

# Foreign Ownership and Corporate Income Taxation: An Empirical Evaluation

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**Abstract:** Economic integration in Europe has not led to a ‘race to the bottom’ regarding corporate income taxes. Corporate income tax revenues as a share of GDP have in fact remained rather stable, even if the share of corporate income taxes in overall tax revenues has declined. This paper documents trends in the foreign ownership of companies in Europe and it examines whether foreign ownership exerts a positive influence on corporate income tax levels. Using company-level data, we document that the foreign ownership share in Europe stood at around 26 percent in the year 2000. The estimation suggests that a one-percentage point increase in foreign ownership increases the average corporate income tax burden by slightly more than 1 percent. Further international economic integration is likely to lead to higher foreign ownership shares with a concomitant positive influence on corporate taxation levels.

**Keywords:** foreign ownership, corporate taxation, tax competition

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## 1. Introduction

Over the last two decades, industrialized countries have eliminated most remaining capital controls and restrictions on the activities of multinational firms. The EU specifically had abolished all restrictions on capital outflows by 1992, while common market principles guarantee EU firms the right of establishment in every Member State. The EU similarly imposes few restrictions on the activities of firms from third countries. Economic integration in principle makes national tax policies interdependent. This realization underlies an already substantial literature on international tax competition. While tax policies may indeed be interdependent, this has so far not led to a ‘race to the bottom’ in the area of corporate income taxes. In fact, Devereux, Griffith and Klemm (2002) document that corporate tax revenues as a percentage of GDP have been rather stable at around 2.5 percent for EU Member States and the G7. Corporate tax revenues, however, have declined as a share of total tax revenues. These outcomes reflect that recent tax reforms in Europe have led to only slight reductions in average or effective corporate income tax rates, even if top statutory rates have been in decline.

Economic integration is expected to exert downward pressure on corporate tax rates insofar as it renders the international location of productive capital more responsive to national tax policies. Economic integration, however, is accompanied by increased levels of foreign direct investment (FDI) and international portfolio investment in corporate shares. Increased foreign ownership per se provides countries with the incentive to increase corporate tax levels, as it introduces the possibility of corporate tax exportation (see Mintz (1994) and Huizinga and Nielsen (1997)). The share of FDI in total investment in Europe has indeed increased rapidly in the last decade (see, for instance, Wildasin (2000), Table 3). The share of foreign assets in European portfolios has correspondingly been on the rise in the run-up to EMU, as documented by Adjaouté et al (2000) and also by European Commission (2001b).<sup>1</sup>

The purpose of this paper is to present evidence on the level of internationalization of corporate sectors in Europe in recent years, and to investigate whether this internationalization is in fact a reason that corporate taxes have remained relatively high. From the *Amadeus* database, we compile information on the foreign

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<sup>1</sup> European Commission (2001b, p. 153) shows that foreign financial assets exceed 25 percent of total financial assets in Belgium, the Netherlands, Spain and the United Kingdom out of the 12 member states for which data are available.

ownership for 31 European countries over the 1996-2000 period. For 2000, we have full ownership information on around 14,000 firms. To expand our sample, we alternatively consider foreign firms to be at least 50 percent foreign owned, and domestic firms to be more than 50 percent domestically owned. This allows us to trace the foreign or domestic ownership of about 26,500 European firms in the year 2000. Depending on the exact definition of a foreign ownership, we find that the asset-weighted foreign ownership share in Europe is in the 23-26 range for the year 2000. For Western Europe, estimates are in the 18-19 percent range, while they are between 35 and 39 percent for Eastern Europe.

Our empirical analysis suggests that corporate tax levels are positively related to country-level foreign ownership shares. Moreover, our estimates indicate that the effect is economically significant. An increase in foreign ownership by one percentage point, specifically, is estimated to increase the tax burden as a percent of assets by 0.027, which is about 1 percent of the average value of this measure of the tax burden. The positive relationship between the corporate tax burden and foreign ownership is found to persist, if we split the sample by year or by economic sector. Robustness checks indicate that the positive empirical relationship between foreign ownership and the tax burden primarily reflects cross-country variation in the data rather than variation over time during the 1996-2000 period. Also, the relationship is stronger for the Western Europe separately than for the entire European sample.

In the remainder, section two first discusses some of the previous theoretical and empirical literature on the relationship between foreign ownership and taxation. Section three discusses the foreign ownership data used in this study. Section four discusses the estimation framework and section five presents the estimation results. Section six concludes.

## **2. Previous literature**

A small open economy optimally does not tax internationally mobile capital (see, for instance, Gordon (1986)). The reason is that the incidence of a capital tax will be on immobile factors of production such as labor. It is then better to tax labor directly, as this leaves the capital input decision undistorted. The corporate income tax in practice taxes mobile capital as well as residual profits. In the absence of a separate profit tax, the corporate income tax then can be rationalized as a crude way of taxing profits. Foreign ownership implies that part of a company's profit stream accrues to

foreign residents. The corporate income tax thus can serve to shift some income away from foreign residents to the domestic treasury or ultimately domestic residents. Huizinga and Nielsen (1997) show that a higher foreign ownership share will generally rationalize higher source-based capital income taxes (such as the corporate income tax) combined with lower residence-based capital income taxes.

In a multi-country world, foreign ownership will generally increase the level of capital income taxation that materializes in the absence of international tax policy coordination. Foreign ownership therefore affects whether countries can increase their welfare by coordinating their tax policies and if so, whether coordination requires increases or reductions in overall capital income tax levels. Huizinga and Nielsen (2002), for instance, show that a high degree of foreign ownership may obviate the need to increase source-based capital income taxes through coordination in a world where the evasion of residence-based capital income taxes would otherwise justify such coordination.

Sorensen (2000) examines the scope for international tax policy coordination with the aid of a simulation model characterized by partial foreign ownership and an absence of residence-based capital income taxes.<sup>2</sup> The model specifically considers regional capital income tax coordination among EU countries in a model consisting of four European ‘regions’ and the US. In the benchmark calibration, the four European regions have a foreign ownership share of 25 percent. Regional coordination in Europe increases the average capital income tax from 33.8 percent to 46.5 percent. Sensitivity analysis reveals that putting the foreign ownership share to zero has the effect of reducing the uncoordinated and coordinated capital income taxes to 23.0 and 41.0 percent, respectively. Higher foreign ownership shares beyond 25 percent, conceivably in the 50-60 percent range, may well imply that tax coordination in Europe implies increasing capital income taxes, although Sorensen (2000) does not provide calculations on this.

Empirical work on the relationship between foreign ownership and capital income taxation has so far mostly focused on whether foreign-owned firms pay higher or lower taxes than domestically-owned firms, rather than on the impact of macro-

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<sup>2</sup> In Sorensen (2000) firms are atomistic. Hence firms are too small to be able to change the taxes they face by changing their degree of foreign ownership through, for instance divestment to domestic owners. Olsen and Osmundsen (2001) instead assume that a multinational firm can affect the tax competition between two countries competing for the multinational’s investments by changes in its international ownership.

level foreign ownership on the overall tax burden. Specifically, Grubert, Goodspeed, and Swenson (1993) find that foreign-controlled U.S. corporations pay lower U.S. taxes than purely domestic firms on the basis of tax-return data. About half of the observed difference in taxes paid can be explained by observable factors such as exchange rate fluctuations, firm size and firm age. The remaining half is attributed to unobservable factors such as a lower accounting profitability following the manipulation of international transfer prices or lower ‘true’ profitability due to lower productivity.

Demirgüç-Kunt and Huizinga (2001), further, examine the taxes paid by domestic and foreign banks in 80 countries during the 1988-1995 period using firm-level accounting information. On average, foreign banks pay higher taxes than domestic banks in lower-income countries, while they pay about equal taxes in higher-income countries. Foreign banks, however, are found to pay lower taxes than domestic banks in many individual industrialized countries (among them the U.K. and the U.S.) after controlling for firm characteristics.<sup>3</sup>

In an attempt to shed further light on why foreign firms may pay lower taxes in the U.S., Kinney and Lawrence (2000) compare the taxes paid by U.S. firms taken over by foreign firms and other domestic U.S. firms, respectively, during the 1975-1989 period. The firms taken over by foreign firms are shown to pay relatively low taxes. This difference, however, is explained by the fact that foreigners tend to take over U.S. targets that are less profitable than their industry counterparts, and hence it is not attributed to income manipulation by foreign firms.

So far, little evidence exists on the potential relationship between macro-level foreign ownership and the overall corporate tax burden (for foreign and domestic firms alike). Using data for U.S. states, Eijffinger and Wagner (2001) relate the average corporate tax rate paid to the real productive assets of foreign owned affiliates (defined to be at least 10 percent foreign owned) as a measure of foreign ownership. In the absence of data on aggregate state-level real productive assets, these authors include statewide corporate income or employment as scaling variables in their empirical specification. Also, the authors fail to include firm-level or industry-level

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<sup>3</sup> See Demirgüç-Kunt and Huizinga (2001, Table 5). These patterns again can reflect transfer pricing and differences in underlying productivity. The further finding that reported profitability rises with the statutory tax rate only for domestic bank is interpreted as evidence that foreign banks are engaged in international profit shifting.

controls in their analysis. All the same, they report a positive relationship between the average corporate tax rate and the real productive assets of foreign affiliates in support of the hypothesis that corporate tax levels increase with the level of foreign ownership.

### 3. The data

The main data source used in this study is the *Amadeus* database that provides balance sheets and income statements for European firms in 34 countries. *Amadeus* also contains detailed information on main shareholders including their nationality (see Appendix A for further details on *Amadeus*). This allows us to account for the domestic and foreign ownership of all shares for about 14,000 European firms in the year 2000.<sup>4</sup> For a larger number of about 26,500 firms, we have sufficient ownership information to determine whether the firm is in majority domestically or foreign owned. Firms with complete or nearly complete ownership information tend to be firms with relatively few shareholders. This implies that our data reflect relatively few publicly traded firms.<sup>5</sup>

For firms with full ownership information, we denote  $fs$  to be the share of foreign ownership. Using these firm-level foreign ownership shares, we construct  $FS1$  as the equal-weighted foreign ownership share at the country level, while  $FS2$  is the asset-weighted national foreign ownership share. Clearly, country-level foreign ownership shares are only meaningful if they are based on a sufficiently large sample. As a cut-off point, we only construct  $FS1$  and  $FS2$  measures, if they can be based on at least 35 firms for a given country in a given year.

Alternatively, we construct a foreign ownership dummy, denoted  $fd$ . This dummy takes on a value of 1 in case 50 percent or more of the shares are foreign owned, while it takes on a value of 0 if more than 50 percent of the shares are domestically owned. On the basis of this firm-level  $fd$  variable, we can again construct two separate foreign ownership measures at the country level. First,  $FS3$  is the share

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<sup>4</sup> Faccio and Lang (2002) do not focus on the nationality of ownership but instead on the type of ownership of European firms. These authors distinguish firms that are primarily family-owned, state owned or with widely held shares.

<sup>5</sup> Unlisted firms in the aggregate may be as important as listed firms. This reflects that listed firms are relatively few, even if they tend to be large on average. In the case of Belgium, for instance, Timmermans (2000) estimates that non listed firms represent 56 percent of the value of all equity. Our empirical estimation is based on samples that underweight publicly traded firms, but still contain significant numbers of these. See Appendix B for details.

of firms designated as foreign in the total, while *FS4* is calculated as the share of the assets of foreign firms in total assets. Again, each of the variables *FS3* and *FS4* is only constructed for a given country in a given year, if it can be based on at least 35 firms.

Table (1) provides information on *FS1* and *FS2*. For 2000, we see that the average values of *FS1* and *FS2* in Europe were 26.1 and 25.9 percent, respectively. For 2000, foreign ownership in the EU and in Western Europe (the EU plus Iceland, Norway and Switzerland) is lower than in Eastern Europe. The average *FS2*, for instance, is 19.2 percent in Western Europe and 39.2 percent in Eastern Europe. Average figures for the 1996-2000 period are also provided. The average *FS2* for 2000 in Europe (at 25.9 percent) is higher than the average for the 1996-2000 period (at 24.0 percent), reflecting an overall increase in foreign ownership. Foreign ownership in Eastern Europe has risen, while it appears to have decreased slightly in Western Europe. Finally, the table indicates the changes in the *FS1* and *FS2* variables between 1996 and 2000. These changes, computed for 15 countries, indicate an increase in the foreign ownership share *FS2* of 3.3 percent for Europe as a whole between 1996 and 2000.

