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The tax and the mighty: Tax payer concentration lowers local business taxation in German Municipalities

The tax and the mighty:

Tax payer concentration lowers local business taxation in German Municipalities

by

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Abstract

We analyze the impact of large firms on business tax rates using data from German municipalities in Hesse in 1998-2005. Results suggest that business tax rates decrease with taxpayers' concentration, indicating strong local lobbying power of large firms.

Key words: tax competition, yardstick competition, local business taxation, large firms, Germany

JEL: H71, C23, D72

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1. Introduction

There is considerable evidence that local tax rates are spatially related (Genschel and Schwarz, 2011; Rivelli, 2006). Two types of models explain this phenomenon. In tax competition models, municipalities set low tax rates to attract mobile capital (Wilson, 1999). Yardstick competition models assume that self-interested governments set high tax rates to divert rents (Besley and Case, 1995). Their ability to divert rents is limited by the fact that citizens can use information about tax rates and public service quality from neighboring municipalities as a yardstick to evaluate their own government's behavior. Thus, yardstick competition disciplines opportunistic incumbents and prevents them from setting high tax rates.

Both tax competition and yardstick competition models assume that there is large number of tax-payers in every municipality with each tax-payer contributing a negligible share to overall revenues (Genschel and Schwarz, 2011). Given this atomistic structure, the individual tax-payer has no incentive to control the government or to lobby it for lower taxes. The reason is that both "control" and "lobbying" produce collective goods for all tax-payers and every tax-payer has the incentive to free ride.

But what if a small number of tax-payers account for a sizable share of local tax revenues? These large tax-payers have incentives to control the government individually and lobby for lower tax rates. Furthermore, their mere size makes the exit of large tax-payers threatening and lends them substantial political power. This opens up a second channel by which large tax-payers can influence tax policy that is unavailable to small tax-payers. In the terminology of Hirshman (1970), small tax-payers can only use the mechanism "exit" to pursue their interest. "Exit" stands for voting for the opponent (yardstick competition models) respectively leaving for a municipality with lower tax rates (tax competition models). Next to the mechanism "exit", large taxpayers can "voice" their interests directly vis-à-vis the government (Hendrick et al. 2007). These arguments lead to our central hypothesis: The more concentrated the tax payments are, the lower the tax rate – other things equal.

The empirical literature has not emphasized the role of tax-payer concentration so far (Rivelli, 2006; Genschel and Schwarz, 2011). By analyzing determinants of local business tax rates (Gewerbeertragssteuer) in the German state of Hesse between 1998 and 2005 we provide a direct test for the impact of tax-payer concentration on tax rates.

The paper proceeds as follows. Section 2 sketches the institutional settings and describes the data. In section 3 we describe the spatial regression techniques and present the results. Section 4 discusses these results and concludes.

2. Institutional Background and data

Hesse (21.100 km^2, 6 mill. population) consists of 426 municipalities. Municipalities are run by formally independent local authorities. They provide important public services like local roads, business parks, cultural infrastructure and pre-school childcare and account for approximately one quarter of overall government expenditures in Germany. More than 50 % of municipal revenues come from state grants and vertical tax sharing. The local business tax is the most important endogenous source of local revenues accounting for more than 10 % of municipal revenues (Zimmermann, 2009). Municipalities decide about the tax multiplier (Hebesatz) that fixes the effective rate on the profits of local business establishments. Fiscal equalization fills up the fiscal gap in financially weak municipalities but accepts inequality in fiscal capacity beyond that. The marginal contribute of local business tax revenues in a certain municipality on overall funds in this municipality remains significant even after fiscal equalization.

The tax multiplier of municipality i in year t is our endogenous variable (TAXRATE). The tax multiplier in our sample has a minimum value of 200 and a maximum value of 515, yet, 90% of multipliers lie in the range from 280 to 380. We measure the concentration in local tax payments using the Herfindahl-Index of tax payments by business establishments (HERFINDAHL), normalized to the range (0,1). We incorporate numerous control variables

used in similar studies (e.g. Buettner, 2001). These include population size (POP), population density (POP_DENS) and the share of population in large Christian churches (SHARE_REL). Furthermore, we include county dummies, a dummy variable for municipalities bordering other states (BORDER) and dummies for central cities "zentrale Orte" (CENTRAL) and medium-size centers "Mittelzentren" (MIDDLE).

