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## ABSTRACT

# Foreign Ownership and Corporate Income Taxation: An Empirical Evaluation*

Economic integration in Europe has not led to a 'race to the bottom' regarding corporate income taxes. This Paper documents trends in the foreign ownership of companies in Europe and examines whether foreign ownership has exerted a positive influence on corporate income tax levels. Using company-level data, we document that the foreign ownership share in Europe stood at around 21.5% in the year 2000. The estimation suggests that a one percentage point increase in foreign ownership increases the average corporate income tax rate between 0.5-1%. Further international economic integration is likely to lead to higher foreign ownership shares with a concomitant positive influence on corporate taxation levels.

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Keywords: corporate taxation, foreign ownership and 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 abolished all restrictions on capital outflows by 1990, 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. Devereux, Griffith and Klemm (2002) document that corporate tax revenues have been rather stable at around 2.5 percent of GDP for EU Member States and the G7 for more than a decade. In the European Union, corporate income taxes even increased from 2.7 percent of GDP in 1996 to 3.1 percent in 2000, while corporate taxes increased from 6.4 percent of total tax revenues to 7.4 percent over the same period.[1] In addition to a business cycle effect, these outcomes reflect that recent tax reforms in Europe have not led to large reductions in average or effective corporate income tax rates, because cuts in statutory rates have been accompanied by a widening of tax bases.

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).[2]

[1] See Eurostat (2003).

[2] 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.

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 ownership for 31 European countries over the 1996-2000 period. For 2000, we have full ownership information on around 15,000 firms. To expand our sample, we alternatively consider firms for which we know that they are in majority either foreign owned or domestically owned. This allows us to trace the foreign or domestic ownership of about 28,000 European firms in the year 2000. Depending on the exact definition of foreign ownership, we find that the foreign ownership share in Europe is in the 22-24 percent range for the year 2000. For Western Europe, estimates are in the 19-22 percent range, while they are between 33 and 36 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 is estimated to increase the average capital income tax rate between a half and one percent. A positive relationship between the corporate tax burden and foreign ownership is shown to exist for a range of individual economic sectors. However, it appears to be limited to Western Europe and not to extend to Eastern Europe. There can be reverse causation from corporate tax levels to foreign ownership for several reasons. Importantly, the availability of foreign tax credits to multinational firms for foreign-source corporate income taxes may provide multinational firms with a comparative advantage to operate in high-tax countries. This reflects that a higher national tax would raise the effective taxation of domestic firms while leaving the worldwide taxation of multinationals unchanged. If so, a higher national tax burden could attract additional multinational investment and lead to a higher foreign ownership share. Estimation by 2SLS to account for the possible endogeneity of foreign ownership confirms a positive relationship between foreign ownership and taxation.

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 describes the estimation framework and section five presents the empirical 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.

Sørensen (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.[3] 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

[3] In Sørensen (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.

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 around 50 or 60 percent, may well imply uncoordinated capital income taxes that are so high that tax coordination requires reducing rather than increasing capital income. Sørensen (2000) does not investigate this possible scenario.

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-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 of foreign owned firms following the manipulation of international transfer prices or lower 'true' profitability due to lower productivity.

Demirgüç-Kunt and Huizinga (2001) 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 are found to 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.[4]

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.

[4] 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.

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 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. Firms with complete or nearly complete ownership information tend to be firms with relatively few shareholders. We focus on a sample of non-listed firms, which excludes exchange-traded firms with highly dispersed ownership.[5] We also limit our sample to firms with unconsolidated accounting statement to exclude the possibility that the taxes reported in the income statement include those paid abroad by foreign subsidiaries.[6] In Appendix A, we describe in detail the *Amadeus* data base and the selection of our sample of firms. The sample includes about 15,000 European firms in the year 2000 for which we have full ownership information.[7] For a larger number of about 28,000 firms, we have sufficient ownership information to determine whether the firm is in majority domestically or foreign owned.

[5] 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.

[6] All the same, some firms – even those with unconsolidated statements – may report some foreign-source tax paid by foreign branches that pay corporate tax in the foreign country. Large-scale operations by multinationals tend to be organised as subsidiaries rather than branches, which suggests that the taxes paid by foreign branches are relatively small. For the case of Belgium, we checked that taxes paid by foreign branches are marginal.

For firms with full ownership information, we denote *fs* to be the foreign ownership share. 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 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 24.3 and 21.5 percent, respectively. For 2000, foreign ownership in the EU and in Western Europe (the EU plus Iceland, Norway and Switzerland where available) is lower than in Eastern Europe. The average *FS2*, for instance, is 19.4 percent in Western Europe and 32.8 percent in Eastern Europe. Average figures for the 1996-2000 period are also provided. The average *FS2* for 2000 in Europe (at 21.5 percent) is slightly higher than the average for the 1996-2000 period (at 21.1 percent), reflecting an overall increase in foreign ownership. Finally, the table indicates the changes in the *FS1* and *FS2* variables between 1996 and 2000. These changes, computed for 15 countries, show an increase in the foreign ownership share *FS2* of 0.5 percent for Europe as a whole between 1996 and 2000. Foreign ownership in Eastern Europe has risen during the sample period, while it appears to have decreased slightly in Western Europe.

Table (2) provides information on the foreign ownership measure *FS3* and *FS4*. For 2000, information is now also available for Lithuania and Switzerland. The overall European average of *FS4* at 22.0 percent is shown to be slightly higher than

[7] 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.

the average for *FS2* of 21.5. The trends in *FS3* and *FS4* over the 1996-2000 period are positive for Europe as a whole and for Eastern and Western Europe separately.

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 firm-level foreign ownership share.

Our tax burden measure is accrued taxes as a percent of assets.[8] 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). Several Eastern European countries, particularly the Czech Republic, Lithuania and Hungary, display relatively high foreign ownership (or low tax burdens) in panels C and D. At

[8] 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 other extreme, Bulgaria continues to show low foreign ownership with a high tax burden.

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 GDP as an explanatory variable. 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, relative capital scarcity 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 influence the tax burden. *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 (and communications), 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 a positive correlation between the

ownership variable *FS2* and the tax burden variable. Appendix A provides full information about data sources and variable definitions.

## 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 percent 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,
- the $\beta$'s are vectors 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 $100\sigma_i (\gamma_i + \gamma_j)[A_i / \Sigma_i A_i]$ 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, $FS2_{jt}$.[9] 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, $FS1_{jt}$.[10]

## 5. Empirical results

This section first presents the results of some basic regressions of the tax burden in section 5.1. These are followed by some robustness checks in section 5.2. Regressions for individual sectors are reported in section 5.3, while section 5.4 presents 2SLS estimation results to account for the possible endogeneity of the foreign ownership variable.

### 5.1 Benchmark results

A set of basic regressions, taking *FS2* as the aggregate measure of foreign ownership, is reported in Table (5). The first four regressions in the table use firm-level data, while the last four use country-year mean data. Regressions (1) and (2) represent firm-level data Europe as a whole and for Western Europe by itself, respectively, and they are estimated by OLS. Regressions (3) and (4) differ in that they are estimated by 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 countries, particularly in Eastern Europe, with relatively few firm observations. Next, columns (5) and (6) have as variables the country-year means rather than individual firm observations which is appropriate if the tax burden is

[9] 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.

[10] 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*.

determined at the country rather than the firm level. These country-year mean regressions include an aggregate foreign-ownership variable, but not a firm-level foreign ownership variable. The single aggregate foreign ownership variable in this instance captures both the 'direct' effect of foreign ownership (for instance, increased profit-shifting opportunities) and the 'indirect' effect through a change in taxation policy. Finally, columns (7) and (8) use country-year mean data based only on purely domestic firms. For these firms, the aggregate foreign ownership variable can only represent an indirect effect through altered tax policies.[11]

Variables derived from the balance sheet are statistically significant in regressions (1)-(4) with individual firm data, but not in regressions (4)-(8) with country-year mean data. In the first firm four regressions, we specifically see that firms with larger assets tend to pay lower taxes.[12] 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 can explain lower taxes (reflecting the tax deductibility of interest payments). Sector fixed effects are included in the individual firm regressions for 7 non-manufacturing sectors. We see that the agriculture and utilities sectors appear to pay relatively high taxes in at least one of the specifications, while other sectors (construction, retail and wholesale, and transport) pay significantly lower taxes according to several specifications.[13]

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 several regressions with a positive and significant coefficient. Next, we test whether richer countries, which tend to have larger public expenditures, levy higher corporate taxes by including the log of per capita GDP. For this hypothesis we find no evidence in the data. The coefficient on inflation turns out to be positive and significant in several

[11] Note that purely domestic firms may still have profit-shifting opportunities to the extent that they own subsidiaries abroad. By definition, these profit-shifting opportunities are not related to the extent of firm-level foreign ownership.

[12] 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.

[13] Such sectoral effects 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

instances, perhaps 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* are positive and significant in all four firm-level regressions. The aggregate foreign ownership variable, FS2, is positive and significant in the firm-level regressions (1) and (2), but it ceases to be statistically significant in the weighted least squares regression (3) for all European firms. This reflects the additional weight given to Eastern European firms in regression (3), as is confirmed by the positive and significant coefficient for *FS2* in regression (4) for only Western Europe. As discussed before, countries in Eastern Europe may still be in a process of economic transition towards a stable, long-run positive relationship between foreign ownership and taxation. For the country-year mean regressions, we similarly see that *FS2* is only positive and significant in regressions (6) and (7) based on the Western European sample of firms.

The sizes of the coefficients on the foreign ownership variables suggest that the total 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 (4) of 0.532 and 2.755, respectively. Noting that their sum is 3.287, we see that an increase in the foreign ownership share by 0.01 would increase taxes as a percent of assets by .033. The mean of this tax variable for the observations in the regression is 2.541 (see Table (4)). Thus an increase in the foreign ownership share by one percentage point would increase the ratio of taxes to assets by 1.294 percent. Devereux et al (2002, Figure 2) document that the average corporate income tax in Europe is currently in the neighborhood of 33 percent. This suggests that an increase of foreign ownership by 0.01 would equivalently increase the average corporate income tax rate by about 0.43 percent.[14] The estimated coefficients on *FS2* in the country-year mean regressions suggest a similarly large impact of foreign ownership on the tax burden.

