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The political side of public utilities: how opportunistic behavior and yardstick competition shape water prices in Austria

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Abstract

This paper studies the effect of politics on water prices in Austria. When public utilities are under political control, price setting may be affected by political incentives. Besides classical theories like the political budget cycle, more current research stresses the role of spatial interactions between jurisdictions (yardstick competition). The paper tests for both local political competition and yardstick competition using a spatial lag model. The results suggest that water prices are lower when political competition is strong and before elections. At the same time the magnitude of the political budget cycle appears to depend upon neighboring jurisdictions, thus confirming yardstick competition as an indirect determinant of water prices.

Keywords Political budget cycle; Yardstick competition; Tax mimicking; JEL: H71, H73

1 Introduction

One way to deal with the market failures in natural monopolies is to provide the goods and services by the public sector. Despite the privatization efforts of the last decades, public enterprises are still very common in Europe. For public services and utilities for example, a recent report by the European Centre of Employers and Enterprises providing Public services (2010) shows that the share of public enterprises is still sizable in most European Countries. Regarding the Austrian water sector, which is analyzed in this paper, provision by a local public monopoly is the predominant case and accounts for more than 75% of all municipalities. Moving a service from the private to the public sphere is considered to remove economic incentives and should therefore lessen the risk of quality shading or the abuse of monopoly power (See Williamson (1999)). Such solutions, although often under scrutiny for cost-inefficiency reasons, are therefore considered to improve upon allocative efficiency because prices are not set to maximize profits. How, on the other hand, public monopolies actually set their prices and whether this is anywhere close to optimal cost

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pricing rules prescribed by economic theory remains unclear.

To investigate the issue of public price setting more deeply, this paper focuses on aspects of political price and tax setting. While private sector behavior is characterized by economic incentives, public sector agents in democracies have political incentives. Until now, associated research has focused almost exclusively on the effect of politics on tax and expenditure policies. Important contributions linking political incentives and fiscal policy are for instance political budget cycles (Rogoff (1990)) and partisan politics (Alesina (1987)). Since public enterprises are typically under the control of politicians, they can be used to pursue political goals. Hence, prices for public services like water, waste and public transport are set or at least potentially influenced by politicians. If we take political economics literature seriously, these politicians will strategically use fiscal instruments to increase the probability of reelection. The literature offers many examples of decisions in public enterprises, which are made on the basis of political benefit rather than economic reasoning (see e.g. Shleifer and Vishny (1994)). Consequently, public service prices may represent just another fiscal instrument for politicians to alter the probability of reelection.

Recent work from both political and regional sciences suggests that there is yet another mechanism - yardstick competition - through which politics and pricing decision in public monopolies may be connected. In analogy to the term coined by Shleifer (1985), (political) yardstick competition means that citizens monitor the performance of the local incumbent by comparison with neighboring politicians (See Salmon (1987) and Besley and Case (1995)). The core prediction of this type of yardstick competition models is that local politicians will mimic the behavior of neighboring jurisdictions to signal good performance and to secure reelection. Thus, there are reasons to believe that vote-seeking and price setting are connected not only by local political conditions but also through the nexus of yardstick-competition.

The goal of this paper is twofold. Firstly, the role of politics for public service prices is assessed using a large dataset on Austrian water provision. This involves testing the effect of partisan politics, the intensity of political competition and the political budget cycle on water prices. Secondly, to account for potential strategic interactions between jurisdictions, the influence of neighboring jurisdictions is tested. These empirical tests should help to evaluate if political price distortions are a relevant phenomenon of public monopolies and whether yardstick competition exists between Austrian municipalities. Testing both hypotheses jointly should help to clarify price setting in public monopolies.

This paper contributes to the literature by showing that vote-seeking politicians also use public service prices in an opportunistic manner. As public utility tariffs in general and water prices in particular typically only increase over time, politicians cannot really gain votes by manipulating prices but rather try to avoid losing votes by strategic timing of unpopular events. This finding suggests that although theoretically utility prices should be closely connected to costs, mandated both by national and European regulations, political reasons lead to deviations from this principle. In addition, the paper shows that yardstick competition may be interpreted as a conditionality of the political budget cycle, thus confirming the notion that the intensity of opportunistic behavior depends on various institutional and political characteristics (see see e.g. Persson and Tabellini (2003),Akhmedov and Zhuravskaya (2004), Shi and Svensson (2006) or Brender and Drazen (2007)). Incorporating strategic interaction as a conditionality not only makes interpretation of results easier – Bordignon et al. (2004):"Yardstick competition theory is too "weak" to produce well defined empirical predictions" – but also forces the researcher to clearly define the link through which neighboring jurisdictions affect local political behavior.

The paper proceeds as follows. The next section briefly sketches the basic literature connecting political incentives and fiscal policy. After that the paper tests the hypotheses that politics influence public monopoly behavior using a large dataset on Austrian water providers in section 3. Section 4 interprets the results and concludes.

2 Theoretical Considerations

If public enterprises like utilities are politically controlled, the prices for the offered services can be considered a special type of tax. As such and in connection with self-interested politicians who seek reelection, public service prices may be used to pursue political goals. As identified by the existing literature connecting fiscal policy and political incentives, two potential phenomena may be expected to be present in pricing decisions: political budget cycles and partisan cycles. Indeed, a number of recent studies finds evidence of these strategic patterns in tax and expenditure policies on national and local government level, e.g. Foucault et al. (2008), Aidt et al. (2010), Sakurai and Menezes-Filho (2010), Schneider (2010), Gérard et al. (2010). Especially the political budget cycle as a determinant of opportunistic fiscal behavior has been analyzed in a large number of studies. It goes back to the works of Nordhaus (1975), Rogoff and Sibert (1988) and Rogoff (1990) and emphasizes electorally motivated cycles in tax and expenditure policy. In a nutshell, political budget cycle models assume that politicians strategically manipulate fiscal policy instruments to ensure reelection. They try to 'signal' good performance to voters with asymmetric information by lowering taxes or increasing (visible) expenditures. Applied to public service prices, one would therefore expect that tariff increases are less likely in or around an election period.[1]

Regarding partisan cycles, although the empirical evidence is not as rich as on political budget cycles, it has been found to significantly influence public policy in a number of empirical tests.[2] Theories of partisan politics stress the influence of party ideological differences on the economy. Abandoning the idea of purely opportunistic political parties, Alesina (1987) suggests that political and economic cycles are connected through preference differences between parties. Different parties have different priorities when in power and the economy may react accordingly. While the direction of the effect is not quite clear for public service prices, partisan models would predict a potentially different price setting pattern, depending on the ideological setup of the ruling political party.

