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Jozef Konings, Cathy Lecocq and Bruno Merlevede

**INTERNATIONAL TRADE AND  
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JEL Classification: F21, F23, H25

Keywords: Foreign direct investment, Multinational Enterprises, Tax policy, employment

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## *Abstract*

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## I. Introduction

During the last few decades, most countries have gone through an intensified process of economic integration resulting in increased trade flows and growing internationalization of the production process. An important part of these global value chains has been the rise in foreign investments by multinational enterprises (MNEs): increasingly, firms choose to locate production, head offices, R&D activities and sales across multiple countries. As a result, an increasing part of a country's employment and output is accounted for by MNEs. It is therefore not surprising that governments engage in various policy initiatives, such as tax credits and subsidies, to attract MNEs (Hines, 2007) and jobs that come with them. Whether or not these financial incentives are justified depends on the social returns of foreign direct investment (FDI), for instance whether technological spillovers to domestic firms take place, or whether new jobs are being created which would not have been created in the absence of FDI.

In this paper, we study the impact of such a tax credit. In particular, we analyze the impact of the 'notional interest deduction' (NID) on employment decisions of foreign MNEs in Belgium. The NID is an 'allowance for corporate equity' (ACE) which allows companies subject to Belgian corporate income tax to deduct from their taxable income an interest that is calculated on the company's equity. The NID lowers the effective corporate tax rate of firms and therefore provides a higher after-tax return on capital-intensive investments in Belgium. Previous research on the impact of the NID has focused on its impact on the capital decisions of firms and indicate that the NID has been successful in reducing the indebtedness of Belgian firms, especially among the largest firms (e.g. Panier et al., 2013; Hebous and Ruf, 2015). This deleveraging process of firms may be important, in particular in the aftermath of the financial crisis of 2007-2008, which was characterized by high corporate debts ratios in the financial sector but also in other non-financial corporations. Recently, there has been a renewed political interest in ACE systems: in October 2016, when relaunching the idea of the Common Consolidated Corporate Tax Base (CCCTB), the European Commission also proposed to reward equity financing in order to remove the current debt bias in taxation systems and stimulate growth, jobs and investment in Europe<sup>2</sup>. Also Switzerland and Denmark are now considering to introduce corporate tax reforms allowing a deduction for equity.

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<sup>2</sup>[http://ec.europa.eu/taxation\\_customs/business/company-tax/common-consolidated-corporate-tax-base-ccctb\\_en](http://ec.europa.eu/taxation_customs/business/company-tax/common-consolidated-corporate-tax-base-ccctb_en)

In 2006, the NID was introduced by the Belgian tax authorities to provide an attractive and internationally accepted corporate tax system that compensated for the discontinuation of the favorable tax regime for coordination centers. The coordination center regime (described in the appendix of the paper) had been very successful in attracting multinational enterprises to Belgium, but had to be abandoned following an EC ruling of state aid in 2003. The adoption of the NID in 2006 can be seen as an unexpected and thus exogenous policy change following the negative decision adopted in 2003 by the EC for the Belgian coordination center regime.

In contrast to previous research, this paper looks at the employment -not the equity<sup>3</sup>- effects of the NID and focusses on MNEs in Belgium, given that an important goal of the NID was to keep and attract foreign jobs to Belgium. Our methodological approach consists of a difference-in-difference estimation (DiD): we compare the evolution of employment in Belgian affiliates with the employment of French affiliates belonging to the same multinational group to analyze whether the introduction of the NID had an impact on the employment decisions of these MNEs, and hence on FDI, in Belgium. Our approach also allows to control for affiliate fixed effects that do not change over time, such as the average size of the affiliate, its sector and the institutional context of the country in which it operates. Our control group is particularly well chosen as affiliates of the same MNE active in neighboring countries arguably operate in very similar markets and are under control of the same corporate management and culture. In addition, in the period under study, from 2003 to 2008, the evolution of the institutional context in France, measured in terms of labor costs and corporate income taxation, follows most closely the Belgian situation, with the only important difference being the introduction of the NID in 2006 for the affiliates operating in Belgium. It is therefore reasonable to assume that existing affiliates in Belgium and neighboring countries belonging to the same multinational group are competing for the same investments from the parent firm. Hence, the introduction of the NID system may trigger different behavior in allocating equity across affiliates with potentially real effects on employment growth.

Our difference-in-difference analyses provide evidence that the tax scheme has increased employment in Belgian affiliates by about 7 percent over the period 2006-2008, relative to French affiliates. Our paper extends previous research (Panier et al., 2013, Van Campenhout & Van Caneghem 2013, Laveren & Van Sweevelt, 2008) on the impact of the NID in Belgium, and, more generally on the impact of corporate taxation systems on FDI, in some important

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<sup>3</sup> Although we replicate and confirm earlier research that found effects on the equity in foreign firms.

ways. First, it focuses on employment effects with a focus on the intensive margin, while previous studies looked at the impact of the NID on the equity and capital structure of firms. Our paper also considers a longer time frame after the introduction of the NID than most studies do and show that the employment effect of the NID persists over time. Second, the paper specifically focuses on MNEs and shows that the NID has been of particular importance for the job creation activities of foreign MNEs active in Belgium immediately after the introduction of the NID. As such, the paper also contributes to the wider (FDI) literature on taxation. While there is ample evidence on the relationship between FDI spillovers and productivity (e.g. Javorcik, 2003; Damijan, et al. 2013), this paper looks at the direct employment effects of a specific and unique tax credit. A number of papers have analyzed the response of FDI to differences in corporate taxation across and within countries. However, the focus of these studies is on the location choice of foreign subsidiaries -the extensive margin- (Barrios et al., 2012; Becker et al., 2012), the relocation of taxable income of multinationals operating in high-tax countries to tax havens (Gumpert et al., 2016), or the impact of a tax reform on the investment decisions (fixed assets) of foreign affiliates (Egger et al., 2015), but not on the employment in foreign subsidiaries. Most studies also look at differences in taxation across multiple countries or regions, but not to changes in taxation. However, in order to be able to infer causal effects from taxation, one needs sufficient and exogenous variation in corporate tax rates (see e.g. Fuest et al., 2018). Moreover, simultaneous changes in corporate tax rates and the corresponding tax base, blurs the effects of how international tax competition affects employment and FDI in general<sup>4</sup>. In particular, the overall tax burden of firms is impacted by additional tax deductions, exclusions and tax credits, which advanced economies typically offer to corporates (see Hines, 2017). In contrast, this paper exploits an unexpected introduction of a tax credit in Belgium in response to a policy decision of the European Commission and compares the employment of foreign affiliates in Belgium with the affiliates of the same MNEs in France. As such, our methodological approach can be seen as a quasi-natural experiment.

The remainder of this paper is structured as follows. In section II, we describe the institutional context in Belgium and neighboring countries at the time when the NID was introduced in Belgium and we present our sample of Belgian and French affiliates. Section III

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<sup>4</sup>Devereux and al. (2002) show that the tax-cutting and base-broadening reforms that countries in the EU and G7 countries implemented in the early 1980s to the late 1990s, have left the effective tax rate on marginal investment of firms, fairly unchanged.

describes the empirical framework of the paper. Main results are presented in section IV, while robustness tests are shown in section V. The last section concludes the paper.

## II. Institutional context and data

### A. *Labor cost and tax reforms in Belgium and neighboring countries*

Production along global supply chains and the increase in FDI imply that MNEs may easily (re)locate (part of) their production and distribution facilities to regions that become more cost-competitive, hence affecting jobs in multinational affiliates. Investment decisions of MNEs are typically triggered by a number of factors. The most important one tends to be the proximity to the market, but also the costs of production, including labor costs and taxation (e.g. Hanson et. al., 2005), are factors that can make a difference at the margin.

Studies of Konings and Murphy (2006) and Muendler and Becker (2010) show how employment in affiliates of MNEs is affected by the relative difference in labor costs between the affiliates. They find that MNEs expand employment in affiliates with lower wage costs that have similar human capital<sup>5</sup>. Javorcik and Spatareanu (2005) provide evidence that the likelihood of multinationals to invest in a country as well as the volume of FDI, also depends on the flexibility of the labor market of the host country in terms of hiring and firing practices and the strength of employment protection legislation.