The regressions in Table (5) are based on *FS2* as the aggregate foreign ownership measure, as a priori we prefer a foreign ownership measure that is based on full ownership information and is asset-weighted. All the same, it is interesting to see

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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.

[14] This implies that the elimination of all foreign ownership (currently at about 21.5 percent) would reduce the average tax rate to about 24 percent, while a doubling of foreign ownership to 43 percent conversely would increase the average tax to 42 percent.

how the results depend on the choice of the aggregate foreign ownership measure. To check this, Appendix B reports regressions such as in Table (5) for the foreign ownership measures *FS1*, *FS3* and *FS4* (in Tables (B1), (B2) and (B3), respectively). Note that the regression in column (1) of Table (B3) for *FS4* is based on a sample of 109,622 firms as opposed to 55,236 firms for *FS2*. Similarly, the country-mean regressions are based on somewhat larger samples. The estimated coefficients for the aggregate foreign ownership measures *FS2* and *FS4* in Tables (5) and (B3) are very similar, which is expected from the high correlation between *FS2* and *FS4* seen from Table (3). The regressions for both *FS1* and *FS3* displayed in Tables (B3) and (B4) differ in that the country-mean regressions fail to indicate a consistently positive impact of foreign ownership on foreign ownership even for Western Europe. Overall, there is no strong evidence that tax authorities adjust tax burdens to equal-weighted foreign ownership shares.

### 5.2 Some robustness checks

Regression (8) of Table (5) - with country-year mean data just for domestically owned firms – provides some evidence that the tax burden is positively related to the aggregate foreign ownership share for Western Europe. In Table (6), we report some additional regressions as robustness checks related to equations (7) and (8) of Table (5) for Europe as a whole and Western Europe, respectively. First, we re-estimate the two equations just for observations for 1996 and 2000. This reduces the number of observations to 26 for Western Europe, which reflects that we have relatively few observations for 1996. *FS2* remains statistically significant in the regression for Western Europe.

Next, we include (averaged) sector fixed effects which yields a positive coefficient for *FS2* in the Western Europe regression that is not statistically significant. This suggests that the positive relationship between foreign ownership and taxation found in regression (8) of Table (5) is due to different sectoral compositions across countries. Regressions for individual sectors presented below, however, indicate that this is not the case, as a positive empirical relationship between foreign ownership and taxation is found for several individual sectors. Alternatively, we include country fixed effects. Again, the coefficient on *FS2* in the regression for Western Europe is positive but insignificant. This suggests that the empirical relationship between foreign ownership and taxation primarily reflects cross-country

variation rather than variation over time. Finally, we lag the *FS2* variable by one year to allow for the possibility that the tax burden is adjusted with a lag to changes in the aggregate foreign ownership. This produces a coefficient for *FS2* that is positive and statistically significant in the equation for Western Europe.

### 5.3 Regressions by sector

The responsiveness of taxation to foreign ownership can in principle differ across sectors. A rationale for such a varying responsiveness may be different elasticities of the tax base across sectors in open economies. In practice, countries have the means to vary tax burdens across economic sectors as tax parameters such as the tax rate and depreciation allowances have differential effects on sectoral effective tax rates if sectors differ, for instance, in capital intensities. To allow for different tax burdens across sectors, we next re-estimate equations (7) and (8) of Table (5) with data for each of 8 sectors. The results – relating to Europe as a whole and to Western Europe, respectively - are reported in Panels A and B of Table (6) respectively. In Panel A, we see that the coefficient for *FS2* is positive and significant for the transport and utilities sectors, while it is insignificant for the other sectors. In Panel B, we see that there are positive and significant coefficients for *FS2* for all sectors apart from financial services and other. Activity in the financial sector may indeed be considered to be relatively elastic. Rather high estimated coefficients for the agricultural and utilities sectors instead may reflect rather low elasticities for these sectors. Note that the coefficient for *FS2* in manufacturing (the largest sector) at 3.433 is very close to the overall estimate of 3.564 in regression (8) of Table (5).

### 5.4 Checking for endogenous foreign ownership shares

In a stylized world, we can assume that all corporate income tax is levied at source and that the corporate income tax system is non-discriminatory towards foreign shareholders. In such a world, there is no reason to expect that a change in the corporate tax burden in a particular country has a major effect on foreign ownership in the country. The reason is that domestic and foreign shareholders face the same tax burden and hence cannot reduce their combined tax burden by trading shares. In such a world, foreign ownership would be largely exogenous to the tax burden. The real world obviously differs from this in two respects: (i) not all income tax is levied at source, and (ii) the tax system is to some extent discriminatory. These real-word

aspects of the tax system can each potentially make foreign ownership endogenous to the tax system. We will examine these two issues in turn.

Many countries tax the income of resident firms on a worldwide basis. Hence, a multinational firm is taxed on both its domestic source and its foreign source income. Any foreign source income most likely is already taxed abroad and thus is at risk of being taxed twice. To prevent or alleviate double taxation, most countries provide their multinational firms with foreign tax credits for foreign-source corporate income taxes. This enables them to reduce their home-country tax liability one-for-one by their taxes already paid abroad. This potentially provides foreign firms with a comparative advantage to operate in high-tax countries. If so, a higher tax burden in a country would attract additional multinational investment and thus lead to higher foreign ownership. In practice, countries, impose varying limits on the foreign tax credits available to their multinational firms.[15] These limitations in practice may prevent an influx of foreign investment into high-tax countries driven by foreign tax credits.

The second issue is whether the national tax system is explicitly discriminatory towards foreign shareholders in either a positive or negative way. Special tax breaks to foreign investors can clearly give rise to a high national foreign ownership share, even if they do not suggest the positive correlation between foreign ownership and tax burdens that we see in the data. No significant corporate-tax discrimination of foreign ownership appears to have existed in the EU in recent years, even though the Treaty of Maastricht does not rule out such discrimination.[16] In Eastern Europe, Poland and Hungary explicitly discriminated in favor of foreign investors through generous investment tax credits and reduced tax rates, respectively, before 1993.[17] The high foreign ownership in Hungary during the sample period of 1996-2000 thus may well reflect earlier positive discrimination of foreign owners.

[15] The U.S., for instance, imposes a foreign tax credit limitation that prevents U.S. tax on foreign source income to be negative, even if it allows cross-crediting across countries. Thus, U.S. firms with subsidiaries in high-tax countries can reduce their tax burdens in these countries towards the U.S. level if they also receive income in low-tax countries. Other restrictions apply as well. The U.S., for instances, categorises foreign-source income into several baskets without possible cross-crediting across baskets. See, for instance, Desai and Hines (2002, section 2) for a description of the U.S. taxation of foreign corporate income.

[16] Article 58, paragraph 1, allows Member States to 'distinguish between taxpayers who are not in the same situation with regard to their place of residence or with regard to the place where their capital is invested.' In practice, the scope for discrimination is limited, however, by paragraph 3 of the same Article which states that there may be no 'arbitratry discrimination' and by European Court of Justice jurisprudence in this area. See Raes (2003).

After 1993, Hungary continued to maintain a low tax regime for offshore companies, but these companies are too limited in what they can do to matter much (they can, for instance, only deal with non-residents). Discrimination of foreign ownership through the corporate tax code in Europe thus appears to be limited.[18]

A separate avenue for tax discrimination is formed by dividend withholding taxes applied to non-resident holdings, which have a potentially negative impact on foreign ownership shares.[19] Dividend withholding taxes, however, do not register in our analysis, as they are essentially prepayments of later (personal) income taxes. For this reason, dividend withholding taxes do not enter corporate income statements and hence are excluded from our empirical tax burden measure.

In summary, the aggregate foreign ownership measure is potentially endogenous to the tax burden primarily on account of the operation of the foreign tax credit mechanism applied to multinational firms. To allow for this, we re-estimate some the regressions of Table (5) using 2SLS. As instruments we take the following four variables: (i) *Accounting standards* measuring the availability of accounting items in annual reports on a scale of 0-90; (ii) *Anti-director rights* tallying the presence of 6 specific shareholder rights – on a scale from 0 to 6; (iii) *Corruption* measuring the presence of corruption in government on a scale from 0 to 10 (with a higher score meaning less corruption); finally, (iv) *Insider trading* measuring the perceived incidence of insider trading on a scale from 0 to 10 (with a higher score indicating less insider trading). The first three of these variables are taken from La Porta et al (1998), while the latter is from the World Competitiveness Report.

As seen in Table (4), each of these institutional indices is negatively correlated with the foreign ownership measure *FS2*. This suggests that investment by multinationals in the form of FDI is higher in countries with relatively low-quality legal and corporate governance institutions. Foreign ownership and good institutions – in other words – appear to be substitutes.[20] The reason may be that multinational firms can rely on institutional arrangements in their home countries, and hence have a comparative advantage to operate in low-quality institutional environments. The

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[17] See Sedmihradsky and Klazar (2002).

[18] In the regressions with firm-level data, any direct discrimination of foreign ownership would be subsumed in the individual-firm foreign ownership effect.

[19] The EU parent-subsidiary directive provides for an exemption if direct shareholding is at least 25 percent. Most Member States have opted to lower this holding threshold.

[20] See Huizinga and Denis (2003) for a study on the determinants of national foreign ownership shares with among these the mentioned indices of legal and corporate governance institutions.

corporate governance environment in which firms operate, on the other hand, does not directly influence tax policy. This makes corporate governance indices reasonable instruments for the foreign ownership share *FS2*. In practice, corporate governance variables are only available for the Western European countries in our sample. Thus the 2SLS estimation is only applied to the regressions in Table (5) that are based on data for Western Europe.

