IFN Working Paper No. 942, 2012

The Effect of Political and Economic Factors on Corporate Tax Rates

Åsa Hansson, Susan Porter and Susan Perry Williams

Research Institute of Industrial Economics
P.O. Box 55665
SE-102 15 Stockholm, Sweden
info@ifn.se
www.ifn.se

The Effect of Political and Economic Factors on Corporate Tax Rates

Åsa Hansson
IFN and Lund University[∫]

Susan Porter
McIntire School of Commerce

Susan Perry Williams
McIntire School of Commerce

October 21, 2012

[∫] Corresponding author: Åsa Hansson, Research Institute of Industrial Economics (IFN)), P.O. Box 55665, SE-102 15 Stockholm, Sweden, and Department of Economics, Lund University, P.O. Box 7082, SE-220 07 Lund, Sweden, e-mail: asa.hansson@nek.lu.se

Abstract: Economists and political scientists have long been interested in factors that affect the statutory tax rate on businesses set by federal governments. In this study, we examine the impact of political and economic factors on several measures of tax rates and tax incentives offered across 19 developed countries for the years 1979 through 2005. Our results indicate that while economic conditions such as openness, strategic interaction, budget constraints, economic downturns and an aging population all influence the rate of tax set by governments, the political structure of the federal government has a significant impact in the form of economic stimulus given. Importantly, our results suggest that different economic and political structures affect the level of incentives offered beyond those factors that affect the level of tax rates. These results are relevant to the current tax debate facing many governments as they consider implementing new policies to attract foreign direct investment and retain and grow domestic business. The impact of the political structure on the ability to enact legislation is significant after controlling for economic factors indicating that as the marketplace continues to become more international, it will become increasingly more important for governments to acknowledge and find opportunities to work within their systems to enact legislation that enables their business community to compete internationally.

JEL classification: H25; H73; D72
Keywords: corporate tax rates, tax competition, political structure

Introduction

Investment decisions' sensitivity to tax rates is well known among academics and policy makers. As a consequence countries are lowering their tax rates in order to retain and attract investments (see e.g., Devereux et al., 2008, Wilson, 1999, Wilson & Wildasin, 2004, Wildasin 1988). This so called tax competition has gone on for some time with no indication of any weakening. For our sample of 19 developed OECD countries the corporate tax rates have declined from an average of 48.1 percent in 1979 to an average of 31.4 percent in 2005, and continue to decrease, down to 27.8 percent in 2011 (OECD, 2011). The variation between countries is substantial, however, and several countries have rates that are much higher than others. In France, Belgium, and the US, for instance, the combined corporate tax rate in 2011 was 34.4, 34, and 39.1 percent, respectively, while the same tax rate was 12.5 and 25 percent in Ireland and the Netherlands, respectively. What explains these differences?

While there are a number of studies that examine the determinants that influence corporate tax rates, these studies tend to focus primarily on either economic or political factors but seldom both. This may be natural as economists tend to be concerned with economic determinants, while political scientists are mainly concerned about political determinants. Economic factors found to be important include market size and openness (i.e., the international flow of capital). For instance, countries with larger market size and more closed economies are able to impose higher tax rates than smaller open countries (Hines & Summers, 2009). Studies focusing on political factors, on the other hand, find the political process and the institutional set-up to be important determinants. In this study, we provide a more complete picture of corporate tax determinants. We include variables that have been examined in prior studies and expand them to include additional political and economic variables in order to determine their relative importance. By doing this we provide information about the determinants that explain the development of corporate tax rates and insight into important factors to consider when developing a competitive tax system.

More specifically, we use a sample of 19 developed countries across the world over the period 1979 to 2005 to study factors that determine corporate tax rates. Because different measures of corporate tax rates provide unique information, we include effective average, effective marginal and statutory tax rates in our analysis. Using the difference between the

statutory tax rate and the marginal tax rate as a measure of tax incentives, we examine the political and economic factors that affect the level of incentives offered. Examining the impact of incentives allows us to get a better picture of how economic and political factors affect a country's ability to retain or attract businesses through tax legislation. It is interesting to note that the factors that affect incentives are not necessarily the same as those that affect the statutory tax rate suggesting that countries that are more constrained in setting their statutory rate, use incentives as a means to retain the business activities in their countries.

The next section reviews the literature focusing on economic and political determinants of corporate tax rates followed by our research design. The results are then presented and discussed.

Literature Review

Tax competition has been an area of growing interest in economic research.[1] There is ample empirical support for its existence (see e.g., Wilson & Wildasin, 2004). This tax competition now takes place though many channels – for instance – through tax rate cuts, and tax base changes for special tax incentives such as R&D and small business activity. There is also empirical evidence that this competition has spread to government spending considerations. Government expenditures are strategically allocated to retain and enhance attractive production factors (see e.g., Kammas, 2011; Bayindir-Upmann, 1998; Keen & Marchand, 1997; and Fuest, 1995). The impact of tax competition is widely studied and the noted effects include increased efficiency of public funds, a decline in public services and a decrease in taxes levied on mobile factors (see e.g., Talpos & Crasneac, 2010; Gomes & Pouget, 2008; and Hansson & Olofsdotter, 2008).

Figure 1 shows the development of corporate tax rates in 19 OECD countries. Three different tax rates are shown. The top line reports the development of the top statutory corporate tax rates. These rates have declined the most, from an average of 48 percent in 1979 to an average of 31 percent in 2005. The second line reports the development of the effective average tax rates. These rates take tax base adjustments into account and are a better measure of actual

[1] For a more detailed discussion of the definition, types and implication of tax competition, see Talpos & Crasneac (2010).

tax payments paid. These tax rates have also experienced a substantial decline of 10 percentage points, from an average of 34 percent in 1979 to 24 percent in 2005. The last line reports the effective marginal tax rates that affect hypothetical investment projects on the margin. These tax rates have also experienced a declining trend but less so than the other tax rates.

Even though tax competition now takes place through many channels, it has been found to have the most significant impact on statutory tax rates (e.g., Oversch & Rincke, 2011 and Devereux et al., 2008). This is not surprising as statutory tax rates are more visible than changes in tax bases or in spending programs and consequently cuts in statutory tax rates send stronger signals to potential investors than corresponding reductions in tax bases or increases in spending programs (Ganghof, 2000). In addition, the statutory tax rate is the single most important determinant for effective tax burdens – the relevant tax measure for firms (European Commission, 2001). Moreover, there is now mounting evidence that multinational firms allocate their profits according to differences in statutory rates (Huizinga & Laeven, 2008).

Prior research analyzing factors impacting corporate tax rates can broadly be divided into studies of economic and political determinants. Below we review some of the key and recent findings from these studies.

Economic Determinants

Economic theory suggests that there is a positive correlation between country size and tax rates. The rationale behind this theory is that smaller countries lose more in per capita terms from capital outflow than larger countries and are, hence, forced to lower their tax rates. Smaller countries can even benefit from tax competition as there is an advantage of smallness in tax competition (Wilson, 1999). Several studies have found support for this hypothesis (e.g., Lorenz, 2007; Winner, 2005; and Genschel et al., 2011). Hines & Summers (2009) examine the relationship of tax rates and country size for 30 countries over the period 1972-2003. They find that larger countries rely more heavily on income taxes (a mobile tax base) than do small countries that are forced to cut rates on the more mobile tax bases. In addition, they argue that larger countries have stronger incentives to tax the extra rent earned on international transactions because they can do so without losing the transaction. However, they also state that the "rapid pace of globalization implies that all countries are becoming small economies" and therefore susceptible to tax competition. Recent studies of more developed countries, have had mixed

results regarding this relationship, however.[1] Plümper et al. (2009) find a negative correlation between size (measured using population) and tax rates using a sample of 23 OECD countries. Devereau et al. (2008) do not find significant results for size (measured as gross domestic product scaled by U.S. gross domestic product) for statutory rates or undiscounted effective tax rates for their sample of OECD countries. In addition, the sign is negative for their test of undiscounted effective rates supporting Hines & Summers (2009) premise that all countries are becoming small economies.

