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An Empirical Analysis of Issuer Location and Regulatory  
Competition in Europe

Finance Working Paper N°. 292/2010

September 2010

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## Abstract

In this article, we study the choice of issuer location and regulatory competition in the European corporate debt market. We find that, in absolute terms, Germany has by far the highest outflow of debt issues, while the Netherlands, the UK, Luxembourg and Ireland see the most inflows (in that order). We use a panel gravity model to investigate country specific factors attracting foreign subsidiaries as issuer. The data clearly support the prediction that the locational choice is positively influenced by a low withholding tax rate. There is also some evidence that corporate tax rates play a role. We do not find support for creditor protection rules in bankruptcy as a driver of cross-border debt securities issues. Hence, countries who wish to attract issuers are well-advised to reduce their withholding tax rates – creditor rights seem not to matter.

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Keywords: debt securities, corporate bonds, external finance, regulatory competition, tax competition, legal arbitrage, multinational corporations, subsidiaries

JEL Classifications: K12, K22, G18, G33

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## 1. Introduction

If offered a choice, firms will opt for the legal framework that best suits their business needs and the transaction at hand. It has been documented for a broad range of settings that firms choose a law of their liking and thus engage in ‘legal arbitrage’ (see Fleischer 2010 for a definition). The most famous example is corporate law. In the U.S., firms have always been able to incorporate in any state, thereby effectively choosing the corporate law under which they are organized. Because supplying corporate law to firms may be attractive for states, jurisdictions in the U.S. have engaged in what has come to be known as ‘charter competition.’ Much more recently, a number of rulings by the European Court of Justice have set off a similar contest among European jurisdictions (Becht et al. 2008).

Firms’ choice of law and regulatory competition between jurisdictions is not confined to corporate law. Other examples include forum shopping with respect to insolvency proceedings or the cross listings of public companies. We consider a somewhat less prominent but highly relevant area of business law: the legal rules governing corporate bonds. Recent legislation indicates that European jurisdictions actively compete in this area. Germany, for example, has just modernized its Bond Debenture Act (SchVG) to make it more competitive.<sup>2</sup> To the best of our knowledge, we are the first to study the extent of legal arbitrage and regulatory competition in corporate debt issues in Europe. Our work examines the motives behind firms’ choices. Knowing why firms prefer certain jurisdictions and avoid others can provide valuable guidance to lawmakers seeking to improve their own legal framework. Such insights are also important if one wishes to evaluate the effects of regulatory competition both generally and in the corporate bond market. Firms’ ability to select from a menu of jurisdictions is not a given but the result of conflict-of-laws rules. These ‘rules of the game’ can be changed if, for instance, the European Union concludes that the quality of corporate bond law deteriorates as a result of regulatory competition.

Investigating legal arbitrage and regulatory competition in the European corporate bond market can also contribute to the ‘law and finance’ literature. The main proposition of this school of thought is that ‘law matters’, i.e., that legal rules advance financial and economic development. Numerous studies have documented a link between economic outcomes (such as the relative size of securities markets, ownership concentration or the amount of credit in the economy) and legal rules and institutions. A difficulty, however, lies in determining the

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<sup>2</sup> See the somewhat confused statement of the former German justice minister, Brigitte Zypries: ‘It is not the case that German issuers are not choosing German law at all. But we have found that many of them prefer foreign law.’ (‘Es ist nicht so, dass deutsche Emittenten deutsches Recht überhaupt nicht mehr wählen. Aber wir haben festgestellt, dass viele von ihnen ausländisches Recht bevorzugen.’), Interview with *Börsen-Zeitung*, May 13, 2008, p. 7.

direction of causality.<sup>3</sup> The coincidence of legal rules and indicators of financial development can mean that ‘good’ law causes superior economic performance. But it could also be the other way round, with the law responding to an increased demand for legal protection due to a growth in specific activities. Identifying causality, therefore, is a major challenge facing the law and finance movement. In this regard, legal arbitrage can be an indirect piece of evidence: If market players shop for particular legal rules, it follows that differences in law matter for economic activity. For instance, stronger creditor rights may coincide with a greater volume of credit in the economy. If firms facing a choice between different jurisdictions actively seek those with more robust creditor protection, then there is a case that creditor rights are the cause, and financial development the effect.

In the realm of public debt, legal arbitrage can occur at two different levels. First, debt securities are themselves governed by the terms of the indenture and hence by contract law. Second, there are various legal rules that attach to the issuer of the securities and that are equally important to investors and the firm. In this contribution, we examine legal arbitrage with respect to the second set of rules. Firms can effectively choose the applicable law by deciding where to locate the issuer of the debt securities – either by using an existing subsidiary or by establishing a new one in the jurisdiction of choice. To examine this decision, we employ a gravity model, nowadays a workhorse in international economics. Although it has been applied mostly to international trade, there is a more recent literature adapting this model to financial flows (Eaton and Tamura 1994; De Ménil 1999; Portes et al. 2001; Portes and Rey 2005) and M&A activities (Ashcroft et al. 1994; Di Giovanni 2005; Delannay and Méon 2006; Hyun and Kim 2010). To our knowledge, this is the first analysis implementing a gravity model in a law and finance context.

The basic idea of gravity models is to focus not on individual countries but on the flows in country-pair relations. Our dependent variable, accordingly, is the number of cross-border debt security issues between a ‘country of origin’ and a ‘host country’ in a given year. We study issuer choice in the European corporate debt market based on a dataset of 870 bilateral country relations for the period 1980 to 2008. We find that, in absolute terms, Germany has by far the highest outflow of debt issues, while the Netherlands, the UK, Luxemburg and Ireland see the most inflows (in that order). The data clearly support the prediction that inflows are influenced positively by a low withholding tax rate. Corporate tax rates also play a role: If the multinational firm’s ultimate parent faces a high corporate tax burden, it is more likely to have foreign subsidiaries issue debt securities. We see this as evidence of profit shifting. At the same time, however, higher corporate tax rates appear to attract debt security

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<sup>3</sup> See La Porta et al. (2008, pp. 298-299) for extant evidence on the direction of causality.

issues by subsidiaries of multinational firms, particularly asset backed securities. We explain this somewhat contradictory finding with a strategy to use locally issued debt securities as a tax shield ('tax shield hypothesis'). Finally, we find only indicative evidence that the level of creditor protection is important for the location of debt security issues. Creditor rights under bankruptcy law do not seem to matter, but the effectiveness of contract enforcement positively influences the number of cross-border bond issues attracted by a particular jurisdiction.

In section 2 we describe the legal environment for corporate debt security issues and formulate hypothesis on the influence of creditor protection rules and tax law on issuer choice and location. Section 3 presents the methodology and data, section 4 the gravity model results. Section 5 concludes.

## **2. The legal environment for corporate debt security issues**

One can think of a variety of reasons why a firm would have a foreign subsidiary issue debt securities. We are interested whether 'law matters' for this decision, that is, whether by choosing a foreign venue firms engage in legal arbitrage and, accordingly, whether jurisdictions can attract more cross-border issues by changing their legal rules. Based on theoretical considerations, there are two main aspects of the legal environment that can influence a firm's decision to locate its debt security issue in a particular jurisdiction. First, tax considerations can play a role in choosing where to issue debt securities. Therefore, tax law is a dimension in which we try to spot legal arbitrage (subsection 2.2). Second, jurisdictions can differ in the degree of protection afforded to the holders of debt securities. If there is significant variation in this regard, one would expect firms to take it into account (subsection 2.3). Before identifying relevant differences in these two areas of the law, we should clarify what we mean by a 'foreign' subsidiary or, correspondingly, by the 'location' of an issuer (subsection 2.1).

### **2.1 'Location' of issuer and parent**

There is a great variety of legal criteria – depending on legal context – to determine an entity's 'location.' The place of incorporation and the statutory seat are strictly formal criteria. Many others consider the actual business activities, such as the 'headquarters,' 'center of main interests,' the 'real seat,' or the 'center of management.' These latter substantive criteria should be very closely aligned. In our data and hence in our analysis, 'issuer location' is defined as the country of incorporation. Accordingly, a 'foreign issuer' is an entity incorporated in a jurisdiction different from the corporate parent. From an empirical point of

view, the country of incorporation should correlate strongly with the more substantive ‘location’ concepts. Before 1999, many European Economic Area (EEA) member states followed the ‘real seat’ doctrine and required a legal entity to incorporate in the jurisdiction in which it had taken its ‘real seat,’ i.e., its central management or principal place of business. While the European Court of Justice in its ground-breaking *Centros* (1999), *Inspire Art* (2002) and *Überseering* (2003) judgments has effectively dismissed the real seat doctrine and some firms have subsequently incorporated out-of-state (Becht et al. 2008; Eidenmüller 2007), there are still significant barriers (Becht et al. 2009), and ‘reincorporations’ of existing entities have become workable only recently.<sup>4</sup> Accordingly, it seems safe to assume that most European firms, especially the large ones, are still incorporated in the country of their main business activities. For the timeframe of our investigation ending in 2008, the incorporation state should largely coincide with the location of the main business activities and the other substantive criteria.

## **2.2 Tax law**

The location of the issuer has important tax implications.<sup>5</sup> One potential type of tax law arbitrage involved in issuer location choice relates to the taxation of interest paid to bondholders. Interest is part of the taxable income in the investor’s home country. From the point of view of the issuer, interest payments are expenses that reduce corporate income and hence the corporate tax burden. Many states, however, levy an additional tax on interest payments from the issuer. The tax is meant to be a tax on income received by investors, but it is collected as a ‘withholding tax’ ‘at the source.’ Issuer location thus determines whether and at what rate the debt security is subject to withholding tax. Typically, the investor’s home country will grant a tax credit to equalize the effect of the withholding tax. Yet claiming the credit creates an additional burden and can entail costly delays. More importantly, a tax credit does not eliminate the withholding tax for tax-exempt investors such as, notably, US employee pension plans and educational endowments. If investors are affected by the withholding tax, they will refrain from buying the debt security or demand to be compensated through higher interest rates; in either event, the firm’s cost of capital rises. We thus hypothesize that jurisdictions with low withholding taxes or no withholding tax at all attract more issuer subsidiaries.

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<sup>4</sup> A reincorporation is typically effected by means of a cross-border merger. Member states of the EU had to transpose the Directive 2005/56/EC on cross-border mergers of limited liability companies by December 2007.

<sup>5</sup> Tax laws and conventions use different location (‘residence’) criteria, cf. Art. 4(1) of the OECD Model Convention with Respect to Taxes on Income and on Capital. For the reasons just stated, we assume that the issuer’s tax residence is in the incorporation state.



In addition, issuer location choice can be influenced by differences in corporate income tax. In this respect, there are two plausible theories that lead to opposite predictions. The first can be referred to as the ‘profit shifting hypothesis.’ As a general rule, an incorporated entity’s profits are subject to corporate income tax in its country of residence. By shifting profits to another entity in a different jurisdiction, firms exploit variation in corporate income taxation and, particularly, in the applicable tax rate.<sup>6</sup> There is a growing literature on corporate tax strategies designed to channel income towards entities in low tax jurisdictions. Tax laws seek to prevent profit shifting by requiring transactions between affiliate entities to be conducted ‘at arm’s length’, i.e. at prices that unrelated parties would demand and pay in the open market. Yet firms appear to be violating the arm’s length principle: Dischinger (2008) and Huizinga and Laeven (2008), among others, provide evidence on a link between reported profits of affiliate entities and corporate tax rate differentials. As an example of the tax planning devices used by multinationals, Dischinger and Riedel (2008) and Karkinsky and Riedel (2009) demonstrate that firms locate their intellectual property in countries with lower corporate tax rates. They explain this finding with the opportunity to transfer profits into low tax jurisdictions by charging higher royalty prices than the arm’s length principle permits.