The results are given in Table (8). The estimated coefficients for *FS2* are positive and significant in all four regressions. Note that the estimated coefficients are about twice as big as the corresponding coefficients in Table (5). This suggests that the parameter estimates reported in Table (5) are biased downward. Such a downward bias would arise, if higher taxes in a particular country indeed lead to a larger presence of multinational firms – aiming to take advantage of the foreign tax credit mechanism. Formal tests reported in the table reject the null hypothesis of exogeneity of the foreign ownership variable.

Before, we discussed that the estimates of $\gamma_i$ and $\gamma_j$ in column (4) of Table (5) - summing to 3.287 – imply that an increase in the foreign ownership share of 0.01 leads to an increase of the average corporate income tax in Europe by 0.43. For the analogous equation (2) in Table (8), we see that the estimates of $\gamma_i$ and $\gamma_j$ sum to 4.656. Correspondingly, the impact of a rise in the foreign ownership share by 0.01 on the average income tax rate rises to 0.60 percent. The coefficients for *FS2* in regressions (3) and (4) of Table (8), however, suggest somewhat larger corporate tax rate effects of 0.85 and 1.03 for all firms and only for domestic firms, respectively. Thus our estimates of the tax rate effect of a higher foreign ownership by 0.01 share lie roughly between a half and one percent.

Finally, Table (9) reports 2SLS results for the sectoral regression with Western European data in parallel to those seen in Panel B of Table (7). Estimated coefficients regarding *FS2* are positive for all 8 sectors, and those for the construction, manufacturing and utilities sectors are statistically significant. The estimated coefficients for the construction and utilities sectors in Table (9) are higher than the corresponding coefficients in Table (7) – which suggests that the coefficients in Table (7) are biased downward. The coefficient for *FS2* in the manufacturing regression in Table (9), however, at 3.204 is slightly less than the one is Table (7) 3.433. The hypothesis that *FS2* is exogenous is not rejected for most sectors.

## 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. The asset-weighted foreign ownership share in Europe is estimated to be 21.5 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 an increase in the foreign ownership share by one percent would lead to an increase in the average corporate income tax rate by between a half and one 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.[21]

The absence of 'race to the bottom' in corporate income taxes, 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 resident firms.

[21] 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.

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## 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 | 153 | 26.1 | 21.4 | 292 | 30.6 | 24.5 | -3 | -2.8 |
| Belgium | 647 | 30.1 | 41.1 | 544 | 36.5 | 41.1 | -8.8 | 5.0 |
| Bosnia | n.a. | n.a. | n.a. | 3 | n.a. | n.a. | n.a. | n.a. |
| Bulgaria | 418 | 21.3 | 18.4 | 383 | 7.1 | 7.4 | 20.9 | 17.8 |
| Croatia | 88 | 19.8 | 7.8 | 51 | 19.8 | 7.0 | n.a. | n.a. |
| Czech Rep. | 275 | 40.0 | 59.6 | 226 | 36.7 | 51.8 | 3.9 | 8.2 |
| Denmark | 1,104 | 25.4 | 28.0 | 821 | 25.8 | 25.5 | -0.3 | 8.1 |
| Estonia | 11 | n.a. | n.a. | 8 | n.a. | n.a. | n.a. | n.a. |
| Finland | 190 | 28.0 | 14.5 | 137 | 27.8 | 15.8 | n.a. | n.a. |
| France | 2,550 | 22.4 | 13.5 | 2,223 | 20.1 | 14.0 | -1.0 | 0.3 |
| Germany | 595 | 16.6 | 12.6 | 1,311 | 13.2 | 12.3 | 5.0 | 1.9 |
| Greece | 201 | 39.5 | 23.2 | 242 | 34.3 | 28.1 | 3.1 | -15.2 |
| Hungary | 59 | 41.1 | 86.8 | 36 | 47.2 | 81.8 | 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 | 1,542 | 40.4 | 29.8 | 1,282 | 32.8 | 32.0 | 7.4 | -7.9 |
| Latvia | 22 | n.a. | n.a. | 14 | n.a. | n.a. | n.a. | n.a. |
| Lithuania | 24 | n.a. | n.a. | 12 | n.a. | n.a. | n.a. | n.a. |
| Luxembourg | 8 | n.a. | n.a. | 22 | n.a. | n.a. | n.a. | n.a. |
| Netherlands | 472 | 20.0 | 43.4 | 770 | 20.4 | 40.9 | -1.6 | 1.5 |
| Norway | 1,868 | 20.4 | 23.2 | 1,501 | 17.2 | 18.9 | 2.7 | 4.1 |
| Poland | 120 | 33.8 | 33.5 | 130 | 23.8 | 19.1 | 18.7 | 29.4 |
| Portugal | 111 | 18.0 | 18.9 | 156 | 24.8 | 17.1 | -10.8 | 5.7 |
| Romania | 1,389 | 39.5 | 31.0 | 604 | 24.0 | 22.6 | 35.6 | 23.8 |
| Slovak Rep. | 3 | n.a. | n.a. | 2 | n.a. | n.a. | n.a. | n.a. |
| Slovenia | 70 | 42.8 | 34.8 | 44 | 42.8 | 34.8 | n.a. | n.a. |
| Spain | 1,067 | 15.4 | 11.7 | 1,395 | 28.6 | 25.3 | -19.1 | -19.5 |
| Sweden | 1,627 | 9.7 | 6.4 | 1,068 | 11.8 | 7.0 | n.a. | n.a. |
| Switzerland | 21 | n.a. | n.a. | 13 | n.a. | n.a. | n.a. | n.a. |
| United Kingdom | 779 | 13.7 | 7.4 | 799 | 17.5 | 10.3 | -6.9 | -5.5 |
| Yugoslavia | n.a. | n.a. | n.a. | 11 | n.a. | n.a. | n.a. | n.a. |
| | | | | | | | | |
| Europe | 15,418 | 24.3 | 21.5 | 13,996 | 22.1 | 21.1 | 2.1 | 0.5 |
| European Union | 11,050 | 22.5 | 18.8 | 11,016 | 22.8 | 21.1 | -2.9 | -4.3 |
| Western Europe | 12,939 | 22.2 | 19.4 | 12,531 | 22.1 | 20.8 | -2.2 | -3.2 |
| Eastern Europe | 2,479 | 35.6 | 32.8 | 1,465 | 22.0 | 23.7 | 28.2 | 22.4 |

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. 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 plus Iceland, Norway and Switzerland where available. See Appendix A for information on the data source.

## 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 | 187 | 23.5 | 18.3 | 363 | 28.3 | 23.9 | -4.7 | -0.4 |
| Belgium | 2,342 | 11.8 | 30.8 | 1,960 | 14.5 | 30.3 | -2.9 | 6.4 |
| Bosnia | n.a. | n.a. | n.a. | 3 | n.a. | n.a. | n.a. | n.a. |
| Bulgaria | 768 | 17.4 | 19.0 | 569 | 8.2 | 10.4 | 16.8 | 13.1 |
| Croatia | 121 | 20.7 | 13.9 | 77 | 19.7 | 13.4 | n.a. | n.a. |
| Czech Rep. | 759 | 32.0 | 44.8 | 685 | 26.1 | 36.3 | 9.6 | 8.3 |
| Denmark | 1,201 | 24.7 | 27.4 | 890 | 25.6 | 25.7 | -2.4 | 5 |
| Estonia | 15 | n.a. | n.a. | 11 | n.a. | n.a. | n.a. | n.a. |
| Finland | 231 | 26.4 | 25.9 | 172 | 25.8 | 17.8 | n.a. | n.a. |
| France | 8,575 | 21.8 | 17.3 | 8,641 | 16.7 | 14.4 | 4.7 | 3.2 |
| Germany | 744 | 16.0 | 10.8 | 1,691 | 12.2 | 11.4 | 5.4 | 0.6 |
| Greece | 732 | 33.5 | 30.6 | 558 | 28.3 | 28.7 | 4.2 | -5.6 |
| Hungary | 190 | 31.3 | 73.9 | 119 | 35.3 | 62.0 | n.a. | n.a. |
| Iceland | 2 | n.a. | n.a. | 3 | n.a. | n.a. | n.a. | n.a. |
| Ireland | 4 | n.a. | n.a. | 9 | n.a. | n.a. | n.a. | n.a. |
| Italy | 2,444 | 42.5 | 31.3 | 2,259 | 29.1 | 28.1 | 14.8 | 1 |
| Latvia | 31 | n.a. | n.a. | 22 | 33.3 | 16.8 | n.a. | n.a. |
| Lithuania | 62 | 17.7 | 15.2 | 37 | 13.5 | 11.3 | n.a. | n.a. |
| Luxembourg | 15 | n.a. | n.a. | 50 | 44.2 | 45.2 | n.a. | n.a. |
| Netherlands | 498 | 20.2 | 42.9 | 816 | 20.5 | 39.7 | -2.0 | 0.7 |
| Norway | 2,327 | 18.0 | 21.8 | 1,930 | 14.8 | 18.3 | 3.0 | 3.6 |
| Poland | 196 | 34.2 | 30.4 | 202 | 27.9 | 24.1 | 7.4 | 10.2 |
| Portugal | 237 | 22.4 | 21.3 | 396 | 20.9 | 22.8 | 2.6 | 7.2 |
| Romania | 1,748 | 38.0 | 32.6 | 1,067 | 21.8 | 24.6 | 31.5 | 19.3 |
| Slovak Rep. | 7 | n.a. | n.a. | 5 | n.a. | n.a. | n.a. | n.a. |
| Slovenia | 102 | 48.0 | 49.0 | 47 | 43.1 | 48.2 | n.a. | n.a. |
| Spain | 2,089 | 13.4 | 10.7 | 2,724 | 23.2 | 22.9 | -14.2 | -16.2 |
| Sweden | 1,760 | 10.3 | 7.1 | 1,173 | 12.3 | 7.4 | n.a. | n.a. |
| Switzerland | 47 | 8.5 | 7.3 | 28 | 9.1 | 8.2 | n.a. | n.a. |
| United Kingdom | 853 | 16.3 | 7.6 | 978 | 18.6 | 11.4 | -5.3 | -5.2 |
| Yugoslavia | n.a. | n.a. | n.a. | 21 | 10.9 | 4.8 | n.a. | n.a. |
| | | | | | | | | |
| Europe | 28,287 | 22.6 | 22.0 | 27,354 | 19.0 | 20.0 | 4.1 | 2.7 |
| European Union | 21,912 | 21.5 | 20.0 | 22,610 | 19.2 | 19.5 | 1.8 | 0.6 |
| Western Europe | 24,288 | 21.1 | 20.1 | 24,570 | 18.8 | 19.4 | 1.8 | 0.8 |
| Eastern Europe | 3,999 | 31.7 | 33.7 | 2,783 | 21.0 | 25.6 | 20.7 | 15.0 |

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. 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 plus Iceland, Norway and Switzerland where available. See Appendix A for information on the data source.

