VIVES
RESEARCH CENTER FOR REGIONAL ECONOMICS

VIVES
POLICY PAPER
July 2016

The Role of an Allowance for Corporate Equity for the Capital Structure and Employment in Multinational Enterprises

An evaluation of the Notional Interest Deduction in Belgium

Jozef Konings
VIVES, KU Leuven

Cathy Lecocq
VIVES, KU Leuven

Bruno Merlevede
Department of General Economics, Ghent University

Robrecht Vandendriessche
VIVES, KU Leuven

KU LEUVEN

Contents

Executive Summary 4
1. Introduction 6
2. Multinationals in the Belgian economy 7
2.1. Firm heterogeneity 7
2.2. The productivity of MNEs 8
2.3. Regional concentration of firms and local spillovers 9
2.4. Summary 11
3. The Notional Interest Deduction 12
3.1. Background 12
3.2. Theoretical basis for ACE systems 13
3.3. Empirical evidence on the effects of the NID 14
3.4. Summary 15
4. The coordination centres 16
4.1. Background 16
4.2. Research framework 17
4.3. Methodology 17
4.4. Results 17
4.5. Summary 19
5. Research setting and data 20
5.1. Research setting 20
5.2. The European Multinational Network database 20
5.3. Summary Statistics 20
5.4. Summary 23
6. The NID and the capital structure of foreign MNEs 24
6.1. Background 24
6.2. Research framework 25
6.3. Econometric model 26
6.4. Results 26
6.5. Summary 28
7. The NID and employment effects in foreign MNEs 29
7.1. Background 29
7.2. Research framework 31
7.3. Econometric model 31
7.4. Results 32
7.5. Summary 35

8. References 36
Appendix A. The capital structure: results of the DID estimators 38
Appendix B. Employment effects: results of the DID estimators 39

List of Figures

Figure 1: Heterogeneity of firms in terms of employment and value added (Food industry, 2014) 8
Figure 2: Productivity (TFP) distribution of MNEs (continuous line) and domestic firms (dotted line) .. 9
Figure 3: Average productivity and employment of multinationals versus domestic firms 9
Figure 4: Spatial concentration of industry and services in Belgium 10
Figure 5: Impact of the presence of MNEs in the region on the productivity of domestic firms 11
Figure 6: Evolution of the notional interest rate 13
Figure 7: Evolution of total employment in coordination centres (NACE 7010) 18
Figure 8: Evolution of total equity (mio euro) in coordination centres (NACE 7010) 18
Figure 9: Evolution of total taxes (mio euro) in coordination centres (NACE 7010) 19
Figure 10: The effective marginal tax rate on debt and on equity (1998-2012) 25
Figure 11: Aggregate equity-to-total assets ratio: Belgium vs non-Belgium affiliates (1997-2014) 27
Figure 12: Difference-in-difference estimator, equity-to-total assets ratio (period 1997-2014) 27
Figure 13: Unit Labour Costs in Belgium, France, Germany and the Netherlands (2000-2015) 29
Figure 14: Evolution of effective average tax rates in percent (2000-2014) 31
Figure 15: Difference-in-difference estimator, log(employment) (period 1997-2014) 34

List of Tables

Table 1: Distribution of the affiliates and observations per country 21
Table 2: Distribution of observations by country of ownership (period 1997-2014) 22
Table 3: Characteristics of foreign MNE's active in Belgium by country of affiliate (average values over the period 1997-2014) 22
Table 4: Corporate income tax rates in the EU (2014) 30
Table 5: Difference-in-difference estimator, log(employment) 33
Table 6: Difference-in-difference estimator, equity-to-total assets ratio 38
Table 7: Difference-in-difference estimator, log(employment) 39

Executive Summary

During the last few decades most countries have gone through an intensified process of economic integration resulting in increased trade flows between countries. It also has resulted in the internationalization of the production process using global supply chains, in which components and goods cross borders many times. An important part of this globalization process has been the rise in foreign direct investment (FDI). As a result, multinational enterprises (MNEs) account for an increasing part of a country's employment and output. Not surprisingly, governments engage in various policy initiatives -such as tax breaks and subsidies- to attract foreign direct investment.

Whether the use of financial incentives to promote FDI is justified, depends on the social returns of FDI. For instance when technological or productivity spillovers to domestic firms take place, or when new jobs are created which would not have been created in the absence of FDI. In this paper, we tune in on this last aspect with a focus on European MNEs active in Belgium. We analyse the introduction of an "Allowance for Corporate Equity (ACE)" in Belgium in 2006: the notional interest deduction (NID). The NID was introduced as a new tax scheme to compensate for the gradual disappearance of a special tax scheme for multinational headquarters and treasury centres, also called the coordination centres regime. The NID allows all companies subject to Belgian corporate tax law to deduct from their taxable income an interest calculated on the basis of the company's equity. It aims at reducing the tax discrimination between debt and equity financing and at promoting capital-intensive investments in Belgium.

This paper first shows that **multinationals matter for the Belgian economy**. In particular:

(i) The largest firms **account for the bulk of total employment and value added** in Belgium. Most of these firms are multinationals.
(ii) Multinationals **tend to be more productive** than domestic firms.
(iii) Proximity to multinationals results in **positive spillover effects** to domestic firms, reflected in productivity gains for the latter. Productivity gains are essential for economic growth and welfare.

With respect to the **Notional Interest Deduction** system in Belgium, we find that:

(i) The NID is a **quite unique tax system** in Europe and the rest of the world.
- Only a few countries have adopted an Allowance for Corporate Equity (ACE), several have abolished it again.
- The NID system in Belgium **approaches tax neutrality very closely** because the entire equity (subject to certain adjustments) qualifies as base for the tax relief. This is not the case for the ACE systems in most other countries where the tax rate on equity is lowered but not exempted from taxation.

(ii) The NID **substantially reduced the tax bias towards debt, but did not fully remove it**.
- In the last few years, tax discrimination against equity has been raising again due to adjustments to the qualifying equity and a drop in the notional interest rate.

(iii) The NID **lowered the effective tax rate** for Belgian incorporated firms.
- With a **statutory corporate income tax rate of 33.99%**, Belgium has the 3rd highest tax rate in Europe, well above the EU-28 average of 22.9%.
- **In 2006**, the year following the introduction of the NID, the **effective average tax rate**, which takes into account changes to the tax base such as the NID, **dropped from 29.5% to 25.7%.**
- **In 2014**, the **effective average tax rate** in Belgium was **26.7**%. **The EU-28 average was 21.1%.** A further decrease in the notional interest rate for the years 2015-2016 will increase the effective average tax rate in Belgium.

(iv) The NID promoted further development of the coordination activities of multinationals.
- For Belgian coordination centres of European MNEs, we also find an **important increase in overall equity** in the years following the introduction of the NID, despite a loss of equity caused by European MNEs that stopped their coordination centre activities in Belgium.
- The **overall employment** at coordination centres **remained quite stable** after the introduction of the NID. Job losses due to European MNEs that stopped their coordination centre activities in Belgium have been largely compensated by employment growth in coordination centres that continued their coordination activities.

Using a **unique firm-level dataset** with detailed financial and operational data over the period 1997-2014 on 2,783 European MNEs active in Belgium and their affiliates in Belgium, France, Germany and the Netherlands, we study the impact of the NID on the capital structure and employment of European MNEs in Belgium. The results of our econometric analyses can be summarized as follows:

(i) The NID has attracted capital-intensive investments to Belgium.
- The introduction of the NID led to a structural change in the behaviour of firms. Due to **large inflows of domestic and foreign capital in 2006-2007,** the **own equity of Belgian firms has increased.**
- After the introduction of the NID, **the equity-to-total asset ratio of Belgian affiliates of European MNEs increased with 5 percentage points** in the period 2009-2010 compared to the affiliates of the same MNEs located in France, Germany and the Netherland that cannot benefit from the NID. Belgian affiliates have therefore **increased their solvability**.

(ii) The NID had **real and significant employment effects**.
- **The NID** leads to a **4.9 percent increase in employment** of Belgian affiliates of European MNEs relative to affiliates located in France, Germany and the Netherlands. Taking into account the average employment of consolidated **European MNEs active in Belgium**, we estimate the total cumulated employment effects of the NID for continuing Belgian affiliates of European MNEs **over the period 2006-2014** to be **20,577 employees**.

1. Introduction

The last few decades, most countries have gone through an intensified process of economic integration resulting in increased trade flows between countries and an internationalization of the production process making use of global supply chains, in which components and goods cross borders many times (Antras and Chor, 2012; Johnson, 2014). An important part of this globalization process has been the rise in foreign direct investment (FDI) (UNCTAD, 2015). As a result, an increasing part of a country's employment and output is accounted for by multinational enterprises (MNEs).

It is therefore not surprising that governments engage in various policy initiatives, such as tax breaks and subsidies, to attract foreign direct investment. Promoting FDI is not only popular in developing countries but also in developed countries, most of them having some kind of industrial policy in place to provide incentives to foreign investors through some form of state aid. Whether or not these financial incentives are justified depends on the social returns of 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 address this question in the context of the introduction of an "Allowance for Corporate Equity (ACE)" in Belgium in 2006: the notional interest deduction (NID). The NID was introduced as a new tax scheme to compensate for the gradual disappearance of a special tax scheme for multinational headquarters and treasury centres in Belgium, also called coordination centres. The NID enables all companies subject to Belgian corporate tax law to deduct from their taxable income an interest which is calculated on the company's shareholder's equity. The aim of the NID is to reduce the tax discrimination between debt financing and equity financing and to promote capital-intensive investments in Belgium. A recent study by Zangari (2014) suggests that the NID has likely been successful in improving the attractiveness of Belgium for MNEs and in reducing the indebtedness of companies, which may be important in the deleveraging process in the aftermath of the financial crisis. To evaluate whether this has indeed been the case, we use a unique firm-level dataset of 2,783 multinational enterprises with detailed financial and operational data.

The structure of this paper is as follows. We start in section 2 with documenting the **role and contribution of MNEs to the Belgian economy**. We describe the **background and characteristics of the NID system** in Belgium in section 3. In section 4, we look into the evolution of employment, equity and tax revenues from the **coordination centres** (i.e. treasure centres) of foreign MNEs in relation to this new system and the gradual disappearance of the beneficial coordination centre regime. In section 5, we describe the unique firm-level data set that we use for the analyses in section 6 and 7, and the research design. In section 6, we investigate whether the introduction of the NID in Belgium has led to **differences in the capital structure of foreign MNEs**, while in section 7 we analyse the **role of the NID** on the **attractiveness for foreign MNEs[1] to expand their Belgian affiliates** and hence on **job creation** by foreign MNEs

[1] Foreign MNEs in this study refer to European multinationals with affiliates in Belgium. Due to data limitations we have no or limited information on non-European multinationals. However, it is reasonable to assume that the conclusions of our statistical analysis remain robust even if we do not include non-European MNEs as we are estimating structural relationships.

2. Multinationals in the Belgian economy

Firms are heterogeneous. They differ in size and added value created. They are active in different sectors such as manufacturers of goods, providers of services or both. They are high-tech and/or knowledge-intensive or rather low-tech and/or low knowledge-intensive. They differ in terms of their global activity. For instance, in contrast to domestic firms that have only affiliates in their home country, multinationals have affiliates in multiple countries. It has been documented many times that MNEs are typically larger, tend to use more high-tech production techniques and typically generate knowledge spillovers to domestic firms. They are also more footloose: when market - or cost conditions change, they relocate easily to regions and markets which are more favourable (Van Beveren, 2007). In this section, we document a number of these characteristics of MNEs in the Belgian economy[2]. To this end, we use information on employment and value added from the annual accounts of Belgium firms which covers all incorporated firms in the Belgian economy.