Having a subsidiary in a low tax jurisdiction issue debt securities could follow an analogous strategy: If all or part of the debt is raised to finance not (only) the business of the issuer-subsidary itself but (also) the operations of the parent or of subsidiaries in other jurisdictions, the issuer serves as an internal bank for the group. Charging a higher interest rate for intra-group loans than it has to pay to investors, the issuer realizes a spread at the expense of its intra-group borrowers. In consequence, the issuer shows a higher profit whereas profits of the parent and/or the other subsidiaries are diminished. Profits are siphoned from high tax to low tax jurisdictions.<sup>7</sup> With regard to the decision to issue debt securities abroad, the profit shifting hypothesis thus predicts that parents from high-tax jurisdictions issue debt securities through subsidiaries in low tax jurisdictions.<sup>8</sup> For our empirical analysis, the profit shifting

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<sup>6</sup> Apart from tax rates, profit shifting can be motivated by specific tax benefits. A prominent example were Belgian ‘coordination centers’ of multinational firms, which (until 2010) enjoyed a significantly lower tax burden, see EU Council (1999, pp. 30-31) for details.

<sup>7</sup> In principle, profits could also be shifted from the subsidiary (high tax jurisdiction) to the parent (low tax jurisdiction). To accomplish this, the subsidiary would have to charge lower interest rates than it has to pay to investors. Tax authorities in the subsidiary’s jurisdiction would face little difficulty detecting and neutralizing such a scheme by treating the net loss as a disguised dividend. By contrast, it is harder for tax authorities to determine that a foreign affiliate is charging more for a loan than its own cost of capital because they would need to observe the financing terms of the foreign entity, which is not subject to their jurisdiction.

<sup>8</sup> A second argument supports this prediction: Raising debt through the subsidiary can also finance the subsidiary’s own operations. In this regard, the subsidiary’s debt issue substitutes for an intra-group loan from the parent. Such downstream loans are a way to shift profits from the subsidiary by charging an interest rate above the parent’s own cost of capital. But if the subsidiary faces a lower tax rate than the parent, there

hypothesis suggests that lower corporate tax rates have a positive effect on cross-border debt security issues in a given jurisdiction.

The profit shifting hypothesis builds on the idea that multinational firms use interest rate spreads between external debt and intra-group loans to direct corporate income to low tax jurisdictions; lenders within the group ‘overcharge’ other affiliates to siphon off profits. By contrast, the competing ‘tax shield hypothesis’ focuses on a general tax characteristic of debt *as opposed to equity*. There is a major tax advantage of debt over equity in that interest expenses are deductible whereas dividends are not; payments to debtholders reduce the firm’s tax burden, payments to equityholders do not (Modigliani and Miller 1963). Debt financing thus creates a tax shield for the firm’s cash flows insofar as they are owed to creditors.<sup>9</sup> The tax-induced incentive to substitute equity with debt rises with the corporate tax rate. Based on this line of reasoning, firms have a foreign subsidiary issue debt securities in order to protect the subsidiary’s cash flows against corporate tax. Erecting the tax shield at the foreign subsidiary instead of the parent is better the higher the subsidiary’s corporate tax rate both in absolute terms and relative to the parent’s. The tax shield effect thus runs in the opposite direction of the profit shifting hypothesis stated above. It predicts more debt securities being issued by subsidiaries in (absolute and relative) high tax jurisdictions. Accordingly, lower tax rates should have a negative impact on cross-border issues in a given country.

Dischinger et al. (2010) provide an instructive overview of the extant evidence on the tax shield effect within multinational groups. For a sample of 14,332 European subsidiaries of multinational firms, they demonstrate that both a higher corporate tax rate for the subsidiary and a larger difference in statutory corporate tax rates between parent and subsidiary significantly increase the subsidiary’s indebtedness. Using micro data on foreign subsidiaries of U.S. firms, Desai et al. (2004) show that leverage increases with corporate tax rates. Huizinga et al. (2008) calculate explicit measures of the marginal tax rate on equity and the tax incentive to shift debt to a subsidiary. They find both variables to have a significant positive effect on the leverage of foreign subsidiaries in a large panel of European firms. In sum, the available evidence supports the tax shield hypothesis. Whether the profit shifting effect exists (with regard to issuing debt securities) and whether it neutralizes or even dominates the tax shield effect for debt securities is a matter we seek to determine empirically.

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is no reason to shift profits to the parent. Hence, one would expect to see fewer downstream loans and, all else equal, more debt being issued by the subsidiary itself.

<sup>9</sup> In principle, the different tax treatment of debt and equity at the level of the corporation can be balanced at the level of the shareholder/debtholder. For instance, shareholders can be granted a credit or a preferential rate on dividends to compensate them for the tax burden on equity at the level of the corporation. As a matter of fact, there is generally no such (full) compensation in cross-border taxation.

### 2.3 Creditor protection rules

In the first instance, bondholders look to the contractual terms of their debt security for protection against opportunist behavior by the debtor, particularly the incentive to increase default risk (Jensen and Meckling 1976). The bond indenture will typically stipulate safeguards such as financial covenants or a trustee acting on behalf of bondholders. Contract law determines the validity of these contractual provisions and can impose additional rules. The applicable contract law may thus be a primary concern for bondholders. However, the contract law governing the securities does not depend on the issuer's domicile. Private international law permits a choice of law, and debentures usually contain a choice-of-law clause.<sup>10</sup> An issuer in jurisdiction A can easily choose the contract law of jurisdiction B to govern its debt securities. Therefore, we do not expect contract law to matter for the location of issuers.

Apart from contractual safeguards, investors can rely on statutory or judge-made rules against debtor opportunism. Such rules will be found in corporation law and bankruptcy law.<sup>11</sup> They include capitalization requirements, restrictions on the transfer of assets to shareholders and third parties, fiduciary duties of directors and corporate officers, liability rules and rules on (a change in) corporate control. Corporation law varies with the issuer's 'location' in our data. Much the same is true for bankruptcy law. Under Art. 3(1) of the European Insolvency Regulation (EC) No 1346/2000, the 'center of a debtor's main interests' determines jurisdiction for (main) insolvency proceedings. Without proof to the contrary, the Regulation presumes that a corporate entity has its 'center of main interests' at the place of its 'registered office,' that is, in the state of incorporation. The Regulation entered into force in EU member states on May 31, 2002. However, its rule on bankruptcy jurisdiction reflected the prevailing view by European jurisdictions even before its enactment. In sum, creditor protection rules embodied in corporate law and bankruptcy law are governed by the jurisdiction in which the issuer is located.

In principle, a multinational firm chooses a foreign creditor protection law by issuing debt securities through an entity located in the desired jurisdiction. Better creditor protection rules should tend to reduce the agency costs of debt and hence the firm's cost of capital. Choosing a creditor-friendly jurisdiction to issue debt securities can thus help the firm to save interest

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<sup>10</sup> The majority of jurisdictions in our sample were subject to the Rome Convention on the Law Applicable to Contractual Obligations (which by the end of 2009 has been replaced by the 'Rome I' Regulation (EC) No. 593/2008). Art. 3 of the Convention (and equally of the Regulation) contains the basic rule of free choice of law. Art. 1(2)(c) of the Convention (Art. 1(2)(d) of the Regulation) exempts from its scope only obligations arising from the 'negotiable character' of an instrument.

<sup>11</sup> Securities law (capital market law) can also benefit creditors, particularly by imposing disclosure duties on issuers. Such requirements usually apply if debt securities are listed at a stock exchange or offered to the public. For the rules determining the applicable securities laws in Europe see Enriques and Tröger (2008).

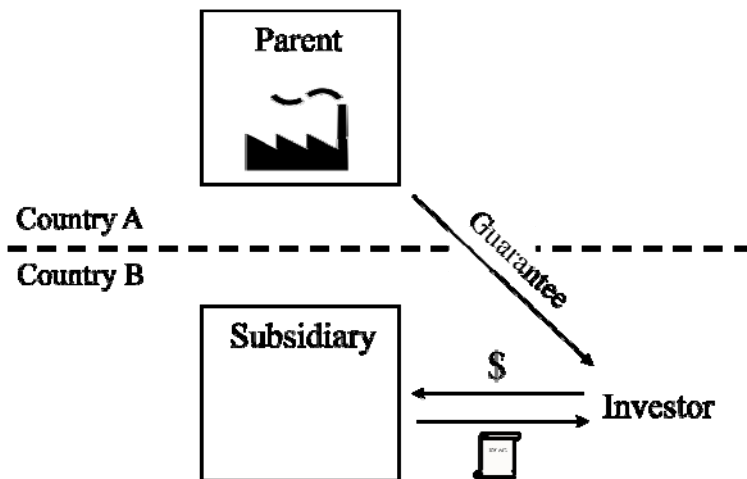
expenses or avoid more restrictive bond covenants. In line with this conjecture, the ‘law and finance’ literature starting with La Porta et al. (1997, 1998) has used an index of creditor rights to show that debt financing rises with the degree of creditor protection. In the most comprehensive sample so far, consisting of 129 countries, Djankov et al. (2007) find a significantly positive relation in a cross-country OLS regression between the creditor rights index and credit extended to firms and individuals (scaled by the country’s GDP or population). Haselmann et al. (2009) corroborate this evidence using microdata on bank loans and changes in creditor rights laws in Eastern European transitions economies.<sup>12</sup> Mansi et al. (2009) and Qi and Wald (2008) document that, within the U.S., firms from states with more stringent restrictions on payouts to shareholders enjoy lower bond spreads and have to agree to fewer debt covenants in their bond indentures.

Drawing on these insights, it seems natural to hypothesize that jurisdictions with stronger creditor rights attract more cross-border debt security issues. However, legal arbitrage regarding creditor protection law is more difficult to accomplish. Corporation and bankruptcy laws of a given jurisdiction govern only domestic entities and their assets. While a multinational firm with its ultimate parent in country A can set up a subsidiary in country B to issue debt securities, the (supposedly superior) corporation and bankruptcy laws of B apply only to the subsidiary and its assets. In practice, the parent will often extend a guarantee to the issuer’s creditors. As a consequence, if a default occurs, the guarantee has to be enforced against the parent, which is subject to the corporation and bankruptcy laws of country A. Employing a foreign issuer does not change creditor protection rules with regard to the assets of the parent (or any other group entity extending a guarantee) located in another jurisdiction (Chart 1). Therefore, if a multinational firm wishes to choose a different jurisdiction for its creditor protection law, it has to transfer the underlying assets to the entity in the preferred jurisdiction. Creditor rights depend not so much on where the debt securities are issued but on where the assets backing the securities are held.

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<sup>12</sup> The results of Haselmann et al. (2009) are driven by legal rules on collateral, which are not included in the widely used creditor rights index of Djankov et al. (2007).

Chart 1: Legal arbitrage with regard to creditor protection rules if assets are held by the parent

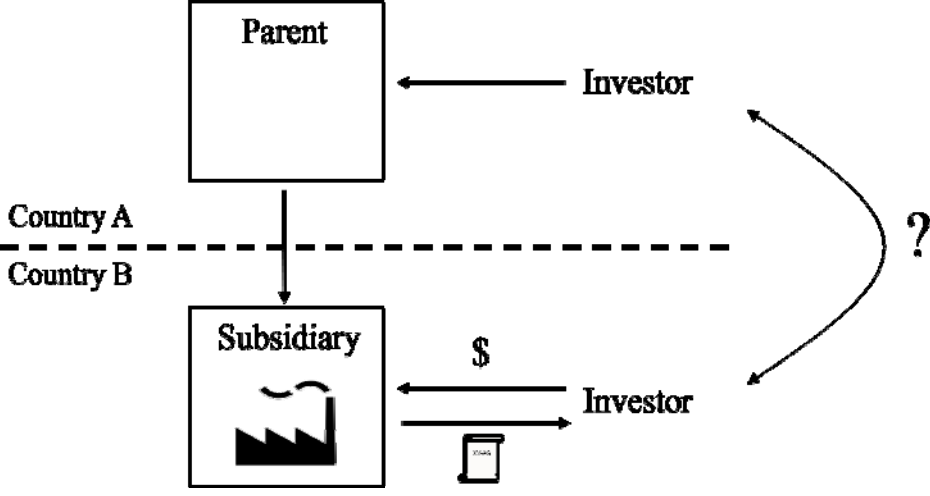


A general conclusion is that legal arbitrage regarding creditor protection rules can be very costly. It is not enough to set up a foreign subsidiary (if it does not exist already) and to use it as issuer of the debt securities. In addition, the firm would have to transfer the assets underlying the debt security to the foreign subsidiary, which will often be infeasible or too expensive, not least because capital gains are realized and become subject to corporate income tax. It thus seems that the cost of legal arbitrage would typically exceed any benefits from superior creditor protection rules.