Finally, a number of more recent empirical contributions (e.g. Bordignon et al. (2003), Solé-Ollé (2003), Allers and Elhorst (2005), Elhorst and Fréret (2009)) has emphasized the notion that the intensity of political competition also matters for fiscal policy choices. E.g. if parties have a large win-margin or are backed by a majority, their behavior may be different from governments with a lower win-margin. Although there is some empirical evidence confirming the notion that majorities behave differently, the sign of the effect is again somewhat unclear. Theoretically, as explained in Solé-Ollé (2003), majority governments may be able to increase tax rates more because they have a higher probability of re-election, i.e. the win-margin from the last election. On the other hand, the political accountability for the tax-increases is also higher compared to a coalition government. Thus, from a theoretical point of view the direction of the effect from more or less intense political competition on

[1] In contrast to taxes, where we may observe changes in both directions, prices for public services typically only increase or remain unchanged.

[2] See Hibbs Jr (1992) and Franzese (2002) for overviews.

tax and price setting is undecided. It is nevertheless expected that party strength affects price setting.

To sum, when applied to price setting decisions in public enterprises, the existing theoretical and empirical work on political determinants of fiscal policy leads to the following hypothesis:

Hypothesis 1 *The price setting behavior of public monopolies is influenced by the political factors party ideology, election dates and strength of the governing party.*

Tax-mimicking and Yardstick competition

The theories outlined above treat each jurisdiction as an isolated political market.[3] These markets may be affected by similar national or regional shocks but apart from that it is usually assumed that there is no interaction between jurisdictions. Public service prices set by one jurisdiction may, however, not be independent from its neighboring jurisdictions. For instance it is possible if not even likely that the political cost of a price increase before an election depends upon the pricing decision of the neighboring jurisdictions. If this is the case, prices are not only determined by local factors but also strategic interaction among jurisdictions.

The decisive feature of strategic interaction and tax mimicking are correlated tax rates among governments, which are indeed often observed in reality. Moreover, the notion that the behavior of neighboring municipalities is relevant for local fiscal policy has been confirmed repeatedly in empirical work. For instance Ashworth et al. (2006) show that the timing of introducing new taxes not only depends on the election cycles but also whether neighboring jurisdictions have already introduced such a tax. Among the different theoretical explanations for tax-mimicking, yardstick competition explicitly links strategic interaction with the political process.[4] The theory of yardstick competition argues that imperfectly informed citizens judge the performance of their local government by comparing it to neighboring jurisdictions. The neighboring jurisdictions therefore serve as a benchmark for the local politician who may find certain policy choices more or less costly depending on neighboring jurisdictions' actions. The argument is therefore somewhat similar to the opportunistic behavior in the political budget cycle model, where politicians also try to signal good performance. But instead of a temporal dimension - before and after elections - yardstick competition stresses that voters judge the performance of the local incumbent by comparing it to neighboring jurisdictions. In this respect, Salmon (1987) emphasizes the incentives (moral hazard) created by strategic interaction among governments:"Office Holders are more or less alike and focus is on the impact of yardstick competition on their incentives."[5] From the point of view of a politician, public service prices may be no different from taxes as a mean to pursue political goals. We would therefore expect that not only tax rates but also public service prices are affected by yardstick competition.

The central problem of empirical studies is that correlated tax rates (or prices) are not necessarily evidence of yardstick competition. Competing theoretical explanations (expenditure

[3]It should be noted however, that some of the papers cited above do consider spatial interactions, e.g. Bordignon et al. (2003), Solé-Ollé (2003), Allers and Elhorst (2005), Elhorst and Fréret (2009). But the presented underlying theoretical ideas are nevertheless restricted to the local political market.

[4]For a comparison of tax-mimicking types see Brueckner (2003)

[5]See Salmon (2006). For a different interpretation of yardstick competition, see Besley and Case (1995), who present yardstick-competition as a solution for the adverse selection problem between 'good' and 'bad' politicians.

spillovers, tax competition and yardstick competition) lead to the same (reduced-form) reaction function.[6] A strategy to distinguish yardstick competition from other types of tax mimicking is using interaction terms between mimicking and political variables.[7] A significant difference between the pure mimicking coefficient and the interaction term can be interpreted as evidence for yardstick competition.[8] Such an approach is e.g. applied by Besley and Case (1995), who find different mimicking of US-governors, depending on whether they serve their first or second and final term. A similar result is obtained by Bordignon et al. (2003), who find tax-mimicking only in those Italian cities, where politicians are eligible for reelection.[9] Moreover, Solé-Ollé (2003), Allers and Elhorst (2005) as well as Elhorst and Fréret (2009) find that mimicking is less pronounced in the presence of a large majority. On top of that, Solé-Ollé (2003) shows that there is stronger mimicking in election years. Finally, Schaltegger and Kuettel (2002) differentiate Swiss cantons by the intensity of direct democracy and find that mimicking is weaker in cantons with a high degree of direct democracy.

To sum, the core difference between yardstick competition and classical theories of fiscal electioneering is that the former emphasizes that local voters compare their jurisdiction with neighboring jurisdictions. In contrast, the theories outlined in the beginning of this section treat each jurisdiction as an isolated political market. What the theories of locally determined policies and yardstick competition have, however, in common is their focus on political behavior. Especially when looking at empirical work, it is interesting to see that the two sets of theories often treat each other as conditionalities. On the one hand, yardstick competition approaches use political variables like term limits or elections cycles for their identification strategy. On the other hand, the effect of electoral or partisan cycles has been shown to be strongly dependent on various institutional and political factors, one of which is the behavior of neighboring jurisdictions. Thus although the two strands of literature appear to have largely ignored each other, the existing empirical work highlights their intimate relationship.

