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WORKING PAPER 06/2017

January 2017

**Working Papers in Public Finance**



**Chair in Public Finance**  
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Working Papers in  
Public Finance

# Evaluating the Effects of ACE Systems on Multinational Debt Financing and Investment\*

Shafik Hebous<sup>†</sup> and Martin Ruf<sup>‡</sup>

January 11, 2017

## Abstract

Theory recommends aligning the tax treatment of debt and equity. A few countries, notably Belgium, have introduced an *allowance for corporate equity* (ACE) to achieve tax neutrality. We study the effects of adopting an ACE on debt financing, passive investment, and active investment of multinational firms, using high-quality administrative data on virtually all German-based multinationals. We use two main identification strategies, based on (1) synthetic control methods and (2) variations across affiliates within the multinational group. Our results suggest that an ACE reduces the corporate debt ratio of multinational affiliates. Additionally, an ACE increases intra-group lending and other forms of passive investment but has no effects on production investment of multinational affiliates. The findings indicate that a unilateral implementation of an ACE system generates a tax planning opportunity using a structure combining the benefits from the ACE with interest deductions.

*Keywords:* ACE, Financial Structure, Corporate Taxation, Debt Bias, Multinational Firms

*JEL Classification:* H25, F23

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\*We thank the research center staff of the Deutsche Bundesbank, particularly Heinz Herrmann and Simone Schultz, for their kind support. We thank the Co-Editor Camille Landais and two anonymous referees for their valuable suggestions. We received helpful comments from Niels Johannesen, Paul Burnham, Johannes Voget, Alfons Weichenrieder, Andrea Pagano, Nadine Riedel, and seminar and conferences participants at the IMF, the OFS at the University of Oslo, the AEA meeting in San Francisco, the CESifo public sector economics area conference in Munich, ZEW Mannheim, the IIPF annual congress at the Trinity College Dublin, Drexel University, and the Technical University Dortmund. The views expressed here are those of the authors and do not necessarily represent the views of the IMF, its Executive Board, or IMF management.

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# 1 Introduction

A central debate in public economics and corporate finance is the role of tax incentives in triggering a debt bias in the corporate financial structure. Most tax systems around the world allow interest payments on loans to be deducted from the corporate tax base. In contrast, returns to equity typically do not benefit from tax deductions. As surveyed in de Mooij (2011), despite a variety of estimates and identification strategies, the empirical evidence indicates a higher reliance on debt financing in a high-corporate-tax environment.

The wedge between the tax treatments of equity and debt generates welfare losses and is frequently cited as affecting investment decisions. The debate on potentially tax-driven high corporate leverage gained new momentum in the aftermath of the global economic and financial crisis of 2008–2009, as several voices expressed concerns about firms’ vulnerability to shocks and their potential macroeconomic consequences.<sup>1</sup>

As a policy response, many experts argue in favor of adopting a tax system that offers an *allowance for corporate equity* (ACE) to remedy tax discrimination against equity. In 2011, the Institute for Fiscal Studies published a high-profile report (Mirrlees et al., 2011) written by a number of experts under the chairmanship of James Mirrlees to “identify the characteristics of a good tax system for any open developed economy in the 21<sup>st</sup> century”. This *Mirrlees review* concludes by recommending that countries adopt, inter alia, an ACE system.<sup>2</sup> In the last two decades, a number of countries introduced a form of ACE: Austria, Belgium, Brazil, Croatia, Italy, Latvia, Portugal, and Liechtenstein. Most recently, in 2016, Cyprus and Turkey adopted an ACE system, and Denmark has proposed to introduce an ACE in its 2017 budget, to be implemented in 2019.

Whilst countries’ experiences may differ in the details, the core idea of an ACE system is to enable the deduction of “normal” returns to equity-financed investment at a measure of the opportunity cost of capital, e.g., the interest rate of long-term government bonds. Since the allowance is received with certainty, an ACE system taxes only the “abnormal” returns to investment.

Thus, ultimately, the idea of an ACE is not only to influence corporate debt policy but also to stimulate investment. Theoretically, offering an ACE achieves neutrality with respect to investment decisions, as it equates the before-tax with the after-tax payoff of the investment (Devereux and Freeman, 1991). Whether or not an ACE system does boost investment, as the theory predicts, is ultimately an empirical question.

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<sup>1</sup>For a discussion, see for example Keen, Klemm, and Perry (2010), de Mooij (2012), International Monetary Fund (2009), and European Commission (2012).

<sup>2</sup>See also Auerbach, Devereux, and Simpson (2010) and Griffith, Hines, and Sørensen (2010).

In this study, we examine the effects of offering an ACE on corporate debt financing and investment, using detailed administrative firm-level panel data on virtually all German firms investing abroad (the MiDi data). An important feature of the data is that we observe loans from related parties, enabling us to test whether an ACE reduces international debt shifting within the group. Another key contribution of this study is that we explicitly distinguish between passive and active (production) investment. This distinction enables us to unveil a novel piece of evidence underscoring the fact that unilateral implementation of an ACE system creates tax planning opportunities for multinational firms. The plan is based on the strategic use of passive investment in the form of intra-group lending.

Specifically, equity injections in a multinational affiliate  $X$  located in an ACE country can be passed on as lending to another group member  $Y$  located in a different country with a high corporate income tax rate. For the group member  $Y$ , the interest on the loans is tax deductible, and at the same time member  $X$  benefits from the ACE relief in the ACE country. In addition, the scheme can entail double-dipping if the source of equity injection is a loan that is forwarded to  $X$  as equity (e.g., cash). In this case, interest expenses are deducted twice. This form of investment is passive in that it does not involve increasing production or tangible assets.

The MiDi data are particularly suitable for examining the above type of double-dipping scheme, since we can observe the full ownership structure of the multinational group. We study intra-group lending by using information on the asset side of German investors abroad on loans to shareholders and enterprises affiliated with the parent.

Figure 1 reveals a compelling picture. In line with the tax plan outlined above, following the introduction of the Belgian ACE in 2006, Figure 1 shows a clear surge in the equity-financed net lending of German investors in Belgium to their affiliated group members in other countries, reaching €10 billion (about 3 percent of Belgian GDP).<sup>3</sup> There is special interest in the experience of Belgium and the lessons that can be learned from the Belgian reform. Belgium adopted a hard version of ACE that treats the total book value of equity as the base of the allowance. In contrast, a soft ACE system, as in most of the other ACE countries, applies the ACE rate only to incremental (new) equity.

Although Figure 1 signals graphical evidence, one challenge facing the evaluation of macroeconomic policy changes in general and ACE reforms in particular is the lack of a

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<sup>3</sup>Although anti-avoidance measures, such as controlled foreign corporations (CFC) rules, are designed to preclude the use of passive investment as a tax planning strategy, they are typically not binding if the statutory corporate income tax rate of the foreign country exceeds a certain threshold. Hence, if a country implements an ACE system with a sufficiently high tax rate, then interest earnings circumvent the German CFC rules. For Belgium, the statutory corporate income tax rate was 33 percent, and is still currently higher than the rate for which the German CFC rules are binding (viz., 25 percent).

coherent control group. The concern is that the evolution of leverage and investment, or the estimated effect, reflects not only the effect of ACE reforms, but also the effects of pre-reform differences in the determinants of leverage and investment across countries.

We address this issue by employing two different identification approaches, based on within-multinational-group comparisons and synthetic control methods. First, we examine whether or not there are differences between firms that operate under ACE systems and their affiliated group members that are owned by the same parent company but located in countries without ACE systems. We estimate a variety of specifications. Including affiliate fixed effects can be viewed as taking account of

parent-firm-destination-country effects that allow for unobserved affiliate and parent-firm heterogeneity. Simultaneously, this set of fixed effects allows all host-country time-invariant characteristics to have different effects across parent firms.

Second, we use synthetic control methods as developed in Abadie and Gardeazabal (2003) and Abadie, Diamond, and Hainmueller (2010). While our regression analysis mentioned above is useful in identifying an average effect and understanding heterogeneous aspects across firms, it is important to compare the ACE country with its counterfactual to address any remaining concerns about the interpretation of regression results and to obtain a country-specific view. As synthetic control techniques require reasonably long time series before and after the treatment, the data enable us to apply this method to Belgium.

Our findings are summarized as follows. Regressions results suggest that an ACE reduces the total debt ratio in ACE countries by about 3 to 5 percentage points on average. We obtain similar results when we consider the ratio of loans from related parties. Concerning investment, we find a positive effect on passive investment, but no effect on active (production) investment. Results indicate that a hard ACE system is more effective in reducing corporate debt. We provide a battery of robustness checks and additional results that support these findings. For example, we conduct the analysis separately for large, small, and profitable firms. A hard ACE has often larger effects on the debt ratio than a soft one. Additionally, since in the case of Belgium the ACE applies only to corporations, we employ a difference-in-differences specification distinguishing between incorporated (treated) and non-incorporated (control) affiliates in Belgium.

Consistently with the regression results, the findings from the synthetic control method show that the average leverage ratio in Belgium fell below 45 percent following the implementation of the ACE. However, in the case of the synthetic control, this ratio remains very close to its previous decade level. Furthermore, for the synthetic control, equity-financed net lending has not increased as it did in Belgium in the period following the implementation of the ACE. This finding confirms the graphical evidence presented in Figure 1 indicating a tax

plan by multinational firms combining the benefit from the ACE with interest deductions. It is also consistent with the idea of rechanneling loans again to Belgium as new equity injections in order to double the benefits from the same genuine new equity. This result is robust to a series of placebo studies on non-ACE countries. In addition, in line with the regression results, we find no effect of the Belgian ACE on investment in fixed assets of multinational affiliates.

Our findings have important implications. First, in spite of the success of a hard ACE in increasing capitalization, a more capitalized firm does not necessarily make higher production investments. Largely, the increase in equity injection is earmarked for intra-group lending and for benefiting from other sources of interest earnings. This speaks for accompanying ACE reforms with anti-avoidance provisions targeting intra-company transactions. Second, the results lend support to the notion of high gains from international tax coordination to diminish the use of double-dipping international arrangements that combine an ACE with interest deductions or even generate a cascading of ACE benefits.

The paper proceeds as follows. In section 2, we relate our contribution to the existing literature. In section 3, we develop our hypotheses and provide a background briefly describing countries' experiences with ACE reforms. In section 4, we present the data. In section 5, we explain our identification approaches and present the results. Finally, we conclude in section 6.

## 2 Contribution to the Literature

The idea of offering an ACE to achieve tax neutrality with respect to financing and investment decisions is certainly not new. The theoretical foundation of ACE systems was developed in the mid-1980s by Boadway and Bruce (1984), among others. The report by the Institute for Fiscal Studies Capital Taxes Group (IFS, 1991) also reached a similar conclusion to that of the the Mirrlees review, recommending offering an ACE.

Empirically, thus far, the effects of implementing ACE systems on the corporate financial structure and passive investment have not yet been extensively evaluated, perhaps due to the difficulty of accessing suitable data and also the above-outlined identification challenges.

Princen (2012) and Panier, Pérez-González, and Villanueva (2013) specifically address the issue of ACE using the commercial database AMADEUS. However, both studies focus only on corporate leverage and the ACE in Belgium. Due to the lack of a counterfactual, these authors consider firms in other European countries, e.g., France, as a control group.

Arguably, this approach has shortcomings.<sup>4</sup>

Our major contribution to this literature is with respect to contents and implemented identification strategies.

First, we study not only the reaction of leverage, but also investment, and we consider not only Belgium, but also all other ACE countries. Importantly, we explicitly examine *passive* investment. This requires observing the ownership structure of the group, a distinctive feature of the MiDi database. This study is the first to use this data set to address the topic of ACE and passive investment.

Second, at the methodological level, we use different identification strategies. In our regression analysis, affiliates within the same multinational group arguably provide a more homogeneous environment for comparison than, e.g., comparing Belgian with French firms. Moreover, ACE reforms offer a natural application for synthetic control methods in which the comparison is between Belgium with an ACE regime and a hypothetical Belgium without the ACE.

More generally, we add to the literature on the effects of corporate taxes on the financial structure. Most existing studies rely on cross-country or within-country variations in corporate income tax rates, whereas only a few papers exploit some form of quasi-natural experiment. Examples of studies include Desai, Foley, and Hines (2004) and Heider and Ljungqvist (2015) for the US; Doidge and Dyck (2015) for Canada; and Huzinga, Laeven, and Nicodeme (2008) for Europe.<sup>5</sup> In our research design, we exploit the introduction of ACE regimes as exogenous variations in the cost of debt in the non-financial corporate sector.

In addition, we contribute to the literature on tax planning of multinational firms. Well-known tax loopholes and tax planning strategies typically involve tax havens or jurisdictions with low statutory corporate income tax rates (e.g., Dharmapala, 2008). The evidence in this paper discloses that a unilateral implementation of an ACE system opens the door for implementing a tax plan with a structure containing only “white-list” high-tax countries. This is the first piece of hard evidence on this issue, and it is in line with concerns raised in policy discussions on potential abuse of ACE systems (e.g, Zangari, 2014).<sup>6</sup>

Finally, our paper is related to a theoretical literature that uses computable general equilibrium (CGE) models to simulate the welfare effects of ACE regimes. De Mooij and Devereux (2011) find that an ACE reform would be welfare-improving for most EU members

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<sup>4</sup>Schepens (2016) uses data from Bankscope to study banks’ reaction to the ACE in Belgium. In the same spirit as Princen (2012), Aus dem Moore (2015) also studies the reaction of debt financing in Belgium to the ACE, using AMADEUS.

<sup>5</sup>For an earlier wave of empirical studies, see Gordon and Lee (2001) and Graham (2000, 2003).

<sup>6</sup>Devereux (2012) discusses practical challenges in implementing an ACE regime within the current international tax system, pointing out profit-shifting opportunities for multinational companies.



if it were coordinated at the European level. Keuschnigg and Dietz (2007) simulate a CGE model for Switzerland and propose an ACE reform that can increase GNP in the long run.

## **3 Effect of ACE on Debt and Investment: Theory**

### **3.1 Hypothesis Development**

#### **3.1.1 ACE Reduces the Tax Benefits of Debt**

Since the seminal contributions by Modigliani and Miller (1958, 1963) and Miller (1977), it has been recognized that if taxes are not neutral, then the financial structure tends to be biased towards debt financing. Theoretically, allowing interest deductions can favor debt financing as governed by arbitrage conditions. Different models entail different details, but generally an arbitrage condition captures a trade-off between the non-tax costs of debt and equity and the tax benefits of debt.

Examples of non-tax considerations are agency costs and default risks (e.g., Kraus and Litzenberger, 1973). The tax benefit of corporate debt can depend not only on the corporate income tax rate but also on other taxes such as the personal income tax. Often, however, international investors, such as pension funds and foreign portfolio investors, are exempted from the tax or at least not subjected to the full domestic tax rate (e.g., de Mooij, 2012).

The attractiveness of debt financing is reinforced in a multinational setup, since multinational firms can exploit differences across countries' corporate tax rates (Mintz and Weichenrieder, 2010). All in all, regardless of modeling details, the theory suggests that an increase in the corporate income tax rate, *ceteris paribus*, raises the tax benefits of corporate debt.

Devereux and Gerritsen (2010) and Devereux and Freeman (1991), among others, show that aligning the tax treatment of debt and equity by introducing an ACE reduces the tax benefit of debt. It eliminates the debt bias if it is applied with a rate equal to the interest rate used for serving the debt. Otherwise, the ACE lowers the debt bias but does not fully eliminate it. Theoretically, the rate of the ACE is set equal to the risk-free nominal interest rate. The rationale for this notional rate is based on the idea that the relief for equity is certain and therefore should be equal to the marginal cost of capital. A theoretical alternative according to Boadway and Bruce (1984) does not allow the deduction of interest payments. Instead, all returns to capital, regardless of the source of financing, receive an allowance equal to the risk-free rate.

Overall, offering an allowance for corporate equity, *ceteris paribus*, reduces discrimination against equity and hence lowers the corporate debt ratio.

### 3.1.2 An ACE Increases Passive Investment

Concerning the effects of an ACE on passive investment, a unilateral implementation of ACE generates an opportunity for the multinational group to implement a tax-minimizing strategy in a very similar vein to models presented in Altshuler and Grubert (2003) and Mintz and Weichenrieder (2010). Panel (a) of Figure 2 illustrates the idea. The group sets up an international arrangement according to which an affiliate obtains a loan in a non-ACE country. The loan is forwarded as cash (share capital) to an affiliate in the ACE country. In turn, the affiliate in the ACE country lends the amount to a third affiliate and receives interests. For the lender affiliate in the ACE country, the passive investment enjoys the ACE, whereas borrower affiliates deduct interest payments from the corporate tax base in high-tax countries. This is a double-dipping structure.

Yet, variants of this tax plan can be engineered entailing different details. Further, the tax plan can imply *cascading* of ACE benefits in the sense of doubling the received allowance corresponding to the same initial genuine increase in equity. The third affiliate can forward the same loan again, as equity financing, to affiliates in the ACE country, so as to benefit once more from the allowance. Such a practice is a frequently cited concern in connection with potential abuses of ACE systems, and in some ACE countries can be subjected to anti-avoidance measures (Zangari, 2014). Another twist to the scheme is to locate an affiliate within the chain in a tax haven. In this case, for this affiliate, there is little benefit from interest deductions, but the group might benefit from obscuring the ultimate ownership.