Studies have shown that also taxation is an important determinant to attract FDI and hence the jobs that are associated with it. Devereux and Griffith (1998) find that changes in corporate income tax rates have an important impact on the capability of countries to attract employment from MNEs. Hence, governments not only take into account that FDI is potentially affected by labor cost competition, but also by tax competition.

To analyze whether the introduction of the NID had an impact on the employment decisions of foreign MNEs, and hence on FDI, in Belgium, we compare the evolution of employment in Belgian affiliates with the employment of French affiliates belonging to the same multinational group. Affiliates of MNEs active in neighboring countries can be considered as a good control group for the evolution of employment in Belgium as they operate in similar markets. The financial reporting requirements for firms in France are most similar to the requirements in Belgium, making French affiliates, from a data perspective, the better candidate for this study

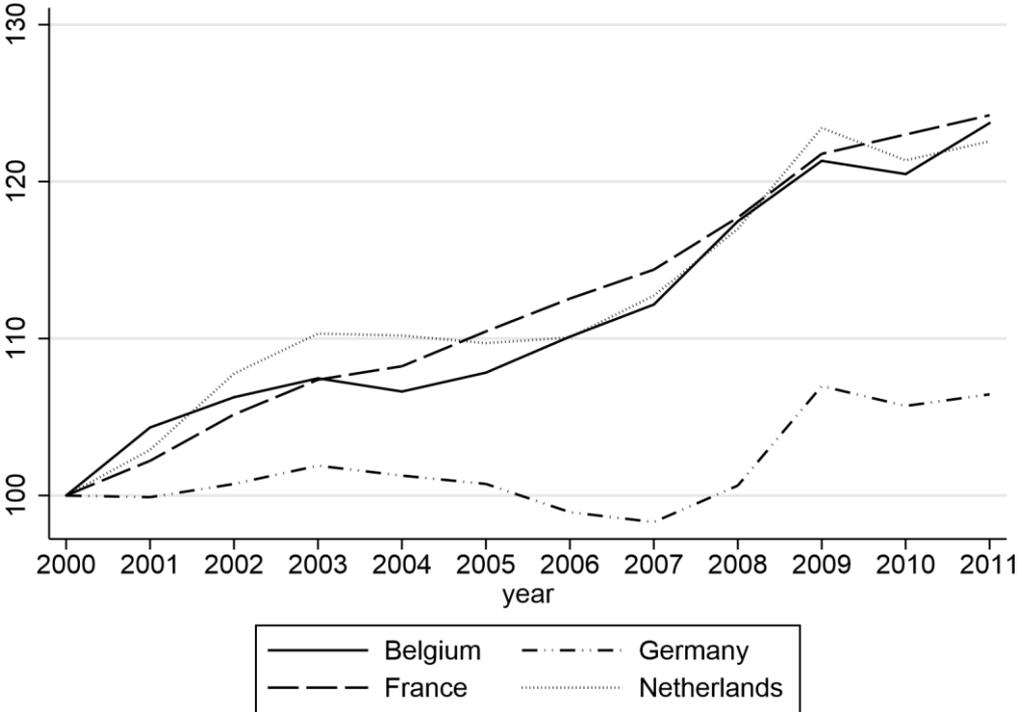
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<sup>5</sup> For example, employment in a Belgian affiliate will respond more to a decrease in wage costs in the Netherlands compared to a similar decrease in wage costs in Poland, because human capital in Belgium and in the Netherlands are more similar.

as compared to the German and Dutch affiliates that are subject to less stringent financial reporting in their respective country of operation. In addition, in the period under study, from 2003 to 2008, the evolution of the institutional context in France, measured in terms of labor costs and corporate income taxation, follows most closely the Belgian situation, as illustrated in the Figures 1 to 3.

Figure 1 shows the unit labor cost - the labor cost to produce one unit of value added - for Belgium and its neighboring countries since 2000. Broadly, the evolution of the unit labor cost in Belgium since 2000 is similar to France and the Netherlands, but different in Germany, reflecting the consequences of the Hartz reforms in the early years 2000. In the period immediately before and after the introduction of the NID, however, the growth rate of the labor costs in France follows most closely the growth rate in Belgium: the evolution of the labor cost runs almost parallel in Belgium and France for the years 2004-2007. In the Netherlands, in contrast, the year 2006 is characterized by a sudden increase in labor cost after a 3 years of almost constant labor costs.

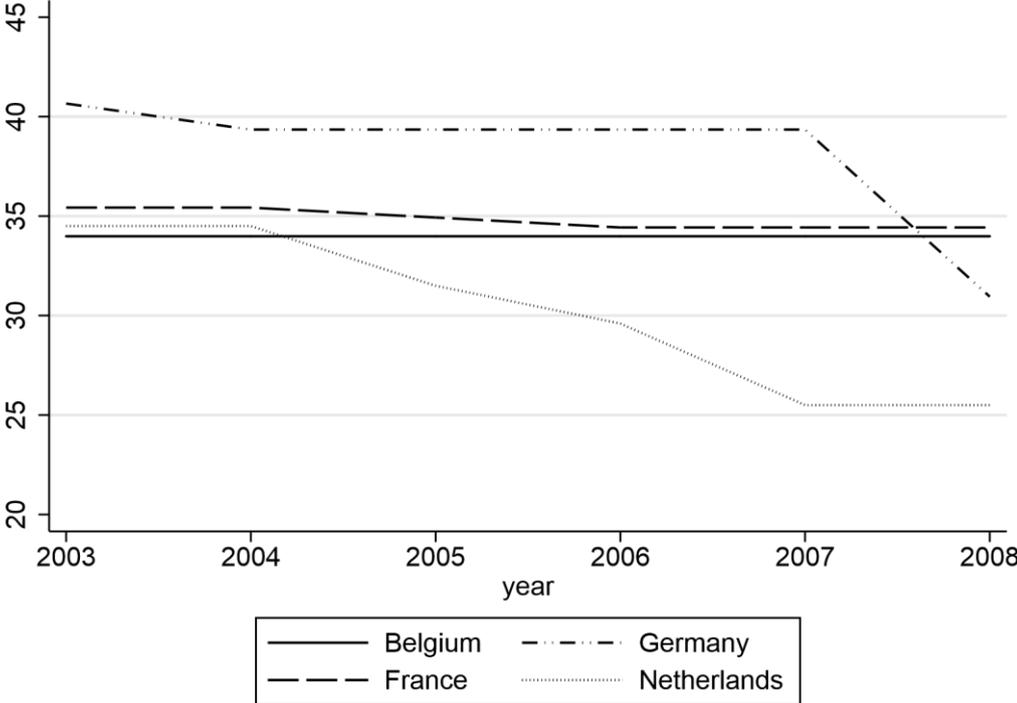
*Figure 1: Evolution of the Unit Labor Costs (ULC) in Belgium, France, Germany, and the Netherlands (2000-2011)*



Source: Eurostat (2016)

Figure 2 illustrates the evolution of the statutory tax rate (STR) on the corporates' income for the period 2003-2008 for the same set of countries. In Belgium and France the STR was very similar (approximately 35%). More importantly for our difference-in-difference analyses, the STR did not change in France nor in Belgium in the period of interest, while in Germany and in the Netherlands the STR substantially reduced, pointing to some major institutional changes in those countries in terms of corporate income taxation.

