City objectives and monopoly franchising. An empirical analysis of calls for tenders in Italian gas distribution

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Abstract

European local governments are entrusted with the task of designing competitive procedures to award monopoly franchises (Directive 93/37). While the contracting authorities are obliged to follow the "most economically advantageous tender" approach, they can interpret it at their substantial discretion.

This paper is an empirical analysis of the calls for tenders that Italian municipalities have issued in the gas distribution sector over the 2001-2008 period. The sample includes 174 calls for tenders. The evaluation criteria generally encompass bid attributes as quality standards, operation requirements, infrastructure investment, and do not limit to prices. Each local government designs own competitive procedures. In particular, when assessing the tenders, municipalities can freely choose the scoring rules to evaluate multidimensional tenders.

The research is mainly aimed at investigating the objectives pursued by the Italian cities that have franchised the gas service, testing the "taxation-by-regulation" effect **(Posner 1971, 1972)**. In particular I analyze the presence of redistributive concerns by testing whether a municipality that suffers from public budget problems is more likely to place a greater weight on the selection criteria that describe the city-provider transactions (e.g. franchise fees).

Keywords: Gas distribution service, multidimensional auctions, scoring rules, taxation by regulation.

JEL Classification: H, K, L

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1. Introduction

European local governments are entrusted with the task of designing competitive procedures to award monopoly franchises (Directive 93/37). While the contracting authorities are obliged to follow the "most economically advantageous tender" approach, they can interpret it at their substantial discretion.

Since 2000, Italian municipalities have been franchising public utility services such as gas distribution, waste collection, public transport and so on. Each local government designs own competitive procedures. In particular, when assessing the tenders, municipalities can freely choose the scoring rules to evaluate multidimensional tenders. This paper is an empirical analysis of the calls for tenders that Italian municipalities have issued in the gas distribution sector over the 2001-2008 period. The sample includes 174 calls for tender. The gas distribution sector offers an appropriate empirical setting for two reasons. The number of awarded concessions is fairly large. At the same time, evaluation criteria generally encompass bid attributes as quality standards, operation requirements, infrastructure investment, and do not limit to prices.

The inspiriting principle of the monopoly franchising lies on the competition for the market motivated by the promotion of consumer interests **(Demsetz 1968, Riordan and Sappington 1987)**. Accordingly, the selection rules should reward the bidder that offers the most efficient contract terms in order to allow consumers to capture any extra-normal rents. Nevertheless the practical design of competitive procedures is critical in determining the contest outcome. Indeed the selection criteria could reflect the objectives of public administrations. Aside from private interests of politicians or bureaucrats (e.g. patronage), public budget concerns can play a role as relevant as sector efficiency. In other words, the selection criteria can be targeted to provide in-kind or in-cash rents for redistribution (e.g. tax revenues), even at the expense of consumers.

The research is mainly aimed at investigating the objectives pursued by the Italian cities that have franchised the gas service, testing the “taxation-by-regulation” effect **(Posner 1971, 1972)**. In particular I analyze the presence of redistributive concerns by testing whether a municipality

that suffers from public budget problems is more likely to place a greater weight on the selection criteria that describe the city-provider transactions (e.g. franchise fees).

2. The gas distribution sector in Italy

After a long period in which the stability of the normative framework has fostered the methanization and the infrastructure development through the country, the Italian gas distribution sector has been subject, in the last years, to an intense normative flow, starting from the Legislative Decree n. 164/2000 (Letta's Decree), which substantially reshaped the regulatory context, introducing the following main innovations:

- the compulsory *competitive bidding* procedures in selecting utility management units to run the gas distribution service, designed by local governments, which are entrusted with functions of programming and control;
- the definition of an upper bound to the franchise duration (12 years);
- the price (tariffs) regulation entrusted to the AEEG, the Italian energy regulator;
- the property of infrastructures going back to the local governments at the end of the franchising term.

The reform is clearly aimed at introducing competition in the local gas distribution system consistently with the liberalization process launched in the natural gas sector as a whole in order to foster prices decreasing and service quality enhancing.

The context in which the liberalization process has been undertaken was characterized by the predominance of the "direct awarding". The local governments franchised the gas distribution service by granting the local monopoly without a selecting procedure assuring the pursuing of efficiency, but relying on its own full discretion. Yet at the end of 2007, 75% of the contracts had been granted through direct awarding, often to public owned firms. Again, even before the Letta's Decree was put in force, 19% of the contracts had been already granted via competitive procedures. Instead only about 300 contracts (4.3%) have been awarded through a competitive procedure after Letta's Decree.

