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Corporatization and the behavior of public firms: how shifting control rights affects political interference

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Corporatization and the behavior of public firms: How shifting control rights affects political interference[☆]

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September 2012

Abstract

As an alternative to privatization, corporatization implies a shift of control rights from politicians to managers while ownership remains public. Even though corporatized firms are fairly common - both in Europe and the US - little empirical work has tried to quantify the effects of corporatizations. This paper tries to fill this gap by analyzing the effect of corporatization on the price setting behavior of public firms. The theoretical prediction that corporatization decreases political interference in price setting is tested using a dataset of Austrian water providers. The empirical evidence largely corroborates this hypothesis. More specifically, the results show that the impact of electoral cycles and partisan politics and on prices setting is significantly restrained for corporatized firms.

Keywords: Corporatization, Control rights, Political interference
JEL: D22 D72 L33

1. Introduction

Most of the discussion about institutional alternatives for the provision of public services has centered on the issue of privatization. While state-owned enterprises are deemed inefficient, transferring ownership from public to private investors is typically presumed to raise efficiency (see e.g. Boycko et al. (1996)). The existing literature has focused on two crucial but distinct effects of privatization as a transfer of ownership. First, as argued by numerous papers considering privatization as a make-or-buy problem, private and public sector are characterized by high-powered and low-powered economic incentives, respectively (see Hart et al. (1997), Williamson (1999) or Levin and Tadelis (2010)). A change in economic incentive intensity may therefore lead to a different behavior of the firm and subsequently to a different outcome. Second, when looking at the issue from a political economy perspective public firms often pursue political goals and are subject to political opportunism (see Shleifer and Vishny (1994) or Savedoff and Spiller (1999)). Privatizing these firms potentially reduces political interference, because decisive control rights over business decisions are no longer under the direct control of politicians. As a result, privatization may affect firms through two channels, namely by increasing economic incentives and decreasing political interference at the same time.

Privatization of public enterprises is, however, not the only possibility for public sector reform. Especially in the case of public infrastructure utilities, high transaction cost (e.g. specific investments), high degrees of contractual incompleteness and monopolistic structures are the norm. In such cases the welfare consequences of contracting-out government services to private partners are far from clear (see e.g. Caves (1990) or Auriol and Picard (2009)). Under certain conditions, e.g. quality shading à la Hart et al. (1997), it may be preferable to keep a service public even though low-powered incentives prevent cost-efficient behavior. Subsequently, corporatization of public firms has been suggested as viable alternative to privatization. 'Corporatization' or 'commercialization' refers to institutional arrangements where the public retains ownership but control rights over business decisions are handed over from politicians to managers.[2] As a matter of fact, organizations with these features are not uncommon in public service and infrastructure provision - both in Europe and the United States. This observations holds true for the Austrian water sector and the dataset used in this paper showing that by 2000 more than 40% of large Austrian cities have corporatized the task. Similarly, public authorities that have substantial administrative and fiscal independence from local governments play a significant role in the provision of public infrastructure in the U.S.[3]

Hence, the question arises as to what extent corporatization matters for firm performance and behavior. As argued by Shleifer and Vishny (1994), the consequences of corporatization are related to the extent of political interference under different governance structures. While economic incentive intensity may be similar after corporatization, control rights are no longer in the hands of politicians. The model considered in Shleifer and Vishny (1994) predicts that shifting control rights from politicians to managers typically decreases political influence. Unfortunately, the existing empirical evidence on the consequences of corporatization (e.g. Shirley (1999), Bozec and Breton (2003), Bilodeau et al. (2007) or Cambini et al. (ress)) has largely ignored this issue by focusing on potentially stronger economic incentives and interpreting corporatization as a weak form of privatization.

The underlying paper tries to fill this gap by testing whether corporatization effectively restrains political interference. Using a dataset of Austrian water providers, a series of panel data estimations are used to assess the effect of politics on water prices and whether corporatization affects this link. Specifically, this paper tests for the existence of political business cycles, partisan politics and majority confidence in corporatized and non-corporatized firms. Importantly, unlike prior research, the effect of an alternative governance form (corporatization) is not only modeled as a sole structural shift, i.e. an intercept, in this paper. Rather, the empirical strategy applied here follows Masten (1993) and tries to take account of the basic rationale of transaction cost economics (TCE), namely that the performance of a governance structure depends on the transaction characteristics. Hence, the determinants of water prices (e.g. political factors) are allowed to differ between corporatized and non-corporatized firms. This approach allows for more flexibility and has the advantage that the interaction effects help identify how corporatization impacts firm behavior. Since the theoretical model in Shleifer and Vishny (1994) predicts important differences with respect to political interfer-

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[2]The idea of a separation of control and cash-flow rights has received attention not only from a privatization perspective (e.g. Halonen-Akatwijuka and Propper (2008)) but also the corporate governance literature (e.g. Edwards and Weichenrieder (2009)).

[3]See Frant (1996) and Levin and Tadelis (2010). Although only a rough proxy for corporatization, 14% of U.S. cities delegate water treatment to other public agencies and authorities.

ence, this approach allows a direct test of the hypothesis.

Analyzing the effect of corporatizations on the municipal level is of interest for several reasons. First, the sheer size of budgets involved in public contracting on the municipal level makes it a prime concern of economic and public policy makers. Local government spending accounts for almost five percent of GDP in Austria and is similarly important in other European countries like Germany, Italy or France. Second, the role of the public sector has changed remarkably in recent years, shifting from a state producing public services to a guarantor state, only bearing final responsibility. This paradigm shift is particularly pronounced within the European Union (see Obermann (2007)). In such an environment, where public production is only one among many possible institutional solutions to provide public services, the government is increasingly faced with typical make-or-buy decisions. As a result, the consequences of delegating public services have become of greater importance for public policy makers when choosing among organizational structures for the provision of public services. As far as the empirics are concerned, this application considering the Austrian water sector is of interest for two reasons. The absence of real privatizations in the Austrian water sector and the panel structure of the data should enable the isolation of the corporatization effect. As argued by Villalonga (2000), separating institutional effects from the various other possible determinants of economic outcomes is detrimental for the empirical analysis of governance structures. This should be easier in the case of corporatizations, where ownership remains public and only control rights are transferred. Lastly, the available dataset of Austrian municipalities is not only rich in terms of the number of observations available for statistical inference but also combines a wide variety of municipal characteristics of both the local water sector and the political situation.

The contribution of this paper is threefold. First, it contributes to the empirical literature analyzing the consequences of different institutional arrangements like Kwoka Jr (2002), Chong et al. (2006), Bel and Warner (2008) or Cambini et al. (ress)). However, unlike previous papers on the topic it puts greater emphasis on political interference and corporatization as mirrored both in the theoretical section and the empirical application. Second, the prevalent dichotomous demarcation between purely public and private service provision is avoided in this paper because there is virtually no private involvement in the Austrian water sector. Nonetheless, municipalities can and effectively do choose between an array of institutions to provide this service. The consequences thereof have, however, hardly been examined empirically yet. Finally, by explicitly modeling the idea that the effect of adopting a certain governance structure critically depends on the characteristics of an associated transaction, the paper implements the basic rationale of Transaction Cost Economics into the empirical analysis. This paper therefore allows for the possibility that there is no generally superior organizational type and the empirical model is specified accordingly. This helps to empirically identify the institutional effects associated with corporatization.

The paper is organized as follows. Section 2 provides the theoretical background and a simple model of corporatization along the lines of Shleifer and Vishny (1994). The empirical analysis for a panel of Austrian water providers is presented in section 3. The final section discusses the results and concludes.