To control for political factors, the share of seats in the council of the municipality occupied by the free voters' associations "Freie Wählergemeinschaft" (SHARE_FREE) and by left parties (SHARE_LEFT) are included. The financial situation of the municipality is captured by the municipality's revenues from tax sharing (TAXSHARE), from unconditional grants "Schlüsselzuweisungen" (GRANTS) and standardized revenues from the local business tax (BUSTAX). On the expenditure side, we include municipalities' debt per capita (DEBT) and the unemployment rate on county level (UNEMP) as proxy for the financial burden from social security.

Hesse's municipalities provide a highly suitable data-set for our purpose because we find considerable variation in business tax rates and tax-payers' concentration. At the same time, tax-payers' concentration is uncorrelated with other exogenous variables, especially with municipality size. Further, all municipalities operate under the same institutional framework which allows a comparative analysis.

The HERFINDAHL-variable is only available on a triennial basis. Until 1995, the local business tax had a multiple tax base and thus concentration cannot be calculated. A structural break in municipal budget data prevents us from using more recent years. Thus, in order to secure comparability of business tax rates, we use a data panel containing observations from business tax rates from years t (1999, 2002, 2005) for our endogenous variable; all explanatory variables refer to the year t-1 (1998, 2001, 2004) when the tax rate for year t is fixed.

3. Empirical approach and results

We assume a spatial-autoregressive model with autoregressive disturbances and exogeneous regressors (Brueckner, 2003). Spatial relations of business tax rates are modeled through spatial lags as the model allows for spatial interactions in the dependent variable, the exogeneous variables, and the disturbances. The spatial autoregressive model reads:

$$y = \lambda \, Wy + X \beta + u \qquad \qquad (1)$$

$$u = \rho Mu + \varepsilon \qquad \qquad (2)$$

where y is the business tax rate of municipalities. X is a matrix of exogenous variables and β represents the corresponding parameter vector. W and M are spatial weighting matrices. Wy and Mu represent the spatial lags and λ and ρ are the corresponding scalar parameters. The vector u denotes the autoregressive error term in expression (1) while the error term in expression (2) is denoted by $\varepsilon \left(\varepsilon \sim N(0, \sigma I) \right)$ (Anselin, 1988).

We apply a generalized two-stage-least-squares estimator. In the first step, this estimator accounts for the endogeneity of y and X, by applying a two stage least squares (2SLS) estimation using $H = \left\{ X, WX, ..., W^q X, MX, MWX, ..., MW^q X \right\}$ as instruments for Wy. In the second step the autoregressive parameter, ρ, is estimated using the generalized moments estimation approach based on the 2SLS residuals obtained via the first step. In the third step, the regression model in (1) is re-estimated by 2SLS after transforming the model via a Cochrane–Orcutt-type transformation to account for the spatial correlation (Kelejian and Prucha, 2010). A number of studies apply a matrix H with q = 1 as instruments, which means regressing Wy on X and WX and use the fitted values as instruments for $\hat{W}y$ (Brueckner, 2003). We follow Kelejian and Prucha's suggestion to set $q=2$ because this has worked well with Monte Carlo simulations (Kelejian and Prucha, 2010).

Table 1 presents the results of our regression. Three municipalities are dropped due to missing values leaving us with 423 municipalities. Consistent with previous literature both weighting matrices W and M are assumed to be identical, row-standardized and population-weighted neighboring matrices. All aforementioned explanatory variables are used in the regression. The grant scheme in Hesse assumes higher per capita needs for larger municipalities. In column (2), we account for this fact by using dummies for the corresponding population brackets instead of the continuous population variables used in column (1).