Obviously the relationship between the local government and the gas distributor is crucial: a "service contract", conditioned on a model contract edited by the AEEG and endorsed by Ministry of Industry is introduced to regulate the relation, which is framed by terms relating franchise duration, quality objectives, economic aspects, controls and sanctions. The service contract must be integrated by the winning bid conditions submitted during the competitive procedure, which provide the effective provisions shaping the contractual arrangement, besides investment programs for infrastructure maintaining and development.

The property of infrastructure is supposed to go back to the local government at the end of the franchise term, so as to make possible a subsequent franchising. No compensation is contemplated aside from eventual non-amortized investments, normally refunded by the new entrant.

Profits resulting from gas distribution are regulated by AEEG employing a *price cap* approach, which establishes an upper bound on returns accruing to the firms, called "Vincolo ai Ricavi di Distribuzione" (VRD). The VRD is computed adding up operating costs and capital remuneration, the first parametrically estimated and so not linked with actual firms' costs, the second evaluated on the base of the net invested capital, yearly incremented by investments implemented during the last year, net of amortizations already met in tariffs.

Assuming that the regulatory framework introduces conflicting incentives for the firms, local governments are required to pay substantial attention to two possible distortions in designing competitive procedures: on the one hand, great emphasis on franchise fees is likely associated to investment shrinking, with direct consequences on service quality and safety; on the other hand, by rewarding firms determined to fulfill ambitious investing programs, no value added investments are stimulated, with firms relying on tariffs for the recovery of the associated extra-costs.

Franchise fee and investment program in infrastructure maintaining and development don't embrace the spectrum of all possible dimensions usually taken into account in designing competitive procedures by local governments. Service quality and organization, economic terms offered to the final customers and conditions regulating the transition between different

operators, both at the beginning and at the end of the franchise span, represent other relevant dimensions included in the procedure designs and thus to the same extent aspects along which bids are assessed.

The bid assessment is run via scoring rules, consisting in a set of upper bounds on the scores associated to each relevant dimension considered in the selection procedure (generally adding up to 100) and formulas to compute each single score. Once the scores for each dimension are computed, the total score associated to a single bid is calculated by their summation.

3. Background

The role played by local governments in regulating public services provision has been recognized by the economic literature as early as seventies, when the regulation of cable television sector by American municipalities, mostly via monopoly franchising, provided an interesting case study.

Since the seminal paper by **Demsetz (1968)**, much has been written about the problems of competitive franchising arrangement (**Williamson, 1976; Goldberg, 1976; Zupan, 1989**). Less attention has been given to the analysis of franchisee's objectives and conducts. It is still unclear whether contracting authorities pursue objectives that are not directly related to their regulatory stance.

The concept of *taxation by regulation* was first introduced and applied to cable television regulation by **Posner (1971, 1972).** Monopoly franchising is a mean to divert monopoly profits from companies to the public purse, rather than a policy to limit monopoly profits. Taxation by regulation has been mentioned often as a reason why local franchise regulation fails to promote consumer welfare (**Hazlett, 1991, Otsuka and Braun, 2002**).

The selection functions may include factors inconsistent with the average consumer preferences. Possible justifications for this view may be a desire to transfer rents in-kind to special interest groups, or in-cash as a source of revenue to bolster municipal tax coffers **(Beutel, 1990)**.

In his work Beutel uses contract bid data coming from standardized summaries of proposals collected by franchising authorities, including proposed prices, firm's experience and financial capabilities, technical aspects of the proposed cable system and so on, and constructs a decision function explaining the CATV operator selection by the cities. In this framework, he indirectly infers the city's objectives, relying upon the mere characteristics of the winning bids. The peculiar design of the first franchising procedures, with most municipalities simply listing their reasons for choosing one bidder over the others, without making clear how the various different dimensions of the proposals were compared, explains the Beutel's strategy.

In the case of cable television, the tendency to award franchises to the firm offering the most elaborate cable system, or the system with the most "bells and whistles," rather than to the firm offering the best deal for the consumers was noticed by **Prager (1989).**

One possible explanation is that powerful interest groups benefit from the so-called excessive demands and pressure local officials to include these demands in their franchise agreements.