2. Corporatization of Public Firms: political vs managerial control

To illustrate the effect of corporatization on firm behavior, a simplified version of the model in Shleifer and Vishny (1994) is considered. The specific framework is chosen because it focuses on political considerations and allows a separation of control and cashflow rights, thus opening a realm between state and market. Other commonly used models like Hart et al. (1997) typically analyze privatization as a dichotomous choice between a public and a private agent, with the private agent having strong and the public agent having weak incentives. If hybrid governance forms between public and private are considered, they are typically just a linear combination of the two, i.e. modeled with medium-strong incentives.[4] This is not the case in Shleifer and Vishny (1994), where both public and private provision are characterized by strong, although different kinds of incentives. The crucial assumption is that if public agents are elected politicians, they have strong political instead of economic incentives. Conversely, private agents need not win elections and rather have strong economic incentives, depending on their cashflow rights. In such a framework hybrid governance forms between 'pure' public or private ownership are no longer simply modeled as having medium-strong incentives. Depending on the allocation of control and cashflow rights intermediate cases represent different combinations of strong or weak political and economic incentives. E.g. shifting control rights from a politician to a manager (corporatization) reduces political incentives. As cashflow rights remain with the public (treasury), economic incentives still remain weak if a public firm is only corporatized. Thus, the definition of corporatization adopted in this paper is fairly narrow and means only that political incentive intensity decreases as control rights are shifted from direct (political) management to another institution.[5] Economic incentives increase only if increasing proportions of cash-flow rights are transfered to the manager (i.e. privatization in a narrow sense).[6]

The consequences of adopting the approach in Shleifer and Vishny (1994) for analyzing the effects of corporatization are quite substantial. Unlike other models that view corporatization as a move towards stronger incentives and potentially greater efficiency, here weaker political incentives are the only source of effects from corporatization. Corporatized firms represent an institutional configuration which has both weak economic and political incentives. It is not a coincidence that these firms share many features with another type of organization with soft incentives that is typically located between state and market – non-profit enterprises. In the spirit of Glaeser and Shleifer (2001), non-profit enterprises are a commitment to soft incentives because control and cash-flow rights are separated. Similarly, corporatized firms are a commitment to soft incentives, both economic but also political. The separation of control and cash-flow rights is therefore not only expected to weaken incentives in the case of profit versus non-profit but also for political versus non-political firms. The bottom line is that corporatization works through the decreased political incentive intensity.

To illustrate the idea more formally, a simplified version of the model in Shleifer and Vishny (1994) is used. Two major simplifications arise: First, only cases where ownership remains public are con-

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[4]The replaceability parameter λ in Hart et al. (1997) is an example in this respect. This interpretation is also in line with the less formal analysis of Williamson (1999).

[5]The definition is therefore different from the interpretation that corporatization is a mild form of privatization, e.g. as adopted in Shirley (1999) or Cambini et al. (ress)

[6]In Shleifer and Vishny (1994) this is captured by the parameter α and represents the direct effect of privatization.

sidered, hence ignoring privatizations. Second, for brevity the model here does not cover bribes and corruption. Nevertheless, the results obtained are in line with those of the more detailed and general model in Shleifer and Vishny (1994). Moreover, instead of employment as the relevant political variable I focus on prices for a public good. That the model is general enough to analyze a wide variety of cases is not only envisaged in Shleifer and Vishny (1994) but also clear from the fact that the only requirement regarding the political variable is that its manipulation generates some benefit for the politician.[7]

The two players in the game are a politician and the manager of the firm, who bargain over the firm's price setting. As will be clear shortly, the decisive point is whether control rights over prices are allocated with the politician or the manager. Let PR denote a price reduction for the good produced by the public firm and q the quantity of the good sold. The latter is assumed exogenous here, which seems a reasonable assumption to make given the typically very low elasticity of demand for many publicly provided goods and services, especially drinking water. The politician derives a political benefit from a price reduction, denoted by $B(PR)$. As prices for public goods typically rise over time $B(PR)$ also has the interpretation of political gains from not increasing prices. While tax and price increases may generally be met by tax resistance, the size of $B(PR)$ will depend on factors like election dates, the preferences of the constituency and the intensity of political competition.[8] For instance, models of political business cycles assume that politicians use fiscal instruments in order to signal performance and maximize votes, especially before elections. Not increasing prices may therefore be especially rewarding the closer the next election. The benefit may also be higher, the higher the intensity of political competition. Partisan models on the other hand predict that the benefits from lower water prices depends on the ideology a politician's constituency. Some parties may prefer a lower share of cost recovery through prices and a larger share of general tax financing.

Now, to persuade the manager to lower prices the politician can subsidize the firm with a transfer (T). However, funding the latter, e.g. by raising tax revenue, the politician faces political costs, denoted as $C(T)$. Accordingly, the politician's utility function is specified as follows:

$$U_{pol} = B(PR) - C(T) \tag{1}$$

where the politician's utility increases with the price reduction and decreases whenever the costs of funding the transfer increase.

The manager's initial benefit, before possible price reductions take place, is denoted by Π. Similar to non-profit enterprises, public enterprises are usually not allowed to distribute profits to persons who exercise control over the firm. Thus managers in publicly owned enterprises, irrespective of whether corporatized or not, typically have no cash-flow rights. If direct payout of profits is not possible, the

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[7]As for excess employment, it remains an empirical issue not only to verify the existence of such practices but also their direction. Theoretically it may be the case that shifting funds from excess employment or price reductions to more salient uses has a positive political benefit.

[8]In the words of Savedoff and Spiller (1999) analyzing government opportunism in Southern America: 'Perhaps most important, the government's time horizon is strongly affected by the periodicity of elections, and whether or not the government faces highly contested elections and a need to satisfy key constituencies'.

manager may benefit from alternative uses of profits. According to Glaeser and Shleifer (2001) this leads to 'improvements in the working environment of the entrepreneur and the employees, which may include lower effort levels, free meals, shorter workdays, longer vacations, better offices, more generous benefits, or even improvements in the quality of the product'. The manager's initial utility Π is therefore a proxy for the utility derived from alternative uses of profits.[9] A price reduction PR reduces profits and therefore also manager utility because it restricts the funds available for alternative uses. This effect can, however, be offset by the transfer (T) the firm receives from the politician. The manager's utility function is given by

$$U_{mgr} = \Pi + T - qPR \tag{2}$$

where the manager's utility increases with his initial benefit as well as a possible transfer received from the politician. The price reduction has the opposite effect because it constrains the alternative uses of profits. If a framework without corruption is assumed, the size of PR and T depend exclusively on who holds control rights over the price. In the case of direct public management the politician controls both PR and T. Given the constraint that the manager must receive a minimal reservation utility of zero, the politician's utility maximization results in the following first-order conditions:

$$T = qPR - \Pi, \tag{3}$$

$$B'(PR) = qC'(T). \tag{4}$$

By reducing prices the politician will consume both the transfer and the manager's initial benefit (Π) up to the point where the marginal political benefit equals the marginal cost of raising funds to pay for the transfer. Now, if a firm is corporatized, the control rights over PR are shifted from the politician to the manager. Two scenarios arise. Firstly, in the non-cooperative Nash equilibrium the players choose $T = PR = 0$. Thus there is no price reduction and no transfer. Secondly, if we allow for coordination between the parties, cooperative solutions such as the jointly efficient outcome are possible. The jointly efficient equilibrium can be derived along the following utility function

$$B(PR) - C(T) + \pi + T - qPR, \tag{5}$$

yielding the following first-order conditions

$$B'(PR) = q, \tag{6}$$

$$C'(T) = 1. \tag{7}$$

Consequently, the politician and the manager jointly decrease price until the marginal political benefit equals the marginal cost. Since demand is assumed to be inelastic here, the marginal cost of a price reduction is equal to the quantity sold. The transfer on the other hand is increased until the

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[9]For the model and the derived hypothesis it is actually not important what the manager derives utility from – profits, spare time or quality – as long as not all potential profits are 'spent' on lower prices.

marginal cost of raising funds is exactly equal to one dollar.