Yet in one special case, legal arbitrage is more likely to be feasible: The firm does not have to shift assets insofar as a subsidiary itself is holding assets, as in the case of an operating subsidiary. In such a setting, the firm can choose to issue debt securities through the subsidiary to take advantage of its better creditor protection rules. The alternative would consist of selling debt claims against the parent. The parent's creditors have indirect recourse against the subsidiary through the parent's shareholdings. Of course, there is a crucial difference: Regarding the subsidiary's assets, creditors of the subsidiary have priority over the parent and its creditors.<sup>13</sup> Nonetheless, debt issues by the parent can serve as substitutes, albeit imperfect ones, for debt issues by the subsidiary (Chart 2).

<sup>13</sup> Conversely, the subsidiary's creditors cannot enforce their claims against the parent's assets (provided that no specific guarantees or security interests have been granted).

Chart 2: Legal arbitrage with regard to creditor protection rules if assets are held by operating subsidiary



All else equal, we expect differences in creditor protection rules to have an impact on the proportion of debt securities issued by a parent and its subsidiary, respectively.<sup>14</sup> In a recent contribution, Banerjee and Noe (2010) analyze the corresponding tradeoff in terms of minimizing the agency costs of debt. They predict that jurisdictions with stronger creditor rights (i.e., a stronger bargaining position for creditors in debt renegotiations) capture a larger share in the total debt being issued by a multinational firm. Consistent with this prediction, Desai et al. (2004) find that foreign subsidiaries of U.S.-based multinational firms incur higher leverage and pay less interest in countries with stronger creditor rights (as measured by the index of La Porta et al. 1998). In addition, the greater indebtedness is driven by more external borrowing while there is less credit extended by the parent. Likewise, Huizinga et al. (2008) also find creditor rights (taken from Djankov et al. 2007) to be a good predictor for subsidiary leverage with respect to a very large panel of European multinational firms ranging from 1994 to 2003.

**3. Methodology and data**

**3.1 Econometric approach**

To identify country-specific differences in law that motivate legal arbitrage, we analyze debt issues where the corporate parent and the debt issuer are located in different jurisdictions (‘cross-border debt security issues’). We are interested in the number of cross-border debt

<sup>14</sup> For the U.S., Kolasinski (2009) reports that issues of debt securities by subsidiaries amounted to 13 % of all public debt issued by non-financial firms.

security issues in a country pair consisting of a ‘country of origin’ (where the corporate parent is located) and a ‘host country’ (location of the subsidiary) in a given year. We thus seek to identify the legal factors influencing the debt security issues a host jurisdiction attracts in a particular country-pair relation. Using country-pair relations has the obvious advantage of revealing more information than a standard country panel because we observe the origin and target of cross-border issues at the same time.

A general difficulty with count data is how to deal with zero cross-border issues. Discarding them would be a poor solution because the countries without any cross-border issues may result from a different data generating process (Baltagi 2008). For instance, certain states might have chosen to abstain from offering even a minimum legal infrastructure for debt securities and hence do not attract any foreign debt issues. In this case, the zero observations would not be representative of the overall sample. By dropping them, we would introduce a selection bias. An econometric solution to this problem would be to apply a two-step estimation technique as suggested by Helpman et al. (2008). However, in the present context we cannot think of a plausible exclusion restriction for the identification of the second stage equation. We therefore rely on the alternative approach suggested by Westerlund and Wilhelmsson (forthcoming): We abolish the traditional log-linearized gravity model and use the data in its original non-linear form instead. Using maximum likelihood (ML) methods, we can naturally estimate the zero observations and handle the count characteristics of the data more appropriately. As Westerlund and Wilhelmsson (forthcoming) have shown based on Monte Carlo simulations, the Poisson ML estimator can deal with a large number of zeros while suffering from considerably less bias than the traditional log-linear OLS estimates. We thus start out from a Poisson regression model as initially suggested by Hausman et al. (1984). We then assess how well the Poisson estimator actually predicts the data at hand. For the baseline specification below we find the Poisson estimator to correctly predict any counts above 5 while it does rather poorly in forecasting the zero observations (69 instead of 91 percent zeros are correctly predicted). This result may be due to the fact that the Poisson model suffers from overdispersion. Comparing the Poisson estimator to the negative binomial (NB) estimator, we find the latter to predict the data almost perfectly for all values (all of the 91 percent zero observations are correctly predicted). We therefore reject the Poisson estimator in favour of the NB estimator.

A second econometric concern is endogeneity. Panel data has the advantage that it permits general types of country specific heterogeneity. To limit the likelihood of omitted variable bias, we have estimated all models postulating time invariant country-pair effects. This specification solves the problem of omitted variable bias much better than including a handful

of control variables that may influence cross-border debt issues (Baldwin and Taglioni 2006). The model thus takes unobservable time invariant variables like a history of legal stability or the quality of legal institutions into account, without having to specify them explicitly in the equation. Due to the fact that the conditional fixed effects NB estimator as suggested by Hausman et al. (1984) is a ‘pseudo’ panel estimator, the model permits the simultaneous identification of explicit time invariant country pair effects like the distances between two jurisdictions.

We specify the following baseline equation considering the theoretical concepts stated above:

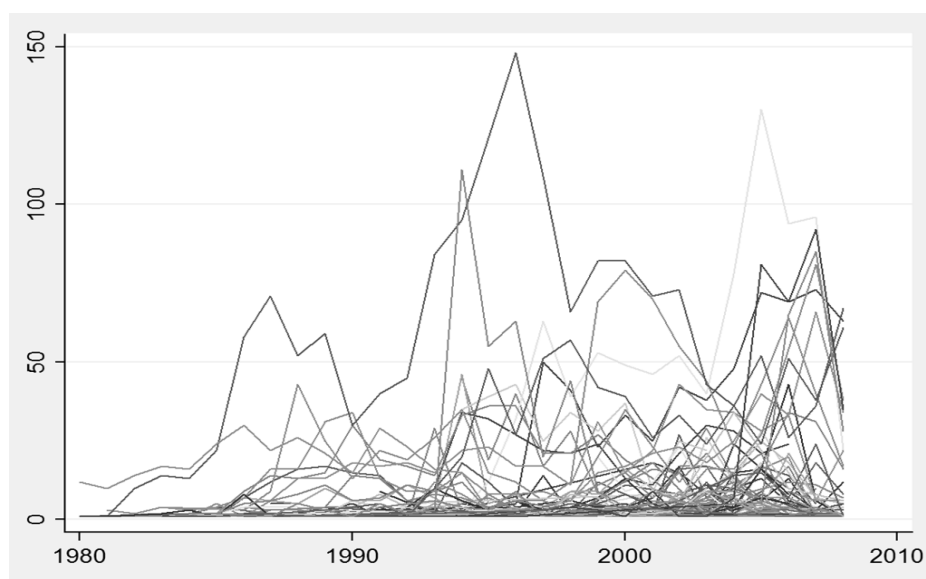
$$\Pr (y_{ij1}, y_{ij2}, \dots y_{ijT}) = F(\mathbf{Gravity}_{ijt} + \mathbf{Risk}_{it} + \mathbf{Law}_{it} + EMU_{it})$$

where  $y$  is the number of cross-border debt issues attracted by the host country  $i$  from the country of origin  $j$  in year  $t$ .  $F(.)$  denotes the NB distribution function as in Baltagi (2008). **Gravity** is a vector of *distance, contiguous, language, imports/exports* and *bond market size*. Likewise, **Risk** and **Law** are vectors of *government yield* and *inflation* as well as *withholding tax, corporate tax, creditor rights, legal origin* and *contract enforcement* respectively (for details see Table 1).

The distribution in our data has many support points, but action concentrates on a few values only. Therefore, we additionally consider an ordered probit model in which we collapse the number of events into a small number of groups and rank them on an ordinal scale. Another robustness check (potentially improving the specification) might be a dynamic model. From a theoretical perspective, one might conjecture that certain pair relations get more intense over time due to learning effects or path dependence. However, since dynamic estimators require us to make additional assumptions while at the same time being more sensitive to omitted variables, we decided not to specify such a model. We take some comfort in that the data does not seem to exhibit much stationarity (see Chart 3). For instance, the number of debt issues by German multinational firms through subsidiaries in the Netherlands peaked in the year 1996 and decreased steadily thereafter. Note that the *total number* of cross-border debt security issues in all country pairs increased over time.



Chart 3: Cross-border debt security issues over time by pair relation



### 3.2 Data and summary statistics

Our analysis is based on a sample of corporate debt securities issued by subsidiaries of multinational corporate groups. The data on debt issues was extracted from the Thomson Financial ‘SDC Platinum’ database.<sup>15</sup> To qualify for inclusion, both the ultimate parent and the subsidiary issuing the securities have to be located in countries that by 2009 were member states of the EU or the EFTA. As we do not observe a single issuer or corporate parent from Malta, we are left with 870 bilateral relations for the period 1980 to 2008 which amounts to 25,230 observations (30 countries of origin  $\times$  29 host countries  $\times$  29 years).

In our overall sample, we consider a broad array of debt securities, which consist mostly of straight bonds, floating rate notes, medium term notes, and asset backed securities; the latter category includes among others collateralized debt obligations and the German ‘Pfandbriefe’ (covered bonds).<sup>16</sup> As a robustness check and to study some of our hypotheses in more depth, we construct two sub-samples – one with straight bonds and the other with asset backed securities. While investors in asset backed securities typically do not have recourse to other assets of the firm, parents and other entities of the group often provide guarantees for straight bonds issued by subsidiaries. Straight bonds are thus more likely to be backed not just by the

<sup>15</sup> As ‘SDC Platinum’ is supposed to be exhaustive, the absence of cross-border bond issues should be interpreted as an absence of activities rather than a lack of data. Hence, we coded the absence of cross-border bond issues by replacing missing values with zeros.

<sup>16</sup> For an overview of the various types of asset backed securities see Bank for International Settlements (2009).

issuer but also by entities in other jurisdictions. In total, we observe 11,718 cross-border issues of debt securities (4,719 straight bonds, 1,275 asset backed securities<sup>17</sup>).

We merge the data on cross-border debt issues with several macroeconomic, financial and legal variables. In the international trade literature, geographic distances are interpreted as a proxy for transaction costs. Despite the intangible nature of financial transactions and communication technologies, transaction costs associated with geographic distance may still play a role. For busy investment bankers, legal advisors and financial managers, flying from Warsaw to Lisbon takes nearly twice as long as flying to London. We therefore include the distance (in 1,000 kilometers) between capitals and a dummy variable indicating whether the country pair is geographically contiguous. Furthermore, we include another dummy variable which indicates whether the two countries share an official language although we expect that the financial industry nowadays generally speaks English. The data on geography and language was taken from the *Centre d'Etudes Prospectives et d'Informations Internationales* (CEPII) database.<sup>18</sup> We further use the average export (in billion US \$) of each individual country pair obtained from the International Monetary Fund (IMF) Direction of Trade Statistics (DOTS) as a measure of countries' economic connectedness.<sup>19</sup>

Additional macroeconomic variables come from the Bank for International Settlements (BIS) as well as the IMF World Economic Outlook (WEO) database. The former source provides information on the size of the international bond market (in billion US \$) in the respective economy. Total bond market size is a measure for economies of scale and scope. A larger market tends to exhibit more liquidity and hence lower costs of capital. Larger markets may also be more developed and offer more advanced financial service providers. The WEO database offers information on classic macroeconomic variables like the country's inflation rate and government bond yield. Both variables are considered as measures for country specific risk.

