New evidence on Fiscal Interactions*

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Abstract

This paper evaluates the existence of international tax competition among OECD countries using the spatial panel data model. We test whether fiscal interactions between governments exist and whether governments with similar public infrastructure investment levels increase these fiscal interdependence among them. Results indicate the existence of tax interdependence in the closest neighboring OECD countries where international tax competition occurs. These tax interactions are higher for countries with similar public infrastructure investment levels.

JEL Classification: E62, H54, H87

Key Words: Tax Competition; Public Infrastructure Investment; Fiscal Interactions; Spatial Panel Data model; OECD.

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1 Introduction

The processes of economic integration have increased international mobility of capital over the last three decades. This has led to a *race to the bottom* in capital taxation with inefficiently low levels of capital tax rates and the underprovision of public goods (Zodrow and Mieszkowski, 1986; Wilson, 1986; Bucovetsky, 1991). Consequently, the tax burden has been shifted from capital towards labor to maintain a certain level of public good provision. As a response to increasing tax competition, the literature has focused on the coordination of capital taxation (Bucovetsky, 1991; Kanbur and Keen, 1993; Fuest and Huber, 2001; Baldwin and Krugman, 2004; Konrad, 2009; Devereux and Fuest, 2010; Keen and Konrad, 2013). It is generally recognized that global tax harmonization is difficult to achieve. Therefore, the conditions that allow for *partial tax harmonization* among a group of countries have been widely discussed (Konrad and Schjelderup, 1999; Burbidge et al., 1997; Brøchner et al., 2007; Bucovetsky, 2009; Vrijburg and De Mooij, 2010).

This chapter has two main objectives. First, we address the question whether or not fiscal interactions between OECD governments exists. There are three main theoretical explanations why countries heeds its neighborings' fiscal decisions. The first explanation is the existence of *international tax competition* among OECD countries.[1] Governments reduce capital taxation to attract foreign capital. The empirical analysis of tax competition has become an important issue in the literature (Besley et al., 2001; Cassette and Paty, 2008; Devereux et al., 2008). Both the European Union (EU) and the OECD have introduced initiatives in the late 1990s designed to combat "harmful" tax competition (Devereux et al., 2008).[2] Therefore, analyzing the intensity of tax competition among OECD countries would help policy makers to develop better actions against these harmful practices. The second explanation is that voters judge their governments by comparing their performance with those of neighbor countries (denominated *yardstick competition*). As a consequence, governments mimic the fiscal decisions applied by their neighbors (Besley and Case, 1995; Besley and Smart, 2007; Bordignon et al., 2003). Finally, the existence of expenditure externalities on public

[1] OECD: Organisation for Economic Cooperation and Development.

[2] See, for example, the *Code of Conduct* from the European Commission (1997) and *Harmful Tax Competition: An Emerging Global Issue* from the OECD (1998) as two initiatives to curb harmful tax practices.

investments in core infrastructures (e.g. transport and communications) whose benefits have *spillover effects* on neighboring countries can diminish their level of investments due to free riding (Redoano, 2014). Accordingly, the analysis of fiscal interdependence among OECD countries is rather complex because it is simultaneously caused by these three processes: tax competition, yardstick competition, and spillover effects. We focus on fiscal interactions in terms of corporate tax choices because fiscal interactions are more likely to affect capital than labor due to its greater mobility.

Second, we test the theoretical assumption that countries with similar public investment levels incur in higher fiscal interdependence. Many authors argue that jurisdictions compete not only in taxes but also in the provision of infrastructure (see Hindriks et al., 2008; Zissimos and Wooders, 2008; Pieretti and Zanaj, 2011). Some institutions have increased the level of infrastructure in order to ensure some similarity on the level of public investment between countries. For example, the European Commission has created the *European Structural and Investment Funds* to support economic development across all EU member countries from 2014 to 2020 (European Commission, 2017). In this case, governments can be more likely to set similar tax policies if they have similar investment levels. Therefore, fiscal interdependence will increase if countries share certain similarities in their levels of public investments.