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

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

| | | FS1 | FS2 | FS3 | FS4 |
|---|---|---|---|---|---|
| **FS1** | Correlation | 1.000 | | | |
| | Prob. | | | | |
| | Number of Obs. | 92 | | | |
| **FS2** | Correlation | .782 | 1.000 | | |
| | Prob. | <.0001 | | | |
| | Number of Obs. | 92 | 92 | | |
| **FS3** | Correlation | .802 | .543 | 1.000 | |
| | Prob. | <.0001 | <.0001 | | |
| | Number of Obs. | 92 | 92 | 105 | |
| **FS4** | Correlation | .753 | .921 | .697 | 1.000 |
| | Prob. | <.0001 | <.0001 | <.0001 | |
| | Number of Obs. | 92 | 92 | 105 | 105 |

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. See Appendix A for variable definitions and information about the data source.

**Part B: Averages per country**

| | | FS1 | FS2 | FS3 | FS4 |
|---|---|---|---|---|---|
| **FS1** | Correlation | 1.000 | | | |
| | Prob. | | | | |
| | Number of Obs. | | | | |
| **FS2** | Correlation | .807 | 1.000 | | |
| | Prob. | <.0001 | | | |
| | Number of Obs. | 21 | 21 | | |
| **FS3** | Correlation | .831 | .571 | 1.000 | |
| | Prob. | <.0001 | .007 | | |
| | Number of Obs. | 21 | 21 | 26 | |
| **FS4** | Correlation | .848 | .929 | .769 | 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. See Appendix A for variable definitions and information about the data source.

## Table (4). Summary statistics

| Variable | Unit | Mean | Std. deviation | Min. | Max. | Correlation with FS2 |
|---|---|---|---|---|---|---|
| **Firm variables** | | | | | | |
| Tax burden | % | 2.541 | 4.036 | -86.347 | 92.272 | .071** |
| Log assets | Log (€1,000) | 10.102 | 1.633 | 3.227 | 17.571 | -.089** |
| Fixed assets/total assets | | .378 | .276 | .000 | 1.000 | -.0129** |
| Short-term debt/total assets | | .493 | .248 | .000 | 1.000 | .130** |
| Long-term debt/total assets | | .175 | .194 | .000 | 1.000 | -.095** |
| Agriculture | | .027 | .162 | 0 | 1 | -.035** |
| Construction | | .052 | .221 | 0 | 1 | .033** |
| Financial services | | .029 | .167 | 0 | 1 | .007** |
| Retail and wholesale | | .254 | .435 | 0 | 1 | .057** |
| Transport | | .058 | .235 | 0 | 1 | -.022** |
| Utilities | | .032 | .175 | 0 | 1 | -.108** |
| Other | | .145 | .352 | 0 | 1 | -.097** |
| Fs | | .220 | .401 | 0.000 | 1.000 | .148** |
| **Country variables** | | | | | | |
| Log GDP | Log (€ billion) | 5.976 | 1.241 | 2.125 | 7.628 | -.132** |
| Log per capita GDP | Log (€ 1,000) | 2.813 | .754 | .007 | 3.382 | -.022** |
| Inflation[22] | % | 7.088 | 38.010 | .515 | 453.200 | -.115** |
| Accounting standards | | 68.385 | 9.269 | 36 | 83 | -.461** |
| Anti-director rights | | 1.902 | 1.100 | 0 | 4 | -.412** |
| Corruption | | 8.769 | 1.273 | 6.13 | 10.0 | -.338** |
| Insider trading | | 6.136 | 1.119 | 3.745 | 8.874 | -.147** |
| FS2 | | .209 | .109 | .020 | .868 | |

The summary statistics are based on the 55,236 observations used in regression (1) in Table (5), except for the variables accounting standards, anti-director rights, corruption and insider trading. Statistics for these variables are based on the 51,469 observations used in regression (1) of Table (8). See Appendix A for data sources and variable definitions. * and ** indicate significance levels of 5 and 1 percent, respectively.

[22] Bulgaria and Romania had inflation rates of 453.2% and 154.9% in 1997, respectively.

## Table (5). Basic regression results

| | (1) Europe | (2) Western Europe | (3) Europe, WLS | (4) Western Europe, WLS | (5) Means, Europe | (6) Means, Western Europe | (7) Means for domestic firms, Europe | (8) Means for domestic firms, Western Europe |
|---|---|---|---|---|---|---|---|---|
| Log assets | -.244** | -.257** | -.266** | -.295** | .031 | .300 | -.191 | -.186 |
| | (.014) | (.014) | (.019) | (.020) | (.161) | (.174) | (.168) | (.224) |
| Fixed assets/total assets | -2.774** | -2.637** | -3.141** | -2.721** | -4.561 | -1.287 | -5.134 | 1.771 |
| | (.096) | (.098) | (.126) | (.127) | (2.724) | (2.807) | (2.720) | (3.444) |
| Short-term debt/total assets | -3.592** | -3.691** | -3.272** | -3.579** | -.305 | 2.480 | -3.300 | -.725 |
| | (.105) | (.109) | (.136) | (.136) | (3.187) | (2.875) | (2.705) | (2.690) |
| Long-term debt/total assets | -3.302** | -3.442** | -3.151** | -3.441** | -.982 | .844 | -1.414 | -3.194 |
| | (.102) | (.106) | (.139) | (.136) | (2.117) | (2.005) | (1.930) | (2.421) |
| Agriculture | 1.066** | 1.916** | .261 | 1.687** | | | | |
| | (.204) | (.268) | (.193) | (.315) | | | | |
| Construction | -.411** | -.579** | -.185 | -.376** | | | | |
| | (.068) | (.071) | (.103) | (.102) | | | | |
| Financial services | -.065 | -.065 | -.012 | -.089 | | | | |
| | (.120) | (.121) | (.153) | (.135) | | | | |
| Retail and wholesale | -.101* | -.092* | -.119 | -.066 | | | | |
| | (.041) | (.041) | (.063) | (.062) | | | | |
| Transport | -.190** | -.211** | -.081 | -.084 | | | | |
| | (.074) | (.077) | (.108) | (.104) | | | | |
| Utilities | .240** | .366** | .018 | .627** | | | | |
| | (.074) | (.079) | (.138) | (.168) | | | | |
| Other | .092 | .076 | .069 | .107 | | | | |
| | (.060) | (.061) | (.079) | (.076) | | | | |
| Log GDP | .272** | .312** | .227** | .207** | .012 | -.054 | .240* | .334* |
| | (.018) | (.022) | (.023) | (.027) | (.105) | (.091) | (.101) | (.130) |
| Log per capita GDP | .012 | .141 | .022 | -.290** | -.252 | -.353 | -.162 | -.108 |
| | (.029) | (.075) | (.038) | (.095) | (.153) | (.218) | (.175) | (.215) |
| Inflation | .007** | -.033 | .006** | -.054 | .007** | .003 | .007** | -.109 |
| | (.001) | (.028) | (.001) | (.038) | (.001) | (.073) | (.000) | (.090) |
| Fs | .166** | .153** | .608** | .532** | | | | |
| | (.044) | (.045) | (.068) | (.065) | | | | |
| FS2 | 2.684** | 3.465** | -.050 | 2.755** | -.264 | 3.022** | -.062 | 3.564** |
| | (.172) | (.206) | (.192) | (.234) | (.767) | (.768) | (.744) | (1.008) |
| Observations | 55,236 | 51,469 | 55,236 | 51,469 | 82 | 66 | 82 | 66 |
| Adj-$R^2$ | .075 | .076 | .080 | .082 | .314 | .377 | .290 | .291 |

The dependent variable is the tax burden. Data are for 1996-2000. Regressions (1)-(4) use firm data. Regressions (5)-(8) use county-year mean data. Estimation is by OLS with the exception of equations (3) and (4) that are estimated by weighted least squares with the weight being the inverse of the number of firms in a country in a year. Equations (7) and (8) use data for firms that are fully domestically owned. 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). Robustness checks

| | All Europe | | | Western Europe | | |
|---|---|---|---|---|---|---|
| | **FS2** | **Adj-$R^2$** | **N** | **FS2** | **Adj-$R^2$** | **N** |
| 1. Data for 1996 and 2000 | .763<br>(1.177) | -.123 | 31 | 4.915**<br>(1.559) | .166 | 26 |
| 2. Sector fixed effects included | .145<br>(.479) | .746 | 82 | .869<br>(.610) | .785 | 66 |
| 3. Country fixed effects included | -.694<br>(.695) | .875 | 82 | .244<br>(.583) | .876 | 66 |
| 4. No year fixed effects included | -.109<br>(.746) | .326 | 82 | 3.338**<br>(.932) | .321 | 66 |
| 5. FS2 lagged | .170<br>(.998) | .337 | 66 | 2.864**<br>(.964) | .286 | 52 |

Regressions are based on regressions (7) and (8) of Table (5) apart from the following changes: regressions (1) are based only on 1996 and 2000 observations; regressions 2 include sector specific effects; regressions (3) include country fixed effects; regressions (4) exclude year fixed effects; regressions (5) replace the current value of FS2 by its first lag. See notes for Table (5).