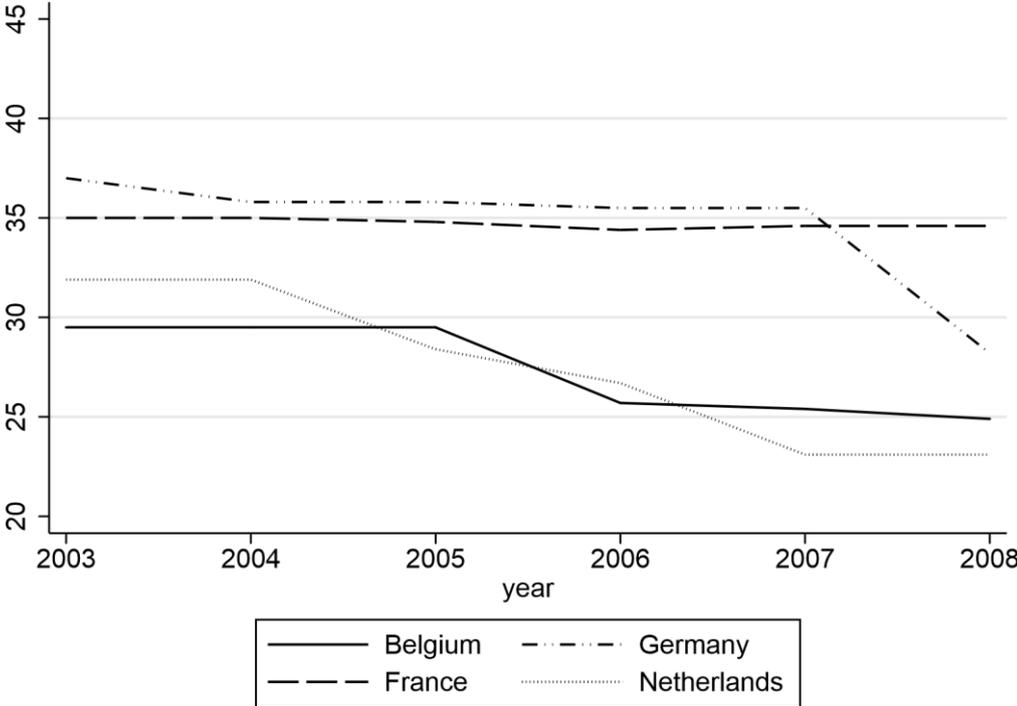
Figure 2: Evolution of the statutory tax rates (STR) in percentage (2003-2008)



Source: EU Taxation Database

Next, Figure 3 shows the evolution of the effective average tax rate (EATR) in Belgium, France, Germany and the Netherlands for the period 2003-2008. The EATR (see also Devereux and Griffith methodology, 1999) is the average tax rate on the returns from investments, taking into account the statutory corporate income tax rate, investment subsidies and adaptations to the tax base such as the notional interest deduction. Consequently, it is often used to measure the attractiveness of a country instead of the statutory tax rate (STR). In their paper, Devereux and Griffith (1998) use the effective average tax rate (EATR) to study the location choices of firms. For Belgium, we observe from Figure 3, a substantial reduction of the EATR from 29.5% in 2005 to 25.7% in 2006 as a result of the introduction of the NID. Over the period 2003-2008, there are no other changes in the EATR in Belgium, while the EATR in both the Netherlands and Germany shows a large decrease mainly driven by the reduction in the STR (see Figure 2). The EATR in France remains stable over the entire period 2003-2008, making the French affiliates of MNEs the most appropriate control group to study the impact of the NID on Belgian affiliates.

Figure 3: Evolution of effective average tax rates (EATR) in percentage (2003-2008)



Source: EU Taxation Database

Within Europe (EU-15), only three other countries - Ireland, Sweden and the United Kingdom - did not change their corporate income tax in the period 2003-2008. However, other adaptations of the tax base did affect the EATR in Sweden and the United Kingdom, leaving only Ireland as a possible candidate for the DID estimation. In our robustness section, we will therefore use Ireland to do a placebo exercise.

It should be noted that in the longer period 2000 to 2011, Belgian and French authorities did introduce a number of reforms that affected the effective tax rate of (some) firms. In 2003, the Belgian authorities reduced the corporate income tax from 40.19 percent to 33.99 percent. The tax reduction was accompanied by a broadening of the tax base. In France, the corporate income tax rate gradually lowered from 40.0 to 35.43 percent between 1999 and 2002 as a consequence of the reduction of the social surcharges. Above tax reforms are affecting all firms in France and Belgium alike, but their implementation took place outside the immediate period before or after the introduction of the NID. To avoid possible interference in our analyses, our main analyses will therefore focus on the period 2003-2008, but include the analyses over the whole period 2000-2011 by way of extension.

In the years 2000, like in many other countries, tax reductions were introduced in Belgium and in France to stimulate R&D activities and R&D investment of firms. In Belgium, a wage subsidy for R&D workers was introduced in 2005, reducing the withholding tax on labor income of R&D workers by 25 to 50 percent. The Belgian government also introduced a patent box regime in 2007, called the Patent Income Deduction (PID) and applicable from 2008 onwards. In France, a patent box regime was already in place since 2001. In 2008, the French R&D tax system, called the Crédit d'Impôt de Recherche (CIR), underwent large changes. It is clear that these measures do not affect all firms, but only those firms active in R&D and / or firms applying for patents.

In 2005, the Belgian government also introduced the “excess profit” tax scheme, allowing MNEs to discount profits resulting from being part of an international group from their tax base. At least 35 MNEs benefitted from the scheme, allowing them to strongly reduce their tax base. In January 2016, the European Commission concluded that the “excess profit” scheme gives a

preferential tax treatment to multinational companies, is therefore illegal under EU state aid rules and had to be abandoned <sup>6</sup>.

Although the tax deductions resulting from the “excess profit ruling” and the R&D tax incentives may be substantial, they only impact specific firms and therefore do not show up in the evolution of the EATR of Belgium nor France in Figure 3 which considers the entire population of firms in the country. A study by Roggeman et al. (2014) confirms that the reduction in the tax burden due to the NID is of a much larger nature than the reduction caused by the implementation of the R&D tax credits. Bornemann et al. (2018) find that the introduction of the patent box regime in Belgium had a significant impact on the innovative activities of firms. However, they find only a reduction in the ETR for the subsidiaries of MNEs without opportunities to shift income out of the country, and not for subsidiaries of MNEs with income shifting opportunities.

To make sure that our analyses are measuring the impact of the NID and not taking up the (positive) employment effects of the other tax measures described above, we will remove from our base sample all firms in Belgium and France that are active in R&D intensive sectors as well as all the affiliates in Belgium and France belonging to the MNEs that are known to have benefitted from the excess profit ruling in Belgium.

### *B. Sample of Belgian and French affiliates*

Our analyses start from the premise that all large, multinational firms are actively looking for opportunities for tax optimization and therefore make use of the notional interest deduction through their affiliates in Belgium. This is consistent with the findings of Panier et al. (2003) who found that firms in Belgium have significantly raised the share of equity in their capital structure in response to the changing tax incentive<sup>7</sup>. The research of Egger et al. (2014) shows that other, local factors such as the institutional quality and financial development of the country in which affiliates operate, may offset or reinforce tax incentives for internal borrowing of

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<sup>6</sup> [http://europa.eu/rapid/press-release\\_IP-16-42\\_en.htm](http://europa.eu/rapid/press-release_IP-16-42_en.htm)

<sup>7</sup> In their paper, Panier et al. (2013) analyze the change in the equity-to-total assets ratio of all Belgian firms, also those not active in international markets, following the introduction of the NID.

multinational firms. For the Belgian and French affiliates of MNE groups, however, these local conditions are likely to be very similar and to remain constant during the period of analysis.

We use the annual September issues of the Amadeus database issued by Bureau Van Dijk to construct a database of Belgian affiliates (treated group) and French affiliates (control group) belonging to the same MNEs. Belgian and French MNEs were removed from the dataset to exclude possible home bias effect on employment from domestic firms. We also removed all affiliates active in the finance and insurance sector (NACE Rev.2 sectors 64-66) and the interim sector (NACE Rev.2 sector 78). Changes in employment in finance and insurance sectors may reflect portfolio optimization, while changes in demand for employment in other sectors may also impact employment in the interim sector that offers employment services to other firms. The resulting dataset consists of panel data for the period 2000-2011 containing Belgian and French affiliates belonging to the same ultimate owner, with corresponding balance sheet data, employment and sector of activity, and the parent's country of origin.

Our main analyses cover the time window 2003 to 2008, as there were no major changes in the economic and institutional environment (market / labor costs / taxes) in France nor in Belgium in that period, except for the introduction of the NID in 2006. We will show that the results are robust when considering the period 2000-2011.

As discussed in the previous section about tax reforms, in Belgium as well as in France, some tax measures targeting specific types of firms -in casu the coordination centers, R&D and other activities of (large) foreign MNEs- have been implemented or were in place during the main period of investigation (2003-2008). As these tax measures are likely to impact the employment decisions of the firms that can benefit from them, we decided to exclude some specific sectors from the analyses.