2.1. Firm heterogeneity

Figure 1 illustrates the presence of firm heterogeneity in terms of employment and value added using a Lorenz-curve. We illustrate this for only one sector, the food industry[3], but this pattern also holds in all other sectors in the Belgian economy. To construct this Lorenz curve, firms are first ranked from large to small based on their employment or value added. On the horizontal axis of the Lorenz curve, the cumulative share of the number of firms active in the food sector is presented. The vertical axis shows the cumulative share of these firms in total employment (green line) or total value added (yellow line). The 45-degree line (pink line) presents the cumulative distribution of employment or value added in the hypothetical case that all firms would be of equal size.

It is clear from figure 1 that both employment and value added are very unevenly distributed between firms. Both employment and value added are concentrated in a limited number of very large firms. In particular, figure 1 indicates that 20% of the firms account for about 90% of employment and value added in the food industry in Belgium. Similar patterns, the so-called '20-80' rule, can be found in every sector and for the economy as a whole: 20% of the firms account for about 70% of all jobs and for about 80% of total value added. More importantly, these 'top firms' are typically active in international markets through exports and imports and most of them are part of a multinational group. In particular, 77% of the value added and 66% of all jobs in the entire Belgian private economy is accounted for by MNEs. Similar patterns can be found in other countries as well. Hence, it is not surprising that policy is targeted towards keeping and attracting FDI.

[2] In this section, MNEs refers to the all MNEs active in Belgium. This includes Belgian MNEs with affiliates abroad as well as foreign MNEs with affiliates in Belgium. In section 6 and 7, we only make use of a specific sample of European (non-Belgian) MNEs investing in Belgium, which is described in section 5.

[3] NACE Rev. 2 sector 10.

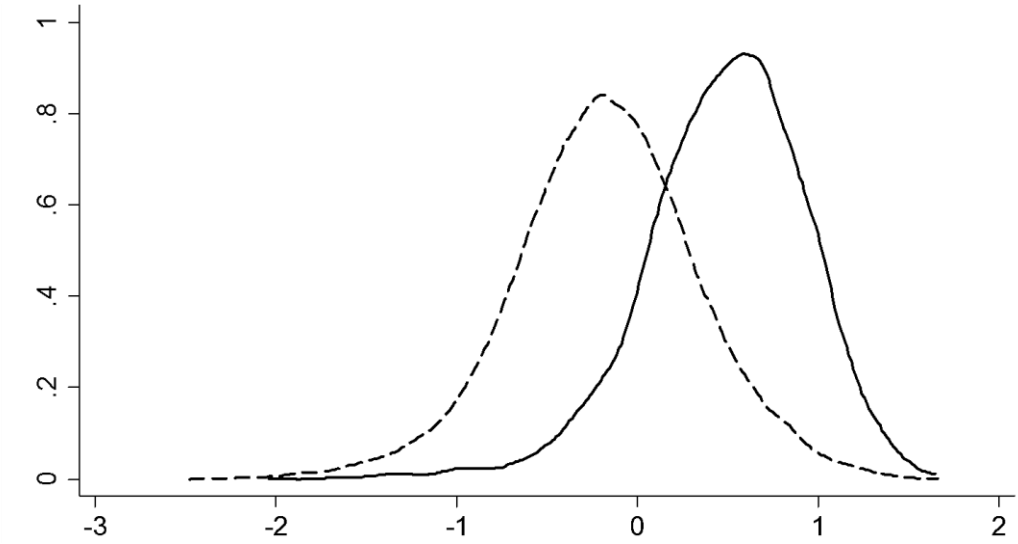
Figure 1: Heterogeneity of firms in terms of employment and value added (Food industry, 2014)

Source: authors' calculations (Annual Accounts data: NACE Rev.2 - Sector 10)

2.2. The productivity of MNEs

If MNEs matter a lot for jobs and value added, they are likely going to matter for productivity growth, which is one of the crucial components for aggregate GDP growth. Productivity refers to the efficiency by which firms transform inputs (labour, capital and materials) into output (value added) and is often measured by computing 'Total Factor Productivity'. More productive firms produce more output with the same amount of input factors or they produce the same amount of output with less input factors. The productivity of firms in the manufacturing sectors is for a large part determined by the use of modern technologies in the production process. In general, productivity gains can be achieved through innovation or technological renewal. Figure 2 shows the productivity (TFP) distribution for multinationals (continuous line) and domestic firms (dotted line) using firm-level data for the manufacturing industry in Belgium. A typical pattern emerges: MNEs are on average more productive than domestic firms. Moreover, figure 2 nicely illustrates the huge dispersion (heterogeneity) that exists between firms. There are very productive firms (fat right tail) and less productive firms (long left tail), both among domestic firms and MNEs. We illustrate this further in figure 3, which shows the *average* productivity and employment of foreign domestic firms, foreign MNEs and Belgian MNEs. The productivity and employment figures on the vertical axis are normalized to 1 using domestic firms as a benchmark. We can easily note that MNEs are on average four to six times larger in terms of employment than domestic firms. The difference is more outspoken for Belgian MNEs than for foreign MNEs, which could be related to a headquarter/parent effect. In addition to size differences, we also note that MNEs are more productive than domestic firms. On average, foreign (Belgian) MNEs tend to be 60% (80%) more productive. Typical explanations for this productivity gap are related to the use of better and more up-to-date technology, better management practices, more R&D and more on-the-job training of workers (Bloom and Van Reenen, 2010). But also agglomeration economies, due to the regional concentration of economic activity, may contribute to productivity gains. We illustrate this in the next sub-section.

Figure 2: Productivity (TFP) distribution of MNEs (continuous line) and domestic firms (dotted line)



Source: authors' calculations (Annual Accounts data: NACE Rev.2 - Section C)

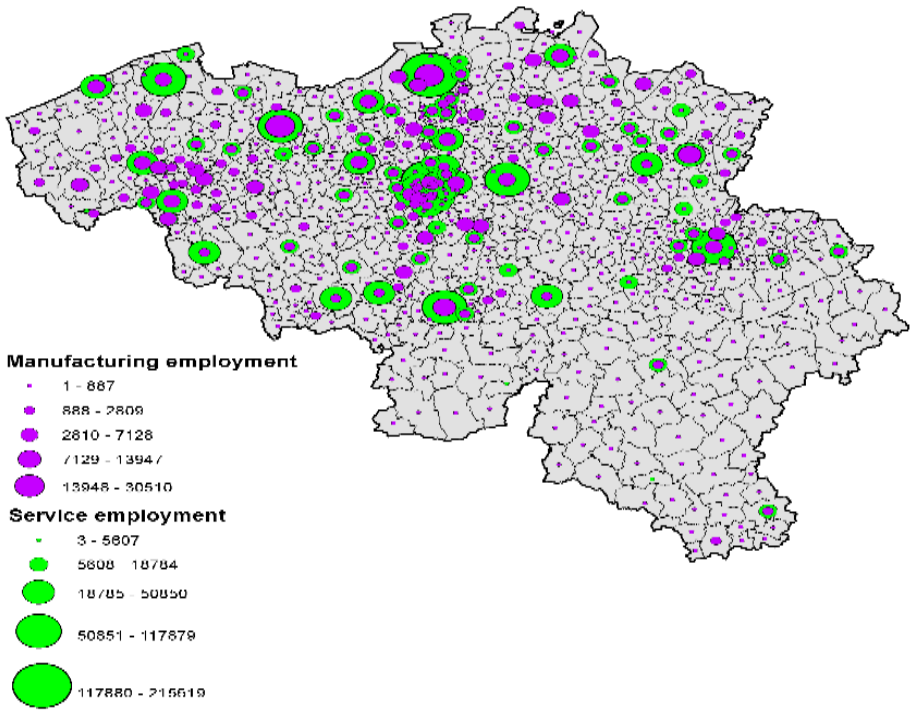
Figure 3: Average productivity and employment of multinationals versus domestic firms

Source: authors' calculations (Annual Accounts data)

2.3. Regional concentration of firms and local spillovers

Economic activity tends to concentrate in certain places. Figure 4 illustrates the spatial concentration of jobs within industry and services in Belgium. A geographical concentration of jobs in industry can be observed in the regions of Antwerp, Brussels, Ghent, Kortrijk, Charleroi and Liège. Jobs in the service sector tend to be geographically concentrated in the provincial capital cities. Interestingly, service jobs and manufacturing jobs tend to locate near each other.

Figure 4: Spatial concentration of industry and services in Belgium



Source: authors' calculations (Annual Accounts data)

Firms that co-locate share some advantages: due to the larger geographically concentration of economic activities, they have broader access to labour, customers, suppliers, infrastructure and finance present in the region. This regional agglomeration generates spillover effects that may affect a firm's productivity and competitiveness, and hence its ability to innovate and to grow. Figure 5 presents the results of a regression specification in which we analyse the importance of the presence of MNEs (foreign and Belgian) and the regional concentration of knowledge on the productivity of domestic firm[4]. The results can be summarized as follows (see figure 5):

(i) A 10% increase in the importance of Belgian MNEs in the region (measured by its market share), is related to an average increase in the productivity of domestic firms in the region with 0.4%.

(ii) A 10% increase in the importance of foreign MNEs in the region (measured by its market share), is related to an average increase in the productivity of domestic firms in the region with 0.6%.

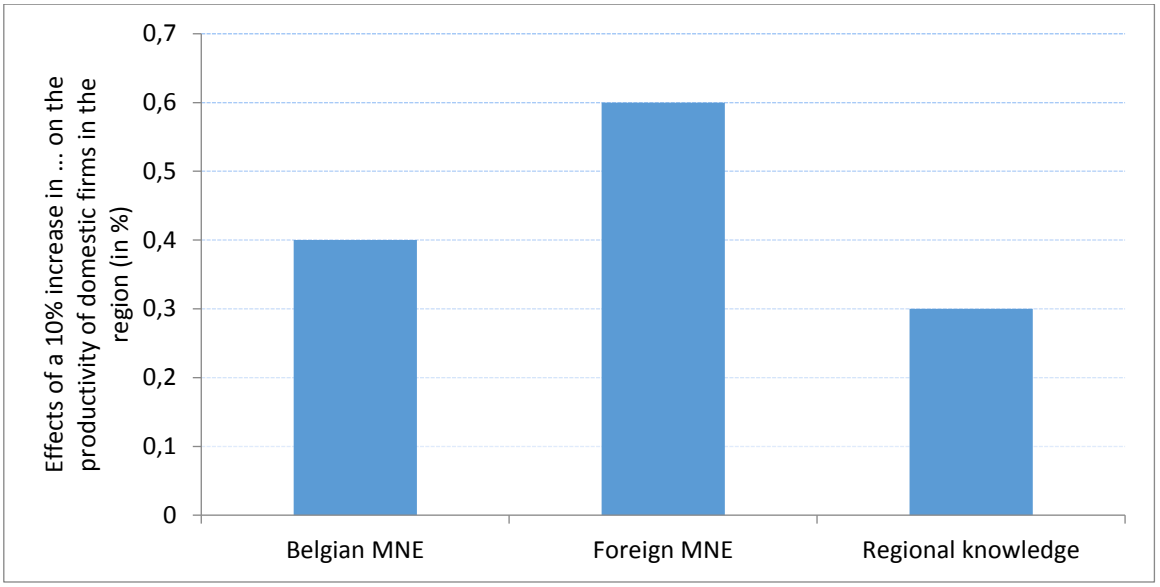
(iii) A 10% increase in regional knowledge (measured by the number of firms active in the same sector in a radius of 5 km), is related to an average increase in the productivity of domestic firms in the region by 0.3%.