Our central hypothesis is clearly supported in all specifications: The local business multiplier is significantly lower for municipalities with a high concentration of tax-payers. The performance of control variables and λ is consistent with previous studies (e.g., Buettner, 2001; Genschel and Schwarz, 2011). Although not reported here, we performed a number of robustness checks. First, we test additional control variables. In particular, we test for population dynamics to rule out the possibility that our result is driven by shrinking municipalities setting low tax rates to prevent the already diminished number of firms to reduce further. We find population growth and HERFINDAHL to be uncorrelated. Second, we apply maximum likelihood estimators and test a row-standardized contiguity matrix without population weights. Third, we exclude the five cities with more than 100,000 inhabitants. Throughout all robustness checks, the impact of the Herfindahl index remains negative and significant.[1]

The estimated coefficient of the Herfindahl index has a value of around 13 in all models (including the robustness checks). To illustrate the economic relevance of this result, imagine a municipality A with 50 firms of tax payments X each and one dominant firm paying 154X. Compared to an otherwise identical municipality B with 51 firms paying 4X each, the tax rate in A is 7.2 percentage points lower. In the ranking of municipalities by tax rates, this represents displacement by more than 30 positions (from the median).

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[1] Details are given in the appendix.

Table 1: Generalized Two-Stage Least Square Estimations on TAXRATE

Variables / Model	(1)	(2)
HERFINDAHL	-12.80**	-12.40**
	(6.449)	(6.168)
Geographical and Demographic Characteristics		
POP	0.000154***	–
	(2.95e-05)	
POP DENS	0.0153***	–
	(0.00293)	
SHARE REL	-0.0238***	0.000988
	(0.00903)	(0.00721)
BORDER	2.176	1.859
	(1.557)	(1.587)
CENTRAL	62.73***	88.69***
	(6.025)	(9.395)
MIDDLE	8.719***	-0.680
	(1.763)	(2.269)
Population brackets included	NO	YES
Political Context		
SHARE FREE	-3.121	-4.630
	(5.154)	(5.237)
SHARE LEFT	52.12***	51.76***
	(5.525)	(5.667)
Fiscal Variables		
TAXSHARE	-1.516	1.906
	(4.620)	(4.101)
GRANTS	-34.99***	-47.81***
	(6.149)	(6.651)
BUSTAX	-0.00693*	-0.00386
	(0.00369)	(0.00381)
DEBT	0.00284***	0.00477***
	(0.000887)	(0.00109)
UNEMP	-0.184	-0.0331
	(0.298)	(0.311)
Spatial Dependence		
λ	0.0987***	0.0915***
	(0.0266)	(0.0254)
ρ	0.158***	0.150***
	(0.0419)	(0.0467)
Constant	265.1***	283.9***
	(9.815)	(12.36)
Observations	1,269	1,269

Standard errors are given in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$

4. Discussion

We contribute to the empirical literature on tax and yardstick competition by addressing a question that has been largely ignored so far: What if a large share of tax revenues stems from a small number of large tax-payers? Using data on the local business tax in Hesse between 1998 and 2005, we find evidence that local business tax rates are lower the higher the concentration among tax-payers.

The rationale behind this result is twofold. First, large firms have much stronger incentives to control the government and lobby it for favorable conditions. Second, the mere size of their contribution to overall revenues lends them political power and opens up a channel of influence unavailable to small firms: They can voice their interest directly vis-à-vis the local government. The mechanism voice has received very little attention in the (empirical) tax and yardstick competition literature so far (for an exception, see Hendrick et al., 2007). Our results suggest that it deserves more attention.

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APPENDIX

In the empirical analysis given in the paper, the authors provide one regression table denoting the results of a generalized-two-stage least squares estimator which is an instrumental regression analysis techniques. As robustness checks – which are not mentioned in the paper – the authors show that the usage of an alternative weighting matrix M and W without population weights, maximum likelihood estimators instead of the instrumental regression approaches, regression analysis disregarding the big five cities with more than 100,000 inhabitants and the addition of further control variables, respectively, does not influence the results. To verify this statement, supplementary material is given in this manuscript.