First of all, we remove all affiliates with activities of head offices (NACE Rev.2 sector 70.10, or NACE Rev.1.1 sector 74.15) in Belgium and in France. After the abolishment of the coordination center regime in 2003, the coordination centers in Belgium<sup>8</sup> - which are a subset of the head offices - could choose either for the continuation of the favorable coordination center

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<sup>8</sup>To benefit from the coordination center regime prior to 2003, firms had to obtain an approval by the Belgian tax authorities (renewable every 10 year), employ at least 10 full-time employees in Belgium and be part of a major multinational group with presence in at least four countries (Pieron, et. al, 2000).

regime during a certain transition period or switch to the NID. However, they were not allowed to cumulate the tax benefits of the coordination center regime with the NID, and the exact duration of the transition period also differed between firms depending on the expiration of their (10-year) recognition as a coordination center.

Next, we also excluded affiliates of high-tech industry sectors (NACE Rev.2 sector 21 and 26) and the scientific R&D service sector (NACE Rev.2 sector 72) in Belgium and France as those R&D intensive firms can apply for additional tax incentives to stimulate R&D activities and increase employment of R&D researchers.

Finally, 35 MNEs were identified that received an excess profit ruling from the Belgian tax authorities, allowing them to strongly reduce their tax base. All the affiliates in Belgium and France of those MNEs were removed from the base sample.

As employment data are key in our analyses, we only retain the MNEs for which both the Belgian and French affiliates report employment. The financial reporting requirements in Belgium and France are quite similar, and very stringent compared to other countries as Germany and the Netherland. We further identified and removed outliers in the dataset by using the STATA `bacon` command<sup>9</sup> on the main firm size variables: number of employees, cost of employees, average labor cost, equity, total assets and the equity-to-total asset ratio. We ended up with on average 2.205 affiliates in Belgium and 3.119 affiliates in France for the period 2003-2008.

Table 1 presents summary statistics at the level of Belgian and French affiliates for the period 2003-2008. The table shows that, on average, French affiliates are larger than Belgian affiliates in terms of employment (164 versus 82 full time equivalents). Average labor costs per worker are higher in Belgian affiliates than in French affiliates. In terms of equity and total assets, affiliates in France are larger than in Belgium. Belgian affiliates have, on average, a higher equity-to-total assets ratio than French affiliates.

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<sup>9</sup> The BACON or ‘blocked adaptive computationally efficient outlier nominators’ algorithm identifies outliers in multivariate data (Weber, 2010)

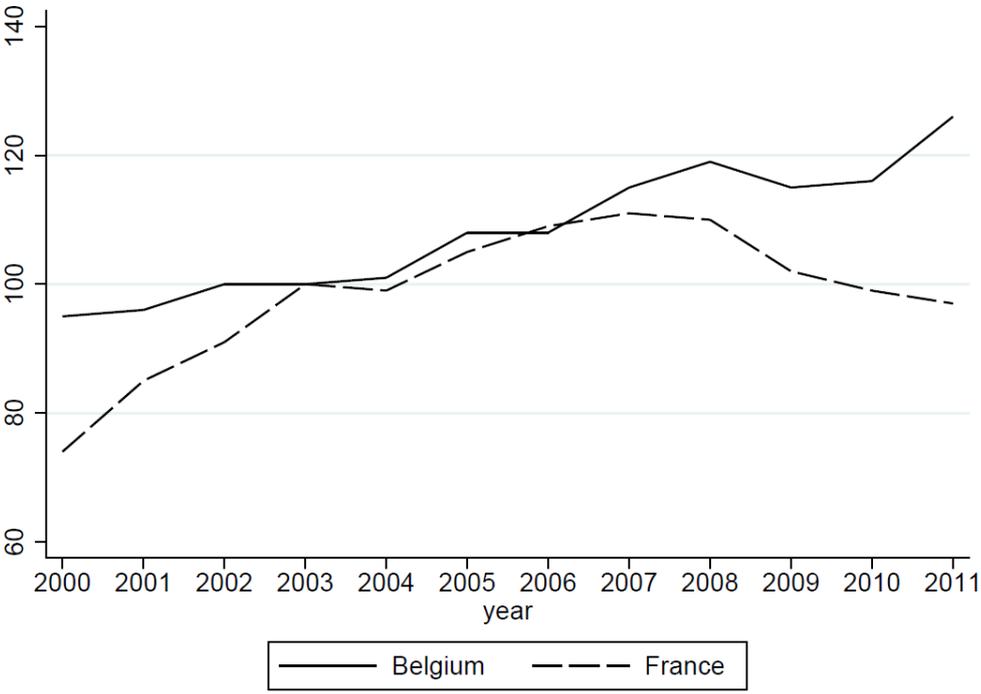
*Table 1 Affiliate level summary statistics (period 2003-2008)*

	Labor (full time equivalent)	Average Labor cost per worker (euro)	Equity (th euro)	Total assets (th Euro)	Equity-to-total assets ratio
<b>Belgium</b>					
mean	82	67,751	9,361	27,103	0.25
sd	223	42,832	40,603	85,804	0.60
N	13,229	13,229	13,229	13,229	13,229
<b>France</b>					
mean	164	58,780	11,514	35,129	0.24
sd	365	45,394	37,351	91,766	0.56
N	18,724	18,724	18,724	18,724	18,724

Figure 4 plots the evolution of the average firm size (measured in terms of employment) for the Belgian affiliates versus the French affiliates in our dataset<sup>10</sup>. The figures have been normalized to 100 in 2003, the first year in the main analyses of the paper. From 2003 to 2005 the average firm size in Belgian and French affiliates of foreign MNEs follow a similar upward trend. After 2006, the first year in which the NID came into effect, the average firm size in Belgian and French affiliates starts to diverge, with the average firm size of Belgian affiliates growing at faster pace than their French counterparts. By 2008, the average firm size of Belgian affiliates is about 19% larger compared to 2003, while the French affiliates show a growth of 10% compared to 2003. While Figure 4 may suggest that Belgian affiliates increased their employment following the introduction of the NID, more rigorous analyses controlling for differences in firm size and the main sector of activity of the firm, different parent firms and differences in the institutional context of the country in which firms operate, are needed to be able to attribute the difference in employment growth to the introduction of the NID. We will control for such differences through our empirical framework.

<sup>10</sup>The graph has been calculated based on the 59.772 observations used in the extended analyses in the paper, covering the period 2000-2011. We plot the evolution of the average firm size in Belgium and France and not the evolution of total employment in Belgium and France because our data does not allow to test for entry and exit, or the extensive margins of firms.

Figure 4: Evolution of the average employment of Belgian and French affiliates (normalized to 100 in 2003)



### **III. Empirical framework**

#### *A. Research design*

In the main analyses, we use a difference-in-difference (DiD) estimator to compare the employment in Belgian affiliates with the employment in French affiliates of the same MNEs. Our sample selection ensures that affiliates in Belgium and France are comparable as they belong to the same MNEs, operate in similar markets and in an institutional context which is very comparable across both countries in terms of the level and evolution of labor costs and corporate income taxation. The only important difference in taxation, is the introduction of the NID in 2006 for the affiliates operating in Belgium.

As the growth rates of individual affiliates are likely to be different depending on the average size and age of the firm, the main sector of activity, the institutional context of the country in which it operates and different internationalization strategies of the parent firm, we control in our models for affiliate fixed effects that do not change over time such as affiliate size and the country in which the affiliate operates, and for time-varying sector fixed effects.

Before the introduction of the NID - after controlling for affiliate and sector-time fixed effects - employment in Belgian affiliates should not be significantly different from employment in our control group of French affiliates belonging to the same MNEs. Observing MNEs' yearly employment after the introduction of the NID, permits to estimate annual treatment effects. This is important as it may take time before the employment effects of the NID are fully realized and it also allows to investigate whether the employment effect of the NID has a permanent character.

The introduction of the NID in 2006 was an unexpected and thus exogenous policy change following the negative decision adopted in 2003 by the EC with respect to the Belgian coordination center regime. The implementation of the tax credit is therefore unrelated to the existing employment level of firms in Belgium. Given that since 2003 no other major tax or labor reforms have been introduced in Belgium or in France, our difference-in-difference estimator therefore identifies a causal effect of the NID on employment in Belgian affiliates.