For this purpose, we use a spatial panel data model from Elhorst (2010) which has been widely used in the literature. This model allows testing for contemporaneous fiscal interactions (Besley and Case, 1995; Cassette and Paty, 2008; Devereux, et al., 2008; Redoano, 2014). The weighting matrix used to model the relationship between countries is the geographical distance. Moreover, in order to test whether public investment plays a role in international tax competition among OECD countries, a specific matrix is constructed.

The main results of the chapter can be summarized as follows. We confirm the existence of tax interdependence in the closest neighboring OECD countries where international tax competition occurs. This fiscal interdependence is higher for countries with similar public investments levels and this weighting scheme seems more appropriate to model corporate tax rate interactions. Therefore, we can accept the hypothesis that countries with similar public investment levels incur in higher fiscal interactions.

The analysis is most related to the following literature. First, on the one hand, the

existence of contemporaneous strategic fiscal interactions between countries is analyzed theoretically and empirically (Cassette and Paty, 2008; Devereux et al., 2008; Deskins and Hill, 2010; Redoano, 2014; Altshuler et al., 2015; Reiter, 2015; Streif, 2015; among others). These authors find positive fiscal interdependence among the studied countries. The main focus of these studies is international tax competition. Yardstick competition, on the other hand, is tested among states or municipalities (see for example Bordignon et al. (2003) for Italian municipalities or Duvois and Paty (2010) for French municipalities who find positive local fiscal interactions). Second, Hauptmeier et al. (2012) estimate a model of strategic fiscal interactions in both tax and public investments for local governments. They find that governments use both capital taxation and public infrastructure investment to compete for international capital.

The main difference of the model to those of the literature is that it tests fiscal interactions between countries that have similar infrastructure investment levels. To the best of my knowledge, this is the first empirical analysis of international tax competition that allows the inclusion of for public infrastructure investment in fiscal interactions.

The remainder of the chapter is organized as follow. Section 2 presents the theoretical model of tax and public investments competition, Section 3 describes the estimation approach, Section 4 shows the data used in the model, and results are shown in Section 5. Finally, Section 6 concludes. Tables of the results are in the Appendix.

2 Theoretical model

Fiscal competition models can be presented following the essence of a simple model of tax competition. The model is built on the strategic tax competition literature such as Zodrow and Mieszkowski (1986), Wilson (1986), and Wildasin (1991). In these models, governments compete for capital using taxes as a policy instrument. Consider a federation of two asymmetric jurisdictions, indexed by $N = i, j$, each inhabited by an identical number of immobile residents with mass one who each supply one unit of labor. Each jurisdiction produces a homogeneous consumption good using a mobile capital k_i and a publicly provided input, g_i. The total amount of capital is fixed and normalized to one. The cost of public investment is convex and is given by $c_i(g_i) = (k_i g_i)^2/2$. Moreover, each jurisdiction chooses a source-based unit capital tax t_i, capable of influencing the location of mobile capital per worker k_i. The simple quadratic production function

is

$$F_i(k_i; g_i) = (a_i + g_i)k_i - \frac{b}{2}k_i^2, \tag{1}$$

where a_i is the productivity level parameter of the jurisdiction i and b the curvature of the production function parameter. The output fulfill with the standard assumptions of $F_i'(k_i; g_i) > 0$, $F_i''(k_i; g_i) < 0$. As capital is mobile, the net return to capital, ρ, is determined by

$$\rho = F_i'(k_i; g_i) - t_i, \tag{2}$$

such that ρ across jurisdictions is equalized,

$$F_i'(k_i; g_i) - t_i = F_j'(k_j; g_j) - t_j. \tag{3}$$

The capital employed in jurisdiction i can be obtained from Eq. (2) and with the world capital stock ($\sum k_i = 1$)

$$k_i = \frac{(b + a_i - a_j + g_i - g_j - t_i + t_j)}{2b} \tag{4}$$

where $i \neq j$. Governments maximize the welfare function U_i in their own jurisdictions, the sum of the return to the immobile factor and tax revenue, net of public good cost[3]

$$U_i = F_i(k_i; g_i) - F_i'(k_i; g_i)k_i + t_i k_i - \frac{(k_i g_i)^2}{2}. \tag{5}$$

