)	
	Q4	20.789 (0.227)		Q4	6.003 (0.815)		Q4	11.061 (0.580)		Q4	16.993 (0.164)		Q4	-29.536 (0.309)	
	0.841 0.229	0.981 0.138		0.979 0.137	0.95 0.203		0.947 0.186								
	NaN	NaN		NaN	NaN		NaN								

Wages by qualification

Neither the CICE nor the PR would have had an effect on the wages of workers across all tax groups of companies; the wages of employees would have increased under the effect of the CICE in the tax groups (Q2), while the wages of managers may have increased in the tax groups that benefited the most from the CICE in 2013. Neither the CICE nor the PR would have had any greater effect on the wages of workers, both in exporting and non-exporting tax groups. The same applies to the wages of employees. A positive effect of the CICE in 2013 on the annual salary of executives in the tax groups that benefited the most is found among exporting TGC. Indeed, neither the CICE (in 2013 or 2014) nor the PR (in 2015) would have had an effect on the wages of workers across all tax groups (Table 6a). The wages of employees would have increased under the effect of the CICE in the tax groups in the second quartile of the change in the CICE rate between 2013 and 2014 (Table 6c). The wages of executives may have increased in the tax groups that benefited the most from the CICE in 2013 (Table 6a);

Distinguishing exporting and non-exporting TGF, neither the CICE nor the PR would have had any greater effect on the wages of workers or employees, both in exporting and non-exporting tax groups. A positive effect of the CICE in 2013 on the annual salary of executives is detected in the tax groups that benefited the most, but only among exporting tax groups.

Table 6a. Evaluating the effect of the CICE and PR on wage earnings across tax groups of companies.

Outcome variable			Average wage	Full time average wage	Blue collar wage	Employees' wage	White collar wage
CICE	2013	Q2	1,795	6,937**	4,823	0,091	1,484
			(0,289)	(0,033)	(0,160)	(0,990)	(0,588)
		Q3	3,005**	5,756**	4,477	1,793	-1,95
			(0,046)	(0,023)	(0,135)	(0,654)	(0,598)
		Q4	0,159	7,661	1,359	4,807	7,943*
			(0,933)	(0,305)	(0,697)	(0,499)	(0,069)
	2014	Q2	-0,146	0,043	-2,231	-8,375	7,032
			(0,946)	(0,991)	(0,587)	(0,324)	(0,289)
		Q3	0,374	11,538	-6,491	3,573	-3,687
			(0,895)	(0,207)	(0,180)	(0,401)	(0,398)
		Q4	-6,412*	-12,793	1,729	-13,305	0,313
			(0,089)	(0,070)	(0,729)	(0,203)	(0,978)
Pacte de responsabilité	PR (first part)	Q2	-0,375	0,744	-1,187	2,679	-4,861
			(0,829)	(0,797)	(0,467)	(0,519)	(0,174)
		Q3	0,908	2,829	1,49	4,624	2,49
			(0,476)	(0,371)	(0,196)	(0,266)	(0,396)
		Q4	-0,745	0,67	-1,426	4,101	-4,082
			(0,563)	(0,763)	(0,528)	(0,245)	(0,209)
	PR (second part)	Q2	-6,58	*-26,068*	-1,108	21,87	-9,656
			(0,230)	(0,093)	(0,734)	(0,314)	(0,245)
		Q3	9,123	11,285	-7,295***	-32,302	7,151
			(0,101)	(0,177)	(0,002)	(0,222)	(0,326)
		Q4	-3,731	-6,593	-1,742	17,191	0,597
			(0,377)	(0,380)	(0,567)	(0,283)	(0,937)
Elasticities	CICE 2013	Q2	1,135	4,386**	3,049	0,058	0,938
		Q3	1,475**	2,826**	2,198	0,88	-0,957
		Q4	0,062	2,587	0,533	1,886	3,116*
	CICE 2014	Q2	-0,158	0,047	-3,701	-9,068	7,613
		Q3	0,302	9,311	-5,238	2,883	7,476
		Q4	-0,389	-5,563	0,752	-5,785	0,136
	PR (first part)	Q2	-0,67	1,329	-2,121	-6,91	-8,686
		Q3	0,908	4,53	1,49	4,625	9,023
		Q4	-0,555	0,499	-1,063	3,056	-3,042
Falsification test (1) : 12 inst 09-10	CICE 2013	Q2	-3.433	-4.645	0.213	6.414**	-1.364
			(0.274)	(0.210)	(0.940)	(0.048)	(0.802)
		Q3	-6.488	-7.236	-3.316	5.615	-10.673
			(0.102)	(0.188)	(0.408)	(0.177)	(0.125)
		Q4	-8.103*	-6.596	-4.399	2.506	-1.671
			(0.071)	(0.397)	(0.263)	(0.568)	(0.858)
	PR (first part)	Q2	2.415	4.148	3.856	-5.019	1.620
			(0.428)	(0.260)	(0.265)	(0.189)	(0.811)
		Q3	16.122*	25.238**	8.494	-5.930	32.812**
			(0.053)	(0.018)	(0.341)	(0.588)	(0.031)
		Q4	20.924**	30.560*	6.931	-2.918	17.647
			(0.036)	(0.053)	(0.533)	(0.825)	(0.392)
	PR (second part)	Q2	.005	3.904	-6.072	2.257	-26.232
			(0.999)	(0.563)	(0.408)	(0.621)	(0.275)
		Q3	14.474	24.114*	-2.351	5.119	5.918
			(0.059)	(0.082)	(0.795)	(0.659)	(0.767)
		Q4	16.207**	23.834*	2.263	-7.733	2.479
			(0.036)	(0.053)	(0.823)	(0.390)	(0.902)
Overidentification (2)			.	.	.	.	.
Weak instruments (3)			0.538 (4)	0.536	0.345	0.422	0.435
Number of firms			4100	4100	3321	3885	2802