To analyze how corporatization affects the behavior of the firm, especially with regards to price setting, the different equilibria are compared. A convenient way to do so is by looking at the manager's utility in each scenario. When the politician has control rights over PR, the initial managerial utility Π is spent on price reductions and therefore zero. If on the other hand the manager has control over PR, his utility is at least Π because he can always choose the non-cooperative equilibrium. Because Π is not spent on price reductions, PR must be lower under management control. Although the price reduction may not be zero if the politician and the manager trade PR and T (for instance a cooperative equilibrium like the jointly efficient case above), the price reduction has to be lower than in a politically managed firm.

Hypothesis: Transferring control rights over prices from a politician to a public firm manager leads to a decrease in politically motivated price reductions.

Corroborating this hypothesis requires two pieces of evidence. First, water prices need to be influenced by political motives when provided through direct management. For instance, when politicians have control rights we would expect to find a political business cycle in prices. Second, if control rights are shifted from politicians to an institution where political incentive intensity is lower, the political patterns in water prices should be reduced. Using a dataset on Austrian municipal water provision, this hypothesis is tested in the ensuing section.

3. Empirical Analysis

3.1. Overview of the Austrian Water Sector

According to Austrian law the main water-juridical competences lie with the 9 federal provinces. However, organization of the service itself is carried out on the municipal level with the municipality bearing ultimate responsibility for the provision of the service. Water supply is characterized by local municipal monopolies as households cannot choose a provider but are automatically connected to the local net. How local authorities organize and operate the service is up to the respective municipality. Thus, in principle, municipalities are free to adopt virtually any mode of governance available, including contracting out the service to a private party or any type of public-private partnership. In reality, however, private sector involvement is still very rare in Austria.[10]

The most common governance mode is still direct inhouse provision of water services by the municipality, i.e. a public bureau (see Schönbäck et al. (2004)). Under such governance arrangements the service is provided within the municipal administration, typically a department, by its own civil servants. Control rights, especially concerning strategic decisions are with the municipal administration and therefore under direct political control of the city council and the mayor. The two

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[10]Solutions involving private partners are being discussed but have only been implemented in a few cases. Interestingly, the 'private' partners in these PPPs are mostly subsidiaries of public or publicly-owned companies. See Schönbäck et al. (2004).

most important alternatives to direct provision by municipalities are government corporations and water associations. While the former is basically a state owned enterprise, the latter represents a public-public-partnership of several municipalities. Government corporations are identical to direct management as far as ownership is concerned, but important differences arise with respect to the competences given to managers (see Edeling et al. (2004)). The management of government corporations is typically not only in charge of basic management functions but also decides on investments and prices. Very often, not only a single task, but a wide range of municipal services are provided by these publicly-owned private companies. Government corporations, especially on the municipal level, are usually expected to be self-financing by means of revenues from the delegated tasks and can therefore set prices accordingly. Water associations represent another important alternative to inhouse provision and means that a non-profit entity is set up by a group of municipalities that share ownership. Management tasks regarding water provision in the member municipalities are delegated to the association. Similar to government corporations, water associations are therefore special purpose entities, who manage and operate water provision. However, water associations typically operate in a multi-principal environment. In addition, while government corporations are often found in major cities, water associations are common in rural and less densely populated areas to benefit from economies of scale. Overall and despite their differences, government corporations and water associations can both be interpreted as corporatizations according to the definition from section 2. In both cases control rights are shifted to institutional arrangements with less political incentive intensity while at the same time ownership remains public.

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).[11] This peculiar regulatory setting gives municipalities considerable leeway regarding price setting. When water is provided inhouse, prices are determined directly by the local government. 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.

For corporatized water providers basically the same rules and regulations apply. Water prices, however, are set by the firm management, which is independent to a certain extent. For instance, municipalities as owners of a corporatization cannot set prices directly and may need to convince or pressure the executive board to have an impact on prices. Although politicians may still try to influence the price setting in corporatized firms, it is certainly more difficult compared to inhouse provision. A survey by KDZ (2008) among Austrian cities gives some indication that corporatization actually affects political influence.[12] When asked about drawbacks of corporatization, the single most important issue raised by the respondents was decreased transparency (35% answered 'Yes') followed by decreased scope for political and administrative influence (28% answered 'Yes'). 15%

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

[12]The survey population comprises all Austrian cities above 5000 inhabitants and is therefore comparable to the sample used in the ensuing empirical analysis, which covers all Austrian cities with a population above 10000.

of the respondents even agreed to the statement that the strategic goals of the administration and the corporatized firm were not aligned. Thus, it appears that the allocation of control rights, and especially seperating control and ownership, at least to some extent curbs ownership influence on managerial decisions.

Water prices are an interesting and important choice variable for local politicians for two reasons. Firstly, together with sanitation and waste, tariffs for drinking water are one of the few discretionary fiscal instruments available to local governments. Fiscal autonomy in terms of taxes is generally rather low on the municipal level in Austria. While other sources of revenues are either not controllable or already exhausted, revenues from local services are an alterable and important source of municipal finance.[13] Secondly, because water tariffs change frequently and have to be paid by every household on an annual basis, they are likely more visible to citizens than other taxes. As a result, water prices are a prime fiscal and political instrument for local governments because they are important for municipal finance but price increases still have to be considered unpopular.

3.2. Data and Variables

To evaluate whether and how strongly the chosen governance structure affects municipal water prices, a dataset from Statistics Austria is used, which compiles annual data on major Austrian cities (see Statistik Austria (2007)). Information on the governance types adopted and changes thereof since 1990 were obtained by surveying cities directly, either via email questionnaires or phone interviews.[14] Overall, this leads to a panel data set comprising 74 cities, all of which have a population above 10.000, from 1992 to 2006. After accounting for data gaps and implausible values, the unbalanced panel dataset contains 931 observations, the actual number depending on the control variables used in each specification.[15]

Waterprice - The dependent variable in the following estimations is $price$, which denotes the annual cost of water for a representative household.[16] This measure is very often used instead of sole m^3 prices in order to account for two-part tariffs, which are typically composed of a fixed annual part and a variable part depending on the individual amount of water consumed. Although other measures than prices may be of interest too, prices are readily available, politically visible and also interesting from an allocative perspective. Irrespective of productive efficiency, if, ceteris paribus, a change in the governance structure (e.g. corporatization) leads to an increase in prices, the resulting situation is inferior from a consumer perspective (see Auriol and Picard (2009)).[17] A similar position is taken by Chong et al. (2006), who also use water prices as dependent variable following the same rationale.

Governance structures - Governance structures are distinguished according to who holds control

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[13]The most important sources of finance to an Austrian municipality are shares from the fiscal equalization scheme (33%), local taxes, e.g. on business and property (16.7%) and tariffs for public services (17.4%). See Statistik Austria (2008).

[14]Phone interviews were used to follow up on cities that did not complete the questionnaire previously sent by email.

[15]Observations were eliminated when unrealistic, e.g. negative values for water losses.

[16]A representative household is presumed to consume 150m^3 per year on average.