Another tax rate determinant that has received considerable attention in the research field is integration or openness. According to traditional tax competition theories more integrated countries are more susceptible to tax competition and hence more likely to face a downward pressure in corporate tax rates. As already mentioned, there is mounting evidence that statutory corporate tax rates have declined due to tax competition (e.g., Devereux et al., 2002; Dreher, 2006; and Winner, 2005). However, there is much less evidence of a negative relationship between openness and *effective* corporate tax rates suggesting that tax rate declines have been offset by tax base increases (see e.g., Slemrod, 2004). The theoretical link between integration and tax rates may be more complicated than the traditional tax competition predicts. The New Economic Geography literature (see e.g., Baldwin et al., 2003 and Baldwin & Krugman, 2004) predicts a positive relationship between integration and tax rates. The argument is that agglomeration (clustered) economies create extra rent that can be taxed. Countries located in the core and benefiting from the agglomeration economies can, hence, tax these locational benefits and employ higher tax rates than countries located in the periphery lacking these agglomeration economies.

The empirical results on the relationship between openness and corporate tax rates are mixed. Some empirical evidence suggests that economic integration creates core-periphery economies that give raise to location specific benefits that can be taxed at higher rates (Lorenz, 2007; Krogstrup, 2004; and Hansson & Olofsdotter, 2012). However, a number of studies find a negative correlation between openness and corporate tax rates. For example, Rodrik (1997), Swank (2002), Swank & Steinmo (2002), Slemrod (2004), Winner (2005), Ghinamo et al. (2007), and Schwarz (2007) all find that increased openness leads to lower corporate tax rates. More recently, several studies have come to question this result. Overesch & Rincke (2011), for example, examine the effect of economic and financial openness in 32 European countries over

the years 1983 through 2006 and find no correlation between the decrease in tax rates and an increase in economic and financial openness. The same result is obtained by Garrett & Mitchell (2001) and Heinemann et al. (2010).

One explanation for this seemingly contradictory result can be that researchers more recently have turned to models that consider strategic tax policy interdependence between countries. Governments are assumed to act strategically and take tax rates in other jurisdictions into account when setting their own tax rates. These models pick up the effect of increased openness and integration stemming from strategic interaction. Empirical studies find strong support for this strategic interaction among governments. Kammas (2011,) for example, finds that within OECD countries governments react to tax rate changes in neighboring countries. This is consistent with results from Heinemann et al. (2010), Deveureux et al. (2008), Cassette & Paty (2008), Redoano (2007), Altshuler & Goodspeed (2002), and Besley et al.(2001).

Several studies find that the top individual tax rate is a significant factor in explaining statutory tax rates (Slemrod, 2004 and Overesch & Rinke, 2011). The backstop theory suggests that a gap between the personal and corporate tax rate can encourage taxpayers to structure their business to enable the income to be subject to the lower tax rates (Slemrod, 2004). For example, if the corporate tax rate is significantly lower than the individual tax rate, small businesses may choose to incorporate and can choose to retain more of their earnings in the business to avoid the higher individual tax rate. Conversely, if the individual tax rate is lower than the corporate tax rate, taxpayers may choose to have their business income subject to individual tax rates by structuring their business as a sole proprietorship or a flow-through entity. As a result, many jurisdictions consider the individual tax rate when setting the corporate tax rates.

Political Determinants

Political scientists have shown an interest in tax rate determinants and naturally focused on political variables but early studies tended to consider limited determinants, such as party color and election (e.g., Heinemann et al., 2010; Cassette & Paty, 2008; Redoano, 2007). Political costs can be categorized as either transaction costs or constituency costs. Transaction costs arise from decentralization of the legislative process while constituency costs are the result of ideological opposition to policy changes that benefit capital (Basinger & Hallerberg, 2004). The operationalization of these costs in the literature has varied significantly across studies.

Transaction Costs

To date, few controls for transactions costs have been included in studies examining tax rates. Basinger & Hallerberg (2004) include the presence of multiple veto players in the government as a proxy for transaction costs when examining tax rates. However, transaction costs include many aspects of government structure that may not be correlated with the ability to veto. Buchanan (2008) argues that the rules of government have been neglected in the political literature as the basic structure is not likely to change. He notes, however, that no one would "challenge the proposition that the results or outcomes of political processes depend on the institutional-constitutional rules that constrain the behavior of the individual actors, whether as principals or agents" (Buchanan (2008), p. 172). Furthermore, Buchanan (2008) outlines the elements of political structure by identifying five structures of governments that influence the process of changing policy and ultimately, may influence outcomes. First, separation of powers, such as that found in the United States, reflects divided rather than unitary authority. When there is separation of power, the division of authority mitigates excesses and makes it more difficult to take positions that benefit the inclusive collectivity. However, the divided power can result in more special interest spending. When power is more concentrated (majoritarian democracy) as found in European countries, more welfare states results. The second constraint is federalism, which results from political power being dispersed vertically through subordinated units such as in the United States. When the European Union (EU) was formed, the members had their power dispersed through the EU and the separate nation-states in Europe. The impact of federalism on the central government depends upon the level of decision-making that is relegated to the subordinated units. Third, legislative supremacy refers to the fact that political coalitions form when a simple majority is used, leading to voting for the benefits of constituents instead of society as a whole. The last two elements represent limits placed on legislators by the constitution and the legal system. In Buchanan's opinion, the majority of these limits protect against discrimination based on physical attributes such as race or sex. However, they do not usually provide protection against rules that favor economic characteristics such as wealth and employment status.

Several papers have included a transaction cost as measured by the ability of different levels of government to veto proposed legislation. Basinger & Hallerberg (2004) expand this measure by considering the ideological positions of those who are in a position to veto

legislation. Ashworth & Heyndels (2002) use OECD data between 1965 to 1995 to show that countries where political power is more dispersed change tax structure less often than countries where the political power is less fractionalized, suggesting that broad coalitions are less flexible and hence, adjust more slowly to exogenous shocks. They argue that government fractionalization leads to political indecisiveness. In an earlier paper (Ashworth & Heyndels, 2001), argued that political fragmentation affects national tax structure and show empirically that countries with more political fragmentation tend to be more persistent and show less convergence toward other countries' tax rates. Gerard & Ruiz (2009), include several proxies for transactions costs. They find that the following are all significant factors affecting tax rates: 1. whether the political system is parliamentary or presidential, 2. if it is a federal state and 3. whether voting in the House is a margin or a majority (which limits business lobbying). However, they neither consider constitution constraints nor whether bicameralism exists - two aspects of transaction costs that are highlighted by Buchanan (2008). We expand upon this research by including two composite measures that together consider all five elements of transaction costs.

Constituency costs

Constituency costs refer to the potential opposition to changes in tax rates by the different branches of the legislative process. Basinger & Hallerberg, (2004) consider the ideological positions of political parties when measuring constituency costs. For taxes on capital, right-leaning parties count capital owners as strong supporters suggesting that right-leaning parties will try to reduce tax rates on capital. Conversely, left-leaning parties are generally more oriented and supported by labor and are generally considered against reduced tax rates for capital. Gerard & Ruiz (2009) find a significant relationship between statutory tax rates and their governance proxy, voice and accountability, which measures the perception of how much the country's citizens participate in selecting the government, as well as their freedom of expression, association and press. They also find that whether the executive is nationalist or religious and whether the political system is right, central or left is significantly related to statutory tax rates.