Using Eq. (4) and (5), we derive the welfare level as

$$U_i = \frac{\delta_i}{4b}(\frac{\delta_i}{2} + \frac{\delta_i}{2b}(2t_i - g_i^2)), \tag{6}$$

where $\delta_i \equiv b + a_i - a_j + g_i - g_j - t_i + t_j$. The main interest of this section is the slopes of the tax reaction functions, $t_i = f_t(t_j; g_i; g_j; \mid g_i - g_j \mid)$, around the equilibrium. An optimal policy change of a government would be capital tax that takes into account the competitors responses who use both taxes and public inputs. To obtain the slopes

[3]The government objective function is widely used in the literature, for example Hindriks et al. (2008) and Hauptmeier et al. (2012). Including the cost of public input provision in the welfare function us justified in Hauptmeier et al. (2012).

of tax rates, the government's first order conditions with respect to t_i are differentiated. The reaction function of t_i is

$$t_1 = (b + g_i^2)\frac{b + a_i - a_j + g_i - g_j + t_j}{3b + g_i^2}, \tag{7}$$

Using the specific derivatives in the equilibrium, the four effects of interest are

$$\frac{\partial t_i}{\partial t_j} = \frac{b + g_i^2}{3b + g_i^2} > 0, \;\; \frac{\partial t_i}{\partial g_i} = \frac{g_i^4 + 4bg_i(a_i - a_j - g_j + t_j) + b(3b + 4bg_i + 8g_i^2)}{(3b + g_i^2)^2} > 0, \tag{8}$$

$$\frac{\partial t_i}{\partial g_j} = -\frac{(b + g_i^2)}{3b + g_i^2} < 0, \;\; \text{and} \;\; \frac{\partial t_i}{\partial \mid g_i - g_j \mid} = \frac{b}{3b + g_i^2} > 0. \tag{9}$$

The upward sloping of $\partial t_i/\partial t_j$ in Eq. (8) shows that if the competitor decreases its capital tax rates, the optimal respond of the government would be also a decrease of its own taxation. The reaction function depends on the curvature of the production function and on its public input. The expression $\partial t_i/\partial g_i$ in Eq. (8) denotes that an increase in the level of public good in jurisdiction i also increases in its level of capital taxation. Moreover, it depends on the levels of the productivity of both jurisdictions and negatively on the competitor public input level. Evaluating $\partial t_i/\partial g_j$ in Eq. (9), the reaction function is downward sloping. This means that if the opponent deviates from the equilibrium by increasing its level of public input, the jurisdiction will decrease its capital taxation as an optimal response but to a lower extent. This response does not depend on the level of jurisdictions' productivity level. Finally, the difference between the level of public input provision's reaction function, i.e., $\partial t_i/\partial \mid g_i - g_j \mid$, in Eq. (9) is positive. This means that when jurisdictions share similar levels of public inputs, jurisdiction i decreases its capital taxation more than before as an unique instrument for attracting more capital than its competitor.

3 Empirical model

In this section, the empirical methodology is presented. The literature on fiscal strategic interactions among governments agrees that the spatial panel data models are

theoretically consistent in situations where capital taxation and public infrastructure investments interact with those of neighboring countries (Brueckner 2003). Therefore, a spatial panel data model from Elhorst (2010) that accounts for contemporaneous cross-sectional dependence is used in this case

$$y_{n,t} = \lambda W_n y_{n,t} + X_{n,t}\beta + v_n + \varepsilon_{n,t} \tag{10}$$

where $y_{n,t}$ is the $n \times 1$ vector of corporate tax rates for the n countries at time t, $X_{n,t}$ is the $n \times k$ matrix containing specific control variables at time t for the n countries, v_n is a $n \times 1$ vector of country fixed effects, and $\varepsilon_{n,t}$ is a vector of error term which is assumed to be normally distributed. W_n is the weighting matrix used to model interactions between countries. The choice of W_n is discussed below. $W_n y_{n,t}$ is the spatially lagged variable. It measures the (potential) contemporaneous interactions among tax decisions across countries. Therefore, λ measures the intensity of the contemporaneous interactions. Starting from this general model, we can conclude that fiscal interactions exist only when λ is significant. Non significance of λ indicates that the use of spatial econometrics is not appropriate.