The theories do differ, however, in their view about the channels through which politics affects price setting. Standard partisan politics or political budget cycle theories postulate a direct impact on prices. For instance, public service prices should be lower before elections than after and left wing governments are predicted to have higher taxes than conservatives. Yardstick competition does not embody such direct effects on taxes and does not give directional predictions regarding the effect of yardstick competition on taxes. In the words of Bordignon et al. (2004):"Yardstick competition theory is too "weak" to produce well defined empirical predictions." Given this theoretical indeterminacy of the direction of the effect of yardstick competition on fiscal variables, this paper interprets yardstick competition as a conditionality for local political factors. As stated in Hypothesis 1 local political factors determine price setting. But the magnitude of how strongly these factors change prices may depend on neighboring jurisdictions. E.g. in the case of the political budget cycle, the more neighboring municipalities increase prices before elections, the larger the leeway for a local politician to increase prices and still appear relatively good compared to neighbors. This leads to the second hypothesis:

Hypothesis 2 *The intensity of political factors as determinants of price setting behavior of public monopolies is conditional on the behavior of neighboring jurisdictions.*

[6] See Brueckner (2003)

[7] This is also the strategy adopted in the underlying paper. See section 3.

[8] See Allers and Elhorst (2005)

[9] The empirical approach in Bordignon et al. (2003) is somewhat different as the authors use a spatial error model instead of the typical spatial lag model.

Hence yardstick competition can only affect price setting indirectly through political factors. Depending on the political situation, it may be almost irrelevant what neighboring jurisdictions do, e.g. if a government has a very large win-margin or if there are no elections in the foreseeable future. Thus the behavior of neighboring jurisdictions alone is not considered a relevant determinant of local municipal price setting. By interpreting yardstick competition as conditionality rather than a direct determinant the paper embeds yardstick competition in contemporary research that tries to answer the question why we observe different magnitudes of electoral or partisan cycles. Treating yardstick competition as a conditionality is also perfectly consistent with standard approaches trying to test for its existence, where interactions with political factors are deliberately used for identification of yardstick competition as the source of strategic interaction. The predictions of yardstick competition and standard fiscal electioneering theories are tested empirically in the next section.

3 Empirical Analysis

3.1 Characteristics of the Austrian Water Sector

Water distribution is a municipal task in Austria. To finance the service, municipalities typically tax water consumption by charging fees or water prices.[10] These prices usually consist of a fixed part and a variable part depending on the amount of water consumed. Regarding the tariff decision itself, water prices are usually determined in the local city council by the municipal government. Although low water prices may be politically more acceptable, public services like water, sewage and waste are an important source of finance for municipalities and account on average for 17.2 % of total revenues.[11] As the two other main sources of finance, grants and shares of overall tax revenues, are determined exogenously, prices for public services are one of the few instruments at the disposal of local politicians.[12] Consequently, while local governments have some flexibility regarding the timing of increases or also the overall level of cost recovery, water prices need to be increased from time to time to account for inflation and other cost increases.

Unlike other public utilities like telecommunications or energy, there is no supervising regulatory agency in the Austrian water sector. Laws on the federal and province level represent a raw regulatory framework for municipalities and providers. While quality is typically explicitly specified in terms of parameter values such as maximum contamination levels, price setting is bound to be at most twice total cost (including operation, construction, interest and amortization).[13] This peculiar regulatory setting gives municipalities considerable leeway regarding price setting. Despite the fact that water services are highly professionalized in most cities in Austria, price setting appears very ad-hoc and discretionary. For example, although some municipalities like Vienna have explicitly pegged their water prices to the inflation rate they decide annually on whether to apply the rule or not. Hence,

[10] Another important source of finance for water services are subsidies. To foster investment in the water infrastructure, subsidies are available on both the federal and the state level. These subsidies are usually granted upon construction or restoration of a water facility or network. After an initial payment the subsidies come in the form of yearly assistance to long term loans.

[11] See Statistik Austria

[12] Land taxes, which are important in many other OECD countries, are also at the disposal of the local municipalities. In reality, however, the rates are capped above and virtually all municipalities have already adopted the maximum rate.

[13] See Finanzausgleichsgesetz 2008, Art. 1 § 15

the Austrian water sector which is characterized by the absence of a regulator and a large degree of discretionary leeway for politicians in price setting, represents an interesting setting for analyzing the pricing behavior of public service providers under political control.

3.2 Data and Variables

A large part of the data used in this paper is from local governments yearly balance of accounts, which is available from Statistik Austria. As regards the political variables, they are based on published election results from the nine provincial states. With 2.350 municipalities and a time period of 9 years, from 2000 to 2008, the total number of observations would amount to 21.150. A substantial number of observations is missing, however, mostly because those municipalities who contracted out water services do not report any comparable figures about water provision revenues in their accounts. While this may raise questions of sample selection, the estimated effects are nevertheless consistent estimates for the subsample at hand, namely municipalities which provide water services themselves. Using only this subsample also has the benefit that the political influence on price setting - determined by the local city council - is most direct and not hampered by conflicting objectives with the other contracting party. This means that the estimated coefficients still have a causal interpretation for the subsample of municipalities that provide water services directly. On the other hand, this paper is unable to answer the question if the same effects are present in the case municipalities chose to contract out water services. Eventually, an unbalanced panel with a total number of 12.032 observations is available for statistical analysis. Table 1 and 2 show summary statistics and pairwise correlations respectively.

Table 1: Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.
water_rev	54.329	35.631	0.076	714.439
W_water_rev	53.362	17.783	17.152	172.342
taxes	285.977	232.243	13.391	4430.358
debt	1915.403	1446.708	0.002	20413.021
expend	70.038	79.796	0.035	3371.476
margin	34.072	21.745	0	100
partisan	0.245	0.43	0	1
election	0.171	0.376	0	1
election_time	2.267	1.476	0	5
N		12032		

The dependent variable in all specifications is water revenues per capita (*water_rev*).[14] One drawback of this measure is that it is not a direct measure of prices meaning that demand shocks are also present in this variable as noise. On the upside, revenues have the advantage that it is not necessary to calculate some kind of tax rate on water. This may be especially relevant in the underlying case, where we usually observe two part tariffs. Regarding the explanatory variables, the following indicators are used to cover the fiscal and political characteristics of the municipality. The fiscal control variables comprise financial debt (*debt*), own tax revenues (*taxes*) and expenditures for water services (*expend*), each in euro per capita. These variables should sketch the financial stance and cost structure of a municipality. Larger financial resources in the form of own tax revenues or low debt reduce the pressure on a municipality to finance by increasing prices for public services. Expenditures for water services are a rough proxy for cost, which should directly and strongly

[14] All euro denominated variables are in logs.