As anecdotal evidence, panel (b) of Figure 2 shows a “real-world exemplar” taken from a publication of a tax-consulting firm. In addition to the above-outlined tax plan, it stresses the prospect of a tax-free distribution of profits to another affiliate located in a “treaty” country. Belgium has extensive double-tax agreements that guarantee no dividend withholding taxes on distributions to a treaty jurisdiction. In the context of German-based and other EU multinationals, the ACE is particularly attractive in that the withholding rate within the EU is zero.<sup>7</sup>

In the presence of an ACE regime, returns on passive investment take advantage of the offered allowances without the need for a low corporate income tax rate. In fact, CFC rules in the home country of the ultimate owner might be binding if the lender affiliate is in a low-tax country. For instance, the German CFC rules apply if the foreign corporate income tax rate is below 25 percent.<sup>8</sup> Therefore, an international structure combining ACE and interest

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<sup>7</sup>Moreover, panel (b) of Figure 2 refers to a structure that involves an intellectual property (IP) contribution to an existing Belgian affiliate in exchange for equity to offset royalty income against the ACE and in addition benefit from the absence of a capital tax on IP contributions in Belgium.

<sup>8</sup>Ruf and Weichenrieder (2012) describe the German CFC rules. Other advanced countries implement

deductions is particularly attractive if the ACE country is a relatively high-tax country, in order to avoid home country CFC rules. Further, the freedom of movement of capital guaranteed in the EU treaty limits the possibilities of German anti-avoidance legislation to deal with the ACE in other EU countries.

Thus, despite possibly involved details, the general principle is the same. Offering an ACE increases passive investment in the form of equity injection in affiliates in the ACE country to be forwarded as loans to affiliated group members in different countries.

### 3.1.3 ACE and Active Investment

Taxation may cause investment projects that were worth undertaking before the tax to be unprofitable after the tax. Devereux and Freeman (1991), Bond and Devereux (1995), and Fane (1987) show that an ACE maintains neutrality in this respect, as returns are given relief up to a value equal to the cost of capital. Hence, only economic rents (abnormal returns) are taxed in such a system.<sup>9</sup>

However, in many discussions, all investment is implicitly assumed to be production investment. Yet, there are reasons to think that an ACE does not necessarily increase investment in tangible assets. First, a profitable strategy in the presence of an ACE can take the form of passive investment as described in the previous subsection.

Second, in practice, ACE experiments tend to be associated with ongoing discussions generating uncertainty regarding their survival. As we will summarize below, most ACE regimes have eventually been abolished. For a firm, the loss of the ACE would immediately remove the tax benefits from using equity. This stands in stark contrast to other elements in the tax codes, such as depreciation allowances. For example, a long-term production investment that starts based on some depreciation allowance rules would not, in principle, be affected by subsequent changes in those rules.

Third, the presumed effect of tax neutrality on investment is based on remedying the distortion in the cost of capital. However, firms may incorrectly discount expected net cash flows. As emphasized in Bylow and Summers (1984) and Summers (1987), firms tend to use the after-tax cost of capital as a uniform discount rate without conditioning on the risk characteristics of future flows. Lund (2014) presents an extended model and shows that when firms use the same discount rate under any tax system, they undervalue projects under an ACE.

Fourth, there are a number of theoretical papers that emphasize how an ACE system

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similar rules.

<sup>9</sup>International differences in tax rates can still affect the location of economic rents.

no longer achieves neutrality with respect to the size of investment in the presence of moral hazard and financial frictions (e.g., Hagen and Sannarnes, 2007, and Keuschnigg and Ribi, 2012). Agency problems complicate the maintenance of the neutrality property, for example, by altering managerial incentives and encouraging unproductive investment (Koethenbueger and Stimmelmayer, 2014).

On the whole, the above discussion suggests that the effect of an allowance for corporate equity on multinational affiliates' investment in tangible assets is rather ambiguous.

## **3.2 Background: Countries' Experiences with ACE Reforms**

In practice, the implementation of an ACE system entails resolving a number of issues, including the rate of ACE and the corresponding base. The main distinction, though, is the definition of the base. We follow Klemm (2007) in distinguishing between two classifications: A *hard* ACE regime considers the entire book value of equity as the base for computing the allowances, whereas a *soft* ACE regime treats only new (incremental) equity as the ACE base.

Table 1 lists countries that offer or offered an ACE, including the implementation periods. Table A1 in the appendix provides further details on the main fundamental elements of ACE reforms.

### **3.2.1 Hard ACE**

Belgium applies the rate of the ACE to the book value of equity after adjusting for participation in other firms to avoid doubling the relief. The reform was implemented in 2006 and is currently still in place. The ACE rate is the 10-year government bond rate. It was about 4 percent in 2010. This means that equity of €1 million, for instance, receives an allowance of €40,000 that can be deducted from the tax base. Zangari (2014) presents an overview of the various aspects of the Belgian ACE. For example, Belgium does not embrace anti-avoidance provisions aiming at intra-firm borrowing and lending transactions.

Croatia adopted a hard ACE between 1994 and 2000. Keen and King (2002) describe the Croatian system in detail. Liechtenstein embraced an ACE system in 2011. The applicable rate is specified annually.

### **3.2.2 Soft ACE**

Austria applied an ACE starting from 2000 with a rate equal to the average return of government bonds in secondary markets plus 0.8 pp. The base includes only new equity. Eventually,

Austria put an end to its ACE in 2004. The Brazilian system allows the deduction of notional returns when they are paid out to shareholders. Klemm (2007) describes the Brazilian ACE system.

Italy offered a soft ACE between 1997 and 2003. The rate of ACE was 7 percent from 1997 to 2003, and 6 percent from 2001 to 2003. Again, Italy reinstated an ACE regime in 2012. Currently, the rate is 4 percent. Zangari (2014) provides a detailed description of the Italian ACE. For instance, Italy adopted anti-avoidance provisions in connection with intra-firm transactions. Latvia implemented an ACE regime in 2009 with an allowance rate of 4.37 percent applied only to new equity. The Latvian ACE ended in 2014. As shown in Table 1, effective in 2016, Cyprus and Turkey introduced soft ACE regimes (notional interest deduction). Switzerland and Denmark are considering introducing an ACE in the near future.

In most of the above countries, the implementation of ACE was heavily debated from the start. Offering an ACE is associated with a loss of tax revenues, as it implies, by definition, giving up a tax base. This factor impedes embracing ACE reforms and played a key role in abolishing them in some countries. As pointed out by de Mooij (2012), on average, an ACE entails a reduction of corporate tax revenues by about to 0.5 percent of GDP.

## 4 Data

According to the German Foreign Trade Regulation, German investors must report key balance sheet items such as sales, liabilities, and assets of their foreign subsidiaries. These data are confidential and stored at the headquarter of the Deutsche Bundesbank. Essentially, this database contains the whole population of German firms investing abroad, as the reporting requirements are generally met for all majority-owned affiliates with a total balance sheet exceeding €3 million.<sup>10</sup> It is a distinctive feature of this database that we can observe the full ownership structure of the multinational group. That is, we observe all affiliates that belong to the same German parent firm, whether directly or indirectly held. This is a very valuable piece of information that we will use in our empirical identification strategy. Furthermore, we observe intra-group lending.

Interest income from raising capital and financial activities within the multinational group is deemed as passive income under the German tax code and hence might be subject to German taxes according to CFC rules. However, in the case of insurance firms and banks, this sort of income is regarded as active income. Therefore, our analysis focuses on non-financial

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<sup>10</sup>See Lipponer (2009) for a detailed description of the data and reporting requirements.

corporations. Thus, our firm-level panel includes 208,573 affiliate observations stemming from 8,155 parent firms in the period from 1999 to 2012.

Table A2 in the appendix summarizes the variables used in our analysis, including mean values and standard deviations.

**Debt** We define two different leverage ratios. First, the total debt ratio is the ratio of total liabilities to total balance sheet. Second, the ratio of loans from affiliated enterprises is defined as the ratio of liabilities, to shareholders and other affiliated parties linked with the subsidiary, to the total balance sheet. In some specifications, we use the ratio of liabilities to non-German shareholders and other non-German affiliated parties linked with the subsidiary to the total balance sheet. Figure 3 presents the mean values of debt ratios for the ACE countries. In Belgium, the average total debt ratio decreased in the ACE period. In Italy, for instance, the simple average debt ratio did not decline in the ACE period, probably because the allowance is only applied to new equity.

**Investment** We define two variables capturing passive investment. First, equity-financed net lending is equal to loans to affiliated enterprises minus total liability. Second, passive assets is defined as financial assets excluding shares in affiliated enterprises and loans to shareholders. Production (or active) investment is defined as the total of tangible and intangible assets. If a firm has more than one affiliate in a country within a year, we consolidate the investment variables at the firm–country–year level.

Table 2 shows the top three countries in terms of liabilities to intra-group affiliates for German multinationals having an equity-financed net lending group member in Belgium in 2006 or later. The amount of net lending was high before 2006 and it increased to an even higher level after 2006, a pattern which is consistent with the notion that multinationals transferred their equity financed net lending activities from non-European tax havens to Belgium. We observe that France and the US are top locations for intra-group liabilities. Both countries have relatively high statutory corporate income tax rates of 39.5 and 35 percent, respectively. German affiliates in the UK and the Netherlands are also characterized by high intra-company debt. Given the new attractive ACE scheme in Belgium multinationals can increase their amount of internal debt in profitable group members, some of which operate in relatively low tax countries (e.g., 25 percent in the Netherlands). For instance, what is particularly attractive in the Netherlands, for this purpose, is the lack of thin-capitalization rules that may restrict interest deduction of excessive debt. Additionally, the Netherlands are a famous host for conduit holding firms that forward loans, dividends, and royalties to other countries (Mintz and Weichenrieder, 2010).

**Additional Firm-Level Variables** Size is measured by the total balance sheet of the affiliate. Profitability is profits prior to profit distribution and offsetting of losses carried

forward, divided by total equity (total balance sheet minus total liabilities). Tangibility is the ratio of total tangible and intangible assets to total assets (including financial, current, and other assets). Median industry leverage is an industry-specific variable defined as the median of the industry-specific leverage in each year.

**Macroeconomic Variables** We merge the MiDi data with an array of country-specific variables. We organize data on statutory corporate income tax rates by extending the data set of Mintz and Weichenrieder (2010), using information from KPMG country reports. Figure 4 is a binned scatterplot of statutory corporate income tax rates and total debt ratios of affiliates abroad – i.e., plotting mean values of both variables within a bin. In line with a strategy of international debt shifting, we observe an upward-sloping relationship. High debt ratios are associated with high tax rates.

Standard macroeconomic variables are obtained from the World Bank World Development Indicators (WDI). These are inflation, PPP GDP (constant prices, 2005), and PPP GDP per capita (constant prices, 2005). Unemployment is as a percentage of the total labor force. Inflation is the annual percentage increase in consumer prices. Interest is the lending interest rate provided by the WDI and complemented by the long-term interest rate provided by the OECD. Additionally, as institutional measures, we use the Political Stability Index of the World Bank Worldwide Governance Indicators (a higher value indicates higher stability) and the Corruption Perception Index provided by Transparency International (a higher value indicates less corruption).

All level variables, except ratios, are expressed in natural logarithms. We winsorize ratios at the 1 percent level to eliminate extreme values.

## 5 Empirical Assessment

### 5.1 Regression Analysis

Consider the benchmark specification

$$debt_{ikpt} = \alpha_0 + \alpha_1 ACE_{kt} + \alpha_2 TAX_{kt} + \mathbf{\Gamma} \mathbf{X}_{ikpt} + \mathbf{\Phi}_i + \mathbf{\lambda}_t + \varepsilon_{ikpt}, \quad (1)$$

where  $debt_{ikpt}$  is a debt-equity ratio of affiliate  $i$  operating in country  $k$  owned by parent firm  $p$  in year  $t$ . This dependent variable is typically used in the literature.<sup>11</sup>

The dummy  $ACE_{kt}$  is defined as

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<sup>11</sup>See the meta study by Feld, Heckemeyer, and Overesch (2013). Alternatively, one can use interest payments. However, this variable is not available in the database.

$$ACE_{kt} = \begin{cases} 1 & \text{if an ACE system is effective in year } t \text{ in country } k, \\ 0 & \text{otherwise.} \end{cases}$$

We are interested in  $\alpha_1$  and expect it to be negative. In addition, to allow for potential heterogeneity across the ACE systems, we define *ACE hard* equal to 1 during the ACE periods of Belgium, Croatia, and Liechtenstein, and zero otherwise. *ACE soft* is equal to 1 during the ACE periods of Austria, Brazil, Italy, Latvia, and Portugal, and zero otherwise.

The coefficient  $\alpha_2$  on the statutory corporate income tax rate  $TAX_{kt}$  is expected to be positive, in line with Figure 4 and previous literature supporting a tax-motivated debt bias.

The vector  $\mathbf{X}_{ikpt}$  includes a number of explanatory variables as suggested by Huizinga, Laeven, and Nicodeme (2008). These are affiliate-specific variables including size, tangibility, and profitability, and also country-specific variables including GDP growth, interest rate, political stability, and inflation. Further, following Frank and Goyal (2009), we add the median industry leverage to the set of explanatory variables.

The set of affiliate fixed effects ( $\Phi_i$ ) captures unobserved heterogeneity across affiliates and additionally allows the time-invariant country-specific effects to be different across parent firms. That is, for example, distance from Germany to the host country can have different effects across German parent firms. Additionally, industry fixed effects are nested within the affiliate fixed effects, allowing for industry-specific characteristics. Furthermore, our specification includes year fixed effects  $\lambda_t$  to allow for global factors affecting all cross-sectional units in a certain year. For example, year fixed effects control for potential effects of the Great Recession on German affiliates, irrespective of the location of the host country and to the extent that those effects are similar across affiliates in a year. However, these fixed effects do not capture a country-year-specific shock. We estimate a number of variants of the above specification with different sets of fixed effects.

### 5.1.1 Results: Debt Financing

Table 3 presents benchmark estimation results. The dependent variable is the total debt ratio. All standard errors are clustered at the country-year level, correcting for potential correlation between the error terms within a country-year cell. In column (1), we start with a parsimonious specification including parent firm and year fixed effects. The estimated coefficient on the ACE dummy suggests that ACE regimes reduce the total debt ratio by about 3.5 percentage points on average. The results are very similar if we cluster the standard errors at the affiliate level; the standard errors become smaller (results are not reported). Further, in line with the literature, the estimated marginal effect of the statutory corporate



income tax rate suggests that an increase in the tax rate of 1 percentage point leads to an increase in the debt ratio of 0.35 percentage point.

In column (2), we restrain the ACE dummy to equal 1 only for hard versions of an ACE. The estimated coefficient on this dummy indicates that hard ACE systems lower the total debt ratio by about 5 percentage points on average. This marginal effect suggests an elasticity of around 10 percent, given the sample average of 53 percent. To get a feel for the magnitude, a calibrated theoretical model in Sørensen (2014) suggests that a reduction of about 5 percentage points in the debt ratio is needed in order to eliminate the excess burden of the tax distortion. In column (3), the *ACE soft* dummy identifies only soft ACE systems. The effect becomes smaller, suggesting a decrease in total debt ratio of 2.5 percentage points.

In columns (4) to (6), we include parent-year fixed effects, essentially comparing affiliates within the multinational group. For example, in column (6) both ACE variables, *ACE hard* and *ACE soft*, are negative and significant suggesting a reduction in the total debt ratio of 5.3 and 3.1 percentage points, respectively.

In columns (7) to (10), we include affiliate fixed effects. These already capture country, industry, and parent fixed effects. As in the previous columns, the estimated coefficients on the ACE dummies are negative and significant. A soft version of an ACE in the last column has an insignificant coefficient, though, when we include both ACE dummies at the same time. Again, the estimated effect of the statutory corporate tax rate on the debt ratio is positive.

Table 4 shows the same specifications as in Table 3, but the dependent variable contains only loans from affiliated parties. The results are very similar to those in Table 3. For example, the estimates in columns (1) suggest that an ACE reduces the ratio of loans from affiliated parties by 2.8 percentage points. In addition, all specifications with affiliate fixed effects (columns 7 to 10) yield negative effects of ACE variables on the ratio of loans from affiliated parties. These results indicate that an ACE regime reduces international debt shifting.

Table 5 presents a number of robustness checks. In the upper panel, we add lagged values of all control variables. In second panel, we add the lagged value of the total debt ratio. Additionally, in the third panel, since some parent firms can own more than one subsidiary in a country, we consolidate at the parent-firm-country-year level and use parent-firm-country pairs of fixed effects. In the fourth and fifth panels, we explicitly distinguish between small and large affiliates, based on the median of total balance sheet. In the sixth and seventh panels, we run regressions for highly profitable and less profitable affiliates separately. With this regard, we note that, in principle, ACE systems permit allowances that remain unused in a given year to be carried forward; for example for a period of seven years in Belgium. This

is particularly relevant for firms making losses. We obtain similar results across all these specifications. ACE regimes are associated with a significant negative coefficient. When we include *ACE hard* and *ACE soft*, the latter remains significant for small affiliates and in the sample of high-profit affiliates. *ACE hard* is significant in all specifications.