The weighting matrix is used to model the relationship between countries. It is composed of elements $w_{i,j}$ that measure the link between country i and country j. More specifically, each weight $w_{i,j}$ measures the impact of country j on country i. In the case of tax interactions, the weighting matrix models the transmission channels between the implementation of tax policy in each country. A high $w_{i,j}$ assumes that fiscal choices of country j strongly affect the fiscal choices in country i. Estimating Eq. (10) using a specific weighting matrix allows to conclude that there are (no) interactions between countries that pass through the specific channel modeled by the matrix.

A way to model interactions between corporate tax rates among governments is using the geographical distance. First, countries that are close are more likely to be competitors for international capital investments. Second, the closer countries are, the stronger commercial relationships they have, such that the probability of international tax competition between neighbor countries is significantly higher. Another advantage of using the geographical distance to construct the weighting matrix is that it is fully exogenous. To measure the geographical distance, the radial distance between capitals of countries i and j ($d_{i,j}$) is used. Moreover, to test the robustness of the estimation,

three matrices are constructed. The first one considers the inverse distance between countries: the closer countries are, the stronger the associated weight is. The elements of this matrix are computed as follow

$$w_{i,j} = \frac{1}{d_{i,j}}. \tag{11}$$

With the second matrix, another functional form is considered to model the geographical distance: We use the exponential distance. Each element is computed as follow

$$w_{i,j} = exp(-d_{i,j}). \tag{12}$$

Finally, consider only the 5-nearest neighbors: $w_{i,j}$ takes the value $1/d_{i,j}$ if j is one of the five nearest neighbors of i, 0 otherwise.

If the coefficient associated to the spatially lagged variable $W_n y_{n,t}$ is not significant, this means that there are not tax interactions between countries according to the weighting schemes used. In contrast, if the coefficient associated to the spatially lagged variable $W_n y_{n,t}$ is significant, this means that countries interact more with close neighbors than with other countries. A positive coefficient implies that there is a degree of interdependence among countries. Therefore, countries increase their corporate tax rates when neighbor countries do so.

The estimation of Eq. (10) requires the normalization of the weighting matrix. Therefore, each matrix is row-normalized. This means the transformed variable $W_n y_{n,t}$ can be interpreted as the average of the y values in neighboring countries at time t.

4 Data

The dataset comprises annual data for 22 OECD economies over the period 1996 to 2014.[4] Further details on data measurement and sources can be found in Table 1. Table 2 reports the descriptive statistics.

The endogenous variable is corporate tax rates (Tax). This measure has been widely used in the literature of fiscal interactions (Keen and Simone, 2004; Cassette and Paty,

[4]Countries are: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, Japan, New Zealand, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, and the United Kingdom.

2008; Devereux et al., 2008; Cassette et al., 2013; Redoano, 2014). Measuring tax competition by corporate tax rates has the advantage of being easily accessible and, moreover, it is commonly recognized that it plays an important role in the international tax competition. We use combined (statutory) corporate income tax rates as percentage units from the OECD Tax database. Thereby, our dependent variable is broadly available in a comparable format.

To estimate fiscal interactions between OECD governments, we include two sets of control variables: socio-economic factors, and political factors. The first set include variables such as gross domestic product per capita (*GDP*), total inland transport infrastructure investment per capita (*Investment*), the unemployment rate (*Unemployment*), public debt (*Debt*), and trade openness (*Trade*).[5] Regarding *GDP*, the expected effect is ambiguous. The sign for *GDP* is negative if countries use higher levels of wealth to reduce their corporate tax rates, otherwise, the sign should be positive. *Invest* is used to control for the nontax instruments that governments use in the tax competition. An increase in public investments is expected to decrease corporate tax rates. This is because governments would use both capital taxation and infrastructure investments as an instruments to attract capital investments. The sign of *Unemployment* is also expected to be ambiguous. On the one hand, if *Unemployment* increases governments would need more tax revenues because of the fiscal stress. On the other hand, the increase of *Unemployment* would encourage governments to use their fiscal policy to be more aggressive in attracting capital and, therefore, they would decrease corporate taxation. A high value of *Debt* is expected to increase corporate taxation because governments face higher revenue requirements Countries with more *Trade* are expected to decrease their corporate tax rates since they are more heavily engaged in international tax competition.