Among the more recent studies that include constituency costs, Heinemann et al. (2010), examine the determinants of tax-cutting reforms. To determine tax–cut reforms they include measures of economic integration, dummies for time periods around elections, and dummy variables for whether the government was right, center or left on a sample of 32 European

countries over the period 1980 - 2007. They find that the level of country-specific tax rate, composite neighbors' rates, openness, election period and governments to the right are significant determinants of tax rate cuts.

Plümper et al. (2009), examine the relationship between effective tax rates and fairness norms and countries' budget constraints. They find that the level of average effective tax rates on capital, labor and the ratio of labor/capital is related to the budget constraints (debt/GDP) and fairness as measured by pre-tax income inequality and redistribution and survey data measuring the belief that the government is responsible to reduce income differences between high and low income constituents. The authors included openness, GDP growth, unemployment, capital mobility and GDP as economic controls and cabinet portfolios (left and Christian) for political controls in their spatial lag model.

Research Design

Our study differs from previous in several dimensions. First, unlike many previous studies we incorporate both economic and political variables and control for strategic interaction. In addition, our new proxies for political costs consider aspects of the political process that have not been considered in past studies of tax structures. Third, we use a longer time period of larger stable economies to gain insights into the factors that make it more difficult for some countries to respond to the pressure to change its rate structure. Fourth, we examine the level of statutory as well as effective average and effective marginal tax rates giving us a more comprehensive picture of factors influencing the tax rates enacted. As effective rates are affected by base changes as well as rate changes, this allows us to examine whether political and economic factors affect tax bases differently than the statutory tax rates. Finally, we examine the level of incentives separately, to see what factors affect the level of incentives offered by the countries.

Tax Rates

Tax measures, especially on capital, vary widely and it is of great importance to identify appropriate tax variables in empirical analysis. Different tax rates are important for different decisions and there is not a priori right measure of corporate tax rate to use. We employ three

different measures. Our first and preferred tax measure is the top statutory tax rates. These have the advantage of being both straightforward and easily accessible. Statutory tax rates are the most accessible tax rates both to researchers and to potential investors and are, as already mentioned, the rates investors most often act upon and the tax rates most susceptible to tax competition. However, statutory rates are problematic since they disregard the size of the tax base and neglect tax incentives such as depreciation rules and other government tax compensations. Effective average tax rates take this into account by calculating the net present value of tax payments as a share of the net present value of pre-tax income using tax rules. Consequently, this measure takes into account tax base changes. These rates are forward looking and not based on actual tax payments. Finally, we include effective marginal rates as well. Marginal rates are the appropriate tax measure for all marginal decisions, e.g., about how much to invest, and of great importance for many economic decisions. To measure these rates, a hypothetical marginal investment project is assumed for which the impact of tax on the cost of capital can be computed. We use the effective average and marginal corporate tax rates constructed and developed by Devereux et al. (2002).

More specifically, we model tax rates as:

$$T_{it} = \beta X_{it-1} + \gamma Y_{it-1} + \delta \bar{T}_{jt} + \varepsilon_{it} \qquad (1)$$

where T_{it} is various measures of tax rates in country i at time t. The vector X_{it-1} captures our economic variables the previous year and includes GDP, openness, top marginal tax rate on personal income, debt as a fraction of GDP, fraction of elderly in the population, the standardized unemployment rate, government size, interest rate and an indicator variable for countries that are members of the EU. Gross Domestic Product (GDP) in current purchasing power and billions of US dollars is our size measure and assumed to be positively correlated with the tax rate. This relation is consistent with both the traditional tax competition literature and New Economic Geography literature as larger countries tend to enjoy agglomeration economies to a larger degree than small. Openness is total trade as a fraction of GDP and is predicted to be negatively correlated with the tax rate. However, this relationship could be the opposite if trade

leads to agglomeration effects and the ability to tax this resulting extra rent. We include the top marginal tax rate on personal income to control for the "backstop" theory arguing that corporate tax rates and personal income tax rates have to be in line in order to avoid providing tax benefits (costs) from structuring as a corporation due to higher individual (corporate) tax rates (Slemrod, 2004). Hence, we expect the top marginal tax rate to be positively correlated with corporate tax rates.

We also include several variables to control for budget constraints that governments must consider when setting their tax rates. The fraction of elderly reflects the demographic composition and is important as a large elderly population may put extra strain on the government and the need for extra tax revenues (Plümper et al., 2009). Government outlays are total government expenditures as a fraction of GDP and measure the degree of public consumption (Ghinamo et al., 2007; Slemrod, 2004; and Heinemann et al., 2010). We expect corporate tax rates to be higher in countries with larger governments as the government needs additional revenues to fund the infrastructure. Debt over GDP measures the public debt and reflects the rigidity of the government budget, which would suggest a positive correlation with tax rates (Plümper et al., 2009 and Winner, 2005). Conversely, debt could be seen as a business cycle variable indicating the strength of the economy, resulting in a negative correlation as a large debt (weak economy) calls for lower tax rates in order to boost the economy. We also include unemployment and the long-term interest rate on government bonds as additional indicators of the business cycle climate and predict a negative correlation with level of tax rates as high unemployment and interest rates would indicate a weak business climate, once again, suggesting lower tax rates in an effort to strengthen the economy. Finally, we include an EU indicator variable for countries that are members of the European Union to control for any restrictions placed on these economies by the EU.

The vector Y_{it-1} captures our political variables, which are all lagged one year, consistent with prior research. Our measures of political transaction costs include institutional constraint and political structure. Our measures of political constituency costs are government party and legislative fractionalization. The government party variable measures whether the sitting government is left, center or right wing. It ranks from one to five, where one reflects having a right-wing government and five a left-wing party. The higher the value the more extreme the government is. We expect more left-wing oriented governments to have higher corporate tax

rates, though the relationship could be the opposite if left-wing parties are concerned that higher corporate tax rates lower investments and cause unemployment.

Legislative fractionalization of the party system is an index measured according to a method developed by Rae (1968). [2] The higher the value the more fractionalized the legislative power. We expect this variable to have a positive impact on tax rates as more fractionalized governments possess less power to implement tax reforms (see e.g., Ashworth & Heyndels, 2001, 2002).

Institutional constraint is an additive index that measures the institutional constraints put on the government (compiled by Schmidt (1996)). It ranks from 0 to 5 where a value of 0 indicates a large maneuvering room for the central government and the higher values indicate the most constrained central government. This composite variable proxies for the constitutional and rule of law restrictions put on legislators which are components of political transaction costs. Again, we expect a positive relationship between institutional constraint and tax rates.

The second political transaction cost, structure, reflects the constitutional structure of the country and comprises a number of different components including federalism and bicameralism and whether the government is presidential or parliamentary. The components consider how many voices are considered when laws are changed. For example, a bicameral legislature generally requires a concurrent majority to pass legislation measures. This composite variable proxies for separation of powers, federalism and legislative supremacy components of political transaction costs. Buchanan (2008) stated that separation of power can also lead to an increase in special interest spending. To the extent that effective tax rates are affected by tax shelters such as depreciation, tax credits and industry specific adjustments, this variable is expected to have a significant impact on the effective tax rates as well as statutory tax rates.

