

Comments

Alexander Galetovic: Many think that price-cap regulation was conceived and first used in the United Kingdom in the late 1980s, as part of the privatization of British Telecom. In fact, it was invented in all but name nearly a decade earlier in Chile, first applied to set the tariffs of Chilectra, a publicly owned electricity distribution firm, in October 1980 and later made official in a 1982 law that radically reformed the regulation of electricity.¹ When generation and distribution companies were privatized in the second half of the 1980s, a clear set of rules had been in place for several years. These rules have remained essentially unchanged for more than a quarter century and presided over a massive expansion of generation, transmission, and distribution capacity during the golden years of Chilean growth. All in all, Chile's regulation has been quite successful.

Relative success does not imply perfection, however, and it is fair to say that the list of shortcomings is rather long. One of these shortcomings is that distributors have made substantial efficiency gains while tariffs have lagged behind.² Distribution companies systematically earn high returns, well above the 10 percent real rate granted by regulatory rules. It thus seems that the regulator has been unsuccessful in passing efficiency gains to consumers.

Pundits have offered many explanations. One is that distributors wield formidable lobbying power over a weak regulator. Another culprit is deficiencies of the so-called efficient-firm standard as a regulatory technique. Cost padding and exaggeration surely also play a part, especially in view of the rather silly "arbitration" rule that averages the regulator's and the firms' cost estimations of the efficient firm. But while a lot has been said and anecdotes abound, little empirical work has tested these beliefs. For this reason, Di Tella and Dyck's interesting paper is a welcome evaluation of the workings and performance of

1. Sebastián Bernstein (personal communication).

2. See Fischer, Gutiérrez, and Serra (2005); Fischer and Serra (2007).

the Chilean distribution price cap. They confirm—this time with evidence—that no matter how hard you try, you cannot regulate without looking at the costs of the real firm. They also provide a clever method for figuring out whether firms influence their tariffs by exaggerating costs.

It is useful to put the Chilean price cap into perspective, both conceptually and historically. Any price-cap regime has at least three parts: a pricing rule, a valuation source, and the price cap. The Chilean price cap is quite standard in that tariffs are set every four years, and between review years prices only change in response to variations in exogenous variables (namely, the inflation rate and the price of key inputs like copper).³ The pricing rule and valuation source, however, are quite peculiar to Chile.

Consider first the pricing rule, which maps costs into a tariff. In Chile, the price of distribution (the so-called value added of distribution, or VAD) equals the intertemporal average cost of one kilowatt of distribution capacity. Formally, assume that the distributor must supply Q kilowatts, requires $K(Q)$ units of capital, which have a useful life of T years, and spends c pesos per kilowatt every year in operation and maintenance costs. The Chilean tariff per kilowatt of distribution capacity then equals

$$p = c + \frac{K(Q)}{Q \cdot R},$$

with $R \equiv \int_0^T e^{-rt} dt$, where $r = 10$ percent real by law. A pricing rule such as the above equation has several desirable properties. In particular, it is the Ramsey-Boiteaux tariff when capital costs have to be recovered over time, and it is thus allocatively efficient subject to the firm's self-financing constraint. Nevertheless, this pricing rule is somewhat peculiar. In most price-cap regimes around the world, tariffs are not equal to the intertemporal average cost, but are instead quite arbitrary.⁴

The second peculiarity of the Chilean price cap is the valuation source. The law mandates that the regulator is to obtain all the technical parameters and unit costs that determine c and $K(Q)$ by designing and valuing an efficient firm from scratch each time tariffs are set. The efficient firm is, in principle, a completely independent entity with no direct relation to the actual firm, as it operates with the best available technology and serves actual demand at least cost. It is not a fantasy, however, for it is designed obeying the topographic,

3. By contrast, no allowance is made for exogenous productivity improvements—the X factor is set equal to zero.

4. See Newbery (1997); Bustos and Galetovic (2007).

demographic, and technological constraints faced by the actual firm. In other words, the efficient firm operates at minimum cost with the best technology available at the time of the tariff review, but it is adapted to the properties of actual topography and demand.⁵