The second set of variables contains: membership in the Economic and Monetary Union (*EMU*), the ideology of the leading party in government (*Left*), and the date of election (*Election*). *EMU* takes the value 1 for countries that belong to the Euro Area, and 0 otherwise. Countries that form part of the EMU are expected to have less corporate tax rates because mobility costs of capital are lower within the EU where the degree of international tax competition is significantly higher. *Left* is introduced

[5]Missing values for the variable *Investment* where imputed using the values of the former period. These were in Portugal at 2011 and 2014, and in Japan and Switzerland at 2014.

to control for the ideology of the leading party in the government as it is often argued that left-wing parties rely more on corporate taxation to increase public revenues than right-wing parties (Profeta and Scabrosetti, 2016). Alluding to *Election*, it is expected that governments reduce corporate tax rates in order to attract some voters and to increase their re-election probability. However, as corporate taxation is a controversial issue the effect might be rather small. Referring to Franzese (2000), the date of elections is quantified as

$$Election = \frac{(M-1) + d/D}{12} \tag{13}$$

where M and d are respectively the month and the day of an election, and D is the total number of days in the election month. Note that *Election = 0* for years without elections. The model is also estimated with a common trend in order to ensure that interactions are not only due to a coincidence or to common changes among countries.

5 Results

In what follows, the results on fiscal interactions between governments using the three weighting schemes presented above are discussed. Results are represented in Table 3. For each weighting matrix, the two left columns shows the results without a *Trend*, and the two right ones depict the results with a *Trend*. All matrices give very similar results, in terms of sign and of the estimates. *Trend* has a negative coefficient and is statistically significant for all weighting matrices. This result reveals that corporate tax rates decrease 2% on average for all countries per year. This is consistent with the existence of a *race to the bottom* in corporate taxation among OECD countries.

Regarding the spatial correlation all weighting matrices show that there are positive contemporaneous fiscal interactions. This means that governments' corporate tax rates depend positively on their neighbors' corporate tax rates. When a neighbor countries increases (decreases) its corporate tax rate (due to higher demand for public spending, for example), governments do the same. As it is shown in Eq. (8) in Section 2, the reaction function in tax rates t_i is positive with respect to t_j, proving that tax rates are strategic complements. This is compatible with the existence of the international tax competition. *GDP* is only significant when *Trend* is included in the model and

impacts positively on *Tax*. As expected. *Unemployment* is not significant and does not have an effect on *Tax*. *Debt* positively affects *Tax*. Governments have higher revenue requirements when they have higher levels of public debt and, consequently, increase corporate tax rates. *Trade* has a significant negative effect on *Tax*. Countries with higher trade openess have less mobility costs. Therefore, international tax competition is more fierce and countries are forced to decrease capital taxation.

Concerning the political variables included in the estimations, *Election* does not have an impact on *Tax*. However, *Left* has a significantly positive effect on *Tax*. This result confirms that left-wing parties rely more on corporate taxation to increase public revenues than right-wing parties. *EMU* also impacts positively on *Tax* if a common trend is included (with exception to the exponential distance). This result reveals that forming part of the European Monetary Union increases corporate taxation, which is contrary to what is expected.