If tax rates in one country depend on tax rates in other countries, we need to control for this interdependence as well. Prior research has suggested that openness, globalization and competitive pressures affect a country's tax rate (Davies & Voget, 2008; Redoano, 2007; Devereux et al. (2008); Ruiz & Gérard, 2008; Cassette & Paty, 2008; Crabbé & Vandenbussche,

---

[2] Specifically, legislative fractionalization, rea_leg, is measured as $rae\_leg = 1 - \sum_{i=1}^{m} s_i^2$, where s_i is share of seats for party *i* and *m* is the number of parties. Hence, if only one party has legislative power rae_leg is equal to zero.

2009; Gomes & Pouget, 2008). Devereux et al. (2008), for example, find that governments are responsive to changes in other countries' tax rates.

The last term before the error term in equation (1) represents this strategic interaction and how other countries' tax rates impact the home country tax rate. Ideally, we would like to include a separate variable for each country's tax rate but this leads to an over-parameterization problem (LeSage & Pace, 2009). Instead, we use a spatial lag model that uses a weighted average of the tax rates of countries with a strategic dependence. This approach has been used previously in many studies including Devereux et al. (2006, 2008) and Brueckner (2003). By construction, $\bar{T}_{jt}$ is the weighted average of strategic interaction multiplied by the respective tax rates in the foreign countries. We thus have:

$$\bar{T}_{jt} = \sum_{j \neq i} w_{ij} T_{jt} \;\; and \;\; \sum_{j \neq i} w_{ij} = 1 \qquad (2)$$

where w_{ij} are weights and □□□ is the corporate tax rate in country *j* at time *t*. The spatial weights are inversely related to the geographical distance and population between country *i* and *j*. The logic is that a high tax rate in a geographically close country exercises a larger impact on country *i*'s tax rate than a high tax rate in a geographically remote country. Population provides a measure of the interaction of distance and influence. Specifically, the weights are calculated as follows:

$$w_{ij} = \frac{\frac{\ln(pop_j)}{d_{ij}^2}}{\sum_{j \neq i} \frac{\ln(pop_j)}{d_{ij}^2}},$$

where *d* is the geographical distance between capitals for each pair of countries and *pop* is the total population. Distance is squared to emphasize the geographical distance for equal size populations. Because of strategic interaction, the tax rates are jointly determined in the different jurisdictions. The tax rates on the right hand side of the equation are endogenous and correlated with the error term. Hence, ordinary least squares estimations of the parameters are inconsistent. We deal with this issue in two ways. First, we use a spatial lag model where the weighted composite tax rate variable on the right hand side uses a lagged tax rate (LeSage & Pace, 2009).

Second, we use an instrument variables (IV) approach. Under this approach we regress *wT* on *X* and *Y* and use the fitted values as instruments for *wT*.

Results

Table 1 presents the correlation table for the variables used in our regressions. All three of the tax rates are highly correlated. Size is positively correlated with the three tax measures indicating that larger countries have a higher tax rate. Debt as a percentage of GDP and unemployment is negatively correlated with tax rates suggesting that lower rates have been enacted to stimulate a sluggish economy. As predicted, all of the political variables are positively correlated with the tax rates with the exception of political party. The results indicate that left-wing parties are concerned with the economic impact of higher tax rates. The political variables, structure, institutional constraint and fractionalization are all positively correlated.

The regression results for the statutory tax rates are presented in Table 2. The first two columns present the results from OLS regressions where the strategic interaction term has been lagged in order to deal with endogeneity problems. The first column includes no fixed effects while column two includes year fixed effects. The last two columns present the corresponding results for the IV regressions.

Among the economic variables the size measure (measured as previous year's GDP) is significant but has a negative sign implying that larger countries employ lower tax rates, contrary to what we would expect from theory. While the positive sign on size has been found consistently in studies that include undeveloped countries, the result has not been consistent when limiting the sample to developed countries as the predicted benefit of a large economy does not hold across developed countries.[3] The coefficients for the openness variable have the expected sign and are highly statistically significant indicating that more open countries tend to have lower tax rates. Also consistent with theory is a positive correlation between top marginal tax rates on labor income and statutory corporate tax rates supporting the backstop theory. An interesting result is that the total government spending is not significant, while fraction of elderly

[3] In untabled results, we included an interaction between size and EU membership. This interaction term was positive and statistically significant indication that the negative relationship between size and tax rates does not exist in EU countries. Indeed, the positive relationship vanish when US is excluded from the sample.

in the population and debt as a share of GDP are positive and significant. This suggests that the constraints that an aging population and high levels of debt put on the government are considered when setting tax rates, while overall government spending is not. This result is not surprising when one considers that our sample is developed countries with a large number of elderly and high levels of debt. Unemployment and interest rates are negative and significant indicating that the government considers the business economic climate while setting their rates. There is also strong support for statutory corporate tax rates being set strategically. The coefficient for the lagged weighted tax rate of other countries is positive and statistically significant as expected. Tax rates in EU member countries do not differ statistically significantly from the other countries' tax rates.

Turning to the political variables, the regressions reveal some interesting results. The party currently in power seems to have no significant impact on the statutory corporate tax rate. Legislative fractionalization, however, is significantly related to corporate tax rates. As expected, the more fractionalized the power, the higher the statutory corporate tax rate. This result is upheld in all specifications both excluding and including time fixed effects and whether OLS or IV regressions are employed and is consistent with results from Ashworth & Heyndels (2001, 2002) who found that more fractionalized governments *change* tax rates less frequently. Institutional constraints reflect a positive and statistically significant impact on the level of the corporate tax rate, consistent with theory. Legislators with more constitutional constraints are not able to change the tax rate as easily as those with less stringent constraints. Finally, constitutional structure, measuring how many voices that are considered when laws are changed, is positive and signficant. This result is also consistent with expectations as this indicates that when fewer levels of government consider changes, the more likely is it that corporate tax rates are lower.[4]

[4] In untabled results, we substitute federalism and presidential regimes, which have been included as political variables in prior research, for our political measures fractionalization, institutional constraint and structure as a sensitivity test. Our results show that federalism has a negative and highly significant impact on statutory rates while presidential regime is insignificant. The use of fractionalization, institutional constraint and structure result in a higher adjusted r-square and provide more insight into the types of political activities that affect statutory rates. We also rerun the sensitivity tests on effective average tax rates and effective marginal tax rates and find once again that only federalism significantly impacts either rate and that the adjusted r-squares in these regressions are lower than those reported in our tables.

Table 3 presents the same regression results for the effective average tax rates. A main difference between the definition of statutory and effective average tax rates is that changes in tax base show up in the effective average tax rate but not in the statutory rate. A cut in the statutory rate that is offset by a broadening of the tax base will leave the effective average rate unchanged but lower the statutory rate. Most of the explanatory variables have the same impact on effective average tax rates as on statutory rates. However, two main differences emerge. The institutional constraint variable is no longer statistically significant suggesting that it may be easier for constrained governments to make changes to the tax base rather than changing the statutory tax rate. It is also noteworthy that the strategic interaction term is only statistically significant (and at the 10 percent level) in one specification. Hence, tax competition seems to be less intense for changes in tax base definitions relative to statutory rates. The statistically significantly positive relation between fractionalization and constitutional structure is upheld.

Results for effective marginal rates are presented in Table 4. The results for effective marginal and average tax rates are similar. The government party variable changes sign and becomes positive (suggesting that the more left-wing the governments the higher the marginal tax rate). Our strategic interaction term is not statistically significant in any specification. Again, legislative fractionalization and constitutional structure are highly significant and influence marginal tax rates positively while the correlation between the institutional constraint variable and marginal tax rates is statistically insignificant. The results are stable across all of the models indicating that the treatment of endogeneity and inclusion of year dummies do not change our inferences.