Of course, almost three decades of information economics might suggest some naïveté on the part of Chilean lawmakers. How can a regulator expect to know what is efficient? Here, a little historical context is useful. Efficient-firm regulation was conceived in the late 1970s, when all distributors were public firms controlled de facto by managers and unions. Until then, no agency in the central government was capable of evaluating the cost estimates that utilities presented to justify their tariffs. Tariffs were reviewed by the government's budget office, which, lacking the skills to confront an informed agent, routinely rubber-stamped whatever the distributors proposed. This led to large allocative and productive inefficiencies that were prompted by overinvestment, overstaffing, above-market wages for most workers, and relaxed working conditions. Consequently, the National Energy Commission was created in the late 1970s with the specific mandate of overseeing public utilities and fixing their tariffs. The efficient-firm standard was part of a package of reforms meant to inform an up-to-then very poorly informed regulator, detect gross inefficiencies, and control managers; it wasn't meant to substitute for knowledge about the actual firm.

Be that as it may, the efficient-firm standard is almost ideal for testing whether distributors inflate costs and successfully influence regulators. If the standard is fully exogenous and tariffs are independent of the actual firm, higher-than-expected costs (that is, a negative cost surprise) should always make returns fall. Even better, if the regulator ignores the real firm while setting tariffs, strategic cost surprises are useless and should not be observed in the first place. By contrast, if the actual firm influences the regulator, strategic cost surprises may inform the market that tariffs will be set higher than expected. Indeed, Di Tella and Dyck's regression 3 in table 6 implies that a one-standard-deviation negative cost surprise during a year before the tariff review (1991, 1995, and 1999 in their paper) increases returns by 220 basis points.⁶ By contrast, a negative cost surprise reduces returns by 110 basis points if it does not occur during the year before a review takes place. The

5. On the efficient-firm standard and its application to regulate Chilean distributors, see Rudnick and Donoso (2000); Bustos and Galetovic (2007).

6. The authors call 1991, 1995, and 1999 review years, although the reviews took place in 1992, 1996, and 2000. In any case, 1991, 1995, and 1999 are the correct dates to insert interaction dummies, as I argue below.

efficient-firm standard thus does not seem to be exogenous after all. Moreover, Di Tella and Dyck seem to have found the smoking gun: distributors exaggerate costs during review years to get higher tariffs.

But did they really find the smoking gun? The paper's thesis is that strategic cost surprises generate abnormally high returns because they raise tariffs. To test this, the interaction dummies must be inserted in the exact quarters in which negative cost surprises can plausibly influence the regulator. Di Tella and Dyck rightly choose the four quarters of the year before the review year. To explain why, let me briefly review the timing of each tariff review. Since October 1980, distribution tariffs are set in Chile every four years in either late October or early November.⁷ Six months before, in late May, the National Energy Commission publishes the methodology that must be used to calculate the value added of distribution, and both the regulator and distributors then have four months to conduct their study. For example, in the 1992 review, the tariff-setting process started in mid-May 1992, and tariffs were then set on 27 October.

On the face of it, one might think that the authors should have inserted interaction dummies for the first three quarters of 1992, 1996, and 2000, instead of the four quarters of 1991, 1995, and 1999. As practitioners and stock analysts know, however, the distributors report to the regulator their costs of the year before a tariff review takes place—in this case 1991, 1995, and 1999. Thus, the interaction dummies were inserted precisely in those quarters in which the information likely to be considered by the regulator is generated. Moreover, the results are even stronger when the authors only insert dummies for the last two quarters of 1991, 1995, and 1999 (as column 3 in table A-1 shows, the effect nearly doubles). It seems reasonable to believe that information generated toward the end of the year will give the market a sharper idea of what the regulator will see while setting tariffs.