Consistently with Beutel's work, the second argument proposed by Prager is that cities and towns award cable television franchises to the firm that will most enrich the local government's coffers, either directly through franchise fees or indirectly through "in-kind" contributions.

The motivation here is obvious: politicians prefer an indirect tax, in the form of higher cable television rates, to a direct tax, as a means for raising revenue. Given this incentive, one might expect that in the absence of any legal constraints, franchise bidding competition would result in the franchise being awarded to the firm that was willing to pay the highest price for the right to become a cable television monopolist. Rates would be set at the profit maximizing monopoly level, but monopoly rents would accrue to the local government rather than the cable system operator.

The failure of the franchising system in the cable television sector in US diverted attention from these issues, but in the last decades, privatization process of local public services in many different countries has called for investigations on monopoly regulation and cities' objectives.

Indeed, pre-existing economic literature has investigated the determinants of local service privatization (e.g. **Bel and Fageda, 2009, Levin and Tadelis, 2007**), mainly by focusing on fiscal constraints, economic efficiency, political processes and ideological attitudes.

In addition the theory of scoring auctions has recently made relevant advances (**Asker and Cantillon, 2008, 2010**). Nevertheless, the design of competitive procedures by local governments is an unexplored field of analysis. In particular, and to the best of my knowledge, the previous analyses do not have so far supplied any evidence on the determinants of scoring rules.

4. Data and methodology

The sample includes 174 calls for tenders spanning eight years, from 2001 to 2008.

Table 1 – Sample

Region	**Year**								**Tot.**
	2001	2002	2003	2004	2005	2006	2007	2008	
Abruzzi				3	6	1	1		11
Aosta Valley						1			1
Apulia					2				2
Basilicata			3	2		1	2		8
Calabria						1	1	1	3
Campania	1		5	2	3	1	1	2	15
Emilia-Romagna			1						1
Friuli-Venezia Giulia					1				1
Lazio		1	4	2	1	1		1	10
Liguria							2		2
Lombardy		4	6	6	15	7	7	11	56
The Marche		1			1				2
Molise			2				1	1	4
Piedmont			1	3	1	1	1	1	8
Sardinia			1	2				13	16
Sicily			2	2	2			1	7
Tuscany					1	1			2
Veneto			1	4	4	5	6	5	25
Total	1	6	26	26	37	20	22	36	174

A first group of variables includes quantitative and qualitative information about the calls for tenders. Indicators have been constructed by collecting information from the Utilitatis Yellow Book dataset on gas and water tenders. All the criteria that are included into the calls have been

described by a continuous variable (i.e. a score variable takes a value from 0 to 100), in order to represent the selection function. The potentially relevant selection criteria have been classified according to five dimensions: franchise fee (*Fee*), terms for infrastructure asset transfer (*Trans*), prices (*Prices*), new infrastructure assets (*Infra*), service quality and organization (*Serv*).

Table 2 – List of variables

Variable	Definition
Fee	Upper bound on franchise fee score
Trans	Upper bound on terms for infrastructure transfer score
Prices	Upper bound on prices score
Infra	Upper bound on new infrastructure assets score
Serv	Upper bound on service quality and organization score
FinAut	Financial Autonomy
Debt	Level of obligations
Liq	Liquidity indicator
qProceeds	Quality of Proceeds
Turnover	Political turnover indicator
Exp	Experience of bureaucrats in designing competitive procedures
Size	Size of the municipality
S	Dummy = 1 if the municipality is located in the South
Poverty	Poverty indicator
PubNet	Probability for a municipality of being owner of the infrastructure
Constr	Dummy = 1 if call for tenders includes also the building of the new infrastructure

A second group of indicators describes the city characteristics, such as financial distress of the local coffer, composition of residents (e.g. poverty), political turnover, need for infrastructure. Finally, some control variables are also included, namely the size of the cities, the experience of bureaucrats in designing competitive procedures, the ownership of previously developed infrastructures, the city geographic location.

The financial distress indicators deserve particular attention. As widely recognized, local finance condition is hardly captured by a single indicator. An important role is played not only by financial flows and debt levels, but also by fiscal autonomy and flexibility in the expenditure structure. Here a set of indicators is used, as in **Farneti and Padovani (2010),** who have developed a model for rating Italian municipalities.