Additional Tests of Tax Incentives

The results from our study suggest that economic factors, tax competition, and political process play an important role in the level of corporate tax rates. Interestingly, we find that legislative fractionalization is highly significantly correlated with our three different measures of corporate tax rates. This result is consistent with results found by Ashworth & Heyndels (2001, 2002) for *changes* in corporate tax measures. We show that this result is upheld for the *level* of tax rates and when more economic factors and strategic behavior is taken into account. Interestingly, institutional constraints do not influence effective average and marginal tax rates suggesting that more constrained governments can lower effective rates by tax base adjustments rather than

lowering statutory tax rates. This finding suggests that countries limited by political constraints that cannot compete by lowering statutory rates instead turn to provide tax breaks that lower effective rates in order to attract investments. In order to further investigate whether tax incentives are used by more constrained governments to provide an attractive tax climate we regress a measure of tax incentives on our economic and political variables (lagged one time period). We define a crude measure of tax incentives by calculating the difference between the statutory tax rate and the marginal tax rate. The logic behind this measure is that for countries where the statutory tax rate deviates from the marginal tax rate more tax incentives are expected. Table 5 presents the regression results. Our political variables also provide some interesting results that support our hypothesis. Institutional constraints have a positive and statistically significant impact on tax incentives. Thus, a more constrained government has a larger difference between the statutory and the marginal tax rate. The other political process variables fractionalization and political structure that we previously found to affect the tax rate now show no significant relationship to our measure of tax incentives.[5] This finding is contrary to that suggested by Buchanan (2008), that separation of power can result in more special interest spending. Our results suggest that while there is not a significant increase in tax incentives due to separation of power, there is an increase in tax incentives in response to the institutional constraints put on the government. Among the political variables, government party has a negative and significant impact suggesting that more left wing oriented parties provide less tax incentives than more right wing oriented parties. Membership in EU is also positively correlated with tax incentives, indicating that members in the EU use tax incentives as a means to circumvent restrictions placed on changing their statutory tax rates due to membership in the EU.

We also find interesting results in the economic area. Consistent with prior research, strategic interaction is positively related to the level of incentives offered. However, openness, which is the level of trade deflated by gross domestic product, has a negative impact on the level of tax incentives. The different impact of openness on tax incentives could be caused by two diverse incentives. First, it could be the result of countries with an active trade leading to agglomeration effects giving the country the ability to tax this extra rent through lower

[5] In untabled results, we again substitute federalism and presidential regimes, which have been included as political variables in prior research, for our political measures fractionalization, institutional constraint and structure as a sensitivity test. Our results show that neither federalism nor presidential regime affect the level of incentives.

incentives. Second, it could be due to an incentive to attract businesses by a simpler tax system which resulted in a lower statutory rate. Government debt, interest rates, and the level of government expenditures are positively related to the level of incentives indicating that when there is an economic downturn, governments use tax incentives to stimulate the economy. There is also a positive correlation with the number of elderly and the level of incentives suggesting that the higher costs associated with an aging population are motivating governments to stimulate the economy by offering tax incentives to businesses.

Conclusions

In this paper we examine both political and economic factors that affect tax rates. This is the first study to examine the factors that affect the level of incentives offered across countries in depth. Importantly, our results suggest that different economic and political structures affect the level of incentives offered. Our paper adds new composite variables that consider all aspects of transaction costs identified by Buchanan (2008) that have not been considered in the tax literature. Our findings suggest that while these costs significantly affect statutory rates, institutional costs, which proxy for constitutional constraints result in a larger amount invested in tax incentives. The results also suggest that the government structure, which proxies for the number of voices that are heard when changing legislation, enable high-tax countries to invest in tax incentives. We find that legislative fractionalization, a measure of how the power is shared across parties, significantly affects statutory tax rates while government party does not. However, when we examine tax incentives, we find left wing oriented parties provide less tax incentives than more right wing oriented parties and legislative fractionalization does not affect the amount of incentives offered.

Our study also identifies some interesting economic findings. Consistent with prior research, openness and strategic interaction affects statutory tax rates. When we examine the level of tax incentives, openness has a negative impact on the level of tax incentives. We find that while the total amount spent by governments does not affect tax rates, an aging population and level of debt have a significantly positive effect on tax rates indicating that governments consider the costs of supporting their elderly and paying back debt when setting their rates. Interestingly, governments with a larger aging population are more likely to offer tax incentives

to stimulate the business environment. A high unemployment rate and interest rates are negatively correlated with the tax rate, indicating that governments lower tax rates to stimulate the economy during economic downturns.

Overall, our results indicate that while economic conditions such as budget constraints, economic downturns and an aging population all influence the rate of tax set by governments, the political structure of the federal government has a significant impact in the form of economic stimulus given. Countries with high levels of institutional constraints are more likely to use tax incentives to stimulate the business sector, while all aspects of government transaction costs affect the statutory tax rate. This study highlights the importance of considering both political and economic factors when examining cross-country taxes. These results are relevant to the current tax debate facing many governments as they consider implementing new policy to attract foreign direct investment and retain and grow domestic business. The impact of the political structure on the ability to enact legislation is significant after controlling for economic factors indicating that as the marketplace continues to become more international, it will become increasingly more important for governments to acknowledge and find opportunities to work within their government systems to enact legislation that enables their business community to compete internationally.

References

Altshuler R. & T. Goodspeed, 2002, Follow the Leader? Evidence on European and US Tax Competition?, mimeo.

Ashworth, J. & B. Heyndels, 2001, Political fragmentation and the evolution of national tax structure in the OECD, *International Tax and Public Finance*, 8, 377-393.

Ashworth, J. & B. Heyndels, 2002, Tax structure turbulence in OECD countries, *Public Choice*, 111, 347-276.

Baldwin, R.E., Forslid, R., Martin, P., Ottaviano, G. & F. Robert-Nicoud, 2003, *Economic Geography and Public Policy*, Princeton University Press.

Baldwin, R.E. & P. Krugman, 2004, Agglomeration, integration and tax harmonization, *European Economic Review*, 48, 1-23.

Basinger, S. J. & M. Hallerberg. 2004, Remodeling the competition for capital: how domestic politics erases the race to the bottom, *American Political Science Review*, 98, 261-276.

Bayindir-Upmann, T., 1998, Two games of interjurisdictional competition when local governments provide industrial public goods, *International Tax and Public Finance*, 89, 529-544.

Besley, T., Giffith, R., & A. Klemm, 2001, Empirical evidence on fiscal interdependency in OECD countries.

Brueckner, J.K., 2003, Strategic interaction among governments: an overview of empirical studies, *Regional Science and Urban Economics*, 31, 215-245.

Buchanan, J. M., 2008, Same players, different game: how better rules make better politics, *Constitutional Political Economy*, 19, 171-179.

Cassette, A., & S. Paty, 2008, Tax competition among Eastern and Western European countries: with whom do countries compete?, *Economic Systems*, 32, 307-325.

Crabbé, K. & H. Vandenbussche, 2009, Are your firm's taxes set in Warsaw? Spatial tax competition in Europe, CEPR Discussion papers 7159.

European Commission, 2001, Company taxation in the internal market, Technical Report 582, European Commission.

Davies, R. & J. Voget, 2008, Tax Competition in an Expanding European Union, Working Papers 0830, Oxford University Centre for Business Taxation.

Devereux, M., Griffith, R. & A. Klemm, 2002, Corporate income tax reforms and international tax competition, *Economic Policy*, 35, 451-495.

Devereux, M., Lockwood, B., & M. Redoano , 2006, Horizontal and vertical indirect tax competition: theory and some evidence from the USA, *Journal of Public Economics*, 91, 451-479.

Devereux, M., Lockwood, B., & M. Redoano, 2008, Do countries compete over corporate tax rates ? *Journal of Public Economics*, 92, 1210-1235.