Overall, the analyses reveal that 'spillovers' from MNEs matter: when MNEs locate in the proximity of domestic firms, there is evidence of a positive productivity effect on the domestic firms.

[4] See Konings, Reynaerts, Goesaert, De Ruyter (2012). "De Sleutelrol van Globale Ondernemingen in Vlaanderen", *VIVES Briefing* 25 juni 2012.

This could be related to the involvement in the supply chain or could be related to worker turnover flowing from MNEs to local domestic firms and hence transferring knowledge.

Figure 5: Impact of the presence of MNEs in the region on the productivity of domestic firms



Source: authors' calculations (Annual Accounts data – 2012)

From this section it is clear that MNEs matter for the Belgian economy along various dimensions. We summarize our main findings below.

2.4. Summary

Why do multinationals matter?

- ✓ The largest firms contribute for a large part (20-80 rule) to the overall employment and value added in Belgium. Most of these firms are multinationals.
- ✓ Multinationals (both Belgian and foreign MNEs) tend to be more productive than domestic firms.
- ✓ The proximity of multinationals has positive spillover effects for domestic firms, reflected in productivity gains for local domestic firms.
- ✓ These productivity gains are essential for economic growth and welfare.

3. The Notional Interest Deduction

3.1. Background

By the law of June 22 2005, the notional interest deduction (NID) was introduced and applicable from the 1st of January 2006 onwards for all companies that are subject to Belgian corporate income tax - or non-resident corporate income tax law. The NID consists of an allowance for corporate equity (ACE) and allows firms to deduct from their tax base an interest on equity in addition to the deduction of an interest on debt.

With the NID, the Belgian tax authorities wanted to offer an attractive and internationally accepted corporate tax system and provide an alternative for the special tax regime for coordination centres which came to an end following the EC ruling of state aid on February 17, 2003. In addition, the tax deduction on equity aims at reducing the tax discrimination between debt financing and equity financing, by making investments financed by equity much more attractive and therefore promote capital-intensive investment in Belgium. The NID also intends to reduce the effective corporate tax rate for all companies and provide a higher after tax return on investment.

The notional interest deduction can be considered unique in the sense that, at the time, in no other European country a similar scheme was commonly applied (Burggraeve et al., 2008). However, the idea of an allowance for corporate equity was not new and in Europe, 3 countries introduced such a system before Belgium did: Croatia (in 1994) , Italy (in 1997) and Austria (in 2000). By 2006 however, all three countries had abolished their ACE system. Italy reinstalled an ACE system in 2012, Latvia adopted an ACE system in 2009 and abolished it in 2014, Liechtenstein applies an ACE system since 2011, and Switzerland was considering to introduce an ACE system in recent years, but excluded it from the corporate reform package.

Following the introduction of the NID, numerous foreign MNEs set up finance companies in Belgium. But also Belgian companies clearly benefit from the system. The evolution of the corporate tax revenues in the period 2006-2011 suggests that the NID has not lowered, but rather increased corporate tax revenues in Belgium (PWC, 2011). Some particular characteristics of the Belgian NID - which are important for the set-up and interpretation of our research - are the following:

(i) The NID is applied on the **entire equity** (subject to certain adjustments), making it a permanent incentive as opposed to the one-time advantage in ACE systems based on new equity. Adjustments to equity are made to obtain the qualifying equity. These include items like the own shares held on the balance sheet, participations, some specific tangible fixed assets; tax-free revaluations gains, tax credits for R&D and capital grants, etc., and aim to avoid double use or abuse (PWC, 2011).

(ii) 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 (see Figure 6), substantially decreasing the allowance qualifying for the notional interest deduction.

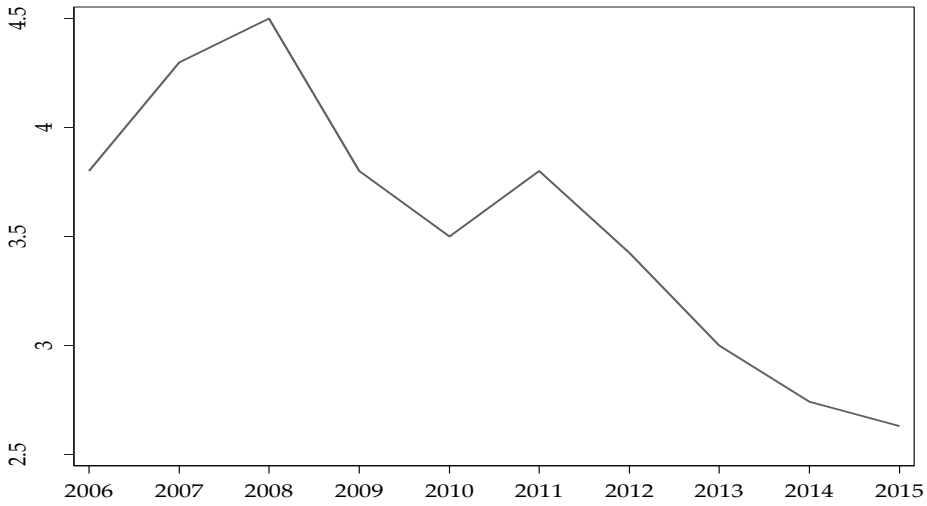
(iii) There is no obligation for **investment** in intangible or tangible assets.

(iv) The **anti-avoidance provisions** targeting transactions between related parties like intra-group borrowing and lending are incomplete. This implies that MNEs can transfer equity to their

affiliate in Belgium which can subsequently lend it to other affiliates within the group located in other countries, thereby also lowering effective tax rates in these non-Belgian affiliates.

(v) The recognised Belgian **coordination centres** that continue to benefit from the advantageous tax regime for coordination centres (ultimately until the end of the 2010), cannot use the system.

Figure 6: Evolution of the notional interest rate



Source: FPS Finance Belgium

3.2. Theoretical basis for ACE systems

The theoretical foundations for an 'Allowance for Corporate Equity' (ACE) system can be traced back to the mid-1980s. In 1984, Boadway and Bruce (1984) developed a theoretical concept for a business tax that is 'neutral' in the sense that it does not affect firms' investment decisions at the margin. Their plan for a neutral business tax consists in permitting firms to deduce a cost of capital in each tax period such that only the returns on investment above the cost of capital are taxed. Boadway and Bruce (1984) recommend the alignment of the tax treatment of debt and equity, such that debt is not favoured over equity.

'Allowances for Corporate Equity' systems provide a tax deductibility to the return on equity which is similar to the deductibility of interest payment on loans. So far, ACE systems have been implemented in a few countries only. Moreover, countries have developed different variants of ACE systems. 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). In other systems (e.g. Italy and Austria), the tax rate on equity was lowered rather than fully exempted from taxation.

The main purpose of the NID is to reduce the tax discrimination between debt financing and equity financing. Like in most tax systems, interest payments on loans can be deducted from the corporate tax base in Belgium, while before 2006 such beneficial treatment did not exist for equity

financing, leading to a difference in tax treatments of equity and debt. The tax incentive for debt financing induces a debt bias in the corporate financial structure and potentially affects investment decisions. It is therefore relevant to analyse whether the introduction of an ACE regime leads to (i) higher corporate equity ratios (and lower debt ratios) and (ii) increased investments. Under an ACE system, only the economic rents (above the cost of capital) are taxed, and therefore an investment project that is unprofitable in the absence of an ACE system, might become worth investing in when the normal return on equity-financed investment can be deduced from the corporate tax base.

3.3. Empirical evidence on the effects of the NID

The study by Burggraeve et al. (2008) on the macroeconomic and budgetary impact of the NID in Belgium already concluded in 2008 that the introduction of the NID led to a structural change in the behaviour of firms, with large inflows of domestic and foreign capital in 2006-2007 increasing the own equity of Belgian firms. Using microdata on firms applying the risk capital allowance from the KeFiK survey on SME financing (2008), Laveren & Van Sweevelt, (2008) and Van Campenhout & Van Caneghem (2013) found that, in the short-term, the NID did not significantly affected the capital structure of SMEs that used the NID.

More recent research of Panier et al. (2013) reveals a significant increase in the share of equity in the capital structure of Belgian firms compared to firms in the neighbouring countries following the introduction of the NID in 2006. They find that the largest responses in the capital structure of firms can be found among the large firms, both affiliates of MNEs and standalone firms, and can be at least partially explained by the issuance of new equity. Using detailed data on German multinationals and their foreign investment through affiliates in other countries, Hebous and Ruf (2015) find that the implementation of an ACE system reduces the average total debt ratio of firms. The NID in Belgium, where the tax deduction applies to the full corporate equity, has larger effects on the firms' capital structure compared to ACE systems with only partial allowance (new or incremental capital) for corporate equity. In Italy, for example, Hebous and Ruf (2015) did not find a decline in the average corporate debt ratio.

Empirical evidence on the real effects (investment and employment) of ACE systems is scarce. Based on a macro-econometric model of the National Bank of Belgium, Burggraeve et al. (2008) expect the impact of the NID on the real economy to be rather limited in the short run and somewhat more important in the medium run. Starting from the premise that the NID tax reform would have no budgetary impact, they calculate that the gross investment in fixed assets would increase by 400 million euro in 5 years' time, while employment effects are estimated at 3,000 people.

Hebous and Ruf (2015) find no effect of the NID on investments in fixed assets by Belgian affiliates of German MNEs. They find however that the higher capitalisation of Belgian affiliates following the NID is associated with higher levels of equity-financed net lending by Belgian affiliates to affiliated group members in other countries. Their findings suggest that MNE firms engage in tax optimisation whereby equity is transferred to Belgian affiliates and subsequently passed on as lending to other affiliates of the MNE located in countries without an ACE system. As a result, the Belgian affiliate (the lender) benefits from the NID in Belgium, but also the other MNE group members that received a loan from the Belgian affiliate (the borrowers) benefit by the increase of interest payment deductions from their tax base.

3.4. Summary

Previous research on the NID has found the following effects:

- ✓ The introduction of the NID system has led to large inflows of domestic and foreign capital in 2006-2007, leading to better capitalized firms.
- ✓ The NID is associated with a significant increase in the share of equity in the capital structure of Belgian firms. This effect is largest among the large firms. In the short run, no effects have been found for SMEs.
- ✓ The NID is related to higher levels of equity-financed net lending by Belgian firms to affiliate group members in other countries.
- ✓ So far, limited evidence is found for real economic effects.

4. The coordination centres

4.1. Background

In 1982, the Belgian government introduced a special tax regime for coordination centres with the goal of attracting multinational enterprises to Belgium[5]. Coordination centres are part of multinational groups and they typically carry out service activities for other companies in the group. Mostly, they are used for activities such as insurance, the hedging of foreign exchange risk and the centralising of financial operations, accounting, administration and data processing.

In order to benefit from the coordination centre regime, coordination centres 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). The main tax benefit of the coordination centre regime was the so-called "cost-plus" method to calculate the taxable revenues of the coordination centre. In this system, a default margin of 8% (or plus) was applied on the operating expenses (costs) associated with the transactions between companies of the same group in order to arrive at a taxable income comparable to the income that would be obtained if the transactions were carried out by independent companies (i.e. at market prices). Certain operating expenses were excluded from the tax basis and coordination centres were also exempted from some other taxes (e.g. capital duty, real estate taxes, withholding taxes on dividends, interest and royalties) (Green, 2003; Quaghebeur, 2005).