Table (2) provides information on *FS3* and *FS4*. For 2000, information is now also available for Lithuania and Switzerland. The data for these two additional countries pull down the average European foreign ownership somewhat. Also, the averages for *FS3* and *FS4* are pulled down, as apparently firms for which we have information on majority foreign or domestic ownership tend to be less foreign owned than firms for which we have full information on the internationalization of ownership. On account of this, the European average of *FS4* at 23.8 percent is about two percentage points below the average for *FS2* of 25.9. The average of *FS4* for Eastern Europe is even pulled down from 39.2 percent to 34.8 percent. The overall trend in *FS3* and *FS4* over the 1996-2000 again is positive due to increases in foreign ownership in Eastern Europe.<sup>6</sup>

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<sup>6</sup> It is interesting to compare our foreign ownership estimates with other available evidence. For Belgium, Timmermans (2000, Table 2) reports estimates by the Bank of Belgium of the value-weighted foreign ownership of shares for 1998 as follows: 30.5 percent for listed shares, 28.0 percent for unlisted shares and 29.1 percent for the total. Our estimates for Belgium are 44.6 percent for *FS2* and 27.1 percent for *FS4*. Dahlquist and Robertsson (2001, Table 1) provide estimates of the equal-weighted and value-weighted foreign ownership of listed shares in Sweden for 1997 of 19.7 and 32.4 percent, respectively. Our estimates are 13.2 percent for *FS1*, 5.4 percent for *FS2*, 13.4 percent for *FS3* and 4.9 percent for *FS4*. Our numbers mostly reflect unlisted shares and are clearly much lower. Finally, Bøhren, Øyvind and Benrt Arne Ødegaard (2000, Table 4) report that the value-weighted foreign ownership of listed shares in Norway in 1997 stood at 32 percent, in contrast to our estimates of 17.1

Variation in aggregate foreign ownership measures over time reflects changes in the foreign ownership of specific firms and changes in the sample of firms. As shown in Appendix C, changes in foreign ownership for given firms tend to be relatively small. This suggests that changes in aggregate foreign ownership mostly reflect corporate changes such as the establishment of new firms and mergers and acquisitions.

The four measures of foreign ownership *FS1* through *FS4* are highly correlated as indicated in Table (3). Part A provides the correlations of the foreign ownership measures as computed per country and per year, while Part B gives the correlations of country-level measures, where these country-level measures are averages of annual averages per country. As seen in the table, *FS1* and *FS3* particularly are highly correlated, and the same goes for *FS2* and *FS4*. This suggests that aggregate foreign ownership measures based on majority domestic or foreign ownership are very similar to those based on the exact foreign ownership share.

Our tax burden measure is accrued taxes as a percent of assets.<sup>7</sup> In Figure (1), we plot the average tax burden over 1996-2000 per country against the four aggregate foreign ownership measures *FS1* through *FS4*. Countries in Eastern and Western Europe are marked differently. Parts A and B of the figure point at a positive relationship between the tax burden and *FS1* and *FS2*, at least for Western Europe. Hungary and Bulgaria are distinct outliers with relatively high and low foreign ownership, respectively. Parts C and D of the figure in addition plot the tax burden against the *FS3* and *FS4* measures, with the advantage of data for several additional countries. The figure again displays an apparently positive relationship between the tax burden and foreign ownership for Western Europe, even if Luxembourg appears to have relatively high foreign ownership (or a relatively low tax burden). There also is a ‘cluster’ of Eastern European countries, consisting of the Czech Republic, Latvia, and Hungary, with relatively high foreign ownership (or low tax burdens). At the other extreme, Bulgaria continues to show low foreign ownership with a high tax burden.

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percent for *FS2* and 19.5 percent for *FS4*. Again our numbers reflect mostly unlisted shares and are lower. Eurostat (2001) reports on the share of value-added for 1998 for Denmark, Spain, Netherlands, Finland, Sweden and the UK, with an average foreign share of 12.3 percent for these countries. Eurostat only counts majority-owned foreign enterprises (with a single owner or group of owners having more than 50 percent of the shares), which can explain the rather low figure. Data in the Eurostat study reflect selected service industries only.

<sup>7</sup> We measure taxes relative to assets rather than some measure of income or profits, as these latter variables are more easily distorted through international profit shifting.

The different data points for Eastern European countries in part reflect different macroeconomic environments. In subsequent empirical work, we try to control for this by, for instance, including absolute and per capita GDP as explanatory variables. The relatively low values of these variables for Eastern European countries can in part explain the relatively low tax burdens. All the same, differences between Eastern and Western Europe no doubt reflect different recent economic histories that are not so easily quantified in a regression framework. Specifically, large-scale privatisation in the early 1990s and the need to import superior foreign technologies catapulted these countries to high foreign ownership levels rather quickly. Eastern European tax burdens, however, continue to be low according to Western European standards, perhaps because a relatively poor infrastructure or the perceived riskiness of investments in Eastern Europe force tax administrators to keep tax levels low.

Ten Eastern European countries are set to join the EU in 2004. This next phase in the economic transition of Eastern Europe will presumably reduce the perceived riskiness of investments in the accession countries. More generally, economic conditions in Eastern and Western Europe will become more similar, and the relationship between foreign ownership and the tax burden in Eastern Europe may approach the one in Western Europe. For now, the data, however, appear to reflect the transition process rather than a stable, long run relationship. To account for this, we consider the group of Western European countries separately in some of the subsequent empirical work.

From *Amadeus*, we also construct several variables – using company balance sheets - that can be expected to affect the tax burden. First, the log of total assets serves as an indicator of firm size. Second, fixed assets, short-term debt and long-term debt (all as shares of total assets) can be expected to matter. *Amadeus* also provides a sector code for each company in the form of the 3-digit NACE classification. On the basis of this coding, we construct 8 sectoral indices. The eight sectors are: agriculture, construction, financial services, manufacturing, retail and wholesale, transport, utilities and other. In addition to data derived from *Amadeus*, this study uses data on several standard macroeconomic variables. Summary statistics on all the variables used in the empirical work are provided in Table (4). The table indicates that the correlations between the ownership variables *FS1* and *FS2* with other macro-level variables are quite low. Appendix A provides full information about data sources, data construction and definitions, and the building of the sample.

#### 4. The estimation

The estimation relates the tax burden of European firms to a range of firm-level and country-level variables. Firm-level and aggregate foreign ownership variables serve as explanatory variables. In addition, there is a range of firm-level and macroeconomic controls. The benchmark specification can be written as follows:

$$Tax\ burden_{ijt} = \alpha + \beta_i X_{ijt} + \beta_j Z_{jt} + \sum_t \beta_t T_t + \gamma_i f_{it} + \gamma_j F_{jt} + \varepsilon_{ijt}$$

where  $i, j$  and  $t$  denote the firm, the country, and the year and the variables are defined as:

- $Tax\ burden_{ijt}$  is taxes accrued as a share of assets,
- $X_{ijt}$  is a range of firm-level controls (several variables derived from balance sheet data as well as sector fixed effects),
- $Z_{jt}$  is a range of country-level controls (log of GDP, log of per capita GDP and inflation),
- $T_t$  is a vector of time fixed effects,
- $f_{it}$  is a variable denoting firm-level foreign ownership,
- $F_{jt}$  is a variable denoting country-level foreign ownership,
- $\varepsilon_{ijt}$  is a random error,
- $\beta$  is a vector of coefficients and  $\alpha, \gamma_i$  and  $\gamma_j$  are individual coefficients.

The variable  $f_{it}$  can be either the firm-level foreign ownership share,  $fs$ , in which case  $F_{jt}$  is either  $FS1$  or  $FS2$ , or it is the firm-level foreign ownership dummy,  $fd$ , in which case  $F_{jt}$  is either  $FS3$  or  $FS4$ . The parameters of interest are  $\gamma_i$  and  $\gamma_j$ . The parameter  $\gamma_i$  measure the effect of firm-level foreign ownership on a firm's tax burden, while the parameter  $\gamma_j$  instead denotes the impact of country-level ownership on firms' tax burdens. This second effect applies to all firms in a country  $j$ .

The firm-level and macro-level foreign ownership variables are not independent, as changes in firm-level foreign ownership are reflected in country-level foreign ownership measures (unless they cancel), and vice versa. A change in the foreign ownership share at a firm thus in principle affects the tax burden through both firm-level and macro-level effects. Specifically, consider that the foreign ownership

share,  $fs_i$ , of firm  $i$  (between zero and one) increases by  $\sigma_i$ . Also, let  $A_i$  be the assets of firm  $i$ . The asset-weighted tax burden in country  $j$  then increases by  $100\sigma_i(\gamma_i + \gamma_j)[A_i / \sum_i A_i]$  in percent, if in fact the firm-level tax burden,  $Tax\ burden_{ijt}$ , is correctly specified to be related to the asset-weighted country-level foreign ownership share,  $FS2_{jt}$ .<sup>8</sup> Similarly, the average tax burden in a particular country increases by  $100\sigma_i(\gamma_i + \gamma_j) / n$  in percent (with  $n$  the number of firms that country), if the firm-level tax burden,  $Tax\ burden_{ijt}$ , is correctly related to the equal-weighted country-level foreign ownership share,  $FS1_{jt}$ .<sup>9</sup>

Our sample is constructed to include only firms with unconsolidated balance sheets (see Appendix A). This is to exclude firms with consolidated balance sheets that may have subsidiaries paying taxes in various countries. As a result, our tax burden variable almost exclusively reflects source-level taxes, and in particular the corporate income tax, in the country of establishment.<sup>10</sup> Corporate income tax systems generally do not discriminate on the basis of the international ownership of the firm. Hence, there is no reason why foreign ownership should be endogenous to the tax variable as constructed in this paper.<sup>11</sup>

## 5. Empirical results

### 5.1 Benchmark results

Table (5) contains the benchmark results. Columns (1) and (2) include the firm-level foreign ownership share,  $fs$ , and the country-level foreign ownership shares  $FS1$  and  $FS2$ , respectively. Columns (3) and (4) instead include the firm-level foreign

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<sup>8</sup> Note that an increase in the tax burden as a percentage of assets may not translate into higher tax revenues if the higher tax burden, resulting from any change in the tax system, induces some firms to relocate.

<sup>9</sup> Similarly, the sign of the sum  $\gamma_i + \gamma_j$  indicates the sign of the total effect higher foreign ownership on the tax burden, if we proxy the foreign dummy,  $fd$ , for the firm-level foreign ownership share,  $fs$ , and correspondingly use the aggregate foreign ownership shares  $FS3$  and  $FS4$ .

<sup>10</sup> All the same, some firms – even those with unconsolidated balance sheets – may report some foreign-source tax paid by foreign branches that pay corporate tax in the foreign country.

<sup>11</sup> In practice, the overall tax system – taking into account the interactions of a country's source taxation with its and foreign countries' residence taxation – may turn out to be discriminatory against or favorable towards foreign ownership. As an example, countries that allow credits for corporate taxes against personal income taxes rarely provide credits against foreign corporate taxes. This discriminates against foreign ownership. On the other hand, residents of a particular country may more easily escape the residence tax on the income derived from foreign corporate shares than on domestic shares. This effectively discriminates against domestic ownership. Our tax burden variable does not capture these possibly discriminatory aspects of the tax system, and should not be correlated with these. See Stulz (1981) for an analysis of the impact of investment barriers such as differential taxation on asset pricing and portfolio allocation.

dummy,  $fd$ , and the country-level foreign ownership share  $FS3$  and  $FS4$ . The regressions in columns (1) and (2) contain ownership variables that are based on full information of the internationalization of ownership giving rise to a sample of 50,481 observations. The regressions in columns (3) and (4) instead require information only about the collective majority ownership of either domestic or foreign shareholders, which increases the sample to 102,138 observations. The regressions in columns (1) and (2) are based on firm-level data from 18 countries, while regressions (3) and (4) contain data from 21 countries. For a breakdown of the national origins of firms in the two samples, see Tables B1 and B2 in Appendix B. Apart from being larger, the sample in regressions (3) and (4) contains relatively more publicly traded firms.<sup>12</sup>

The results in all four columns of Table (5) first indicate that firms with larger assets tend to pay lower taxes.<sup>13</sup> Other variables derived from balance sheet data enter the regressions as expected: fixed assets lead to lower taxes (reflecting generous depreciation), and both short-term and long-term debt lower taxes (reflecting the tax deductibility of interest payments). Relative to the left-out sectoral fixed effect for manufacturing, we see that several sectors (agriculture, utilities, other) appear to pay significantly higher taxes in at least one of the specifications, while other sectors (construction, retail and wholesale, and transport) pay significantly lower taxes. These differences may reflect variation in pre-tax profitability due to economic rents that are not fully reflected in (book) asset values. At the same time, sectors that use few assets with substantial depreciation allowances may pay higher taxes as scaled by assets. The agricultural sector, for instance, uses mostly non-depreciable land and it appears to face a relatively high tax burden.