As suggested by the tax law considerations in section 2.2, the first variable of interest is the withholding tax rate which would be deducted from interest paid to investors. We predict that a higher withholding tax makes a jurisdiction less attractive as a host for cross-border debt issues. The data come from the *Zentrum für Europäische Wirtschaftsforschung* (Centre for European Economic Research). The second variable of interest is corporate income tax rates.

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<sup>17</sup> Note that the subsamples leave out various types of debt securities, which explains why they do not add up to the full sample.

<sup>18</sup> Available at <http://www.cepii.fr/anglaisgraph/bdd/distances.htm>.

<sup>19</sup> There is an old tradition in the estimation of gravity models of using import data only (as nations spend more time on measuring imports than exports to avoid tariff fraud). Since 1993, trade data is generated from the VAT statistics, so that exports provide a more accurate measure than imports.

To test the profit shifting and tax shield hypotheses, we use panel data from the OECD tax database measuring the basic central government statutory (flat or top marginal) corporate income tax rate (including surtax if applicable).<sup>20</sup> The panel was supplemented in part by information from the KPMG Corporate and Indirect Tax Rate Surveys.<sup>21</sup>

The third set of variables of interest comes from the law and finance literature and is specified to test the hypothesis that creditor protection rules matter for issuer location choice (see section 2.3 above). La Porta et al. (1998) have created a *creditor rights* index which has been used in dozens of previous studies. Djankov et al. (2007) provide panel data ranging from 1978 to 2003.<sup>22</sup> The index is designed to measure the rights of lenders in a particular jurisdiction on a scale from 0 to 4 (with 4 indicating the highest degree of creditor protection). The index is incremented by 1 for each of the following bankruptcy law provisions: (i) There are restrictions for debtors to file for reorganization, such as creditor consent; (ii) secured creditors can seize the collateral if the reorganization petition is approved, i.e. there is no automatic stay; (iii) secured creditors enjoy priority over other creditors, such as workers or the government; (iv) the debtor does not retain administration of its assets during reorganization. While we are somewhat skeptical of how well the creditor rights index actually measures creditor protection in bankruptcy law, it is the best proxy we have. Because the *creditor rights* variable in our study has a panel structure, it is less likely to suffer from miscoding or a confounding variable problem. We further use information on the number of days it takes to resolve a payment dispute through courts. The data for our *contract enforcement days* variable come from Djankov et al. (2003) and provide a measure for the efficiency of the judicial system. Finally, we include the *legal origin* of each country from Zweigert and Kötz (1998). To the main advocates of the law and finance movement, legal origin determines the ‘style of social control of economic life’ (La Porta et al. 2008). According to this view, the common law tends to be more concerned with free market contracting and, therefore, provides stronger safeguards for investors and creditors. Hence, *legal origin* could be a proxy for more robust creditor protection.

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<sup>20</sup> The data is available at [http://www.oecd.org/document/60/0,3343,en\\_2649\\_34533\\_1942460\\_1\\_1\\_1\\_37427,00.html#cci](http://www.oecd.org/document/60/0,3343,en_2649_34533_1942460_1_1_1_37427,00.html#cci).

<sup>21</sup> We extended the initial OECD panel for Bulgaria, Cyprus, Estonia, Iceland, Latvia, Lithuania, Romania and Slovenia.

<sup>22</sup> As the data is only available until the year 2003 but does not exhibit much variance over time, we extend the latest observation in all cases until the year 2008.

Table 1: Variable descriptions

| Variable                         | Description   |
|----------------------------------|---|
| <b>Gravity</b>                   |   |
| <i>distance</i>                  | Identifies the bilateral distance (in 1,000 kilometers) between the capitals of the two countries. Source: Centre d'Etudes Prospectives et d'Informations Internationales (CEPII).  |
| <i>contiguous</i>                | Equals 1 if the two countries are contiguous and 0 otherwise. Source: CEPII.  |
| <i>language</i>                  | Equals 1 if the two countries share a common official language and 0 otherwise. Source: CEPII.  |
| <i>imports/exports</i>           | Is the host country's average of imports from and exports to the country of origin (in billion US \$) for each year from 1980 to 2008. Source: IMF Direction of Trade Database.   |
| <i>international bond market</i> | International debt securities by nationality of issuer (in billions of US dollars) for each year from 1980 to 2008. Source: BIS Quarterly Review Statistical Appendix Table 15B: International bonds and notes: Amounts outstanding all issuers.  |
| <b>Risk</b>                      |   |
| <i>government bond yield</i>     | Average government bond yield to maturity (in percent per annum) for each year from 1996 to 2007. Source: IMF International Financial Statistics Yearbook.  |
| <i>inflation</i>                 | Average consumer prices (Index, 2000=100, annual percent change) for each year from 1980 to 2008. Source: IMF World Economic Outlook Database.  |
| <b>Law</b>                       |   |
| <i>withholding tax rate</i>      | Withholding tax rates on cross-border interest payments for each year from 1998 to 2008. Source: Zentrum für Europäische Wirtschaftsforschung (ZEW)   |
| <i>corporate tax rate</i>        | Tax rate for the basic central government statutory (flat or top marginal) corporate income tax (including surtax if applicable) for each year from 1981 to 2008 Source: OECD tax database: Taxation of corporate and capital income Table II.1 and KPMG Corporate and Indirect Tax Rate Survey.  |
| <i>creditor rights index</i>     | An index aggregating creditor rights, following La Porta et al. (1998). The index ranges from 0 (weak creditor rights) to 4 (strong creditor rights) and is constructed as of January for each year from 1978 to 2003. Source: Djankov et al. (2007).   |
| <i>legal origin</i>              | Identifies the legal origin of each jurisdiction. Four legal origins are considered: (1) English, (2) French, (3) German, (4) Scandinavian. Source: Zweigert and Kötz (1998).   |
| <i>contract enforcement</i>      | Number of days to resolve a payment dispute through courts. The data are based on the methodology in Djankov et al. (2003), but the variable contains the (logarithmized) number of calendar days to enforce a contract of unpaid debt worth 50 percent of the country's GDP per capita. The variable is constructed as of January 2003. Source: Djankov et al. (2003). |
| EMU                              | Equals 1 if the host country is a member of the Economic and Monetary Union and 0 otherwise for each year from 1980 to 2008.  |

In very many of the country pairs (9 out of 10), no cross-border debt security issue took place. The remaining observations largely cluster around 1 to 10 issues (see Chart 4), with an absolute maximum of 148 issues from German multinational firms hosted in the Netherlands in 1996 (see Table 2).

Chart 4: Density of cross-border debt security issues in country pairs (values 1 to 30)

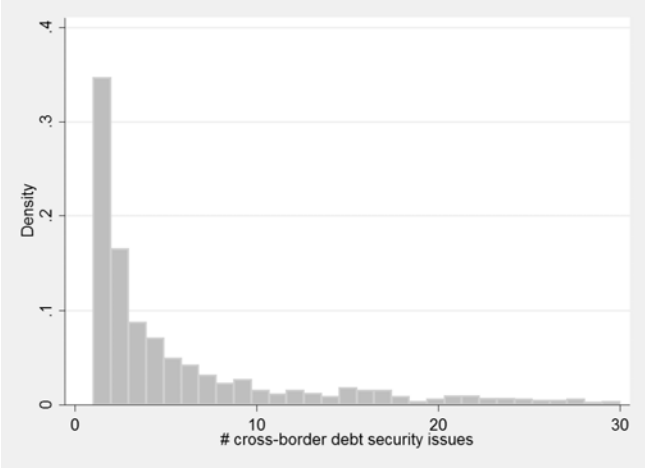
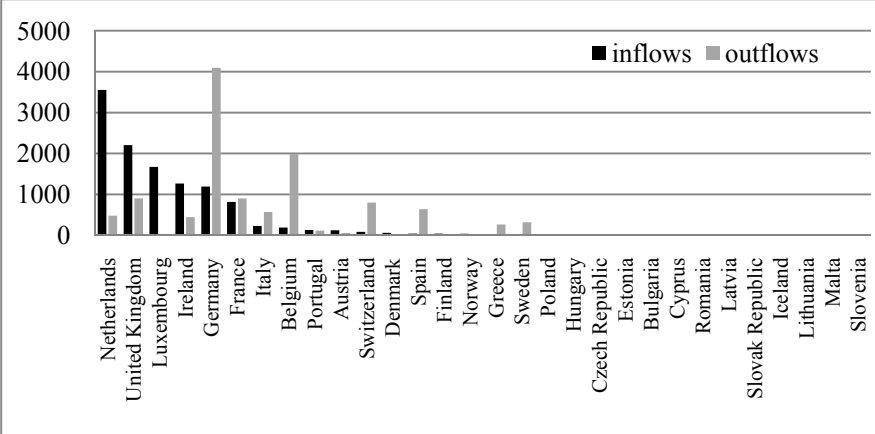


Table 2: Country pairs with most frequent cross-border debt security issues

| <b>Origin</b> | <b>Host nation</b> | <b># cross-border issues</b> | <b>Year</b> |
|---------------|--------------------|------------------------------|-------------|
| Germany       | Netherlands        | 148                          | 1996        |
| Germany       | Ireland            | 130                          | 2005        |
| Germany       | Netherlands        | 121                          | 1995        |
| Switzerland   | United Kingdom     | 111                          | 1994        |
| Germany       | Netherlands        | 109                          | 1997        |

Interestingly, cross-border issue flows are often rather one-sided. 6,842 of the cross-border debt issues in our sample in a given country pair and year (say, from country A to country B in 1995) are not matched by a corresponding debt issue in the opposite direction (from country B to country A). They can be characterized as net inflows (to country B). This is a first hint that cross-border issues concentrate in certain host jurisdictions. In fact, 98 percent of net inflows are attracted by the Netherlands, Luxembourg, the United Kingdom and Ireland (listed from the most to the least important host jurisdiction). Chart 5 depicts the (gross) inflows and outflows for the European jurisdictions in our sample.

Chart 5: Total inflows and outflows of cross-border debt issues 1980 – 2008



This picture is confirmed by the findings reported in Table 3. The values in the matrix represent the debt securities issued in a given country (columns) as a percentage of all debt security issues by multinational firms located in a particular country of origin (rows).<sup>23</sup> The rows show the different magnetism of European jurisdictions. The diagonal shows that most of the debt issues are located in the country of origin, indicating that debt security issues exhibit a strong home bias. The two exceptions are Belgium and Greece, where the majority of the debt security issues is located abroad.

<sup>23</sup> I.e., the country where the group’s ultimate parent is located.