In Table S1 the authors utilize a row-standardized contiguity matrix without population weights for M and W in columns (3) and (4). Column (1) and (2) contains the results for a contiguity-matrix M and W based on population weights as given in the paper. In other words, the first two models assume that the influence of neighboring municipalities is proportional to their size where as the other models assume that all neighboring municipalities exert the influence, regardless of their size. Columns (2) and (4) of Table S1 also report the coefficient estimators for the single population brackets of the fiscal equalization system. In Table S2 the authors provide maximum likelihood estimators with the same set of variables and the same weighting schemes as given in Table 1 of the main manuscript. In Table S3 we provide models excluding the big five cities of analysis, applying the population-weighted weighting matrix. Additional test of the same estimation approach as in Table 1 are presented in Tables S4 and S5. In the first column of these tables, standardized landtax rates is included in the analysis. Additionally, a measure to what extent a municipality is potentially growing or shrinking (percentage of inhabitants of AGE over 64 - percentage of inhabitants of AGE under 15) is included. Finally, the third model uses redemption payments as an alternative debt variable.

The only difference comparing Table S4 and Table S5 is the application of population-weighted (Tables S4) and contiguity weighting matrices (Table S5).

Over all models – except for model (2) in Tables S4 and S5, where the Herfindahl index has a negative and significant impact on the ten percent level – the Herfindahl index has a negative impact on tax share being significant on the 5 percent level. The size of the coefficient estimator of around 13 is quite robust.

Table S1: Generalized Two-Stage Least Square Estimations on TAXRATE

Variables / Models	(1)	(2)	(3)	(4)
HERFINDAHL	-12.80**	-12.40**	-13.14**	-12.71**
	(6.449)	(6.168)	(6.440)	(6.046)
Geographical and Demographic Characteristics				
POP	0.000154***	–	0.000141***	–
	(2.95e-05)		(2.52e-05)	
POP DENS	0.0153***	–	0.0137***	–
	(0.00293)		(0.00294)	
POPULATION SIZE – 5,000	–	-20.63***	–	-21.72***
		(6.991)		(6.623)
POPULATION SIZE 5,001 – 7,500	–	-18.36***	–	-19.52***
		(6.859)		(6.505)
POPULATION SIZE: 7,501 – 10,000	–	-13.26*	–	-14.48**
		(6.860)		(6.484)
POPULATION SIZE: 10,001 – 15,000	–	-3.702	–	-5.047
		(6.787)		(6.378)
POPULATION SIZE: 15,001 – 20,000	–	-0.0650	–	-1.846
		(6.929)		(6.597)
POPULATION SIZE: 20,001 – 30,000	–	0.299	–	-1.258
		(7.056)		(6.666)
POPULATION SIZE: 30,001 – 50,000	–	12.96*	–	10.44
		(7.739)		(7.468)
POPULATION >50,000	–	Ref.	–	Ref.
SHARE REL	-0.0238***	0.000988	-0.0226**	0.00395
	(0.00903)	(0.00721)	(0.00886)	(0.00679)
BORDER	2.176	1.859	1.858	1.424
	(1.557)	(1.587)	(1.510)	(1.523)
CENTRAL	62.73***	88.69***	65.79***	86.52***
	(6.025)	(9.395)	(5.956)	(8.862)
MIDDLE	8.719***	-0.680	8.479***	-0.312
	(1.763)	(2.269)	(1.722)	(2.229)
Political Context				
SHARE FREE	-3.121	-4.630	-2.568	-3.596
	(5.154)	(5.237)	(5.041)	(5.036)
SHARE LEFT	52.12***	51.76***	48.40***	46.75***
	(5.525)	(5.667)	(5.410)	(5.461)
Fiscal variables				
TAXSHARE	-1.516	1.906	-4.741	-2.692
	(4.620)	(4.101)	(4.826)	(4.254)
GRANTS	-34.99***	-47.81***	-34.24***	-44.90***
	(6.149)	(6.651)	(5.963)	(6.398)
BUSTAX	-0.00693*	-0.00386	-0.00685*	-0.00361
	(0.00369)	(0.00381)	(0.00361)	(0.00338)
DEBT	0.00284***	0.00477***	0.00295***	0.00499***
	(0.000887)	(0.00109)	(0.000869)	(0.00104)
UNEMP	-0.184	-0.0331	-0.00798	0.174
	(0.298)	(0.311)	(0.289)	(0.299)
Spatial Dependence				
λ	0.0987***	0.0915***	0.276***	0.302***
	(0.0266)	(0.0254)	(0.0490)	(0.0463)
ρ	0.158***	0.150***	0.0365	0.0248
	(0.0419)	(0.0467)	(0.0650)	(0.0674)
Constant	265.1***	283.9***	210.9***	219.5***
	(9.815)	(12.36)	(16.07)	(17.38)
Observations	1,269	1,269	1,269	1,269
population-weights in W,M	YES	YES	NO	NO

