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Infrastructure Concessions, Information Flows, and Regulatory Risk

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Prices for monopoly infrastructure services have a history of controversy. But regulatory experience in newly concessioned infrastructure sectors in Argentina and the United Kingdom shows that even the arcane rules and data requirements for setting prices can end up being fiercely contested. Regulators typically start the price review process with limited sectoral and corporate data. To move toward more realistic regulatory targets, they must ensure that this information base grows and that their ability to process it improves—a costly undertaking but worth the expense. Getting it right—with well-conceived rules, data, and methodologies—helps to avoid time-consuming regulatory disputes and contract renegotiations, reduce regulatory capture by the new private operator, and assess who gains and who loses from utility privatization. Getting it wrong can cause the concessionaire to operate and invest inefficiently, raise its cost of capital, and ultimately jeopardize privatization. This Note outlines the accounting requirements that a regulator should impose on new concessionaires to navigate these waters as smoothly as possible.

Contest of unequals

The control of prices charged by monopolists is often characterized by economists as a “contest” between the regulator and the service provider in which the two players do not share the same information. The asymmetry of information places the regulator at a disadvantage. Thus the regulator must define its information requirements and data processes early in the design of the concession contract and transaction. And it should take advantage of the government’s leverage during bidding to extract information from concessionaires and commitments from them to provide continued flows of information to aid price review.

A variety of regulatory instruments are available to a regulator of monopolies, and the choice has profound implications for the regulator’s infor-

mation burden. The regulatory instruments fall roughly into three categories: pure price caps, price control with frequent adjustments to ensure that profits are normal ex post, and price control that attempts to achieve, ex ante, a normal rate of return for the firm.

Price caps, a high-powered regime, were the starting point for regulation in some sectors in Argentina and in all sectors in the United Kingdom. The regulator sets (and periodically resets) a $CPI - X$ target from the existing price level, where CPI is the consumer price index and X is the regulator’s best estimate of future productivity growth. Whether these high-powered regimes are sustainable enough to deliver efficiency gains is yet to be proven. Implicit in high-powered regimes is the assumption that increased profits for utilities are not a failure of regulation. But they tend to



be politically unpopular, and regulators may be under constant political pressure to recontract when a firm reports higher profits, as has been the case in the United Kingdom.

Under a simple design in which prices of different products are capped individually, as in gas and electricity in Argentina, a price cap regime simply requires the regulator to forecast future productivity growth, not to adjust prices for past excess profits. To forecast productivity growth, the regulator can look at the firm's historical achievements or use comparative information from similar businesses, or yardstick competition (box 1). This type of control requires only the most basic checks to ensure that the profits resulting from its application are reasonable. In practice, it has tended to underestimate profits, especially in the United Kingdom, and leads to political sustainability problems.

The second option, rate-of-return regulation, guarantees that ex post profits reach certain levels. The U.S. system in the 1970s was representative of this regime. Rate-of-return regulation gives operators little incentive to cut costs. But it protects investors in risky environments and may persuade some of them to bid for deals they would not otherwise have considered given the risks involved. The problem with this regime is its demanding information requirements. To allow regulators to retain control, especially over investment decisions, the regime virtually places them in a position to run the business, confusing the roles of managers and regulators.

An intermediate scheme—and the one assessed in this Note—is one in which regulators attempt to set prices that recover an efficient level of costs ex ante, but ex post the firm is given incentives to beat the control because it will not be reviewed for some time. When the price control is reviewed, however, the regulator passes the benefits of efficiency improvements to the customers. Regulators applying this form of control use an accounting approach in which they forecast asset values, capital expenditure, depreciation, and operating expenditure profiles, along

with the cost of capital, in an attempt to deliver ex ante a fair distribution of returns between shareholders and customers. This approach coincides broadly with U.K. regulation today. The U.K. regime has served as a model in Argentina and Brazil, where the main implementation problems so far have centered on controversies about information requirements.

How to prepare for shocks, conflicts, cheating, and mistakes

The experience of price reviews in Argentina and the United Kingdom suggests that regulators can easily become embroiled in methodological debates with the regulated companies. To prepare for these debates and prevent their escalation into prolonged disputes, regulators must be able to:

- Compare utility performance outcomes with expectations.
- Evaluate the cost of adverse shocks that may warrant relaxing the regulatory regime for the utility.
- Evaluate whether lower-than-expected costs are due to better performance or a reduction of output.
- Evaluate the asset base and charge for the consumption of the utility's capital.

The rest of this Note looks at how regulators should prepare for and sequence the information requirements for price reviews.

The first step is to establish the allowable revenue of the business on which to base a price control. This is required regardless of the specific control the reformers have selected: a control on price per unit sold, a control on revenue, or a hybrid of the two. There are two equivalent methods for calculating allowable revenue: the traditional accounting-based method and the cash flow approach.

In the traditional accounting-based method, over the price control period revenues should be expected to cover operating costs plus depreciation plus a return on capital. The cash flow

approach sets regulated revenues over a price control period equal to the present value of operating and capital expenditures over the period plus the present value of the change in the asset value over the period. The first component ensures that the business can conduct its ongoing activities; the second maintains the value of existing assets. Any expropriation of asset value is made transparent.