Turning to the country variables, we test for a country-size effect by including the log of GDP. Smaller countries should face a larger elasticity of the tax base with respect to the effective tax rate, and hence are expected to levy lower taxes in a non-cooperative tax competition equilibrium. The log of GDP indeed enters all four regressions with a positive and significant coefficient. Next, we test whether richer

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<sup>12</sup> Regressions (1) and (2) contain 11,405 firms in 2000, of which 69 are publicly quoted. Regressions (3) and (4) contain 21,322 firms in 2000, of which 360 are quoted. See Appendix B for information about the nationalities of these quoted firms.

<sup>13</sup> Large firms tend to combine many ventures and hence are less likely to be restricted by limits on the carry forward or backward of losses for tax purposes. Also, they may be less risky and hence on average yield lower pre-tax returns on assets. Finally, large firms may pay lower taxes because they are more successful in implementing tax avoidance strategies.

countries, which tend to have larger public expenditures, levy higher corporate taxes by including the log of per capita GDP. This variable, as expected, enters all four regressions positively, but it is statistically significant only in the *FS1*, *FS3* and *FS4* regressions. The coefficient on inflation turns out to be positive and significant throughout, reflecting that inflation erodes the value of depreciation and interest allowances based on historical values.

Turning to the ownership variables, we see that the firm-level ownership variables *fs* and *fd* have positive and significant coefficients between .158 and .199 in the four regressions. A plausible explanation for this is simply that foreign-owned firms are more profitable than domestic firms.<sup>14</sup> Finally, we consider the country-level foreign ownership variables. Note that the equal-weighted *FS1* and *FS3* variables enter columns (1) and (3) with very similar coefficients of 1.377 and 1.454, while the coefficients for *FS2* and *FS4* in columns (2) and (4) equally are very similar at 2.528 and 2.726. Hence, it makes little difference whether the aggregate foreign ownership measures are based on full ownership information or only on information of majority domestic or foreign ownership. A priori, the asset-weighted measures would be preferred to the equal-weighted measures, as they appropriately give a larger weight to bigger firms. Regression with asset-weighted foreign ownership measures also fit the data somewhat better, as evidence by slightly larger R-squares. For all four regressions, the sign of the combined firm-level and country-level effects of higher foreign ownership on the tax burden, indicated by the sign of  $\gamma_i + \gamma_j$ , is clearly positive.<sup>15</sup>

The sizes of the coefficients on the foreign ownership variables suggest that the impact of foreign ownership on the tax burden is economically significant. To illustrate, we take the estimates of the coefficients  $\gamma_i$  and  $\gamma_j$  in column (2) of 0.160 and 2.528, respectively. Noting that their sum is 2.688, we see that an increase in the foreign ownership share by 0.01 would increase taxes as a percent of assets by 0.027. The mean of this tax variable for the observations in the regression is 2.600 (see Table (4)). Thus an increase in the foreign ownership share by one percentage point would increase taxes relative to assets by 1.034 percent. Devereux et al (2002, Figure 2)

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<sup>14</sup> An investigation of the extent to which the differential taxes paid by foreign firms reflect differences in productivity or perhaps international profit shifting is beyond the scope of this paper.

<sup>15</sup> Formal T-tests of the hypothesis of this sum being equal to zero are strongly rejected for all four regressions.

document that the average corporate income tax in Europe is currently in the neighborhood of 33 percent. The elimination of all foreign ownership (currently at about 26 percent) would thus reduce the average tax rate to about 24 percent, while a doubling of foreign ownership to 52 percent conversely would increase the average tax to 42 percent.

## 5.2 Regressions for different years and sectors

Higher corporate taxes may reduce the tax base by inducing some firms to relocate or to invest less, while they increase the taxation of foreign-owned rents. The nature of this trade-off may in principle differ over time giving rise to varying sensitivities of the tax burden to foreign ownership over time. Specifically, increases in the elasticity of the tax base to the tax rate over time would suggest that tax policy makers are inclined to increase the tax rate less in response to any increase in foreign ownership. If so, the sensitivity of the tax burden to foreign ownership falls over time.

To check this, Table (6) reports cross-sectional regressions for each of the years 1996-2000, corresponding to the four benchmark regressions in Table (5). Regressions for different years based on these four benchmark regressions are reported in Panels A, B, C and D. We only report the coefficients for the *fs*, *fd* and the *FSI* to *FS4* variables in the various panels. The coefficient for *fs* is positive for all years in Panels A and B, but not statistically significant for all years. The *fd* variable instead is positive and significant throughout panels C and D. The coefficients for *FSI* through *FS4* are positive and statistically significant for all years but 1996 in all panels (in that year coefficients are positive and significant in Panels B and D, while they are negative and significant in Panel A and negative but insignificant in Panel C). In each of the panels, 1996 is the year with the smallest number of observations. Estimated coefficients on the aggregate ownership variables for 2000 are lower than in several previous years. The sample period, however, is too short to conclude whether this reflects a structural or a business cycle related decline in the sensitivity of the tax burden to foreign ownership.

Next, tax authorities no doubt have some discretion to vary the effective tax burden across sectors. Sectors tend to differ in their asset use and in the rate of (economic) depreciation of their assets. Therefore, changes in tax rates and in depreciation allowances will affect effective tax rates differently across sectors. In principle this means that countries can also vary the sensitivity of the tax burden to

foreign ownership across sectors as part of active policy making. A reason to do this could be possibly different sensitivities of the tax base with respect to the tax rate across sectors.

Table (7) reports estimates of the coefficients for the firm-level and country-level foreign ownership variables for each of the 8 sectors in each of four panels, as based on the four benchmark regressions of Table (5). Estimates of  $fs$  are positive and significant for the retail and wholesale sector in Panels A and B, while  $fd$  is positive and significant for the manufacturing and the retail and wholesale sectors in Panels C and D. Also, the coefficients for the aggregate foreign ownership variables are positive and significant for the manufacturing and the retail and wholesale regressions in all four panels. In each panel, these two sectors also are the ones with the most observations. Coefficients in the agricultural sector, with the smallest number of observations, are positive and significant for Panels B and D, while they are negative and insignificant in Panel A and negative and significant in Panel C.<sup>16</sup>

### 5.3 Robustness checks

Next, we subject the benchmark regressions in Table (5) to several robustness checks to better understand the nature of our results. The four Panels of Table (8) contain the robustness checks corresponding to each of the four benchmark regressions. First, we redo the benchmark regressions for samples of only domestic firms for which the firm-level foreign ownership variables  $fs$  and  $fd$  are zero. These firms have few international profit shifting opportunities, as we exclude all firms (fully domestically owned or not) with consolidated statements that could own foreign subsidiaries that can be used in profit shifting schemes. Hence, for purely domestic firms any effect of foreign ownership on taxation has to come primarily through changes in the tax system.<sup>17</sup> In Table (8), we see that the country-level foreign ownership measures enter positively and significantly in the domestic-firms-only regressions in all four panels.

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<sup>16</sup> In both Tables (6) and (7), we see a negative and significant coefficient on an equal-weighted foreign ownership measure in one instance, in each case matched by a positive and significant coefficient in the regression with the corresponding value-weighted foreign ownership measure. While these results are difficult to explain, we a priori think that value-weighted foreign ownership measures are more relevant for tax policy makers.

<sup>17</sup> There might still be profit-shifting opportunities to the extent that there is an holding company that owned this fully domestic firms as well as firms abroad.

Next, we select only firms located in Western European countries (i.e., the EU-15, Iceland, Norway, and Switzerland). As expected, the coefficients are positive and significant for each of the country-level foreign ownership measures. Also, the estimated coefficients are larger than the corresponding benchmark regressions reflecting, as seen in Figure (1), that the relationship between foreign ownership and the tax burden is stronger for Western European countries than for the whole sample.

Alternatively, we include interaction terms of all firm-level variables (including sector fixed effects) with the relevant firm-level foreign ownership variable (either  $fs$  or  $fd$ ). This allows the impact of firm-level foreign ownership on the tax burden to vary with all firm characteristics.<sup>18</sup> The estimated coefficients for  $FS1$  through  $FS4$  in the four panels remain positive and significant.

Next, we redo the regressions with weighted least squares with the weight equal to the inverse of the number of firms for a particular country in a particular year. This puts additional weight on those countries and years with relatively few firm-level observations. Perhaps undesirably, this also puts additional weight on those observations for which our estimate of an  $FS$  measure is based on relatively few firm observations. The estimated coefficients for the  $FS$  variables become insignificant for all panels but Panel D. Figure (1) suggests that weighted least squares puts additional weight on outliers for several Eastern European countries, which indeed tend to have relatively few observations. As discussed before, countries in Eastern Europe are still in a process of economic transition, which suggests that the relationship between foreign ownership and taxation observed for these countries does not represent a stable, long run outcome. Thus, it makes sense to redo the weighted least squares for only Western European observations. This is shown to restore positive and highly significant coefficients for the country-level foreign ownership variables in the weighted least squares regressions.

We also report regressions with data averaged for each firm over the 5-year period. The measures of  $FS$  are positive and significant in all four panels.

To the contrary, the inclusion of country fixed effects renders the coefficients for the  $FS$  variables negative in all four panels, while significant in Panels A and D. From Tables (1) and (2), we know that the foreign ownership measures increased

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<sup>18</sup> Note that the reported coefficients for  $fs$  or  $fd$  in this instance are not directly comparable to corresponding estimates for these variables in other regressions.

significantly in Eastern Europe during the 1996-2000 period, while they changed little in Western Europe. At the same time, the tax burden was on a downward path in several Eastern European countries. Thus, the negative relationship between foreign ownership and taxation in the regressions with country fixed effects appears to reflect developments in Eastern Europe. Again, it makes sense to redo the regressions for only Western European observations. This yields positive but insignificant coefficients for the country-level foreign ownership variables in the four panels. This suggests that the positive relationship between foreign ownership and taxation found in Western Europe reflects cross-country variation rather than cross-time variation. This should not be surprising given that the sample period is only 5 years and given that foreign ownership in Western Europe has been stable during this period.

Also, we exclude year fixed effects from the regressions as a robustness check, with little impact on estimated coefficients. Finally, we lag the *FS* variables to allow for a possibly lagged response of tax policy to changes in country-level foreign ownership. Estimates of coefficients for the *FS* variables remain very similar to those in the benchmark regressions.

## **6. Conclusions**

Using firm-level data, this paper presents consistent estimates of the degree of foreign ownership of firms for a large set of European countries. Average foreign ownership share in Europe is estimated to be about 26 percent in the year 2000. This average foreign ownership figure reflects considerable variation across Europe, with foreign ownership in Eastern Europe generally higher than in Western Europe.

The estimation results presented in this paper suggest that company tax burdens are positively related to foreign ownership at the country level. This indicates that company tax policies in Europe are in part motivated by the desire to export corporate tax burdens. The empirical relationship between company tax burdens and foreign ownership is economically significant. Specifically, our benchmark results suggest that a doubling of foreign ownership in Europe, from 26 to 52 percent, would increase the average corporate tax rate from about 33 percent to about 42 percent. During the 1996-2000 period, average foreign ownership in Western Europe appears to have been rather stable, while it has significantly increased in Eastern Europe. In the decades to come, foreign ownership can be expected to increase in Western

Europe as well and thus might mitigate any ‘race to the bottom’ in corporate tax burdens.