In this work, four indicators are employed for the characterization of the financial status of the municipalities. The first is the financial autonomy *FinAut*, which is computed as the ratio between self-generated revenue (by local taxes and service management) and total revenue (including transfers from State and others public authorities); the variable *Debt* is a measure of the obligation faced by the municipality and is computed as the ratio between interest expenses and just verified current revenue. The third is a liquidity indicator *Liq,* a dummy variable that is set equal to 1 if the municipality had made use of an advance payment during the year before the call for tenders was issued. The last, *qProceeds*, the quality of municipality's proceeds, is a ratio between credits not cashed in and total proceeds. Data used for the calculation of these indicators have been collected from the Central Direction of Local Finance belonging to the Italian Ministry of the Interior.

Table 3 – Local finance indicators, descriptive statistics

Indicator	Obs	Mean	Std. Dev.	Min	Max
FinAut	166	72.279	21.805	23.51	99.96
Debt	174	0.0465	0.0232	0	0.1006
Liq	169	0.0947	0.2936	0	1
qProceeds	166	17.438	116.17	0	1381.317

Table 4 – Local finance indicators, correlation matrix

	FinAut	Debt	Liq	qProceeds
FinAut	1.0000			
Debt	-0.0165	1.0000		
Liq	-0.2593	0.2109	1.0000	
qProceeds	-0.2127	0.0056	0.1518	1.0000

Table 4 shows the correlations among local finance indicators. They are clearly weakly correlated or not correlated at all, justifying the strategy to adopt all of them to capture as comprehensively as possible the actual status of the local government finance.

The city characteristics, besides *Size*, measured as number of inhabitants, and a localization dummy *S*, which takes value 1 when the municipality is located in the south of the country (namely in one of the following regions: Campania, Abruzzi, Molise, Apulia, Basilicata, Calabria, Sicily and Sardinia) include the variable *Turnover*, as number of years to the next local election at the moment in which the call for tenders has been issued, constructed using

data from the web archive of the Italian Ministry of the Interior and obviously assuming that the local government in charge would carried out its own term of office; *Exp*, which measures the experience of local bureaucrats in designing competitive procedures, computed as the number of calls for tenders issued by the local authority along the five years before the gas distribution was franchised, sourced from the database Guritel of the Official Gazette of the Italian Republic; *Poverty*, the percentage of tax-payers whose annual income is lower than 10 thousand euro, sourced from the Department of Finance, belonging to the Italian Ministry of Economy and Finance.

Two variables refer to the infrastructure: *PubNet* is the percentage of the gas distribution network belonging to the municipalities, measured at region level, here used as a proxy of the probability that the network actually belongs to the municipality; *Constr* is a dummy variable equal to 1 when the competitive procedure is designed not only to award the gas distribution service franchise, but also to entrust the same firm with the task to build and develop the gas distribution infrastructure.

Table 5 – City characteristics, descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Size	174	10563.690	14987.340	223	120819
Turnover	169	2.112	1.416	0	5
Exp	169	3.982	12.788	0	155
Poverty	169	17.567	7.272	5.24	40.62
PubNet	174	11.322	6.750	0	26.30
Constr	174	0.241	0.429	0	1

About selection criteria framed by the upper bounds on the scores attached to each relevant dimension, Table 6 clearly shows that franchise fee is far the most weighty criterion, followed by new infrastructure assets. The score on terms for infrastructure transfer is instead not considered as a key criterion in most cases. The high negative correlation among the scores, primarily between *Fee* and *Infra*, is explained by the construction of the selection procedure, which is based on the sharing of a fixed amount of points among the five relevant dimensions.

Table 6 – Scores, descriptive statistics

Score	Obs	Mean	Std. Dev.	Min	Max
Fee	174	37.71	24.48	0	88
Trans	174	5.10	10.28	0	70
Prices	174	10.84	8.94	0	55
Infra	174	28.99	17.66	0	80
Serv	174	14.78	10.21	0	55

Table 7 – Scores, correlation matrix

	Fee	Trans	Prices	Infra	Serv
Fee	1.0000				
Trans	-0.2817	1.0000			
Prices	-0.3554	-0.0853	1.0000		
Infra	-0.7275	-0.0588	0.0169	1.0000	
Serv	-0.4316	-0.1342	-0.0003	0.1449	1.0000

4.1 The Model

The aim of the paper is to explore the relationship between the municipality characteristics (i.e. financial distress, poverty, political turnover) and the selection criteria. In order to accomplish this task it should have been possible to estimate five equations separately, each one with the maximum score attached on one of the five dimensions as a dependent variable and a proper set of city characteristics as explanatory variables. However the simultaneity shaping the score variables, which are jointly determined when the competitive procedure is designed, imposes not only to introduce all the score variables in every equation, but also to deal with endogeneity of these variables.