Table 2: Cross-correlation table

Variables	water_rev	W_water_rev	taxes	debt	expend	margin	partisan	election	election_time
water_rev	1.000								
W_water_rev	0.468	1.000							
taxes	0.425	0.096	1.000						
debt	0.224	0.167	0.203	1.000					
expend	0.495	0.189	0.340	0.272	1.000				
margin	-0.009	0.078	-0.094	0.125	0.044	1.000			
partisan	0.027	0.023	0.071	-0.087	-0.030	-0.152	1.000		
election	-0.022	-0.036	-0.026	-0.009	-0.024	0.058	-0.011	1.000	
election_time	-0.011	-0.025	0.010	-0.001	0.010	-0.046	-0.005	-0.697	1.000

influence water price decisions. Because many other unobservable local characteristics may influence water revenues, time and municipality fixed effects are included. Municipality fixed effects should account for factors like size, population, geographical and topographical situation, access to water, quality of water etc. The time dummies capture trends and exogenous shocks on revenues such a yearly weather conditions, cost developments and similar factors. On the political side, local tax revenues may be influenced by the intensity of political competition (*margin*), the political budget cycle (*election*) and partisan politics (*partisan*). As found in many empirical studies, e.g. Bordignon et al. (2003), Solé-Ollé (2003) or Elhorst and Fréret (2009), the strength of the incumbent and in general the intensity of political competition may affect the pressure to mimic neighbors. Therefore a variable indicating the win-margin from the previous election is included in the model.[15] Along the arguments of a political budget cycle, a dummy for election years enters the estimations. As election dates are different between the nine states, the election dummies together with the year dummies are perfectly suited to explain different behavior in election years. Finally, because theories of partisan politics predict that different ideologies lead to different fiscal behavior, also a dummy for left wing governments is included.

To motivate the idea that politics matter for pricing decisions in the public sector, Figure 1 shows the mean yearly change in water revenues per capita, distinguished by the political regimes. According to the upper panel of the graph, water revenues in municipalities with below average win-margins and non-partisan governments increased relatively stronger than in municipalities with a coalition or partisan government. The most accentuated message the descriptive statistics convey, however, relates to the political budget cycle. In election years, the average yearly increase of water revenues is very close to zero, while it is around two euros for non-election years. In the lower panel of Figure 1, the average increase of water revenues over the election cycle is exhibited. While revenues are almost unchanged in election years and the year before, the increases get stronger the further the election is away.[16] The simple descriptive statistics presented in graph 1 suggest that politics may matter for water prices. Although this graph is uninformative about any causal relationships, the observed patterns indicate a relation of water price changes to politics.

[15] Instead of win-margin, a simple dummy variable indicating whether the incumbent has a majority of seats could be used. The results are, however, insensitive as to which of the two variables is used. Results with a majority dummy instead of win-margin are available from the author upon request.

[16] Because some states have elections every 5 and others every 6 years, the strength of the effect in the post election period is hard to establish here.