[17]It is therefore important to control for factors like quality and access to water services, which may justify price increases or even be welfare improving.

rights. As outlined in the previous section transferring control rights from politicians to managers should decrease politically motivated price changes. When managed directly, prices are determined by the city council and as such reflect the behavior of the governing parties. Conversely, if the service provision is delegated to an association or government corporation, major control rights are transferred to the respective firm management. Because it is more difficult to influence tariffs after transferring price setting competence to a special purpose entity, corporatization should reduce politically motivated price setting. In the application used here, corporatization is represented by a binary variable $corp$, where 0 indicates direct management and 1 indicates that the local water provision has been corporatized and is run by a firm manager, who has control rights. There are 571 observations of direct management and 360 of corporatized firms (215 of government corporations and 145 of associations).[18]

Political factors - As argued in section 2 political factors may influence pricing decisions in public firms. Given that political benefits from opportunistic behavior may depend upon the situation, three potential channels are considered: the political business cycle, partisan politics and majority confidence. Simple dummy variables are used to indicate the presence of either situation. Political budget cycle theories go back to the works of Nordhaus (1975), Rogoff and Sibert (1988) and Rogoff (1990) and emphasize 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. To capture the political business cycle the variable $election$ is included, which is 1 in an election year and 0 otherwise. Political business cycle models predict lower prices or lower price increases in election periods.

Theories of partisan politics, on the other hand, stress the influence of differing party ideologies on the economy. Dismissing the idea of purely opportunistically driven political parties, Alesina (1987) suggests that political and economic cycles are connected by divergent preferences among parties. According to this logic, different parties have different priorities when in power and the economy reacts accordingly. With the direction of the effect remaining unclear, partisan models predict that the economy behaves differently, depending on the ideological constituency of the ruling political party. This effect is captured by the dummy $partisan$, which indicates that the strongest party is a left-wing party whenever it takes the value of 1. Because water prices are consumption taxes, which have a regressive effect on the income distribution, one would expect them to be lower in left-wing dominated municipalities.

Finally, a variable called $majority$ is added to the model indicating whether the leading party holds a majority of seats in the city council. Since a simple majority is required for most legislation, parties controlling more than 50% may be more confident about being re-elected. At the same time, since this variable also indicates if the government is a single party government or a coalition, strategic

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[18]Although it would be possible to further differentiate associations and government corporations, the analytical results from section 2 would be the same for both types of corporations. One should keep in mind that the goal of this paper is to quantify the effect of shifting control rights away from elected politicians, which is the case for both of the two. The estimation results where one of the two types is excluded respectively are shown in Table 5 in the Appendix. As the results are very similar, associations and government corporations remain pooled to achieve more precise estimates.

effects become relevant. For instance, preventing price increases by veto as well as blame-shifting regards price increases are potential actions. This may in turn lead to a different price setting pattern because the political benefit or costs change. However, the direction of this effect is unclear a priori.

Control variables - Apart from governance structure and political factors, the control variables in X represent environmental factors and municipal characteristics, which could influence prices. First, the percentage rate of the population connected to the distribution system ($connect$) is included in the estimation because connecting more remote households to the central water system may be more expensive than covering only densely populated areas. Second, water leakage in percent of the total amount of water delivered ($leakage$) is an important indicator for the condition of the distribution network leakage. Third, the annual average of nitrate pollution ($nitrate$) is included to directly control for quality. Other indicators of pollution would be desirable but nitrate is the only one available for the municipalities and time periods in the dataset used and is reportedly the most important source of contamination.[19] In addition, $spring$ and $external$, the percentage rate of water coming from spring water or from an external provider, respectively, are included to indicate different production technologies.[20] Water consumption per capita ($watercap$) proxies for industry or tourism which tend to increase the average consumption. In this respect $watercap$, along with population (pop) and area ($area$), is included to account for economies of scale and density.[21] Finally, to account for other unobserved factors and overall trends, municipal and time fixed effects are included. Summary statistics and pairwise correlations are given in Tables 1 and 2.

Table 1: Summary statistics

Variable	spring	Mean	Std. Dev.	Min.	Max.
waterprice	Statistik Austria (2007)	144.027	45.466	39	273.84
corp	own survey	0.387	0.487	0	1
sewagecorp	own survey	0.270	0.444	0	1
external	Statistik Austria (2007)	0.109	0.261	0	1
spring	Statistik Austria (2007)	0.331	0.415	0	1
nitrate	Statistik Austria (2007)	10.223	7.988	0.700	44
leakage	Statistik Austria (2007)	14.177	11.057	0.109	60.143
watercap	Statistik Austria (2007)	211.758	51.703	102	885
connect	Statistik Austria (2007)	95.489	7.081	44	100
debt	Statistik Austria (2007)	1.484	0.836	0.162	7.045
pop	Statistik Austria (2007)	0.464	1.69	0.017	15.501
area	Statistik Austria (2007)	0.64	0.653	0.045	4.147
election	Statistik Austria (2007)	0.182	0.386	0	1
majority	Statistik Austria (2007)	0.603	0.49	0	1
partisan	Statistik Austria (2007)	0.539	0.499	0	1
N		931			

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[19] See BMLFUW (2009) for details.

[20] External providers are typically neighboring municipalities. The percentage rate of ground water is excluded because together with spring water and external provision it adds up to 1 and the coefficient would therefore not be identified.

[21] Data on population and area stem from the year 2001 and are the same for the whole observation period. Most specifications include municipality fixed effects that render these variables obsolete.

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Table 2: Pairwise correlations

	waterprice	corp	sewagecorp	external	spring	nitrate	leakage	watercap	connect	debt	pop	area	election	majority	partisan
waterprice	1.000														
corp	0.022	1.000													
sewagecorp	0.054	0.452	1.000												
external	0.183	0.232	0.023	1.000											
spring	-0.225	0.031	0.227	-0.270	1.000										
nitrate	0.108	-0.115	-0.125	0.057	-0.466	1.000									
leakage	-0.154	-0.018	0.155	-0.120	0.157	-0.078	1.000								
watercap	-0.189	-0.011	-0.168	-0.004	-0.080	0.040	-0.103	1.000							
connect	0.017	0.013	-0.135	-0.061	-0.220	0.023	-0.027	0.290	1.000						
debt	0.221	-0.184	-0.190	-0.159	-0.238	0.241	-0.141	0.233	0.161	1.000					
pop	0.188	-0.042	-0.033	-0.037	0.131	-0.061	-0.064	0.028	0.044	0.050	1.000				
area	0.173	-0.191	-0.151	-0.029	0.275	-0.078	0.002	-0.128	-0.169	0.022	0.623	1.000			
election	-0.004	0.021	-0.004	0.009	-0.002	-0.051	0.027	0.066	0.029	0.026	0.001	-0.020	1.000		
majority	-0.012	-0.027	-0.150	0.111	0.001	-0.026	-0.193	0.094	0.067	0.141	-0.052	0.066	0.035	1.000	
partisan	0.042	0.004	0.154	-0.047	-0.099	0.185	-0.041	-0.184	-0.191	0.037	0.142	0.206	-0.045	0.178	1.000

3.3. Model and Methodology

To evaluate the effect of corporatization on water prices, initially the following model is estimated

$$price_{it} = corp_{it}\gamma + X_{it}\beta + \epsilon_{it} \tag{8}$$

where $price_{it}$ is a function of the governance structure $corp_{it}$, the covariates X_{it} and an unexplained part ϵ_{it}. Such a specification is representative for a large part of the existing empirical literature analyzing the effects of different governance types. While this model may produce some interesting results regarding the relationship between corporatization, the political variables and waterprices, the model is too restrictive to test the main research question of this paper – namely if the political influence on water prices is conditional on being corporatized.[22] Thus, instead of forcing all covariates, and therefore also the political variables, to have the same effect for either insitutional type, one may estimate the following model

$$price_{it} = corp_{it}\gamma + X_{it}\beta + corp_{it}(X_{it} - X_i)\delta + \epsilon_{it} \tag{9}$$

where $price_{it}$ is a function of the governance structure $corp_{it}$, the covariates X_{it}, the interaction term $corp_{it}(X_{it} - X_i)$ and an unexplained part ϵ_{it}.[23] The interaction effects are an important feature of the model because it allows to directly test the hypothesis that corporatization reduces political price setting behavior. As the overall effect of corporatization now depends on X, the covariate vector X of the interaction term is demeaned to ensure the interpretation of γ as average treatment effect. Therefore, corporatization affects water prices both through the dummy $corp_{it}$ and the interaction terms $corp_{it}(X_{it} - X_i)$.