Sources: BRC (Acos), DADS-FARE (Insee) and MVC (Dgfp).

Scope: 4,102 fiscal groups employing 5 workers or more over, perennial over 2009-2016.

Notes: instrumental variable estimated coefficients (p-value within parentheses). Treatment variables: quartiles of apparent CICE tax credit rate in 2013, of its variation between 2013 and 2014 in 2014; quartiles of the PR1 (resp. PR2) payroll tax cuts in 2015 (resp. in 2016). (1) Falsification (placebo) test in 2012 for overall firm average wage, in 2011 for socio professional category. (2) H0: (instruments are not correlated with the error term). (3) H0: (instruments are not correlated with the treatment). Instruments: quartiles of simulated treatment using past total firm payroll (years 2010 and 2011). Dependent variables of estimated equations are in differences in logarithms of the considered outcome variable. (4) Highest p-value maximum for excluded instruments (first stage of instrumental variables estimation). In bold: significant coefficients, at a 5 percent or smaller than 5 percent level. ***, ** and * : significant coefficient at a 1, 5 or 10 percent levels.

Reading: In 2013, in fiscal groups from the third quartile of the apparent CICE rate, the increase in wages of blue collar workers is 4.477 percentage points greater than in the fiscal groups from the first quartile; the difference is not significant. The corresponding elasticity is 2.198 and relate the estimated coefficient to the corresponding value of the difference in average apparent rate between the 3rd and 1st quartile of the apparent PR rate distribution. For 2013, in fiscal groups, the average levels of apparent CICE rates are 1.44 in the first quartile, 3.02 in the second, 3.48 in the third and 3.99 percent in the last.