The coordination centre regime soon became very successful with over 400 multinationals applying for the status of coordination centre and around 280 multinational groups effectively establishing a coordination centre in Belgium and operating under the regime for some time. Amongst them, some of the largest US multinationals as well as considerable numbers of MNEs from the UK, the Netherlands, the Scandinavian countries and Belgium (PWC, 2011). In 2002, employment of coordination centres in Belgium topped at almost 10,000 people, with additional indirect employment of the same magnitude (PWC, 2011). The favourable tax regime also inspired other countries like France, Germany, the Netherlands and Luxembourg to introduce similar regimes in an attempt to attract multinational enterprises to their country.

On July 11 2001, the European Commission opened a formal state aid action on 15 corporate tax measures including the Belgian coordination centre regime[6]. On February 17 2003, a final negative decision was adopted for the Belgian coordination centre regime, making an end to the favourable coordination centre regime in Belgium. A transition period was introduced in which recognized coordination centres whose 10-year approval had not yet expired, could continue to benefit from this special tax regime until the end of 2010 (Green, 2003; Quaghebeur, 2005).

In 2006, the Belgian government introduced the NID with the aim to decrease the effective corporate tax rates of firms, but also partly to compensate for the discontinuation of the coordination centres regime. The recognised coordination centres that still benefitted from the advantageous tax regime for coordination centres could not use both systems, and had to opt for either one.

[5] Royal Decree 187 of 30 December 1982. At the time, the European Commission approved the coordination centre tax regime (Quagheur, 2005).

[6] On November 11 1998, the European Commission, upon invitation by the Council, clarified the application of the state aid rules (defined in art. 87 EC Treaty, now) to cases relating to direct business taxation, opening the possibility to examine the compatibility of the CC tax regime with the EC rules on state aid (Hinnekens, 2000).

4.2. Research framework

Prior to the end of the coordination centre regime in 2003, both Belgian and foreign MNE could apply for the status of coordination centre. In the following analyses, however, we focus on the coordination centres of foreign multinationals. We expect that the end of the coordination centre regime has prompted some coordination centres of foreign MNEs to reconsider their location in Belgium and discontinue their coordination centre activities in Belgium. Given that a first negative advice on the coordination centre regime was already given in 2001, firms may have anticipated a final negative advice and exited before 2003. As coordination centres could still benefit from the coordination centres after 2003 as long as their approval was not yet expired (maximum until the end of 2010), they may also have decided to exit only when their 10-approval of coordination centre came to an end. At the same time, the NID, introduced in 2006, and particularly aiming at attracting capital-intensive investments to Belgium, provides a favourable tax regime to the previous coordination centres, and therefore may have persuaded coordination centres to keep and even expand their coordination activities in Belgium.

4.3. Methodology

In the following analyses, we take a macro-perspective to describe the evolution of employment and equity within coordination centres owned by foreign multinationals. Since the NID regime overlaps with the phasing out of the coordination centre regime in the period 2003-2010, we cannot disentangle the employment and equity effects of the NID regime from those of the coordination centre regime. We use annual account data of the Belfirst database and retain all Belgian affiliates of foreign MNEs active in the NACE-sector 7010 "Activities of head offices"[7]. Over the period 1996-2014, we identify 231 coordination centres of foreign MNEs in Belgium with about 7,000 to 8,000 employees. With an average size of 54 employees by coordination centre, employment is much higher than the minimum employment requirements for coordination centres (10 FTE).

As aggregate figures may hide underlying dynamics caused by firm entry and - growth versus firm exit, we also provide more insights in the job losses following firm 'exit'. Note that a firm 'exit' suggests that the coordination centre has stopped its activities in Belgium. This does not necessarily imply that all employment is lost as a firm can decide to re-employ (part of their) employees in another Belgian affiliate of the foreign MNE group.

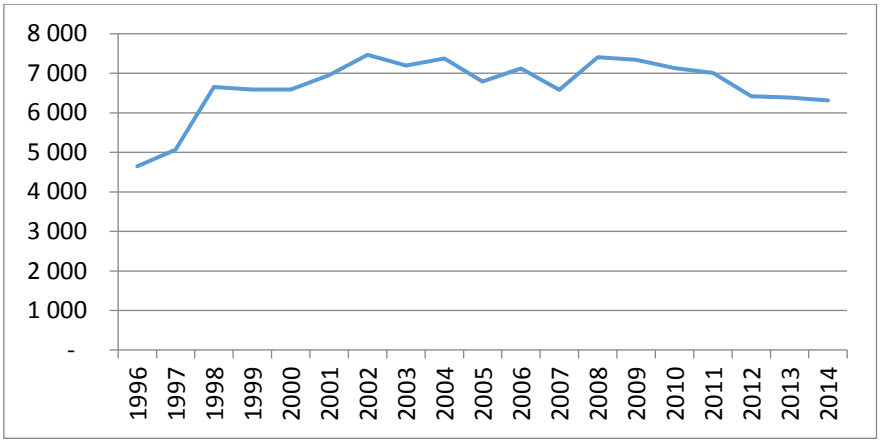
4.4. Results

Figure 7 shows the evolution of the total employment in the coordination centres of foreign MNEs. From 2001, when the European Commission opened the formal state aid action on the Belgian coordination centre regime, till 2014, the overall employment in the coordination centres did not fluctuate much. Yearly employment remained stable at around 7,000 FTE, with the highest levels in 2002 and 2008. A more detailed look into the data, reveals that the exits of coordination centres over

[7] The firms under the NACE-sector 7010 should largely correspond with the coordination centres approved by the government. A visual verification of the names of the enterprises has found that most enterprises within NACE-sector 7010 are labelled as "coordination centres".

the period 2001-2013 triggered substantial employment loss, especially in the period after 2010. For a large part, this loss of jobs has been offset by substantial employment growth in the incumbent firms.

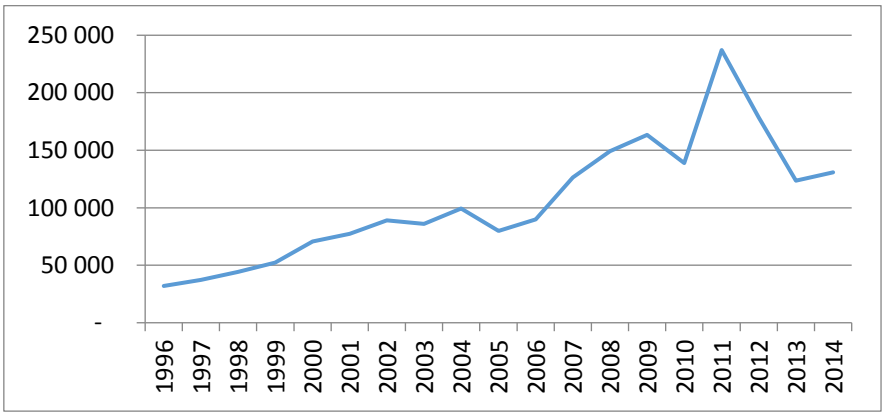
Figure 7: Evolution of total employment in coordination centres (NACE 7010)



Source: authors' calculations (Annual Accounts data)

Figure 8 shows the evolution of the total equity of coordination centres in Belgium over the period 1996-2014. Unlike employment, a substantial increase in equity of the incumbent coordination centres of foreign multinationals is evident in the period directly after the NID was introduced. The loss of equity due to the exits of coordination centres is quite substantial in the period 2002-2006, but particularly in the period 2011-2013, resulting in an overall drop in total equity after 2011.

Figure 8: Evolution of total equity (mio euro) in coordination centres (NACE 7010)

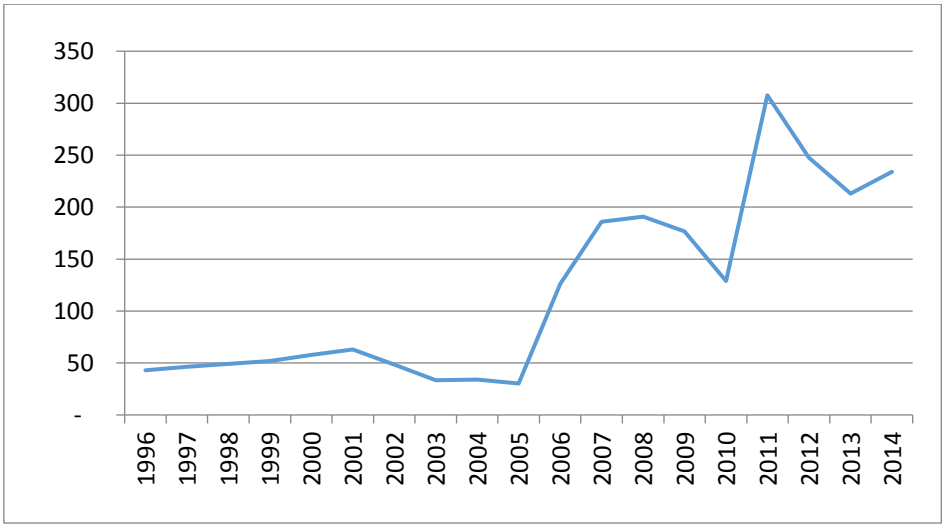


Source: authors' calculations (Annual Accounts data)

Finally, figure 9 shows the evolution of the total tax revenues of coordination centres in Belgium over the period 1996-2014. The figure shows a substantial increase in taxes in the period 2006-2008, which is consistent with the fact that many coordination centres lost their beneficial

coordination centre status in 2005 (PWC, 2011). In 2011 again, we notice another large increase in total corporate income taxes paid by coordination centres.

Figure 9: Evolution of total taxes (mio euro) in coordination centres (NACE 7010)



Source: authors' calculations (Annual Accounts data)

4.5. Summary

In this section, the evolutions of employment, equity and taxation of coordination centres of foreign multinationals in Belgium are described for the period 1996-2014. We find that:

- ✓ employment remains quite stable over time. The substantial negative impact on employment due to the exit of coordination centres are to a large extent offset by the employment growth of incumbent firms.
- ✓ equity increased substantially after the introduction of the NID. Overall equity increase is for the most part explained by the raise of equity in incumbent firms and partly offset by exiting firms.
- ✓ tax revenues from coordination centres raise steeply in the period after the introduction of the NID.

The nature of the firm data and the overlap in timing between the coordination centre regime and the notional interest deduction scheme does not allow us to draw any causal inferences on the impact of the notional interest deduction on the attractiveness of Belgium for coordination centres of foreign multinationals.

5. Research setting and data

5.1. Research setting

Given the aim of the NID to attract capital-intensive investments to Belgium, we will first focus on the capital structure of affiliates of MNEs active in Belgium in the period before and after the introduction of the NID and compare the equity structure of the Belgian affiliates with the equity structure of the Dutch, French and German affiliates belonging to the same multinational group. The affiliates in neighbouring countries thus act a control group as arguably they are operating in very similar markets, in contrast to affiliates active in say Romania or Poland. It is therefore reasonable to assume that existing affiliates in Belgium and neighbouring countries are competing for the same investments from the parent firm. Hence, the introduction of the NID system may trigger different behaviour in allocating equity across affiliates and in potential real effects on investment and employment growth. We next describe the dataset of European MNEs and their affiliates in Belgium, France, Germany and the Netherlands, that was constructed and used for analysing the impact of the NID.