### 5.1.2 Results: Investment

*Passive Investment:* Since equity-financed net lending at the firm level is frequently non-positive, we employ three different specifications. First, we use passive assets as a broader variable capturing passive investment. The results are reported in columns (1) to (3) in Table 6. The estimated coefficient of 0.26 suggests that adopting an ACE increases passive assets by 29.6 percent ( $e^{0.26} - 1$ ).

Second, we define a binary choice variable equal to 1 if the variable equity-financed net lending is larger than zero. Using this specification, we can estimate the effects of an ACE on the probability of being a net-lender affiliate. Columns (4) to (6) in Table 6 show the results. For example, in column (5), the estimated coefficient of 0.618 implies an odds ratio of 1.8, suggesting that adopting a hard ACE increases the odds of being a net-lender affiliate by a factor of 1.8.

Third, we estimate a host country location choice model, as in Ruf and Weichenrieder (2012), by only looking at *new* affiliates. This model enables us to estimate the likelihood of a country hosting a new affiliate with special financing functions (i.e., characterized by positive equity-financed net lending). We refer to such an affiliate as a conduit entity with positive net lending (CEPNL). The latent variable is coded 1 if a country hosts a new CEPNL, and zero for the other countries. Columns (7) to (9) indicate that adopting an ACE increases the likelihood of locating a net-lender affiliate in the ACE country.

The empirical results, presented thus far, suggest that multinational affiliates in ACE countries decreased their debt and increased their passive investment in the form of lending to other group members. In line with this evidence, a recent analysis by the Central Bank of Belgium indicates that a large proportion of FDI inflows into Belgium tends to take the form of equity and leaves the country quickly as FDI outflows in the form of intra-company loans (see, Duprez and Van Nieuwenhuyz, 2016).

Yet, it is informative to look at the other side of the coin by looking at the liabilities of group-members in non-ACE countries. Intuitively, we would expect that the new lending of ACE-affiliates would be forwarded particularly to affiliates in high tax countries. It is important to note, however, that an increase in the leverage in high tax countries following an ACE in another country, *per se*, is not a necessary condition for tax planning. A multinational

group can relocate its financing affiliate to an ACE country while maintaining the same level of debt shifting to high tax countries. The relocation process pays off as a tax plan even without increasing the overall amount of lending to high tax countries. Furthermore, a multinational group can increase its amount of internal debt in profitable affiliates, some of which are already operating in relatively low tax countries; e.g., in Ireland or the Netherlands. Even if the tax rate is not particularly high in these countries, it is still a viable option given the zero taxation of capital income offered through the ACE.

To shed light on this issue, in Table 7, we formally test the effects of an ACE on the borrowing of affiliates in high tax countries. The dependent variable is the ratio of liabilities to non-German shareholders and other non-German affiliated parties linked with the subsidiary to the total balance sheet. We define a dummy equal to one if a group has a CEPNL in an ACE-country in an ACE-year, zero otherwise. We interact this dummy with the corporate tax rate. This interaction term captures the “excess internal debt” of affiliates in high tax countries that are members of CEPNL-groups compared to affiliates in high tax countries that are not members of CEPNL-groups. The findings suggest that affiliates in high tax countries that belong to a CEPNL-group have on average higher internal debt than comparable affiliates in high tax countries that do not belong to a CEPNL-group. For example, in column (1) the estimated coefficient of the interaction term (0.158) suggests that the higher the tax rate the higher is the debt ratio. Evaluated at a tax rate of 40 percent, the excess debt ratio of a high-tax affiliate to a CEPNL-group is 6.3 percentage points ( $0.4 \times 0.158$ ). This finding is reconfirmed in the last column where the sample includes only non-ACE countries, and the CEPNL dummy is restricted to be one only for groups that have a CEPNL in Belgium following the ACE (BELCEPNL). The estimates suggest that in a country with a tax rate of 40 percent, for instance, the excess debt ratio is 7.2 percentage points ( $0.4 \times 0.1798$ ).

As graphical evidence, Figure 5 presents the average internal debt (defined as above) in non-ACE countries distinguishing between a treatment group – defined as multinationals having a CEPNL in Belgium after 2006 – and a control group – defined as multinationals having no CEPNL in Belgium. Further, the plot distinguishes between high and low tax countries using a rate of 32 percent as the cutoff. The two upper panels show that the treated group has a higher internal debt in high tax countries than in low tax countries, and that internal debt tends to increase in high tax countries after the ACE in Belgium (upper right panel). In contrast, the control group (in the lower two panels) has on average high internal debt in low tax countries, and we observe no response to the ACE, neither in the low nor in the high tax countries.

*Production Investment:* Despite the fact that the evidence presented in Table 6 supports

the tax plan outlined in section 3.1.2, one possible scenario is that the increase in passive investment is associated with an increase in real investment. We examine this possibility and estimate an investment equation using three different samples. In the full sample, columns (1) to (4) in Table 8 show that ACE variables have no significant effects on fixed assets. The lack of statistical significance of the coefficients of the ACE variables implies that production investment did not respond, neither in the ACE countries nor in the non-ACE countries. This finding lends no support to the possibility that lending channeled through affiliates in Belgium has led to higher production investment in other affiliates elsewhere, as this would require a statistically significant negative coefficient on the ACE variable.<sup>12</sup> Additionally, as expected, in Table 8 we see that the corporate income tax rate has significant negative effects on fixed assets in all specifications.

One question is whether the absence of a real investment response holds for a subset of subsidiaries that had substantial investment in Belgium already prior to the ACE reform. Hence, the second sample in Table 8 includes only multinational groups that had high fixed assets (above the 75<sup>th</sup> percentile) in the period prior to the introduction of the ACE in Belgium. Columns (5) and (7) show that the coefficients of the ACE variables remain insignificant.

We note that our analysis focuses on multinationals, and that domestic firms may react differently to the reform. Still, FDI is vital for a small open economy such as Belgium. For example, according to the UNCTAD World Investment Report (2015), the stock of inward FDI in Belgium in the last years exceeded 100 percent of GDP. To gain insights on the reaction of non-German affiliates and test for the external validity of our results, we estimate the model using data from the MiDi database on minority-owned affiliates (i.e., those with a German ownership participation lower than 50 percent). Minority-owned affiliates serve as a proxy for domestic firms and other multinationals. Columns (8) to (10) of Table 8 report the results from this sample. Again, neither *ACE hard* nor *ACE soft* seems to affect investment in tangible assets in the ACE country (e.g., column 10). While this exercise offers an indication that German-owned and non-German firms tend to behave similarly, studying the reaction of small domestic firms in detail requires high-quality administrative data on firms in the ACE countries.<sup>13</sup>

Can timing explain the results in Table 8? One may argue that passive investment can react more quickly than production investment. We conduct additional exercises to allow

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<sup>12</sup>This is not the case if investment reacts in the ACE country and the non-ACE countries in an identical manner.

<sup>13</sup>Commercial databases such as the AMADUES database mostly contain relatively large domestic firms, and do not cover SMEs and entrepreneurs, especially in the last decade.

for more flexible timing and the possibility of a sluggish reaction of active investment to the ACE reform. Figure 6 presents results from an event-study estimation approach including interaction terms between the ACE variables and years before and after the reform. The x-axis depicts the time to the event, and the y-axis gives the estimated coefficients of the interaction terms. The 95 percent confidence bands are given by the shaded regions around the point estimates. Overall, we do not find evidence supporting a production investment effect of an ACE, as most coefficients are insignificant. There is a spike before the ACE implementation that may indicate to an optimistic anticipation effect, but it died out quickly and it is not robust as it is not always significant at the 95 percent level (upper left panel and lower right panel).

Furthermore, we check different definitions of dependent variables capturing production investment. In the first three columns of Table 9, the dependent variable is capital expenditure as a ratio to total assets, whereas in columns (4) to (6) we use the growth of production investment instead of the level. We obtain similar results. Overall, the findings from our regression analysis indicate that active investment did not react to the ACE.

### 5.1.3 Difference-in-differences Results: Corporation vs. Non-corporation in Belgium

Before we proceed with using synthetic control methods, we can exploit one additional source for identification. Namely, in Belgium, the rate of ACE applies only to incorporated firms. As a further test, we consider non-incorporated affiliates as a within-country control group. As multinational affiliates mostly tend to be corporations, we find a small but reasonable number of non-incorporated affiliates in Belgium. Adding non-incorporated affiliates to the sample makes them constitute about 3 percent of total observations. Looking at these cases is informative. We specify a difference-in-differences model of the form

$$y_{it} = \beta_0 + \beta_1(\text{incor}_i \times \text{ACE}_t) + \Phi_i + \lambda_t + \epsilon_{it}, \quad (2)$$

where the outcome variable  $y$  depicts debt or investment variables and the dummy  $\text{incor}_{it}$  is equal to 1 if the affiliate is incorporated; zero otherwise.

The coefficient  $\beta_1$  on the interaction term gives the average treatment effect. We note that multinational affiliates tend to stick to their legal forms. In the sample, there are only six cases of switching the legal form from or to corporations; these we discard. This observation is reassuring that potential selection in the treatment is not a major concern in this application. The set of affiliate fixed effects,  $\Phi_i$ , captures affiliate-specific effects including the legal form  $\text{incor}_i$ . All Belgium-wide macroeconomic variables, such as taxes and  $\text{ACE}_t$ , are captured

by the set of year fixed effects,  $\lambda_t$ .

Table 10 supports the above regression results. Panel (a) shows that the Belgian ACE reduces the debt ratio of incorporated affiliates in Belgium. Passive investment increases (panel (b) of Table 10), whereas the effect of the ACE on tangibles is insignificant (panel (c) of Table 10).

## 5.2 Synthetic Control Method

We are interested in constructing a counterfactual country that serves as a synthetic control with respect to that where the ACE was actually implemented. The aim is to make sure that the synthetic country mimics as closely as possible the actual one before the treatment. Then, we can compare the evolution of the variable of interest,  $y$  (leverage or investment), in the two countries after the treatment. For example, the comparison between Belgium and the synthetic Belgium illustrates what would have happened had Belgium not installed an ACE in 2006.

Let  $\mathbf{X}_1$  be a  $K \times 1$  vector of variables that determines the outcome variable  $y$  in the treated country, and  $\mathbf{X}_0$  be a  $K \times J$  matrix including their counterparts for the rest of the non-treated countries,  $j = 1, 2, \dots, J$ . As in Abadie and Gardeazabal (2003) and Abadie, Diamond, and Hainmueller (2010), for constructing the synthetic control, we optimize over the weights  $\mathbf{W} = (\omega_1, \dots, \omega_j)'$  associated with each possible control country  $j$  to minimize the distance between  $\mathbf{X}_1$  and  $\mathbf{X}_0\mathbf{W}$ :

$$\underset{\mathbf{W}}{\operatorname{argmin}} \left( \mathbf{X}_1 - \mathbf{X}_0\mathbf{W} \right)' \mathbf{V} \left( \mathbf{X}_1 - \mathbf{X}_0\mathbf{W} \right), \quad (3)$$

subject to  $\sum \omega_j = 1$  and  $\omega_j \geq 0$ .

The matrix  $\mathbf{V}$  is diagonal positive semidefinite. Its elements give the relative importance of each predictor in  $\mathbf{X}_1$ . This method requires a reasonable pre-reform time series to credibly fit the treated outcome variable. We are able to apply it to Belgium. At the country-year level we can go back 11 years before the Belgian reform.<sup>14</sup> We add distance between Germany and a host country to the set of predictors (in the regression analysis, its effect is captured by the affiliate fixed effects).

Figure 7 shows the results for the debt ratio. The optimal weights are positive for France (71.5%), Denmark (6%), Malta (22.1%), and Uruguay (0.4%). The average debt ratio of German affiliates in Belgium fell below 45 percent following the implementation of ACE.

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<sup>14</sup>For instance, in the case of Brazil there is no post-reform period in our firm-level sample. In the case of Latvia, there are only three post-reform years, and Italy abolished in 2003 its system that was introduced in 1997.

For the synthetic control, after the reform, this ratio remains at its 1990s level of around 60 percent.

From the regression analysis, the magnitude of the estimated average effect on the debt ratio obtained from benchmark specifications is about 4 to 5 percentage points. A country-specific regression for Belgium (a before–after analysis) yields a larger effect of about 11 percentage points (results are not reported). This magnitude is similar to that illustrated by the synthetic control method. The difference between the panel regression analysis and synthetic control methods is due to comparing with different control groups. The multi-country regressions give the same weights for all affiliates within the multinational group, whereas the synthetic control is based on optimizing over the assigned weights to produce the counterfactual.

The upper panel of Figure 8 presents the results for equity-financed net lending. The optimal weights are positive for the Netherlands (60.5%), France (17.5%), Luxembourg (18.2%), and Uruguay (3.9%). There is a clear increase in equity-financed net lending in Belgium, but no indication that a similar increase occurs in the synthetic control. This finding supports the graphical evidence presented in the introduction. Also, it indicates that the combination of a high statutory corporate income tax rate and an ACE system enables a German multinational group to use intra-firm lending as an effective plan to minimize the group’s tax bill in spite of the existence of CFC rules.

The lower panel of Figure 8 shows that investment in fixed assets in Belgium does not diverge from the synthetic control following the introduction of the ACE. The synthetic control and Belgium move fairly close to each other both before and after the reform.

*Inference* – Finally, regarding inference, Abadie, Diamond, and Hainmueller (2010) suggest an inferential technique that relies on a series of falsification tests analogous to permutation tests of inference for comparative studies. We follow their suggestion and conduct a set of placebo studies using potential control countries in the sample excluding the ACE countries (38 potential controls). How often would we obtain results of this magnitude if we had chosen a country at random for the study instead of Belgium? For each placebo run, we compute the distance between  $\mathbf{X}_1$  and  $\mathbf{X}_0\mathbf{W}$ . The upper panel of Figure 9 considers equity-financed net lending and plots the gaps for placebo tests with mean squared prediction error (MSPE) not higher than twice the MSPE of Belgium. This test provides significant evidence that the magnitude estimated for net equity-financed lending in Belgium is unusually different from that for countries that did not implement an ACE system. The lower panel plots the gaps from a series of placebo tests for the debt ratio.

### 5.3 Overall Costs and Benefits of the ACE

On the cost side, the direct budgetary impact of an ACE reform is equal to the equity (the base of the ACE) times the allowance rate. Based on our estimates, given the sample mean of the debt ratio of 53 percent and an estimated reduction in the debt ratio of 5 percentage points (i.e., a new ratio of 48 percent), the new share of equity is 52 percent. Assuming an interest rate  $r$  equal to the rate of ACE, the direct budgetary cost of a hard ACE is  $52 \times r \times t$ , where  $t$  is the tax rate.

On the benefit side, the increase in equity implies a reduction in interest deductions that mitigates the direct budgetary cost of the ACE. Our estimates suggest a reduction in interest deduction of  $5 \times r \times t$ . Thus, the direct budgetary cost of the ACE is lowered by about 10% (viz.,  $5/52$ ). Additionally, according to our results, the ACE is successful in reducing the debt bias and international debt shifting, hence contributing to lower default risks and enhancing overall financial stability.

In spite of the above favorable effects, potential international tax planning is a concern. However, this problem can be addressed with appropriate anti-avoidance provisions that target intra-firm loans within a multinational group. As described in Zangari (2014), Italy embarked upon such provisions whereas Belgium did not. Recently, however, Belgium implemented various legislative changes that weakened the ACE – for example, the fairness tax, which is a tax levied on distributed dividends of large companies, starting from 2014.

It is not straightforward to compute the cost generated by tax planning under an ACE. A portion of the direct cost of the ACE is due to the increase in equity resulting from intra-group net-lending tax schemes. Yet, before the ACE in Belgium, such a structure did not exist, and therefore earning from this investment was not there to be taxed. From this standpoint, one might be tempted to conclude that there is no forgone tax revenue for the ACE country from such planning. Firstly, however, this tax plan affects revenues in other countries. Secondly, this tax plan can lower the effective tax rates facing those firms that implement it in the ACE country (e.g., compared to domestic firms). Thirdly, it is not clear to what extent passive investment acts as a substitute for real investment with potentially positive dynamic effects on the economy. Quantifying these effects, though, is very challenging, as it requires detailed information on directions of transactions and information on the full activities of firms.