## Table (7). Regressions per sector

### Panel A - Europe

| Sector | FS2 | Adj-$R^2$ | N |
|---|---|---|---|
| Agriculture | 4.019 | .079 | 79 |
| | (2.651) | | |
| Construction | 1.573 | .440 | 79 |
| | (.833) | | |
| Financial services | -1.393 | .366 | 57 |
| | (1.469) | | |
| Manufacturing | -.124 | .418 | 82 |
| | (-.136) | | |
| Retail and wholesale | .656 | .217 | 82 |
| | (.780) | | |
| Transport | 1.552* | .100 | 80 |
| | (1.051) | | |
| Utilities | 4.109* | -.009 | 69 |
| | (1.738) | | |
| Other | -2.286 | .348 | 80 |
| | (1.792) | | |

Regressions are as regression (7) of Table (5) with the sample restricted to data for a single sector. See notes to Table (5).

### Panel B – Western Europe

| Sector | FS2 | Adj-$R^2$ | N |
|---|---|---|---|
| Agriculture | 9.708** | .225 | 65 |
| | (3.485) | | |
| Construction | 2.607* | .355 | 65 |
| | (1.145) | | |
| Financial services | -1.393 | .366 | 57 |
| | (1.469) | | |
| Manufacturing | 3.433** | .332 | 66 |
| | (.631) | | |
| Retail and wholesale | 3.256** | .213 | 66 |
| | (.660) | | |
| Transport | 3.269** | .235 | 66 |
| | (.916) | | |
| Utilities | 7.089** | .045 | 56 |
| | (2.227) | | |
| Other | .117 | .599 | 66 |
| | (1.115) | | |

Regressions are as regression (8) of Table (5) with the sample restricted to data for a single sector. See notes to Table (5).

## Table (8). Basic regressions estimated by 2SLS

| | (1) Western Europe | (2) Western Europe, WLS | (3) Means, Western Europe | (4) Means for domestic firms, Western Europe |
|---|---|---|---|---|
| Log assets | -.256** | -.293** | .293 | -.241 |
| | (.014) | (.014) | (.278) | (.296) |
| Fixed assets/total assets | -2.610** | -2.697** | 4.658 | 12.060 |
| | (.082) | (.082) | (5.740) | (7.387) |
| Short-term debt/total assets | -3.748** | -3.605** | 3.035 | -.185 |
| | (.095) | (.094) | (4.618) | (3.871) |
| Long-term debt/total assets | -3.427** | -3.419** | -.269 | -7.182 |
| | (.108) | (.112) | (3.035) | (3.890) |
| Agriculture | 1.940** | 1.685** | | |
| | (.125) | (.126) | | |
| Construction | -.617** | -.408** | | |
| | (.086) | (.084) | | |
| Financial services | -.065 | -.100 | | |
| | (.104) | (.104) | | |
| Retail and wholesale | -.081 | -.064 | | |
| | (.044) | (.044) | | |
| Transport | -.189* | -.079 | | |
| | (.077) | (.082) | | |
| Utilities | .460** | .698** | | |
| | (.106) | (.112) | | |
| Other | .113* | .124* | | |
| | (.054) | (.054) | | |
| Log GDP | .344** | .221** | .070 | .588** |
| | (.022) | (.019) | (.147) | (.210) |
| Log per capita GDP | .185* | -.368** | -.654 | -.205 |
| | (.073) | (.060) | (.351) | (.335) |
| Inflation | -.143** | -.104** | -.066 | -.226 |
| | (.031) | (.023) | (.108) | (.129) |
| Fs | .094* | .495** | | |
| | (.044) | (.043) | | |
| FS2 | 5.864** | 4.161** | 6.518** | 7.959** |
| | (.310) | (.300) | (2.727) | (2.572) |
| Observations | 51,469 | 51,469 | 66 | 66 |
| Adj-$R^2$ | .076 | .080 | .254 | .119 |
| Endogeneity test for FS2 | p-value: .000 | p-value: .000 | p-value: .047 | p-value: .023 |

The dependent variable is the tax burden. Data are for 1996-2000. Regressions (1)-(2) use firm data. Regressions (3)-(4) use county-year mean data. Estimation is by 2SLS with equation (2) estimated by weighted 2SLS setting the weight to the inverse of the number of firms in a country in a year. Equation (4) uses data for firms that are fully domestically owned. All regressions include unreported time fixed effects. Accounting standards, Anti-director rights, Corruption and Insider trading are used as instruments for FS2. The endogeneity test is carried out by including the predicted errors from an OLS estimation of a regression of FS2 on the other right-hand-side variables plus the four instruments in the model in the table. The null hypothesis is exogeneity. Detailed variable definitions and data sources are given in Appendix A. Standard errors are given in parentheses. * and ** indicate significance levels of 5 and 1 percent, respectively.

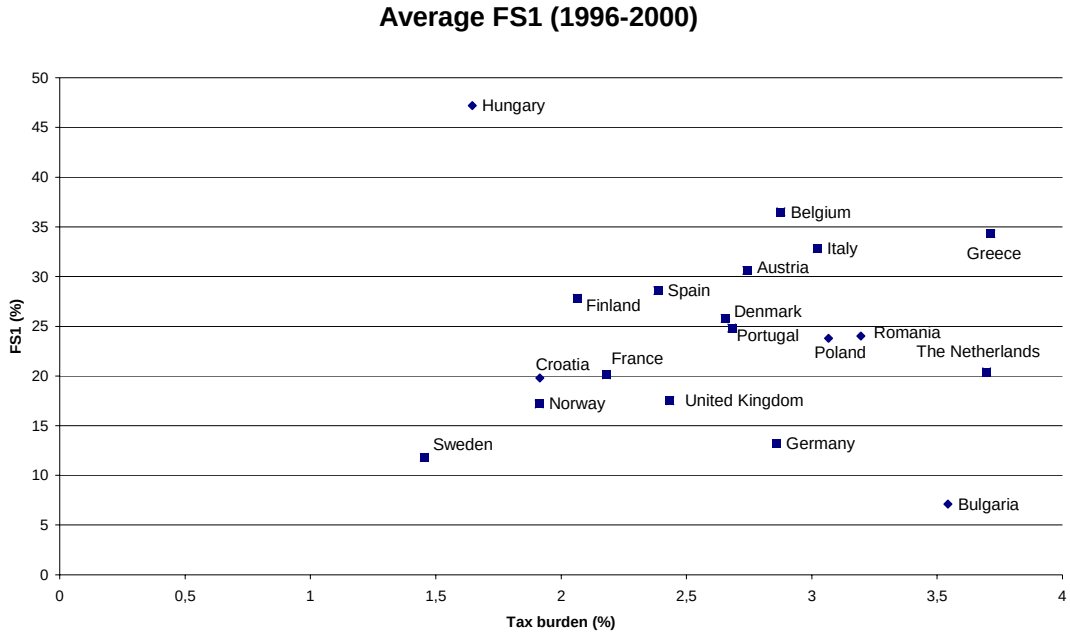
**Table (9). Regressions per sector estimated by 2SLS.**

| Sector | FS2 | Adj-$R^2$ | N | P-value for endogeneity test of FS2 |
|---|---|---|---|---|
| Agriculture | 10.935<br>(6.714) | .188 | 65 | .665 |
| Construction | 3.595*<br>(1.639) | .354 | 65 | .129 |
| Financial services | 3.770<br>(3.348) | .337 | 57 | .011 |
| Manufacturing | 3.204*<br>(1.276) | .267 | 66 | .667 |
| Retail and wholesale | 2.741<br>(1.660) | .065 | 66 | .596 |
| Transport | 1.820<br>(1.651) | .143 | 66 | .838 |
| Utilities | 13.485*<br>(5.069) | .059 | 56 | .324 |
| Other | 6.536<br>(3.592) | .505 | 66 | <.001 |

Regressions are as regression (4) of Table (8) with the sample restricted to data for a single sector. See notes to Table (8).

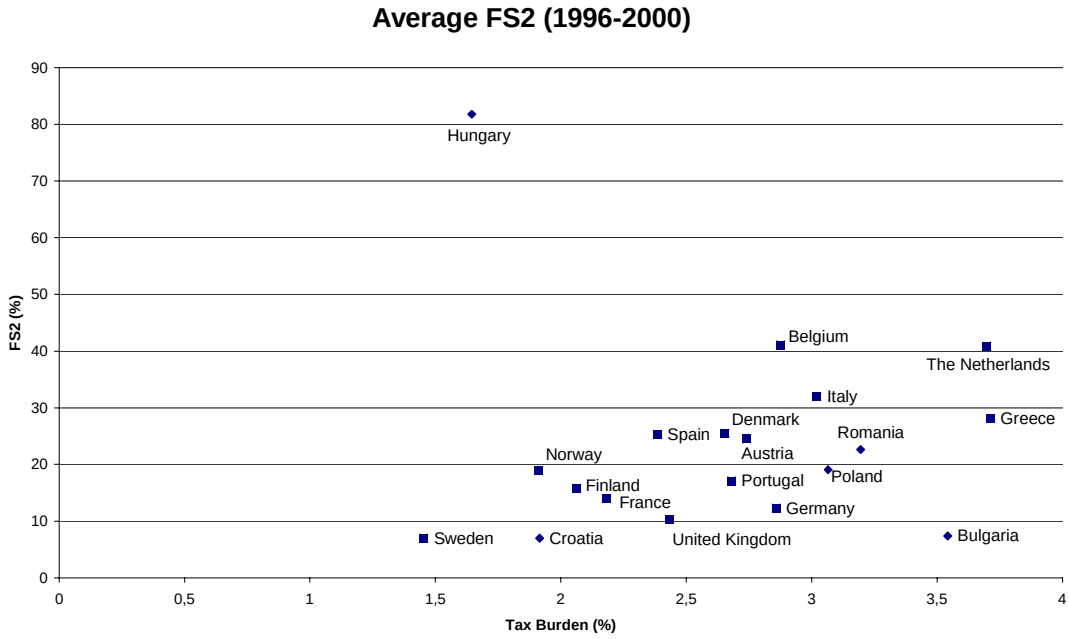
## Figure (1). The tax burden and foreign ownership