5.2. The European Multinational Network database

We use the European Multinational Network (EUMULNET) database (see Merlevede *et al.*, 2015), which is a unique database containing balance sheet and profit and loss account information of MNEs in *26* European countries over the period 1997-2014[8]. The EUMULNET database is constructed on the basis of the company accounts in the Amadeus database issued by Bureau Van Dijk Electronic Publishing (BVDEP) and links parent firms with their affiliates in Europe

In EUMULNET, a multinational is defined as a *firm that holds at least 50 % of the shares of a firm in a different country at some point in time*. The EUMULNET database contains information on European parent firms and their European affiliates. It does not contain information about European affiliates owned by a non-European parent or about non-European affiliates owned by a European parent. While this is a drawback, we believe that the patterns we document and analyse based on European MNEs are likely to hold also for non-European MNEs as the key economic drivers embedded in the tax system of the NID is the same irrespective of the country of ownership.

5.3. Summary Statistics

Using the EUMULNET database as a starting point, we select all European MNEs active in Belgium and construct a database with the affiliates in Belgium as well as the European affiliates that

[8] The database covers the following European countries: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Germany, Estonia, Spain, Finland, France, United Kingdom, Greece, Croatia, Hungary, Ireland, Italy, Latvia, Lithuania, the Netherlands, Norway, Poland, Portugal, Romania, Sweden, Slovenia, and Slovak Republic. The EUMULNET data used in this study has been extended to cover the period until 2014. The previous version of EUMULNET covered the period 1997-2011.

belong to the same multinational group between 1997 and 2014. This corresponds to 3,353,787 parent-affiliate-year combinations.

Since we do not observe which MNEs use the NID[9], we need a good control group of firms that operate in a similar market environment as the affiliates in Belgium, but have not been able to use the NID regime. The approach that we seek to pursue is comparable to an experimental design in drug testing, where one group of patients receive treatment and a similar group of other patients does not receive treatment. Our control group of firms will therefore consist of the Dutch, French and German affiliates of MNEs active in Belgium. This approach allows us to control for the characteristics of the entire MNE group.

Our analyses thus focus on European MNEs[10] active in Belgium and their affiliates in Belgium, France, Germany and the Netherlands. We exclude the Belgian MNEs from our sample as we are interested in the behaviour of foreign MNEs, and also exclude affiliates that are active in the finance sector (NACE Rev.1 categories 65-67). Using the approach described above, we end up with a dataset with 2,783 European MNEs and their 63,184 affiliates in Belgium, France, Germany and the Netherlands.

Table 1 shows the distribution of the 63,184 affiliates by country of the affiliate and the total number of observations in our dataset. France has by far the highest number of affiliates in our dataset. The reporting system for firms in France is similar to the one in Belgium in the sense that all firms – with exception of very small firms – are required by law to submit annual accounts. For Germany, the dataset contains considerably less affiliates and observations than for France. This is due to the different reporting requirements in Germany: only the larger firms need to report financial figures. Also in the Netherlands, legal reporting requirement are less strict than in Belgium and France. By using country-fixed effects in our statistical analysis, we are able to control for such differences in reporting requirement between countries.

Table 1: Distribution of the affiliates and observations per country
(2,783 parent firms; period 1997-2014)

Affiliate country	Affiliates	Observations
Belgium	6,305	73,330
France	27,362	294,946
Germany	18,788	180,320
Netherlands	10,729	90,028
Total	**63,184**	**638,624**

Table 2 shows the distribution of all parents by country of ownership, including their affiliates and the total observations in the dataset. For example, our dataset includes 8 European MNEs with a parent from Austria and with a respective total of 99 affiliates in Belgium, France, Germany and the Netherlands, representing 696 parent-affiliate-year combinations. Table 2 shows that two-thirds of the parent firms are either French, German or Dutch.

[9] Detailed information on the amount of NID is confidential, however, it is reasonable to expect that almost all MNEs have been adopting the NID system.
[10] The country of MNE is defined by the location of the parent firm at which consolidation of financials takes place.

Table 2: Distribution of observations by country of ownership (period 1997-2014)

Parent Country	Parents	Affiliates	Observations
Austria	8	99	696
Denmark	88	771	7,802
Finland	59	740	8,032
France	607	26,350	279,635
Germany	239	13,181	126,276
Greece	1	1	15
Ireland	19	359	3,719
Italy	207	1,470	16,950
Netherlands	1,013	13,856	126,106
Norway	23	165	1,713
Portugal	8	55	527
Spain	82	612	5,928
Sweden	185	1,774	21,622
United Kingdom	244	3,751	39,603
Total	**2,783**	**63,184**	**638,624**

In table 3, we report some descriptive statistics of the financial and balance sheet data of the 63,184 affiliates in our sample. Over the sample period 1997-2014, the equity-to-total assets ratio of Belgian affiliates (37%) is on average higher than for French and German affiliates but similar to the Dutch affiliates. In terms of employment and total assets, Belgian affiliates are most similar to the French affiliates, while German and Dutch affiliates are clearly larger. These differences are again reflecting the differences in reporting requirement between countries and will be controlled for in the analyses. Further, table 3 reveals that the average wage cost (per employee) is highest in Belgium and Germany. Affiliates in the different countries are quite similar in terms of profitability, but show some difference in terms of tangibility.

Table 3: Characteristics of foreign MNE's active in Belgium by country of affiliate (average values over the period 1997-2014)

Variables	All	Belgium	France	Germany	Netherlands
	(Average values)				
Equity-to-total assets (%)	34	37	34	33	37
Employment (FTE)	258	126	246	465	384
Total assets (in 1000 euro)	99,303	77,781	80,628	193,977	166,316
Wage cost	51,743	58,955	47,835	58,418	53,159
Profitability (%)	10	10	10	12	12
Tangibility (%)	19	19	17	26	21

Source: authors' calculations. Averages are calculated on a dataset cleaned for extreme values, defined as the 1% lower and upper bound of the distribution of the variable. Wage cost = wages / FTE; profitability = operating revenue over assets (OROA) = EBITDA / Total Assets (%) and Tangibility = Tangible Fixed Assets / Total Assets (%).

5.4. Summary

The aim of this research is the following:

- ✓ we investigate whether the capital structure of European MNEs active in Belgium changed after the introduction of the NID, with higher equity ratios implying increased solvability of firms,

- ✓ we analyse the effects of the NID on the employment of Belgian affiliates of European MNEs.

Our research builds on a unique dataset of European multinationals, comprising financial and operational data of Belgian affiliates and the affiliates within the same multinational group operating neighbouring countries.

6. The NID and the capital structure of foreign MNEs

6.1. Background

In two seminal articles in 1958 and 1963, Modigliani and Miller show that in the absence of taxes, the market value of a firm is independent of its capital structure. However, when interest payments on debt are allowed to be deducted from the tax base, the firm's market value will increase with the share of debt in the capital structure. This increase is amplified when the corporate income tax rate is high. Firms will be highly leveraged: the share of debt in the capital structure will be large. Consequently, the firm's solvability will be lower, possibly leading to financing problems during periods of economic distress. Allowing firms to deduct a normal return on equity from the tax base, known as "an allowance for corporate equity (ACE)", can restore the solvability of firms. Not surprisingly, the *Mirrlees Review* advocates the implementation of an ACE system as an integral part for an optimal tax regime in Europe (Mirrlees and Adam, 2011).

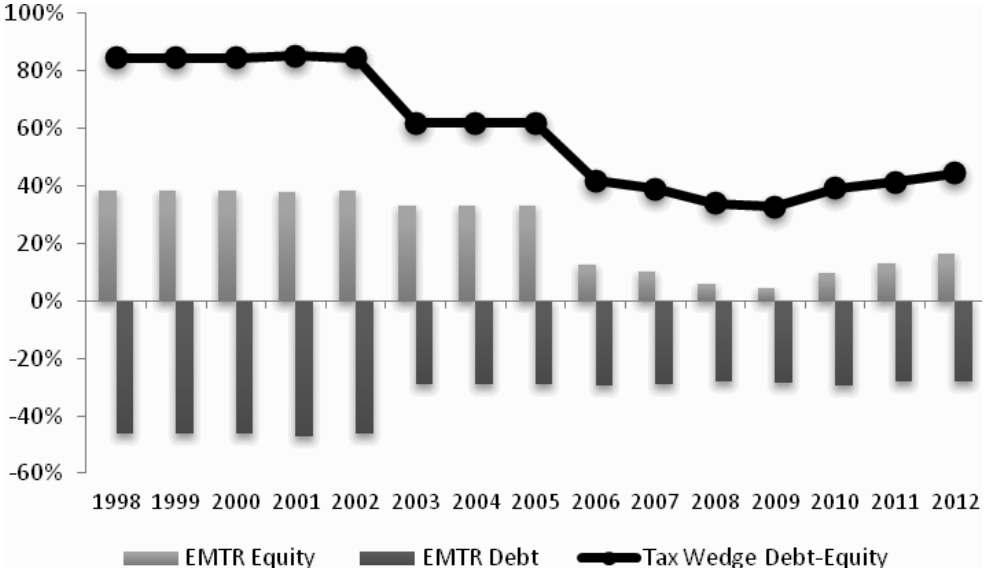
As discussed in section 3, the Belgian government implemented the notional interest deduction (NID) in 2006. This is similar to an ACE system which gives a firm a deduction from its corporate income tax base that is equal to the product of its equity (subject to some adjustments) and a notional interest rate. The main purpose of the NID measure is to reduce the tax discrimination between debt and equity financing, also called the "tax wedge" between debt and equity. Figure 10 illustrates the evolution of the tax wedge in Belgium over the period 1998-2012[11]. The tax wedge is the difference between the effective marginal tax rate (EMTR)[12] on a new investment financed by equity (represented by the light grey bars) and the effective marginal tax rate on a new investment financed by debt (represented by the dark grey bars). As interest payments can be fully deducted from the taxable income, the EMTR of debt is negative, while the EMTR of equity is positive as it is subject to the corporate income tax.

In Figure 10, a first substantial decline in the tax wedge between debt and equity can be observed in 2003 when the corporate income tax rate in Belgium was reduced from 40.17% to 33.99%. A decrease in the corporate income tax rate reduces both the tax benefit of debt-financing and the cost of equity, hence a decrease in the tax wedge follows. The introduction of the NID in 2006 gave rise to a further decline in the tax wedge between debt and equity. However, the tax discrimination towards the use of debt is still present after 2006 as reflected by the positive EMTR on equity. While the EMTR on debt remains stable after 2006, the EMTR on equity fluctuates over time. The increase in the EMTR of equity from 2010 onwards reflects recent adjustments made to the qualifying equity and the drop in the notional interest rate. For 2013 to 2016, we expect an increase in the tax wedge between debt and equity due to further restrictions on the qualifying capital and a further decrease of the notional interest rate.

[11] For more details, we refer to the Zangari (2014).

[12] The effective marginal tax rate (EMTR) is the tax burden for a 1 euro increase in investment. When the EMTR for an investment financed by equity differs from the EMTR for an investment financed by debt, there is tax discrimination between the two.

Figure 10: The effective marginal tax rate on debt and on equity (1998-2012)



Source: ZEW (2012)

6.2. Research framework

The tax wedge between debt financing and equity financing was substantially reduced in favour of equity financing as a result of the introduction of the NID (2006). We expect that this reduction in debt bias promotes foreign capital investments in Belgium and leads to higher capitalization in Belgian affiliates of foreign MNEs, resulting in higher equity-to-total assets ratios. More specifically, we investigate whether the capital structure of MNEs active in Belgium changed after the introduction of the NID, with a higher equity ratio implying increased solvability of foreign MNEs in Belgium.