The only doubt I am left with concerns strategic cost surprises. Di Tella and Dyck should have reported each of the forty-four quarterly cost surprises they computed. Results would be strengthened if one finds that cost surprises were systematically negative and large in 1991, 1995, and 1999, but did not exhibit any systematic pattern in irrelevant quarters. By contrast, if they are not systematically negative in the key quarters, then one would wonder whether distribution firms act strategically after all, for what would be the point of strategically reporting costs that are lower than expected?

7. Thus there have been seven reviews to date, and this paper considers three—1992, 1996, and 2000.

All in all, this is an important paper. The evidence is convincing, and the authors have developed an interesting method for testing whether firms use strategic cost surprises to influence regulators. A straightforward but important lesson is that regulators should examine the evolution of costs over the entire period between tariff reviews and be particularly skeptical of cost increases that occur right before the tariff review begins. While this may sound obvious after reading Di Tella and Dyck's paper, I doubt that most regulators are aware of it, much less that they do anything about it.

William W. Hogan: Di Tella and Dyck address the incentive regulation scheme applied to the Chilean electricity distribution system, covering the period between 1989 and 1999. Chile was an innovator in restructuring the electricity system to allow for greater reliance on competition and markets. Previous studies focus on policies for generation competition through a wholesale market design built on principles of economic dispatch. The wholesale market is an interesting topic, but it leaves out the important transmission and distribution sectors. The case of high voltage transmission is a separate and separable topic, with many debates about the best approach to regulating transmission systems. There is little controversy, however, about the character of electricity distribution systems, which comprise the local collection of wires and meters that connect final customers to the high voltage grid. The distribution system is generally deemed to be a natural monopoly. As such, it lends itself to various forms of incentive regulation that have been much discussed and debated in the literature.

Joskow provides a recent overview of the theory and much of the practice in the case of electricity.¹ In a world of assumed uncertainty and asymmetric information between regulator and firm, the fundamental tension is to ensure the firm's financial viability while balancing the trade-off between the goals of providing high-powered incentives for efficiency and ensuring a maximum rent extraction from the regulated company. For example, an idealized price-cap model with fixed prices set independently of the firm's performance would provide very strong incentives for cost reductions. Traditional cost-of-service regulation emphasizes setting prices equal to the firm's reported costs for the maximum in rent extraction, but it provides poor incentives for efficiency. There are many alternatives in between these two extremes. Theoretical and empirical work seeks to analyze and evaluate the incentives induced and the results produced by alternative implementations of the idealized models.

1. Joskow (2006).

The case of Chile and the research of Di Tella and Dyck raise general questions that could be addressed in other countries. As part of their research, Di Tella and Dyck collected quantitative data supplemented by interviews in 1999 that add insight to the numbers and the models. One of the interesting features of the Chilean experience is that the innovative models were developed independently in Chile, without apparent reference to work on similar problems in other countries. The authors quote Sebastián Bernstein, who headed the committee drafting the 1982 reform law: “Yardstick is a term we learned later, but in many ways that is an accurate way to characterize our model. The system was consciously designed to decentralize decisionmaking away from politicians and regulators. We had no reference books to turn to, but instead thought that the best way to regulate would be to simulate a market.” Based on this alone, the Chilean innovations are impressive.

There is a political economy story here about limiting the discretion and political control of regulators. The basic idea was to create a model distribution company in each of five zones and then optimize this company based on a comparison with other distribution companies in Chile, to produce an efficient-standard company that would provide the regulatory yardstick for setting the distribution prices of the real regulated company. This is one form of benchmarking.² Although benchmarking has many obvious attractions as a management tool used to point to opportunities to improve company operations, it can be much more problematic in setting prices for regulated companies.³ Yardstick competition based on the performance of other identical companies has great theoretical appeal, as long as the yardstick derives from identical companies. The fundamental difficulty arises in dealing with real companies, which are never identical. In the case of Chile, “the methodology has been complex to apply, with bitter disputes among the parties involved.”⁴

Di Tella and Dyck complement their research with an effort to theorize and examine the data to answer a number of interesting questions about the performance of this particular model. The paper addresses four broad questions. First, are the incentives sufficient to produce cost reductions? Based on the interviews and case studies included in the paper, the broad answer is probably yes. As Di Tella and Dyck observe, however, the evidence is consistent with induced cost reductions, but it is not dispositive because there is no real control group for comparison.