For a rough back-of-envelope calculation of the revenue implication of the tax plan, and abstracting from the above effects, consider the increase in net equity-financed lending, which amounts to about €8,000 million in Belgium. Assuming an allowance of 4 percent and a statutory tax rate of 33 percent, the plan provides a tax shelter in Belgium for firms in our sample of €106 million ( $8,000 \times 0.04 \times 0.33$ ). This amount is about 1 percent of the 2005 total



corporate tax revenues in Belgium. Assuming that the net equity-financed lending of €8,000 million is fully directed to the US, with an interest rate of 4 percent and the US tax rate of 39 percent, the forgone tax revenue due to interest deduction in the US would amount to €125 million. This is an upper-bound figure, because borrower affiliates are typically not only in the US. However, this calculation is based on German multinationals only. Multinationals from other countries can also use a similar planning structure with similar consequences to tax revenues in the US.

Finally, it should be noted that assessing the total consequences of an ACE for the reforming country requires taking into account the reaction of domestic firms. Our study is about multinationals. As mentioned in section 5.1.2, entrepreneurs and small domestic firms may react differently.

## 6 Concluding Remarks

Does an ACE reduce the corporate debt bias? If so, does that imply increases in investment? In this study, we have addressed these questions using a high-quality administrative database on German-based multinational firms. Results based on various specifications and identification strategies suggest that corporate debt decreases following an ACE, especially in its hard version. Thus, in this sense, the ACE was successful. However, the findings indicate that the resulting higher capitalization of multinational affiliates is associated with increases in passive investment rather than production investment. An ACE opens the door for multinational firms to use an international tax plan. Lender affiliates receive the allowances on interest earnings, whereas borrower affiliates deduct interest payments or forward them back to the ACE country as a new equity injection.

Yet, this result is not to be taken as an argument against the theory of ACE *per se*, but rather as a hint to improve the practice of implementing an ACE. The findings of this paper underscore the importance of well-designed anti-avoidance provisions and increasing the credibility of an ACE reform. Further research may disclose additional important evidence.

## References

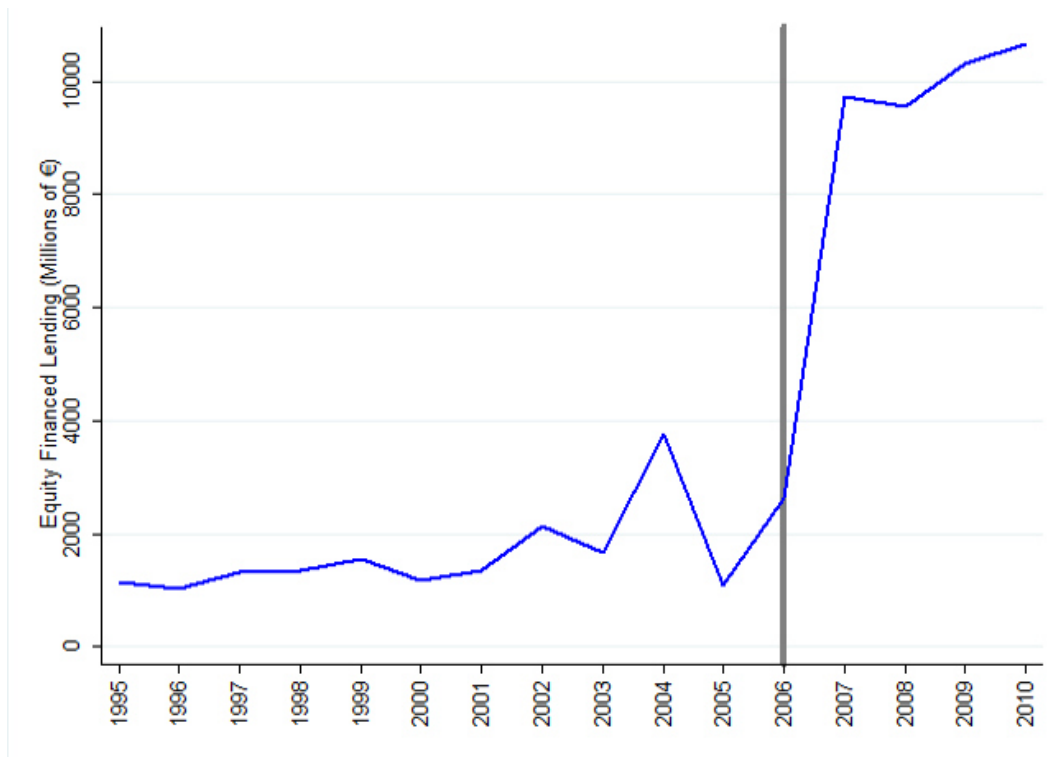
- Abadie, A., and Gardeazabal, L. (2003), The Economic Costs of Conflict: A Case Study of the Basque Country, *American Economic Review* 93(1), 112–132.
- Abadie, A., Diamond, A., and Hainmueller, J. (2010), Synthetic Control Methods for Comparative Case Studies: Estimating the Effect of California’s Tobacco Control Program, *Journal of the American Statistical Association* 105 (490), 493–505.
- Altshuler, R., and Grubert, H. (2003), Repatriation Taxes, Repatriation Strategies and Multinational Financial Policy, *Journal of Public Economics* 87 (1), 73–107.
- Auerbach, A., Devereux, M. P., and Simpson, H. (2010), Taxing Corporate Income, in Mirrlees, J. (Ed.), *Dimensions of Tax Design*, Chapter 9, 837–893, Oxford University Press, Oxford, UK.
- Aus dem Moore, N. (2015), Corporate Taxation and Corporate Financing Decisions: Evidence from the Belgian ACE Reform, Ruhr Working Paper No. 533.
- Boadway, R., and Bruce, N. (1984), A General Proposition on the Design of a Neutral Business Tax, *Journal of Public Economics* 25, 231–239.
- Bond, S., and Devereux, M.P. (1995), On the Design of a Neutral Business Tax under Uncertainty, *Journal of Public Economics* 58 (1), 57–71.
- Bulow, J. I., and Summers, L. H. (1984), The Taxation of Risky Assets, *Journal of Political Economy* 92 (1), 20–39.
- Dharmapala, D. (2008), What Problems and Opportunities Are Created by Tax Havens?, *Oxford Review of Economic Policy* 24 (4), 661–679.
- de Mooij, R. (2011), The Tax Elasticity of Corporate Debt: A Synthesis of Size and Variations, IMF Working Paper No. 11/95.
- de Mooij, R. (2012), Tax Biases to Debt Finance: Assessing the Problem, Finding Solutions, *Fiscal Studies* 33 (4), 489–512.
- de Mooij, R., and Devereux, M. P. (2011), An Applied Analysis of ACE and CBIT Reforms in the EU, *International Tax and Public Finance* 18 (1), 93–120.
- de Mooij, R., Keen, M., and Orihara, M. (2013), Taxation, Bank Leverage and Financial Crises, IMF Working Paper No. 13/48.
- Desai, M. A., Foley, F. C., and Hines, J. R. (2004), A Multinational Perspective on Capital Structure Choice and Internal Capital Markets, *Journal of Finance* 59 (6), 2451–2487.

- Devereux, M. P. (2012), Issues in the Design of Taxes on Corporate Profit, *National Tax Journal* 65 (3), 709–730.
- Devereux, M. P., and Gerritsen, A. (2010), The Tax Treatment of Debt and Equity, in D. Albergtsse and P. Kavelaars (Eds.), *Towards a European Profit Tax*, Deventer, Kluwer, 67–74.
- Devereux, M. P., and Freeman, H. (1991), A General Neutral Profits Tax, *Fiscal Studies* 12 (3), 1–15.
- Doidge, C., and Dyck, A. (2015), Taxes and Corporate Policies: Evidence From a Quasi Natural Experiment, *Journal of Finance* 70, 45–89.
- Duprez, C., and Van Nieuwenhuyze, C. (2016), Belgium’s Inward and Outward Foreign Direct Investment, National Bank of Belgium Economic Review, Brussels.
- European Commission (2012), The Debt-Equity Tax Bias: Consequences and Solutions, Taxation Paper No 33 (2012), European Commission, Brussels.
- Fane, G. (1987), Neutral Taxation under Uncertainty, *Journal of Public Economics* 33 (1), 95–105.
- Feld, L. P., Heckemeyer, J. H., and Overesch, M. (2013), Capital Structure Choice and Company Taxation-A Meta Study, *Journal of Banking and Finance* 37, 2850–2866.
- Frank, M.Z., and Goyal, V.K. (2009), Capital Structure Decisions: Which Factors Are Reliably Important?, *Financial Management* 38 (1), 1–37.
- Gordon, R. and Lee, Y. (2001), Do Taxes Affect Corporate Debt Policy? Evidence from U.S. Corporate Tax Return Data, *Journal of Public Economics* 82 (2), 195–224.
- Graham, J.R. (2003), Taxes and Corporate Finance: A Review, *Review of Financial Studies* 16 (4), 1075–1129.
- Graham, J.R. (2000), How Big Are the Tax Benefits of Debt?, *Journal of Finance* 55 (5), 1901–1941.
- Griffith, R., Hines, J., and Sørensen P. B. (2010), International Capital Taxation, in Mirrlees, J. (Ed.) *Dimensions of Tax Design*, Chapter 10, 914–1027, Oxford University Press, Oxford, UK.
- Hagen, K., and Sannarnes, J.G. (2007), Taxation of Uncertain Business Profits, Private Risk Markets and Optimal Allocation of Risk, *Journal of Public Economics* 91, 1507–1517.

- Heider, F., and Ljungqvist, A. (2015), As Certain as Debt and Taxes: Estimating the Tax Sensitivity of Leverage from State Tax Changes, *Journal of Financial Economics* 118, 684–712.
- Huizinga, H., Laeven, L., and Nicodeme, G. (2008), Capital Structure and International Debt Shifting, *Journal of Financial Economics* 88 (1), 80–118.
- IFS (1991), Equity for Companies: A Corporation Tax for the 1990s, Commentary 26, Institute for Fiscal Studies, London.
- International Monetary Fund (2009), Debt Bias and Other Distortions: Crisis-related Issues in Tax Policy, Washington DC.
- Keen, M., and King, J. (2002), The Croatian Profit Tax: An ACE in Practice, *Fiscal Studies* 23 (3), 401–418.
- Keen, M., Klemm, A., and Perry, V. (2010), Tax and the Crisis, *Fiscal Studies* 31 (1), 43–79.
- Klemm, A. (2007), Allowances for Corporate Equity in Practice, *CESifo Economic Studies* 53 (2), 229–262.
- Kraus, A., and Litzenberger, R. (1973), A State-preference Model of Optimal Financial Leverage, *Journal of Finance* 28 (4), 911–922.
- Keuschnigg, C., and Ribi, E. (2012), Profit Taxes and Financing Constraints, *International Tax and Public Finance* 20 (5), 808–882.
- Keuschnigg, C., and Dietz, M. D. (2007), A Growth Oriented Dual Income Tax, *International Tax and Public Finance* 14 (2), 191–221.
- Koethenbueger, M., and Stimmelmayer, M. (2014), Corporate Deductibility Provisions and Managerial Incentives, *Journal of Public Economics* 111, 120–130.
- Lipponer, A. (2011), Microdatabase Direct Investment – MiDi. A Brief Guide, Technical Documentation, Deutsche Bundesbank, Frankfurt.
- Lund, D. (2014), How Taxes on Firms Reduce the Risk of After-tax Cash Flows, *FinanzArchiv / Public Finance Analysis* 70 (4), 567–598.
- Miller, M. H. (1977), Debt and Taxes, *Journal of Finance* 32 (2), 261–275.
- Modigliani, F., and Miller, M. H. (1963), Corporate Income Taxes and the Cost of Capital: A Correction, *American Economic Review* 53 (3), 433–443.
- Modigliani, F., and Miller, M. H. (1958), The Cost of Capital, Corporate Finance and the Theory of Investment, *American Economic Review* 48 (3), 261–97.

- Mintz, J. and Weichenrieder, A. (2010), *The Indirect Side of Direct Investment: Multinational Company Finance and Taxation*, MIT Press, Cambridge, MA.
- Mirrlees, J., Adam, S., Besley, T., Blundell, R., Bond, S., Chote, R., Gammie, M., Johnson, P., Myles, G., and Poterba, J. (2011), *Tax by Design: The Mirrlees Review*, Oxford University Press, Oxford, UK.
- Panier, Pérez-González, and Villanueva (2013), *Capital Structure and Taxes: What Happens When You (Also) Subsidize Equity?*, Unpublished Manuscript, Stanford University.
- Princen, S. (2012), *Taxes Do Affect Corporate Financing Decisions: The Case of Belgian ACE*, CESifo Working Paper No. 3713. Munich.
- Ruf, M., and Weichenrieder, A. (2012), *The Taxation of Passive Foreign Investment – Lessons from German Experience*, *Canadian Journal of Economics* 45 (4), 1504–1528.
- Schepens, G. (2016), *Taxes and Bank Capital Structure*, *Journal of Financial Economics*, forthcoming.
- Sørensen P. B. (2014), *Taxation and the Optimal Constraint on Corporate Debt Finance*, CESifo Working Paper No. 5101.
- Summers, L. H. (1987), *Investments Incentives and Discounting of Depreciation Allowances*, in Feldstein, M. (Ed.), *The Effects of Taxation on Capital Accumulation*, 295–304, University of Chicago Press, Chicago, IL.
- World Investment Report (2015), *Reforming International Investment Governance*, United Nations Conference on Trade and Development, UNCTAD, Geneva.
- Zangari, E. (2014), *Addressing the Debt Bias: A Comparison between the Belgian and Italian ACE Systems*, Taxation Working Paper No. 44-2014, European Commission, Brussels.

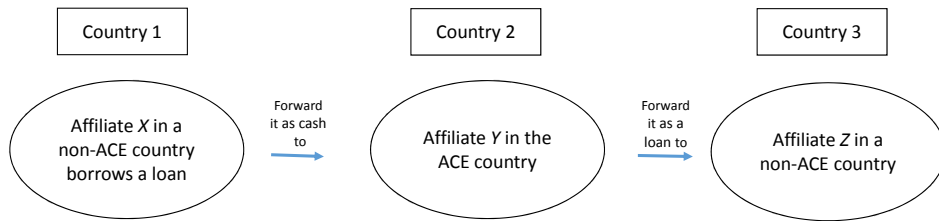
Figure 1: Aggregate Equity Financed Lending of German firms in Belgium



Note: The figure shows total equity-financed lending of German affiliates in Belgium defined as total loans to shareholders and affiliated enterprises with the German parent firm in a certain year minus total liabilities. Belgium implemented an ACE system in 2006. The source of the data is the MiDi database of the Deutsche Bundesbank.

Figure 2: Tax Planning and an ACE

(a) An illustration of using intra-group lending as a tax plan under an ACE



(b) An example from a publication of a tax consulting firm (Source: Intertrust, 2009)

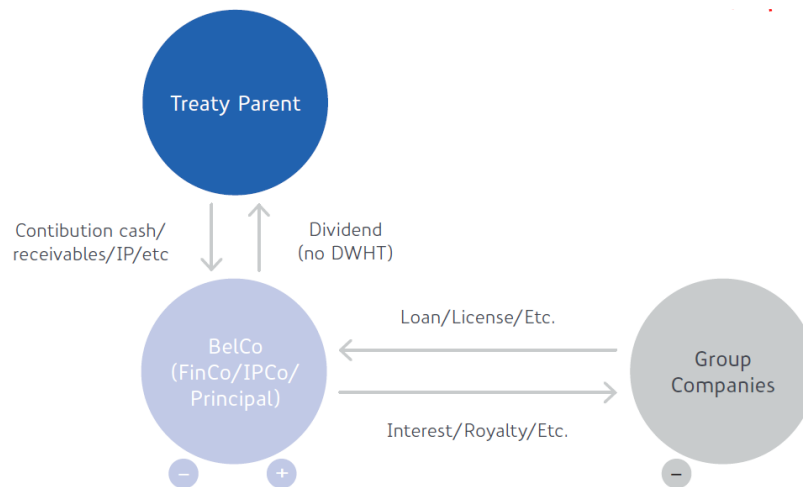
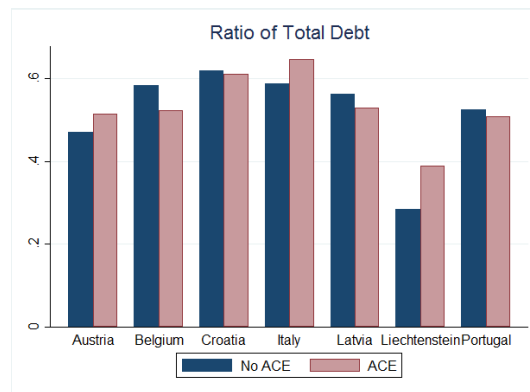


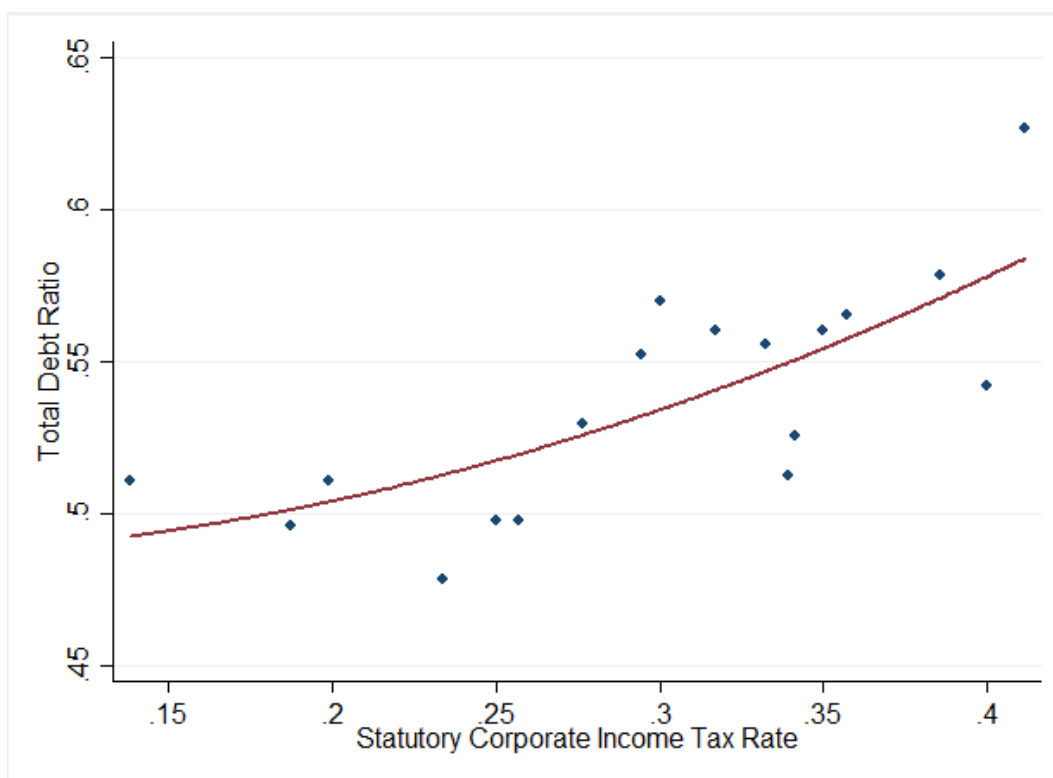
Figure 3: Average Debt Ratio



Note: The figure shows averages of total debt ratios of German affiliates in ACE countries. The source of the data is the MiDi database of the Deutsche Bundesbank.