Table 3: Debt security issues in a particular country (columns) as a percentage of all debt securities issues by multinational firms in a country of origin (rows) 1980 – 2008

|  | country of origin |       |      |       |      |      |        |       |       |      |       |       |        |      |      |     |  |
|--|-------------------|-------|------|-------|------|------|--------|-------|-------|------|-------|-------|--------|------|------|-----|--|
|  | AUT               | BEL   | BGR  | CHE   | CYP  | CZE  | DEU    | DNK   | ESP   | EST  | FIN   | FRA   | GBR    | GRC  | HUN  |     |  |
| country where debt securities are issued |                   |       |      |       |      |      |        |       |       |      |       |       |        |      |      | >0  |  |
| AUT                                      | 0.96              | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00   | 0.00  | 0.00  | 0.00 | 0.00  | 0.00  | 0.00   | 0.00 | 0.00 | >5  |  |
| BEL                                      | 0.00              | 0.32  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00   | 0.00  | 0.00  | 0.00 | 0.01  | 0.00  | 0.00   | 0.00 | 0.00 | >10 |  |
| BGR                                      | 0.00              | 0.00  | 1.00 | 0.00  | 0.00 | 0.02 | 0.00   | 0.00  | 0.00  | 0.00 | 0.00  | 0.00  | 0.00   | 0.00 | 0.00 | >20 |  |
| CHE                                      | 0.00              | 0.00  | 0.00 | 0.76  | 0.00 | 0.00 | 0.00   | 0.00  | 0.00  | 0.00 | 0.00  | 0.00  | 0.00   | 0.00 | 0.00 | >40 |  |
| CYP                                      | 0.00              | 0.00  | 0.00 | 0.00  | 1.00 | 0.00 | 0.00   | 0.00  | 0.00  | 0.00 | 0.00  | 0.00  | 0.00   | 0.00 | 0.00 |     |  |
| CZE                                      | 0.00              | 0.00  | 0.00 | 0.00  | 0.00 | 0.67 | 0.00   | 0.00  | 0.00  | 0.00 | 0.00  | 0.00  | 0.00   | 0.00 | 0.00 |     |  |
| DEU                                      | 0.00              | 0.08  | 0.00 | 0.02  | 0.00 | 0.00 | 0.78   | 0.00  | 0.00  | 0.00 | 0.01  | 0.00  | 0.00   | 0.00 | 0.00 |     |  |
| DNK                                      | 0.00              | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00   | 0.99  | 0.00  | 0.00 | 0.00  | 0.00  | 0.00   | 0.00 | 0.00 |     |  |
| ESP                                      | 0.00              | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00   | 0.00  | 0.82  | 0.00 | 0.00  | 0.00  | 0.00   | 0.00 | 0.00 |     |  |
| EST                                      | 0.00              | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00   | 0.00  | 1.00  | 0.00 | 0.00  | 0.00  | 0.00   | 0.00 | 0.00 |     |  |
| FIN                                      | 0.00              | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00   | 0.00  | 0.00  | 0.99 | 0.00  | 0.00  | 0.00   | 0.00 | 0.00 |     |  |
| FRA                                      | 0.00              | 0.21  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00   | 0.00  | 0.00  | 0.00 | 0.89  | 0.00  | 0.00   | 0.00 | 0.00 |     |  |
| GBR                                      | 0.00              | 0.01  | 0.00 | 0.16  | 0.00 | 0.00 | 0.03   | 0.00  | 0.09  | 0.00 | 0.02  | 0.94  | 0.57   | 0.00 | 0.00 |     |  |
| GRC                                      | 0.00              | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00   | 0.00  | 0.00  | 0.00 | 0.00  | 0.00  | 0.42   | 0.00 | 0.00 |     |  |
| HUN                                      | 0.00              | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00   | 0.00  | 0.00  | 0.00 | 0.00  | 0.00  | 0.00   | 0.97 | 0.00 |     |  |
| IRL                                      | 0.00              | 0.01  | 0.00 | 0.01  | 0.00 | 0.00 | 0.04   | 0.00  | 0.01  | 0.00 | 0.01  | 0.01  | 0.00   | 0.00 | 0.00 |     |  |
| ISL                                      | 0.00              | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00   | 0.00  | 0.00  | 0.00 | 0.00  | 0.00  | 0.00   | 0.00 | 0.00 |     |  |
| ITA                                      | 0.00              | 0.03  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00   | 0.00  | 0.01  | 0.00 | 0.01  | 0.00  | 0.00   | 0.00 | 0.00 |     |  |
| LIE                                      | 0.00              | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00   | 0.00  | 0.00  | 0.00 | 0.00  | 0.00  | 0.00   | 0.00 | 0.00 |     |  |
| LTU                                      | 0.00              | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00   | 0.00  | 0.00  | 0.00 | 0.00  | 0.00  | 0.00   | 0.00 | 0.00 |     |  |
| LUX                                      | 0.01              | 0.15  | 0.00 | 0.02  | 0.00 | 0.05 | 0.04   | 0.01  | 0.00  | 0.00 | 0.02  | 0.00  | 0.00   | 0.00 | 0.00 |     |  |
| LVA                                      | 0.00              | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00   | 0.00  | 0.00  | 0.00 | 0.00  | 0.00  | 0.00   | 0.00 | 0.00 |     |  |
| NLD                                      | 0.02              | 0.18  | 0.00 | 0.03  | 0.00 | 0.26 | 0.09   | 0.00  | 0.05  | 0.00 | 0.03  | 0.03  | 0.01   | 0.03 | 0.03 |     |  |
| NOR                                      | 0.00              | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00   | 0.00  | 0.00  | 0.00 | 0.00  | 0.00  | 0.00   | 0.00 | 0.00 |     |  |
| POL                                      | 0.00              | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00   | 0.00  | 0.00  | 0.00 | 0.00  | 0.00  | 0.00   | 0.00 | 0.00 |     |  |
| PRT                                      | 0.00              | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00   | 0.00  | 0.02  | 0.00 | 0.00  | 0.00  | 0.00   | 0.00 | 0.00 |     |  |
| ROM                                      | 0.00              | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00   | 0.00  | 0.00  | 0.00 | 0.00  | 0.00  | 0.00   | 0.00 | 0.00 |     |  |
| SVK                                      | 0.00              | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00   | 0.00  | 0.00  | 0.00 | 0.00  | 0.00  | 0.00   | 0.00 | 0.00 |     |  |
| SVN                                      | 0.00              | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00   | 0.00  | 0.00  | 0.00 | 0.00  | 0.00  | 0.00   | 0.00 | 0.00 |     |  |
| SWE                                      | 0.00              | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00   | 0.00  | 0.00  | 0.00 | 0.00  | 0.00  | 0.00   | 0.00 | 0.00 |     |  |
| Total #                                  | 1,734             | 2,958 | 21   | 3,386 | 29   | 42   | 19,317 | 1,720 | 3,506 | 17   | 2,208 | 8,610 | 15,758 | 460  | 39   |     |  |

|  | country of origin |      |       |      |      |       |      |       |       |      |       |      |      |      |       |        |  |
|--|-------------------|------|-------|------|------|-------|------|-------|-------|------|-------|------|------|------|-------|--------|--|
|  | IRL               | ISL  | ITA   | LIE  | LTU  | LUX   | LVA  | NLD   | NOR   | POL  | PRT   | ROM  | SVK  | SVN  | SWE   |        |  |
| country where debt securities are issued |                   |      |       |      |      |       |      |       |       |      |       |      |      |      |       | >0     |  |
| AUT                                      | 0.00              | 0.00 | 0.01  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00 | 0.00  | >5     |  |
| BEL                                      | 0.00              | 0.00 | 0.01  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00 | 0.00  | >10    |  |
| BGR                                      | 0.00              | 0.00 | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00 | 0.00  | >20    |  |
| CHE                                      | 0.00              | 0.00 | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00 | 0.00  | >40    |  |
| CYP                                      | 0.00              | 0.00 | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00 | 0.00  |        |  |
| CZE                                      | 0.00              | 0.00 | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00  | 0.00  | 0.00 | 0.00  | 0.06 | 0.00 | 0.00 | 0.00  |        |  |
| DEU                                      | 0.09              | 0.00 | 0.01  | 0.00 | 0.00 | 0.00  | 0.00 | 0.06  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00 | 0.04  |        |  |
| DNK                                      | 0.00              | 0.06 | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00 | 0.01  |        |  |
| ESP                                      | 0.00              | 0.00 | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00 | 0.00  |        |  |
| EST                                      | 0.00              | 0.00 | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00 | 0.00  |        |  |
| FIN                                      | 0.00              | 0.00 | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00 | 0.01  |        |  |
| FRA                                      | 0.00              | 0.00 | 0.00  | 0.00 | 0.00 | 0.01  | 0.00 | 0.00  | 0.02  | 0.02 | 0.00  | 0.00 | 0.00 | 0.00 | 0.00  |        |  |
| GBR                                      | 0.03              | 0.00 | 0.02  | 0.00 | 0.00 | 0.00  | 0.00 | 0.02  | 0.01  | 0.05 | 0.01  | 0.00 | 0.00 | 0.00 | 0.01  |        |  |
| GRC                                      | 0.00              | 0.00 | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00 | 0.00  |        |  |
| HUN                                      | 0.00              | 0.00 | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00 | 0.00  |        |  |
| IRL                                      | 0.87              | 0.00 | 0.02  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00  | 0.00  | 0.04 | 0.00  | 0.00 | 0.00 | 0.00 | 0.00  |        |  |
| ISL                                      | 0.00              | 0.93 | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00 | 0.00  |        |  |
| ITA                                      | 0.00              | 0.00 | 0.87  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00 | 0.00  |        |  |
| LIE                                      | 0.00              | 0.00 | 0.00  | 1.00 | 0.00 | 0.00  | 0.00 | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00 | 0.00  |        |  |
| LTU                                      | 0.00              | 0.00 | 0.00  | 0.00 | 1.00 | 0.00  | 0.00 | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00 | 0.00  |        |  |
| LUX                                      | 0.00              | 0.00 | 0.03  | 0.00 | 0.00 | 0.99  | 0.00 | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00 | 0.01  |        |  |
| LVA                                      | 0.00              | 0.00 | 0.00  | 0.00 | 0.00 | 0.00  | 1.00 | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00 | 0.00  |        |  |
| NLD                                      | 0.01              | 0.00 | 0.02  | 0.00 | 0.00 | 0.00  | 0.00 | 0.91  | 0.00  | 0.18 | 0.02  | 0.00 | 0.00 | 0.00 | 0.03  |        |  |
| NOR                                      | 0.00              | 0.01 | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00  | 0.99  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00 | 0.01  |        |  |
| POL                                      | 0.00              | 0.00 | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00  | 0.75  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00 | 0.00  |        |  |
| PRT                                      | 0.00              | 0.00 | 0.01  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00  | 0.00  | 0.92 | 0.00  | 0.00 | 0.00 | 0.00 | 0.00  |        |  |
| ROM                                      | 0.00              | 0.00 | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00  | 0.00  | 0.00 | 1.00  | 0.00 | 0.00 | 0.00 | 0.00  |        |  |
| SVK                                      | 0.00              | 0.00 | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00  | 0.00  | 0.00 | 0.00  | 0.94 | 0.00 | 0.00 | 0.00  |        |  |
| SVN                                      | 0.00              | 0.00 | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 1.00 | 0.00 | 0.00  |        |  |
| SWE                                      | 0.00              | 0.00 | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00 | 0.88 | 0.00  |        |  |
| Total #                                  | 3,318             | 320  | 4,247 | 19   | 6    | 3,257 | 2    | 5,516 | 1,806 | 56   | 1,397 | 8    | 18   | 3    | 2,680 | 22,653 |  |

Table 4 provides summary statistics on the total number of debt securities, straight bonds and asset backed securities issued in a jurisdiction over the years 1980 through 2008. It also reports the number of debt security issues attracted from abroad (inflows) and the number of issues in foreign jurisdictions from multinational firms located in the respective country (outflows), each as a percentage of the total number of debt security issues in the country. Because they are scaled to total issues, inflows can per definition never exceed 100 percent but outflows can and do in some cases because they do not count in the denominator. For instance, the number of debt securities by Belgian firms through foreign subsidiaries is 1.75 times larger than the total number of issues in the domestic market. In Luxembourg, by contrast, outflows represent less than 1 percent although inflows from EU/EFTA member states amount to 34 percent of the domestic market. Except for Sweden, the Scandinavian debt markets are relatively closed with a small share of in- and outflows relative to the domestic market. In absolute terms, Germany has by far the highest outflow of debt issues, while the Netherlands see the most inflows. Table 4 also contains our three principal explanatory variables *corporate tax rate*, *withholding tax rate* and *creditor rights*, each averaged over all years under consideration.