2. Farsi, Fetz, and Fillipini (2007).

3. Shuttleworth (2005).

4. Rudnick and Donoso (2000).

Second, does this yardstick competition provide an effective means of rent extraction and lower prices for customers? Apparently, the broad answer is no. Although there is evidence of material reductions in costs, the data and the interviews suggest that relatively little of the improved efficiency has been translated into prices.

Third, does the Chilean scheme conform to the theory of yardstick competition, according to which prices are set independently of the observed costs of the regulated firm, or do firms behave strategically to influence the yardstick? This is perhaps the most interesting part of the paper. Di Tella and Dyck collect data on company cost performance and stock prices. They present a theoretical model and hypotheses, which they explore using econometric estimates based on pooled data for companies in Chile. The collective results support the hypothesis that a company's own actions have a direct impact on the estimates that will be developed in a review period when the yardstick is reset. Compared to a naïve model, actual costs decline more until the review period and then decline less. For stock prices, Di Tella and Dyck use an event model analysis to show a positive impact on stock valuation as a result of a cost surprise increase above a simple trend, but only during the review period. It is hard to see how these results could be squared with any theory that does not include regulators' and consultants' peeking at the company results in the interest of producing yardsticks that are not unreasonable. This peeking, of course, undermines the incentive properties of yardstick competition and presents the opportunity for strategic behavior by the regulated firm.

Figure 1 of the paper reveals a troubling feature of this implementation of yardstick competition. The data show the yardsticks calculated by two different sets of consultants, one hired by the regulator and one hired by the company. Any delusion that there is a simple way to set the yardstick is quickly dispelled by these figures. The price differences are substantial, and the bias is clear, with the regulator's consultants coming in low and the companies' consultants coming in high. This does not look like objective yardstick calculation. The presence of fixed weights for averaging the two estimates gives little comfort for those who hope objectivity in the yardstick is producing strong incentives.

Finally, what are the other incentive effects of the optimized model-company yardstick regulation? Di Tella and Dyck suggest that yardstick competition in Chile probably reduced costs as measured over this period, but the strategic behavior of firms runs against this conclusion. Furthermore, other incentive effects may be even more important in the long run. For example, the Chilean model-company approach is very similar in spirit to the "opti-

mal deprivation value” price regulation found in New Zealand. In the face of uncertainty, this form of regulation creates an ex post asymmetry that provides a bias against capital investment. The difficulty is that repeated optimization of the model company to set the price cap in effect always assumes that investments are made with perfect foresight. If the allowed return is set in the usual ex ante way, as is typically the case, the earned return can never be more than the allowed return and will usually be less. This creates a slow bleed with a bias against capital investment, until the situation becomes dire and the rules are changed. It would be interesting to explore whether the Chilean data could be applied to further empirical work addressing this long-term incentive effect.

If such work is undertaken, it would be useful to reconsider the cost measure employed in the econometric model. Di Tella and Dyck argue that normalizing total costs by total revenues provides the best measure for their purposes, and this choice expands the available data for the statistical analysis. However, what is being measured is a combination of cost reductions and revenue increases, which confuses the interpretation of the efficiency results. A more appealing approach would be to normalize for numbers of customers and quantities of delivered energy. Rudnick and Donoso use the latter approach to compute their benchmarks.⁵ Their model and data set may provide additional leverage for Di Tella and Dyck’s analysis.

This concern about the cost measure does not extend to the stock price analysis. Assuming the cost variable is defined the same way (that is, costs as a proportion of revenue), increases in this variable should reflect either higher costs or lower revenues, both of which should result in lower, not higher, stock valuations. The impressive stock market results thus seem to provide robust evidence of assumed strategic behavior, or at least behavior that leads the stock market to believe that the company’s performance affects its own yardstick.

5. Rudnick and Donoso (2000).

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