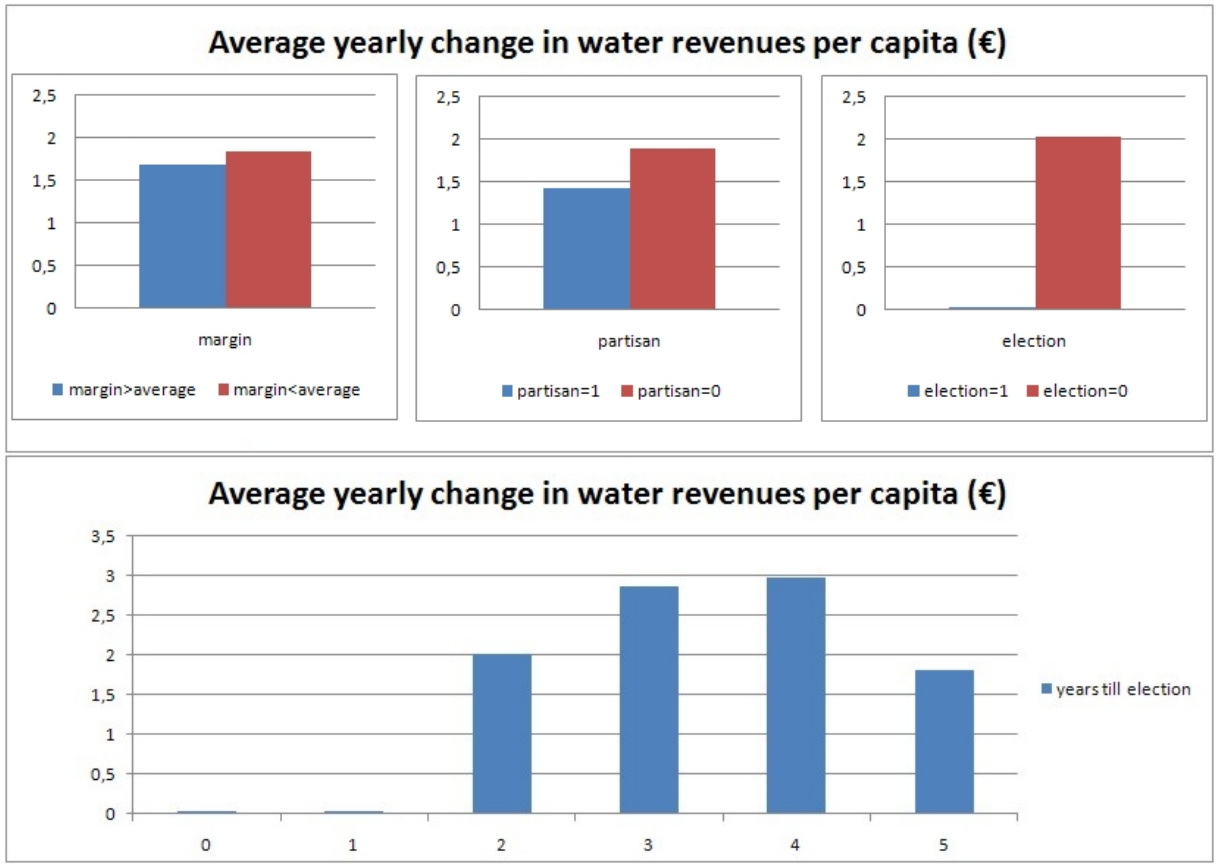

Figure 1:
Average yearly change in water revenues per capita

3.3 Model and Methodology

To test the hypotheses that water prices in Austria are affected by local politics and yardstick competition the following model is estimated:

$$y_{it} = \rho_1 W_{ij} y_{jt} + \rho_2 * pol_{it} * [W_{ij} y_{jt} - \overline{Wy}] + \gamma pol_{it} + \beta X_{it} + \epsilon_{it} \quad (1)$$

Revenues per capita (y_{it}) in jurisdiction i are a function of the revenues in reference jurisdictions j ($W_{ij} y_{jt}$), political factors (pol_{it}) and controls variables like local characteristics (βX_{it}, which also contain municipality and time fixed effects). In addition, introducing an interaction term of the spatial lag and the political variables ($pol_{it} * [W_{ij} y_{jt} - \overline{Wy}]$) is a direct test for the existence of yardstick competition as the source of correlated prices. Thus while $W_{ij} y_{jt}$ is more of a control variable that should filter regional revenue shocks, e.g. as a result of increased water usage in a hot period, a positive and statistically significant interaction term ρ_2 can be considered evidence of yardstick competition. The interaction term is demeaned to ensure an average treatment effect interpretation of the political variables. Although potentially all political variables could be used for the interaction terms, the political budget cycle has several advantages.[17] First, it is without doubt the most 'exogenous' political variable at hand. Election dates are fixed on the state level and not alterable by local politicians. Second, unlike other political variables the election cycle indicators exhibit a lot of variation over time. This may be especially important in the chosen specification, where FE not only control for unobserved heterogeneity but also purge the time invariant components of the variables. Moreover, since election dates vary between municipalities situated in different provinces, it is possible to differentiate the political budget cycle from mere time effects (captured by year-fixed effects). Current research on election cycles stresses the advantage of being able to separate the two effects (see Dahlberg and Mörk (2008)).

W is the spatial weight matrix and defines the weights of the neighboring jurisdictions j. Following Solé-Ollé (2003) a weight matrix which defines neighbors as municipalities which are situated within a 20km radius of each other is used. Since the inclusion of a spatial lag leads to an endogeneity problem, OLS no longer delivers consistent estimates. Either instrumental variables (IV) or maximum likelihood (ML) can be used to estimate model (2). Although Elhorst (2003) and Elhorst and Fréret (2009) extend ML to panel data, most applied work uses IV methods because the Jacobian term used for ML is not defined in an unbalanced panel. IV and more generally GMM approaches do not rely on strong distributional assumptions and as shown by Kelejian and Prucha (1998) are consistent even in the presence of spatial error correlation. Especially the latter is important, as spatially correlated shocks in revenues from water services are possibly present. Natural instruments for the endogenous spatial lag are the spatially lagged independent variables $W_{ij} X_{jt}$ and $W_{ij}^2 X_{jt}$. A subset of these potential instruments is chosen as to satisfy both tests for strong (Kleinbergen-Paap Wald F statistic) and valid (Hansen J-Test) instruments. As a result of the above specification with two spatial lags, additional instruments are required for identification. Hence, the existing subset of instruments $W_{ij} X_{jt}$ and $W_{ij}^2 X_{jt}$ is interacted with the respective political variable. The political variables are therefore not only interesting in themselves but also crucial for identification of yardstick competition as the source of spatial interaction between municipalities. Using the full set of potential instruments leads to a rejection of the Hansen J-Test and indicates that some instruments are invalid. Although using only a subset of instruments for spatial lag IV models is very common in the relevant literature (e.g. Solé-Ollé (2003), Edmark and Ågren (2008) or Dubois and Paty (2010)) some

[17] For the sake of completeness and comparability with existing research, estimations with the other political variables (*margin* and *partisan*) as interaction terms can be found in Table 5 in the Appendix.

additional statistical tests were conducted to avoid an arbitrary dismissal of potentially relevant instruments. Difference-in-Hansen tests (C-statistics) using the orthog() option of Stata's xtivreg2 reject the null that the instruments related to 'expend' and the election cycle indicator (e.g. 'election') are valid while the remaining subset of instruments are not rejected by the J-Test. The set of instruments used in the following estimations therefore comprises the spatial lags of *taxes*, *debt*, *margin* and *partisan*, their squared spatial lags and their interactions with the political variable. The test statistics from the difference-in-Hansen tests are available from the author upon request.

To assess the sensitivity and robustness of the above results, two modifications are proposed. First, the model is re-estimated with different indicators of the political budget cycle. As indicated by the descriptive statistics, politicians may be reluctant to increase water prices not only in the election period itself but increasingly so the closer to the election date. This behavior should be accounted for by the variable *election_time*, which indicates the number of years until the next election, being 0 in election years. In addition, to treat the political budget cycle really as a cycle, a separate model with *election_time* and its square $election\_time^2$ is estimated. If the picture conveyed by the descriptive statistics is correct, the political budget cycle is indeed inversly U-shaped, with its maximum somewhere between election dates. The coefficient on *election_time* should then be positive whereas coefficient on $election\_time^2$ should be negative.