The overall model to be estimated is the following:

$$\ln Sc_1 = \beta_{10} + \sum_{\substack{i=1 \\ i\neq 1}}^{5} \alpha_{1i} \ln Sc_i + \beta_{11} FinAut + \beta_{12} Debt + \beta_{13} Liq + \beta_{14} q\,\mathrm{Pr}oceeds + \beta_{15} Turnover + \beta_{16} Exp + \beta_{17} Size + u_1$$

$$\ln Sc_2 = \beta_{20} + \sum_{\substack{i=1 \\ i\neq 2}}^{5} \alpha_{2i} \ln Sc_i + \beta_{21} Constr + \beta_{22} Debt + \beta_{23} Liq + \beta_{24} PubNet + \beta_{25} Turnover + \beta_{26} Exp + \beta_{27} Size + u_2$$

$$\ln Sc_3 = \beta_{30} + \sum_{\substack{i=1 \\ i\neq 3}}^{5} \alpha_{3i} \ln Sc_i + \beta_{31} Poverty + \beta_{35} Turnover + \beta_{36} Exp + \beta_{37} Size + u_3$$

$$\ln Sc_4 = \beta_{40} + \sum_{\substack{i=1 \\ i\neq 4}}^{5} \alpha_{4i} \ln Sc_i + \beta_{41} Constr + \beta_{42} S + \beta_{45} Turnover + \beta_{46} Exp + \beta_{47} Size + u_4$$

$$\ln Sc_5 = \beta_{50} + \sum_{\substack{i=1 \\ i\neq 5}}^{5} \alpha_{5i} \ln Sc_i + \beta_{55} Turnover + \beta_{56} Exp + \beta_{57} Size + u_5 \qquad (1\text{-}5)$$

where **Sc** is the vector of the scores, which for each observation *j* is equal to:

$$\begin{bmatrix} Sc_{1j} \\ Sc_{2j} \\ Sc_{3j} \\ Sc_{4j} \\ Sc_{5j} \end{bmatrix} = \begin{bmatrix} Fee_j \\ Trans_j \\ \Pr ices_j \\ Infra_j \\ Serv_j \end{bmatrix} \tag{6}$$

In the model specification logarithms of score variables are considered in order to deal with the skewness of data distribution.

The first is the franchise fee score equation, in which all local finance indicators are included, besides the political turnover variable, the experience in designing competitive procedures and the size of the municipality, added to all the equations. This is far the most relevant of the five equations, because it actually tests the existence of a taxation by regulation effect in the gas distribution service franchising.

The second equation has the terms for assets transfer score as dependent variable. The dummy *Constr* and the ownership of preexisting infrastructure assets *PubNet* are included into the equation in order to control for the existence of assets to be transferred and the extent to which assets transfer is a relevant issue to be dealt with. Two local finance indicators are also added, *Debt* and *Liq*, considered as factors explaining the reluctance of municipalities to take over the incumbent in the ownership of the infrastructure and the consequent propensity for entrusting the new entrant with such a commitment.

The third is the prices score equation in which the *Poverty* variable is included. Indeed, It could be argued that, other things being equal, more families under poverty line make the local government more sensitive to economic terms at which the service is offered.

The fourth is the new infrastructure score equation in which the *Constr* dummy is included. The reason is straightforward. When the competitive procedure is designed not only to award the gas distribution service franchise, but also to entrust the same firm with the task to build and develop the distribution network, the tendency to put an higher weight on the infrastructure dimension of the bids is expected.

The last is the service quality and organization equation. It includes only variables entering into the baseline specification, namely the political turnover, the experience of bureaucrats and the size of the municipality.

The proposed model is a linear simultaneous equations model, where the dependent variables are assumed to be endogenous as they are correlated with model errors, while the remaining variables are assumed to be exogenous because uncorrelated with the error term. Due to the presence of endogenous variables SUR estimator is inconsistent. Consistent estimation methods are placed in the context of GMM estimation. Here the 3SLS estimator has been used, which assumes errors are correlated across equations.

5. Results

The Tables A1-A5 present the results of estimations of the overall model. Equation by equation GMM and 3SLS estimations are shown, although only the second will be commented because of their superiority in terms of efficiency.