We start from the work of Panier et al. (2012) that analyse the impact of the NID on the equity structure of Belgian firms. However, Panier et al. do not particularly focus on (foreign) MNEs and therefore their control group for the analyses with MNEs is less precise than in our analyses. Instead, we focus on the non-Belgian affiliates owned by a MNE active in Belgium as counterfactual and control for fixed effects at the level of the affiliate, in addition to country, year and industry fixed effects. While the research of Panier et al. (2012) covers a rather short time period before and after the introduction of the NID (2002-2009), we observe affiliates in Belgium over the entire 1997-2014 period. This allows us to control for anticipation effects on the introduction of the NID and/or firm' responses to changes in the corporate tax rate from 2003. It also allows to observe the equity structure of firms beyond 2009, when long-run interest rates were falling and hence the tax incentive induced from the NID is reduced.

6.3. Econometric model

We use a difference-in-difference estimation to analyse the effect of the NID on the capital structure of Belgian affiliates, and compare the evolution of the capital structure of affiliates in Belgium before and after the introduction of the NID with the evolution of the capital structure of non-Belgian affiliates of European MNEs active in Belgium before and after the introduction of the NID. As the introduction of the NID was unrelated to the existing capital structure of firms in 2006, our difference-in-difference estimator identifies a causal effect. Formally, the model can be written as:

$$y_{imkt} = \beta_i + \beta_1 NID_{imkt} + d_k + d_t + d_s + \boldsymbol{\beta_k} \boldsymbol{X}_{imkt} + e_{imkt} \quad (1).$$

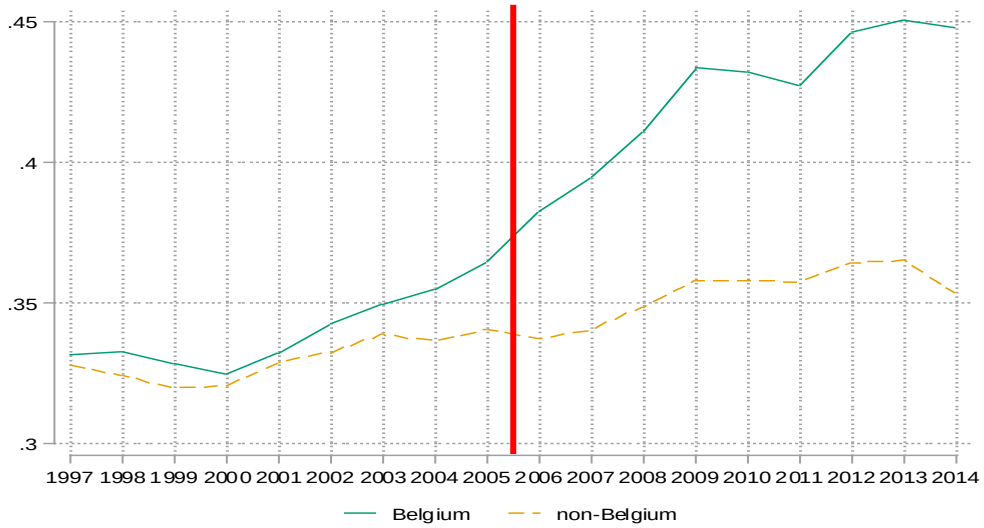
The dependent variable is the equity-to-total assets ratio (y_{imkt}) which is defined for an affiliate (*i*) of a MNE parent (*m*) operating in country (*k*) in year (*t*). The control group (*k=0*) consists of the non-Belgian affiliates of European MNEs active in Belgium. Our variable of interest NID_{imkt} is a dummy variable equal to 1 for Belgian affiliates after 2006 (NID_{im11}) and equal to 0 otherwise. We use fixed effects at the level of the affiliate, country, year and sector and thus take out the average equity-to-total assets ratio for a given affiliate (*i*) by β_i, for a given country (*k*) by d_k, for a given year (*t*) by d_t and for a given sector (*s*) by d_s. Additionally, we control for affiliate-level characteristics that might affect the equity-to-total assets ratio in vector $\boldsymbol{X_{imkt}}$. These are profitability (OROA), the capital-intensity of the firm (tangibility) and the size of the firm (total assets).

Since we have annual data, we can also observe how the effect of the NID (β_1) on the firms' capital structure evolves over time. The difference-in-difference estimator represents the differences between the average equity-to-total assets ratios compared to the base year 1997.

6.4. Results

We first look at the evolution of the *aggregate* equity-to-total assets ratio for Belgian - and non-Belgian affiliates. This is useful to check the validity of our control group. If the evolution of the equity ratio in both groups is similar before treatment, we can say that the control group is appropriate as its behaviour is similar prior to the change in the policy. This is also referred to as the common trend assumption. Figure 11 shows that the common trend assumption is valid from 1997 onwards. This is a sufficiently long period before the introduction of the NID. Immediately after 2006, the evolution of the aggregate equity-to-total assets ratio of the Belgian and the non-Belgian affiliates follow a very different path, which suggests that there has been an important impact of the NID on the capital structure of Belgian affiliates.

Figure 11: Aggregate equity-to-total assets ratio: Belgium vs non-Belgium affiliates (1997-2014)



Source: authors' calculations

To identify a causal effect of the NID on the equity-to-total assets ratio of European MNEs in Belgium, we calculate the difference-in-difference estimator as defined in equation 1. The full set of estimated coefficients can be found in appendix A. The coefficients for the yearly effects of the NID on the capital structure of Belgian subsidiaries are graphically presented in figure 12. Every dot in figure 12 shows the evolution of the average equity-to-total assets ratio of Belgian versus non-Belgian affiliates over time, with the legs around the dot representing the 95% confidence interval and indicating how precise the difference is being estimated. From 2006 onwards, the difference-in-difference estimator represents the effect of the NID on the equity-to-total assets ratio of Belgian affiliates.

Figure 12: Difference-in-difference estimator, equity-to-total assets ratio (period 1997-2014)

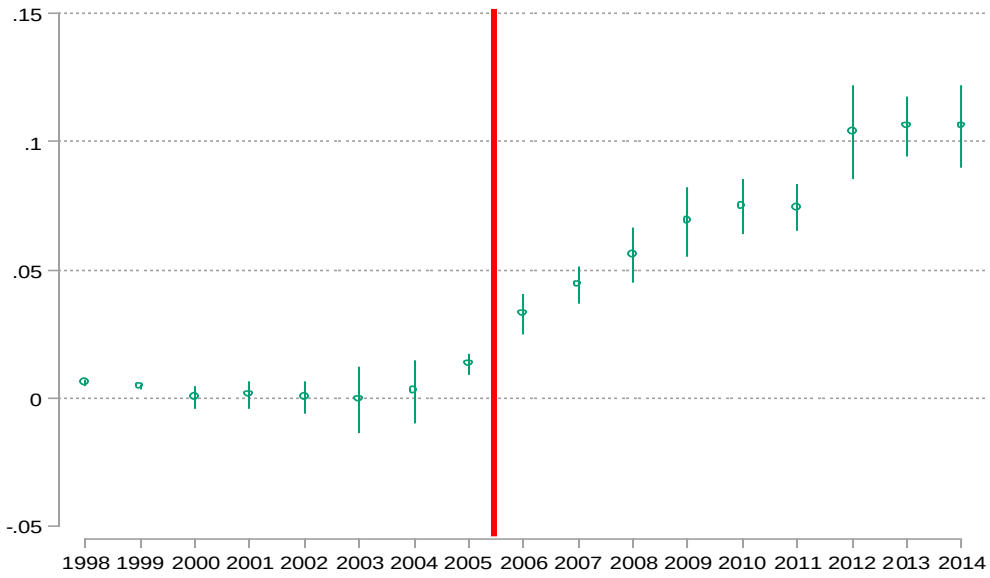


Figure 12 shows a significant increase in the equity-to-total assets ratio of Belgian affiliates compared to non-Belgian affiliates from 2006 onwards. This effect can be attributed to the introduction of the NID in Belgium. The average increase in the equity-to-total assets ratio of Belgian affiliates in the period 2009-2011 was 5 percentage points when taking the year 2005 as a baseline. When taking the year 2003 as a baseline, the average increase rises to 7 percentage points.

6.5. Summary

- ✓ The NID introduced in Belgium in 2006 allows firms to deduct a capital allowance for equity from their corporate income tax base, equal to the product of their adjusted equity and a notional rate.
- ✓ The NID substantially reduced the tax discrimination between debt financing and equity financing, but did not fully remove the tax bias towards debt.
- ✓ Our research provides evidence for a structural change in the capital structure of European MNEs in Belgium following the introduction of the NID.
- ✓ The significant increase in the equity-to-total asset ratio of European MNEs in Belgium indicates an increased solvability of European MNEs active in Belgium.

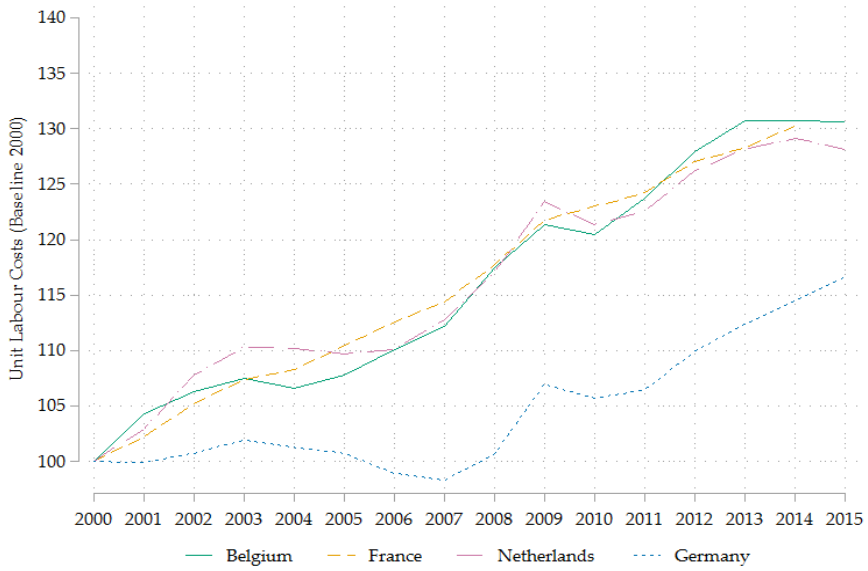
7. The NID and employment effects in foreign MNEs

7.1. Background

Production along global supply chains and the increase in foreign direct investments imply that MNEs may easily (re)locate (part of) their production and distribution facilities to regions which may become more cost-competitive, hence affecting jobs in multinational affiliates. Such investment decisions 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 labour costs and taxation, are factors that can make a difference at the margin. For instance, Konings and Murphy (2006) and Muendler and Becker (2010) study how employment in affiliates of MNEs is affected by the relative difference in labour costs between the affiliates. They find that MNEs expand employment in affiliates with lower wage costs that have similar human capital[13].

Figure 13 shows the evolution of the "Unit Labour Cost (ULC)" in Belgium, France, Germany and the Netherlands from 2000 to 2015. The ULC reflects the labour cost to produce one unit of value added. Over the whole period, the ULC follows the same evolution in Belgium, France and the Netherlands. Only Germany deviates from this trend in the period before 2008, reflecting the consequences of the Hartz reforms in the early years 2000.