A second extension relates to the choice of a suitable weight matrix. Although following the existing literature (see Solé-Ollé (2003)), the estimates of the mimicking variables may be sensitive to the definition of neighborhood. In addition to the already used measure, neighbors as municipalities within a 20km radius (W_{N20}), the coefficient estimates for alternative specifications of W are obtained. Specifically, the radius is expanded from 20km to 30km (W_{N30}) to see whether the cutoff point is decisive.[18] Moreover, instead of equally weighted neighborhood relationships, inverse distance functions with a 20km (W_{D20}) and 30km (W_{D30}) cutoff points were used. To restrict the number of benchmarks, i.e. if only a small number of municipalities should be considered as neighbors, also a 5 (W_{NN5}) and 10 (W_{NN10}) nearest neighbors concept is used.

On top of these distance based weight matrices, economic and political similarity are taken into account and thus the distance based weight matrix (W_{N20}) is modified by size and political similarity. A measure of size similarity as the inverse of the absolute difference in population between a pair of municipalities (W_{size}) is calculated. Hence, if two municipalities are neighbors to municipality i, the one which is more similar in terms of population has a higher weight. For political similarity, municipality j is only considered a neighbor if it is governed by the same party governing municipality i (W_{pol}).[19] The underlying idea is that cities with the same political alignment may be more important reference points when adjusting water prices.

Finally, a weight matrix is constructed which excludes municipalities from the same province or put differently, municipalities are considered as neighbors only if they lie in another state (W_{border}).[20] Thus as a final test whether yardstick competition really is the driver of mimicking, provincial border regions are used. If there is really yardstick competition, a politician should not only mimic the neighbors in the same province but also be responsive to close

[18] As 19km is the minimum radius to ensure that every municipality has at least one neighbor, the initial radius of 20km was not decreased.

[19] The parties considered are 'SPÖ', 'ÖVP' and 'FPÖ'. Other local or independent parties are therefore ignored and not considered as neighbors.

[20] As for W_{size} and W_{pol} the underlying distance matrix defining neighborhood is W_{N20}.

Table 3: Estimation Table

	(1) Election	(2) Cycle	(3) Cycle^2
Wy	0.158	0.265**	0.366***
	(0.121)	(0.116)	(0.108)
Wy_inter	0.153***	-0.041***	-0.100***
	(0.039)	(0.010)	(0.035)
Wy_inter^2			0.014*
			(0.007)
taxes	0.208***	0.206***	0.208***
	(0.020)	(0.020)	(0.020)
debt	0.027***	0.028***	0.027***
	(0.010)	(0.010)	(0.010)
expend	0.305***	0.306***	0.304***
	(0.032)	(0.032)	(0.032)
win_margin	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)
partisan	-0.014	-0.013	-0.014
	(0.033)	(0.033)	(0.033)
election	-0.027***		
	(0.008)		
election_time		0.002	0.029***
		(0.002)	(0.009)
election_time^2			-0.006***
			(0.002)
N	12032	12032	12032
Time Dummies	0.001	0.001	0.003
Mun. Dummies	0.000	0.000	0.000
Kleinbergen-Paap F-statistic	25.529	26.222	22.455
Hansen J-Test	0.428	0.493	0.433

The instruments in all three specifications are the spatial lags and the squared spatial lags of 'taxes', 'debt', 'win_margin' and 'partisan' as well as interactions of these variables with the respective election cycle variable.
Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

neighbors in an adjacent province. To robustify inference, all regressions are estimated using heteroscedasticity and cluster-robust standard errors.

4 Results

The first column in Table 3 shows the results for the baseline model according to the above specification with two spatial lags. As the test statistics at the bottom of the Table 3 indicate, the instruments are informative and valid. Regarding the results for the political variables in Estimation (1), water price revenues per capita increase by about 1% if the win-margin of the governing party is 10%. The significant coefficient supports the notion that if political competition is less intense, politicians may act less opportunistically as indicated by the positive sign. Conversely, the result could also be interpreted as evidence that political competition restrains the tax burden set by leviathan like governments. In the case of left-wing governments, the effect is -1.4% but statistically insignificant. Finally, the coefficient

on the election year dummy indicates that on average water prices are 2.7 percent less in election years. Given the fact that water prices very rarely decrease, the results indicate that in contrast to the general upward trend, water prices don't increase or not as strongly in election years. Thus, hypothesis 1 is partially confirmed in the sense that price setting by municipalities is found to be affected by the political budget cycle and the intensity of political competition. Partisan politics is not found to be a statistically significant determinant of water prices.

Turning to the spatial lag and its interaction, the results seem to confirm the idea that the election cycle effect is conditional on the behavior of neighboring municipalities. Specifically, the results exhibit an insignificant coefficient of 0.16 for the spatial lag, which, as noted before is considered only a control variable for common regional shocks. Of greater interest is the coefficient on the interaction of the spatial lag with the electoral cycle, which is 0.15 and statistically significant.[21] Taking into consideration that the election year dummy is negative and statistically significant, the results displayed in the first column of Table 3 can be interpreted in the following way. Per capita water revenues are generally lower in election years, but how much lower depends on the neighbors behavior. The lower per capita water revenues in neighboring municipalities, the stronger the election cycle effect. Thus, the evidence suggests that water prices may indeed be affected by strategic interaction in the form of yardstick competition, which confirms hypotheses 2.

Much of the literature on yardstick competition would interpret the results from Table 3 in a slightly different manner. If the focus was on strategic interaction and mimicking alone, analysis would center around the difference between the two spatial lags, which would be interpreted as mimicking in two different situations. In this case, mimicking in an election year and mimicking in non-election years. The statistically significant increase in the mimicking coefficient by 15.3%-points in election years, which is almost twice as large as in non-election years, would then be interpreted as a confirmation of the yardstick competition hypothesis: Mimicing is more pronounced in situations when politicians have an incentive to behave opportunistically to win elections.

In contrast, this paper treats yardstick competition as a conditionality of the political budget cycle and concentrates on the effect of neighboring jurisdictions as a constraint for local politics. The reasons for this type of interpretation are closely related to the theoretical indeterminacy of the yardstick competition theory as outlined in Bordignon et al. (2004) and the fact that it does not produce directional predictions regarding its effect on fiscal behavior. In particular, the interpretation of results is much more straightforward in the case where yardstick competition is linked directly to the political variable through which it is supposed to work. Looking at the underlying case for example, the finding that an increase of prices by neighboring municipalities decreases the downward effect of elections certainly conveys more information than the finding of stronger mimicking in election years. Thus, while finding different mimicking effects in different situations may still be interesting, looking more closely at the political determinants themselves yields deeper insights into the actual mechanisms at hand.