Interestingly, *Investment* has a significant negative effect on *Tax*. When governments increase their level of infrastructure investment, at the same time, they decrease the level of corporate tax rates. Note that this finding is well in line with the evidence presented in Eq. (9) in Section 2. This result confirms that governments compete in both capital taxation and the provision of infrastructure (Hindriks et al., 2008; Zissimos and Wooders, 2008; Pieretti and Zanaj, 2011). From a tax competition perspective, we observe that fiscal interactions are higher if countries have similar infrastructure investment levels. Therefore, it is important to analyze whether fiscal interactions increase when countries are similar in nontax instruments (e.g., infrastructure investment levels).

To test if governments with similar infrastructure investment levels have higher fiscal interactions, a weighting matrix is constructed that accounts for the distance in terms of public infrastructure investment levels. Each element $w_{i,j}$ is computed as follow

$$w_{i,j} = |\frac{1}{invest_j - invest_i}| \tag{14}$$

We consider the average of public infrastructure investment in 1995 (which is before the beginning of the estimation period) to avoid endogeneity problems.

Estimations are represented in Table 4. The results are similar to the ones obtained with the geographical weighting distance matrices. Thus, we find positive fiscal

contemporaneous interactions. It reveals that countries with similar public investment levels incur in fiscal interdependence between their neighbors. From Eq. (9) we find that when jurisdictions share similar public input provision, the jurisdiction i decreases its capital taxation in order to be more competitive. Therefore, fiscal interactions are more aggressive between these jurisdictions. Moreover, the coefficients associated to the spatially lagged variables are higher than the geographical distance weighting matrices, meaning that this weighting scheme seems to be more appropriate to model corporate tax interactions. Thus, countries with similar public investment levels incur in higher fiscal interdependence than with countries geographically close. Finally, as it was expected, the other explanatory variables maintain the same coefficients and significance.

6 Conclusions

The coordination of capital taxation has been an important issue for both politicians and economists because of inefficiently high international tax competition. As the global harmonization of capital tax rates is difficult to achieve, the literature has focused on the conditions that allow partial tax harmonization. This chapter tests the existence of fiscal interactions among OECD countries, whether or not fiscal interactions are caused by international tax competition, and if fiscal interactions increase when countries have similar levels of public infrastructure investments. We fins that governments compete in both capital taxation and public infrastructure investments in order to attract capital. This fiscal interdependence is higher for countries with similar public investment levels. Therefore, this weighting scheme seems more appropriate to model corporate tax rates interactions. Moreover, we accept the hypothesis that countries with similar public investment levels have higher fiscal interactions in corporate tax rates.

The results imply that, as fiscal interactions are higher for countries with similar public investments, policy makers should focus more to accomplish tax harmonization between the OECD members. The similarity of infrastructure investments can be an instrument to carry out this objective. Sanz-Córdoba & Theilen (2016) show that the coordination of infrastructure investments (i.e. similar levels of public investments) leads countries to be more likely to achieve tax harmonization. Therefore, this might help to reduce the fierce international tax competition that governments are dealing

with currently.

Regarding lines of further research, it would be interesting to analyze spatially lagged control variables in order to add new information about the variables that affect corporate tax rates and the interactions of these variables between countries. Taking into account different policy instruments could yield further insights into the rather complex process of fiscal policy decision making at the macro level. Additionally, it would be interesting to analyze a spatial dynamic panel data model including both contemporaneous and time-delayed fiscal interactions.

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Appendix

Table 1: Data definitions and sources

Variables	Definition	Measurement	Source
Tax	Combined (statutory) corporate income tax rates	Percentage points, in logaritms.	OECD (2016a); Tax database.
Investment	Total inland transport infrastructure investment	Investment per inhabitant at constant hundreds Euro prices, base year 2010 in logaritms.	OECD (2016c); International Transport Forum.
GDP	Gross domestic product per capita	Per capita in constant thousands US dollars, in logaritms.	World Bank (2016a); World Development Indicators.
Unemployment	Unemployment rate	Percentage points of total working force, in logaritms.	Ameco (2016); OECD (2016c).
Debt	Public debt	Percentage of GDP, in logaritms.	IMF (2016); Historical Public Debt database (HPDD).
Trade	Exports and imports as share of GDP	Percentage of GDP, in logaritms.	World Bank (2016a); World Development Indicators.
Election	Date of election	Date of election as time share over year in election years, 0 in years without elections.	Döring and Manow (2011); Parliament and government composition database (ParGov); Data for the USA is from Benoit and Laver (2006).
Left	Ideology of the leading party in government	Between 1 (hegemony of right-wing parties) to 5 (hegemony of social-democratic and left-wing parties).	Klaus et al. (2015); Comparative Political dataset.
EMU	Economic and Monetary Union of the European Union countries	Dummy variable. 1 = country belongs to EMU, 0 otherwhise.	Own calculation using European Commission historial data.