### B. Empirical specification

To study the impact of the NID, we compare the evolution of employment in the Belgian affiliates (treatment group) before and after the introduction of the NID with the evolution of employment in the French affiliates (control group) following the DiD specification in equation (1):

$$\ln EMP_{it} = \alpha_i + \beta_t + \gamma_{st} + \tau NID_i + \varepsilon_{it} \quad (1)$$

$\ln EMP_{it}$  is the log of employment of affiliate  $i$  at time  $t$ . Affiliate fixed effects are represented by  $\alpha_i$ . These control for firm characteristics that do not change over time such as average firm size and sector. Since parent - affiliate linkages remain quite stable over time, the affiliate fixed effects also control to a large extent for parent characteristics such as size, country of origin and international orientation of the MNE. The coefficients  $\beta_t$  represent the time fixed effects and measure different aggregate time trends in employment across the firms in our dataset. Likewise, the coefficients  $\gamma_{st}$ , the sector-time interaction fixed effects, control for different aggregate time trends in employment across sectors. The variable  $NID_i$  takes the value 1 for the Belgian firms when the NID is in place (2006 and later), and the value zero otherwise. The coefficient  $\tau$  therefore measures the average effect of the NID in the Belgian affiliates.

To measure the annual effect of the NID on Belgian firms, equation (1) is being extended as follows:

$$\ln EMP_{it} = \alpha_i + \beta_t + \gamma_{st} + \tau_t (T_t BE_i) + \varepsilon_{it} \quad (2)$$

In equation (2),  $T_t BE_i$  are time dummies specifically for Belgian affiliates, with 2005 taken as base year. For our analyses, the coefficient of interest is  $\tau_t$ : it estimates the annual difference in employment of the Belgian affiliates relative to the French affiliates compared to the base year 2005. From 2006 onwards,  $\tau_t$  measures the annual treatment effect of the NID on the employment in Belgian affiliates.

## IV. Main results

### A. *Evolution of equity and employment in Belgian and French affiliates*

To get more insight on the impact of the introduction of the NID on the equity and employment decisions of foreign MNEs, we plot the evolution of equity and employment variables in our dataset for the Belgian and the French affiliates of MNEs active in Belgium, controlling for affiliate fixed effects. To do this, we first perform regression analyses - separately on the Belgian and French affiliates - with the year dummies 2000 to 2011 as regressors and with affiliate fixed effects. These fixed effects control for affiliate characteristics that do not change over time such as affiliate's average size and age, sector of activity, average wages, and the country in which the affiliates operate.

One of the main purposes of the NID is to attract equity investments to Belgium. An increase in equity results in a more 'balanced' capital structure (more equity, less debt) and can be measured with the equity-to-total-assets ratio ( $eq\_ta$ ), which is the ratio of the firms' shareholder equity over the total assets of the firm. The equity-to-total-assets ratio will be used as dependent variable in the first two regressions. The average equity-to-total-assets ratio in 2003 was 0.20 for the Belgian affiliates and 0.22 for the French affiliates of the same MNEs. The evolution of the equity-to-total-assets ratio in Belgian and French affiliates in Figure 5 is measured relative to the year 2003. The triangles and the dots represent the yearly change in the equity-to-total-assets ratio of the Belgian versus French affiliates compared the year 2003, the vertical bars are the 95 percent confidence intervals.

Figure 5 illustrates that before 2003, as well as in the period right before the introduction of the NID in 2006, the equity-to-total-assets ratio of firms in Belgian and France did not change significantly compared to 2003. For the French affiliates, the equity-to-total-assets ratio also did not change after 2006. In contrast, in the Belgian affiliates the average equity-to-total-assets ratio starts to gradually increase from 2005 onwards, with significantly higher ratio's from 2006 onwards. The higher equity-to-total-assets ratio corresponds with the introduction of the NID

in 2006<sup>11</sup>, and can only be observed in the Belgian affiliates. This confirms earlier research by Panier et al. (2013).

Figure 5: Evolution of equity-to-total-asset ratio, correcting for affiliate fixed effects

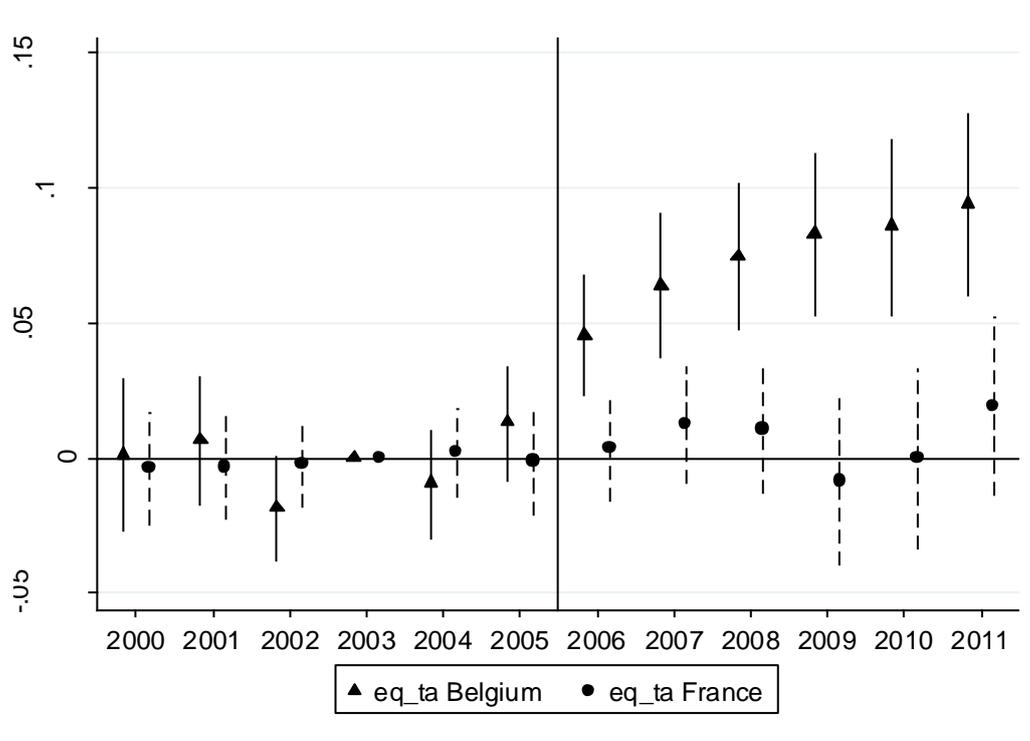


Figure 6 shows the evolution of employment in Belgian and French firms over the period 2000-2011, again, controlling for affiliate fixed effects. The average employment in 2003 was 76 full time equivalents for the Belgian affiliates and 157 full time equivalents for the French affiliates. In the regression analyses, the logarithm of employment is being used as dependent variable.

<sup>11</sup>The small, but non-significant increase in the equity-to-total-asset ratio of the Belgian affiliates in 2005, might reflect an anticipation effect: firms that have increased their equity at the end of fiscal year 2005, in order to be able to fully benefit from the NID deduction in 2006.