The welfare effects of a positive relationship between foreign ownership and corporate tax burdens are uncertain. Foreign ownership is relatively high in smaller countries. The resulting upward pressure on corporate taxes thus is also relatively large in smaller countries. This may serve to partially or wholly cancel the relatively strong pressure to reduce taxes in smaller countries to attract a larger corporate tax base. The higher foreign ownership in smaller countries thus in principle may help to bring about more equal corporate tax levels across countries. Hence, the foreign ownership effect on taxes could serve to reduce distortions in the international tax system coming from international disparities in corporate tax burdens. In a world of equal-sized, symmetric countries, foreign ownership would simply serve to increase the equal corporate tax burden in the various countries. The welfare effects of such upward pressure on corporate tax levels are unclear. Higher corporate income tax levels could be desirable in a world where tax evasion increasingly erodes residence-based capital income taxes. Higher capital income taxes, however, discourage capital formation and may ultimately not be welfare improving.<sup>19</sup>

The absence of ‘race to the bottom’ so far, in part due to the already significant foreign ownership share at present, may be a reason that proposals to coordinate corporate income taxes in the EU have so far not taken hold. In the absence of all-out corporate income tax degradation, EU Member States apparently prefer to maintain a high degree of national autonomy over corporate tax policies. This also was evident at the Nice EU summit of December 2002, where Member States decided to uphold the unanimity requirement regarding EU directives on tax policy.

In the absence of across-the-board tax coordination, EU Member States in recent years have focused on identifying elements of ‘harmful tax competition’. Peer pressure is applied to convince partner Member States to give up tax regimes that are deemed harmful. Examples of these are the low-tax treatments of corporate headquarters in Belgium and the Netherlands and the 10-percent tax regime in Ireland. Actual tax coordination efforts in the EU thus have been in the direction of higher corporate income taxes. This suggests that tax policy makers in the EU are of the

opinion that currently corporate tax levels are too low. If so, this suggests that they would welcome the foreign-ownership effect on corporate tax burdens.

Recent initiatives by the European Commission (see European Commission, 2001a) do not call for higher or lower corporate income taxes in the EU, but rather they address the problems associated with separate tax accounting in Member States. The European Commission at this point favors the introduction of a consolidated corporate tax base in the EU along with some type of formula apportionment of tax revenues. There is no push for the introduction of a common tax rate or even a minimum tax rate. A common EU tax base, however, would help to make tax burdens in the EU more transparent, and hence may lead to relatively intense tax competition with a view to altering the apportionment of tax base among Member States. The introduction of a common tax base in the EU thus would neither eliminate tax competition nor the incentive to levy relatively high corporate income taxes on account of a high foreign ownership of domestic firms.

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<sup>19</sup> In one view, optimal capital income taxes are zero in the long run (see Chamley (1986)), in which case the positive impact of foreign ownership on corporate income taxes appears to be undesirable.

## References

- Adjaouté, Kpate, Laura Botazzi, Jean-Pierre Danthine, Andreas M. Fischer, Rony Hamoui, Richard Portes, Michael R. Wickens (2000), “EMU and portfolio adjustment”, *CEPR Policy Paper 5*.
- Bøhren, Øyvind and Benrt Arne Ødegaard (2000), “The ownership structure of Norwegian firms: characteristics of an outlier”, *mimeo*, Norwegian School of Management BI.
- Chamley, Christophe (1986), “Optimal taxation of capital in economies with identical private and social discount rates”, *Econometrica*, 1986.
- Dahlquist, Magnus and Göran Robertsson (2001), “Direct foreign ownership, institutional investors, and firm characteristics”, *Journal of Financial Economics* 59, 413-440.
- Demirgüç-Kunt, Asli. and Harry Huizinga (2001), “The taxation of domestic and foreign banking”, *Journal of Public Economics* 79, 429-453.
- Devereux, Michael P., Rachel Griffith and Alexander Klemm (2002), “Corporate income tax reforms and international tax competition”, *Economic Policy* 35, 451-488.
- European Commission (2001a), *Company taxation in the internal market*, COM (2001) 582 final.
- European Commission (2001b), “Financial market integration in the EU”, Chapter 4 in *EU Economy Review 2001*, Brussels.
- Eurostat (2001), “Foreign owned enterprises”, *Statistics in focus*, Industry, trade and services, Theme 4, No 20.
- Eijffinger, Sylvester C. and Wolf Wagner (2001), “Taxation if capital is not perfectly mobile: tax competition versus tax exportation”, *CEPR Working Paper* No. 3084.
- Faccio Mara and Larry H. Lang (2002), “The ultimate ownership of Western European corporation”, *Journal of Financial Economics* 65, 365-395.
- Grubert, Harry, T. Goodspeed and D. Swenson (1999), “Explaining the low taxable income of foreign-controlled companies in the United States”, in A. Giovanni, R. Hubbard and J. Slemrod, eds., *Studies in International Taxation*. University of Chicago Press, Chicago, IL. 237-270.
- Gordon, Roger H. (1986), “Taxation of investment and savings in a world economy”, *American Economic Review* 96, 1086-1102.
- Huizinga, Harry and Søren B. Nielsen (1997), “Capital income and profit taxation with foreign ownership of firms”, *Journal of International Economics* 42, 149-165.

Huizinga, Harry and Søren B. Nielsen (2002), “The coordination of capital income and profit taxation”, *Regional Science and Urban Economics* 32, 1-26.

Kinney, Michael and Janice Lawrence (2000), “An analysis of the relative U.S. tax burden of U.S. corporations having substantial foreign ownership”, *National Tax Journal* 53, 9-22.

Mintz, Jack M. (1994), “Is there a future for capital income taxation?”, *Canadian Tax Journal*.

Olsen, Trond E. and Petter Osmundsen (2001), “Strategic tax competition; implications of national ownership”, *Journal of Public Economics* 81, 253-277.

Sørensen, Peter Birch (2000), “The case for international tax co-ordination reconsidered”, *Economic Policy* 31, 431-461.

Stulz, René M. (1981), “On the effects of barriers to international investment”, *Journal of Finance* 36, 923-934.

Timmermans, Thierry (2000), “International diversification of investments in Belgium and its effects on the main Belgian securities markets”, in *International financial markets and the implications for monetary and financial stability*, Conference Papers No. 8, Bank for International Settlements.

Wildasin, David (2000), “Factor mobility and fiscal policy in the EU: policy issues and analytical approaches”, *Economic Policy* 31, 339-368.

**Table (1). Foreign ownership variables FS1 and FS2**

Country	2000			Average 1996-2000			Change in yearly average between 1996 and 2000	
	# firms	FS1	FS2	# firms	FS1	FS2	FS1	FS2
Austria	148	25.8	21.4	282	29.9	24.0	-3.2	-2.3
Belgium	620	29.1	28.0	525	36.3	39.0	-9.7	-12.6
Bosnia	n.a.	n.a.	n.a.	3	n.a.	n.a.	n.a.	n.a.
Bulgaria	418	21.3	18.4	383	6.8	7.2	20.9	17.8
Croatia	85	20.1	13.5	49	20.3	12.5	n.a.	n.a.
Czech Rep.	282	39.9	54.6	227	36.4	50.3	4.2	3.9
Denmark	916	22.6	22.8	666	23.9	21.4	-2.2	8.5
Estonia	12	n.a.	n.a.	8	n.a.	n.a.	n.a.	n.a.
Finland	125	21.0	7.4	92	20.3	8.6	n.a.	n.a.
France	2,479	21.9	14.7	2,163	20.1	15.4	-1.3	-2.0
Germany	553	16.2	14.1	1,218	13.1	13.6	5.1	2.8
Greece	203	39.3	23.3	248	34.1	24.5	4.9	-14.2
Hungary	64	42.0	86.9	38	48.5	80.6	n.a.	n.a.
Iceland	n.a.	n.a.	n.a.	3	n.a.	n.a.	n.a.	n.a.
Ireland	4	n.a.	n.a.	8	n.a.	n.a.	n.a.	n.a.
Italy	1,369	39.4	29.7	1,121	32.1	33.7	7.3	-9.0
Latvia	20	n.a.	n.a.	12	n.a.	n.a.	n.a.	n.a.
Lithuania	32	n.a.	n.a.	12	n.a.	n.a.	n.a.	n.a.
Luxembourg	7	n.a.	n.a.	21	n.a.	n.a.	n.a.	n.a.
Netherlands	473	20.0	43.4	771	20.4	40.6	-1.6	1.5
Norway	1,535	19.5	24.7	1,202	16.3	18.2	1.9	6.9
Poland	123	33.5	33.2	133	22.7	16.2	19.2	30.8
Portugal	112	17.8	18.7	156	24.2	18.3	-10.9	5.5
Romania	1,424	39.6	31.7	618	18.6	20.6	35.8	25.3
Slovak Rep.	2	n.a.	n.a.	2	n.a.	n.a.	n.a.	n.a.
Slovenia	75	45.2	36.4	47	45.2	36.4	n.a.	n.a.
Spain	1,006	13.8	9.5	1,289	26.2	21.6	-19.1	-19.9
Sweden	1,314	7.4	4.8	849	10.0	5.2	n.a.	n.a.
Switzerland	21	n.a.	n.a.	13	n.a.	n.a.	n.a.	n.a.
United Kingdom	794	13.6	7.1	816	17.7	12.3	-7.4	-10.0
Former Yugoslavia	n.a.	n.a.	n.a.	11	n.a.	n.a.	n.a.	n.a.
Europe	14,216	26.1	25.9	12,891	23.9	24.0	3.0	3.3
European Union	10,123	22.1	18.8	10,190	24.2	22.4	-4.9	-7.0
Western Europe	11,679	21.9	19.2	11,405	23.6	22.1	-4.3	-5.9
Eastern Europe	2,537	34.5	39.2	1,485	23.5	27.7	20.9	24.2

FS1 and FS2 are the equal-weighted and asset-weighted foreign ownership in percent. These foreign ownership measures are based on firms for which domestic and foreign ownership are fully known and they are computed only if the number of observations for a country in a specific year is at least 35 (see appendix A for details). The average for 1996-2000 is computed using the available years. The changes in between 1996 and 2000 are in absolute levels. Western Europe is the EU-15 where available plus Iceland, Norway and Switzerland.

**Table (2). Foreign ownership variables FS3 and FS4**

Countries	2000			Average 1996-2000			Change in yearly average from 1996 to 2000	
	# firms	FS3	FS4	# firms	FS3	FS4	FS3	FS4
Austria	184	23.9	18.5	354	28.1	22.8	-4.2	0.6
Belgium	2,265	11.4	25.9	1,896	14.4	26.5	-3.2	2.8
Bosnia	n.a.	n.a.	n.a.	3	n.a.	n.a.	n.a.	n.a.
Bulgaria	768	17.4	19.0	569	7.0	9.5	16.9	13.1
Croatia	117	22.2	24.8	74	20.8	23.6	n.a.	n.a.
Czech Rep.	804	31.5	34.8	724	25.5	24.2	9.3	12.8
Denmark	971	22.0	22.1	702	23.8	22.5	-3.4	4.1
Estonia	18	n.a.	n.a.	12	n.a.	n.a.	n.a.	n.a.
Finland	147	21.1	8.0	111	19.9	8.6	n.a.	n.a.
France	8,369	21.6	18.2	8,543	16.8	16.6	4.4	0.2
Germany	710	15.6	12.2	1,568	12.4	13.4	5.1	0.3
Greece	823	31.1	22.7	641	25.9	23.2	4.8	-10.9
Hungary	206	31.6	50.5	125	35.4	43.6	n.a.	n.a.
Iceland	7	n.a.	n.a.	6	n.a.	n.a.	n.a.	n.a.
Ireland	4	n.a.	n.a.	9	n.a.	n.a.	n.a.	n.a.
Italy	2,106	40.9	25.1	1,917	28.3	25.2	14.2	-2.3
Latvia	29	n.a.	n.a.	21	33.3	26.5	n.a.	n.a.
Lithuania	84	19.0	n.a.	39	13.3	13.1	n.a.	n.a.
Luxembourg	16	n.a.	n.a.	48	42.6	52.5	n.a.	n.a.
Netherlands	499	20.2	42.9	817	20.7	40.0	-2.1	0.8
Norway	1,772	18.1	23.3	1,416	14.9	18.3	2.3	4.7
Poland	227	33.9	40.8	234	26.5	20.5	10.0	28.3
Portugal	240	22.1	21.0	399	21.3	24.2	2.4	7.0
Romania	1,798	38.0	32.8	1,104	18.2	21.7	31.8	20.9
Slovak Rep.	2	n.a.	n.a.	2	n.a.	n.a.	n.a.	n.a.
Slovenia	111	52.3	54.8	50	41.4	51.0	n.a.	n.a.
Spain	1,939	11.7	8.9	2,491	21.0	18.5	-14.5	-16.3
Sweden	1,395	7.9	5.1	907	10.0	5.2	n.a.	n.a.
Switzerland	48	8.3	7.3	30	10.1	10.5	n.a.	n.a.
United Kingdom	924	15.2	7.0	1,062	17.5	12.1	-5.7	-8.7
Europe	26,583	23.4	23.8	25,683	21.1	22.2	2.7	2.5
European Union	20,592	20.4	18.3	21,330	21.6	22.7	-3.1	-6.0
Western Europe	22,419	19.4	17.9	22,783	20.9	22.1	-3.5	-6.0
Eastern Europe	4,164	30.7	34.8	2,899	20.4	20.9	17.5	21.7

FS3 and FS4 are the equal-weighted and asset-weighted foreign ownership in percent. A firm that is at least 50 percent foreign-owned is considered foreign, while a firm that is more than 50 percent domestically owned is considered domestic. FS3 and FS4 are computed only if the number of observations for a country in a specific year is at least 35 (see appendix A for details). The average for 1996-2000 is computed using the available years. The changes in between 1996 and 2000 are in absolute levels. Western Europe is the EU-15 where available plus Iceland, Norway and Switzerland.