Table 6d. Evaluating the effect of the CICE and PR on wage earnings across tax groups of companies. Sample: 2004-2016. Distinguishing exporting from non exporting tax groups of companies.																							
Coefficients				Coefficients				Coefficients				Coefficients				Coefficients							
Average wage (inst 2010-2011)				Full time average wage (inst 2011-2012)				Blue collars (inst 2010-2011)				Employees' wage (inst 2010-2011)				White collar wage (inst 2010-2011)				White collar wage (inst 2011-2012)			
CICE 2013				2013				2013				2013				2013				2013			
Q2				Q2				Q2				Q2				Q2				Q2			
0.844				1.564				3.209				-2.141				-2.631				-2.130			
(0.575)				(0.454)				(0.232)				(0.474)				(0.497)				(0.686)			
Q3				Q3				Q3				Q3				Q3				Q3			
1.415				1.413				1.978				-2.288				-2.288				-4.436			
(0.692)				(0.452)				(0.320)				(0.435)				(0.967)				(0.479)			
Q4				Q4				Q4				Q4				Q4				Q4			
-2.007				-1.169				1.272				-5.347				-5.347				1.034			
(0.655)				(0.957)				(0.756)				(0.478)				(0.799)				(0.521)			
Q2				Q2				Q2				Q2				Q2				Q2			
-0.078				-1.281				-0.578				2.854				-3.999				-5.661			
(0.972)				(0.542)				(0.865)				(0.632)				(0.391)				(0.795)			
Q3				Q3				Q3				Q3				Q3				Q3			
-0.078				2.499				1.107				-3.378				7.987				8.193			
(0.569)				(0.274)				(0.757)				(0.217)				(0.212)				(0.311)			
Q4				Q4				Q4				Q4				Q4				Q4			
3.709				2.857				-0.339				5.885				4.953				-1.192			
(0.130)				(0.163)				(0.926)				(0.159)				(0.758)				(0.311)			
Q2				Q2				Q2				Q2				Q2				Q2			
-1.907				-2.085				-2.249				5.936				-5.303				-6.650			
(0.476)				(0.286)				(0.647)				(0.234)				(0.256)				(0.200)			
Q3				Q3				Q3				Q3				Q3				Q3			
-12.594				-1.495				0.097				28.304				2.514				2.522			
(0.247)				(0.665)				(0.986)				(0.215)				(0.866)				(0.680)			
Q4				Q4				Q4				Q4				Q4				Q4			
5.647				-1.386				-5.324*				-36.219				-11.540				-10.657			
(0.542)				(0.662)				(0.096)				(0.307)				(0.386)				(0.336)			
Q2				Q2				Q2				Q2				Q2				Q2			
4.561				-2.325				0.001				-15.076				0.153				4.325			
(0.677)				(0.649)				(1.000)				(0.508)				(0.992)				(0.531)			
Q3				Q3				Q3				Q3				Q3				Q3			
6.92				0.321				-0.066				2.545				7.446				8.403			
(0.226)				(0.937)				(0.987)				(0.807)				(0.409)				(0.407)			
Q4				Q4				Q4				Q4				Q4				Q4			
-14.488**				-3.263				-2.104				-2.503				-3.694				1.956			
(0.639)				(0.496)				(0.694)				(0.796)				(0.708)				(0.688)			
Q2				Q2				Q2				Q2				Q2				Q2			
2.483				2.796				-4.002**				-4.181				1.851				1.869			
(0.236)				(0.187)				(0.002)				(0.283)				(0.595)				(0.311)			
Q3				Q3				Q3				Q3				Q3				Q3			
2.157*				1.044				-4.137**				-0.142				-0.937				-0.926			
(0.695)				(0.407)				(0.017)				(0.843)				(0.843)				(0.645)			
Q4				Q4				Q4				Q4				Q4				Q4			
-1.556				-1.459				-1.273				-1.483				-1.483				-4.645			