Table 4: Summary statistics of total number of debt security issues, (gross) inflows and outflows as a percentage of total number of debt issues, and average values of explanatory variables

| Location of issuer | Total debt issues | Total straight bond issues | Total abs issues | Debt inflows % | Debt outflows % | Corporate tax rate Ø | Withholding tax rate Ø | Creditor rights Ø |
|--------------------|-------------------|----------------------------|------------------|----------------|-----------------|----------------------|------------------------|-------------------|
|                    | (1)               | (2)                        | (3)              | (4)            | (5)             | (6)                  | (7)                    | (8)               |
| Austria            | 1,797             | 698                        | 188              | 6.7            | 3.1             | 38.0                 | 0.0                    | 3.1               |
| Belgium            | 1,136             | 470                        | 123              | 16.5           | 174.6           | 40.3                 | 11.0                   | 2.0               |
| Bulgaria           | 24                | 10                         | 1                | 8.3            | 0.0             | 12.5                 | 12.5                   | 1.2               |
| Cyprus             | 31                | 20                         | -                | 6.5            | 0.0             | 15.8                 | 11.4                   | -                 |
| Czech Republic     | 36                | 19                         | 4                | 22.2           | 38.9            | 32.7                 | 10.9                   | 3.0               |
| Denmark            | 1,757             | 549                        | 233              | 3.5            | 1.4             | 36.3                 | 0.0                    | 2.8               |
| Estonia            | 25                | 9                          | 3                | 32.0           | 0.0             | 22.5                 | 14.2                   | -                 |
| Finland            | 2,225             | 625                        | 292              | 1.8            | 1.0             | 38.5                 | 0.0                    | 2.1               |
| France             | 8,549             | 3,613                      | 908              | 9.6            | 10.6            | 40.1                 | 10.9                   | 0.0               |
| Germany            | 16,352            | 5,127                      | 3,646            | 7.3            | 25.0            | 51.8                 | 0.0                    | 3.0               |
| Greece             | 214               | 123                        | 6                | 10.3           | 122.9           | 39.4                 | 27.5                   | 1.0               |
| Hungary            | 48                | 29                         | 4                | 20.8           | 2.1             | 24.9                 | 9.8                    | 1.0               |
| Iceland            | 297               | 172                        | 8                | 0.0            | 7.7             | 25.7                 | -                      | -                 |
| Ireland            | 4,144             | 2,470                      | 152              | 30.6           | 10.7            | 33.7                 | 13.7                   | 1.4               |
| Italy              | 3,904             | 1,965                      | 271              | 5.8            | 14.5            | 42.5                 | 17.5                   | 2.0               |
| Latvia             | 3                 | 1                          | 1                | 33.3           | 0.0             | 19.1                 | 10.0                   | 3.0               |
| Liechtenstein      | 20                | 8                          | 4                | 0.0            | 0.0             | -                    | -                      | -                 |
| Lithuania          | 6                 | 3                          | 1                | 0.0            | 0.0             | 15.0                 | 12.7                   | 1.2               |
| Luxembourg         | 4,955             | 2,029                      | 487              | 33.7           | 0.7             | 31.7                 | 0.0                    | -                 |
| Netherlands        | 8,744             | 3,880                      | 821              | 40.6           | 5.5             | 36.7                 | 0.0                    | 3.0               |
| Norway             | 1,815             | 645                        | 217              | 2.0            | 1.5             | 37.0                 | 0.0                    | 2.0               |
| Poland             | 54                | 20                         | 4                | 22.2           | 24.1            | 36.4                 | 10.9                   | 1.0               |
| Portugal           | 1,420             | 365                        | 267              | 9.2            | 8.0             | 39.8                 | 16.4                   | 1.0               |
| Romania            | 10                | 6                          | -                | 20.0           | 0.0             | 20.5                 | 12.5                   | 1.7               |
| Slovak Republic    | 18                | 5                          | 3                | 5.6            | 5.6             | 30.5                 | 17.2                   | 2.0               |
| Slovenia           | 3                 | 2                          | -                | 0.0            | 0.0             | 24.5                 | 0.9                    | 3.0               |
| Spain              | 2,913             | 1,436                      | 204              | 1.4            | 21.9            | 34.5                 | 14.2                   | 2.0               |
| Sweden             | 2,380             | 839                        | 348              | 0.8            | 13.4            | 38.6                 | 0.0                    | 1.7               |
| Switzerland        | 2,653             | 742                        | 557              | 3.2            | 30.1            | 27.8                 | 6.7                    | 1.0               |
| United Kingdom     | 17,161            | 7,628                      | 1,724            | 12.8           | 5.3             | 34.7                 | 12.7                   | 3.8               |

Table 5 reports the correlations between the number and the volume of debt securities, straight bonds and asset backed securities, for all country pairs. All of these variables exhibit strong correlations. In particular, a plausible alternative for our dependent variable – the volume (in billion US \$) of cross-border debt security issues – is highly correlated with the number of issues. Since we are interested in firms' choice, and the unreported estimates of a Tobit gravity model based on the volume of debt security issues generate results rather similar to the conditional NB panel model, we restrict our analysis to count data estimates only.

Table 6 contains a correlation matrix of cross-border debt security issues in country pairs with the main explanatory and control variables. As expected, the withholding and corporate tax

rates in the host country are negatively correlated with inflows. Vice versa, the number of cross-border debt issues is positively correlated with the corporate tax rate in the ultimate parent's jurisdiction, which is in line with the profit shifting hypothesis. The latter correlation is not only highly significant but also large in magnitude. Moreover, the number of debt issues is positively correlated with the host country's creditor rights index. The correlation matrix shows, however, that most explanatory variables are highly correlated with one another (very frequently at the 1-percent level). Therefore, one cannot identify the effect of market size, tax advantages and creditor rights on inflows of debt issues based on simple correlations, making multivariate and in particular panel data methods clearly preferable.

Table 5: Correlation matrix: Number and volume of cross-border issues in country pair for full sample and subsamples

|                             | (1)  | (2)  | (3)  | (4)  | (5)  | (6)  |
|-----------------------------|------|------|------|------|------|------|
| (1) debt securities #       | 1.00 |      |      |      |      |      |
| (2) debt securities \$      | 0.82 | 1.00 |      |      |      |      |
| (3) straight bond issues #  | 0.88 | 0.71 | 1.00 |      |      |      |
| (4) straight bond issues \$ | 0.77 | 0.78 | 0.87 | 1.00 |      |      |
| (5) asset backed sec. #     | 0.64 | 0.54 | 0.27 | 0.21 | 1.00 |      |
| (6) asset backed sec. \$    | 0.58 | 0.60 | 0.24 | 0.23 | 0.88 | 1.00 |

Table 6: Correlation matrix: Cross-border issues in country pairs (inflows to host country from country of origin) and explanatory variables

|                               | (1)   | (2)   | (3)   | (4)   | (5)   | (6)   | (7)   | (8)   | (9)   | (10)  | (11)  | (12)  | (13)  | (14) | (15) |
|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|
| (1) debt securities # inflows | 1.00  |       |       |       |       |       |       |       |       |       |       |       |       |      |      |
| (2) distance                  | -0.07 | 1.00  |       |       |       |       |       |       |       |       |       |       |       |      |      |
| (3) contiguous                | 0.06  | -0.49 | 1.00  |       |       |       |       |       |       |       |       |       |       |      |      |
| (4) common language           | 0.04  | -0.45 | 0.65  | 1.00  |       |       |       |       |       |       |       |       |       |      |      |
| (5) exports / imports         | 0.23  | -0.39 | 0.48  | 0.22  | 1.00  |       |       |       |       |       |       |       |       |      |      |
| (6) EMU membership            | 0.04  | -0.02 | 0.15  | 0.13  | 0.16  | 1.00  |       |       |       |       |       |       |       |      |      |
| (7) international bond market | 0.17  | -0.04 | -0.02 | 0.00  | 0.44  | -0.01 | 1.00  |       |       |       |       |       |       |      |      |
| (8) government bond yield     | -0.07 | 0.06  | -0.06 | -0.12 | -0.20 | -0.26 | -0.25 | 1.00  |       |       |       |       |       |      |      |
| (9) inflation rate            | 0.03  | 0.11  | -0.11 | -0.12 | -0.19 | 0.27  | -0.21 | 0.28  | 1.00  |       |       |       |       |      |      |
| (10) corporate tax host       | -0.07 | -0.11 | 0.20  | 0.10  | 0.30  | 0.06  | 0.27  | 0.09  | -0.37 | 1.00  |       |       |       |      |      |
| (11) withholding tax host     | -0.15 | 0.14  | -0.03 | -0.06 | -0.17 | -0.13 | -0.29 | 0.32  | 0.13  | -0.10 | 1.00  |       |       |      |      |
| (12) corporate tax origin     | 0.21  | -0.02 | 0.17  | 0.00  | 0.29  | 0.03  | -0.25 | 0.21  | 0.09  | 0.06  | 0.27  | 1.00  |       |      |      |
| (13) legal origin             | -0.19 | -0.12 | 0.26  | 0.14  | 0.10  | 0.08  | -0.02 | -0.12 | -0.14 | 0.35  | -0.49 | -0.16 | 1.00  |      |      |
| (14) creditor rights index    | 0.10  | 0.01  | -0.25 | -0.11 | 0.05  | -0.42 | 0.36  | 0.10  | -0.21 | 0.18  | -0.21 | -0.14 | -0.14 | 1.00 |      |
| (15) contract enforcement     | -0.10 | 0.17  | -0.01 | -0.07 | -0.09 | -0.22 | 0.04  | 0.22  | 0.05  | -0.19 | 0.49  | 0.01  | -0.11 | 0.05 | 1.00 |

## 4. Results

### 4.1 Gravity model

#### 4.1.1 Debt securities

In Table 7 we present the results of the gravity model estimations. They originate from the baseline model set out in section 3.1. In what follows, we report incidence rate ratios as they can conveniently be interpreted as multiplicative effect or semi-elasticity. This implies that all estimates below one have to be interpreted as a negative effect, while estimates greater than one reveal a positive relationship. We focus on the fixed country-pair effects estimator, because it deals with omitted variables more adequately than the simple pooled model. Conducting a Hausman test leads us to dismiss the random effects model as being inconsistent for the overall sample and the subsamples (analyzed in subsection 4.1.2 below).

As regards the classic gravity variables, we find throughout all specifications a negative effect for *distance* (between the capitals of the host country and the country of origin). 1,000 kilometers of additional distance reduce cross-border issues by 40–55 percent, but the effect does not come out significant in our preferred fixed-effects specification. A common geographic border also fails to be statistically significant. Unlike in the international trade literature, we do not find support for our conjecture that geographic proximity – as a proxy for transaction cost – explains where firms locate debt issues. Even more surprisingly, a common official language also does not stimulate inflows, which suggests that English as the *lingua franca* of international finance overcomes any language barriers. Even though the *EMU membership* and *bond market size* variable show the expected sign, these variables are not significant as well. As regards the two measures of country specific risk, we find somewhat mixed results, with lower *government bond yields* and higher *inflation* increasing the attractiveness of the host state. The former result, indicating that shaky public finances discourage corporate debt issues is weakly significant, while the latter is not.