Figure 6: Evolution of employment, correcting for affiliate fixed effects

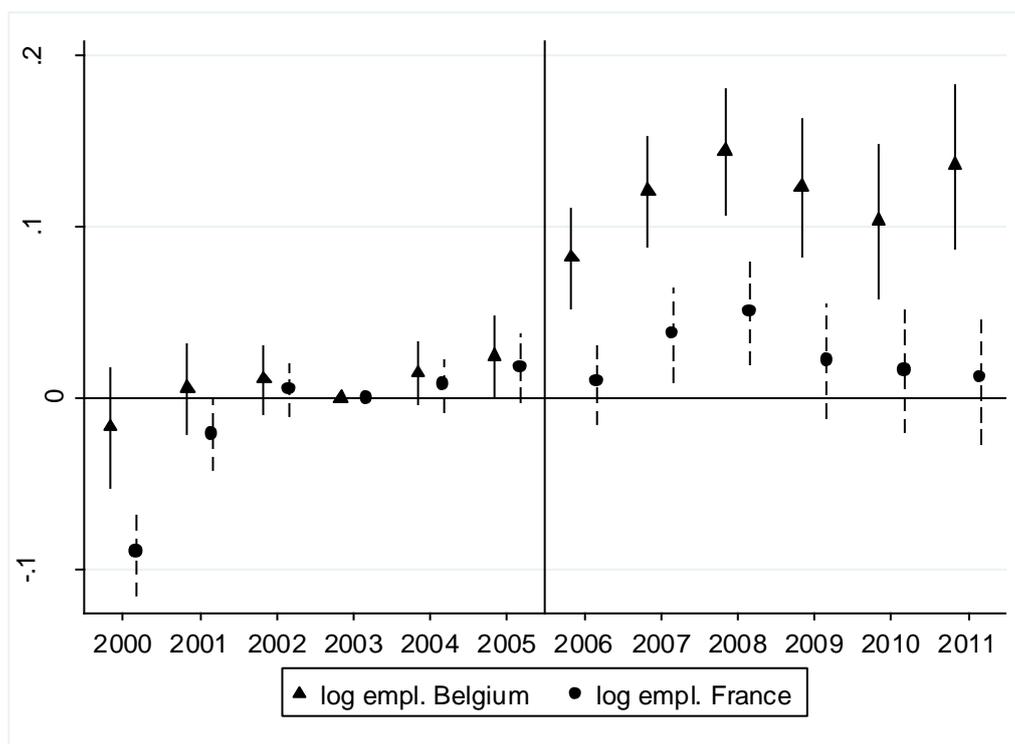


Figure 6 illustrates that from 2003 to 2005 the employment growth in Belgian and French affiliates was very similar and slightly increasing over time. In the next few years, Belgian and French affiliates were further growing until 2008. Next, as the worldwide financial recession sets in in 2009, employment levels were falling, both in the Belgian and French affiliates. In the DiD specification, we will be able to correct for business cycles by controlling for sector-time fixed effects in the sample of Belgian and French affiliates. This will allow to separate the effect from the NID from the effect of business cycles affecting Belgian and French affiliates of foreign MNEs over time in similar ways.

A closer look at Figure 6 shows that from 2006, the year in which the NID came into effect, employment in Belgian affiliates started to diverge from employment in French affiliates, with significantly higher employment levels in Belgium from 2006 onwards. More specifically, the figure shows that affiliates in Belgium increased their employment shortly after the introduction of the NID, while the employment growth in French affiliates continued at similar speed as in the years 2005-2006.

### *B. Difference-in-difference estimation*

In this section, we present the results of the difference-in-difference estimations (DiD) in which employment in Belgian affiliates (treated group) is compared with employment in French affiliates (control group), controlling for affiliate fixed effects, time fixed effects and sector-time interaction fixed effects. As the implementation of the tax credit in 2006 is unrelated to the existing employment levels of MNEs, our difference-in-difference estimator identifies a causal effect.

Columns (1) to (3) in Table 2 cover the period 2003-2008. In this time window, there were no major changes in the economic and institutional environment of firms in Belgium or France, except for the introduction of the NID in 2006. First, we estimate the average employment effect of the NID on Belgian affiliates compared to the employment in French affiliates (equation (1)). Column (1) provides first evidence for an increase in employment in Belgian affiliates attributable to the NID. In the three years following the introduction of the NID, the analyses show a significant positive difference in the average employment of Belgian affiliates compared to the French affiliates of 7.5 percent. The affiliate fixed effects, the time fixed effects and the sector-year interaction fixed effects in the DID estimations take out the average size, age and wage differences between affiliates, the average time effects and the average sector-year effects across affiliates.

Next, we look more into detail in the yearly employment effects of the NID, by estimating the year-by-year evolution in employment of the Belgian affiliates relative to the French affiliates compared to the base year 2005 (equation (2)). The results in column (2) show that in the years prior to 2005, the coefficients, representing the difference in employment between Belgian and French affiliates compared to 2005, are not statistically different from zero. This validates the common trend assumption: in our DiD specification, after controlling for affiliate and time fixed effects and for time-sector interaction fixed effects, employment in Belgian affiliates should not be different from employment in our control group of French affiliates. In 2006, we find that the average employment of Belgian affiliates is 6.6 percent higher compared to French affiliates. The difference in employment between Belgian and French affiliates remains significant in the next two years, with 8.6 percent more employment in Belgian affiliates by 2008.

The results presented in columns (1) and (2) include all affiliate-firm observations in our dataset for the period 2003-2008. Our main dataset of firms, however, is not balanced as we do not observe employment of each affiliate for every year of the period under study. When a MNE for example sets up or acquires a new affiliate in Belgium or France, the affiliate will only appear in the dataset from the year of establishment or acquisition onwards. Likewise, when a MNE decides to disinvest in one of its affiliates in Belgium or France, the affiliate will no longer appear in the dataset from the moment the activities of the affiliate are stopped or the affiliate is no longer part of the MNE group. However, we have no information in our data about what causes exactly the unbalanced nature of the sample. In column (3), we therefore restrict the sample to those affiliates for which we have employment data in all years before and after the introduction of the NID such that we obtain a balanced sample. This is important because, when studying the employment effects of the NID, we are looking at the intensive margin only. In the analyses using a balanced sample, the number of observations reduces substantially from 31,953 to 12,696 affiliate-year observations. The coefficients of the analyses, however, remain significant and of the same size as for the full, unbalanced sample of firms in column (2).

*Table 2 - DiD estimation: Average and yearly employment effects of the NID, Belgian versus French affiliates*

	(1)	(2)	(3)	(4)	(5)	(6)
	2003-08	2003-08	2003-08	2000-11	2000-11	2000-11
	all	all	balanced	all	all	>=10obs
NID	0.075			0.064		
	[0.016]			[0.019]		
NID-2000					0.074	0.052
					[0.026]	[0.034]
NID-2001					0.024	-0.008
					[0.023]	[0.027]
NID-2002					0.003	-0.017
					[0.021]	[0.025]
NID-2003		-0.006	-0.004		-0.004	0.003
		[0.017]	[0.019]		[0.017]	[0.019]
NID-2004		-0.003	-0.005		0.001	-0.004
		[0.012]	[0.013]		[0.013]	[0.012]
NID-2006		0.066	0.052		0.065	0.053
		[0.014]	[0.013]		[0.014]	[0.014]
NID-2007		0.067	0.066		0.068	0.056
		[0.017]	[0.018]		[0.017]	[0.018]
NID-2008		0.086	0.081		0.082	0.074
		[0.021]	[0.024]		[0.021]	[0.023]
NID-2009					0.083	0.060
					[0.024]	[0.027]
NID-2010					0.073	0.029
					[0.027]	[0.033]
NID-2011					0.107	0.069
					[0.029]	[0.037]
Affiliate FE	yes	yes	yes	yes	yes	yes
Year FE	yes	yes	yes	yes	yes	yes
Sector x year FE	yes	yes	yes	yes	yes	yes
Observations	31,953	31,953	12,696	59,772	59,772	20,422
R-squared	0.970	0.970	0.970	0.947	0.947	0.943

Specification includes affiliate fixed effects and industry-time interaction fixed effects (NACE 2-digit); robust standard errors clustered at affiliate level.

The DiD estimations in columns (4) to (6) cover an extended time period, from 2000 to 2011. In contrast to the period 2003-2008 in our main analyses, there has been some changes in the corporate income taxation in Belgium and France before 2003 and after 2008. Overall, the results of the estimations over the extended period 2000-2011, however, confirm the presence of an employment effect of the NID with consistent results of 6 to 8% gain of employment in Belgian affiliates in 2008 relative to the French affiliates. The employment effects of the NID, however, are less present in the period 2009-2011, especially in the balanced dataset (column (6)), resulting in smaller average effect when considering the longer time period.

Based on the results described above, we conclude that our model seems to control well for employment growth differences between affiliates (e.g. firm size, sector of activity,...) and between countries (e.g. institutional differences such as the labor market and tax legislation) in the period prior to introduction of the NID. The common trend assumption holds. Given that no major labor or tax reforms have been introduced in Belgium or France in the period 2003-2008 with the exception of the NID, our difference-in-difference estimator identifies a causal effect of the NID from the year 2006 onwards, with an average 7-8% percent increase in the employment of Belgian affiliates of foreign MNEs.

In the next sections, we perform a placebo test and we test the robustness of our findings.

## V. Robustness tests

### A. Placebo test with Irish affiliates

We want to provide further evidence that the positive employment effects shown in Table 2 are related to the introduction of the NID and not to any other factors that may have impacted employment in French affiliates differently from employment in affiliates of the same MNEs located in Belgium. Therefore, we perform a placebo experiment in which the evolution of employment in Irish firms before and after the introduction of the NID is compared with the employment in French firms belonging to the same MNEs. The approach that we pursue here is comparable to an experimental design in drug testing, where one group of patients receives a treatment with a placebo and a similar group of other patients does not receive a treatment.