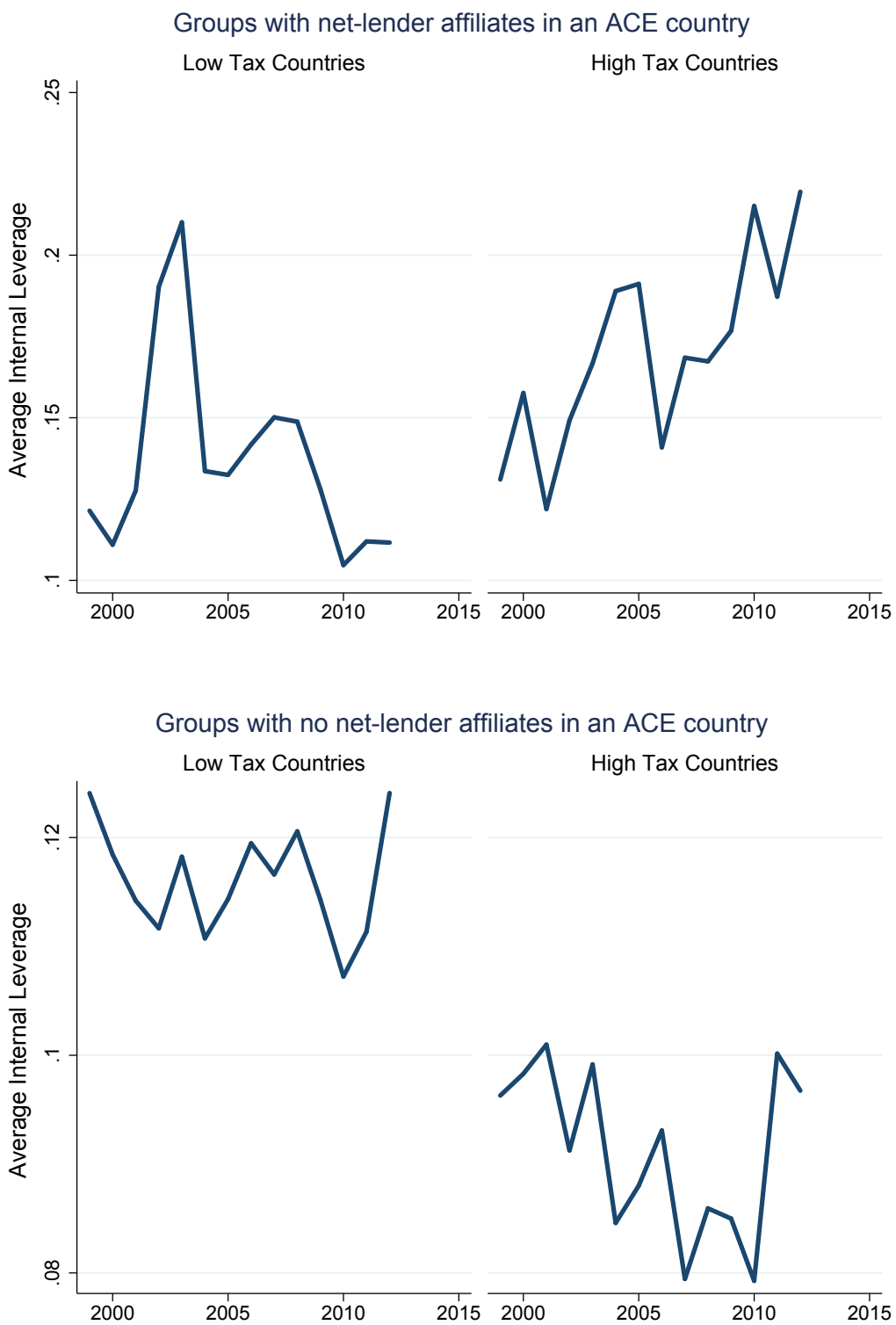


Figure 4: Debt Ratios and Statutory Corporate Income Tax Rates



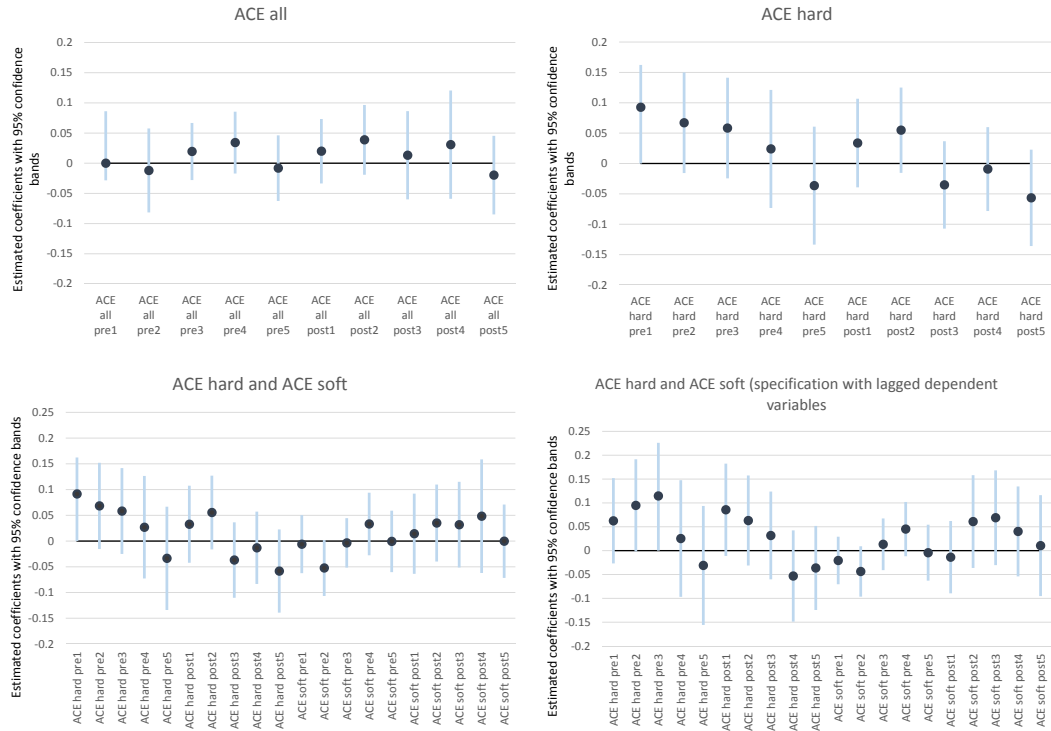
Note: This figure is a binned scatterplot of total debt ratios of German affiliates abroad and international statutory corporate income tax rates in the period 1999–2012. The source of the data on debt ratios is the MiDi database of the Deutsche Bundesbank. Statutory corporate tax rates are collected by the authors as described in the text.

Figure 5: Internal Leverage



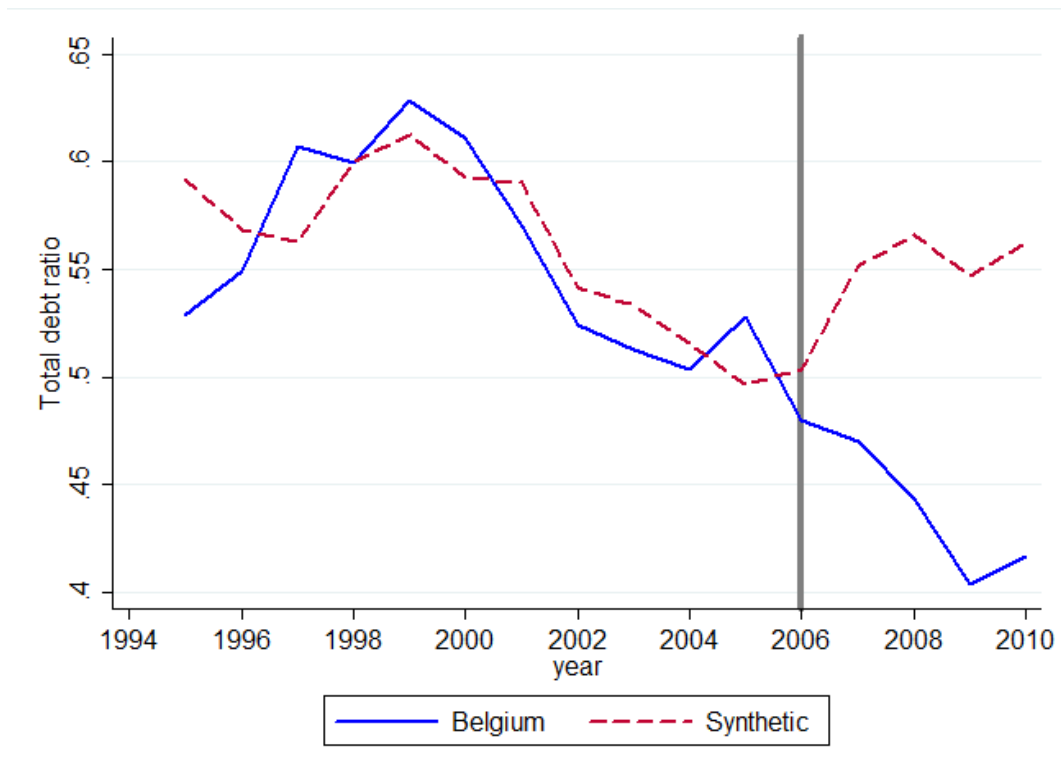
Note: The debt ratio is the ratio of liabilities to non-German shareholders and other non-German affiliated parties linked with the subsidiary to the total balance sheet. Average debt ratio is defined as the average across all affiliates on a yearly basis. This figure distinguishes between a treatment group – defined as multinationals having a CEPNL in Belgium after 2006 – and a control group – defined as multinationals having no CEPNL in Belgium. Further, the plot distinguishes between high and low tax countries using 32 percent as the cutoff.

Figure 6: Event Study: ACE and Active Investment



Note: This figure shows estimated coefficients from event studies using active investment as the dependent variable. All specifications include control variables as in Table 8. The model in the upper left panel is specified for *ACE all*. The variable *ACE all* is a dummy equal to one if the host country adopts any ACE system and zero otherwise. The model in the upper right panel is specified for *ACE hard*. The variable *ACE hard* is a dummy equal to one if the host country adopts a hard ACE regime and zero otherwise. The model in the lower left panel includes *ACE soft* and *ACE hard*. *ACE soft* is a dummy equal to one if the host country adopts a soft ACE regime and zero otherwise. “pre $i$ ” denotes  $i$  years before ACE reform, e.g., for  $i = 1$  the variable “*ACE all* pre1” is equal to 1 in the year before the introduction of an ACE according to *ACE all*, and for  $i = 2$  it is equal 1 for the year that is two years prior to the *ACE* reform. “post $i$ ” denotes  $i$  years after ACE reform. The model in the lower right panel is similar to the one in the lower left panel, but it contains in addition lagged dependent variables. All specifications include affiliate fixed effects. The number of observations is 207,223. All panels display 95% confidence bands based on robust standard errors, clustered at the country–year level correcting for correlation of the errors within the cluster cell.

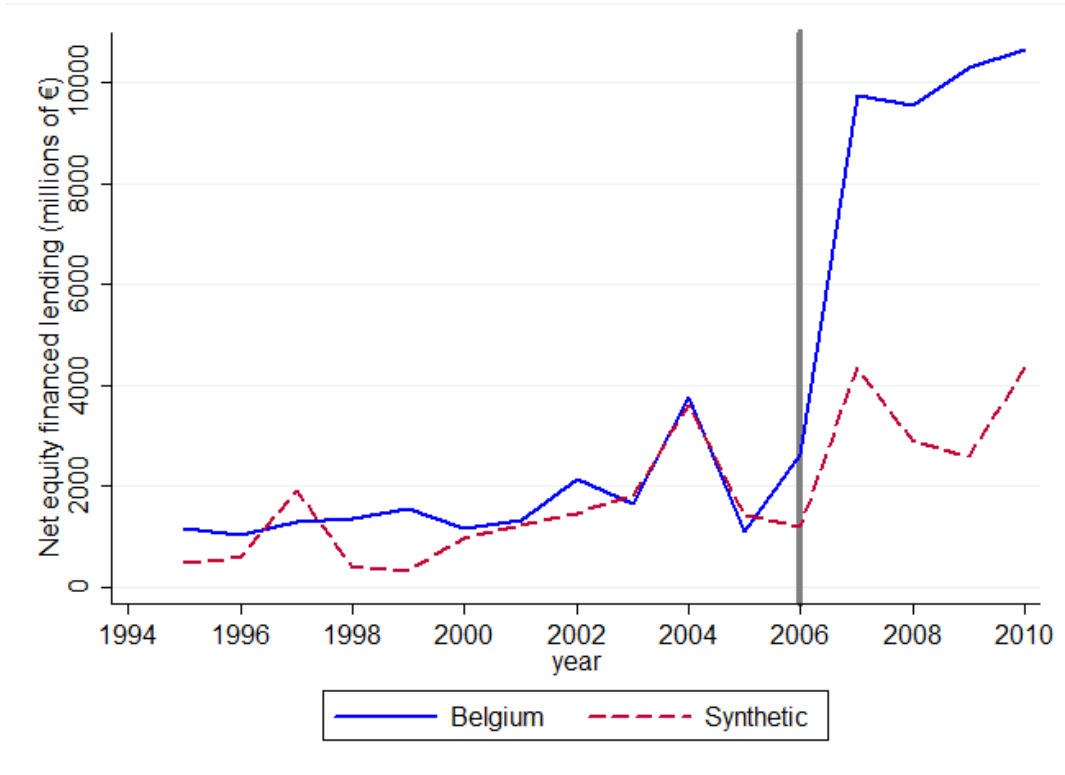
Figure 7: Synthetic Control: Debt Financing



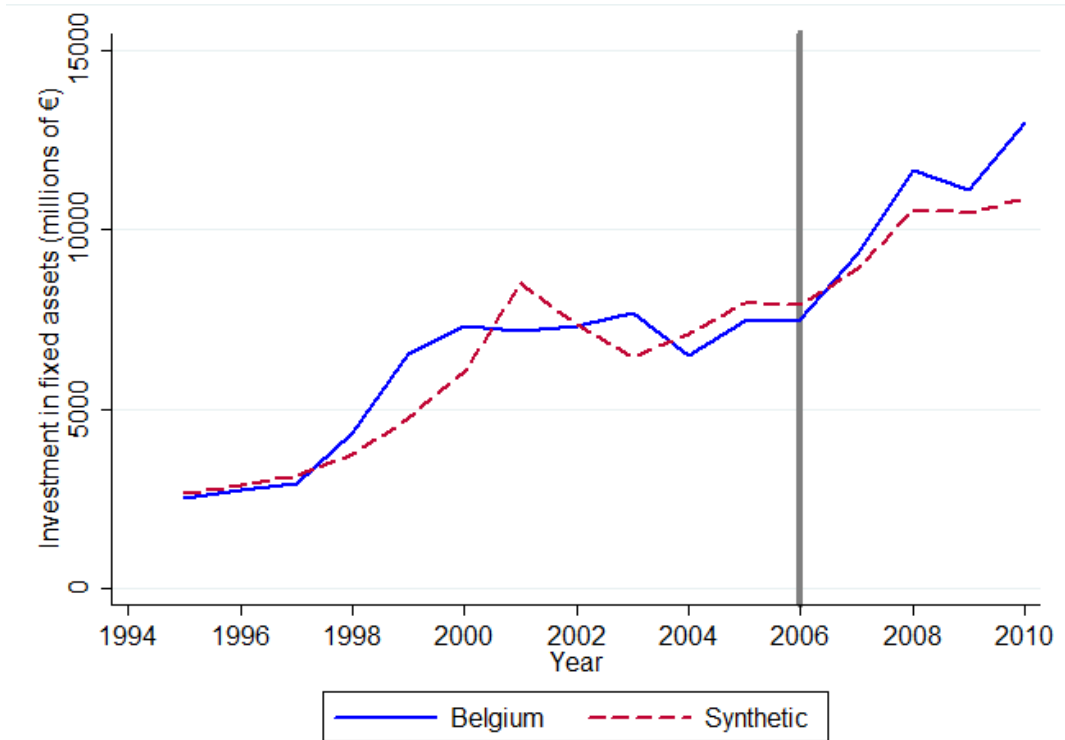
Note: The figure shows the average total debt ratio of German affiliates in Belgium. Belgium implemented an ACE system in 2006. Synthetic Belgium is obtained using synthetic controls methods as described in equation 3. The source of the data is the MiDi database of the Deutsche Bundesbank.