A prime concern in this context is of course the potential, if not likely endogeneity of $corp_{it}$. As the local municipality can choose to corporatize or not, the decision may well be guided by factors that also influence price. E.g. a large municipality may not only be able to charge lower prices because of economies of scale but also have more internal ressources to manage a service on its own. To deal with this problem, which renders OLS estimates of equations (8) and (9) inconsistent, a number of diffent approaches are taken. First, if the source of endogeneity is time-invariant, as for instance in the case of municipal characteristics like size or geographical circumstances, a simple fixed effects (FE) model produces consistent estimates of the impact of corporatization on water prices (see Heckman and Hotz (1989)). Theoretically, this is not unlikely in the present case of water provision because many transaction characteristics like investment or natural resources are fairly stable over time. In addition to using only simple FE, the right-hand side variables may also be lagged by one year.[24] The basic idea is that lagging the right hand side variables by one period should ensure sequential exogeneity. With the relatively long panel at hand (T=15), the bias of FE estimators in the

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[22]In addition to being restrictive, such an approach can produce misleading or plainly wrong results based on a misspecified model (see Masten (1993) or Ohlsson (2003)).

[23]Although estimating separate estimations for corporatized and non-corporatized firms would be an alternative to the interaction terms, two drawbacks arise. First, the number of clusters is too small for estimation of cluster-robust standard errors if the sample is split (see Angrist and Pischke (2008)). Given the potential of serial correlation within municipalities, e.g. over time, this is certainly important. Second, splitting would obscure the underlying endogeneity problem into a sample selection problem, which not only requires similar approaches as those outlined below, but typically lacks tests for the validity of the chosen exclusion restrictions.

[24]Potentially, all right hand side variables except those related to election dates are endogenous. Election dates are fixed on

absence of strict exogeneity may be minimal anyway (see Wooldridge (2010)). Alternatively, the endogeneity of $corp$ may be purged by simply dropping all municipalities from the sample, which changed their governance type during the sample period from 1992 to 2006. This step should ensure that endogeneity can only occur on the time-invariant component of $corp$, which is also controlled for due to the FE specification. Although dropping the time-variant part of $corp$ makes identification of γ impossible, it should nevertheless lead to a consistent estimate of β and δ, which are the pivotal parameters in order to answer the research question of this paper.

A perhaps more convincing approach is to address the endogeneity directly by instrumental variable estimation (IV). A successfull identification strategy requires variables, which affect the municipal decision to corporatize while at the same time having no effect on price. Two instruments are considered. The first instrument that potentially fullfills these requirements is the dummy variable $sewagecorp$, which equals 1 if a municipality has corporatized sewage services and 0 otherwise. The idea is that if the local government has a general preference for a specific organizational type, this may also influence the choice of institutional arrangement for water distribution (see Chong et al. (2006) for a similar identification strategy). The mere preference is, however, unlikely to have a direct impact on prices. Hence, the $sewagecorp$ dummy is used as instrument in Z. The second potential instrument is debt per capita ($debt$). In the literature looking specifically at municipal outsourcing decisions debt is considered a fiscal constraint, which should increase the likelihood of outsourcing in order to reduce budgetary pressure (see Bel and Miralles (2003) or González-Gómez and Guardiola (2009)). The relationship may, however, not be linear. Similar to the discussion of debt thresholds in the empirical growth literature (see Reinhart and Rogoff (2010)), only large or very large debt burdens may trigger corporatization of services. Conversely, such a relationship may not be present for small or intermediate amounts of debt, where increases in debt could rather imply a more interventionist government, which is also less likely to give away control rights over water distribution. Given the unclear functional form of the effect of debt on prices, the variable enters the instrument set Z both linear and quadratic.

While the IV-strategy is straightforward for the model in (8), the interaction terms in (9) are troublesome for identification. Crucially, it is not only necessary to instrument $corp$ but also each interaction term $corp_{it}(X_{it} - X_i)$. Although sufficient instruments can be generated by interacting the instrument Z_{it} and $(X_{it} - X_i)$, multicollinearity will likely render the estimates from traditional IV to imprecise to be useful (see Wooldridge (2010)), leaving the model effectively unidentified. Thus, and as an alternative to standard IV, the third approach used deal with the endogeneity problem is a control function estimator (CF). This correctional procedure in the spirit of an endogenous switching regression model with a heterogeneous treatment effect is conceptually very similar to an IV approach.[25] For instance, an exclusion restriction, again given by the instrument set Z, is required for identification of the model. The most notable advantage of control function estimators over ordinary IV estimators materializes when the model is more complicated in terms of nonlinearities and the number of endogenous regressors is large. This is the case in the present nonlinear model

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the provincial level and cannot be altered by the municipalities. Lagging election cycle variables would also be inconsistent with theory because it would assume that water prices are affected one year after elections. Thus, the election cycle variable is not lagged.

[25]See Vella and Verbeek (1999) for an excellent discussion of control function approaches and their close relation to IV.

where not only the variable $corp$ but also all interaction terms have to be instrumented. While a distributional assumption is necessary - the error terms are considered independent of X and Z with a trivariate normal distribution -, Control function estimators will generally be (much) more precise in this case than IV (see Wooldridge (2010)). The actual implementation follows the estimator of Wooldridge (2010), which can be extended to panel data along the lines of Wooldridge (1995).[26] Instead of replacing the endogenous variables by their first stage prediction, as in a typical IV approach, the residuals from the first stage are used as a correction term in the outcome equation. In addition to producing consistent parameter estimates, the t-tests on these additional terms are basically a test of whether endogeneity is present or not.

To robustify inference all regressions are estimated using heteroscedasticity and cluster-robust standard errors. Therefore, standard errors are fully robust with respect to arbitrary serial correlation within municipalities as well as general heteroscedasticity (see Stock and Watson (2008)).

3.4. Results

The results of estimating the two models in (8) (without interactions) and (9) (with interactions) are shown in Table 3. Regarding the simple FE version of the uninteracted model in column one, it is noteworthy that apart from year and municipality fixed effects only the election year indicator *election* and *majority* have a statistically significant effect on waterprices. As can be seen from columns two and three, lagging the right hand side variables or using only the subsample of municipalities without a governance change hardly affects the results, with *majority* loosing its previous borderline statistical significane. Given the rather good fit of the model as indicated by the R^2, it appears that municipal price setting is largely determined by a fixed component, a time trend and political opportunism related to election dates. Neither the governance type ($corp$) itself nor other municipal or water provision specific factors seem to directly translate into water price setting.

To see if political interference in price setting is different between direct public management and corporatized firms, columns four to six re-estimate the previous specifications including interaction effects (i.e. the model in (9)). Most importantly, while the average effect of $corp$ is still not statistically different from zero, the results from the interacted models show that corporatized firms are markedly different when it comes to price setting. According to the FE specificationin in column 4, a municipality that uses direct public management has 6.9 euro lower water prices in election years, 7.0 euro higher prices in the case of a majority government and 20.1 euro lower prices if the governing party is left-wing. In stark contrast to this, the interaction terms, which have to be interpreted as contrasts, reveal that price setting in corporatizations is much less influenced by these political variables. The total effect of the election cycle (the sum of *election* and *election_corp*) remains statistically significant, but is much smaller, whereas the effects for *majority* and *partisan* are not statistically different from zero for corporatized firms. The estimations in columns five and six broadly confirm the result that corporatizations are less affected by political factors, most strongly

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[26]The two step procedure first estimates the governance choice by probit using all covariates X and the instrument Z. To adapt the procedure to panel data, the first stage probit is estimated using a Mundlak type transformation to account for the time invariant component in the first stage. Two selection terms, one for selection into treatment h_sel and one for selection into non-treatment h_mills, are subsequently calculated from the first stage residuals and added to the outcome equation.