As clearly verifiable, only the first equation shows a certain level of significance of the estimates, while the remaining four equations, aside from, in some cases, the coefficients of the endogenous score variables (the coefficient of terms of transfer score in the prices equation or the coefficient of the franchise fee score in the service quality and organization equation), which are of scarce interest, don't seem to be rather valuable. Indeed the payoff from have been mastering a multiple equation model is considerable. Even if it was not possible to get some evidences from the four equations above mentioned, a gain in terms of efficiency has probably been achieved by combining the first equation with the other equations[2].

The first equation results are instead quite interesting and seem to give a piece of evidence for the taxation by regulation effect. The coefficients of the *Debt* and *Liq* variables are positive and significant, meaning that municipalities facing higher levels of debt or financial straits in terms

[2] Obviously, the efficiency gain presumes that the model is correctly specified, that is, all the model assumptions are satisfied. If the model is misspecified, the multiple equation estimator is not guaranteed to be consistent. And the chances of misspecification increase as equations are added to the system.

of liquidity are more prone, other things being equal, to attach an higher upper bound to the franchise fee score and have hopes of raising much money from the cash flow guaranteed by the gas distribution service operator.

The financial autonomy variable is also found to be positive and significant. This result seems to be counterintuitive or at least in contrast with the taxation by regulation story. Effectively municipalities with an high financial and ultimately fiscal autonomy are generally far from confronting financial distress. A possible explanation of this result could be retrieved by supposing that a sort of tendency of some municipalities to raising fund via public service management exists, and if so, these ones would display a strong propensity to tax by public service regulation, resulting finally highly financial autonomous. Obviously, following the same argumentation, we are reduced to admit the endogeneity of the *FinAut* variable. In the model here estimated, instead, it is assumed to be predetermined. Finally, the coefficient of the quality of proceeds variable is weakly significant and its sign is athwart the prediction.

Moreover, some valuable insights are provided by the three variables shared by all equations. The experience in designing competitive procedures, *Exp*, seems to have an impact, although weakly significant, on the choice of the scores. In particular, when the public bureaucrats are neophytes, they show an inclination towards the overweighting of the franchise fee dimension of the bids, maybe because easier to asses.

The political turnover, *Turnover*, is found to significantly affect the propensity of local governments towards overweighting of franchise fee dimension. When the local government is expected to be in charge for a long period of time, it is more sensitive to local finance status and can richly enjoy the future cash flows provided by the franchise fee.

Lastly, even the size of the city seems to play a role in the setting of competitive procedures. Larger cities tend to be more interested in franchise fee, arguably because they are more resources demanding in comparison with smaller ones.

6. Conclusions

These paper means to investigate the relationship between city objectives and the competitive procedure designing in the Italian gas distribution franchising. The empirical strategy consists of a linear simultaneous equations model estimation, in which five equations, each one with the maximum score attached to as much bid dimensions as dependent variable, are jointly estimated against the four remaining maximum scores and some explanatory variables describing city characteristics considered significant in shaping the competitive procedure design.

For each maximum score a different set of covariates is established, relying on none other than taxation by regulation hypothesis in the case of franchise fee score and my own conjecture about the set of considerations shaping the decision process regarding the maximum score attached to the other dimensions. This is undoubtedly a weakness of the analysis, but it is justified by the lack of references in the field.

Results seem to not reject the taxation by regulation story, although a strong evidence is far from having been found. Italian municipalities, when entrusted with the task to franchise a monopoly, appear to take into account their financial status, attempting to tax the selected service operator rather than force it to provide a consumer welfare maximizing set of conditions.

Difficulties in data collection forced the analysis to be exclusively focused on city characteristics and to leave out technical aspects of the service, such as current level of service quality, distribution network status, planned infrastructure investments, or market structure aspects, in terms of level of competition among operators and incumbency.