Figure 8: Synthetic Control: Investments

(a) Passive Investment



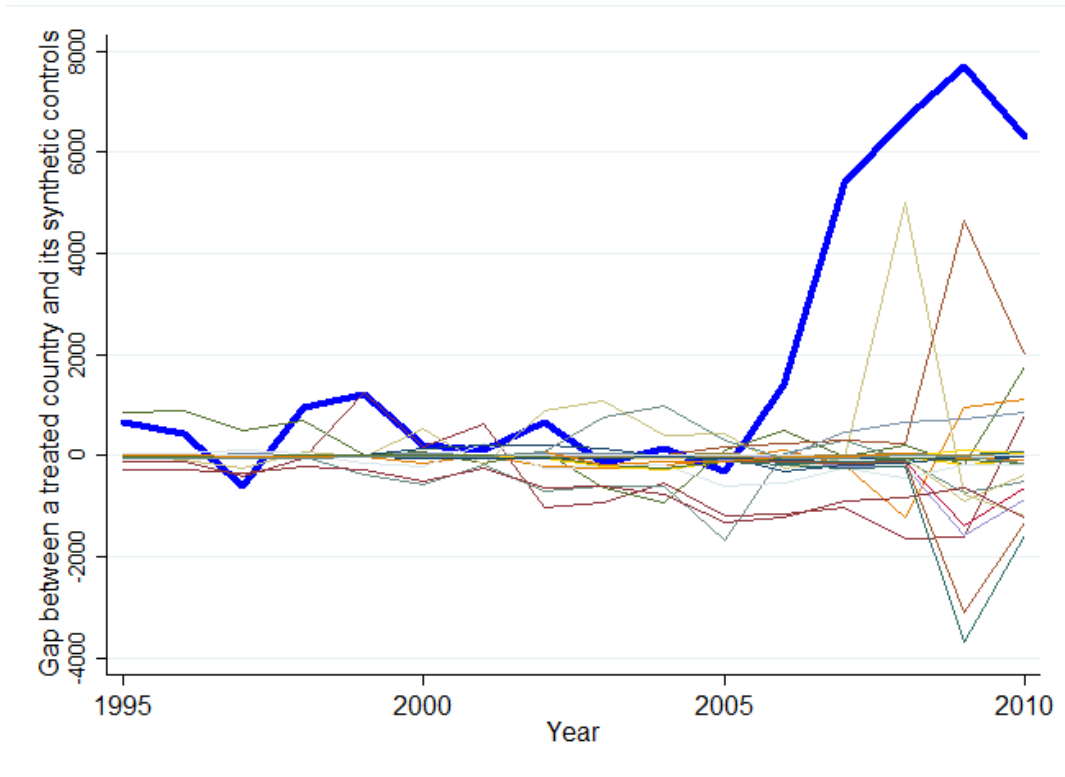
(b) Active Investment



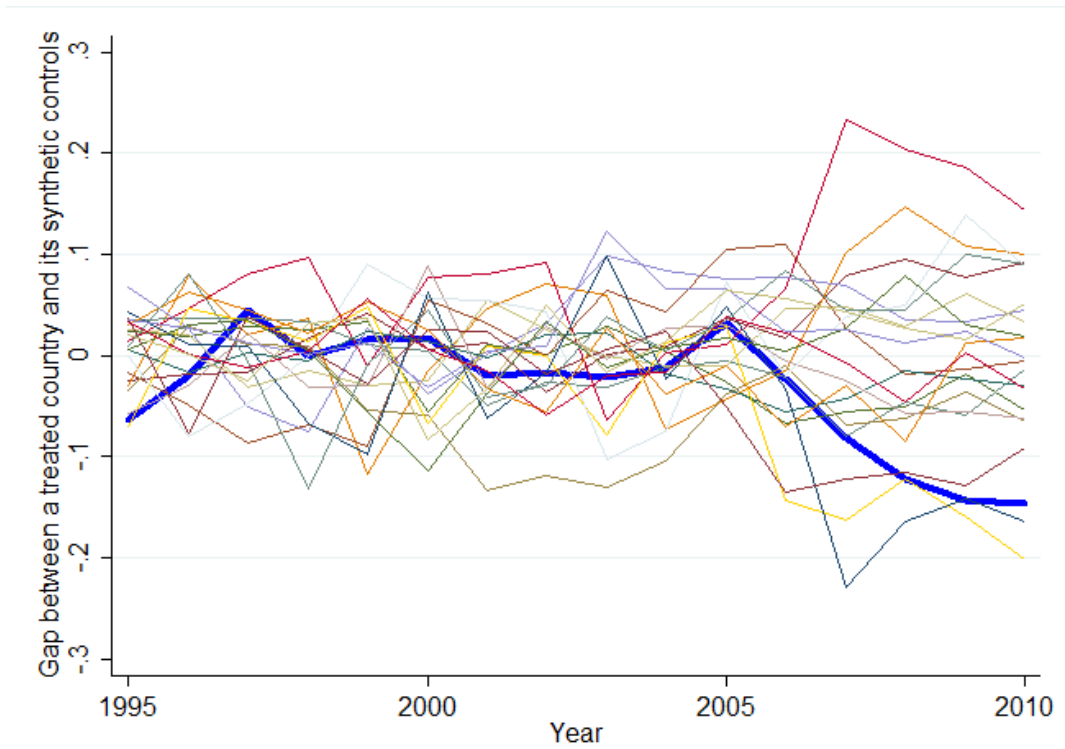
Note: The upper panel shows equity-financed lending of German affiliates in Belgium defined as total loans to shareholders and affiliated enterprises with the German parent firm in a certain year minus total liabilities. The lower panel shows active investment defined as total tangible and intangible assets. Belgium implemented an ACE system in 2006. Synthetic Belgium is obtained using synthetic controls methods as described in equation 3. The source of the data is the MiDi database of the Deutsche Bundesbank.

Figure 9: Placebo Tests

(a) Passive Investment



(b) Total Debt



Note: This figures presents a series of placebo tests. The upper panel plots the gap between a control country and its synthetic for the variable equity-financed net lending. The lower panel plots the gap for the total debt ratio. Belgium is indicated by the thick blue curve.

Table 1: List of Countries with ACE Systems

Country	Period	Type
Austria	2000–2004	Soft
Belgium	Since 2006	Hard
Brazil	Since 1996	Soft
Croatia	1994–2000	Hard
Italy	1997–2003	Soft
	Since 2012	Soft
Latvia	2009–2014	Soft
Liechtenstein	Since 2011	Hard
Portugal	2010–2013	Soft
Cyprus	since 2016	Soft
Turkey	since 2016	Soft

Note: This table lists countries that adopted an ACE system. A hard ACE regime considers the entire book value of equity as the base for computing the allowances, whereas a soft ACE regime treats only new (incremental) equity as the ACE base. The ACE in Belgium is known as notional interest deduction. The Swiss parliament voted in 2016 for introducing an ACE. Denmark has proposed an ACE in the 2017 budget. Table A1 in the appendix provides additional details.

Table 2: Top Three Countries in Terms of Liabilities to Intra-group Members

2002-2005			2006-2009		
Country	Liabilities to intra-group members	Statutory corporate tax rate (in %)	Country	Liabilities to intra-group members	Statutory corporate tax rate (in %)
US	22,000	39.5	US	31,600	40
France	19,600	35	France	18,800	33
UK	3,160	30	Netherlands	11,200	25

Note: This table shows the top three countries in terms of liabilities to intra-group affiliates in the period around the Belgium 2006-ACE reform for German multinationals having an equity-financed net lending group member in Belgium in 2006 or later. Figures on liabilities to intra-group members are summed over a four-year period. Numbers are in millions of euros. The statutory corporate income tax rate is the average for the same period. The table considers only liabilities in non-ACE countries.

Table 3: Benchmark Results: Total Debt and ACE Systems

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
The dependent variable is the total debt ratio										
<i>ACE all</i>	-0.035*** (0.009)			-0.037*** (0.010)			-0.013*** (0.005)			
<i>ACE hard</i>		-0.050*** (0.007)			-0.047*** (0.007)	-0.053*** (0.007)		-0.038*** (0.007)		
<i>ACE soft</i>			-0.025** (0.012)			-0.031** (0.013)			-0.005 (0.005)	-0.038*** (0.007)
Tax	0.347*** (0.028)	0.333*** (0.028)	0.329*** (0.029)	0.343*** (0.031)	0.329*** (0.031)	0.346*** (0.031)	0.313*** (0.056)	0.295*** (0.054)	0.296*** (0.058)	0.305*** (0.057)
Profitability	0.009*** (0.002)	0.009*** (0.002)	0.009*** (0.002)	0.008*** (0.002)	0.008*** (0.002)	0.008*** (0.002)	0.006*** (0.001)	0.006*** (0.001)	0.00570*** (0.001)	0.006*** (0.001)
Size	-0.001 (0.000)	-0.001 (0.000)	-0.001 (0.000)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	0.030*** (0.002)	0.030*** (0.002)	0.030*** (0.002)	0.030*** (0.002)
Tangibility	0.054*** (0.006)	0.054*** (0.006)	0.055*** (0.006)	0.051*** (0.007)	0.051*** (0.007)	0.051*** (0.007)	0.095*** (0.008)	0.094*** (0.008)	0.095*** (0.008)	0.094*** (0.008)
Median indu. lev.	0.439*** (0.010)	0.440*** (0.010)	0.439*** (0.010)	0.448*** (0.012)	0.449*** (0.012)	0.448*** (0.012)	0.144*** (0.012)	0.144*** (0.012)	0.144*** (0.012)	0.144*** (0.012)
Inflation	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Growth	-0.001* (0.000)	-0.001 (0.000)	-0.001* (0.000)	-0.001 (0.000)	-0.001 (0.000)	-0.001 (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
Political Stability	-0.032*** (0.003)	-0.033*** (0.003)	-0.034*** (0.003)	-0.031*** (0.003)	-0.032*** (0.003)	-0.030*** (0.003)	-0.027*** (0.005)	-0.027*** (0.005)	-0.026*** (0.005)	-0.027*** (0.005)
Interest	0.002 (0.002)	-0.001 (0.003)	0.000 (0.003)	0.002 (0.003)	-0.001 (0.003)	0.002 (0.003)	-0.003 (0.002)	-0.003 (0.002)	-0.004 (0.002)	-0.003 (0.002)
Constant	0.213*** (0.015)	0.220*** (0.015)	0.220*** (0.015)	0.211*** (0.016)	0.211*** (0.016)	0.211*** (0.016)	0.0264 (0.031)	0.0310 (0.031)	0.030 (0.031)	0.028 (0.031)
Observations	208,573	208,573	208,573	208,573	208,573	208,573	208,573	208,573	208,573	208,573
$R^2$	0.32	0.32	0.32	0.41	0.41	0.41	0.80	0.80	0.80	0.80
Parent-FE	Yes	Yes	Yes	No	No	No	No	No	No	No
Year-FE	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes
Parent-Year-FE	No	No	No	Yes	Yes	Yes	No	No	No	No
Affiliate-FE	No	No	No	No	No	No	Yes	Yes	Yes	Yes

Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Robust standard errors are clustered at the country-year level, correcting for correlation of the errors within the cluster cell, and are reported in parentheses. The dependent variable is the ratio of liabilities to shareholders and other affiliated parties linked with the subsidiary to the total balance sheet. *ACE all* is a dummy equal to one if the host country adopts any ACE system and zero otherwise. *ACE hard* is a dummy equal to one if the host country adopts a hard ACE regime and zero otherwise. *ACE soft* is a dummy equal to one if the host country adopts a soft ACE regime and zero otherwise. Tax is the international statutory corporate income tax rate. Profitability is the ratio of profit or loss for the financial year (after interest and taxes, prior to profit distribution, and offsetting of losses carried forward) to shareholders' equity. Size is measured by the total balance sheet of the affiliate. Tangibility is the ratio of total tangible and intangible assets to total assets (including financial, current, and other assets). Industry leverage is an industry-specific variable defined as the median of the industry-specific leverage in each year. Inflation is the increase in consumer prices (annual %) as provided by the World Bank WDI. Political stability is the political stability index of the World Bank Worldwide Governance Indicators; a higher value indicates higher stability. Interest is the log of the lending interest rate (%) provided by the World Bank, complemented by the long-term interest rate provided by the OECD. FE = fixed effect.



Table 4: Ratio of Loans from Affiliated Parties and ACE Systems

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<i>ACE all</i>	-0.028*** (0.005)	-0.011** (0.005)	-0.0312*** (0.006)	-0.026*** (0.005)	-0.008 (0.005)	-0.013*** (0.004)	-0.016*** (0.006)	-0.012** (0.006)	-0.018** (0.007)	-0.012** (0.006)
<i>ACE hard</i>										
<i>ACE soft</i>										
Tax	0.125*** (0.028)	0.104*** (0.028)	0.117*** (0.028)	0.122*** (0.025)	0.102*** (0.025)	0.119*** (0.025)	0.099* (0.055)	0.068 (0.057)	0.097* (0.055)	0.101* (0.055)
Profitability	0.003** (0.001)	0.003** (0.001)	0.003** (0.001)	0.003** (0.001)	0.003** (0.001)	0.003** (0.001)	0.0007 (0.001)	0.0007 (0.001)	0.0008 (0.001)	0.0007 (0.001)
Size	-0.007*** (0.001)	-0.007*** (0.001)	-0.007*** (0.001)	-0.007*** (0.001)	-0.006*** (0.001)	-0.006*** (0.001)	0.012*** (0.002)	0.012*** (0.002)	0.012*** (0.002)	0.012*** (0.002)
Tangibility	0.014*** (0.004)	0.014*** (0.004)	0.014*** (0.004)	0.015*** (0.004)	0.015*** (0.004)	0.015*** (0.004)	0.021*** (0.0052)	0.021*** (0.0052)	0.021*** (0.0052)	0.021*** (0.0052)
Median indu. lev.	0.058*** (0.006)	0.058*** (0.006)	0.058*** (0.006)	0.054*** (0.007)	0.054*** (0.007)	0.054*** (0.007)	0.045*** (0.012)	0.045*** (0.012)	0.045*** (0.012)	0.045*** (0.012)
Inflation	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001** (0.000)	0.001** (0.000)	0.001** (0.000)	0.001** (0.000)
Growth	0.0004 (0.000)	0.0004 (0.000)	0.0004 (0.000)	0.0006 (0.000)	0.0007 (0.000)	0.0006 (0.000)	-0.0001 (0.000)	-0.0001 (0.000)	-0.0001 (0.000)	-0.0001 (0.000)
Political Stability	-0.006** (0.002)	-0.007*** (0.002)	-0.007*** (0.002)	-0.005** (0.002)	-0.007* (0.002)	-0.005* (0.002)	-0.0099* (0.006)	-0.008 (0.006)	-0.009 (0.006)	-0.0099* (0.006)
Interest	0.004** (0.002)	0.000 (0.002)	0.003** (0.002)	0.001 (0.002)	-0.003 (0.002)	0.001 (0.001)	0.012*** (0.003)	0.011*** (0.003)	0.011*** (0.003)	0.012*** (0.003)
Constant	0.005 (0.015)	0.015 (0.015)	0.008 (0.015)	0.161*** (0.015)	0.161*** (0.015)	0.0162*** (0.015)	-0.178*** (0.026)	-0.171*** (0.027)	-0.178*** (0.026)	-0.178*** (0.026)
Observations	208,573	208,573	208,573	208,573	208,573	208,573	208,573	208,573	208,573	208,573
R <sup>2</sup>	0.37	0.36	0.36	0.50	0.50	0.50	0.67	0.67	0.67	0.67
Parent-FE	Yes	Yes	Yes	No	No	No	No	No	No	No
Year-FE	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes
Parent-Year-FE	No	No	No	Yes	Yes	Yes	No	No	No	No
Affiliate-FE	No	No	No	No	No	No	Yes	Yes	Yes	Yes

Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Robust standard errors are clustered at the country-year level, correcting for correlation of the errors within the cluster cell, and are reported in parentheses. The dependent variable is the ratio of liabilities to shareholders and other affiliated parties linked with the subsidiary to the total balance sheet. *ACE all* is a dummy equal to one if the host country adopts any ACE system and zero otherwise. *ACE hard* is a dummy equal to one if the host country adopts a hard ACE regime and zero otherwise. *ACE soft* is a dummy equal to one if the host country adopts a soft ACE regime and zero otherwise. Tax is the international statutory corporate income tax rate. Profitability is the ratio of profit or loss for the financial year (after interest and taxes, prior to profit distribution, and offsetting of losses carried forward) to shareholders' equity. Size is measured by the total balance sheet of the affiliate. Tangibility is the ratio of total tangible and intangible assets to total assets (including financial, current, and other assets). Industry leverage is an industry-specific variable defined as the median of the industry-specific leverage in each year. Inflation is the increase in consumer prices (annual %) as provided by the World Bank WDI. Political stability is the political stability index of the World Bank Worldwide Governance Indicators; a higher value indicates higher stability. Interest is the log of the lending interest rate (%) provided by the World Bank, complemented by the long-term interest rate provided by the OECD.