Figure 13: Unit Labour Costs in Belgium, France, Germany and the Netherlands (2000-2015)



Source: Eurostat (2016)

[13] 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.

Besides labour costs, taxation is also an important determinant to attract foreign direct investment and hence the jobs that are associated with it. Konings and Vandenbussche (2006), Devereux and Griffith (1998) and Desai et al. (2004) find that changes in corporate income tax rates have an important effect on the capability of countries to attract employment from MNEs. Hence, governments not only take into account that FDI is potentially affected by labour cost competition, but also by tax competition.

Table 4 illustrates that such tax competition may be important. The table lists the 2014 statutory corporate income tax rate and the effective average tax rate (EATR) for the 28 EU countries. The effective average tax rate is calculated according to the Griffith and Devereux (1999) methodology. It represents 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 a better indicator for the attractiveness of a country than the statutory corporate income tax rate. Table 4 shows that Belgium's statutory corporate income tax rate of 33.99% in 2014 is clearly above the EU-average of 22.9% In fact, Belgium has the third highest statutory corporate income rate, after France (rank 1) and Malta (rank 2). Also the effective average tax rate in Belgium - which takes into account changes to the tax base such as the NID – is with 26.7% above the EU average of 21.1%.

The evolution of the effective average tax rates over time seems to suggest that there is some tax competition going on between countries. Figure 14 shows the evolution of the effective average tax rates for Belgium, France, Germany and the Netherlands for the period 2000-2014. For Belgium, we notice a decrease in the effective average tax rate after 2006, when the NID was introduced.

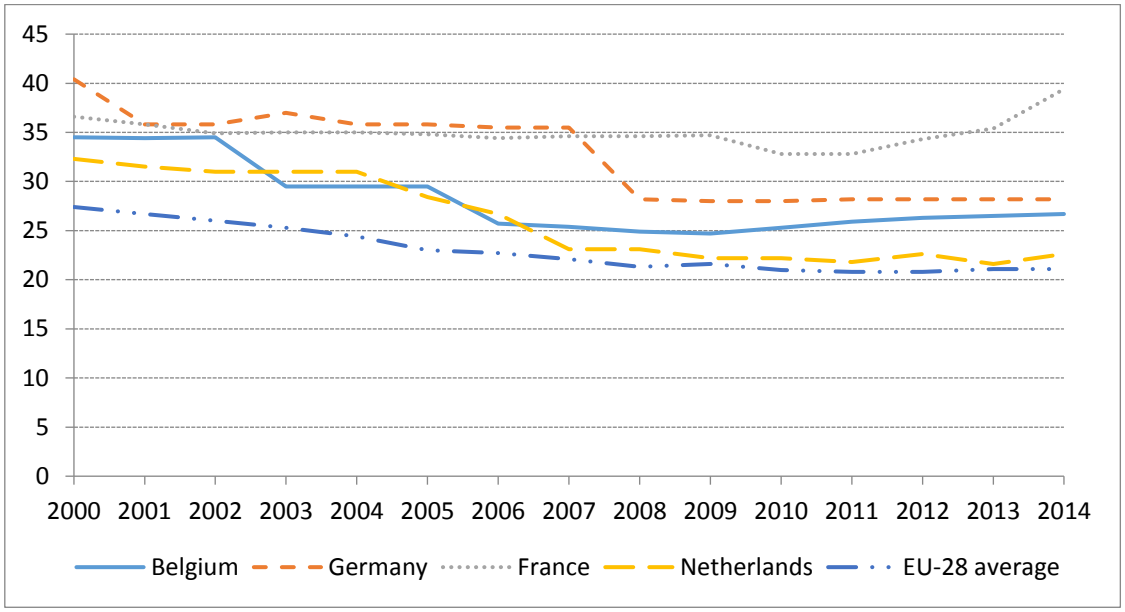
Table 4: Corporate income tax rates in the EU (2014)

Country	Statutory	Stat. Rank	EATR	EATR Rank
Belgium	33.99	3	26.7	6
Bulgaria	10	28	9	28
Czech Republic	19	20	16.7	19
Denmark	24.5	12	22.2	13
Germany	30.175	6	28.2	4
Estonia	21	15	16.5	20
Ireland	12.5	26	14.4	25
Greece	26	9	24.1	8
Spain	30	7	32.6	2
France	38	1	39.4	1
Croatia	20	18	16.5	20
Italy	31.4	5	24	9
Cyprus	12.5	26	15.2	23
Latvia	15	24	14.3	26
Lithuania	15	24	13.6	27
Luxembourg	29.2	8	25.5	7
Hungary	20.6	17	19.3	16
Malta	35	2	32.2	3
Netherlands	25	10	22.6	11
Austria	25	10	23	10
Poland	19	20	17.5	18
Portugal	31.5	4	27.1	5
Romania	16	23	14.8	24
Slovenia	17	22	15.5	22

Slovakia	22	13	19.4	14
Finland	20	18	18.4	17
Sweden	22	13	19.4	14
United Kingdom	21	15	22.4	12
EU Average	**22.9**		**21.1**	

Source: EU Taxation Database

Figure 14: Evolution of effective average tax rates in percent (2000-2014)



Source: EU Taxation Database

7.2. Research framework

The effective average tax rate in Belgium decreased as a result of the introduction of the NID (2006). We expect that this reduction in firm taxation, attracts foreign investments to Belgium and hence is likely to affect employment in foreign affiliates. Since the argument of employment creation is often used by policy makers to introduce special measures to make investment by foreign investors more attractive, we therefore analyse whether employment of foreign affiliates in Belgium increased after the introduction of the NID.

7.3. Econometric model

We use a difference-in-difference estimation to analyse the impact of the NID on the employment[14] of Belgian affiliates and compare the evolution of employment of Belgian affiliates before and after the introduction of the NID with the evolution of employment of similar affiliates in

[14] Employment is expressed in full-time equivalents.

France, Germany and the Netherlands before and after the introduction of the NID. As the introduction of the NID was unrelated to the existing employment level of firms in 2006, our difference-in-difference estimator identifies a causal effect. Formally, the model can be written as:

$$l_{imkt} = \beta_i + \beta_1 NID_{imkt} + d_k + d_t + d_s + \boldsymbol{\beta_k} \boldsymbol{X}_{imkt} + e_{imkt} \quad (2).$$

The dependent variable is log employment (l_{imkt}) which is defined for an affiliate (*i*) of an MNE parent (*m*) operating in country (*k*) in year (*t*). The control group (*k=0*) consists of the non-Belgian affiliates of European MNEs active in Belgium. Our variable of interest NID_{imkt} is a dummy variable equal to 1 for Belgian affiliates after 2006 (NID_{im11}) and 0 otherwise. We take out the average employment level for a given affiliate (*i*) by β_i, for a given country (*k*) by d_k ,for a given year (*t*) and for a given sector (*s*) by d_s, thus controlling for affiliate, country, year and sector fixed effects. Additionally, we control for affiliate-level characteristics that might affect the level and evolution of employment in vector $\boldsymbol{X_{imkt}}$. The obvious variable that is likely going to affect employment is the average labour cost per employee. There is a large literature showing that high labour costs are typically associated with lower employment levels in firms. Hence, a change in the labour costs, due to for example bargaining between unions and firms or due to changes in labour market regulation, which may affect employment, is controlled for. Since we have annual data, we can observe how the effect of the NID (β_1) evolves over time.

7.4. Results

We start by looking at the average effect of the NID on employment of Belgian affiliates over the period 2006-2014. Table 5 presents the results of the difference-in-difference estimator as defined in equation 2. Our dependent variable is the logarithmic transformation of employment at the level of affiliates. This implies that the estimated coefficients can be interpreted as percentage change in employment. For instance, we define NID, which takes the value 1 for Belgian affiliates from 2006 onwards and the value 0 in all other cases. The coefficient should be interpreted as the percentage change in employment at the level of Belgian affiliates compared to non-Belgian affiliates after the NID was introduced.

Table 5: Difference-in-difference estimator, log(employment) (period 1997-2014)

	Dependent variable: log(employment)
NID	0.049***
	(0.017)
log(wage): BE	-0.266***
	(0.048)
log(wage): DE	-0.100***
	(0.020)
log(wage): FR	-0.204***
	(0.016)
log(wage): NL	-0.398***
	(0.040)
Country FE	Yes
Year FE	Yes
Affiliate FE	Yes
Industry FE	Yes
Number of observations	258,843
Adjusted R^2	0.043

Notes: Robust standard errors in brackets, clustered at the country-level. ***/**/* denotes statistically significant different from zero at the 1%/5%/10% level. Employment is measured in full-time equivalents.

First, we discuss the employment effects of the average labour costs. For all countries, we observe a significant, negative relationship between wages and employment. For Belgian affiliates, a 1% increase in the average labour costs per employee, decreases employment of Belgian affiliates with 0.266 percent. The elasticity of employment to changes in wages cost is quite similar for French affiliates (0.204), lower for German affiliates (0.100) and substantially higher for the Dutch affiliates (0.398).

Next, we look at the average employment effects of the notional interest deduction. In table 5, we find that the notional interest deduction leads to a 4.9 percent, statistically significant, increase in employment of Belgian affiliates compared to the employment of non-Belgian affiliates over the period 2006-2014. To gain more insight in the yearly evolution of the effect of the NID, we run the same econometric model but with year interaction effects. The full set of estimated coefficients can be found in appendix B. We graphically present the yearly coefficients for the effect of the NID on employment in Belgian affiliates of MNEs in figure 15. Every dot in figure 15 shows the percent difference in the average employment of Belgian versus non-Belgian affiliates compared to the base year 1997, with the legs around the dot representing the 95% confidence interval[15]. From 2006 onwards, the difference-in-difference estimator shows the yearly effect of the NID on employment of Belgian affiliates compared to non-Belgian affiliates.

[15] For the most recent years 2012-2014, the confidence intervals tend to increase and the estimates are therefore less precise. This is due to the lower numbers of observations of affiliates' financial data in our sample in the later years compared to the period 1997-2011. Missing financial data in the latter years are a consequence of publication delays of the financial data in firm annual account databases.

Figure 15: Difference-in-difference estimator, log(employment) (period 1997-2014)

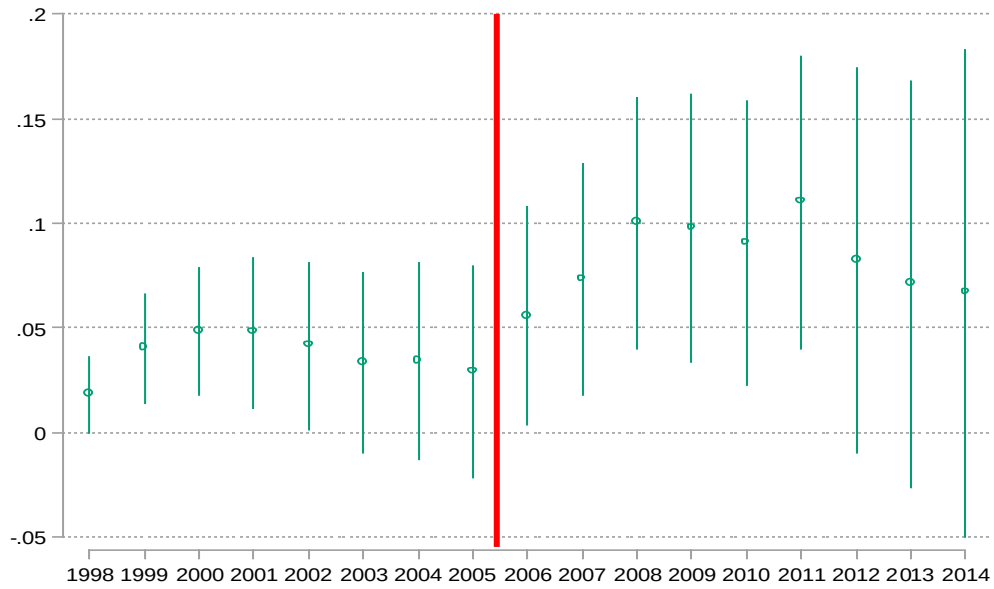


Figure 15 shows an increase in employment of Belgian affiliates compared to non-Belgian affiliates following the introduction of the notional interest deduction. In 2006, the percentage difference in the average employment of Belgian versus non-Belgian affiliates was 2.7 percent higher than in 2005. The employment effects of the NID further increased in the next years. Over the period 2008-2011, the percent difference in the average employment of Belgian versus non-Belgian affiliates was between 6.2 and 8.1 percent higher compared to 2005.