Considering legal factors driving the choice of issuer location in multinational firms, we hypothesized that a lower *withholding tax rate* would increase inflows of debt issues to a jurisdiction. We find impressive support for this prediction. Our *withholding tax rate* variable is strongly significant for the conditional NB estimates (and unreported Poisson as well as Tobit estimates) and shows the expected sign, with a 1 percentage point increase in the withholding tax rate reducing cross-border debt issues by 2.6 percent. With regard to

corporate taxes, our results generally confirm neither the tax shield nor the profit shifting hypothesis, as the *corporate tax rate* variable comes out insignificant for the overall sample.

Regarding the legal factors we expect to influence issuers' choice, we find only *legal origin* to have a significant and robust impact throughout all specifications. In unreported estimations using three separate dummy variables, *French*, *German* and *Scandinavian* relative to *English legal origin* all show an incidence rate ratio below 1, which is significant at the 1-percent level. It might be that there is a drift towards better creditor protection under the common law. However, we do not have much confidence in this conclusion: There are only three jurisdictions of English legal origin in our sample. These are also the countries with English as an official language, which could explain their attractiveness; or the *legal origin* variable may just have randomly selected two countries with very large inflows (the UK and Ireland). The effect of *contract enforcement days* is as one would expect: The more efficient the court system (as measured by the time to resolve a dispute), the more debt issues a jurisdiction attracts. This effect is, however, only weakly significant (at the 10-percent level) for the preferred fixed effects model. Our third variable of interest is *creditor rights*. In none of the panel models we find a significant impact of creditor rights on multinational firms' choice where to issue debt securities. Generally speaking, the creditor rights index has been a mixed success in empirical research. It failed to yield significant results as soon as *legal origin* was included even in La Porta et al. (1997), the paper that started the law and finance movement and first introduced the creditor rights index.<sup>24</sup> At the same time, there are too many potential legal or economic factors behind the *legal origin* variable to draw reliable conclusions. In sum, our analysis lends only very weak support to the hypothesis that differences in creditor protection rules generally explain multinational firms' choices where to issue debt securities. The relevant factor for the location choice is taxes.

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<sup>24</sup> See also the other references in subsection 2.3 above.

Table 7: Negative binomial gravity model<sup>25</sup>

|                                     | pooled               |                      | pair effects         |  |
|-------------------------------------|----------------------|----------------------|----------------------|--|
|                                     | (1)                  | (2)                  | (3)                  |  |
| distance                            | 0.549 ***<br>(0.097) | 0.601<br>(0.218)     | 0.450 ***<br>(0.072) |  |
| contiguous                          | 0.975<br>(0.287)     | 1.801<br>(1.328)     | 2.091<br>(0.608)     |  |
| language                            | 1.797<br>(0.751)     | 0.889<br>(0.718)     | 0.921<br>(0.273)     |  |
| imports / exports                   | 1.110 ***<br>(0.013) | 1.007<br>(0.379)     | 1.008<br>(0.004)     |  |
| EMU                                 | 1.453<br>(0.218)     | 1.118<br>(0.203)     | 1.329 *<br>(0.176)   |  |
| bond market size * 10 <sup>-3</sup> | 0.994<br>(0.234)     | 0.837<br>(0.150)     | 0.895<br>(0.101)     |  |
| government yield                    | 1.027<br>(0.113)     | 0.845 *<br>(0.075)   | 0.863 *<br>(0.064)   |  |
| inflation                           | 0.841 ***<br>(0.056) | 1.073<br>(0.057)     | 0.994<br>(0.045)     |  |
| corporate tax host                  | 0.997<br>(0.020)     | 1.009<br>(0.010)     | 1.021 *<br>(0.009)   |  |
| withholding tax host                | 0.941 ***<br>(0.015) | 0.974 **<br>(0.012)  | 0.971 **<br>(0.007)  |  |
| legal origin                        | 0.224 ***<br>(0.042) | 0.495 ***<br>(0.072) | 0.373 ***<br>(0.040) |  |
| creditor rights                     | 1.202 *<br>(0.124)   | 0.956<br>(0.137)     | 0.970<br>(0.067)     |  |
| contract enforcement                | 0.751 **<br>(0.092)  | 0.820 *<br>(0.148)   | 0.779<br>(0.076)     |  |
| Pair effects                        | -                    | FE                   | RE                   |  |
| Hausman                             | -                    | -                    | inconsistent         |  |
| SEs                                 | robust               | bootstrap            | bootstrap            |  |
| Obs.                                | 5652                 | 1115                 | 5652                 |  |
| Groups                              | -                    | 120                  | 725                  |  |
| Log-likelihood                      | -3007.15             | -1593.71             | -2376.25             |  |

#### 4.1.2 Subsamples: Straight bonds and asset backed securities

To ensure that we are not missing important effects that are specific to certain types of debt securities, we analyze two subsamples consisting of only straight bonds and of only asset backed securities. Beside a general concern for robustness, we expect these two subsamples to

<sup>25</sup> Due to the pairwise exclusion of cases, the sample reduces to the period 1998–2007.

differ regarding the importance of safeguards on behalf of creditors: Straight bonds typically have longer maturities so that creditors should be particularly concerned about protecting themselves against opportunism. By contrast, asset backed securities are typically ‘bankruptcy remote’: The entitlements of securityholders and the special purpose entity holding the assets are structured so as to prevent the entity from becoming insolvent (Standard & Poor’s 2008). Creditor protection should therefore play a more pronounced role in the straight bond subsample.

In general, our findings appear to be quite robust in the straight bonds subsample, with *withholding tax rates* and *legal origin* showing the same sign and high statistical significance as in the larger debt securities sample. Furthermore, within the straight bonds sample we find that multinational corporate groups locate the bond issues preferably in jurisdictions with low *government bond yields*, which can be interpreted as aversion to country-specific risk. As in the baseline sample, we find *inflation* to attract cross-border issues of straight bonds. High *inflation* may point to a greater exchange rate risk, leading firms to finance the subsidiary’s operations in local currency. With regard to the asset backed securities subsample, the effect of *government bond yields* and *inflation* turns the other way. Country-specific risk may affect going concern firm value more than the value of individual assets, which could render asset based financing relatively less expensive than debt backed by the firm’s business operation. The opposite signs of *government bond yield* and *inflation* in the two subsamples might explain why the variables do not turn out significant in the larger sample. Surprisingly, in the asset backed securities subsample the withholding tax effect disappears in our preferred fixed-effects specification, which is hard to explain. The host country *corporate tax rate* remains insignificant.

Table 8: Negative binomial gravity model: Subsamples of straight bonds and asset backed securities

|                                     | Straight bonds       |                      |                      | Asset backed securities |                      |                      |
|-------------------------------------|----------------------|----------------------|----------------------|-------------------------|----------------------|----------------------|
|                                     | pooled               | panel                |                      | pooled                  | panel                |                      |
|                                     | (1)                  | (2)                  | (3)                  | (4)                     | (5)                  | (6)                  |
| distance                            | 0.593 ***<br>(0.103) | 0.589<br>(0.216)     | 0.408 **<br>(0.148)  | 0.454 ***<br>(0.084)    | 0.525<br>(1.172)     | 0.404 ***<br>(0.113) |
| contiguous                          | 0.941<br>(0.283)     | 1.085<br>(0.759)     | 1.382<br>(0.679)     | 0.709<br>(0.293)        | 1.555<br>(7.128)     | 3.014 **<br>(1.575)  |
| language                            | 1.415<br>(0.551)     | 0.774<br>(0.555)     | 0.766<br>(0.401)     | 1.429<br>(0.580)        | 0.394<br>(2.816)     | 1.135<br>(0.866)     |
| imports / exports                   | 1.101 ***<br>(0.012) | 1.012<br>(0.008)     | 1.014 *<br>(0.008)   | 1.077<br>(0.011)        | 0.989<br>(0.025)     | 1.006<br>(0.027)     |
| EMU                                 | 1.339<br>(0.382)     | 1.280<br>(0.237)     | 1.596 **<br>(0.315)  | 1.341<br>(0.447)        | 0.638<br>(0.307)     | 1.226<br>(0.435)     |
| bond market size * 10 <sup>-3</sup> | 1.347<br>(0.324)     | 0.925<br>(0.237)     | 1.047<br>(0.181)     | 0.099 ***<br>(0.041)    | 0.425<br>(0.275)     | 0.124 **<br>(0.132)  |
| government yield                    | 0.813 *<br>(0.057)   | 0.603 ***<br>(0.060) | 0.656 ***<br>(0.061) | 2.036 ***<br>(0.249)    | 7.027 ***<br>(2.027) | 2.703 ***<br>(0.536) |
| inflation                           | 0.859 **<br>(0.057)  | 1.170 **<br>(0.079)  | 1.061<br>(0.076)     | 0.950<br>(0.176)        | 0.695 **<br>(0.119)  | 0.598 ***<br>(0.105) |
| corporate tax host                  | 0.957<br>(0.025)     | 0.994<br>(0.015)     | 1.006<br>(0.011)     | 1.182 ***<br>(0.045)    | 1.057<br>(0.048)     | 1.136 ***<br>(0.037) |
| withholding tax host                | 0.951 ***<br>(0.018) | 0.966 ***<br>(0.012) | 0.964 ***<br>(0.011) | 0.910 ***<br>(0.016)    | 1.038<br>(0.053)     | 0.945 *<br>(0.030)   |
| legal origin                        | 0.275 ***<br>(0.058) | 0.593 **<br>(0.126)  | 0.402 ***<br>(0.082) | 0.083 ***<br>(0.042)    | 1.536<br>(2.958)     | 0.142 ***<br>(0.081) |
| creditor rights                     | 1.216 *<br>(0.129)   | 1.002<br>(0.127)     | 1.025<br>(0.117)     | 1.051<br>(0.118)        | 0.966<br>(0.716)     | 1.259<br>(0.222)     |
| contract enforcement                | 0.756 **<br>(0.104)  | 0.923<br>(0.201)     | 0.847<br>(0.173)     | 0.995<br>(0.159)        | 1.117<br>(1.810)     | 0.716<br>(0.186)     |
| Pair effects                        | -                    | FE                   | RE                   | -                       | FE                   | RE                   |
| Hausman                             | -                    | -                    | -                    | -                       | -                    | inconsistent         |
| SEs                                 | robust               | bootstrap            | bootstrap            | robust                  | bootstrap            | bootstrap            |
| Obs.                                | 5652                 | 915                  | 5652                 | 5652                    | 540                  | 5652                 |
| Groups                              | -                    | 98                   | 725                  | -                       | 54                   | 725                  |
| Log-likelihood                      | -2160.35             | -1108.85             | -1736.15             | -631.793                | -245.76              | -553.18              |

### 4.2.3 Push and pull factors

By construction, our sample contains only cross-border debt issues. This enables us to analyze what multinational firms look for when they pick a foreign jurisdiction, once they have decided to go abroad. However, since our unit of observation are cross-border debt security issues in country pairs, we also know the location of the firm's ultimate parent. Obviously, the number of cross-border debt security issues in a given country pair should not only depend on



the conditions in the host country but also of those in the country of origin. The latter can be thought of as ‘pushing’ firms abroad whereas host country variables determine which of the available jurisdictions ‘pulls’ most issues. For this reason, we include the variables of interest from country of origin into our analysis.

Including ‘push’ factors should help to specify the model better and thus to estimate the coefficients more precisely. As to host country ‘pull’ variables, the estimates confirm *withholding tax rate* and *legal origin* as relevant predictors for a host country’s attractiveness. The extended model lends more empirical support to *contract enforcement* than our original specification. In addition, *EMU* membership now turns out highly significant for debt securities in general and straight bonds in particular. For the straight bond sample, we find membership in the EMU to more than double the debt issues being attracted. Finally, we now find a significant positive effect of *corporate tax rate* in the host country. This result conforms to the tax shield hypothesis. It is mainly driven by asset backed securities, which is also consistent with the tax shield hypothesis: Securitization amounts to refinancing the assets through debt securities. The assets’ cashflows no longer generate profits for the subsidiary but instead have to be used to pay the securityholders.<sup>26</sup> Asset backed securities are another way of establishing a tax shield.