In addition to the baseline model, Table 3 also shows the results for different definitions of the election cycle. The results strongly confirm the predictions of the previous specification. Using the variable *election_time*, which indicates the number of years until the next election, shows that the political budget cycle may indeed follow an inverse U-shape. As the

[21] The coefficient is actually a contrast. The total effect in election years is the sum of the spatial lag coefficient plus the interaction term coefficient.

coefficient of *election_time* in specification 2 (without the squared term) is not significant, it appears that water prices are not increased the strongest immediately after the elections. Given the results in the third column (with the squared term) the strongest increases happen between two and three years before the election.[22] Regarding the spatial lags, the mimicking term Wy is positive and significant in both specifications using the cycle variable, indicating correlated revenue shocks. The negative and significant interaction terms confirms the yardstick competition idea that mimicking is less strong the further away the next election. Again, it appears that the political budget cycle is inversely U-shaped, also for mimicking. Mimicking decreases the further away an election, but there is a turning point after 3.6 years. In the adopted interpretation of neighboring jurisdiction's prices as a simple conditionality for the political cycle, the following picture arises: The price setting behavior of municipalities over the electoral cycle is inversely U-shaped, with the strongest price increases somewhere in the middle between elections and decreasing when elections approach. This effect is, however, mitigated by neighboring municipalities that increase prices, which leads to a less pronounced political cycle.

To conclude, alternative measures of the political election cycle do not only confirm the previous results but seem to strongly support the notion that local politics as well as strategic interaction influence water prices. The additional structure imposed by the *election_time* variables indicates that there is not only an election year effect, but that there is a real electoral cycle in water prices depending on the distance to election dates.

Sensitivity and Robustness
To assess the robustness of the previous results, the specifications in Table 3 is re-estimated using different weight matrices. As shown by Table 4, different definitions of W_{ij} affect the results to some extent. An increase in the radius or number of neighbors in general, leads to a higher mimicking coefficient in all specifications. The larger the number of neighbors, the more averaged the spatial lag $W_{ij}y_{jt}$, which is apparently more highly correlated to the local water revenues. Statistical significance of the coefficients also varies between specifications.

Nevertheless, sign and magnitude of the coefficients is fairly robust for the various definitions of W but for two exceptions. Regarding the political similarity weight matrix (W_{pol}), the coefficients decrease both in magnitude and significance. This may be interpreted as evidence that mimicking is not only restricted to municipalities with a similar ideological alignment. Citizens may compare the local politician with any neighboring municipality, unconditional on the incumbent party. Thus even if mayors from the same party have closer ties, they cannot ignore municipalities governed by a different party. This result is somewhat at odds with Santolini (2008) which finds that Italian municipalities governed by the same coalition tend to implement similar tax rates according to their ideology. For the underlying case, the competition aspect introduced by citizen comparing municipalities seems to outweigh potential coordination efforts by mayors from the same party.

Regarding the weight matrix using only the information by neighboring municipalities which are not situated in the same province (W_{border}), the mimicking coefficients collectively turn insignificant. Although this casts some doubts about what kind of correlation the spatial lags are really picking up, there are some qualifications to this test. First, if only the interacted spatial lags would turn insignificant, it would be a clear indication that no yardstick competition is present. Since, however, no spatial correlation remains using the border matrix, it may simply be that the sample and the number of neighbors to construct the spatial lag are too small after purging all neighbors from the same province. Leaving

[22] The maximum of the function is at 2.42 years.

Table 4: Estimation Table

		(1) Election	(2) Cycle	(3) Cycle^2
W_{N20}	Base	0.158	0.265***	0.366***
		(0.121)	(0.116)	(0.108)
	Inter	0.153***	-0.041***	-0.100***
		(0.039)	(0.010)	(0.035)
	Inter^2			0.014*
				(0.007)
W_{N30}	Base	0.211	0.326***	0.448***
		(0.130)	(0.127)	(0.113)
	Inter	0.177***	-0.040***	-0.137***
		(0.048)	(0.011)	(0.042)
	Inter^2			0.023**
				(0.009)
W_{D20}	Base	0.160	0.264**	0.350***
		(0.128)	(0.121)	(0.113)
	Inter	0.138***	-0.037***	-0.093***
		(0.037)	(0.010)	(0.032)
	Inter^2			0.013**
				(0.006)
W_{D30}	Base	0.228*	0.330**	0.453***
		(0.133)	(0.128)	(0.115)
	Inter	0.160***	-0.036***	-0.124***
		(0.045)	(0.011)	(0.039)
	Inter^2			0.020**
				(0.008)
W_{NN5}	Base	0.058	0.157*	0.187**
		(0.093)	(0.091)	(0.087)
	Inter	0.089***	-0.027***	-0.060**
		(0.030)	(0.007)	(0.026)
	Inter^2			0.007
				(0.005)
W_{NN10}	Base	0.171	0.271**	0.327***
		(0.113)	(0.107)	(0.103)
	Inter	0.116***	-0.032***	-0.082***
		(0.036)	(0.009)	(0.031)
	Inter^2			0.011*
				(0.006)
W_{size}	Base	0.051	0.139	0.166**
		(0.093)	(0.091)	(0.084)
	Inter	0.081***	-0.029***	-0.058**
		(0.031)	(0.007)	(0.028)
	Inter^2			0.007
				(0.006)
W_{pol}	Base	0.122	0.211*	0.260**
		(0.123)	(0.122)	(0.111)
	Inter	0.070*	-0.020**	-0.060**
		(0.036)	(0.008)	(0.030)
	Inter^2			0.010
				(0.006)
W_{border}	Base	0.084	0.085	0.099
		(0.082)	(0.081)	(0.071)
	Inter	0.016	0.001	-0.013
		(0.025)	(0.006)	(0.029)
	Inter^2			0.003
				(0.007)

Estimations are based on the same variables and instruments as in Table 3
The number of observations when using W_{pol} and W_{border} is reduced to 9738 and 4001 respectively.
Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

this finite sample issue aside, it could also indicate that in-province neighbors are more important than out of state neighbors. Information on the behavior of neighboring municipalities may simply be more easily observable and available within the same state because television, radio and especially print media is typically state specific in Austria. The result should nevertheless be taken seriously as an indication that the standard test to identify yardstick competition (i.e. use an interacted spatial lag as suggested by Brueckner (2003)) may not be sufficient to rule out alternative explanations. The presented evidence in this paper shows that mimicking is stronger in election years. Although this finding can be interpreted as evidence in favor of the yardstick competition hypothesis, it is more a necessary than a sufficient condition to prove its existence.