(0.395)				(0.333)				(0.255)				(0.785)				(0.616)				(0.630)			
Q2				Q2				Q2				Q2				Q2				Q2			
2.248*				1.671				-1.192				-4.106				2.39				2.301			
(0.690)				(0.178)				(0.515)				(0.260)				(0.410)				(0.392)			
Q3				Q3				Q3				Q3				Q3				Q3			
1.116				0.437				-0.371				4.181				4.181				4.238			
(0.382)				(0.766)				(0.886)				(0.695)				(0.283)				(0.277)			
Q4				Q4				Q4				Q4				Q4				Q4			
1.72				1.706				-1.467				-0.791				-0.942				-0.856			
(0.268)				(0.262)				(0.099)				(0.499)				(0.186)				(0.190)			
Q2				Q2				Q2				Q2				Q2				Q2			
2.67				2.786				-2.275				-4.434				-30.385				-30.788			
(0.138)				(0.390)				(0.441)				(0.636)				(0.525)				(0.521)			
Q3				Q3				Q3				Q3				Q3				Q3			
2.591				-0.233				-2.152				-2.004				20.586				20.683			
(0.123)				(0.892)				(0.479)				(0.314)				(0.314)				(0.316)			
Q4				Q4				Q4				Q4				Q4				Q4			
-0.717				-1.059				-1.271				-4.485				-4.485				-12.516			
(0.616)				(0.420)				(0.503)				(0.686)				(0.157)				(0.150)			
Q2				Q2				Q2				Q2				Q2				Q2			
-0.196				-2.930				-1.687				1.357				20.324				20.606			
(0.913)				(0.199)				(0.662)				(0.339)				(0.450)				(0.448)			
Q3				Q3				Q3				Q3				Q3				Q3			
3.268				3.669*				2.260				12.925				14.190				14.794			
(0.690)				(0.059)				(0.107)				(0.869)				(0.389)				(0.392)			
Q4				Q4				Q4				Q4				Q4				Q4			
-0.576				-2.483*				1.516				2.992				4.178				4.034			
(0.706)				(0.093)				(0.632)				(0.478)				(0.662)				(0.673)			
Elasticities				Elasticities				Elasticities				Elasticities				Elasticities				Elasticities			
CICE 2013				2013				2013				2013				2013				2013			
Q2				Q2				Q2				Q2				Q2				Q2			
0.527				0.977				2.005				-1.338				-1.644				-1.331			
Q3				Q3				Q3				Q3				Q3				Q3			
0.463				0.697				-0.972				-1.967				-2.571				-2.19			
Q4				Q4				Q4				Q4				Q4				Q4			
-0.055				-0.066				-0.385				-1.899				-2.661				-2.432			
Q2				Q2				Q2				Q2				Q2				Q2			
-0.052				0.839				0.545				-1.664				3.936				4.333			
Q3				Q3				Q3				Q3				Q3				Q3			
-0.038				1.231				-0.135				2.738				0.779				0.475			
Q4				Q4				Q4				Q4				Q4				Q4			
1.479				-2.175				-0.513				10.367				5.676				6.938			
CICE 2014				2014				2014				2014				2014				2014			
Q2				Q2				Q2				Q2				Q2				Q2			
-0.02				-1.152				0.075				21.806				1.987				3.301			
Q3				Q3				Q3				Q3				Q3				Q3			
-9.702				-0.282				-0.479				-2.004				20.586				20.683			
Q4				Q4				Q4				Q4				Q4				Q4			
2.372				-1.152				-2.386*				-15.212				-4.847				-6.486			
Q2				Q2				Q2				Q2				Q2				Q2			
6.201				-3.161				0.001				-20.497				0.208				-10.995			
Q3				Q3				Q3				Q3				Q3				Q3			
1.692				-0.231				-0.068				2.345				7.446				8.403			
Q4				Q4				Q4				Q4				Q4				Q4			
-7.04				-1.483				-1.271				-4.485				-4.485				-12.516			
PR1 (first pair)				2015				2015				2015				2015				2015			
Q2				Q2				Q2				Q2				Q2				Q2			
4.472				5.036				-4.017**				-7.537				3.334				3.366			