Table 5: Robustness

Regression Including	Specification with			
	<i>ACE all</i>	<i>ACE hard</i>	<i>ACE hard</i> and <i>ACE soft</i>	
Lagged explanatory variables	-0.011** (0.005) <i>N</i> : 165,333 <i>R</i> <sup>2</sup> : 0.770	-0.039*** (0.005) <i>N</i> : 165,333 <i>R</i> <sup>2</sup> : 0.770	-0.039*** (0.004) <i>N</i> : 165,333 <i>R</i> <sup>2</sup> : 0.770	-0.002 (0.005) <i>N</i> : 165,333 <i>R</i> <sup>2</sup> : 0.770
Lagged dependent variable	-0.006*** (0.002) <i>N</i> : 165,333 <i>R</i> <sup>2</sup> : 0.839	-0.018*** (0.003) <i>N</i> : 165,333 <i>R</i> <sup>2</sup> : 0.839	-0.018**** (0.003) <i>N</i> : 165,333 <i>R</i> <sup>2</sup> : 0.839	-0.003 (0.002) <i>N</i> : 165,333 <i>R</i> <sup>2</sup> : 0.839
Highly profitable affiliates	-0.017*** (0.005) <i>N</i> : 104,719 <i>R</i> <sup>2</sup> : 0.751	-0.027*** (0.007) <i>N</i> : 104,719 <i>R</i> <sup>2</sup> : 0.751	-0.027*** (0.007) <i>N</i> : 104,719 <i>R</i> <sup>2</sup> : 0.751	-0.014** (0.006) <i>N</i> : 104,719 <i>R</i> <sup>2</sup> : 0.751
Less profitable affiliates	-0.008 (0.005) <i>N</i> : 103,846 <i>R</i> <sup>2</sup> : 0.764	-0.049*** (0.009) <i>N</i> : 103,846 <i>R</i> <sup>2</sup> : 0.764	-0.049*** (0.009) <i>N</i> : 103,846 <i>R</i> <sup>2</sup> : 0.764	0.003 (0.005) <i>N</i> : 103,846 <i>R</i> <sup>2</sup> : 0.764
Small affiliates	-0.015** (0.006) <i>N</i> : 104,155 <i>R</i> <sup>2</sup> : 0.768	-0.019** (0.008) <i>N</i> : 104,155 <i>R</i> <sup>2</sup> : 0.768	-0.018** (0.008) <i>N</i> : 104,155 <i>R</i> <sup>2</sup> : 0.768	-0.014* (0.008) <i>N</i> : 104,155 <i>R</i> <sup>2</sup> : 0.768
Large affiliates	-0.011** (0.005) <i>N</i> : 104,406 <i>R</i> <sup>2</sup> : 0.735	-0.058*** (0.011) <i>N</i> : 104,406 <i>R</i> <sup>2</sup> : 0.735	-0.058*** (0.011) <i>N</i> : 104,406 <i>R</i> <sup>2</sup> : 0.735	0.002 (0.004) <i>N</i> : 104,406 <i>R</i> <sup>2</sup> : 0.735

Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . The dependent variable is the ratio of total liabilities to total balance sheet. Robust standard errors are clustered at the country-year level, correcting for correlation of the errors within the cluster cell, and are reported in parentheses. *ACE all* is a dummy equal to one if the host country adopts any ACE system and zero otherwise. *ACE hard* is a dummy equal to one if the host country adopts a hard ACE regime and zero otherwise. *ACE soft* is a dummy equal to one if the host country adopts a soft ACE regime and zero otherwise. Larger firms are those that have total balance sheet exceeding the sample median. Small firms are those that have total balance sheet lower than the sample median. Highly profitable affiliates are those with profits exceeding the sample median. Less profitable firms are those with profits lower than the sample median. All regressions include affiliate and year fixed effects and all explanatory variables as in Tables 1 and 2, as follows: Tax is the international statutory corporate income tax rate. Profitability is the ratio of profit or loss for the financial year (after interest and taxes, prior to profit distribution and offsetting of losses carried forward) to shareholders' equity. Size is measured by the total balance sheet of the affiliate. Tangibility is the ratio of total tangible and intangible assets to total assets (including financial, current, and other assets). Median industry leverage is an industry-specific variable defined as the median of the industry-specific leverage in each year. Inflation is the increase in consumer prices (annual %) as provided by the World Bank WDI. Political stability is the political stability index of the World Bank Worldwide Governance Indicators; a higher value indicates higher stability. Interest is the log of the lending interest rate (%) provided by the World Bank, complemented by the long-term interest rate provided by the OECD.

Table 6: Passive Investment and ACE Regimes

Dependent Variable	Passive assets			Net lending choice			Country location choice		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>ACE all</i>	0.266*** (0.065)			0.0410 (0.19)			0.566*** (0.17)		
<i>ACE hard</i>	0.343** (0.14)	0.331** (0.14)	0.331** (0.14)		0.618** (0.31)	0.589* (0.31)		1.012*** (0.24)	1.038*** (0.24)
<i>ACE soft</i>		0.252*** (0.073)	0.252*** (0.073)			-0.275 (0.25)		0.307 (0.22)	0.307 (0.22)
Tax	-3.012*** (0.71)	-1.791*** (0.62)	-2.967*** (0.72)	0.869 (1.15)	0.489 (1.14)	0.653 (1.16)	-1.808** (0.72)	-1.821*** (0.70)	-1.946*** (0.72)
Corruption	0.102 (0.071)	0.107 (0.074)	0.0997 (0.070)	0.599*** (0.20)	0.567*** (0.20)	0.552*** (0.20)	0.491** (0.20)	0.412** (0.19)	0.447** (0.20)
GDP PC	-1.082 (0.98)	-1.004 (1.01)	-1.074 (0.99)	0.672*** (0.18)	0.661*** (0.18)	0.668*** (0.18)	1.156*** (0.15)	1.172*** (0.15)	1.161*** (0.15)
GDP	2.500*** (0.92)	2.522*** (0.94)	2.504*** (0.92)	-0.244*** (0.065)	-0.232*** (0.066)	-0.236*** (0.066)	0.281*** (0.043)	0.285*** (0.042)	0.288*** (0.043)
Interest	0.0586 (0.055)	0.0819 (0.056)	0.0567 (0.055)	-0.184* (0.095)	-0.221** (0.097)	-0.205** (0.098)	-0.406*** (0.069)	-0.407*** (0.071)	-0.419*** (0.070)
Assets	0.215*** (0.028)	0.216*** (0.028)	0.215*** (0.028)	-0.269*** (0.026)	-0.270*** (0.026)	-0.270*** (0.026)			
Observations	41,793	41,793	41,793	39,204	39,204	39,204	33,682	33,682	33,682
Affiliate FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
$R^2$	0.82	0.82	0.82	0.09	0.09	0.09	0.12	0.12	0.12

Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Robust standard errors are clustered at the country-year level, correcting for correlation of the errors within the cluster cell, and are reported in parentheses. The dependent variable in columns (1) to (3) is the log of passive assets defined as total financial assets net of equity in affiliated firms and lending to affiliated firms, and the estimation is by OLS. In columns (4) to (6), the latent variable “net lending choice” is equal to 1 if equity-financed net lending of an affiliate is larger than zero. Otherwise, this latent variable is equal to zero. This is a discrete choice model with affiliate fixed effects (conditional logit) estimated by maximum likelihood estimation. Equity-financed net lending is equal to loans to affiliated enterprises minus total liability. Columns (7) to (9) present maximum likelihood estimation with a latent variable equal to 1 if a country hosts a new affiliate with positive equity-financed net lending. The estimated model is a discrete choice location (logit) model. The data source is the MiDi. *ACE all* is a dummy equal to one if the host country adopts any ACE system and zero otherwise. *ACE hard* is a dummy equal to one if the host country adopts a hard ACE regime and zero otherwise. *ACE soft* is a dummy equal to one if the host country adopts a soft ACE regime and zero otherwise. Tax is the international statutory corporate income tax rate. GDP is the log of GDP in PPP (constant prices, 2005) as provided by the World Bank. GDP PC is the log of GDP per capita in PPP (constant prices, 2005) as provided by the World Bank. Inflation is the increase in consumer prices (annual %) as provided by the World Bank WDI. Interest is the log of the lending interest rate (%) provided by the World Bank, complemented by the long-term interest rate provided by the OECD.

Table 7: Internal Debt in Non-ACE Countries

	(1)	(2)	(3)	(4)
<i>CEPNL</i> × <i>TAX</i>	0.1581*** (0.0523)	0.1611*** (0.0524)	0.1591*** (0.0523)	
<i>BELCEPNL</i> × <i>TAX</i>				0.1798*** (0.0567)
CEPNL	-0.0518*** (0.0145)	-0.0527*** (0.0145)	-0.0520*** (0.0145)	
BELCEPNL				-0.0533*** (0.0153)
<i>ACE all</i>	-0.008*** (0.0035)			
<i>ACE hard</i>		-0.0113* (0.0068)	-0.0112* (0.0069)	
<i>ACE soft</i>			-0.0071* (0.0041)	
Tax	0.0769*** (0.0232)	0.0628*** (0.0223)	0.0759*** (0.0233)	0.1043*** (0.0232)
Profitability	-0.0007 (0.001)	-0.0007 (0.001)	-0.0007 (0.001)	-0.0006 (0.0011)
Size	0.0187*** (0.0014)	0.0187*** (0.0014)	0.0187*** (0.0014)	0.0191*** (0.0015)
Tangibility	0.0111** (0.005)	0.0111** (0.005)	0.0111** (0.005)	0.0106*** (0.052)
Median indu. Lev.	0.0046 (0.0087)	0.0047 (0.0087)	0.0046 (0.0087)	-0.0037 (0.0088)
Inflation	0.0006*** (0.0002)	0.0006*** (0.0002)	0.0006*** (0.0002)	0.0006*** (0.0002)
Growth	-0.0006** (0.0003)	-0.0006** (0.0003)	-0.0006** (0.0003)	-0.0006** (0.0003)
Political Stability	-0.0032 (0.0022)	-0.0027 (0.0022)	-0.0033 (0.0022)	-0.0032 (0.0023)
Interest	-0.0011 (0.0015)	-0.0013 (0.0015)	-0.001 (0.0015)	-0.0012 (0.0015)
Observations	208,573	208,573	208,573	193,464
$R^2$	0.73	0.73	0.73	0.74
Affiliate FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Robust standard errors are clustered at the country-year level, correcting for correlation of the errors within the cluster cell, and are reported in parentheses. The dependent variable is the ratio of liabilities to non-German shareholders and other non-German affiliated parties linked with the subsidiary to the total balance sheet. *CEPNL* is a dummy equal to one if the multinational group has a conduit entity with positive net lending in an ACE country, and zero otherwise. *BELCEPNL* is a dummy equal to one if the multinational group has a conduit entity with positive net lending in Belgium from 2006 onwards, and zero otherwise. *CEPNL* × *Tax* is *CEPNL* multiplied with tax. Tax is the statutory corporate income tax rate. Profitability is the ratio of profit or loss for the financial year (after interest and taxes, prior to profit distribution, and offsetting of losses carried forward) to shareholders' equity. Size is measured by the total balance sheet of the affiliate. Tangibility is the ratio of total tangible and intangible assets to total assets (including financial, current, and other assets). Industry leverage is an industry-specific variable defined as the median of the industry-specific leverage in each year. Inflation is the increase in consumer prices (annual, percent) as provided by the World Bank WDI. Political stability is the political stability index of the World Bank Worldwide Governance Indicators; a higher value indicates higher stability. Interest is the log of the lending interest rate (percent) provided by the World Bank, complemented by the long-term interest rate provided by the OECD.

Table 8: Active Investment and ACE Regimes

	The dependent variable is log fixed assets									
	Full Sample					Large Investors in Belgium			Minority Owned	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<i>ACE all</i>	0.0172 (0.023)				-0.032 (0.029)			0.036 (0.60)		
<i>ACE hard</i>		-0.0603 (0.039)	-0.0626 (0.039)	-0.0646 (0.042)		-0.117* (0.060)	-0.111 (0.071)		-0.299* (0.172)	-0.300 (0.205)
<i>ACE soft</i>			0.0402 (0.026)	0.0369 (0.027)		-0.003 (0.032)	-0.003 (0.035)		0.080 (0.060)	0.064 (0.064)
Tax	-1.164*** (0.25)	-1.127*** (0.25)	-1.196*** (0.25)	-1.088*** (0.25)	-1.319*** (0.28)	-1.361*** (0.28)	-1.291*** (0.32)	-0.881** (0.35)	-0.941** (0.35)	-0.972*** (0.40)
GDP	0.316*** (0.065)	0.314*** (0.065)	0.313*** (0.065)	0.314*** (0.055)	-0.117 (0.10)	-0.120 (0.10)	0.109 (0.10)	-0.352 (0.286)	-0.353 (0.285)	-0.415 (0.317)
GDP PC	0.530*** (0.085)	0.529*** (0.085)	0.514*** (0.084)	0.454*** (0.076)	0.683*** (0.137)	0.660*** (0.137)	0.496*** (0.135)	0.585** (0.270)	0.550** (0.269)	0.632** (0.300)
Unemployment	-0.178*** (0.025)	-0.175*** (0.025)	-0.183*** (0.025)	-0.199*** (0.029)	-0.195*** (0.030)	-0.200*** (0.030)	-0.2190*** (0.035)	-0.1666*** (0.042)	-0.174*** (0.042)	-0.175*** (0.045)
Inflation	-0.0168*** (0.0032)	-0.0168*** (0.0031)	-0.0168*** (0.0031)	-0.0128*** (0.0024)	-0.015*** (0.003)	-0.015*** (0.003)	-0.012*** (0.002)	-0.001*** (0.000)	-0.002*** (0.000)	-0.001*** (0.000)
Interest rate	0.0400* (0.024)	0.0435* (0.023)	0.0419* (0.024)	0.0336 (0.026)	0.050** (0.022)	0.053** (0.022)	0.037 (0.023)	0.009 (0.029)	0.012 (0.029)	0.013 (0.033)
Profitability	-0.031*** (0.004)	-0.031*** (0.004)	-0.031*** (0.004)	-0.011*** (0.004)	-0.032*** (0.009)	-0.032*** (0.009)	0.003 (0.009)	-0.016 (0.017)	-0.017 (0.017)	-0.012 (0.018)
Sales	0.102*** (0.0031)	0.102*** (0.0031)	0.102*** (0.0031)	0.0581*** (0.0032)	0.100*** (0.005)	0.100*** (0.005)	0.056*** (0.004)	0.056*** (0.006)	0.055*** (0.006)	0.021*** (0.006)
GDP Growth	-0.00797*** (0.003)	-0.00781*** (0.003)	-0.00774*** (0.003)	0.00383 (0.003)	-0.007** (0.003)	-0.007** (0.003)	0.002 (0.003)	-0.006* (0.003)	-0.006* (0.003)	-0.003 (0.003)
Corruption	0.054 (0.045)	0.057 (0.045)	0.055 (0.044)	0.016 (0.027)	0.017 (0.033)	0.019 (0.030)	0.012 (0.038)	0.075 (0.063)	0.080 (0.062)	0.060 (0.049)
Observations	207,259	207,259	207,259	167,006	39,770	39,770	35,572	19,436	19,436	13,472
Affiliate FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lagged Controls	No	No	No	Yes	No	No	Yes	No	No	Yes
R <sup>2</sup>	0.91	0.91	0.91	0.91	0.76	0.76	0.78	0.91	0.91	0.92

Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Robust standard errors are clustered at the country-year level, correcting for correlation of the errors within the cluster cell, and are reported in parentheses. The dependent variable "fixed assets" is the natural logarithm of total fixed tangible and intangible assets. *ACE all* is a dummy equal to one if the host country adopts any ACE system and zero otherwise. *ACE hard* is a dummy equal to one if the host country adopts a hard ACE regime and zero otherwise. *ACE soft* is a dummy equal to one if the host country adopts a soft ACE regime and zero otherwise. Tax is the international statutory corporate income tax rate. GDP is the log of GDP in PPP (constant prices, 2005) as provided by the World Bank. GDP PC is the log GDP per capita in PPP (constant prices, 2005) as provided by the World Bank. Log unemployment is the log of unemployment (% of total labor force) as provided by the World Bank. WDI. Inflation is the increase in consumer prices (annual %) as provided by the World Bank WDI. Interest is the log of the lending interest rate (%) provided by the World Bank, complemented by the long-term interest rate provided by the OECD. Profitability is the ratio of profit or loss for the financial year (after interest and taxes, prior to profit distribution and offsetting of losses carried forward) to shareholders equity. Sales is the log of annual turnover in thousands of euros, plus one. GDP growth (annual %) is provided by the World Bank. Corruption is the log of the corruption perception index as provided by Transparency International; a higher value indicates less corruption. All regressions are estimated using OLS and include firm and year fixed effects as indicated.