Collectively, the results in Table 4 are rather supportive of the idea that there is strategic interaction between Austrian municipalities. The mostly significant interaction effects also suggest that yardstick competition is the source of the mimicking behavior. Neighboring jurisdictions affect local price setting because they reduce the opportunistic pressure. If neighboring municipalities increase prices when an election approaches, the local politician may be able to increase prices as well even without loosing popular support.

5 Discussion and Conclusion

This paper tries to assess the effect of politics on water prices in Austria. Two different channels, a direct and an indirect, are considered. Firstly, treating every jurisdiction as an isolated political market, the results indicate that local politics significantly affect water prices. As a result of a political budget cycle prices are lower in and immediately before election years. If a local government faces less intense political competition, prices are significantly higher because staying in power is more probably anyway. Regarding partisan politics, there is no significant evidence that party ideology is shaping water prices. Secondly, because water prices set by one jurisdiction may not be independent from its neighboring jurisdictions, the existence of strategic interaction between municipalities is analyzed. The obtained results indicate that neighboring municipalities affect the magnitude of the political budget cycle, which points towards toward yardstick competition as the most likely source of price mimicking. The combined results therefore suggest that local political competition is an important determinant of public service prices, but the observed extent of opportunistic behavior also depends on the behavior of neighboring municipalities. Thus yardstick competition is an important constraint for local politics.

The approach in this paper treats neighboring municipalities as a conditionality for local politics, which may intensify or mitigate political determinants of water prices. This has a long tradition in research that tries to explain why political budget or partisan cycles are present in some situations but not in others (see e.g. Franzese (2002) for an overview). In contrast standard approaches to yardstick competition simply try to find mimicking in the form of correlated tax and expenditure policies. Since the two approaches are usually empirically identical and the identification of yardstick competition always requires connection to a political variable, treating neighboring jurisdictions as a conditionality may be a sensible way forward because it strengthens the link through which neighbors affect local politics. It also forces the researcher to think about the theoretical underpinnings instead of simply testing a number of interactions with the spatial lag. Right now empirical studies more or less arbitrarily choose a variable deemed to affect mimicking and interpret a statistically significant interaction term, regardless of its sign, as evidence for yardstick competition. Empirical research along these lines is therefore not easily comparable and of-

ten sidelines, ignores or leaves implicit the channel through which mimicking is working.

The results from the empirical application give an interesting insight on how politicians dose opportunistic interference in public companies. Regarding the political budget cycle specifically, opportunistic policies depend both on space and time. Although prices are on average lower during election times, the strength of the effect depends on neighboring municipalities. The more a municipality's neighbors increase their prices, the larger the leeway for politicians to increase prices in the local municipality and still be able to signal good performance. What is important to for opportunistic behavior is the distance to neighboring municipalities, which set a benchmark for voters. This result is not only intuitively compelling but also in line with a strand of literature trying to explain differences in the magnitude of opportunistic political action. E.g. as shown by Shi and Svensson (2006) the size of the political budget cycle strongly differs between countries and may critically depend on institutional features. Similarly, this study finds that the size of the political budget cycle varies between municipalities, depending on the behavior of neighbors. This may also indicate a possible direction for theoretical work trying to combine yardstick competition with other political theories like the political budget cycle. By now there is no theoretical framework combining standard theories of opportunistic political behavior and yardstick competition. This is unfortunate, as both of them stress that politicians behave opportunistically to win elections. It may therefore be a worthwhile endeavor trying to link yardstick competition with classical political economy models. An advantage of such a combined theoretical model would also be that it clearly indicates through which channel mimicking works.

Finally, even though the results are robust to most choices of a weight matrix W, there are still many open questions regarding the diffusion process of information. Even if we assume that there is yardstick competition between jurisdictions, the existing empirical research is not quite able to identify which neighbors are the relevant benchmarks for citizens. Instead of experimenting with different weight matrices, more elaborate research designs may be necessary to pin down the potential effects of yardstick competition. This paper has tried a first step into this direction by using province borders as an identification strategy. While this test is associated with some challenges, for instance the question if borders are also an obstacle for information flows, the obtained results cast some doubt on the finding that yardstick competition is the driver of correlated prices. To conclude, while there is some evidence that municipalities are affected by their neighbors, more demanding tests of yardstick competition could not corroborate its existence.

6 Literature

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7 Appendix

Table 5: Estimation Table

	(1) Margin	(2) Partisan
Wy	0.064	0.126
	(0.144)	(0.123)
Wy_inter	0.001	-0.149
	(0.001)	(0.096)
taxes	0.206***	0.206***
	(0.020)	(0.020)
debt	0.028***	0.027***
	(0.010)	(0.010)
expend	0.307***	0.307***
	(0.033)	(0.033)
win_margin	0.001***	0.001***
	(0.000)	(0.000)
election	-0.037***	-0.038***
	(0.008)	(0.008)
partisan	-0.011	-0.013
	(0.033)	(0.033)
N	12032	12032
Time Dummies	0.002	0.002
Mun. Dummies	0.000	0.000
Kleinbergen-Paap F-statistic	23.738	23.038
Hansen J-Test	0.911	0.182

The instruments in both specifications are the spatial lags and the squared spatial lags of 'taxes', 'debt', 'win_margin' and 'partisan' as well as interactions of these variables with 'margin' in the first and 'partisan' in second column respectively. The results for the instrumented spatial lags remain insignificant when the full set of potential (but invalid) instruments is used. Thus the results do not seem to be driven by weak identification induced by discarding possibly invalid but informative instruments.
Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$