Dreher, A., 2006, The influence of globalization on taxes and social policy: an empirical analysis for OECD countries, *European Journal of Political Economy*, 22, 179-201.

Fuest, C., 1995, Interjurisdictional competition and public expenditure: is tax coordination counterproductive?, *Finanzarchiv*, 52, 478-496.

Ganghof, S., 2000, Adjusting national tax policy to economic internationalisation: Strategies and outcomes, in Scharpf, E.W. & V.A. Schmidt,*Welfare and work in the open economy, Vol II: Diverse Responses to Common Challenges*, Oxford, Oxford Univerrsity Press, 597-645.

Garrett, G. & D. Mitchell, 2001, Globalization, government spending and taxation in the OECD, *European Journal of Political Research*, 39, 145-177.

Genschel, P., Kemmerling, A., & E. Seils, 2011, Accelerating downhill: how the EU shapes corporate tax competition in the single market, *Journal of Common Market Studies*, 49, 585-606.

Gerard, M. & F. Ruiz, 2009, Corporate Taxation and the Impact of Governance, Political and Economic Factors, Cesifo Working Paper #2901.

Ghinamo, M., P. Panteghini & F. Revelli, 2007, FDI Determination and Corporate Tax Competition in a Volatile World, Cesifo working paper # 1965.

Gomes, P. & F. Pouget, 2008, Corporate Tax Competition and the Decline of Public Investment, Cesifo working paper #2384,

Hansson, Å. & K. Olofsdotter, 2008, Integration and the structure of Public Spending, *Comparative Political Studies*, 41(7).

Hansson, Å. & K. Olofsdotter, FDI, 2012, Taxes and Agglomeration Economies in the EU15, *Applied Economics*, 45, 2653-2664

Heinemann, F., Overesch, M., & J. Rincke, 2010, Rate-cutting tax reforms and corporate competition in Europe, *Economics & Politics*, 22, 498-518.

Hines. J. & L. Summers, 2009, How globalization affects tax design, National Bureau of Economic Research Working Paper #14664, Cambridge, Massachusetts.

Huizinga, H. & N. Laeven, 2008, International profit shifting within multinationals: a multi-country perspective, *Journal of Public Economics*, 92, 1164-1182.

International Bureau of Fiscal Documentation (IBFD), various years, European Tax Handbook, various editions, IBDF, Amsterdam.

Kammas, P., 2011, Strategic fiscal interaction among OECD countries, *Public Choice*, 147, 459-480.

Keen, M. & M. Marchand, 1997, Fiscal competition and the pattern of public spending, *Journal of Public Economics*, 66, 33-53.

Krogstrup, S., 2004, Are corporate taxes racing to the bottom in the European Union?, mimeo The Graduate Institute of International Studies, Geneva.

LeSage, J. & R. Pace, 2009, *Introduction to Spatial Econometrics*, Chapman and Hall, Boca Raton, FL.

Lorenz, S., 2007, Determinants of bilateral effective tax rates: Effective evidence from OECD countries, *Fiscal Studies*, 28.

OECD, 2011, Tax database, OECD, Paris.

Overesch, M. & J. Rincke, 2011, What drives corporate tax rates down? A reassessment of globalization, tax competition and dynamic adjustments to shocks, *The Scandinavian Journal of Economics*, 113. 579-602.

Plümper, T., Troeger, V.E. & H. Winner, 2009, Why is there no race to the bottom in capital taxation?, *International Studies Quarterly*, 53, 761-786.

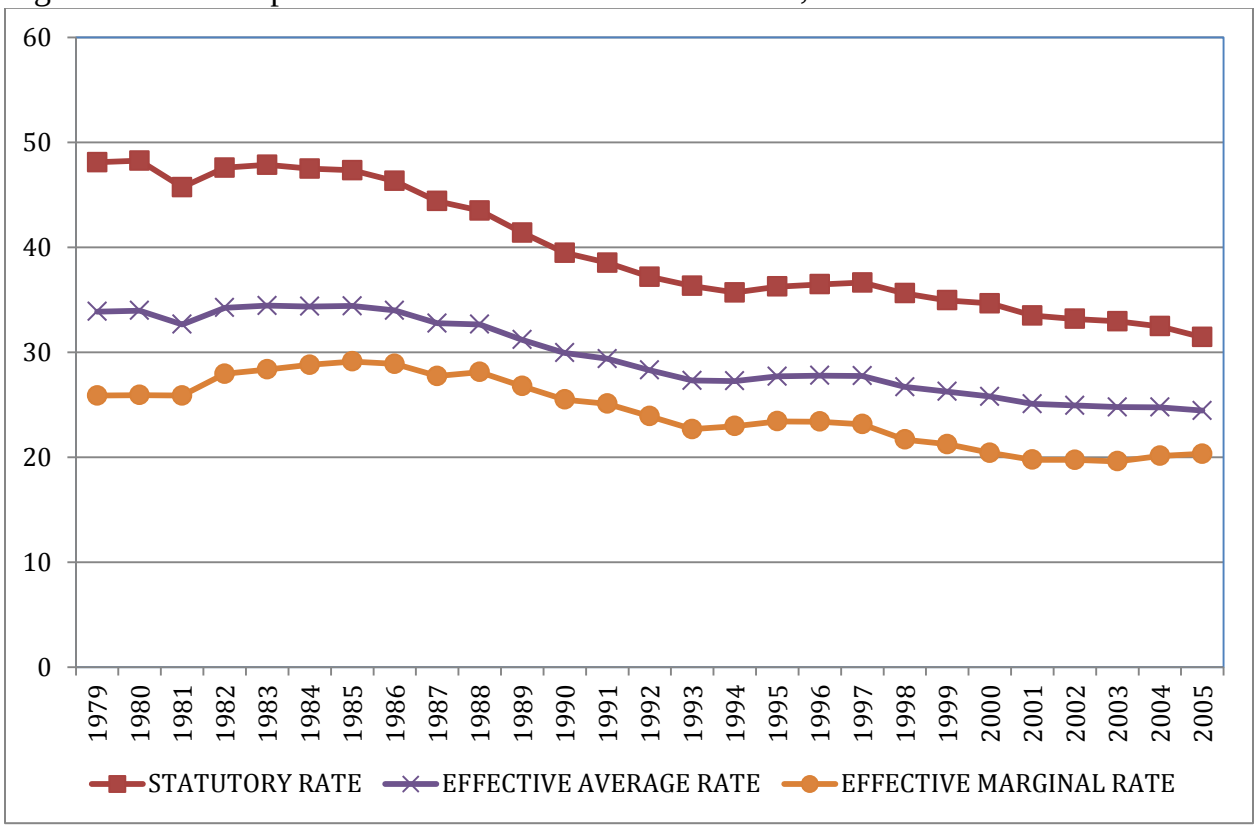
Rae, D., 1968, A note on the Fractionalization of Some European Party Systems, *Comparative Political Studies*, 1, 413-418.

Redoano, M., 2007, Fiscal interaction among European countries. Does the EU matter?, Working paper no 1952, CESifo Munich.

Rodrik, D.,1997, Has globalization gone too far? Washington, DC, Institute for International Economics.