## Part A: FS1



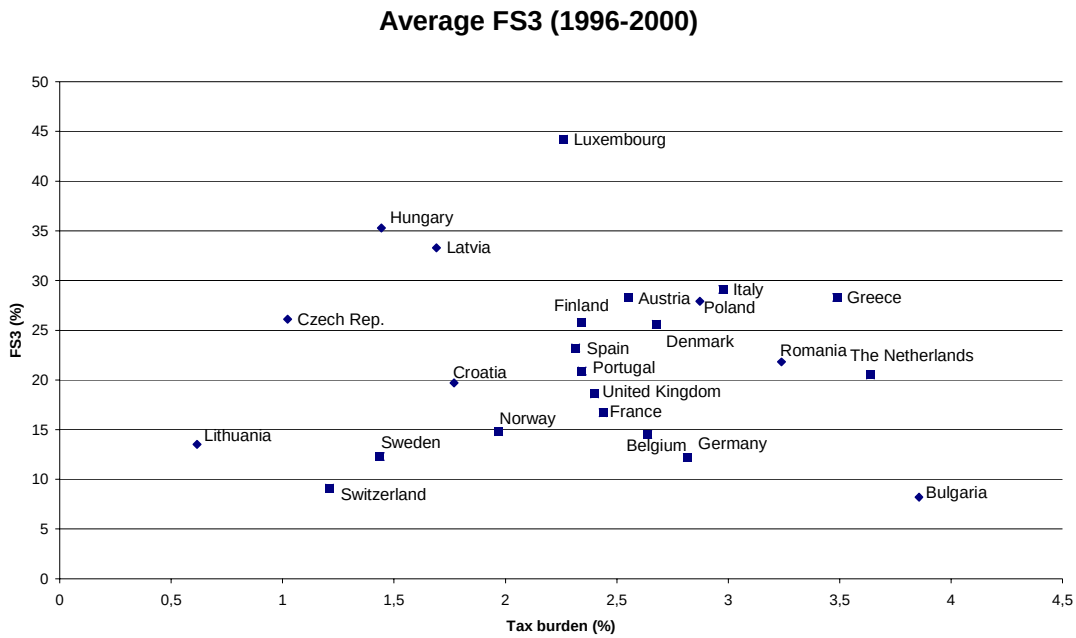

Data for FS1 and the tax burden are averages of yearly averages. FS1 for a given country in a given year is only computed if there are at least 35 observations. In that case the corresponding tax burden is computed as well. Detailed variable definitions and data sources are given in Appendix A.

## Part B: FS2.



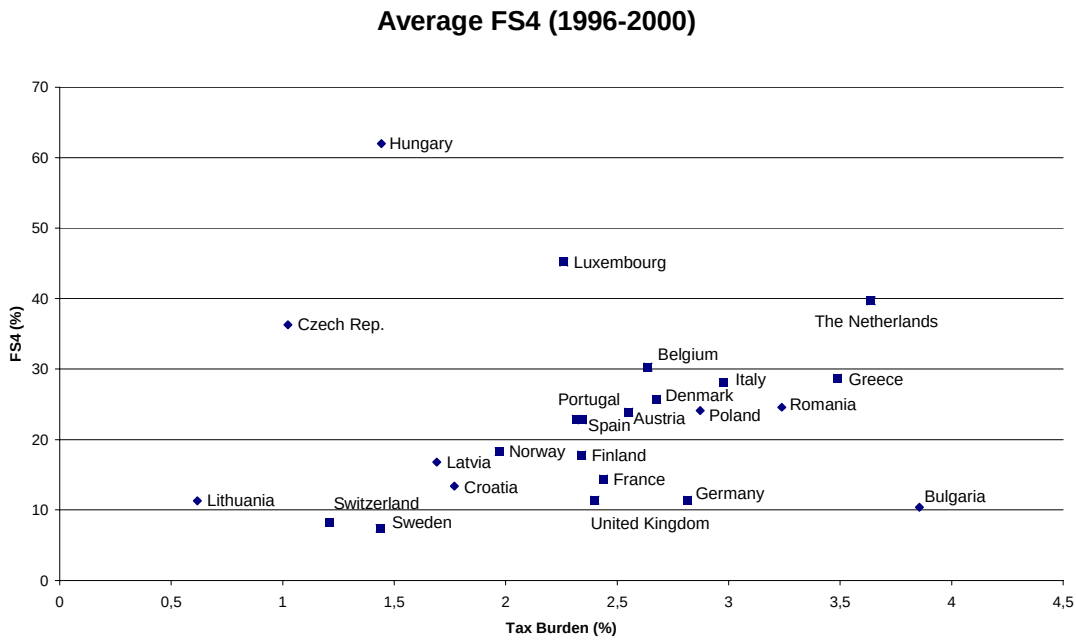

Data for FS2 and the tax burden are averages of yearly averages. FS2 for a given country in a given year is only computed if there are at least 35 observations. In that case the corresponding tax burden is computed as well. Detailed variable definitions and data sources are given in Appendix A.

## 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

### Variable definitions

Ownership variables:

- *fs* is the portion of shares owned by foreign shareholders.
- *FS1* is the aggregate equal-weighted foreign ownership share for firms with full ownership information.
- *FS2* is the aggregate asset-weighted foreign ownership share for firms with full ownership information.
- *fd* is the a foreign ownership dummy equal to one if 50 percent or more of the shares are foreign-owned and equal to zero if more than 50 percent of the shares are domestically owned.
- *FS3* is the aggregate share of foreign firms with *fd* equal to 1 in the total.
- *FS4* is the aggregate share of domestic firms with *fd* equal to 0 in the total.

Other variables:

- *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 a GDP deflator that 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.
- *Accounting standards* is measured as number of 90 potentially important items included in the 1990 annual report of surveyed companies. Produced by International accounting and auditing trends, Center for International Financial Analysis and Research.
- *Anti-director rights* tallies total presence of 6 specific shareholder's rights in company law or commercial code - on a scale from 0 to 6.
- *Corruption* is the monthly assessment of the corruption in government (average of April to October from 1982 to 1995) on a scale from 0 to 10, with higher scores indicating lower levels of corruption.
- *Insider trading* reflects survey responses to the statement "Insider trading is not common in the stock market" on a scale from 0 to 10 with higher scores indicating less insider trading.

**Data sources**

Firm-level data are 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.[23] 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.

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 data on ultimate ownership are relatively scarce.[24] Ownership shares in some instances reflect differential voting rights. 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.

From *Amadeus*, we select all entries with some ownership information. We exclude entries of firms with consolidated statements as these firms may have subsidiaries abroad paying taxes abroad. This effectively excludes most exchange-traded firms. The few remaining firms that are coded as exchange listed are excluded as well as Amadeus does not track the dispersed ownership of exchange-listed firms. Also, entries of firms in primarily public sectors are excluded. This yields 69,981 observations with full ownership information (or ownership information exceeding 99.5 percent of the shares given rounding errors). For a larger set of 136,769 observations, we can determine that the firm is either in majority foreign owned or domestically owned. The data used in the regressions further exclude outliers for the tax burden variable taken to be cases where taxes accrued exceed assets (or the taxes returned are more than assets) or firms with erroneous balance sheet ratios that are negative or that exceed unity. The regression samples are further reduced on account of missing variables to yield 55,236 observations in regression (1) of Tables (5) and (B1) and 109,622 observations in regression (1) of Tables (B2) and (B3). Tables (A1) and (A2) indicate how many observations are from a particular country in a particular year in each of these two samples.

[23] 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.

[24] 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.

It is interesting to compare our foreign ownership estimates with other available evidence. For Belgium, Timmermans (2000, Table 2) reports an estimate by the Bank of Belgium of the value-weighted foreign ownership share of unlisted shares for 1998 of 28.0 percent. Our estimates of the foreign ownership of Belgian non-traded equities are 45.4 percent for *FS2* and 32.2 percent for *FS4*. Eurostat (2001) reports an average foreign share of 12.3 percent of value-added in 1998 for 5 countries: Denmark, Spain, Netherlands, Finland, Sweden and the UK. 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. The Amadeus data for non-traded firms can also be compared with evidence on the foreign ownership of traded equities. Information on the latter is available from the Coordinated Portfolio Investment Survey by the International Monetary Fund (1999). Foreign ownership shares can be obtained by taking the ratio of absolute foreign ownership of traded shares – from the IMF – to the capitalization of the country's stock market.

Estimated foreign ownership shares for non-traded firms and traded firms in 1997 are provided in Table (A3). For Europe as a whole, foreign ownership of traded firms appears to be larger than for non-traded firms. For several countries there are substantial differences in the foreign ownership of non-traded and traded equities. This reflects that several factors – among these the quality of legal institutions – can be expected to have a different impact on the two types of international investment (see, for instance, Huizinga and Denis (2003)). Traded companies tend to be internationally active firms with consolidated statements that also reflect taxes paid by subsidiaries abroad. Therefore, this paper focuses on the taxes paid by and foreign ownership of non-traded rather than traded firms.

The source of the macro data used in this study is *AMECO* (DG Economic and Financial Affairs, European Commission). The *Accounting standards, Anti-director rights* and *Corruption* variables are taken from La Porta et al (1998). The *Insider trading* variable is from the World Competitiveness Report published by the World Economic Forum.