Standard errors are given in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table S2: Maximum Likelihood Estimations on TAXRATE

Variables / Models	(1)	(2)	(3)	(4)
HERFINDAHL	-13.00**	-12.12**	-13.46**	-12.87**
	(5.885)	(5.997)	(5.812)	(5.867)
POP	0.000150***		0.000141***	
	(2.31e-05)		(2.39e-05)	
POP_DENS	0.0158***		0.0148***	
	(0.00247)		(0.00245)	
POPULATION SIZE – 5,000		-19.09*		-21.81**
		(9.749)		(9.471)
POPULATION SIZE 5,001 – 7,500		-16.66*		-19.41**
		(9.668)		(9.395)
POPULATION SIZE: 7,501 – 10,000		-11.67		-14.52
		(9.667)		(9.388)
POPULATION SIZE: 10,001 – 15,000		-1.835		-4.701
		(9.536)		(9.268)
POPULATION SIZE: 15,001 – 20,000		2.319		-1.147
		(9.702)		(9.413)
POPULATION SIZE: 20,001 – 30,000		2.280		-0.624
		(9.675)		(9.427)
POPULATION SIZE: 30,001 – 50,000		14.44		11.27
		(9.925)		(9.682)
POPULATION >50,000		Ref.		Ref.
SHARE_REL	-0.0239***	0.000798	-0.0228***	0.00362
	(0.00865)	(0.00995)	(0.00852)	(0.00976)
BORDER	2.160	1.747	1.941	1.425
	(1.503)	(1.515)	(1.470)	(1.472)
CENTRAL	62.02***	89.32***	64.95***	87.02***
	(5.761)	(10.50)	(5.807)	(10.20)
MIDDLE	8.898***	-0.552	8.732***	-0.321
	(1.765)	(2.298)	(1.749)	(2.253)
SHARE_FREE	-3.281	-4.657	-3.033	-4.059
	(5.954)	(6.018)	(5.871)	(5.888)
SHARE_LEFT	52.30***	51.12***	49.33***	47.50***
	(5.299)	(5.389)	(5.205)	(5.256)
TAXSHARE	-1.518	1.518	-4.177	-1.933
	(5.028)	(4.926)	(4.932)	(4.805)
GRANTS	-35.10***	-47.97***	-34.87***	-46.02***
	(6.372)	(6.409)	(6.297)	(6.308)
BUSTAX	-0.00665**	-0.00355	-0.00647**	-0.00327
	(0.00302)	(0.00302)	(0.00299)	(0.00294)
DEBT	0.00290***	0.00505***	0.00303***	0.00515***
	(0.000943)	(0.000979)	(0.000935)	(0.000959)
UNEMP	-0.219	-0.0149	-0.0797	0.119
	(0.318)	(0.322)	(0.308)	(0.310)
λ	0.0817***	0.0684*	0.205***	0.231***
	(0.0244)	(0.0386)	(0.0539)	(0.0635)
ρ	0.178***	0.182**	0.121	0.127
	(0.0472)	(0.0712)	(0.0756)	(0.0916)
Sigma	474.3***	483.0***	460.6***	462.4***
	(18.87)	(19.25)	(18.32)	(18.41)
Constant	270.8***	289.6***	233.4***	242.2***
	(9.113)	(16.30)	(17.65)	(22.48)
Weighting scheme	W_p	W_p	W_c	W_c
Observations	1,269	1,269	1,269	1,269

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table S3: Generalized Two-Stage Least Square Estimations on TAXRATE (without biggest five cities)