Ruiz, F. & M. Gerard, 2008, Is there evidence of strategic corporate tax interaction among EU countries?, MPRA Paper 10094, University Library of Munich, Germany.
Schmidt, M. G. 1996, When parties matter: a review of the possibilities and limits of partisan influence on public policy, *European Journal of Political Research*, 30, 155- 183.
Schwarz, P., 2007, Does capital mobility reduce the corporate-labor tax ratio?, *Public Choice*, 130, 363-380.
Slemrod, J., 2004, Are corporate tax rates, or countries, converging? *Journal of Public Economics*, 88, 1169-1186.
Swank, D., 2002, *Global capital, political institutions, and policy change in developed welfare states*, Cambrigde, Cambridge University Press.
Swank, D., & S. Steinmo, 2002, The new political economy of taxation in advanced capitalist democracies, *American Journal of Political Science*, 46, 642-655.
Talpos, I. & A. Crasmeac, 2010, The effects of tax competition, *Theoretical and applied economics*, 549. 39-52.
Wildasin, D., 1988, Nash equlibria in models of fiscal competition, *Journal of Public Economics*, 35, 229-240.
Wilson, J., 1999, Theories of tax competition, *National Tax Journal*, 52, 269-304.
Wilson, J. & D. Wildasin, 2004, Tax competition: bane or boon, *Journal of Public Economics*, 88, 1065-1091.
Winner, H., 2005, Has tax competition emerged in OECD countries? Evidence from panel data, *International Tax & Public Finance*, 12, 667-687.

Figure 1. Mean corporate tax rates in 19 OECD countries, 1979-2005



Source: Devereux, Griffith & Klemm (2002)

Table 1: Correlation Table

	Stat rate	EATR	EMTR	Size	Openness	Debt/gdp	Elderly	Top labor tax	Unempl rate	Gov size	Interset rate	Gov party	Fractional	Inst const	Structure	Strateg interac stat
Stat rate	1.000															
EATR	0.9521	1														
EMTR	0.8042	0.9423	1													
Size	0.1841	0.1686	0.1243	1												
Openness	-0,5185	-0.4649	-0.3428	-0.4345	1											
Debt/gdp	-0,0337	-0.0452	-0.0514	-0.0617	0.1167	1										
Elderly	0,1131	0.0699	-0.0013	-0.0886	0.0588	-0.0039	1									
Top labor tax	0,1877	0.2009	0.2107	-0.2731	0.0927	0.0291	-0.0297	1								
Unempl rate	-0,3364	-0.408	-0.4353	-0.183	-0.0371	0.0551	-0.0797	0.1405	1							
Gov size	0,0215	-0.0215	-0.0559	-0.4076	0.2155	0.0633	0.3612	0.4427	0.1894	1						
Interset rate	0,1949	0.1293	0.0704	-0.2089	-0.3006	0.032	-0.3544	0.2988	0.2684	0.2306	1					
Gov party	-0,0684	-0.0404	-0.0175	-0.2698	0.0371	0.0544	0.3157	0.1134	0.0906	0.2089	0.1165	1				
Fractional	0,0485	0.0857	0.1252	-0.428	0.4865	0.0733	0.2806	0.3442	-0.1034	0.4406	-0.1209	0.1399	1			
Inst const	0,1162	0.0728	0.0266	0.4875	0.0048	0.0269	0.0253	-0.3773	-0.0719	0.3968	-0.3058	-0.2488	-0.0828	1		
Structure	0,2739	0.2629	0.2019	0.6645	-0.3972	0.0238	-0.2419	-0.3584	0.0017	-0.4789	-0.0474	-0.2574	-0.3805	0.6959	1	
Strategic inter. stat	0,4369	0.3869	0.3275	0.013	-0.3111	-0.0174	-0.427	0.2728	-0.1118	0.0457	0.6782	-0.1601	-0.161	-0.2037	0.1128	1
Strategic inter. eatr	0,0721	0.0186	-0.0173	0.0982	-0.0987	-0.0263	-0.2551	0.0626	0.0212	0.0874	0.2743	-0.1778	-0.1038	-0.2381	-0.0253	0.55
Strategic inter. emtr	0,0533	0.0359	0.0356	0.0604	-0.0597	-0.0243	-0.2156	0.1128	-0.0079	0.1286	0.2628	-0.1105	-0.0072	0.3128	0.0989	0.52

Table 2. Regression results for top statutory tax rates

	OLS	OLS Time FE	IV	IV Time FE
Size	-1.42e-05***	-1.17e-05***	-1.47e-05***	-1.24e-05***
	(3.35e-06)	(3.56e-06)	(3.40e-06)	(3.57e-06)
Openness	-0.00198***	-0.00183***	-0.00198***	-0.00184***
	(0.000136)	(0.000166)	(0.000135)	(0.000167)
Top labor tax rate	0.158***	0.107**	0.177***	0.129**
	(0.0433)	(0.0520)	(0.0451)	(0.0543)
Debt/GDP	1.80e-05**	2.15e-05**	1.79e-05**	2.13e-05**
	(7.36e-06)	(8.75e-06)	(7.32e-06)	(8.73e-06)
Elderly	0.00802***	0.00910***	0.00850***	0.00947***
	(0.00227)	(0.00259)	(0.00232)	(0.00260)
Unemp rate	-0.00990***	-0.0104***	-0.0101***	-0.0106***
	(0.00136)	(0.00153)	(0.00139)	(0.00154)
Gov size	0.00102	0.000934	0.000766	0.000781
	(0.000641)	(0.000679)	(0.000645)	(0.000692)
Interest rate	-0.00473**	-0.00567**	-0.00368*	-0.00398
	(0.00200)	(0.00248)	(0.00204)	(0.00256)
Gov party	-0.00220	-0.000773	-0.00296	-0.00176
	(0.00209)	(0.00223)	(0.00207)	(0.00226)
Fractionalization	0.00227***	0.00230***	0.00220***	0.00222***
	(0.000557)	(0.000560)	(0.000572)	(0.000575)
Inst constraint	0.0180***	0.0147***	0.0190***	0.0159***
	(0.00465)	(0.00499)	(0.00467)	(0.00516)
Structure	0.0111**	0.0130**	0.0111**	0.0129**
	(0.00486)	(0.00515)	(0.00492)	(0.00523)
EU	0.0154	0.0198	0.0160	0.0186
	(0.0120)	(0.0127)	(0.0120)	(0.0132)
Strategic interaction	0.750***	0.455**	0.718***	0.444**
	(0.112)	(0.181)	(0.123)	(0.218)
Constant	-0.123**	0.0124	-0.118**	0.0569
	(0.0533)	(0.0968)	(0.0567)	(0.112)
Observations	360	360	352	352
R-squared	0.686	0.699	0.689	0.699

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 3. Regression results for effective average tax rate

	OLS	OLS Time FE	IV	IV Time FE
Size	-1.50e-05***	-6.85e-06**	-1.53e-05***	-7.11e-06**
	(2.90e-06)	(3.21e-06)	(3.02e-06)	(3.49e-06)
Openness	-0.00139***	-0.00104***	-0.00136***	-0.00104***
	(0.000119)	(0.000131)	(0.000118)	(0.000131)
Top labor tax rate	0.205***	0.102**	0.225***	0.118**
	(0.0380)	(0.0443)	(0.0378)	(0.0491)
Debt/GDP	9.73e-06*	1.10e-05*	1.05e-05*	1.08e-05*
	(5.46e-06)	(5.88e-06)	(5.38e-06)	(5.83e-06)
Elderly	0.00231	0.00558***	0.00336*	0.00592***
	(0.00197)	(0.00203)	(0.00200)	(0.00207)
Unemp rate	-0.0108***	-0.00938***	-0.0106***	-0.00951***
	(0.000990)	(0.00108)	(0.00100)	(0.00107)
Gov size	0.000611	0.000309	0.000399	0.000182
	(0.000529)	(0.000559)	(0.000521)	(0.000566)
Interest rate	-0.00176	-0.00660***	-0.00134	-0.00520***
	(0.00140)	(0.00179)	(0.00157)	(0.00184)
Gov party	-0.000926	0.00189	-0.00139	0.000931
	(0.00178)	(0.00187)	(0.00192)	(0.00189)
Fractionalization	0.00171***	0.00173***	0.00162***	0.00171***
	(0.000482)	(0.000467)	(0.000483)	(0.000484)
Inst constraint	0.00360	-0.000762	0.00485	-0.000248
	(0.00425)	(0.00387)	(0.00435)	(0.00409)
Structure	0.0162***	0.0149***	0.0158***	0.0149***
	(0.00387)	(0.00391)	(0.00387)	(0.00388)
EU	-0.00590	0.00390	-0.0101	0.00262
	(0.0109)	(0.0103)	(0.0115)	(0.0112)
Strategic interaction	0.112	-0.143*	0.132	-0.156
	(0.0820)	(0.0778)	(0.121)	(0.102)
Constant	0.137***	0.239***	0.119**	0.279***
	(0.0407)	(0.0475)	(0.0463)	(0.0551)
Observations	347	347	339	339
R-squared	0.613	0.659	0.621	0.657