While the analyses provide evidence for a statistically significant effect of the notional interest deduction on employment, it is interesting to also compute the number of new jobs that is associated with this percentage increase in employment in Belgian affiliates. To calculate the total employment effect of the NID in Belgian affiliates of European multinationals over the period 2006-2014, we multiply the coefficient of the NID variable in table 5 ($\beta_1 = 0.049$) with the total employment in the Belgian affiliates in our sample in 2005 (419,948 FTE[16]), or mathematically,

$$\text{jobs created} = \beta_1 * \text{total employment}$$

Based on the above formula, we estimate that the introduction of the NID created 20,577 additional jobs in Belgian affiliates of European MNEs relative to affiliates in neighbouring countries. This figure does not include new entry of foreign multinationals, neither exits of MNEs. The estimation may be considered as an upper bound of the number of new jobs. Indeed, as our difference-in-difference estimator shows the effect of the NID on employment of Belgian affiliates compared to non-Belgian affiliates, above calculation starts from the assumption that the NID had no effect on the employment of the non-Belgian affiliates. If, however, within MNEs, employment has been reshuffled from non-Belgian affiliates to Belgian affiliates as a consequence of the NID, the real number of new jobs in Belgian affiliates will consequently be lower.

[16] Our sample of firms excludes firms active in the finance industry (NACE Rev.1.1 65-67). Furthermore, we exclude those observations that are the 1% upper and lower outliers in terms of employment growth rate and the average labour costs per employee.

7.5. Summary

- ✓ The introduction of the NID led to a decrease in the effective average tax rate in Belgium.
- ✓ The NID did increase employment of Belgian affiliates of European MNEs with 4.9 %, resulting in 20,577 additional jobs.

8. References

Antras, P. and Chor, D. (2013), 'Organizing the Global Value Chain', *Econometrica*, 81(6):2127-2204.

Boadway, R. and Bruce, N. (1984), 'A general proposition on the design of a neutral business tax', *Journal of Public Economics*, 24(2): 231–239.

Bloom, N. and Van Reenen, J. (2010), 'Why Do Management Practices Differ across Firms and Countries?', *Journal of Economic Perspectives*, 24(1): 203-224.

Borjas, G. J. (2010), *Labor economics*. Boston, Mass: McGraw-Hill/Irwin.

Burggraeve, K. et. al. (2008), 'Macro-economische en budgettaire impact van de belastingaftrek voor risicokapitaal.', *NBB Economisch Tijdschrift*.

Desai, M. A., Foley, C. F. and Hines, J. R. (2004), 'Foreign direct investment in a world of multiple taxes', *Journal of Public Economics*, 88(12): 2727–2744.

Devereux, M. and Freeman, H. (1991), 'A general neutral profits tax', *Fiscal Studies*, 12(3): 1–15.

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): 335–367.

Green, P. (2003), 'Coordination centres: the end of an era? Not quite…', *Competition Policy Newsletter*.

Hebous, S. and Ruf, M. (2015), 'Evaluating the Effects of ACE Systems on Multinational Debt Financing and Investment', *CESifo Working Paper Series*, 5360.

Hinnekens, L. (2000), 'European Commission investigates compatibility of Belgian coordination centre tax legislation with European state aid rules', *EC Tax Review*, 4.

Johnson, RC. (2014), 'Five facts about value-added exports and implications for macroeconomics and trade research', *The Journal of Economic Perspectives*, 28(2):119-142.

Klemm, A. (2007), 'Allowances for corporate equity in practice', *CESifo Economic Studies*, 53(2): 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): 267–286.

Konings, J. and Vandenbussche, H. (2006), 'Vennootschapsbelasting, tewerkstelling en groei', *VKW Metena Beleidsnota*, 13.

Konings, J., Reynaerts, J., Goesaert, T., and De Ruyter, S. (2012), "De Sleutelrol van Globale Ondernemingen in Vlaanderen", *VIVES Briefing* 25 juni 2012.

Laveren, E., and Van Sweevelt, K. (2008). KeFiK-enquête KMO financiering 2008. *KeFiK Working Paper*, November 2008. Brussels, Belgium.

Merlevede, B. et. al. (2015), *Multinational Networks, Domestic, and Foreign Firms in Europe*.

Mirlees, J. et. al. (2011), 'The Mirrlees Review: Conclusions and Recommendations for Reform', *Fiscal Studies: The Journal of Applied Public Economics,* 33(3), 331-359.

Modigliani, F. and Miller, M. H. (1958), 'The Cost of Capital, Corporation Finance and the Theory of Investment', *The American Economic Review*, 48(3), 261-297.

Modigliani, F. and Miller, M. H. (1963), 'Corporate income taxes and the cost of capital: a correction', *The American Economic Review*, 53(3): 433–443.

Muendler, M.-A. and Becker, S. O. (2010), 'Margins of Multinational Labor Substitution', *American Economic Review*, 100(5): 1999–2030.

Panier, F., Pérez-González, F. and Villanueva, P. (2013), 'Capital Structure and Taxes: What Happens When You (Also) Subsidize Equity?', *Working Paper*.

Pieron, A., de Haan, K. and Bonaugure, J. (2000), 'The Coordination Centre: Dead Or Alive?', *International Bureau of Fiscal Documentation*.

Princen, S. (2012), 'Taxes do affect corporate financing decisions: The case of Belgian ACE', *CESifo Working Paper Series*, 3713.

PWC (2011), 'The Notional Interest Deduction, a true economic wealth-generator', *Tax Freedom Day.*

Quaghebeur, M. (2005), 'Belgium renovates and generalizes coordination center regime', *Practical European Tax Strategies*, 7(7): 1, 14-19.

UNCTAD (2015), *World Investment Report 2015: Reforming International Investment Governance*.

Van Beveren, I. (2007), 'Footloose Multinationals in Belgium?', *Review of World Economics*, 143(3):483-507.

Van Campenhout, G. and Van Caneghem, T. (2013), 'How did the notional interest deduction affect Belgian SMEs' capital structure?', *Small Business Economics*, 40(2): 351–373.

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 Europ. Union.

ZEW (2012), *Effective tax levels using the Devereux-Griffith methodology*, Final report 2012, Project for the EU Commission, TAXUD/2008/CC/099.

Appendix A. The capital structure: results of the DID estimators

Table 6: Difference-in-difference estimator, equity-to-total assets ratio (period 1997-2014)

	Dependent variable: Equity to Assets ratio	
	(1)	(2)
Belgium x 1998		0.006***
		(0.000)
Belgium x 1999		0.005***
		(0.000)
Belgium x 2000		0.001
		(0.001)
Belgium x 2001		0.001
		(0.002)
Belgium x 2002		0.000
		(0.002)
Belgium x 2003		-0.000
		(0.004)
Belgium x 2004		0.003
		(0.004)
Belgium x 2005		0.014***
		(0.001)
Belgium x 2006		0.033***
		(0.002)
Belgium x 2007		0.044***
		(0.002)
Belgium x 2008		0.056***
		(0.003)
Belgium x 2009		0.069***
		(0.004)
Belgium x 2010	0.054***	0.075***
	(0.002)	(0.003)
Belgium x 2011		0.075***
		(0.003)
Belgium x 2012		0.104***
		(0.006)
Belgium x 2013		0.106***
		(0.004)
Belgium x 2014		0.106***
		(0.005)
ln(assets)	-0.030	-0.030
	(0.013)	(0.013)
OROA	0.311***	0.313***
	(0.052)	(0.051)
tangibility	-0.088***	-0.087***
	(0.008)	(0.008)
Country FE	Yes	Yes
Year FE	Yes	Yes
Affiliate FE	Yes	Yes
Industry FE	Yes	Yes
N	236,656	236,656
adj. R-sq	0.102	0.103

Notes: Robust standard errors in brackets, clustered at the country-level. ***/**/* denotes statistically significant different from zero at the 1%/5%/10% level. OROA is the EBITDA to total assets ratio (%), tangibility is the tangible fixed assets to total assets ratio (%).The year 2012-2014 have far lower number of observations, reflected in the increasing standard errors.

Appendix B. Employment effects: results of the DID estimators

Table 7: Difference-in-difference estimator, log(employment)
(period 1997-2014)

	Dependent variable: log(employment)	
	(1)	(2)
Belgium x 1998		0.019*
		(0.010)
Belgium x 1999		0.041***
		(0.013)
Belgium x 2000		0.049***
		(0.016)
Belgium x 2001		0.048***
		(0.018)
Belgium x 2002		0.042**
		(0.021)
Belgium x 2003		0.033
		(0.022)
Belgium x 2004		0.034
		(0.024)
Belgium x 2005		0.029
		(0.026)
Belgium x 2006		0.056**
		(0.027)
Belgium x 2007		0.074**
		(0.029)
Belgium x 2008		0.100***
		(0.031)
Belgium x 2009		0.098***
		(0.033)
Belgium x 2010	0.049***	0.091***
	(0.017)	(0.035)
Belgium x 2011		0.110***
		(0.036)
Belgium x 2012		0.083*
		(0.047)
Belgium x 2013		0.071
		(0.050)
Belgium x 2014		0.067
		(0.060)
log(wage): BE	-0.266***	-0.273***
	(0.048)	(0.052)
log(wage): DE	-0.100***	-0.100***
	(0.020)	(0.020)
log(wage): FR	-0.204***	-0.203***
	(0.016)	(0.017)
log(wage): NL	-0.398***	-0.397***
	(0.040)	(0.040)
Country FE	Yes	Yes
Year FE	Yes	Yes
Affiliate FE	Yes	Yes
Industry FE	Yes	Yes
Number of observations	258,843	258,843
adjusted R2	0.043	0.043

Notes: Robust standard errors in brackets, clustered at the country-level. ***/**/* denotes statistically significant different from zero at the 1%/5%/10% level. The year 2012-2014 have far lower number of observations, reflected in the increasing standard errors.

Research Centre for Regional Economics
Waaistraat 6 - bus 3550
3000 Leuven, België

Jozef Konings

VIVES, KU Leuven
joep.konings@kuleuven.be

Cathy Lecocq

VIVES, KU Leuven
cathy.lecocq@kuleuven.be

Bruno Merlevede

Department of General Economics, Ghent University
Bruno.Merlevede@UGent.be

Robrecht Vandendriessche

VIVES, KU Leuven
robrecht.vandendriessche@kuleuven.be

Copyright © 2016 @ the authors.

An electronic version of the paper is available on the VIVES website:
http://www.feb.kuleuven.be/VIVES