Table 3: OLS FE Estimations

	(1) FE	(2) FE Lag	(3) FE Drop	(4) FE INT	(5) FE Lag INT	(6) FE Drop INT
corp	0.864	3.048		-6.309	-2.930	
	(4.314)	(4.589)		(5.691)	(4.930)	
external	8.031	5.201	8.619	24.852	28.968	28.254
	(5.130)	(6.171)	(5.299)	(20.931)	(19.950)	(22.919)
source	-9.350	2.743	-10.603	-15.838**	-2.071	-17.004**
	(7.647)	(7.824)	(7.533)	(7.003)	(9.149)	(8.073)
nitrate	0.227	0.327	0.197	0.190	0.219	0.121
	(0.247)	(0.264)	(0.247)	(0.345)	(0.385)	(0.369)
leakage	0.027	0.013	0.069	0.016	-0.024	-0.055
	(0.121)	(0.112)	(0.157)	(0.124)	(0.120)	(0.165)
connect	-0.148	0.053	-0.247	-0.329	-0.035	-0.648
	(0.334)	(0.359)	(0.334)	(0.447)	(0.509)	(0.462)
watercap	-0.022	-0.011	-0.032	-0.006	0.001	-0.045
	(0.020)	(0.014)	(0.039)	(0.017)	(0.017)	(0.042)
election	-4.718***	-4.762***	-5.195***	-6.880***	-6.167***	-7.126***
	(0.900)	(0.779)	(1.030)	(1.142)	(1.012)	(1.200)
majority	4.688*	3.083	3.935	7.046**	5.701	8.061**
	(2.788)	(3.206)	(3.257)	(3.322)	(3.884)	(3.758)
partisan	-5.937	-1.173	-7.056	-20.067**	-11.492**	-20.314
	(6.756)	(5.955)	(7.896)	(9.969)	(4.518)	(12.605)
external_corp				-16.153	-23.704	-19.502
				(20.864)	(20.043)	(23.285)
source_corp				21.792**	15.484*	18.164
				(8.864)	(9.009)	(11.432)
nitrate_corp				-0.214	-0.168	-0.138
				(0.382)	(0.402)	(0.544)
leakage_corp				-0.237	-0.141	0.103
				(0.212)	(0.199)	(0.346)
watercap_corp				-0.092*	-0.096*	-0.010
				(0.056)	(0.053)	(0.093)
connect_corp				0.097	-0.126	0.440
				(0.653)	(0.689)	(0.707)
election_corp				4.513***	2.933**	4.903***
				(1.678)	(1.488)	(1.895)
majority_corp				-8.683**	-8.463*	-12.656**
				(4.051)	(4.592)	(5.577)
partisan_corp				20.135**	15.250**	19.646
				(9.618)	(6.650)	(13.703)
N	931	872	813	931	872	813
R2	0.724	0.681	0.714	0.743	0.704	0.735

Cluster and heteroscedasticity robust standard errors in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
ad (1) and (4): Baseline FE specification
ad (2) and (5): Independent variables (except $election$) lagged by one year.
ad (3) and (6): Subsample without municipalities where $corp$ changes.

for *election* and somewhat more sensitive in the case of *majority* and *partisan*.[27]

IV and CF Estimations

Up until now the potential endogeneity of *corp* has been dealt with rather indirectly by choosing appropriate specifications or samples. To address the issue more thoroughly, this subsection applies IV and CF methods. As instruments are pivotal for both approaches, the first stage estimates for different sets of instruments are given in Table 4.[28]

Table 4: First Stage Estimations

	(1)	(2)	(3)	(4)	(5)	(6)
	IV1	CF1	IV2	CF2	IV3	CF3
external	-0.038	-0.063	0.001	-0.025	-0.072	-0.095
	(0.078)	(0.067)	(0.063)	(0.062)	(0.064)	(0.066)
spring	0.016	0.014	-0.029	-0.025	0.005	0.010
	(0.092)	(0.099)	(0.058)	(0.057)	(0.087)	(0.094)
nitrate	0.001	0.002	0.001	0.001	0.002	0.002
	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)
leakage	0.000	-0.000	-0.000	-0.002	0.000	-0.000
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
watercap	-0.001***	-0.001***	-0.001***	-0.001*	-0.000***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
connect	-0.005**	-0.002	-0.005	-0.002	-0.005**	-0.002
	(0.002)	(0.003)	(0.003)	(0.004)	(0.002)	(0.003)
election	-0.007	-0.005	-0.010	-0.006	-0.007	-0.004
	(0.006)	(0.007)	(0.010)	(0.010)	(0.006)	(0.007)
majority	-0.046*	-0.039	-0.049	-0.036	-0.049*	-0.035
	(0.026)	(0.028)	(0.042)	(0.043)	(0.027)	(0.027)
partisan	-0.070	-0.075	-0.042	-0.050	-0.065	-0.067
	(0.070)	(0.067)	(0.056)	(0.061)	(0.062)	(0.057)
sewagecorp	0.608***	0.524***			0.579***	0.529***
	(0.157)	(0.160)			(0.170)	(0.164)
debt			-0.170***	-0.137***	-0.067	-0.033
			(0.047)	(0.047)	(0.046)	(0.047)
debt2			0.019***	0.017***	0.005	0.002
			(0.005)	(0.006)	(0.005)	(0.006)
R2	0.379	0.266	0.165	0.147	0.390	0.295

Cluster and heteroscedasticity robust standard errors in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
ad (1) and (2): IV and CF first stages with Instrument Set 1.
ad (3) and (4): IV and CF first stages with Instrument Set 2.
ad (5) and (6): IV and CF first stages with Instrument Set 3.
ad (2), (4) and (6): Mundlak type probit to account for FE; marginal effects.

The dependent variable in all specifications is *corp* and the right hand side variables contain the instruments *sewagecorp*, *debt*, *debt2* along with all variables in X. Basically, the two sets of instruments are first used individually, Set1 and Set2, before joining together in Set3. As standard IV uses a linear model and CF estimators a probit model in the first stage, two estimations per instrument set appear in Table 4. Overall and as expected, the estimates from the linear and the probit model are quite similar both in size and statistical significance. As exhibited by columns one and two, a municipality that corporatized sewage is also much more likely (roughly 60% in the linear probability model) to have chosen a corporatized firm for water provision. The effect is highly statistically significant. Similarly, when looking at the results in columns three and four, it appears that the debt level has strong effect on the decision to corporatize or not. The estimates indicate that the effect is actually non-linear, meaning that only after a sufficiently high debt level has been reached,

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[27]A similar interpretation arises regarding the interaction effect of *spring*. While spring water decreases prices for inhouse production, the effect is not significantly different from zero when a service was corporatized. It is unclear from the obtained results if corporatized firms extract the cost savings from spring water as rents or reinvest them into the company.

[28]For the model in (9), there is also one first stage for each interaction term. For representation purposes and also because the first stage regarding *corp* only is the most interesting one, these additional estiamations are not presented here. Test statistics regarding overidentification and weak instruments are, however, given in the respective tables.

debt increses the probability of corporatizations. However, when the two instrument sets are used together, column five and six, the effect of debt on *corp* becomes insignificant with *sewagecorp* remaining almonst unchanged. It appears therefore, that both instruments *debt* and *sewagecorp* are both proxies for probably similar underlying factors. Governments which have a preference for or against corporatization are obviously not changeing their behavior because of debt levels. Rather the opposite, the level of debt may well be an indicator for the overall preference and behavior of a government. Apart from these more qualitative interpretation, standard statistical tests regarding the validity and identification property of the instruments are presented along with the following second stage estimations.