**Table (A1). Number of firms in regressions (1) of Tables (5) and (B1).**

| Country | 1996 | 1997 | 1998 | 1999 | 2000 | Total per country |
|---|---|---|---|---|---|---|
| Austria | 112 | 192 | 258 | 180 | 83 | 825 |
| Belgium | 296 | 401 | 418 | 428 | 496 | 2,039 |
| Bulgaria | 0 | 349 | 312 | 214 | 266 | 1,141 |
| Germany | 980 | 1,127 | 1,457 | 1,321 | 481 | 5,366 |
| Denmark | 288 | 573 | 763 | 990 | 978 | 3,592 |
| Spain | 844 | 1,147 | 1,233 | 1,478 | 922 | 5,624 |
| Finland | 0 | 0 | 0 | 160 | 154 | 314 |
| France | 1,290 | 1,749 | 2,093 | 2,040 | 2,118 | 9,290 |
| United Kingdom | 541 | 699 | 769 | 825 | 684 | 3,518 |
| Greece | 121 | 167 | 202 | 265 | 140 | 895 |
| Hungary | 0 | 0 | 26 | 24 | 39 | 89 |
| Italy | 567 | 966 | 1,159 | 1,782 | 1,529 | 6,003 |
| The Netherlands | 498 | 629 | 762 | 819 | 378 | 3,086 |
| Norway | 903 | 1,096 | 1,267 | 1,619 | 1,766 | 6,651 |
| Poland | 0 | 110 | 90 | 117 | 89 | 406 |
| Portugal | 135 | 153 | 134 | 101 | 98 | 621 |
| Romania | 446 | 274 | 210 | 147 | 1,054 | 2,131 |
| Sweden | 0 | 635 | 711 | 1,052 | 1,247 | 3,645 |
| | | | | | | |
| Europe | 7,021 | 10,267 | 11,864 | 13,562 | 12,522 | 55,236 |
| European Union | 5,672 | 8,438 | 9,959 | 11,441 | 9,308 | 44,818 |
| Western Europe | 6,575 | 9,534 | 11,226 | 13,060 | 11,074 | 51,469 |
| Eastern Europe | 446 | 733 | 638 | 502 | 1,448 | 3,767 |

**Table (A2). Number of firms in regressions (1) of Tables (B2) and (B3).**

| Country | 1996 | 1997 | 1998 | 1999 | 2000 | Total per country |
|---|---|---|---|---|---|---|
| Austria | 144 | 237 | 330 | 234 | 104 | 1,049 |
| Belgium | 1,180 | 1,356 | 1,548 | 1,610 | 1,832 | 7,526 |
| Bulgaria | 0 | 481 | 426 | 362 | 501 | 1,770 |
| Czech Rep. | 13 | 21 | 0 | 1 | 4 | 39 |
| Germany | 1,328 | 1,488 | 1,920 | 1,682 | 609 | 7,027 |
| Denmark | 328 | 613 | 829 | 1,060 | 1,063 | 3,893 |
| Spain | 1,674 | 2,368 | 2,458 | 3,022 | 1,821 | 11,343 |
| Finland | 0 | 0 | 31 | 213 | 188 | 432 |
| France | 6,063 | 7,244 | 8,515 | 7,934 | 7,337 | 37,093 |
| United Kingdom | 713 | 928 | 962 | 979 | 745 | 4,327 |
| Greece | 258 | 347 | 422 | 567 | 563 | 2,157 |
| Hungary | 0 | 0 | 96 | 71 | 124 | 291 |
| Italy | 977 | 1,697 | 2,130 | 3,397 | 2,428 | 10,629 |
| Lithuania | 0 | 0 | 0 | 26 | 26 | 52 |
| Luxembourg | 42 | 41 | 57 | 46 | 0 | 186 |
| Latvia | 0 | 0 | 0 | 33 | 0 | 33 |
| The Netherlands | 531 | 661 | 807 | 865 | 397 | 3,261 |
| Norway | 1,200 | 1,427 | 1,630 | 2,074 | 2,194 | 8,525 |
| Poland | 0 | 164 | 144 | 204 | 146 | 658 |
| Portugal | 368 | 389 | 381 | 222 | 214 | 1,574 |
| Romania | 510 | 679 | 556 | 671 | 1,338 | 3,754 |
| Sweden | 0 | 709 | 795 | 1,151 | 1,348 | 4,003 |
| | | | | | | |
| Europe | 15,329 | 20,850 | 24,037 | 26,424 | 22,982 | 109,622 |
| European Union | 13,606 | 18,078 | 21,185 | 22,982 | 18,649 | 94,500 |
| Western Europe | 14,806 | 19,505 | 22,815 | 25,056 | 20,843 | 103,025 |
| Eastern Europe | 523 | 1,345 | 1,222 | 1,368 | 2,139 | 6,597 |

**Table (A3). Foreign ownership shares of non-traded and traded equities in percent, 1997.**

| Country | Non-traded equities | Traded equities |
|---|---|---|
| Austria | 21.0 | 20.9 |
| Belgium | 37.1 | 13.9 |
| Bulgaria | 2.0 | |
| Czech Rep. | 44.6 | |
| Denmark | 24.1 | 19.2 |
| Finland | | 36.7 |
| France | 12.6 | 27.4 |
| Germany | 12.3 | 19.7 |
| Greece | 29.2 | 13.4 |
| Ireland | | 64.4 |
| Italy | 34.1 | 25.6 |
| Netherlands | 27.1 | 39.8 |
| Norway | 19.3 | 25.2 |
| Poland | 6.5 | 23.2 |
| Portugal | 15.6 | 29.6 |
| Romania | 19.6 | |
| Slovenia | | 5.2 |
| Spain | 31.3 | 26.2 |
| Sweden | 7.5 | 26.6 |
| Switzerland | | 25.0 |
| United Kingdom | 8.9 | 17.8 |
| | | |
| Europe | 20.8 | 25.5 |
| European Union | 21.7 | 27.2 |
| Western Europe | 21.5 | 27.0 |
| Eastern Europe | 18.2 | 14.2 |

Notes. Data for non-traded equities are computed using information from Amadeus and correspond to FS2 in Table (1). The figures for traded equites are the foreign-owned traded securities as a percent of stock market capitalization. Data on the foreign ownership of exchange-listed equities are from the Coordinated Portfolio Investment Survey as published by the IMF. Data on stock market capitalization are from the International Federation of Stock Exchanges. Regional averages weight figures for countries appearing in the table equally. Western Europe is the EU-15 plus Norway and Switzerland where available.

## Appendix B. Basic regression results for aggregate foreign ownership shares FS1, FS2 and FS3

### Table (B1). Basic regression results for FS1.

| | (1) Europe | (2) Western Europe | (3) Europe, WLS | (4) Western Europe, WLS | (5) Means, Europe | (6) Means, Western Europe | (7) Means for domestic firms, Europe | (8) Means for domestic firms, Western Europe |
|---|---|---|---|---|---|---|---|---|
| Log assets | -.248** | -.262** | -.265** | -.306** | .156 | .309 | -.071 | -.057 |
| | (.014) | (.014) | (.020) | (.020) | (.151) | (.177) | (.156) | (.227) |
| Fixed assets/total assets | -2.798** | -2.664** | -3.145** | -2.738** | -5.400 | -6.457 | -7.755** | -7.768* |
| | (.096) | (.099) | (.126) | (.127) | (2.925) | (3.758) | (2.919) | (3.960) |
| Short-term debt/total assets | -3.540** | -3.664** | -3.266** | -3.552** | .885 | 2.005 | -3.452 | -1.417 |
| | (.106) | (.110) | (.137) | (.137) | (2.931) | (3.562) | (2.573) | (2.882) |
| Long-term debt/total assets | -3.290** | -3.420** | -3.456** | -3.434** | -.863 | 1.799 | -1.914 | -.105 |
| | (.102) | (.106) | (.139) | (.136) | (1.999) | (2.432) | (1.910) | (2.510) |
| Agriculture | 1.052** | 1.925** | .255 | 1.735** | | | | |
| | (.204) | (.269) | (.193) | (.319) | | | | |
| Construction | -.380** | -.506** | -.190 | -.295** | | | | |
| | (.069) | (.072) | (.103) | (.102) | | | | |
| Financial services | -.059 | -.053 | -.015 | -.056 | | | | |
| | (.120) | (.120) | (.154) | (.134) | | | | |
| Retail and wholesale | -.112** | -.096* | -.120 | -.058 | | | | |
| | (.041) | (.041) | (.063) | (.063) | | | | |
| Transport | -.205** | -.219** | -.083 | -.076 | | | | |
| | (.074) | (.077) | (.108) | (.105) | | | | |
| Utilities | .173* | .310** | .013 | .560** | | | | |
| | (.075) | (.080) | (.138) | (.169) | | | | |
| Other | .051 | .044 | .068 | .087 | | | | |
| | (.060) | (.061) | (.079) | (.076) | | | | |
| Log GDP | .224** | .293** | .225** | .217** | -.090 | -.162 | .111 | .068 |
| | (.018) | (.022) | (.023) | (.027) | (.101) | (.087) | (.095) | (.128) |
| Log per capita GDP | .049 | .345** | .022 | -.052 | -.337* | -.092 | -.245 | -.037 |
| | (.030) | (.078) | (.038) | (.098) | (.143) | (.203) | (.158) | (.202) |
| Inflation | .007** | .077** | .006** | .018 | .007** | .062 | .006** | -.002 |
| | (.001) | (.027) | (.001) | (.037) | (.001) | (.072) | (.001) | (.085) |
| Fs | .206** | .179** | .614** | .547** | | | | |
| | (.044) | (.045) | (.068) | (.065) | | | | |
| FS1 | 1.436** | 2.423** | -.196 | 2.039** | -1.904* | -.022 | -2.262* | -.789 |
| | (.206) | (.260) | (.263) | (.325) | (.822) | (1.187) | (.938) | (1.413) |
| Observations | 55,236 | 51,469 | 55,236 | 51,469 | 82 | 66 | 82 | 66 |
| Adj-$R^2$ | .071 | .072 | .080 | .078 | .345 | .196 | .337 | .119 |

See notes to Table (5).