Q3				Q3				Q3				Q3				Q3				Q3			
2.165*				1.048				-4.153**				-0.143				-0.941				-0.929			
Q4				Q4				Q4				Q4				Q4				Q4			
-1.185				-1.264				-2.329				-0.776				-3.705				-3.539			
Q2				Q2				Q2				Q2				Q2				Q2			
3.912*				0.396				-0.368				0.045				4.144				4.712			
Q3				Q3				Q3				Q3				Q3				Q3			
1.106				0.396				-1.08				-0.583				-0.694				-0.63			
Q4				Q4				Q4				Q4				Q4				Q4			
1.332				1.256																			
Falsification tests				Falsification tests				Falsification tests				Falsification tests				Falsification tests				Falsification tests			
2012 inst-2				2012 inst-2				2012 inst-2				2012 inst-2				2012 inst-2				2012 inst-2			
Q2				Q2				Q2				Q2				Q2				Q2			
-15.943				0.028				-5.638				9.737				-3.995				-0.947			
Q3				Q3				Q3				Q3				Q3				Q3			
0.160				(0.993)				(0.773)				(0.446)				(0.482)				(0.581)			
Q4				Q4				Q4				Q4				Q4				Q4			
-16.902				-2.599				-2.503				24.023				2.444				2.422			
CICE				CICE				CICE				CICE				CICE				CICE			
Q2				Q2				Q2				Q2				Q2				Q2			
-0.223				(0.589)				(0.783)				(0.444)				(0.716)				(0.621)			
Q3				Q3				Q3				Q3				Q3				Q3			
-2.043				-1.971				-11.735				30.917				-9.621				-9.621			
Q4				Q4				Q4				Q4				Q4				Q4			
0.261				(0.755)				(0.713)				(0.299)				(0.776)				(0.776)			
Q2				Q2				Q2				Q2				Q2				Q2			
27.535				9.873				28.180				0.297				0.961				0.961			
Q3				Q3				Q3				Q3				Q3				Q3			
36.489				(0.280)				(0.640)				(0.929)				(0.360)				(0.360)			
Q4				Q4				Q4				Q4				Q4				Q4			
0.172				13.466*				17.862				-24.273				20.959				20.959			
PR1 2012- 'inst-2				PR1 2012- 'inst-2				PR1 2012- 'inst-2				PR1 2012- 'inst-2				PR1 2012- 'inst-2				PR1 2012- 'inst-2			
Q2				Q2				Q2				Q2				Q2				Q2			
37.402				17.994**				19.759				-24.262				28.039				28.039			
Q3				Q3				Q3				Q3				Q3				Q3			
0.161				(0.631)				(0.686)				(0.450)				(0.513)				(0.513)			
Q4				Q4				Q4				Q4				Q4				Q4			
5.037				2.594				-1.406				-0.046				-26.031**				-26.031**			
CICE				CICE				CICE				CICE				CICE				CICE			
Q2				Q2				Q2				Q2				Q2				Q2			
-0.606				(0.593)				(0.472)				(0.723)				(0.629)				(0.629)			
Q3				Q3				Q3				Q3				Q3				Q3			
25.685*				6.942				18.852				-6.271				10.207				10.207			
Q4				Q4				Q4				Q4				Q4				Q4			
0.191				(0.933)				(0.633)				(0.443)				(0.653)				(0.653)			
Q2				Q2				Q2				Q2				Q2				Q2			
22.982				-0.814				12.582				-27.129				45.551				45.551			
PR1 2012- 'inst-2				PR1 2012- 'inst-2				PR1 2012- 'inst-2				PR1 2012- 'inst-2				PR1 2012- 'inst-2				PR1 2012- 'inst-2			
Q3				Q3				Q3				Q3				Q3				Q3			
0.444				(0.963)				(0.810)				(0.496)				(0.547)				(0.547)			
Q4				Q4				Q4				Q4				Q4				Q4			
7.183				-3.005				-27.560				20.702				17.258				17.258			
Q2				Q2				Q2				Q2				Q2				Q2			
0.682				(0.792)				(0.573)				(0.740)				(0.790)				(0.790)			
Q3				Q3				Q3				Q3											