Table 5: IV Estimations

	(1) IV1	(2) IV2	(3) IV3	(4) IV1 INT	(5) IV2 INT	(6) IV3 INT
corp	-2.160	-18.137	-3.215	298.450	14.627	-0.872
	(8.469)	(30.242)	(9.228)	(1761.292)	(19.708)	(15.462)
external	8.292	9.672*	8.383	-1.8e+03	35.947	60.112
	(5.184)	(5.764)	(5.193)	(1.2e+04)	(100.295)	(96.602)
spring	-9.366	-9.452	-9.372	-139.623	3.060	-6.266
	(7.731)	(8.276)	(7.764)	(897.267)	(16.627)	(11.590)
nitrate	0.230	0.246	0.231	-1.774	0.421	0.503
	(0.246)	(0.247)	(0.246)	(12.020)	(0.650)	(0.427)
leakage	0.027	0.029	0.027	0.477	-0.050	0.295
	(0.121)	(0.129)	(0.122)	(1.811)	(0.412)	(0.188)
connect	-0.162	-0.235	-0.167	1.306	-0.392	0.392
	(0.333)	(0.393)	(0.335)	(9.451)	(0.954)	(0.638)
watercap	-0.023	-0.034	-0.024	0.487	-0.007	-0.010
	(0.020)	(0.023)	(0.019)	(2.711)	(0.035)	(0.033)
election	-4.744***	-4.882***	-4.753***	4.747	-10.448	-7.655***
	(0.902)	(1.044)	(0.910)	(68.922)	(6.806)	(2.698)
majority	4.560*	3.879	4.515*	-6.836	5.348	-0.164
	(2.719)	(2.916)	(2.717)	(48.369)	(10.251)	(5.895)
partisan	-6.090	-6.901	-6.144	58.618	5.327	-8.765
	(6.753)	(7.166)	(6.768)	(426.969)	(21.454)	(13.444)
external_corp				2177.824	-47.272	-62.786
				(1.5e+04)	(120.216)	(112.835)
spring_corp				108.724	-55.339	8.014
				(881.899)	(51.165)	(15.424)
nitrate_corp				9.814	-0.650	-1.392
				(64.411)	(1.699)	(0.952)
leakage_corp				-0.112	0.591	-0.935**
				(5.794)	(1.506)	(0.419)
watercap_corp				-2.933	-0.015	0.077
				(16.217)	(0.229)	(0.183)
connect_corp				-6.272	0.184	-1.477
				(21.768)	(2.289)	(0.959)
election_corp				-25.024	13.674	6.249
				(168.722)	(15.660)	(5.893)
majority_corp				5.087	5.845	13.055
				(149.449)	(24.572)	(13.252)
partisan_corp				-67.935	-17.675	5.133
				(577.490)	(33.921)	(20.838)
N	931	931	931	931	931	931
r2	0.723	0.710	0.723	-6.921	0.685	0.697
F-Stat (Kleibergen Paap Wald)	15.003	7.069	8.174	0.002	0.500	0.951
Hansen J-Statistic (p-value)		0.402	0.438		0.518	0.790

Cluster and heteroscedasticity robust standard errors in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
ad (1) and (2): IV estimators with Instrument Set 1
ad (3) and (4): IV estimators with Instrument Set 2
ad (5) and (6): IV estimators with Instrument Set 3

The IV results, for both the uninteracted and the interacted models, are shown in Table 5. Regarding the results of the restricted model without interactions, the estimated results are very similar to the OLS results in Table 3. *Corp* remains insignificant and only *election* or borderline also *majority* appear to significantly affect municipal price setting. The different instrument sets do no change these conclusions. Importantly, the overidentification tests like the Hansen J-Statistic seem

to support the argument that the chosen instruments are valid. Similarly, the Kleibergen-Paap Wald F-Statistic does not indicate that the results suffer from weak-identification.[29] Turning to the model with interactions, as expected, a severe identification problem arises. As the Kleibergen-Paap Wald F-Statistic shows, the model is basically unidentified. The large coefficients and even larger standard errors are indicators of this problem. Apparently, instrumenting not only $corp$ but also all the interaction terms delivers results which are too imprecise to be useful.[30] For this reason Table 6 reproduces the estimations in Table 5 using a control function estimator instead of standard IV.

Table 6: CF Estimations

	(1) CF1	(2) CF2	(3) CF3	(4) CF1 INT	(5) CF2 INT	(6) CF3 INT
corp	-3.625	-12.046	-3.862	-3.165	-19.295	-3.523
	(8.222)	(29.769)	(8.413)	(8.565)	(29.422)	(8.871)
external	8.221	8.304	8.173	25.033	26.093	25.033
	(5.151)	(5.249)	(5.149)	(21.253)	(23.348)	(21.334)
spring	-9.149	-9.471	-9.095	-15.513**	-15.986**	-15.502**
	(7.508)	(7.671)	(7.526)	(7.073)	(7.301)	(7.119)
nitrate	0.240	0.242	0.241	0.181	0.196	0.182
	(0.248)	(0.248)	(0.248)	(0.346)	(0.343)	(0.347)
leakage	0.027	0.017	0.025	0.021	0.004	0.022
	(0.120)	(0.117)	(0.119)	(0.126)	(0.121)	(0.125)
connect	-0.147	-0.150	-0.142	-0.323	-0.321	-0.324
	(0.331)	(0.343)	(0.331)	(0.448)	(0.436)	(0.449)
watercap	-0.025	-0.033	-0.026	-0.004	-0.019	-0.004
	(0.020)	(0.027)	(0.020)	(0.019)	(0.024)	(0.019)
election	-4.722***	-4.744***	-4.718***	-6.882***	-6.918***	-6.881***
	(0.903)	(0.928)	(0.903)	(1.150)	(1.150)	(1.146)
majority	4.532*	4.205	4.512	7.366**	6.199*	7.316**
	(2.746)	(2.926)	(2.759)	(3.434)	(3.706)	(3.470)
partisan	-6.065	-6.790	-6.108	-19.921**	-21.231**	-19.934**
	(6.792)	(7.031)	(6.769)	(9.957)	(10.007)	(10.027)
external_corp				-16.114	-17.252	-16.152
				(21.116)	(23.887)	(21.246)
spring_corp				21.235**	22.116**	21.059**
				(8.862)	(9.092)	(8.998)
nitrate_corp				-0.191	-0.203	-0.195
				(0.384)	(0.382)	(0.385)
leakage_corp				-0.243	-0.241	-0.245
				(0.234)	(0.218)	(0.229)
watercap_corp				-0.094	-0.092	-0.094
				(0.058)	(0.057)	(0.058)
connect_corp				0.091	0.088	0.087
				(0.659)	(0.641)	(0.664)
election_corp				4.544***	4.503***	4.545***
				(1.687)	(1.678)	(1.687)
majority_corp				-9.433**	-7.846*	-9.339**
				(4.365)	(4.678)	(4.433)
partisan_corp				20.438**	20.440**	20.385**
				(9.650)	(9.878)	(9.715)
h_mills	2.140	6.474	2.193	-3.248	5.444	-2.807
	(4.575)	(17.134)	(4.882)	(4.000)	(18.549)	(4.432)
h_sel	-4.873	-10.784	-5.735	1.985	-12.530	1.952
	(4.515)	(19.681)	(4.840)	(5.497)	(20.172)	(5.910)
N	931	931	931	931	931	931
r2	0.724	0.724	0.724	0.744	0.744	0.744

Cluster and heteroscedasticity robust standard errors in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
ad (1) and (2): CF estimators with Instrument Set 1
ad (3) and (4): CF estimators with Instrument Set 2
ad (5) and (6): CF estimators with Instrument Set 3

The uninteracted models in columns one to three of Table 6 are indicative of the close relation between standard IV and CF estimators. In terms of magnitude and statistical significance the estimation results are very similar, even more so to IV than to OLS. The insignificant terms h_mills

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[29]See Baum et al. (2010) for more details on these test statistics and the associated stata command.
[30]Using more efficient IV-type estimators like LIML or GMM does not solve this problem.

and h_sel can be interpreted as an indication that there is no endogeneity in the estimations. The FE may afterall purge most of it. Even more interesting are the results from columns four to six, the models with interaction terms. As exhibited, the more efficient CF estimator seems to be able to deliver much more precise results than standard IV. This result seems to support the notion that the advantages of CF estimators over IV unfold especially in the case of non-linear models where multiple endogenous variables would otherwise have to be instrumented. More concretely, the estimates once more confirm the hypothesis from the theoretical section, that corporatization leads to a decrease in politically motivated price changes. Water prices in directly managed water providers are influenced by the electoral cycle, the strength of the governing party as well as partisan politics. In contrast, price setting in corporatized firm seems much less affected by such forces. Corporatization seems therefore to truly mitigate the effect of politics on firm behavior.