Variables / Models	(1)	(2)
HERFINDAHL	-12.58**	-13.68**
	(6.241)	(5.913)
POP	0.000779***	
	(0.000139)	
POP_DENS	0.00917***	
	(0.00344)	
POPULATION SIZE – 5,000		-20.42***
		(7.782)
POPULATION SIZE 5,001 – 7,500		-18.69**
		(7.641)
POPULATION SIZE: 7,501 – 10,000		-14.25*
		(7.599)
POPULATION SIZE: 10,001 – 15,000		-4.330
		(7.759)
POPULATION SIZE: 15,001 – 20,000		0.755
		(7.931)
POPULATION SIZE: 20,001 – 30,000		-0.297
		(7.818)
POPULATION SIZE: 30,001 – 50,000		14.06*
		(8.073)
POPULATION >50,000		
SHARE_REL	-0.00773	0.00580
	(0.00765)	(0.00650)
BORDER	2.463	1.683
	(1.675)	(1.712)
CENTRAL	25.24**	66.61***
	(10.42)	(10.38)
MIDDLE	2.969	0.0646
	(2.138)	(2.136)
SHARE_FREE	-3.926	-4.613
	(4.871)	(4.955)
SHARE_LEFT_	41.55***	40.84***
	(5.610)	(5.679)
TAXSHARE	-4.335	-0.885
	(5.874)	(4.521)
GRANTS	-36.08***	-44.61***
	(6.249)	(6.645)
BUSTAX	-0.00490	-0.00316
	(0.00320)	(0.00309)
DEBT	0.00448***	0.00542***
	(0.000927)	(0.000949)
UNEMP	-0.303	-0.418
	(0.316)	(0.339)
Constant	229.1***	259.8***
	(14.08)	(16.74)
λ	0.212***	0.189***
	(0.0416)	(0.0425)
ρ	0.220***	0.288***
	(0.0536)	(0.0502)
Weighting scheme	W_p	W_p
Observations	1,254	1,254

Standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table S4: Generalized Two-Stage Least Square Estimations on TAXRATE (Weighting Scheme W_c)

Variables / Models	(1)	(2)	(3)
HERFINDAHL	-12.68**	-10.02*	-12.73**
	(6.044)	(5.809)	(6.098)
POPULATION SIZE – 5,000	-21.75***	-20.00***	-20.41***
	(6.651)	(5.025)	(6.296)
POPULATION SIZE 5,001 – 7,500	-19.58***	-18.21***	-17.80***
	(6.546)	(4.904)	(6.217)
POPULATION SIZE: 7,501 – 10,000	-14.52**	-13.64***	-13.10**
	(6.519)	(4.892)	(6.142)
POPULATION SIZE: 10,001 – 15,000	-5.118	-5.389	-3.414
	(6.418)	(4.738)	(6.080)
POPULATION SIZE: 15,001 – 20,000	-1.914	-3.223	-0.490
	(6.624)	(4.978)	(6.282)
POPULATION SIZE: 20,001 – 30,000	-1.325	-2.562	0.739
	(6.684)	(5.104)	(6.335)
POPULATION SIZE: 30,001 – 50,000	10.37	10.17*	11.95*
	(7.473)	(6.133)	(7.129)
POPULATION SIZE > 50,000			
SHARE_REL	0.00396	0.00304	0.00411
	(0.00679)	(0.00694)	(0.00682)
BORDER	1.420	1.941	1.276
	(1.521)	(1.492)	(1.519)
CENTRAL	86.41***	83.19***	87.18***
	(8.900)	(7.305)	(8.611)
MIDDLE	-0.279	1.876	-1.149
	(2.228)	(2.184)	(2.233)
SHARE_FREE	-3.503	-3.678	-4.045
	(5.049)	(4.954)	(5.022)
SHARE_LEFT	46.66***	46.79***	45.05***
	(5.444)	(5.311)	(5.441)
TAXSHARE	-1.607	2.551	1.225
	(6.069)	(5.534)	(5.952)
GRANTS	-44.40***	-38.57***	-41.98***
	(6.903)	(6.363)	(6.906)
BUSTAX	-0.00346	-0.00620**	-0.00363
	(0.00348)	(0.00298)	(0.00351)
LANDTAX	-626.1	669.4	-490.7
	(2,915)	(2,738)	(2,883)
DEBT	0.00502***		0.00466***
	(0.00105)		(0.00107)
UNEMP	0.183	0.223	0.0888
	(0.297)	(0.293)	(0.299)
REDEMPTION PAYMENT (alternative to DEBT)		0.000229***	
		(5.77e-05)	
SHRINK			0.397*
			(0.207)
Constant	218.2***	215.7***	215.1***
	(17.29)	(15.90)	(17.10)
λ	0.306***	0.311***	0.311***
	(0.0458)	(0.0433)	(0.0457)
ρ	0.0217	-0.0265	0.0141
	(0.0671)	(0.0671)	(0.0670)
Weighting Scheme	W_c	W_c	W_c
Observations	1,269	1,269	1,269

Standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table S5: Generalized Two-Stage Least Square Estimations on TAXRATE
(Weighting Scheme W$_p$)

Variables / Models	(1)	(2)	(3)
HERFINDAHL	-12.38**	-9.724*	-12.49**
	(6.168)	(5.956)	(6.216)
POPULATION SIZE	-20.67***	-18.45***	-19.43***
– 5,000	(7.032)	(5.556)	(6.720)
POPULATION SIZE	-18.44***	-16.52***	-16.76**
5,001 – 7,500	(6.911)	(5.425)	(6.623)
POPULATION SIZE:	-13.33*	-11.96**	-12.01*
7,501 – 10,000	(6.904)	(5.439)	(6.570)
POPULATION SIZE:	-3.799	-3.506	-2.170
10,001 – 15,000	(6.834)	(5.348)	(6.546)
POPULATION SIZE:	-0.154	-0.775	1.216
15,001 – 20,000	(6.965)	(5.518)	(6.674)
POPULATION SIZE:	0.219	-0.438	2.207
20,001 – 30,000	(7.080)	(5.674)	(6.781)
POPULATION SIZE:	12.89*	13.17**	14.46*
30,001 – 50,000	(7.745)	(6.526)	(7.444)
POPULATION SIZE > 50,000	Ref.	Ref.	Ref.
SHARE_REL	0.000976	0.000619	0.00110
	(0.00720)	(0.00732)	(0.00721)
BORDER	1.862	2.259	1.726
	(1.586)	(1.569)	(1.586)
CENTRAL	88.65***	85.79***	89.45***
	(9.452)	(7.857)	(9.194)
MIDDLE	-0.641	1.553	-1.493
	(2.266)	(2.224)	(2.284)
SHARE_FREE	-4.523	-4.642	-5.070
	(5.250)	(5.163)	(5.224)
SHARE_LEFT	51.69***	51.40***	50.26***
	(5.656)	(5.526)	(5.673)
TAXSHARE	3.320	7.425	6.141
	(5.912)	(5.646)	(6.142)
GRANTS	-47.21***	-40.88***	-44.96***
	(7.176)	(6.660)	(7.226)
BUSTAX	-0.00368	-0.00634*	-0.00379
	(0.00393)	(0.00339)	(0.00396)
LANDTAX	-787.5	240.4	-708.0
	(2,989)	(2,846)	(3,008)
DEBT	0.00481***		0.00447***
	(0.00109)		(0.00111)
UNEMP	-0.0216	0.0124	-0.116
	(0.309)	(0.307)	(0.311)
REDEMPTION PAYMENT		0.000235***	
(alternative to DEBT)		(5.63e-05)	
SHRINK			0.394*
			(0.218)
Constant	282.8***	278.2***	281.2***
	(12.33)	(11.27)	(12.12)
λ	0.0939***	0.104***	0.0942***
	(0.0253)	(0.0243)	(0.0253)
ρ	0.147***	0.118**	0.141***
	(0.0466)	(0.0466)	(0.0466)
Weighting Scheme	W$_p$	W$_p$	W$_p$
Observations	1,269	1,269	1,269

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1