**Table (3). Correlation coefficients of foreign ownership measures**

**Part A: Averages per country and per year**

		<b>FS1</b>	<b>FS2</b>	<b>FS3</b>	<b>FS4</b>
<b>FS1</b>	Correlation	1.000			
	Prob.				
	Number of Obs.	92			
<b>FS2</b>	Correlation	.785	1.000		
	Prob.	<.0001			
	Number of Obs.	92	92		
<b>FS3</b>	Correlation	.807	.568	1.000	
	Prob.	<.0001	<.0001		
	Number of Obs.	92	92	104	
<b>FS4</b>	Correlation	.680	.803	.768	1.000
	Prob.	<.0001	<.0001	<.0001	
	Number of Obs.	92	92	104	104

The FS variables are averages per country and per year. An FS variable for a country in a year is computed if the number of observations is at least 35. Prob. is the p-value of a test of the hypothesis that the correlation coefficient is different from zero.

**Part B: Averages per country**

		<b>FS1</b>	<b>FS2</b>	<b>FS3</b>	<b>FS4</b>
<b>FS1</b>	Correlation	1.000			
	Prob.				
	Number of Obs.				
<b>FS2</b>	Correlation	.823	1.000		
	Prob.	<.0001			
	Number of Obs.	21	21		
<b>FS3</b>	Correlation	.849	.624	1.000	
	Prob.	<.0001	.003		
	Number of Obs.	21	21	26	
<b>FS4</b>	Correlation	.779	.771	.847	1.000
	Prob.	<.0001	<.0001	<.0001	
	Number of Obs.	21	21	26	26

The FS are averages per country of yearly averages. An FS variable for a country in a year is computed if the number of observations is at least 35. Prob. is the p-value of a test of the hypothesis that the correlation coefficient is different from zero.

**Table (4). Summary statistics**

Variable	Unit	Mean	Std. deviation	Min.	Max.	Correlation with FS1	Correlation with FS2
<b>Firm variables</b>							
Tax burden	%	2.600	4.103	-86.347	92.272	.032	.067
Log assets	Log (€1,000)	10.037	1.635	3.227	17.571	-.040	-.069
Fixed assets/total assets		.369	.275	.000	1.000	-.155	-.129
Short-term debt/total assets		.501	.248	.000	1.000	.171	.123
Long-term debt/total assets		.171	.193	.000	1.000	-.151	-.080
Agriculture		.027	.162	0	1	-.078	-.037
Construction		.051	.221	0	1	-.009	.039
Financial services		.027	.162	0	1	-.017	-.001
Retail and wholesale		.258	.437	0	1	.053	.050
Transport		.057	.232	0	1	-.035	-.020
Utilities		.031	.172	0	1	-.118	-.102
Other fs		.142	.349	0	1	-.065	-.089
		.213	.397	.000	1.000	.214	.151
<b>Country variables</b>							
Log GDP	Log (€ billion)	5.996	1.265	2.125	7.628	-.014	-.070
Log per capita GDP	Log (€ 1,000)	2.781	.783	.007	3.382	-.103	-.002
Inflation <sup>20</sup>	%	7.636	39.756	.515	453.200	-.166	-.122
FS1		.214	.086	.015	.566		
FS2		.206	.107	.012	.869		

Summary statistics are for variables in regressions (1) and (2) in Table (5) based on 50,481 observations

<sup>20</sup> Bulgaria and Romania had inflation rates of 453.2% and 154.9% in 1997, respectively. Removing these observations changes the estimated coefficients on inflation in the benchmark regressions little and leaves these significant at the one-percent level. Also, the estimated coefficients and significance levels for the fs, fd and various FS variables change little.

**Table (5). Basic regression results**

	(1)	(2)	(3)	(4)
Log assets	-0.248** (.047)	-0.242** (.015)	-0.250** (.010)	-0.247** (.010)
Fixed assets/total assets	-2.877** (.102)	-2.858** (.102)	-3.132** (.070)	-3.115** (.070)
Short-term debt/total assets	-3.609** (.111)	-3.648** (.111)	-4.165** (.074)	-4.181** (.074)
Long-term debt/total assets	-3.286** (.108)	-3.315** (.108)	-3.492** (.077)	-3.485** (.077)
Agriculture	1.092** (.222)	1.093** (.221)	.541** (.153)	.540** (.152)
Construction	-.337** (.074)	-.338** (.073)	-.549** (.045)	-.581** (.044)
Financial services	-.078 (.133)	-.082 (.133)	-.016 (.110)	-.013 (.110)
Retail and wholesale	-.089* (.043)	-.178** (.023)	-.062* (.028)	-.058* (.028)
Transport	-.186* (.079)	-.175* (.079)	-.107* (.053)	-.110* (.053)
Utilities	.196* (.081)	.254** (.080)	.428** (.062)	.471** (.062)
Other	.102 (.064)	.140** (.043)	-.202 (.041)	-.010 (.041)
Log GDP	.209** (.019)	.239** (.019)	.117** (.013)	.178** (.014)
Log per capita GDP	.065* (.032)	.029 (.031)	.141** (.026)	.080** (.024)
Inflation	.006** (.001)	.007** (.001)	.008** (.001)	.009** (.001)
fs	.199** (.047)	.160** (.047)		
FS1	1.377** (.217)			
FS2		2.528** (.180)		
fd			.169** (.032)	.158** (.032)
FS3			1.454** (.193)	
FS4				2.726** (.191)
Observations	50,481	50,481	102,138	102,138
Adj-R <sup>2</sup>	.070	.073	.082	.084

Data are for 1996-2000. All regressions include unreported time fixed effects. Detailed variable definitions and data sources are given in Appendix A. Heteroskedasticity consistent errors are given in parentheses. \* and \*\* indicate significance levels of 5 and 1 percent, respectively.

**Table (6). Cross-sectional analysis for different sectors****Panel A**

Year	fs	FS1	Adj-R <sup>2</sup>	N
1996	.387** (.124)	-2.067* (.821)	.059	6,505
1997	.257* (.107)	1.335* (.616)	.086	9,433
1998	.194 (.107)	2.723** (.509)	.074	10,865
1999	.159 (.092)	2.911** (.510)	.073	12,273
2000	.157 (.102)	2.030** (.431)	.070	11,405

Included variables as in regression (1) of table (5) apart from time fixed effects. Variable definitions and data sources are given in Appendix A. Heteroskedasticity consistent errors are given in parentheses. \* and \*\* indicate significance levels of 5 and 1 percent, respectively.

**Panel B**

Year	fs	FS2	Adj-R <sup>2</sup>	N
1996	.287* (.123)	3.022** (.570)	.063	6,505
1997	.189 (.106)	3.141** (.420)	.089	9,433
1998	.183 (.107)	3.146** (.377)	.077	10,865
1999	.156 (.093)	2.541** (.370)	.075	12,272
2000	.167 (.103)	2.002** (.408)	.070	11,405

Included variables as in regression (2) of table (5) apart from time fixed effects. Variable definitions and data sources are given in Appendix A. Heteroskedasticity consistent errors are given in parentheses. \* and \*\* indicate significance levels of 5 and 1 percent, respectively.

**Panel C**

Year	fd	FS3	Adj-R <sup>2</sup>	N
1996	.215** (.080)	1.305 (.744)	.071	14,452
1997	.198** (.073)	3.409** (.698)	.101	19,580
1998	.159* (.073)	1.537** (.490)	.083	22,426
1999	.202** (.066)	3.819** (.517)	.081	24,358
2000	.138* (.066)	1.770** (.309)	.080	21,322

Included variables as in regression (3) of table (5) apart from time fixed effects. Variable definitions and data sources are given in Appendix A. Heteroskedasticity consistent errors are given in parentheses. \* and \*\* indicate significance levels of 5 and 1 percent, respectively.

**Panel D**

Year	fd	FS4	Adj-R <sup>2</sup>	N
1996	.199* (.079)	3.547** (.658)	.074	14,452
1997	.184* (.073)	5.012** (.430)	.105	19,580
1998	.150* (.073)	3.110** (.439)	.085	22,426
1999	.202** (.067)	3.226** (.384)	.082	24,358
2000	.167* (.066)	1.568** (.392)	.079	21,322

Included variables as in regression (4) of table (5) apart from time fixed effects. Variable definitions and data sources are given in Appendix A. Heteroskedasticity consistent errors are given in parentheses. \* and \*\* indicate significance levels of 5 and 1 percent, respectively.

**Table (7). Cross-sectional analysis for different sectors****Panel A**

Sectors	fs	FS1	Adj-R <sup>2</sup>	N
Agriculture	.398 (.972)	-2.732 (2.040)	.037	1,355
Construction	.130 (.291)	.590 (.769)	.108	2,594
Financial services	.026 (.320)	.786 (1.735)	.121	1,360
Manufacturing	.127* (.061)	.996** (.302)	.077	20,562
Retail and wholesale	.379** (.079)	2.483** (.449)	.093	13,019
Transport	.230 (.207)	2.696** (.816)	.055	2,882
Utilities	.663 (.645)	.465 (.849)	.122	1,542
Other	-.243 (.143)	1.382 (.789)	.118	7,167

Data are for 1996-2000. Included variables as in regression 1 of table 5 apart from sector fixed effects. Variable definitions and data sources are given in Appendix A. Heteroskedasticity consistent errors are given in parentheses. \* and \*\* indicate significance levels of 5 and 1 percent, respectively.

**Panel B**

Sectors	fs	FS2	Adj-R <sup>2</sup>	N
Agriculture	.213 (.965)	5.345* (2.269)	.041	1,355
Construction	-.017 (.288)	2.889** (.571)	.117	2,594
Financial services	.022 (.332)	.297 (.946)	.121	1,360
Manufacturing	.091 (.061)	2.190** (.247)	.081	20,562
Retail and wholesale	.382** (.079)	2.609** (.323)	.095	13,019
Transport	.177 (.216)	4.077** (1.080)	.063	2,882
Utilities	.549 (.683)	1.655 (.932)	.124	1,542
Other	-.269 (.140)	2.051** (.562)	.119	7,167

Data are for 1996-2000. Included variables as in regression 2 of table 5 apart from sector fixed effects. Variable definitions and data sources are given in Appendix A. Heteroskedasticity consistent errors are given in parentheses. \* and \*\* indicate significance levels of 5 and 1 percent, respectively.