Our placebo experiment uses the same set-up as in the main model: we construct a database of affiliates in Ireland and France that are part of the same MNE and perform a DiD estimation to measure the impact of the NID on employment. In the placebo experiment the affiliates of MNEs in Ireland form the treatment group, while the counterfactual consists of the affiliates of the same MNEs in France. Firms in Ireland are subject to similar financial reporting requirements than Belgium and France. Like Belgium, Ireland is a small economy with FDI contributing substantially to the overall economic performance of the country. In addition, beside France, Ireland is one of the few European countries that did not introduce a major tax change in the immediate period before or after the introduction of the NID<sup>12</sup>. Therefore, Irish affiliates of foreign MNEs are a good candidate for the placebo. We expect the evolution of employment in Irish affiliates not to differ from the employment in French affiliates after 2005. This will provide additional evidence that the employment differences in Belgian affiliates compared to the French affiliates after 2005 found in our main model are driven by the growth of employment in the Belgian affiliates, and not by changes in the employment growth rate of the French affiliates.

Table 3 presents the results of the placebo test with the Irish affiliates. Similarly as in the main model, we start from all French and Irish affiliates in column (1), do an extra check in column (2) on the dataset in which employment data is available for at least 5 of the 6 years.

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<sup>12</sup> Alternative candidates would be Austria or Finland, but both countries had substantial reduction in corporate income tax in 2004.

Finally, we split the affiliates in column (1) into affiliates of MNE groups that have no Belgian siblings (column (3)) and those that do have Belgian siblings (column (4)). The results of the placebo test show that in the period immediately before the introduction of the NID (2003-2005), there is no significant difference in employment between Irish and French affiliates, validating the common trend assumption<sup>13</sup>. After the introduction of the NID in 2006, there is no increase of employment in Irish affiliates compared to the French affiliates. Therefore, there is no placebo effect<sup>14</sup>.

*Table 3: DiD estimation – Ireland placebo, robustness*

	(1)	(2)	(3)	(4)
	2003-2008	2003-2008	2003-2008	2003-2008
	all	>=5obs	no BE links	BE links
NID-2003	-0.043 [0.033]	-0.022 [0.036]	-0.024 [0.037]	0.018 [0.246]
NID-2004	0.003 [0.037]	0.014 [0.047]	0.002 [0.040]	-0.092 [0.237]
NID-2006	0.011 [0.043]	-0.000 [0.047]	0.062 [0.048]	-0.013 [0.240]
NID-2007	-0.049 [0.049]	-0.042 [0.055]	-0.030 [0.050]	0.046 [0.232]
NID-2008	-0.054 [0.055]	-0.015 [0.063]	-0.042 [0.063]	-0.054 [0.232]
Affiliate FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
Sector x year FE	yes	yes	yes	yes
Observations	11,883	5,461	11,175	708
R-squared	0.964	0.953	0.966	0.981

Specification includes affiliate fixed effects and industry-time interaction fixed effects (NACE 2-digit); robust standard errors clustered at affiliate level.

<sup>13</sup> If we consider the larger period 2000-2011, we find that at the turn of the century, when the Irish economy was hardly hit by the crash of the ICT bubble, Irish firms did suffer substantial and significant losses in employment compared to French affiliates belonging to the same MNE. However, analog to the analyses with Belgian and French affiliates, we decide to focus the analyses to the period immediately before and after the introduction of the NID.

<sup>14</sup> The overall results remain very similar when removing the Irish and French firms active in the ICT sectors. Compared to France and Belgium, the ICT sector is much more important in Ireland.

The main conclusion from the placebo experiment is that the introduction of the NID had no effect on the employment of affiliates of MNEs in Ireland. Therefore, we can conclude that the positive effects found in the main model must be driven by changes that took place in Belgium in the period after 2005, and not by changes in France.

### *B. Firms that benefitted from other tax advantages*

In Table 4 additional analyses are run to check the robustness of our results using different subsamples of Belgian and French affiliates. In column (1) and (2), we add the observations of Belgian and French affiliates of the MNEs that could benefit from a favorable tax regime (coordination center regime, R&D tax credits, excess profit ruling) in Belgium and / or France during the period 2003-2008, to the analyses. Including these firms, about 3,000 extra observations, does not affect the results. In column (3), we only retain the firms that we observe for the complete period 2003-2008. Again, the results are in line with the results in the main model. In the last three columns, columns (4) to (6), we observe employment of Belgian and French affiliates over the longer period 2000-2011. The results confirm earlier results: we find a 7-8% increase in employment in Belgian affiliates compared to French affiliates belonging to the same MNE group.

*Table 4: DiD estimation – robustness: coordination centers, R&D firms and firms with EPR included*

	(1)	(2)	(3)	(4)	(5)	(6)
	2003-2008	2003-2008	2003-2008	2000-2011	2000-2011	2000-2011
	all	all	balanced	all	all	>=10obs
NID	0.069 [0.015]			0.056 [0.018]		
NID-2000					0.075 [0.025]	0.055 [0.032]
NID-2001					0.029 [0.022]	-0.006 [0.025]
NID-2002					0.009 [0.019]	-0.011 [0.023]
NID-2003		-0.000 [0.016]	-0.000 [0.018]		0.000 [0.016]	0.004 [0.018]
NID-2004		0.001 [0.012]	0.001 [0.012]		0.004 [0.012]	0.001 [0.011]
NID-2006		0.065 [0.013]	0.048 [0.013]		0.065 [0.013]	0.049 [0.013]
NID-2007		0.064 [0.016]	0.061 [0.017]		0.066 [0.016]	0.050 [0.018]
NID-2008		0.080 [0.020]	0.079 [0.023]		0.077 [0.020]	0.070 [0.022]
NID-2009					0.075 [0.023]	0.063 [0.026]
NID-2010					0.060 [0.026]	0.025 [0.032]
NID-2011					0.098 [0.028]	0.075 [0.035]
Affiliate FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Sector x year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	35,638	35,638	14,280	66,516	66,516	22,829
R-squared	0.970	0.970	0.969	0.946	0.946	0.942

Specification includes affiliate fixed effects and industry-time interaction fixed effects (NACE 2-digit); robust standard errors clustered at affiliate level.

## **VI. Conclusions**

To attract foreign direct investment, many countries traditionally engaged in reducing statutory corporate income tax rates. However, increasingly, countries have implemented tax schemes that affect the tax base rather than the tax rate. In this paper, we exploit the introduction of such a tax scheme, the Notional Interest Deduction in Belgium, to identify the impact of corporate income taxation on FDI.

Using a unique dataset that covers the multinational nature of firms, our difference-in-difference analyses find that the tax scheme has increased employment in Belgian affiliates by about 7 percent over the period 2006-2008 relative to affiliates of the same MNEs located in France. The increase in employment was most pronounced in the first year following the introduction of the NID but was also maintained over the period 2009-2011. Our analyses therefore shows that MNEs respond swiftly and substantially to changing international tax policies. The observed employment effects are not related to other tax credits that have been introduced in Belgium and France in the 2000s, nor are they related to the activities of MNEs which operated a coordination center in Belgium before the abolishment of this scheme in 2003. Since we look at foreign MNEs and their existing affiliates in Belgium and France, our analyses measure the effect of the NID on the intensive margins of firms. It is clear that the introduction of the NID may have persuaded MNEs to open new affiliates in Belgium, leading to FDI of firms which were previously not active in Belgium. Our data does not allow to measure the impact of the NID on the extensive margin.