**Table (B2). Basic regression results for FS3.**

| | (1) Europe | (2) Western Europe | (3) Europe, WLS | (4) Western Europe, WLS | (5) Means, Europe | (6) Means, Western Europe | (7) Means for domestic firms, Europe | (8) Means for domestic firms, Western Europe |
|---|---|---|---|---|---|---|---|---|
| Log assets | -.249** | -.262** | -.318** | -.301** | -.220 | .173 | -.275 | .002 |
| | (.009) | (.010) | (.022) | (.016) | (.183) | (.204) | (.162) | (.207) |
| Fixed assets/total assets | -3.104** | -2.961** | -3.300** | -2.944** | -.546 | -3.188 | -3.158 | -5.196 |
| | (.068) | (.069) | (.218) | (.111) | (2.937) | (2.211) | (2.032) | (1.665) |
| Short-term debt/total assets | -4.115** | -4.214** | -3.886** | -3.806** | 1.209 | 1.781 | -1.939 | -.332 |
| | (.073) | (.075) | (.300) | (.123) | (3.235) | (2.350) | (2.312) | (1.579) |
| Long-term debt/total assets | -3.496** | -3.654** | -3.250** | -3.509** | -2.849 | .562 | -2.647 | .044 |
| | (.073) | (.076) | (.196) | (.116) | (1.881) | (1.930) | (1.682) | (2.176) |
| Agriculture | .555** | 1.182** | .939 | 1.220** | | | | |
| | (.143) | (.182) | (.674) | (.262) | | | | |
| Construction | -.553** | -.664** | -.311* | -.464** | | | | |
| | (.042) | (.043) | (.132) | (.075) | | | | |
| Financial services | .161 | .143 | .402** | .172 | | | | |
| | (.106) | (.106) | (.141) | (.123) | | | | |
| Retail and wholesale | -.077** | -.066* | .085 | -.037 | | | | |
| | (.027) | (.027) | (.073) | (.054) | | | | |
| Transport | -.131** | -.130* | .155 | .022 | | | | |
| | (.049) | (.051) | (.112) | (.087) | | | | |
| Utilities | .401** | .533** | .344** | .479** | | | | |
| | (.066) | (.070) | (.124) | (.095) | | | | |
| Other | -.042 | -.054 | .234** | .154* | | | | |
| | (.040) | (.040) | (.088) | (.077) | | | | |
| Log GDP | .143** | .190** | .329** | .304** | .207* | .057 | .251** | .170 |
| | (.012) | (.015) | (.053) | (.019) | (.103) | (.102) | (.085) | (.107) |
| Log per capita GDP | .108** | .304** | .165** | .128* | .183 | .097 | .157 | .308 |
| | (.024) | (.055) | (.040) | (.065) | (.153) | (.181) | (.129) | (.179) |
| Inflation | .008** | .094** | .010** | .075** | .010** | .136* | .010** | .090 |
| | (.001) | (.020) | (.001) | (.026) | (.001) | (.062) | (.001) | (.066) |
| Fd | .170** | .149** | .549** | .555** | | | | |
| | (.030) | (.031) | (.122) | (.061) | | | | |
| FS3 | 1.605** | 2.384** | .493 | 1.848** | -.226 | .606 | -1.018 | .011 |
| | (.177) | (.213) | (.745) | (.332) | (1.006) | (1.032) | (.953) | (1.190) |
| Observations | 109,622 | 103,025 | 109,622 | 103,025 | 94 | 71 | 93 | 71 |
| Adj-$R^2$ | .083 | .083 | .095 | .087 | .372 | .174 | .391 | .233 |

See notes to Table (5).

**Table (B3). Basic regression results for FS4.**

| | (1) Europe | (2) Western Europe | (3) Europe, WLS | (4) Western Europe, WLS | (5) Means, Europe | (6) Means, Western Europe | (7) Means for domestic firms, Europe | (8) Means for domestic firms, Western Europe |
|---|---|---|---|---|---|---|---|---|
| Log assets | -.251** | -.262** | -.316** | -.288** | -.239 | .149 | -.349* | -.077 |
| | (.009) | (.010) | (.022) | (.016) | (.167) | (.126) | (.158) | (.141) |
| Fixed assets/total assets | -3.078** | -2.927** | -3.298** | -2.913** | -.451 | .734 | -2.763 | -.836 |
| | (.068) | (.069) | (.215) | (.111) | (2.976) | (2.207) | (1.931) | (1.766) |
| Short-term debt/total assets | -4.155** | -4.252** | -3.885** | -3.847** | 1.172 | 2.043 | -2.126 | -1.372 |
| | (.073) | (.046) | (.298) | (.123) | (3.194) | (2.050) | (2.169) | (1.806) |
| Long-term debt/total assets | -3.480** | -3.639** | -3.248** | -3.483** | -2.737 | -.439 | -2.158 | -1.889 |
| | (.073) | (.076) | (.196) | (.116) | (1.935) | (1.748) | (1.716) | (2.091) |
| Agriculture | .573** | 1.196** | .930 | 1.167** | | | | |
| | (.143) | (.181) | (.681) | (.259) | | | | |
| Construction | -.574** | -.710** | -.322* | -.540** | | | | |
| | (.042) | (.042) | (.127) | (.076) | | | | |
| Financial services | .162 | .139 | .395** | .145 | | | | |
| | (.106) | (.106) | (.140) | (.123) | | | | |
| Retail and wholesale | -.068* | -.060* | .084 | -.046 | | | | |
| | (.027) | (.027) | (.072) | (.054) | | | | |
| Transport | -.121* | -.125* | .152 | .018 | | | | |
| | (.049) | (.051) | (.110) | (.087) | | | | |
| Utilities | .460** | .598** | .345** | .561** | | | | |
| | (.066) | (.070) | (.124) | (.095) | | | | |
| Other | -.020 | -.037 | .234** | .188* | | | | |
| | (.040) | (0.040) | (.086) | (.075) | | | | |
| Log GDP | .223** | .255** | .326** | .348** | .220* | .198* | .311** | .399** |
| | (.013) | (.015) | (.051) | (.023) | (.092) | (.090) | (.081) | (.092) |
| Log per capita GDP | .061** | .211** | .168** | .010 | .188 | -.081 | .167 | .159 |
| | (.023) | (.053) | (.043) | (.065) | (.147) | (.196) | (.126) | (.197) |
| Inflation | .009** | .035 | .010** | .021 | .010** | .074 | .010** | -.003 |
| | (.001) | (.021) | (.001) | (.027) | (.001) | (.063) | (.001) | (.064) |
| Fd | .161** | .144** | .556** | .556** | | | | |
| | (.030) | (.031) | (.093) | (.062) | | | | |
| FS4 | 2.668** | 3.652** | .326 | 2.967** | .033 | 3.487** | .105 | 4.084** |
| | (.156) | (.186) | (.521) | (.282) | (.902) | (.872) | (.955) | (.969) |
| Observations | 109,622 | 103,025 | 109,622 | 103,025 | 94 | 71 | 93 | 71 |
| Adj-$R^2$ | .085 | .086 | .095 | .091 | .372 | .405 | .385 | .450 |

See notes to Table (5).

## 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). Thus 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 *FS2* variable 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. The same-firm *FS2*, reported in Table (C1), again is only constructed for a given country and year if it can be based on at least 35 firms.

Same-firm *FS2* is available for only 10 countries. There are two major differences with the measures reported in the main text. First, the same-firm *FS2* by and large is lower, which suggests 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 1.7 percent between 1996 and 2000 in Europe as a whole. As a check, we carried out a set of regressions such as in Table (5) for the sample of firms that existed the entire 1996-2000 period. The same-firm *FS2* measure turns out to be statistically insignificant in all 8 regressions. Thus, tax policy appears to reflect the foreign ownership of all firms rather than those that existed during the entire 1996-2000 period.

**Table (C1). Foreign ownership variable FS2 based on same firms in different years**

| Countries | 2000 | | Average 1996-2000 | | Change in yearly average between 1996 and 2000 |
|---|---|---|---|---|---|
| | # firms | FS2 | # firms | FS2 | FS2 |
| Austria | 7 | n.a. | 7 | n.a. | n.a. |
| Belgium | 98 | 33.7 | 98 | 34.6 | -1.9 |
| Bulgaria | 50 | 1.2 | 50 | 0.8 | 0.4 |
| Czech Rep. | 29 | n.a. | 29 | n.a. | n.a. |
| Denmark | 78 | 20 | 78 | 18.8 | 7.9 |
| France | 231 | 9.9 | 231 | 14.7 | -5.7 |
| Germany | 74 | 8.3 | 74 | 5.3 | 4.1 |
| Greece | 30 | n.a. | 30 | n.a. | n.a. |
| Italy | 69 | 17.0 | 69 | 17.3 | -2.9 |
| Netherlands | 47 | 25.9 | 47 | 16.6 | -2.5 |
| Norway | 479 | 15.8 | 479 | 17.1 | -2.4 |
| Poland | 1 | n.a. | 1 | n.a. | n.a. |
| Portugal | 1 | n.a. | 1 | n.a. | n.a. |
| Romania | 9 | n.a. | 9 | n.a. | n.a. |
| Spain | 93 | 11.2 | 93 | 10.9 | -3.9 |
| Switzerland | 1 | n.a. | 1 | n.a. | n.a. |
| United Kingdom | 79 | 9.1 | 79 | 9.4 | 1.0 |
| | | | | | |
| Europe | 1,376 | 15.1 | 1,376 | 15.9 | -1.7 |
| European Union | 807 | 15.5 | 807 | 16.1 | -1.5 |
| Western Europe | 1,287 | 15.6 | 1,287 | 16.5 | -1.9 |
| Eastern Europe | 89 | 1.2 | 89 | 0.8 | 0.5 |

FS2 is the asset-weighted foreign ownership in percent. This foreign ownership measure is based on firms for which domestic and foreign ownership are fully known and here it is computed for those firms that appear in each of the years 1996-2000 if there are at least 35 of these. The changes between 1996 and 2000 are in absolute levels. Western Europe is the EU-15 plus Norway and Switzerland where available. See Appendix A for information on the data source.