7. Discussion

7.1. Independent firms

7.1.1. Employment

Summary

Both CICE and PR have positive effects on employment for firms that benefit most, either in 2013, 2014 or 2015. These effects are more pregnant for exporting firms (and no effect for non-exporting firms in 2013 and 2015). They are also greater for CICE in 2014 than for PR in 2015, and in PR in 2015 than for CICE in 2013.

CICE benefit to both FTC and OEC in 2013, but only to OED in 2014; PR to both OEC and FTC in 2015. The positive impacts of the CICE and PR on OEC and FTC would have benefitted more to exporting than to non-exporting firms. Blue collar workers benefit from both CICE and PR, employees only from PR and executives only from CICE. For blue-collar workers, we have a greater positive sensitivity of employment to PR in exporting firms. The same holds for employees and PR (but still no effect for CICE). It is the contrary for executives as to both CICE and PR.

Explanations

The positive impact of CICE and PR policies on overall employment is consistent with (theoretical) expected effects and with “most” empirical articles. This result is obtained in spite of salience (Chetty, 2011; Chetty et al., 2009) in the case of CICE, *i.e.* to what extent the CICE is perceived by firms as a reduction in labor cost. A more important impact of exporting firms than for other firms is found because not any firm abroad benefit from such a policy, contrary to what happens in France where almost all companies benefit from it. Moreover, competitiveness is more of a topic for export-oriented companies, which are more frequently involved in the manufacturing sector.

A priori PR should be more effective than CICE because it is a more targeted device (decreasing with low and medium wages) and more direct than CICE. However, the effects of the CICE pass through several channels (financial, labor costs, profit margins), and the amount of financial aid available to businesses is more substantial.

As to labor contracts, results were expected because. Indeed, in 2012-2013, the CICE was a measure considered temporary (lasting one year?), thus inducing an impact of the policy on FTC only in 2013. Moreover, as for overall employment, the greater sensitivity of OEC and FTC in exporting firms to both the CICE and PR is not surprising because of international competition and the fact foreign firms did not benefit from any kind of such policy.

For socio-professional categories, and considering all kinds of firms, blue collar benefit more often from both CICE and PR, than employees (PR) or executives (CICE). Blue collar workers are more concerned with low or medium wages (smaller than 1.6 or 2.5 times the minimum wage). Besides, blue-collar workers are more often employed in manufacturing firms that export more often and are more often concerned with more targeted policies like the PR.

7.1.2. Wages

Summary

The CICE has a positive impact only in 2013 (in the companies that benefited most), while the PR had no effect. CICE would have benefited exporting companies more, while the PR benefited only exporting companies. Moreover, only the CICE would have positively impacted annual wages for workers and employees, whereas both CICE and PR increase wages for

executives. These effects would be more due for exporting firms for blue-collar workers; the contrary holds for white collar workers.

Mechanisms / explanations

The positive impact of CICE on wages was expected (second channel) and the fact it was observed in 2013 may be linked to the fact that this year the CICE was considered temporary at this time, and thus perhaps less costly than increasing employment in 2013 and years after. The no effect of PR may be linked to the fact PR is a PTR and thus a policy aiming directly at reducing labor cost. A greater impact on exporting firms is due to the fact they are more sensitive to policies that aim at improving competitiveness, all the more than foreign firms did not benefit from such policy. As such, PR increase wages only in exporting companies.

Besides, CICE and PR increase wages only for executives who have the greater bargaining power. CICE also induces increase in wages for both workers and employees, more in exporting firms than in others, maybe because both kinds of workers are more concerned.

7.2. Tax groups of companies

7.2.1. Employment

Summary

No impact on employment of both CICE or PR was detected. This holds also if distinguishing exporting or non-exporting tax groups of companies.

Otherwise, the CICE had a positive impact on the employment of fixed-term contracts only 2013 (in particular in most benefiting). The PR would also have increased this kind of employment. This effect only holds for exporting firms. No effect of both CICE and PR was detected on OEC, whatever the considered kind of TGC. As to socio-professional categories, there is a positive effect of CICE on employment for blue collar workers in 2013 and 2015 (respectively), for the most benefiting TGC; the effect of CICE is greater for exporting TGC than for non-exporting ones. For employees and executives, no effect of CICE and the PR was detected across all tax groups and in both exporting and non-exporting tax groups.