Table 2: Summary Statistics

Variables	Mean	Std. Dev.	Min.	Max.
Tax	29.76	7.87	12.5	56.79
Investment	6.02	8.56	0.04	53.55
GDP	35.73	10.35	11.98	65.07
Unemployment	7.85	3.87	2.24	26.09
Debt	63.09	37.57	9.68	246.17
Trade	83.30	38.39	18.76	209.08
Election	0.15	0.27	0	0.96
Left	2.55	1.51	1	5
EMU	0.35	0.49	0	1

Table 3: Results using geographical distance weighting matrices-Row-normalization

	Inverse Distance				Exponential Distance				5-nearest neighbors			
Variables	Coefficient (Std. Error)											
W*Tax	0.15	(0.01)***	0.14	(0.01)***	0.14	(0.01)***	0.13	(0.01)***	0.13	(0.03)***	0.12	(0.02)***
Investment	-0.02	(0.00)**	-0.02	(0.01)**	-0.02	(0.01)**	-0.02	(0.01)**	-0.02	(0.01)**	-0.02	(0.01)***
GDP	-0.08	(0.04)*	0.04	(0.04)	-0.07	(0.04)†	0.04	(0.04)	-0.04	(0.04)	0.08	(0.04)*
Unemployment	-0.03	(0.03)	0.01	(0.03)	-0.03	(0.03)	0.01	(0.03)	-0.03	(0.03)	0.02	(0.03)
Debt	0.07	(0.02)***	0.08	(0.02)***	0.07	(0.02)***	0.09	(0.02)***	0.08	(0.02)***	0.10	(0.02)***
Trade	-0.29	(0.03)***	-0.24	(0.03)***	-0.30	(0.03)***	-0.26	(0.03)***	-0.35	(0.03)***	-0.31	(0.03)***
Election	-0.01	(0.03)	0.00	(0.03)	-0.01	(0.04)	0.01	(0.03)	-0.01	(0.04)	0.01	(0.03)
Left	0.02	(0.01)*	0.01	(0.01)†	0.02	(0.01)*	0.01	(0.01)†	0.02	(0.01)*	0.01	(0.01)†
EMU	0.02	(0.02)	0.03	(0.02)†	0.02	(0.02)	0.03	(0.02)†	0.03	(0.02)	0.04	(0.02)*
Trend		-	-0.02	(0.00)***		-	-0.02	(0.00)***		-	-0.02	(0.00)***

Number of observations: 418. The model include individual fixed effects. ***Significant at 0.1 percent, **Significant at 1 percent, *Significant at 5 percent, and † Significant at 10 percent.

Table 4: Results using investment distance weighting matrix

	Distance in investment levels			
Variables	Coefficient	(Std. Error)		
W*Tax	0.17	(0.02)***	0.18	(0.02)***
Investment	-0.02	(0.01)*	-0.02	(0.01)**
GDP	-0.06	(0.04)†	0.05	(0.04)
Unemployment	-0.02	(0.03)	0.02	(0.02)
Debt	0.07	(0.02)***	0.08	(0.02)***
Trade	-0.31	(0.03)***	-0.25	(0.02)***
Election	0.00	(0.03)	0.02	(0.03)
Left	0.01	(0.01)*	0.01	(0.01)
EMU	0.02	(0.02)	0.04	(0.02)†
Trend		-	-0.02	(0.00)***

Number of observations: 418. The model include individual fixed effects. ***Significant at 0.1 percent, **Significant at 1 percent, *Significant at 5 percent, and † Significant at 10 percent.