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Appendix

Table A1 – First equation estimates

	(1) (eq. by eq. IV)	(2) (3SLS)
	lnFee	lnFee
lnTrans	-24.6200 (-0.06)	492.500** (1.96)
lnPrices	-13.1600 (-0.06)	257.600** (1.96)
lnInfra	-0.54600 (-0.04)	-10.4600 (-0.91)
lnServ	-54.3100 (-0.06)	1108.20* (1.92)
FinAut	-0.64200 (-0.06)	13.6300** (1.98)
Debt	-77.6800 (-0.06)	1654.10** (2.00)
Liq	-4.70100 (-0.06)	100.400** (2.00)
qProceeds	0.00130 (0.03)	-0.03140* (-1.87)
Exp	0.84200 (0.06)	-17.2500* (-1.95)
Turnover	-1.49600 (-0.06)	31.1200** (2.08)
Size	-0.00024 (-0.06)	0.00495** (2.04)
_cons	239.300 (0.06)	-4756.20* (-1.93)
N	163	163
	F(11,151) = 0.00 p = 1.000	Chi2 = 30.84 p = 0.0012

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2 – Second equation estimates

	(1) (eq. by eq. IV)	(2) (3SLS)
	lnTrans	lnTrans
lnFee	-97.3600 (-0.01)	-1939.00 (-0.34)
lnPrices	21.0700 (0.01)	468.000 (0.36)
lnInfra	90.0800 (0.01)	1854.00 (0.35)
lnServ	2.12200 (0.01)	83.4800 (0.46)
Constr	-309.700 (-0.01)	-6261.10 (-0.34)
Debt	139.800 (0.01)	2391.00 (0.28)
Liq	-1.87000 (-0.01)	14.6400 (0.12)
PubNet	-5.05200 (-0.01)	-101.600 (-0.34)
Exp	-0.36100 (-0.01)	-7.46400 (-0.33)
Turnover	7.39500 (0.01)	150.000 (0.34)
Size	0.00014 (0.01)	0.00271 (0.30)
_cons	98.6600 (0.02)	1602.40 (0.30)
N	163	163
	F(11,151) = 0.00 p = 1.0000	Chi2 = 12.41 p = 0.3336

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3 – Third equation estimates

	(1) (eq. by eq. IV)	(2) (3SLS)
	lnPrices	lnPrices
lnFee	-0.65000** (-2.24)	-0.52100* (-1.90)
lnTrans	-0.96200** (-2.04)	-0.90400** (-1.98)
lnInfra	0.23100 (0.42)	0.50400 (0.98)
lnServ	0.95000 (0.68)	0.90100 (0.67)
Poverty	-0.07650 (-1.49)	-0.07180 (-1.45)
Exp	-0.00213 (-0.10)	-0.00104 (-0.05)
Turnover	-0.14500 (-1.19)	-0.14300 (-1.21)
Size	-0.00003* (-1.83)	-0.00003* (-1.93)
_cons	3.96200 (0.94)	2.67200 (0.67)
N	163	163
	F(8,154) = 1.42 p = 0.1931	Chi2 = 11.93 p = 0.1543

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A4 – Fourth equation estimates

	(1) (eq. by eq. IV)	(2) (3SLS)
	lnInfra	lnInfra
lnFee	0.56800	-0.13300
	(0.53)	(-0.16)
lnTrans	-0.23000	-0.57300
	(-0.37)	(-1.02)
lnPrices	0.14600	-0.19900
	(0.28)	(-0.43)
lnServ	-0.58400	-1.04000*
	(-0.77)	(-1.69)
Constr	1.89400	0.87300
	(1.02)	(0.63)
S	0.63300*	0.38800
	(1.82)	(1.39)
Exp	0.01090	0.01500
	(0.74)	(1.10)
Turnover	-0.02740	-0.01330
	(-0.25)	(-0.13)
Size	0.00000	-0.00000
	(0.02)	(-0.12)
_cons	1.97900	6.68600
	(0.31)	(1.32)
N	163	163
	F(9,153) = 1.54 p = 0.1395	Chi2 = 15.22 p = 0.0852

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A5 – Fifth equation estimates

	(1) (eq. by eq. IV)	(2) (3SLS)
	lnServ	lnServ
lnFee	-0.39200* (-1.76)	-0.48300** (-2.27)
lnTrans	-0.64400* (-1.68)	-0.67600* (-1.81)
lnPrices	-0.51800* (-1.70)	-0.51200* (-1.72)
lnInfra	-0.20500 (-0.66)	-0.43600 (-1.56)
Exp	0.01460 (1.51)	0.01420 (1.50)
Turnover	-0.01810 (-0.22)	-0.01750 (-0.22)
Size	-0.00000 (-0.66)	-0.00000 (-0.58)
_cons	6.06000*** (2.92)	7.08400*** (3.61)
N	163	163
	F(7,155) = 1.11 p = 0.3620	Chi2 = 10.18 p = 0.1787

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$