**Panel C**

Sectors	fd	FS3	Adj-R <sup>2</sup>	N
Agriculture	.322 (.612)	-3.787* (1.718)	.031	2,201
Construction	.126 (.171)	.525 (.669)	.133	5,491
Financial services	-.126 (.271)	7.431** (2.626)	.148	2,333
Manufacturing	.160** (.044)	1.306** (.266)	.092	41,059
Retail and wholesale	.293** (.055)	1.121** (.372)	.106	29,212
Transport	.187 (.150)	4.030** (.837)	.067	5,653
Utilities	.624 (.508)	.964 (.817)	.121	2,418
Other	-.154 (.094)	2.859** (.802)	.117	13,771

Data are for 1996-2000. Included variables as in regression 3 of table 5 apart from sector fixed effects. Variable definitions and data sources are given in Appendix A. Heteroskedasticity consistent errors are given in parentheses. \* and \*\* indicate significance levels of 5 and 1 percent, respectively.

**Panel D**

Sectors	fd	FS4	Adj-R <sup>2</sup>	N
Agriculture	.186 (.607)	4.640* (2.262)	.033	2,201
Construction	.049 (.173)	3.135** (.599)	.139	5,491
Financial services	-.029 (.285)	1.238 (1.116)	.145	2,333
Manufacturing	.149** (.044)	2.571** (.270)	.094	41,509
Retail and wholesale	.283** (.054)	2.920** (.338)	.108	29,212
Transport	.233 (.150)	4.352** (1.131)	.070	5,653
Utilities	.563 (.509)	2.124** (.724)	.123	2,418
Other	-.120 (.093)	1.243* (.559)	.116	13,771

Data are for 1996-2000. Included variables as in regression 4 of table 5 apart from sector fixed effects. Variable definitions and data sources are given in Appendix A. Heteroskedasticity consistent errors are given in parentheses. \* and \*\* indicate significance levels of 5 and 1 percent, respectively.

**Table (8). Robustness checks****Panel A**

	fs	FS1	Adj-R <sup>2</sup>	N
1. Only domestic firms		.561* (.260)	.068	38,107
2. Only Western European firms	.171** (.048)	2.373** (.274)	.071	46,649
3. Firm variables interacted with fs	1.521** (.476)	1.370** (.217)	.071	50,481
4. Weighted least squares	.637** (.072)	-.045 (.269)	.079	50,481
5. Weighted least squares for Western European firms	.576** (.069)	2.452** (.337)	.078	46,649
6. 5-year averages of firm data	.178** (.064)	.844** (.304)	.076	24,042
7. Country fixed effects	.194** (.047)	-1.154* (.584)	.086	50,481
8. Country fixed effects for Western European firms	.162** (.048)	.526 (.699)	.087	46,649
9. No year fixed effects	.197** (.047)	1.216** (.214)	.069	50,481
10. FS1 lagged	.193** (.045)	1.239** (.262)	.071	43,359

Data are for 1996-2000. All regressions but (9) include unreported time dummies. The specifications are based on regression (1) of table (5) apart from following changes: in regression (1) the sample is restricted to firms for which fs is 0; in regression (2) the sample contains only firms from Western Europe; in regression (3) all firm-level variables are interacted with fs and added to the basic regression; in regression (4) the weight in the weighted least squares is the inverse of the number of observations for each country in a given year; in regression (5) the weighted least squares is applied to Western European companies only; in regression (6) observations are 5-year averages per firm; in regression (7) country fixed effects are included; in regression (8) the former regression is applied to Western European companies only; in regression (9) time fixed effects are excluded; in regression (10), FS1 is replaced by its first lagged value. Detailed variable definitions and data sources are given in Appendix A. Heteroskedasticity consistent errors are given in parentheses. \* and \*\* indicate significance levels of 5 and 1 percent, respectively.

**Panel B**

	fs	FS2	Adj-R <sup>2</sup>	N
1. Only domestic firms		2.568** (.216)	.072	38,107
2. Only Western European firms	.144** (.049)	3.309** (.214)	.075	46,649
3. Firms variables interacted with fs	1.551** (.477)	2.556** (.181)	.074	50,481
4. Weighted least squares	.642** (.072)	-.134 (.191)	.079	50,481
5. Weighted least squares for Western European firms	.571** (.069)	2.630** (.245)	.081	46,649
6. 5-year averages of firm data	.137* (.064)	2.036** (.243)	.079	24,042
7. Country fixed effects	.189** (.047)	-.226 (.465)	.086	50,481
8. Country fixed effects for Western European firms	.162** (.048)	.814 (.560)	.088	46,649
9. No year fixed effects	.154** (.047)	2.528** (.180)	.073	50,481
10. FS2 lagged	.147** (.051)	2.377** (.202)	.074	43,359

Data are for 1996-2000. All regressions but (9) include unreported time dummies. The specifications are based on regression (2) of table (5) apart from following changes: in regression (1) the sample is restricted to firms for which fs is 0; in regression (2) the sample contains only firms from Western Europe; in regression (3) all firm-level variables are interacted with fs and added to the basic regression; in regression (4) the weight in the weighted least squares is the inverse of the number of observations for each country in a given year; in regression (5) the weighted least squares is applied to Western European companies only; in regression (6) observations are 5-year averages per firm; in regression (7) country fixed effects are included; in regression (8) the former regression is applied to Western European companies only; in regression (9) time fixed effects are excluded; in regression (10), FS2 is replaced by its first lagged value. Detailed variable definitions and data sources are given in Appendix A. Heteroskedasticity consistent errors are given in parentheses. \* and \*\* indicate significance levels of 5 and 1 percent, respectively.

**Panel C**

	<b>fd</b>	<b>FS3</b>	<b>Adj-R<sup>2</sup></b>	<b>N</b>
1. Only domestic firms		.736** (.218)	.081	83,512
2. Only Western European firms	.149** (.033)	2.295** (.229)	.082	95,257
3. Firm variables interacted with fd	1.381** (.333)	1.422** (.193)	.083	102,138
4. Weighted least squares	.505** (.083)	.446 (.616)	.089	102,138
5. Weighted least squares for Western European firms	.545** (.063)	2.226** (.356)	.083	95,257
6. 5-year averages of firm data	.143** (.045)	1.663** (.294)	.090	42,830
7. Country fixed effects	.176* (.080)	-1.296 (.744)	.096	102,138
8. Country fixed effects for Western European firms	.152** (.033)	-.609 (.427)	.096	95,257
9. No year fixed effects	.167** (.032)	1.030** (.183)	.081	102,138
10. FS3 lagged	.176** (.035)	1.535** (.260)	.083	86,897

Data are for 1996-2000. All regressions but (9) include unreported time dummies. The specifications are based on regression (3) of table (5) apart from following changes: in regression (1) the sample is restricted to firms for which fd is 0; in regression (2) the sample contains only firms from Western Europe; in regression (3) all firm-level variables are interacted with fd and added to the basic regression; in regression (4) the weight in the weighted least squares is the inverse of the number of observations for each country in a given year; in regression (5) the weighted least squares is applied to Western European companies only; in regression (6) observations are 5-year averages per firm; in regression (7) country fixed effects are included; in regression (8) the former regression is applied to Western European companies only; in regression (9) time fixed effects are excluded; in regression (10), FS3 is replaced by its first lagged value. Detailed variable definitions and data sources are given in Appendix A. Heteroskedasticity consistent errors are given in parentheses. \* and \*\* indicate significance levels of 5 and 1 percent, respectively.

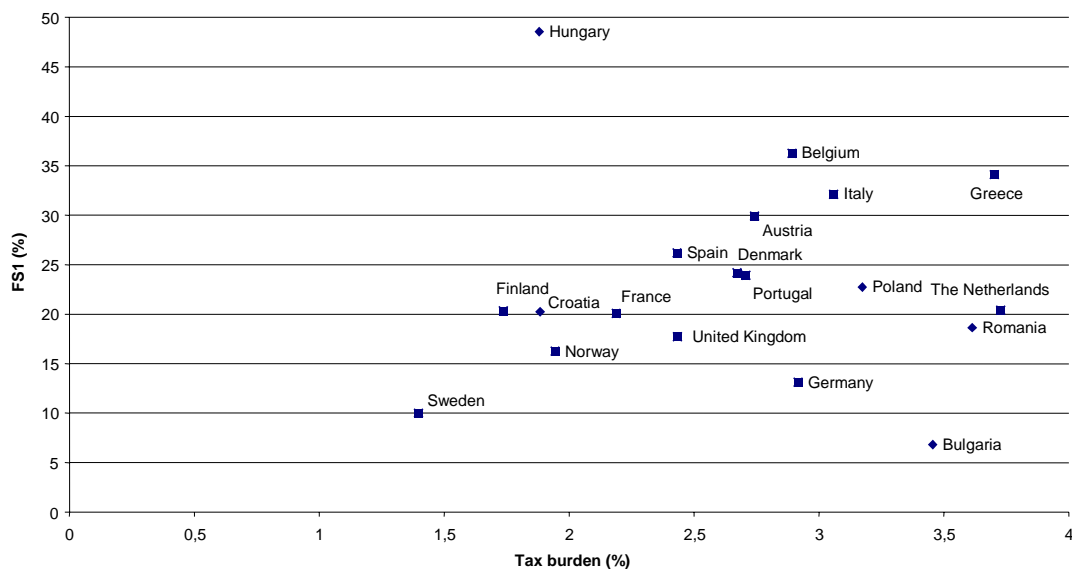
**Panel D**

	<b>fd</b>	<b>FS4</b>	<b>Adj-R<sup>2</sup></b>	<b>N</b>
1. Only domestic firms		2.727** (.216)	.083	83,512
2. Only Western European firms	.144** (.033)	3.607** (.615)	.084	95,257
3. Firms variables interacted with fd	1.404** (.333)	2.752** (.192)	.085	102,138
4. Weighted least squares	.490** (.082)	.915* (.451)	.089	102,138
5. Weighted least squares for Western European firms	.544** (.064)	2.512** (.287)	.085	95,257
6. 5-year averages of firm data	.141** (.045)	2.536** (.286)	.091	42,830
7. Country fixed effects	.171** (.032)	-.808* (.368)	.096	102,138
8. Country fixed effects for Western European firms	.149** (.033)	.266 (.422)	.096	95,257
9. No year fixed effects	.152** (.032)	2.491** (.190)	.083	102,138
10. FS4 lagged	.166** (.035)	2.786** (.219)	.085	86,897

Data are for 1996-2000. All regressions but (9) include unreported time dummies. The specifications are based on regression (4) of table (5) apart from following changes: in regression (1) the sample is restricted to firms for which fd is 0; in regression (2) the sample contains only firms from Western Europe; in regression (3) all firm-level variables are interacted with fd and added to the basic regression; in regression (4) the weight in the weighted least squares is the inverse of the number of observations for each country in a given year; in regression (5) the weighted least squares is applied to Western European companies only; in regression (6) observations are 5-year averages per firm; in regression (7) country fixed effects are included; in regression (8) the former regression is applied to Western European companies only; in regression (9) time fixed effects are excluded; in regression (10), FS4 is replaced by its first lagged value. Detailed variable definitions and data sources are given in Appendix A. Heteroskedasticity consistent errors are given in parentheses. \* and \*\* indicate significance levels of 5 and 1 percent, respectively.