Table 9: Investment Regressions with Different Dependent Variables

Dependent variable	Capital expenditures			Growth of fixed assets		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>ACEall</i>	0.003 (0.006)			0.011 (0.017)		
<i>ACEhard</i>		0.000 (0.010)	-0.001 (0.010)		-0.034 (0.036)	-0.036 (0.036)
<i>ACEsoft</i>			0.004 (0.007)			0.025 (0.019)
Observations	187,386	187,386	187,386	165,775	165,775	165,775
$R^2$	0.90	0.90	0.90	0.22	0.22	0.22
Year-FE	Yes	Yes	Yes	Yes	Yes	Yes
Affiliate-FE	Yes	No	Yes	Yes	No	Yes

Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Robust standard errors are in parentheses. Estimates in this table include exactly the same controls as in Table (6) in the manuscript, i.e., these are identical specification as in Table 8; the rest of the controls are skipped for brevity.

Table 10: Corporations vs. Non-Corporations: A Difference-in-Differences Approach

Debt Financing		
Dependent variable	Total debt	Loans from affiliated parties
$\beta$	-0.121*** (0.03)	-0.067* (0.03)
Observations	6,457	6,457
$R^2$	0.78	0.64
Passive Investment		
Dependent variable	Passive assets	Total financial assets
$\beta$	0.428* (0.024)	0.547** (0.024)
Observations	1,892	3,111
$R^2$	0.82	0.84
Active Investment		
Dependent variable	Log fixed assets	Growth of fixed assets
$\beta$	0.115 (0.14)	-0.109 (0.14)
Observations	6,457	4,755
$R^2$	0.73	0.21
Affiliate-FE	Yes	Yes
Year-FE	Yes	Yes

Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Robust standard errors are in parentheses. The coefficient  $\beta_1$  is the average treatment effect estimated using the following equation:

$$y_{it} = \beta_0 + \beta_1(\text{incor}_i \times \text{ACE}_t) + \Phi_i + \lambda_t + \epsilon_{it},$$

where the dummy  $\text{incor}_{it}$  is equal to 1 if the affiliate is incorporated; zero otherwise.  $\text{ACE}$  is a dummy equal to one in the period of the Belgian ACE; zero otherwise. The total debt ratio is the ratio of total liabilities to total balance sheet. The variable “loans from affiliated parties” is the ratio of liabilities to shareholders and other affiliated parties linked with the subsidiary to the total balance sheet. “Passive assets” is the log of financial assets excluding shares in affiliated enterprises and loans to shareholders. “Financial assets” is the log of financial assets. The variable “fixed assets” is the log of total tangible and intangible assets. “Growth of fixed assets” is the annual change in total tangible and intangible assets. The sample includes only affiliates in Belgium and spans from 1999 to 2012. The source of the data is the MiDi.

# Appendix

Table A1: Overview: Countries' Experiences with ACE Reforms

Country	Period	Name	Base/Rate	Details
Austria	2000–2004	Notional interest	Book value of new (post-reform) equity/ Average return of government bonds in secondary markets plus 0.8 pp	The notional return is taxed at a reduced rate of 25 percent instead of 34 percent.
Belgium	Since 2006	Notional interest deduction	Book value of equity; teh rate is the average monthly government bond rate of year preceding fiscal year by 2 years. The rate was initially capped at 6.5 percent, but was lowered to 3 percent in 2013. Special SME rate is 0.5 pp higher.	The notional return is deductible. In 2013, new legislative changes eliminated carrying forward of the unused allowances and levied a tax on distributed dividends of large firms.
Brazil	Since 1996	Remuneration of equity	Book value of equity/Rate applicable to long-term loans	Up to the level of the notional return, dividends can be paid as "interest on equity". This is deductible for all corporate income taxes and subject to the usual withholding tax on interest.
Croatia	1994–2000	Protective interest	Book value of equity/5 percent plus inflation rate of industrial goods if positive.	The notional return is deductible.
Italy	1997–2003	Dual income tax	Book value of new (post-reform) equity. From 2000: 120 percent of new equity. In 2001: 140 percent of new equity, then again 100 percent of new equity./7 percent 1997–2000, 6 percent 2001	The notional return is taxed at a reduced rate of 19 percent. Other profits are taxed at 37 percent (34 percent in 2003). Before 2001, the average tax must be at least 27 percent.
	Since 2012	Notional interest deduction (NID)	New equity (the amount of increase in equity over a 2010 base equity amount)/For the first three fiscal years (2011, 2012, 2013): 3 percent; 4 percent for the 2014 fiscal year; 4.5 percent for 2015; 4.75% 2016; for subsequent years the rate will be based on the Italian public debt securities' average return and a risk factor and will be annually set by the Minister of Finance.	Italian resident companies and Italian permanent establishments of non-resident companies can deduct the NID (with certain exclusions and deductions). The new equity does not include any profits from that year. It can be calculated based on qualifying upward and downward equity adjustments after 2010. It may not exceed the company's equity at the end of the given fiscal year.
Latvia	2009-2014	Notional interest deduction	Retained earnings/ The specified percentage is the weighted average rate of interest on loans to non-financial enterprises made in the current taxable period. 5.05 percent in 2010, 4.37 percent in 2011.	The deduction is equal to the specified percentage of the retained earnings of the immediately preceding taxable period.
Liechtenstein	Since 2011	Notional interest deduction	Modified equity/ The applicable interest rate is specified annually, depending on the market development (currently: 4 percent).	The notional return is deductible.
Portugal	2010–2013, replacement by 2014	Notional interest deduction	Share contributions during 2010 until 2013 respectively the share capital/SME's held by individuals, venture capital companies and business angels can benefit for a three-year period from a notional interest deduction of 3 percent on the amount of cash contributions by shareholders to share capital made during 2010 through 2013; from 2014, individual-owned micro, small and medium-sized enterprises may deduct 5 percent of the company's share capital for three years (limited to EUR 200,000).	The notional return is deductible.
Cyprus	Since January 2015		New equity defined as any equity introduced in the business on or after 1 January 2015 in the form of issued share capital and share premium (provided it is fully paid); the interest rate of the 10-year government bond yield of the country in which the new equity is invested increased by 3% having as a lower limit the 10-year government bond yield of the Republic of Cyprus increased by 3%.	
Turkey	Since July 2015	Notional interest deduction	Cash capital increase of the paid-in capital; the rate is 50 percent of the annual weighted average interest rate applied to Turkish Lira-denominated loans provided by banks.	The benefit does not apply to companies with high passive income or high financial assets, shares in subsidiaries or participations.

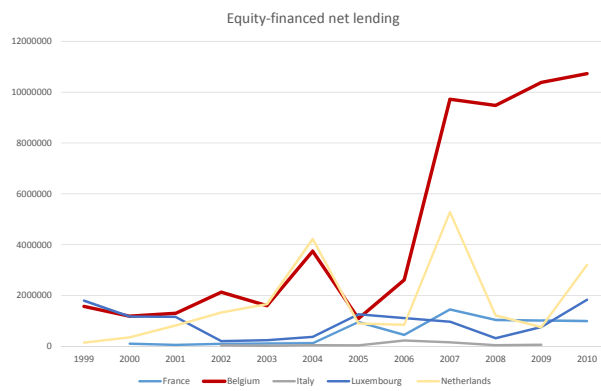
Note: The sources of information are: PwC European Tax Newsletter, Washington National Tax Services (WNTS) Publication (2012), p. 1-3; Deloitte International Tax: Italy Highlights 2014, p. 3; European Tax Handbook 2012, p. 508; ZEW Project for the EU Commission, TAXUD/2008/CC/099, Final Report (2012), p. A-4; EY Worldwide Corporate Tax Guide 2013/14, p. 752, 753; PwC Worldwide Tax Summaries: Corporate Taxes 2013/14, p. 1926; KPMG, Unternehmenssteuerreform III: <http://www.kpmg.com/ch/de/services/tax/corporate-tax/seiten/swiss-corporate-tax-reform.aspx>, retrieved 10/04/14; and Klemm (2007).



Table A2: Summary of Variables

<b>Variable</b>	<b>Mean</b>	<b>SD</b>	<b>Description</b>
<i>ACE all</i>	0.0724	0.25	A dummy equal to one if the host country adopts an ACE regime and zero otherwise
<i>ACE soft</i>	0.0543	0.22	A dummy equal to one if the host country adopts a hard ACE regime and zero otherwise
<i>ACE hard</i>	0.0181	0.25	A dummy equal to one if the host country adopts a hard ACE regime and zero otherwise
Total debt	0.53	0.34	The ratio of total liabilities to total balance sheet
Loans from affiliated parties	0.162	0.264	The ratio of liabilities to shareholders and other affiliated parties linked with the subsidiary to total balance sheets
Passive assets	4.971	2.813	The log of total financial assets net of equity in affiliated firms and lending to affiliated firms
Equity-financed net lending	8.22	2.146	The log of total loans to shareholders and affiliated enterprises with the German parent firm in a certain year minus total liabilities
Net lending choice	0.0535	0.22	A dummy equal to one if an affiliate is a net lender; i.e., if net lending choice > 0
Country location choice	0.0213	0.14	A dummy equal to one if a country host a net lender affiliate
Fixed assets	7.583	2.205	The log of total fixed tangible and intangible assets
Size	9.833	0.247	The log of the total balance sheet of the affiliate
Tangibility	0.247	0.274	The ratio of total tangible and intangible assets total assets including financial, current, and other assets
Profitability	0.09	0.609	Profits prior to profit distribution and offsetting of losses carried forward divided by total equity (total balance sheet minus total liabilities)
Industry leverage	0.512	0.149	The median of industry-specific total debt ratio
Tax	0.294	0.071	Statutory corporate income tax rates
GDP Growth	2.45	3.2	Annual GDP growth from the WB WDI
GDP Capita	9.972	0.8	The log of PPP GDP per capita, constant prices (2005) from the WDI
GDP	26.24	1.73	The log of PPP GDP level from the WB WDI
Interest rate	1.65	0.67	The lending interest rate (WDI) and the long-term interest rate (OECD)
Inflation	2.84	3.59	Annual changes in consumer prices from the WDI
Political stability	0.547	0.62	The Political Stability index of the Worldwide Governance Indicators
Corruption	1.64	0.44	The corruption perception index from transparency international

Figure 10: Aggregate Equity Financed Lending of German firms in Selected Countries



**List of countries:** Regressions include the following countries: Albania, Angola, Australia\*, Austria, Bahamas, Bahrain, Bangladesh, Belarus, Belgium\*, Bolivia, Bosnia and Herzegovina, Brazil\*, Bulgaria\*, Canada\*, Chile\*, China Colombia\*, Costa Rica\*, Croatia, Cyprus\*, Czech Republic, Denmark\*, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Finland\*, France\*, Greece\*, Guatemala\*, Honduras, Hong Kong\*, Hungary\*, Iceland, India, Indonesia, Iran, Ireland\*, Israel\*, Italy, Japan\*, Jordan, Kenya, Korea\*, Latvia, Lithuania, Luxembourg\*, Macedonia, Malaysia\*, Malta\*, Mauritius, Mexico\*, Morocco, Namibia, Netherlands\*, New Zealand\*, Nigeria, Norway\*, Pakistan, Panama\*, Paraguay, Peru, Philippines\*, Poland\*, Portugal, Qatar, Romania, Russian Federation, Singapore\*, Slovak Republic, Slovenia, South Africa, Spain\*, Sri Lanka, Sweden\*, Switzerland, Tanzania, Thailand\*, Tunisia\*, Uganda, Ukraine, United Kingdom\*, United States\*, Uruguay\*, Venezuela\*, and Vietnam.

The synthetic control analysis include countries marked with an asterisk. This analysis requires a balanced panel, nonzero equity-financed net lending, and exclusion of the other treated (ACE) countries.

The following tables provide descriptive statistics from the AMADEUS database. These statistics are useful to form an overall impression about German owned and non-German owned firms in Belgium. German owned companies in Belgium are overall similar to other firms. For example, the median total assets for domestic Belgian firms is 9.5 million euro (Table A3), and it is around 12 million euro for German owned firms (Table A4). The median total assets for all foreign owned firms in Belgium is 10.4 million euro, also very similar (Table A5). The descriptive statistics suggest that multinational companies (MNCs) in general are similar to German MNCs. The median profitability ratio for German MNCs in Belgium is 0.08 (Table A4) and for non-German MNCs is 0.05 (Table A5). The ratio of tangible assets to total assets is also comparable across the three types of firms ranging from 10 to 13 percent. These statistics are reassuring, and are in line with existing published studies that give no indication that German MNCs behave differently from other MNCs.

Table A3: Descriptive statistics for all firms in Belgium that do not have a global ultimate owner (source: AMADEUS)

Variable	Profitability	Total Assets	Employment	Debt	Tangibility	Sales
p50	0.03	9.5	26	0.2	0.13	13.7
mean	-0.26	21.0	56	3.9	0.24	21.1
sd	14.03	67.5	84	14.3	0.27	34.5
p5	-0.04	1.4	1	0.0	0.00	0.0
p95	0.28	72.9	224	22.1	0.87	67.5
min	-765.33	0.0	1	0.0	0.00	0.0
max	1.90	3560.0	1004	470.0	1.00	883.0

Descriptive statistics are based on all corporations in Belgium available in the Amadeus database in year 2006 (provided by the Bureau van Dijk). Figures are based on unconsolidated financial statements of firms that do not have a global ultimate owner according to the Amadeus data. Profitability is profit and loss before tax divided by total assets. Total assets, debt, and sales are measured in millions of Euros. Employment is the number of employees. Debt is long-term debt. Tangibility is tangible fixed assets divided by total assets.

Table A4: Descriptive statistics for all firms in Belgium that have a German global ultimate owner (source: AMADEUS)

Variable	Profitability	Total Assets	Employment	Debt	Tangibility	Sales
p50	0.08	12.1	59	0	0.10	30.7
mean	0.86	21.8	87	3.2	0.19	37.0
sd	0.27	31.0	110	12.8	0.22	31.3
p5	-0.10	2.6	12	0	0.00	0.6
p95	0.43	72.8	365	11.6	0.71	96.3
min	-2.44	0.5	1	0	0.00	0.0
max	0.70	235.0	574	84.5	0.96	188.0

Descriptive statistics are based on all corporations in Belgium available in the Amadeus database in year 2006 (provided by the Bureau van Dijk). Figures are based on unconsolidated financial statements of firms that have a German global ultimate owner according to the Amadeus data. Profitability is profit and loss before tax divided by total assets. Total assets, debt, and sales are measured in millions of Euros. Employment is the number of employees. Debt is long-term debt. Tangibility is tangible fixed assets divided by total assets.

Table A5: Descriptive statistics for all firms in Belgium that have a foreign global ultimate owner (source: AMADEUS)

Variable	Profitability	Total Assets	Employment	Debt	Tangibility	Sales
p50	0.05	10.4	41	0.0	0.11	20.5
mean	0.07	24.7	74	4.7	0.19	30.8
sd	0.16	121.0	101	74.5	0.22	77.2
p5	-0.07	1.9	4	0.0	0.00	0.0
p95	0.30	76.9	250	14.8	0.69	84.9
min	-2.77	0.0	1	0.0	0.00	0.0
max	2.16	6930.0	1249	4610.0	1.00	4240.0

Descriptive statistics are based on all corporations in Belgium available in the Amadeus database in year 2006 (provided by the Bureau van Dijk). Figures are based on unconsolidated financial statements of firms that have a foreign global ultimate owner according to the Amadeus data. Profitability is profit and loss before tax divided by total assets. Total assets, debt, and sales are measured in millions of Euros. Employment is the number of employees. Debt is long-term debt. Tangibility is tangible fixed assets divided by total assets.

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