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 4. Regression results for effective marginal tax rate

	OLS	OLS Time FE	IV	IV Time FE
Size	-1.71e-05***	-7.39e-06*	-1.77e-05***	-7.09e-06
	(3.62e-06)	(4.13e-06)	(3.82e-06)	(4.79e-06)
Openness	-0.00124***	-0.000778***	-0.00120***	-0.000766***
	(0.000162)	(0.000177)	(0.000161)	(0.000179)
Top labor tax rate	0.241***	0.163***	0.266***	0.184***
	(0.0448)	(0.0551)	(0.0441)	(0.0615)
Debt/GDP	3.51e-06	3.82e-06	4.87e-06	3.90e-06
	(7.37e-06)	(7.25e-06)	(7.13e-06)	(7.12e-06)
Elderly	-0.00130	0.00361	0.000186	0.00399
	(0.00264)	(0.00280)	(0.00259)	(0.00283)
Unemp rate	-0.0120***	-0.0104***	-0.0115***	-0.0106***
	(0.00122)	(0.00129)	(0.00124)	(0.00127)
Gov size	0.000319	-0.000433	8.09e-05	-0.000566
	(0.000608)	(0.000652)	(0.000604)	(0.000663)
Interest rate	-0.00454***	-0.0111***	-0.00434**	-0.00940***
	(0.00169)	(0.00221)	(0.00200)	(0.00226)
Gov party	0.00159	0.00565**	0.00121	0.00436*
	(0.00242)	(0.00258)	(0.00266)	(0.00260)
Fractionalization	0.00190***	0.00170***	0.00176***	0.00167**
	(0.000607)	(0.000632)	(0.000603)	(0.000658)
Inst constraint	-0.000783	-0.00408	0.00112	-0.00419
	(0.00559)	(0.00526)	(0.00600)	(0.00574)
Structure	0.0177***	0.0146***	0.0171***	0.0147***
	(0.00436)	(0.00433)	(0.00439)	(0.00428)
EU	-0.0153	-0.00318	-0.0227	-0.00580
	(0.0137)	(0.0134)	(0.0142)	(0.0148)
Strategic interaction	0.153	-0.0954	0.220	-0.155
	(0.0991)	(0.116)	(0.160)	(0.163)
Constant	0.152***	0.258***	0.121**	0.286***
	(0.0469)	(0.0562)	(0.0512)	(0.0712)
Observations	347	347	339	339
R-squared	0.510	0.561	0.515	0.556

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 5. Tax incentives

	OLS	OLS Time FE	IV	IV Time FE
Size	9.52e-08	-1.75e-06	-2.29e-07	-1.84e-06
	(2.54e-06)	(2.67e-06)	(2.59e-06)	(2.77e-06)
Openness	-0.000830***	-0.000964***	-0.000855***	-0.000979***
	(0.000110)	(0.000150)	(0.000110)	(0.000154)
Debt/GDP	1.56e-05**	1.86e-05**	1.49e-05**	1.80e-05**
	(6.35e-06)	(7.22e-06)	(6.35e-06)	(7.34e-06)
Elderly	0.00791***	0.00553**	0.00757***	0.00540**
	(0.00234)	(0.00260)	(0.00233)	(0.00265)
Top labor tax rate	-0.0447*	-0.0867***	-0.0484*	-0.0944***
	(0.0249)	(0.0332)	(0.0263)	(0.0339)
Unemp rate	0.000126	-0.000586	-0.000177	-0.000706
	(0.000932)	(0.000987)	(0.000944)	(0.000974)
Gov size	0.000720	0.00134***	0.000722	0.00132***
	(0.000460)	(0.000478)	(0.000476)	(0.000491)
Interest rate	0.00308**	0.00610***	0.00329*	0.00619***
	(0.00148)	(0.00171)	(0.00167)	(0.00179)
Gov party	-0.00528**	-0.00655***	-0.00520**	-0.00648***
	(0.00236)	(0.00231)	(0.00245)	(0.00235)
Fractionalization	0.000232	0.000665	0.000235	0.000689
	(0.000464)	(0.000462)	(0.000470)	(0.000463)
Inst constraint	0.0188***	0.0153***	0.0193***	0.0156***
	(0.00370)	(0.00404)	(0.00381)	(0.00427)
Structure	-0.00422	-0.000492	-0.00423	-0.000690
	(0.00277)	(0.00283)	(0.00285)	(0.00290)
EU	0.0307***	0.0275***	0.0345***	0.0308***
	(0.00820)	(0.00899)	(0.00819)	(0.00914)
Strategic interaction	0.343***	0.219*	0.331***	0.227
	(0.0670)	(0.126)	(0.0750)	(0.143)
Constant	-0.145***	-0.118	-0.136***	-0.0825
	(0.0409)	(0.0750)	(0.0409)	(0.0819)
Observations	360	360	352	352
R-squared	0.406	0.467	0.408	0.470

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 6: Definition of variables and sources of data

Variable	Definition	Source
Statutory tax rate		Devereux, Griffith, & Klemm (2002)
Effective tax rate		Rates constructed and developed by Devereux, Griffith, & Klemm (2002).
Marginal tax rate		Rates constructed and developed by Devereux, Griffith, & Klemm (2002).
Size	Gross Domestic Product in current purchasing power and billions of US dollars	OECD
Openness	Total trade as a fraction of GDP	OECD
Top labor tax rate	Top Marginal Tax rate on personal income	International Bureau of Fiscal Documentation
Debt/ GDP	Debt over GDP	OECD
Elderly	Fraction of elderly in the population	OECD
Unemploy rate	Standardized unemployment rate	OECD
Gov size	Total government expenditures as a fraction of GDP	OECD
Interest Rate	Long term interest rate on government bonds	OECD
EU Dummy	1 if member of European Union, else 0	
Government party	Rank one to five, where one reflects having a right-wing government and five a left-wing party	Comparative Political Data Set I using the calculations proposed by Schmidt (1996)
Fractionalization	index measured as legislative fractionalization , where s_i is share of seats for party i and m is the number of parties	Comparative Political Data Set I using the formula proposed by Rae (1968)
Inst constraint	Institutional constraint ranked from 0 to 5 where a value of 0 indicates large maneuvering for central government and 5 is most constrained	Comparative Political Data Set I using the methodology developed by Schmidt (1996)
Structure	Composite variable proxies for separation of powers, federalism and legislative supremacy components of political transaction costs.	Comparative Political Data Set I as proposed by Huber et al. (1993).
Strategic Interaction	Spatial lag model that uses a weighted average of the tax rates of countries based on population and distance.	Mayer, T. & S. Zignago, 2011 (distance) and OECD (population)