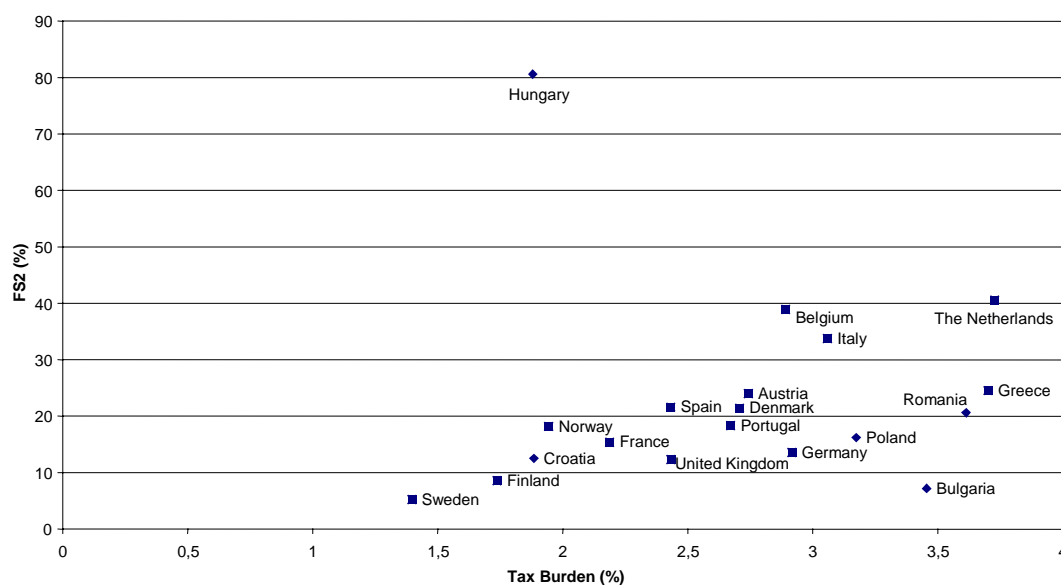
**Figure (1). The tax burden and foreign ownership**

**Part A: FS1**



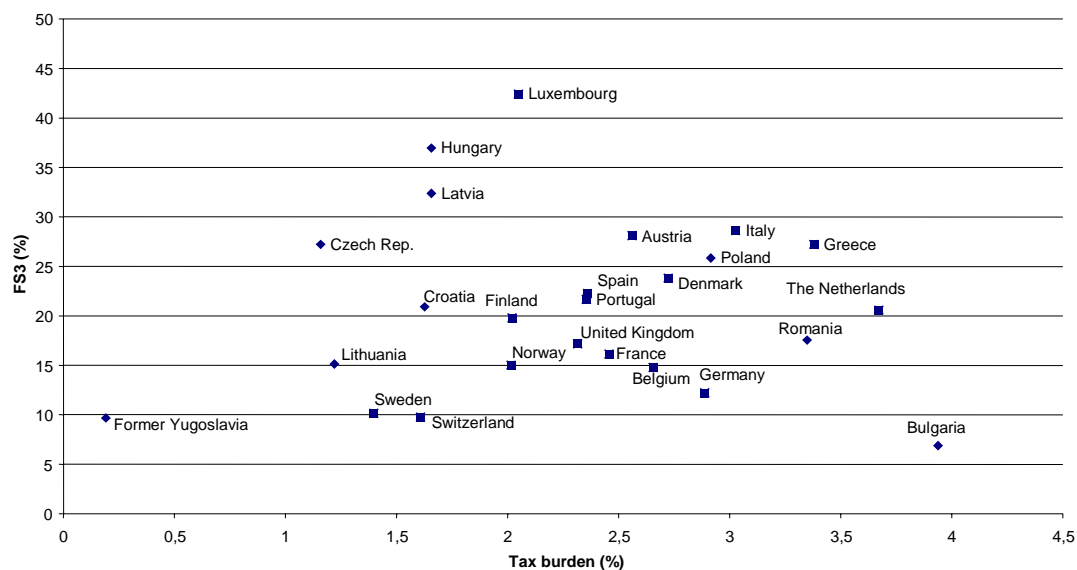
Data for FS1 and the tax burden are averages of yearly averages. FS1 for a given country in a given year is only computed if there are at least 35 observations. In that case the corresponding tax burden is computed as well. Detailed variable definitions and data sources are given in Appendix A.

**Part B: FS2.**



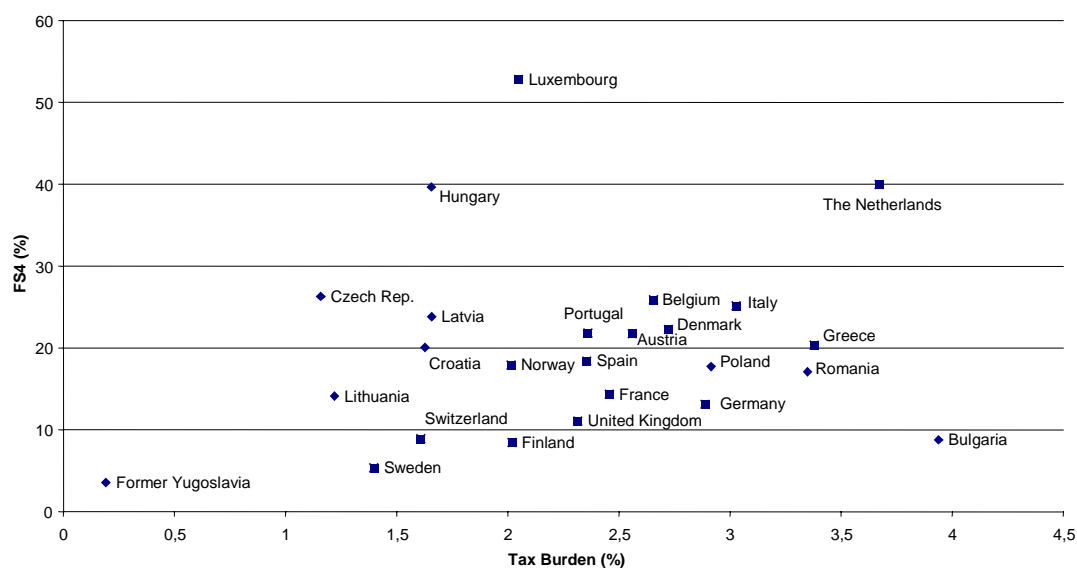
Data for FS2 and the tax burden are averages of yearly averages. FS2 for a given country in a given year is only computed if there are at least 35 observations. In that case the corresponding tax burden is computed as well. Detailed variable definitions and data sources are given in Appendix A.

## Part C : FS3



Data for FS3 and the tax burden are averages of yearly averages. FS3 for a given country in a given year is only computed if there are at least 35 observations. In that case the corresponding tax burden is computed as well. Detailed variable definitions and data sources are given in Appendix A.

## Part D: FS4



Data for FS4 and the tax burden are averages of yearly averages. FS4 for a given country in a given year is only computed if there are at least 35 observations. In that case the corresponding tax burden is computed as well. Detailed variable definitions and data sources are given in Appendix A.

## Appendix A. Variable definitions and data sources

### Data sources

Most firm-level data is from the January 2001 version of the *AMADEUS 'Top 200,000'* Database compiled by Bureau Van Dijk Electronic Publishing. This database contains 241,312 entries of financial statements for private and also public firms in 34 European countries. Firms are included if they meet one of three criteria regarding the magnitude of operating revenues, total assets and the number of employees.<sup>21</sup> Van Dijk states that 95% of the companies in each country that meet at least one of the three criteria are included. The 2001 database provides financial accounts for our 1996-2000 sample period. As a rule, bankrupt companies are kept in the database for 5 more years so that the 2001 database includes firms that went bankrupt in the 1996-2000 period. The database provides a NACE rev1-3-digit sector code for each firm. Van Dijk makes use of company reports, reports from official bodies, and of data provided by associated information providers such as auditing companies and national statistical offices. The information is checked and supplemented by way of mailings and phone calls to companies and the reading of company web-sites and press reports. The source of the macro data used in this study is *AMECO* (DG Economic and Financial Affairs, European Commission).

### Data construction and definitions

Ownership information for the year 2000 is provided in the January 2001 database. Some information on ownership is available for about 80% of the companies. Ownership data for the years 1996 to 1999 are culled from the January versions of the databases for the years 1997 through 2000. *Amadeus* provides data on direct owners and in some instances also on ultimate owners. Our ownership variables are based on direct ownership information, as there is little information on how these direct owners may differ from any ultimate owners.<sup>22</sup> Shareholders with the same nationality as the firm are labeled domestic and shareholders with a different nationality are foreign. For many firms, the nationality of some portion of the shareholders remains unknown, because not all shareholders are listed and the nationality of some of the listed shareholders is not provided.

For firms where we can trace the nationality of all shareholders, we define  $fs$  to be the portion of the shares owned by foreign shareholders. On an aggregate basis,  $FS1$  then is the equal-weighted foreign ownership share, while  $FS2$  is the asset-weighted foreign ownership share. Full ownership information may not be necessary to be able to label firms as either foreign or domestic. Countries in fact typically classify investments to be FDI, if the concerned firm is, say, at least 10 percent foreign-owned. Analogously, we consider an alternative classification where a firm is labeled foreign if 50 percent or more of the shares are foreign-owned, while the firm is domestic if more than 50 percent of the shares is domestically owned. On a national basis, we then define  $FS3$  to be the share of foreign firms in the total, while  $FS4$  is the assets of foreign firms as a share of total assets. In all instances, an aggregate foreign

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<sup>21</sup> For the UK, Germany, France, Italy, Ukraine and the Russian Federation, the inclusion thresholds are € 15 million in operating revenues, € 30 million in assets, and 150 employees. For other countries, they are € 10 million in operating revenues, € 20 million in assets and 100 employees.

<sup>22</sup> As we focus on foreign ownership, this distinction would only matter if a direct foreign owner fronted for an ultimate domestic owner, and vice versa.

ownership measure for a given country in a particular year is only computed if there are 35 observations on which to base the calculation.

Definitions of other variables used in the regressions:

- *Tax burden* is the ratio of the tax accrued to total assets in percent.
- *Log assets* is the log of the deflated total assets (in thousands of euros). The deflator is GDP deflator which puts 1995 deflated GDP equal to 1995 current GDP.
- *Fixed assets/total assets* is the ratio of the fixed assets to total assets.
- *Short-term debt/total assets* is the ratio of the current liabilities to total assets.
- *Long-term debt/total debt* is the ratio of the non-current liabilities to total assets.
- Sector fixed effects distinguish 8 sectors based on the 3-digit NACE code: *Agriculture and fisheries* (NACE 0 to 146), *Manufacturing* (NACE 149 to 373), *Utilities* (NACE 390 to 420), *Construction* (NACE 440 to 460), *Retail and wholesale* (NACE 490 to 560), *Transport and communications* (NACE 590 to 649), *Financial services* (NACE 649 to 675), and *Other* (NACE 699 to 749). Firms in essentially public sectors (NACE equal to or above 749) are excluded from our sample.
- *Log GDP* is the log of deflated GDP in billions of ecus or euros.
- *Log per capita GDP* is the log of the deflated GDP per capita in thousands of ecus or euros.
- *Inflation* is the percentage change in the Harmonized Consumer Price Index.

### **Sample construction**

From *Amadeus*, we first selected all entries with some ownership information. This yielded 197,114 entries for the 1996-2000 period. We then excluded entries of firms with consolidated statements to prevent 'double counting' of a subsidiary as an entity in itself and as owned by a firm with a consolidated statement. Also, entries of firms in primarily public sectors were excluded. This yielded 64,379 observations with full ownership information (or ownership information exceeding 99.5 percent of the shares given rounding errors). For a larger set of 128,314 observations, we could determine that the firm is either in majority foreign owned or domestically owned. Next, we looked for outliers for the tax burden variable taken to be cases where taxes accrued exceeded assets (or the taxes returned would be more than assets). These outliers represent unconventional companies with very few assets or data errors. For the regression sample with full ownership information, we eliminated 14 such outliers where in all cases taxes exceeded assets. The samples were further reduced on account of missing variables to yield 50,481 observations in regressions (1) and (2) of Table (5) and 102,138 observations in regressions (3) and (4).