Mechanisms / explanations

This absence of any effect of both CICE and PR on overall employment may be explained as follows. First, to build tax groups of companies, we consider only perennial firms for perennial groups over the period under consideration, so to avoid endogeneity to the policy of an increase in size of the TGC. Thus we get rid of some information that may explained this results. We also exclude from our analysis all TGC that contain at least one foreign firm. Second, within a group, only one company reports the CICE credit, which is then used for various purposes depending on the group's strategy and does not necessarily benefit one of the companies whose workforce is highly eligible for the CICE (many workers earning less than 2.5 times the minimum wage). Third, increasing employment through CICE and PR is not necessarily the goal of TGCs. Fourth, this may hold also if distinguishing exporting or non-exporting tax groups of companies.

In spite of this limitations or differences in strategies for TGC, some categories of employment would have positively been impacted by CICE or PR. This is particularly the case for people employed on fixed-term contracts, exclusively in 2013, at a time when the sustainability of the CICE was not yet guaranteed. As expected, these effects should be credited solely to exporting tax groups, which are more sensitive to measures aimed at improving competitiveness than others. Like for independent firms, CICE positively affects employment of blue-collar workers

in 2013 and 2015 (respectively), for the most benefiting TGC, and still greater for CICE in exporting TGC.

7.2.2. Wages

Summary

No impact of both CICE and the PR was detected on average wages. However, there is a positive effect of the CICE for exporting tax groups (Q2), and for non-exporting tax groups (Q3).

Indeed, neither the CICE nor the PR would have had an effect on the wages of workers across all tax groups; the wages of employees would have increased under the effect of the CICE in the tax groups (Q2), while the wages of managers may have increased in the tax groups that benefited the most from the CICE in 2013. Finally, neither the CICE nor the PR would have had any greater effect on the wages of workers, both in exporting and non-exporting tax groups. The same applies to the wages of employees. A positive effect of the CICE in 2013 on the annual salary of executives in the tax groups that benefited the most is found among exporting TGC.

Mechanisms / explanations

Like for whole employment, no effect at all was detected for both CICE and PR. However, there is a positive effect of the CICE for exporting tax groups, where competitiveness is more matter than for other groups.

Besides, contrary to independent firms, no effect on the wages of workers across all TGC was found. As for independent firms, wages of managers may have increased in the tax groups that benefited the most from the CICE (but not the PR) in 2013.

Unlike in independent firms, not any impact of CICE nor the PR on the wages of workers or employees (both in exporting and non-exporting tax groups) was found. There was a positive effect of the CICE in 2013 on the annual salary of executives in the tax groups that benefited the most is found among exporting TGC, contrary to what happens with independent firms.

8. Conclusion

In this paper, we ask the following question. Does improving competitiveness matter to boost employment and increase wages?

To answer the question, we exploit the natural experiment from France, where the CICE and PR policies were implemented to improve competitiveness over 2013-2016. Indeed, in a context of a slowdown in price-competitivity for French firms, while labor cost is large and employment sluggish after the subprime crisis, these two large-scale measures were adopted in 2012 by the French President François Hollande. We focus on evaluating the impact of these CTC and PTR policies, distinguishing exporting from non-exporting firms. To proceed, we consider differences-in-differences-in-differences estimators combined with instrumental variables models.

We found that improving competitiveness allows to increase employment, and more particularly in exporting firms, to increase wages and to show incidence partly in favor of labor. Indeed, both the CICE corporate tax cut and the additional payroll tax reduction introduced with the PR impact positively employment and wages, in firms that most benefit from each policy. CICE is often more efficient than PR. Overall employment effects benefit more particularly to unskilled workers or workers with permanent labor contract, whereas wage

effects more often to skilled workers (executives). Exporting firms are more positively impacted by CICE and PR than non-exporting firms. Independent firms are more concerned with employment effects, whereas tax groups of companies are more concerned with wages increases.

So far, in this article, we do not consider multinational corporations (MNCs). It is not possible because of a lack of information: to proceed, it would be necessary to have access to the consolidated financial statements of multinational corporations, encompassing those of all the multinational's companies, whether located in France or abroad. However, and for instance, in a recent study, Overesch *et al.* (2023) consider the 2017 US tax reform (Tax Cuts and Job Act) to show that the effect is in particular more pronounced for MNCs with a high share of domestic activity. Thus, it may be of interest to also focus on MNCs while analyzing the effect of a CTC and or a PTR.

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