## References

- Barrios, S., Huizinga, H., Laven, L. and Nicodème, G. 2012, “International Taxation and Multinational Firm Location Decisions”, *Journal of Public Economics*, 96 (11-12), pp.946-958.
- Becker, S.O., Egger, P.H. and Merlo, V. 2012, “How low Business Tax Rates attract MNE Activity: Municipality-Level Evidence from Germany”, *Journal of Public Economics*, 96 (9-10), pp. 698-711.
- Bornemann, T., Laplante, S.K. and Osswald, B. 2018, “The Effect of Intellectual Property Boxes on Innovative Activity and Effective Tax Rates”, *WU International Taxation Research Paper Series*, 2018-03. WU Vienna University of Economics and Business, Universität Wien, Vienna.
- Damijan, J.P., Rojec, M., Maicen, B and Knell, M. 2013. “Impact of Firm Heterogeneity and Direct and Spillover Effects of FDI: Micro-evidence from ten Transition Countries”, *Journal of Comparative Economics*, 41(3), pp. 895-922.
- Devereux, M. Griffith, R. and Klem, A. 2002, “Corporate Income Tax. Reforms and Tax Competition”, *Economic Policy*, 17(35), pp.449-495.
- Devereux, M. and Griffith, R., 1999, “The Taxation of Discrete Investment Choices”, *IFS Working Paper Series*, No. W98/16.
- Devereux, M. P. and Griffith, R. 1998, “Taxes and the Location of Production: Evidence from a Panel of US Multinationals”, *Journal of Public Economics*, 68(3): pp.335-367.
- Egger, P., Merlo, V., Ruf, M. and Wamser, G. 2015, “Consequences of the new UK Tax Exemption System: evidence from Micro-Level Data”, *The Economic Journal*, 125(589): pp. 1764-1789.
- Egger, P., Keuschnigg, C., Merlo, V. and Wamser, G. 2014, “Corporate Taxes and Internal Borrowing within Multinational Firms”, *American Economic Journal: Economic Policy*, 6(2): pp. 54-93.
- Fuest, C., Peichl, A. and Sieglic, S. 2018, “Do Higher Corporate Taxes Reduce Wages? Micro Evidence from Germany”, *American Economic Review*, 108(2), pp.393-418.
- Gumpert, A., Hines, J.R. and Schnitzer, M. 2016, “Multinational Firms and Tax Havens”, *The Review of Economics and Statistics*, 98 (4), pp. 713-727.
- Hanson, G. H., Mataloni, R. J. and Slaughter, M.J. 2005, “Vertical Production Networks in Multinational Firms”, *Review of Economics and Statistics*, 87(4), pp.664-678.

- Hebous, S. and Ruf, M. 2015, “Evaluating the Effects of ACE Systems on Multinational Debt Financing and Investment”, *CESifo Working Paper Series*, 5360.
- Hines, J.R. 2017, “Business Tax Burdens and Tax Reform”, *Brookings Papers on Economic Activity*, pp.449-471.
- Hines, J.R. 2007, “Corporate Taxation and International Competition” in *Taxing Corporate Income in the 21<sup>st</sup> Century*, New York: Cambridge University Press, pp. 268-295.
- Javorcik, B. 2003. “Does Foreign Direct Investment Increase the Productivity of Domestic Firms? In search of spillovers through backward linkages”, *American Economic Review* 94(3), pp. 605-627
- Javorcik, B. and Spatareanu, M. 2005, “Do Foreign Investors Care about Labor Market Regulations?”, *Review of World Economics* 141(3), pp. 141-375.
- Klemm, A. 2007, “Allowances for Corporate Equity in Practice”, *CESifo Economic Studies* 53(2), pp. 229-262.
- Konings, J. and Murphy, A. P. 2006, “Do multinational enterprises relocate employment to low-wage regions? Evidence from European multinationals”, *Review of World Economics*, 142(2): pp.267–286.
- Laveren, E. and Van Sweevelt, K. 2008, KeFiK-enquête KMO financiering 2008. KeFiK Working Paper, November 2008. Brussels Belgium.
- Muendler, M.-A. and Becker, S. O. 2010, “Margins of Multinational Labor Substitution”, *American Economic Review*, 100(5): pp.1999–2030.
- Panier, F., Pérez-González, F. and Villanueva, P. 2013, “Capital Structure and Taxes: What Happens When You (Also) Subsidize Equity?”, *Working Paper*.
- Princen, S. 2012, “Taxes do affect corporate financing decisions: The case of Belgian ACE”, *CESifo Working Paper Series*, 3713.
- Roggeman, A., Verleyen, I., Can Cauwenberge, P. and Coppens, C. 2014, “Impact of a Common Corporate Tax Base on the Effective Tax Burden in Belgium”, *Journal of Business Economics and Management*, 15(3), pp.530-543.
- Van Campenhout, G. and Van Caneghem, T. 2013, “How did the notional interest deduction affect Belgian SMEs’ capital structure?”, *Small Business Economics*, 40(2): pp. 351–373.
- Weber, S. 2010, “bacon: An effective way to detect outliers in multivariate data using State (and Mata)”, *The Stata Journal*, 10(3): pp.331-338.

Zangari, E. 2014, "Addressing the debt bias: a comparison between the Belgian and the Italian  
ace systems", *Taxation Papers 44*. Luxembourg: Publ. Office of the European Union.

## Appendix: Corporate taxation in Belgium

### *The coordination center regime*

The coordination center tax regime was introduced in 1982 with the goal of attracting multinational enterprises, and in particular the affiliates of multinational groups that carry out service activities for other companies in the group, to Belgium. The scheme is generally considered as very successful given that over 400 multinationals applied for the status of coordination center and around 280 multinational groups effectively established a coordination center in Belgium and operated under the regime for some time<sup>15</sup>.

Following the EC ruling of state aid on February 17, 2003, the scheme was discontinued but a transition period was defined in which recognized coordination centers whose 10-year approval had not yet expired, could continue to benefit from this special tax regime until the end of 2010<sup>16</sup>. The recognized coordination centers that still benefitted from the advantageous tax regime for coordination centers could however not use the notional interest deduction, but had to opt for either one, coordination center regime or notional interest deduction.

### *The notional interest deduction*

The notional interest deduction (NID) is an ‘allowance for corporate equity’ (ACE) introduced by the Belgian authorities in 2006. It allows companies subject to Belgian corporate income tax - and therefore also the Belgian branches of foreign companies - to deduct from their taxable income an interest<sup>17</sup> that is calculated on the company’s equity. The notional interest deduction comes on top of the companies’ interest deduction on debt and aims at reducing the tax discrimination between debt financing and equity financing, the so-called ‘debt bias’, by making investments

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<sup>15</sup> PWC (2011), ‘The Notional Interest Deduction, a true economic wealth-generator’, Tax Freedom Day.

<sup>16</sup> Green, P. (2003), ‘Coordination centres: the end of an era? Not quite...’, *Competition Policy Newsletter*.  
Quaghebeur, M. (2005, ‘Belgium renovates and generalizes coordination center regime’, *Practical European Tax Strategies* 7(7): pp. 1, 14-19.

<sup>17</sup> The notional interest rate is defined as the yearly average of the Belgian 10-year government bond yield. Since 2008, the notional interest rate decreased considerably, substantially decreasing the allowance qualifying for the notional interest deduction.

financed by equity much more attractive. The tax credit also lowers the effective corporate tax rate of Belgian companies and therefore provides a higher after-tax return on capital-intensive investments in Belgium. It does however, not contain any obligation for companies to invest in intangible or tangible fixed assets.

So far, ACE systems have been implemented in a few countries only. The Belgian tax deduction on equity can be considered unique in the sense that at the time, in no other country in Europe, a similar scheme was commonly applied. Other countries have developed different variants of ACE systems. In Italy and Austria, for example, the tax rate on equity was lowered rather than fully exempted from taxation. The NID system in Belgium, in which the entire equity (subject to certain adjustments) qualifies as base for the tax relief, resembles most the theoretical model and therefore approaches tax neutrality very closely (Princen, 2012; Klemm, 2007).

Research on the impact of ACE systems on firms has focused on the reduced tax discrimination between debt and equity financing following the introduction of the NID (e.g. Zangari, 2014) and its impact on the capital (equity) decisions of firms. The studies of Panier et al. (2013) and Hebous and Ruf (2015) provide evidence for a more balanced capital structure (more equity, less debt) in Belgian firms, especially among the large firms, while, in contrast, the capital structure of SMEs using the NID (Laveren and Van Sweevel, 2008; Van Campenhout and Van Caneghem, 2013) does not seem to have been affected in the short term. The studies generally look at a very short time frame after the introduction of the NID and do not provide evidence whether also new jobs have been created which would not have been created in the absence of the NID. Notable exception is Hebous and Ruf (2015), who also did some research on the economic impact of the NID. They find that introducing an ACE increases lending between affiliates of the same multinational, but they do not find evidence for an increase in productive investments in affiliates in Belgium following the introduction of the NID. Their research focuses on German-based multinationals and their affiliates and therefore only provides a partial picture of overall FDI activities in Belgium.