## Appendix B. Data samples in basic regressions

**Table B1. Number of firms in regressions (1) and (2) of Table (5)**

Country	1996	1997	1998	1999	2000	Of which, quoted in 2000	Total per country
Austria	105	187	247	171	82	1	792
Belgium	289	384	404	413	478	1	1,968
Bulgaria	0	349	312	214	266	0	1,141
Denmark	215	457	604	810	807	2	2,893
Finland	0	0	0	105	95	1	200
France	1,263	1,698	2,028	1,986	2,056	4	9,031
Germany	891	1,025	1,343	1,232	441	3	4,932
Greece	131	177	208	268	142	2	926
Hungary	0	0	26	24	39	0	89
Italy	481	860	1,013	1,538	1,352	5	5,244
Netherlands	500	629	764	820	378	0	3,091
Norway	704	877	1,022	1,291	1,446	1	5,34
Poland	0	114	92	120	92	3	418
Portugal	135	153	134	101	99	1	622
Romania	467	277	212	147	1,081	27	2,184
Spain	773	1,043	1,123	1,375	872	3	5,186
Sweden	0	486	548	819	982	2	2,835
United Kingdom	551	717	785	839	697	13	3,589
Total per year	6,505	9,433	10,865	12,273	11,405	69	50,481

**Table B2. Number of firms in regressions (3) and (4) of Table (5)**

Country	1996	1997	1998	1999	2000	Of which, quoted in 2000	Total per country
Austria	138	231	314	223	104	3	1,01
Belgium	1,154	1,306	1,502	1,561	1,777	8	7,3
Bulgaria	0	481	426	362	501	0	1,77
Czech Rep.	15	25	0	0	4	1	44
Denmark	235	477	633	847	852	3	3,044
Finland	0	0	0	132	110	1	242
France	5,944	7,08	8,315	7,745	7,145	44	36,229
Germany	1,214	1,359	1,766	1,565	579	39	6,483
Greece	303	406	497	680	646	83	2,532
Hungary	0	0	98	72	125	1	295
Italy	814	1,484	1,808	2,8	2,084	22	8,99
Lithuania	0	0	0	37	36	10	73
Luxembourg	41	37	52	44	0	0	174
Netherlands	533	661	809	866	397	0	3,266
Norway	850	1,04	1,203	1,507	1,66	2	6,26
Poland	0	195	179	231	171	25	776
Portugal	371	390	383	222	216	2	1,582
Romania	535	711	581	689	1,377	39	3,893
Spain	1,544	2,141	2,206	2,807	1,696	18	10,394
Sweden	0	528	591	873	1,042	4	3,034
United Kingdom	761	1,028	1,063	1,065	800	55	4,717
Total per year	14,452	19,580	22,426	24,328	21,322	360	102,108

### Appendix C. Foreign ownership data for a same-firm sample

The four aggregate foreign ownership measures, *FS1*, *FS2*, *FS3* and *FS4*, where available, tend to be based on different firms in different years. A main reason for this is that firms come and go. Another reason is that the sample of firms including in the *Amadeus* database may not be the same each year (one reason for this is that the database selects firms based on minimum turnover, total assets and employment). All the same, it is interesting to see how the foreign ownership share tends to develop for the same firms over time. This we do by constructing an alternative set of four country-level foreign ownership variables based on firms for which we have ownership information over the entire 1996-2000 period. By definition, these are the longer established and more stable firms. These alternative foreign ownership measures, dubbed same-firm *FS1* through *FS4*, again are only constructed for a given country and year if they can be based on at least 35 firms. Corresponding to Tables (1) and (2), information on same-firm *FS1* through *FS4* is contained in Tables C1 and C2.

Same-firm *FS1* and *FS2* are available for only for 10 countries, while same-firm values of *FS3* and *FS4* can be calculated for 13 countries. There are two major differences with the measures reported in the main text. First, the same-firm measures by and large are significantly lower, suggesting that long-established, stable firms tend to be relatively highly domestically owned. This can reflect that foreign-owned firms are more prone to business failures or on average more recently established, but more likely that they are more frequently involved in business restructurings. Second, changes in the same-firm measure of foreign ownership over time tend to be rather small. Hence, a relatively small part of the overall variation in foreign ownership appears to be attributable to changes in the degree of foreign ownership in stable, long-established firms. A reason may simply be that the purchase of a domestic firm by a foreign firm leads to the demise of the domestic firm as a legal entity. In that instance, a foreign acquisition would not be reflected in our same-firm foreign ownership measures. Be that as it may, foreign ownership, as measured by the same-firm *FS2*, decreased on average 0.7 percent between 1996 and 2000 in Europe, while the same firm *FS4* increased by 2.2 percent over this period.

Table C3 presents a regression parallel to regression (2) in Table (5) using the same-firm *FS2* measure of foreign ownership. Such a regression is appropriate, if policy makers base their best guess of the extent of foreign ownership by observing the relatively long-standing and stable companies on which the same-firm *FS2* measure is based. The regression includes 42,415 observations on firms from 10 countries. The estimates for the coefficients on *fs* and *FS2* are statistically significant, even if they are somewhat smaller than the corresponding estimates in regression (2) of Table (5). Table C3 presents the results of robustness checks parallel to Panel B of Table (8). A difference is the addition of a regression based on only those firms used to calculate same-firm *FS2* variable. This latter regression includes only 5,119 observations and the *FS2* is only significant at the 10 percent level.

**Table C1. Foreign ownership variables FS1 and FS2 based on same firms in different years**

Same-firm data Countries	2000			Average 1996-2000			Change in yearly average between 1996 and 2000	
	# firms	FS1	FS2	# firms	FS1	FS2	FS1	FS2
Austria	7	n.a.	n.a.	7	n.a.	n.a.	n.a.	n.a.
Belgium	97	33.0	33.8	97	33.0	34.8	0.0	-2.0
Bulgaria	50	2.5	1.2	50	1.6	0.8	1.5	0.5
Czech Rep.	29	n.a.	n.a.	29	n.a.	n.a.	n.a.	n.a.
Denmark	60	43.3	20.2	60	38.3	21.0	10.0	7.6
France	228	23.4	11.0	228	25.0	16.2	-3.5	-6.1
Germany	66	9.1	9.2	66	7.9	5.8	1.5	4.6
Greece	30	n.a.	n.a.	30	n.a.	n.a.	n.a.	n.a.
Italy	63	25.6	32.0	63	23.7	30.5	1.7	-3.1
Netherlands	47	8.5	25.9	47	8.3	16.6	-2.7	-2.6
Norway	392	18.5	15.3	392	16.3	16.2	2.7	-1.3
Poland	1	n.a.	n.a.	1	n.a.	n.a.	n.a.	n.a.
Portugal	1	n.a.	n.a.	1	n.a.	n.a.	n.a.	n.a.
Romania	9	n.a.	n.a.	9	n.a.	n.a.	n.a.	n.a.
Spain	86	12.1	7.9	86	12.3	8.0	-1.8	-5.8
Switzerland	1	n.a.	n.a.	1	n.a.	n.a.	n.a.	n.a.
United Kingdom	82	15.1	8.8	82	16.0	8.7	-2.4	1.2
Europe	1,249	19.0	16.5	1,249	18.2	15.9	0.7	-0.7
European Union	767	21.2	18.6	767	20.6	17.7	0.3	-0.8
Western Europe	1,160	20.8	18.2	1,160	20.1	17.5	0.6	-0.8
Eastern Europe	89	2.5	1.2	89	1.6	0.8	1.5	0.5

FS1 and FS2 are the equal-weighted and asset weighted foreign ownership in percent. These foreign ownership measures are based on firms for which domestic and foreign ownership are fully known and they are computed for those firms that appear in each of the years 1996-2000 if there are at least 35 of these (see appendix A for details). The average for 1996-2000 is computed using the available years. The changes in between 1996 and 2000 are in absolute levels. Western Europe is the EU-15 where available plus Norway and Switzerland.

**Table C2. Foreign ownership variables FS3 and FS4 based on same firms in different years**

Same-firm data Countries	2000			Average 1996-2000			Change in yearly average between 1996 and 2000	
	# firms	FS3	FS4	# firms	FS3	FS4	FS3	FS4
Austria	8	n.a.	n.a.	8	n.a.	n.a.	n.a.	n.a.
Belgium	765	7.6	19.6	765	7.8	18.9	-0.3	2.3
Bulgaria	74	4.1	0.9	74	1.4	0.3	4.1	0.9
Czech Rep.	164	29.3	20.3	164	29.3	18.1	2.4	3.4
Denmark	67	43.3	22.8	67	39.1	24.3	9.0	5.2
France	1,792	16.0	15.6	1,792	15.2	16.2	1.1	0.4
Germany	118	6.8	6.0	118	6.8	4.9	0.0	1.3
Greece	183	32.8	35.4	183	31.3	38.8	2.2	-5.8
Italy	139	27.3	41.9	139	22.4	26.3	5.8	17.1
Luxembourg	4	n.a.	n.a.	4	n.a.	n.a.	n.a.	n.a.
Netherlands	53	11.3	9.3	53	10.9	13.5	-1.9	-10.7
Norway	498	16.9	15.0	498	14.9	17.4	2.4	-3.7
Poland	4	n.a.	n.a.	4	n.a.	n.a.	n.a.	n.a.
Portugal	5	n.a.	n.a.	5	n.a.	n.a.	n.a.	n.a.
Romania	184	19.0	39.1	184	12.1	30.0	11.4	20.4
Spain	193	7.8	4.9	193	8.8	5.7	-2.1	-4.1
Switzerland	1	n.a.	n.a.	1	n.a.	n.a.	n.a.	n.a.
United Kingdom	94	17.0	8.4	94	17.9	8.7	-2.1	0.8
Europe	4,346	18.4	18.3	4,346	16.7	17.1	2.5	2.1
European Union	3,421	18.9	18.2	3,421	17.8	17.5	1.3	0.7
Western Europe	3,920	18.7	17.9	3,920	17.5	17.5	1.4	0.3
Eastern Europe	426	17.4	20.1	426	14.2	16.1	6.0	8.2

FS3 and FS4 are the equal-weighted and asset-weighted foreign ownership in percent. A firm that is at least 50 percent foreign-owned is considered foreign, while a firm that is more than 50 percent domestically owned is considered domestic. FS3 and FS4 are computed only for those firms that appear in each of the years 1996-2000 if there are at least 35 of these (see appendix A for details). The average for 1996-2000 is computed using the available years. The changes in between 1996 and 2000 are in absolute levels. Western Europe is the EU-15 where available plus Iceland, Norway and Switzerland.

**Table C3. Basic regression with FS2 based on the same-firm sample**

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Log assets	-.244** (.017)
Fixed assets/total assets	-2.943** (.115)
Short-term debt/total assets	-3.954** (.124)
Long-term debt/total assets	-3.469** (.125)
Agriculture	1.555** (.270)
Construction	-.588** (.080)
Financial services	-.194 (.144)
Retail and wholesale	-.134** (.047)
Transport	-.192* (.089)
Utilities	.438** (.091)
Other	-.030 (.071)
Log GDP	.236** (.022)
Log per capita GDP	.176** (.043)
Inflation	.006** (.001)
fs	.098 (.051)
Same-Firm FS2	.988** (.232)
Observations	42,415
Adj-R <sup>2</sup>	.070

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Data are for 1996-2000. The regression includes unreported time dummies. FS2 is computed using firms appearing consistently during the 5-year period. Detailed variable definitions and data sources are given in Appendix A. Heteroskedasticity consistent errors are given in parentheses. \* and \*\* indicate significance levels of 5 and 1 percent, respectively.

**Table C4. Robustness checks with same-firm FS2 data**

	fs	FS2	Adj-R <sup>2</sup>	N
1. Only domestic firms		-.013 (.240)	.067	32,155
2. Only Western European firms	.101* (.051)	1.123** (.234)	.069	41,274
3. Firm variables interacted with fs	1.225* (.552)	1.018** (.232)	.071	42,415
4. Weighted least squares	.232** (.060)	1.014** (.265)	.070	42,415
5. Weighted least squares for Western European firms	.243** (.060)	1.468** (.268)	.069	41,274
6. 5-year averages of firm data	.057 (.071)	.585 (.326)	.077	19,376
7. Country fixed effects	.073 (.051)	.500 (.573)	.085	42,415
8. Country fixed effects for Western European firms	.073 (.051)	.493 (.571)	.085	41,274
9. No year fixed effects	.093 (.051)	.907** (.233)	.069	42,415
10. FS2 lagged	.090 (.055)	.488* (.247)	.070	36,748
11. Firms with 5 years of data	.383* (.154)	1.317 (.717)	.066	5,119

Data are for 1996-2000. All regressions but (9) include unreported time dummies. The specifications are based on regression (2) of table (5) apart from the fact that FS2 is constructed using only firms that appear every year during 1996-2000 and apart following changes: in regression (1) the sample is restricted to firms for which fs 0; in regression (2) the sample contains only firms from Western Europe; in regression (3) all firm-level variables are interacted with fs and added to the basic regression; in regression (4) the weight in the weighted least squares is the inverse of the number of observations for each country in a given year; in regression (5) the weighted least squares is applied to Western European companies only; in regression (6) observations are 5-year averages per firm; in regression (7) country fixed effects are included; in regression (8) the former regression is applied to Western European companies only; in regression (9) time fixed effects are excluded; in regression (10) FS2 is replaced by its first lagged value; regression (11) includes only those firms on which the same-firm FS2 variable is based. Detailed variable definitions and data sources are given in Appendix A. Heteroskedasticity consistent errors are given in parentheses. \* and \*\* indicate significance levels of 5 and 1 percent, respectively.