4. Discussion and Conclusion

This paper analyzes the effect of corporatization on the behavior of public firms. The empirical results suggest that on average water prices are not significantly different between direct management and corporatized services. However, price setting between the two governance types was found to be markedly different. While political determinants are important when politicians have control rights over price setting, commercializing a firm leads to a strong reduction of political interference. This result applies to a series of political determinants tested in this paper. As such, the theoretical prediction brought forward by Shleifer and Vishny (1994), namely that corporatization of public firms reduces politically motivated practices, is empirically corroborated in this paper. It is important to note, however, that despite the reduced magnitude, the behavior of corporatized firms is still affected by political considerations. On top of that, the significant interaction effects strongly support Masten (1993) who stresses that modeling the effect of a change in the governance structure by an intercept is an imperfect translation of the theoretical predictions into empirical models.

Regarding economic policy, neither governance type appears preferable in terms of consumer prices. Hence, no general recommendation as to what governance structure is most desirable can be made. However, the results do show that corporatization is an effective mean to reduce political influence on the price setting process. The relevant question for economic policy then boils down to whether political incentives are desireable when it comes to providing public services. In Shleifer and Vishny (1994), political benefits are considered net welfare losses, representing only transfers from political competitors. Thus, ceteris paribus, reducing political control over business decisions such as prices is desirable. Removing high-powered political incentives may, however, come at a cost if depoliticization of a task reduces administrative control and consequently accountability. Elections may after all help to increase allocative efficiency by increasing the probability that public services and goods are tailored to voter-citizens' preferences (see Frant (1996)). This link may be lost when a public service is no longer part of the ordinary political process (e.g. as part of the budget). As pointed out by Alesina and Tabellini (2008) politicians themselves may deliberately choose to delegate a task in order to shift blame to outside agencies. Thus, even if politicians are considered self-interested, decreased political responsibility should be taken into account.

Corporatization, or more generally depoliticizing a task, may be especially desirable in two cases. First, when the political benefits from a price reduction are large, i.e. when citizens - preferably the own constituency - are noticeably affected by a tax or spending item. Since public service charges like water prices are among the few local taxes meeting this requirement, the opportunistic potential for politicians seeking reelection can be assumed to be large. Water prices in particular have been found to be highly politicized, even more than other utilities (see Savedoff and Spiller (1999)), and are therefore an attractive instrument for opportunistic political action. Second and even more importantly, corporatization may be desirable when the political cost of financing the price reduction are low. Instead of actually raising new taxes or increase debt, politicians may rather choose not to invest or to reduce maintenance, therefore shifting expenditures from less visible to highly visible uses. If, for instance, citizens have difficulty judging the quality of infrastructure (like water or sewage lines), a vote-seeking agent may relocate funds from infrastructure investment to politically more beneficial uses like water prices (see Frant (1996)).[31] In such cases, the short term political costs of financing the price reduction are low because shifting funds from maintenance to price reductions will typically go unnoticed.

While the findings of this paper are certainly somewhat specific to the Austrian institutional framework, this paper supports the general notion that institutional changes can help to reduce political opportunism. In this respect, a large literature has stressed the role of privatization for successful public sector reform (see Savedoff and Spiller (1999) or Shirley (1999)). But given that privatization is often politically infeasible and its consequences in terms of social welfare unclear it is an important insight that other less controversial institutional alternatives exist. The loss of political accountability is certainly lower under corporatization and one may achieve similar outcomes to privatization if the institutional design is chosen appropriately. While existing research is somewhat pessimistic about the potential of 'softer' public sector reforms, the actual institutional design may be much more important than simply choosing to implement a reform (see Shirley and Xu (1998) and Shirley and Xu (2001)).

Considering corporatizations as a distinct institutional choice might explain why this kind of special purpose organizations, e.g. as government corporations or public authorities, are particularly present in activities which build and maintain public infrastructure. An observation that holds true not only for Austria and continental Europe but also the U.S.[32] Further research on this issue may compare the effect of corporatizations to that of privatizations, as two distinct institutional alternatives. On a more general note, breaking up the overly polar distinction between public and private provision of infrastructure could provide a deeper insight into the determinants explaining performance differences across institutional modes.

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[31]A more general but similar argument is put forward in Gersbach and Liessem (2008) when considering politicians with multi-task problems. In analogy to the seminal results in Holmstrom and Milgrom (1991), politicians may have incentives to distort the allocation of effort by overemphasizing tasks that can be measured more precisely than others.

[32]For a more in depth analysis of the U.S. water sector, where a long-term shift from private to public ownership has been recorded, see Masten (2011).

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Table .7: Corporation poolability

	(1)	(2)	(3)
corp	-6.309	-28.839	-4.079
	(5.691)	(20.797)	(6.586)
external	24.852	22.989	27.128
	(20.931)	(21.733)	(22.740)
spring	-15.838**	-17.227**	-16.767**
	(7.003)	(7.940)	(7.212)
nitrate	0.190	0.176	0.228
	(0.345)	(0.381)	(0.364)
leakage	0.016	-0.028	-0.017
	(0.124)	(0.129)	(0.122)
connect	-0.329	-0.426	-0.344
	(0.447)	(0.426)	(0.442)
watercap	-0.006	-0.009	-0.010
	(0.017)	(0.018)	(0.019)
election	-6.880***	-6.920***	-6.793***
	(1.142)	(1.168)	(1.145)
majority	7.046**	7.342**	6.675**
	(3.322)	(3.535)	(3.322)
partisan	-20.067**	-20.092	-17.824*
	(9.969)	(12.688)	(9.879)
external_corp	-16.153	-16.997	-14.475
	(20.864)	(22.372)	(27.960)
spring_corp	21.792**	-82.867	26.009***
	(8.864)	(59.924)	(9.546)
nitrate_corp	-0.214	-0.030	-0.291
	(0.382)	(0.453)	(0.438)
leakage_corp	-0.237	0.362	-0.480**
	(0.212)	(0.248)	(0.201)
watercap_corp	-0.092*	0.074	-0.166***
	(0.056)	(0.054)	(0.063)
connect_corp	0.097	14.047***	-0.188
	(0.653)	(1.729)	(0.749)
election_corp	4.513***	5.101**	4.046*
	(1.678)	(2.191)	(2.102)
majority_corp	-8.683**	-2.835	-9.609**
	(4.051)	(5.384)	(4.385)
partisan_corp	20.135**	15.986	21.287**
	(9.618)	(12.797)	(9.838)
N	931	716	786
r2	0.743	0.753	0.751

Cluster and heteroscedasticity robust standard errors in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
ad (1): Baseline fixed effects specification.
ad (2): Government corporations excluded.
ad (3): Associations excluded.