Looking at the country of origin, we find *corporate tax rate* to be significantly and positively related to cross-border issues. The effect is even larger than that of the host country *corporate tax rate*. High corporate taxes in the country of origin push firms to issue debt securities abroad. In and of itself, this finding is consistent with the profit shifting hypothesis. At first blush, however, it is hard to reconcile with high corporate taxes being a ‘pull’ factor. It seems that firms decide to go abroad to escape high corporate taxes, but then again seek high-tax jurisdictions. The former result conforms to the profit shifting hypothesis while the latter is predicted by the tax shield hypothesis. Yet the two hypotheses may well coexist. Profit shifting and erecting a tax shield can be motives for different multinational firms and different subsets of cross-border debt security issues.

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<sup>26</sup> See Han et al. (2010) for a model of corporate tax incentives to securitize bank loans.

Table 9: Negative binomial gravity model: Host and origin country effects

|                                     | pooled                     |                            | panel                 |                                |
|-------------------------------------|----------------------------|----------------------------|-----------------------|--------------------------------|
|                                     | all debt securities<br>(1) | all debt securities<br>(2) | straight bonds<br>(3) | asset backed securities<br>(4) |
| distance                            | 0.220 ***<br>(0.038)       | 0.408 ***<br>(0.073)       | 0.346<br>(0.075)      | 0.628<br>(0.249)               |
| contiguous                          | 2.376 **<br>(0.916)        | 2.060 **<br>(0.634)        | 1.366<br>(0.491)      | 3.207 **<br>(1.849)            |
| language                            | 1.227<br>(0.464)           | 0.886<br>(0.281)           | 0.790<br>(0.290)      | 0.489<br>(0.305)               |
| imports / exports                   | 0.991<br>(0.008)           | 1.003<br>(0.005)           | 1.000<br>(0.006)      | 1.024<br>(0.016)               |
| <b>host country (subsidiary)</b>    |                            |                            |                       |                                |
| EMU                                 | 2.584 ***<br>(0.560)       | 1.581 ***<br>(0.268)       | 2.024 ***<br>(0.446)  | 1.275<br>(0.391)               |
| bond market size * 10 <sup>-3</sup> | 3.228 ***<br>(0.748)       | 1.105<br>(0.154)           | 1.314 *<br>(0.208)    | 0.407 *<br>(0.188)             |
| government yield                    | 0.970<br>(0.108)           | 0.865<br>(0.102)           | 0.792<br>(0.117)      | 1.896 ***<br>(0.370)           |
| inflation                           | 0.866 **<br>(0.054)        | 1.032 *<br>(0.049)         | 1.051<br>(0.061)      | 0.757 **<br>(0.095)            |
| corporate tax                       | 0.996<br>(0.017)           | 1.026 **<br>(0.011)        | 1.016<br>(0.013)      | 1.073 ***<br>(0.027)           |
| withholding tax                     | 0.932 ***<br>(0.013)       | 0.969 ***<br>(0.008)       | 0.969 ***<br>(0.010)  | 0.929 ***<br>(0.024)           |
| legal origin                        | 0.220 ***<br>(0.032)       | 0.344 ***<br>(0.040)       | 0.387 ***<br>(0.054)  | 0.149 ***<br>(0.049)           |
| creditor rights                     | 1.155 *<br>(0.095)         | 0.979<br>(0.078)           | 1.060<br>(0.108)      | 1.297<br>(0.213)               |
| contract enforcement                | 0.896<br>(0.100)           | 0.808 **<br>(0.083)        | 0.893<br>(0.112)      | 0.720<br>(0.178)               |

table continues on the next page

| <b>country of origin (corporate parent)</b> |                      |                     |                     |                      |
|---|----------------------|---------------------|---------------------|----------------------|
|   | (1)                  | (2)                 | (3)                 | (4)                  |
| EMU   | 0.580 **<br>(0.146)  | 1.130<br>(0.207)    | 1.239<br>(0.302)    | 1.239<br>(0.375)     |
| bond market size * 10 <sup>-3</sup>         | 1.745 ***<br>(0.302) | 1.031<br>(0.124)    | 1.302 **<br>(0.183) | 0.177 ***<br>(0.084) |
| government yield                            | 1.329<br>(0.247)     | 0.866<br>(0.110)    | 0.731 **<br>(0.115) | 1.626 *<br>(0.417)   |
| inflation                                   | 1.076<br>(0.143)     | 0.992<br>(0.066)    | 0.974<br>(0.078)    | 0.669 **<br>(0.116)  |
| corporate tax                               | 1.114 ***<br>(0.018) | 1.052 **<br>(0.012) | 1.029 **<br>(0.014) | 1.079 ***<br>(0.027) |
| withholding tax                             | 1.017<br>(0.012)     | 1.006<br>(0.446)    | 1.012<br>(0.010)    | 0.995<br>(0.023)     |
| legal origin                                | 0.646 ***<br>(0.088) | 0.932<br>(0.125)    | 1.083<br>(0.175)    | 0.525 **<br>(0.170)  |
| creditor rights                             | 0.763 ***<br>(0.075) | 1.033<br>(0.082)    | 1.116<br>(0.108)    | 1.100<br>(0.194)     |
| contract enforcement                        | 0.875<br>(0.293)     | 1.031<br>(0.343)    | 0.915<br>(0.379)    | 0.807<br>(0.591)     |
| Pair effects                                | -                    | RE                  | RE                  | RE                   |
| SEs   | robust               | -                   | -                   | -                    |
| Obs.  | 2660                 | 2660                | 2660                | 2660                 |
| Groups                                      | -                    | 360                 | 360                 | 360                  |
| Log-likelihood                              | -2299.22             | -1963.40            | -1444.49            | -421.87              |

## 4.2 An alternative ordered probit model

As an additional robustness check, we group country pairs in four groups depending on the number of cross-border debt security issues: The first contains the country pairs with no cross-border issues, the second to fourth those with a moderate (1–10), large (11–50) and very large number (51–150) of cross-border debt issues. The idea is that there could be distinct data generating processes. For instance, some jurisdictions may have ceased to provide any infrastructure for debt securities at all; others have the required legal and financial institutions but take no interest in luring debt issues from abroad; a few countries are pursuing a conscious competitive strategy of promoting its legal and financial services industry. To see whether our results hold up against such a story, we estimate an ordered probit model based on the four groups mentioned above. Our results on tax and creditor protection variables are largely confirmed. While a lower withholding tax attracts cross-border debt security issues

generally and with respect to straight bonds in particular, asset backed securities are affected by corporate taxes. The legal origin of a particular country affects all samples alike.

Table 10: Ordered probit model

|                                     | pooled                |                       | panel                 |                         |
|-------------------------------------|-----------------------|-----------------------|-----------------------|-------------------------|
|                                     | all debt securities   | all debt securities   | straight bonds        | asset backed securities |
|                                     | (1)                   | (2)                   | (3)                   | (4)                     |
| distance                            | -0.413 ***<br>(0.052) | -0.564 ***<br>(0.115) | -0.820 ***<br>(0.135) | -0.371 *<br>(0.197)     |
| contiguous                          | 0.025 *<br>(0.089)    | 0.957 ***<br>(0.193)  | 0.356 *<br>(0.200)    | 1.000 **<br>(0.427)     |
| language                            | 0.296 ***<br>(0.094)  | 0.974 ***<br>(0.212)  | 0.752 ***<br>(0.249)  | 0.017<br>(0.432)        |
| imports / exports                   | 0.038 ***<br>(0.003)  | 0.027 ***<br>(0.004)  | 0.037 ***<br>(0.004)  | 0.019 **<br>(0.007)     |
| EMU                                 | 0.059<br>(0.078)      | 0.165<br>(0.121)      | 0.431 ***<br>(0.144)  | -0.142<br>(0.172)       |
| bond market size * 10 <sup>-3</sup> | -0.200 ***<br>(0.073) | -0.045<br>(0.099)     | -0.043<br>(0.109)     | -1.059 ***<br>(0.224)   |
| government yield                    | 0.053<br>(0.035)      | -0.044<br>(0.063)     | -0.192 **<br>(0.076)  | 0.445 ***<br>(0.106)    |
| inflation                           | -0.085 ***<br>(0.026) | -0.030<br>(0.043)     | -0.008<br>(0.051)     | -0.183 **<br>(0.078)    |
| corporate tax host                  | -0.006<br>(0.005)     | 0.020 **<br>(0.008)   | 0.001<br>(0.010)      | 0.061 ***<br>(0.013)    |
| withholding tax host                | -0.018 ***<br>(0.005) | -0.017 **<br>(0.007)  | -0.026 ***<br>(0.008) | -0.021<br>(0.013)       |
| legal origin                        | -0.631 ***<br>(0.053) | -0.720 ***<br>(0.093) | -0.836 ***<br>(0.102) | -0.986 ***<br>(0.185)   |
| creditor rights                     | 0.063 **<br>(0.029)   | 0.053<br>(0.062)      | -0.021<br>(0.065)     | 0.156<br>(0.109)        |
| contract enforcement                | -0.162 ***<br>(0.040) | -0.119<br>(0.094)     | -0.186 **<br>(0.092)  | -0.306 **<br>(0.156)    |
| Pair effects                        | -                     | RE                    | RE                    | RE                      |
| SEs                                 | robust                | -                     | -                     | -                       |
| Obs.                                | 5652                  | 5652                  | 5652                  | 5652                    |
| Log-likelihood                      | -1493.82              | -1111.87              | -849.2                | -372.77                 |

## 5. Summary and conclusion

Regulatory competition between jurisdictions has become a central feature of the European legal landscape. As in the US, such competition occurs, for example, in the area of company law. But it surely is not confined to this field. In this article, we have been looking at issuer location and regulatory competition in the European Corporate Debt Market. To the best of our knowledge, we are the first to study the extent of competition for corporate debt issues in Europe empirically. We find that, in absolute terms, Germany has by far the highest outflow of debt issues, while the Netherlands, the UK, Luxemburg and Ireland see the most inflows (in that order). We use a panel gravity model to investigate the motives for choosing an issuer incorporated in another jurisdiction.

The data clearly support the prediction that inflows are influenced positively by a low withholding tax rate. A 1 percentage point increase in the withholding tax rate reduces cross-border debt issues by 2.6 percent. Corporate tax rates also play a role, but here the picture is less clear. Considering the perspective of both the host country and the country of origin, we find some support for the hypothesis that firms use out-of-state issues as a tax shield by issuing more debt locally in high-tax jurisdictions ('tax shield hypothesis'). This effect shows up with respect to asset backed securities. There is also some evidence for the hypothesis that multinational firms from high-tax jurisdictions issue debt securities abroad to create profit shifting opportunities ('profit shifting hypothesis'). Further, in none of the panel models do we find a significant impact of creditor rights in bankruptcy on multinational firms' choice where to issue debt securities. The only weakly significant effect that we observe is that of the efficiency of a host country's court system as measured by the time it takes to resolve a dispute.

The implications of these findings appear to be straightforward: Countries that wish to attract bond issues should lower or abolish withholding taxes. From a European regulatory perspective, this result provides empirical evidence on an important field of tax competition. As tax law arbitrage is costly, our findings strengthen the case for abolishing withholding taxes in Europe. A somewhat sobering result for European jurisdictions might be that even if they radically improve on their legal rules as applicable to debt securities, especially with respect to creditor protection, they should not anticipate to capture a larger market share in the European public debt market. 'Success' in European regulatory competition crucially depends on identifying the drivers of firms' choices. Whereas in company law, incorporation speed

and capital requirements play the decisive role (Becht et al. 2008), issuer choice in the European corporate bond market is driven by (withholding) tax rates – not creditor rights.

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