Regulators may use model companies or yardstick competition to provide a benchmark

compare the performance of regulated companies, taking into account technology, asset age, and reasonable operating conditions. Another benchmark can be obtained through yardstick competition, in which a business is regulated by reference to its actual peers. Under this approach, if all firms are expected to achieve the same rate of productivity growth, the firms that do best end up with the greatest profits, while poorer performers

The inputs into the calculation of allowable revenue are the same under both methods:

- Operating costs.
- Capital expenditure.
- An opening asset value.
- Depreciation.
- Cost of capital.

How to count operating costs

The regulator needs to evaluate the current level of operating costs and the efficient level of operating costs. Forecasts of operating expenditures may be based on information on other firms (exogenous information) or firm-specific information (historical or current). Regulators cannot directly observe firm-specific information and may find it difficult to build up a reliable picture of firm-specific costs. Bidding documents often cover some of this information, but in most developing countries the private operators will have to revise the forecasts once they get a better idea of the value of the assets. If the regulator uses firm-specific information based on these forecasts, the company may be tempted to change some of its accounting outcomes to affect regulatory behavior. That is why it is often suggested that using exogenous information provides sharper incentives.

In Chile's water sector and Spain's electricity sector, for example, regulators use model companies to provide a benchmark with which they

make lower profits. This form of regulation is predicated on the assumption that enough comparators exist for each business.

An important issue is how incentives affecting operating expenditure and investment work together. If operating expenditure is subject to strong incentives through yardstick competition but capital expenditure is automatically rolled forward into a regulatory asset base, this may distort efficiency incentives and input choices. That does not mean that yardstick competition should not be used. It merely implies that models should take account of investment and that the regulator's treatment of investment and operating expenditure should not affect input choices arbitrarily.

How to count investment

While productivity trends in infrastructure are reasonably stable, those associated with capital expenditure are not. Investment is lumpy, and it can be postponed or brought forward by the operator. Two major problems emerge: how to forecast investment, and how to deal with divergence between expected and actual capital expenditure at each review.

Engineers' reports, benchmarking against other businesses, and submission of business plans can help in forecasting investment requirements, but expectations and outcomes will inevitably diverge. The crucial issue in providing investment

BOX 1 YARDSTICK COMPETITION

Under yardstick competition the price that a regional monopolist may charge is determined by the costs of the other regional monopolists.

If the businesses are perfectly comparable, setting prices for each business at the average level of costs in the industry gives strong incentives for the businesses to reduce their costs, which then has the effect of reducing costs and prices across the industry.

If the businesses differ in some respects (because of geographical or topographical characteristics) and the way in which they differ can be unambiguously identified, the regulator can simply adjust the prices for each business by the share of the costs that is outside its control. But if the cost differences due to inefficiency and those due to factors beyond the firms' control cannot be distinguished with certainty, econometric techniques need to be used to separate them.

incentives is how to treat investment over- or underspend relative to forecasts at each regulatory review (see below).

How to value assets

Asset valuation and depreciation have proved to be extremely controversial issues in regulation. Regulatory asset valuation should be the fixed point of any regulatory system: the rules should be clear and transparent to minimize the risk to shareholders that their investments will be expropriated by an opportunistic regulator. The problem in privatized utilities is that the assets are usually sold at a value quite different from (usually less than) the current cost valuation.

Which value should regulators use? Where possible, regulators have steered away from using current cost values as a basis for regulation and instead have derived a regulatory value based on the flotation value of the assets, rolled forward by net investment. The depreciation profile reflects this choice, for it is charged on the regulatory value rather than the current cost value. This approach avoids giving investors a return on assets valued at a higher price by the regulator than the investors actually paid.

For a concessionaire that has paid a transfer to the government to operate a business at a predetermined set of prices, these issues could be important. Regulatory disputes could emerge relating to what the concessionaire actually bought with that transfer—a stream of future earnings or a return on the preexisting and future asset base? Issues relating to the depreci-

ation profile of both old and new assets therefore assume particular importance and should be signaled by the government during the bidding process.

If the success criterion for a bid is the lowest customer prices offered, old assets are explicitly written down to zero, but there will still need to be regulatory treatment of any exit payments to concessionaires for the value of undepreciated assets. If the criterion is the largest lump sum offered to run a franchise, however, the outgoing concessionaire could receive the highest bid, since this bid reflects the value of the assets as they currently exist. But this value is based on the future stream of earnings, which is determined by the price set by the regulator throughout the new franchise. If the regulator unreasonably ratchets down prices for the period of the new concession, this effectively expropriates the value of the assets built in the previous concession. Generally, therefore, new investment by the concessionaire needs to be transparently treated by the regulator at each review, as part of the process of rolling forward the asset base and charging depreciation on it.

How to measure the cost of capital

The cost of capital has also been a contentious issue in regulation. Regulators need to compute the weighted average cost of total capital (debt plus equity) to ensure a return to investors and sustain the asset base. The cost of debt capital can be observed from published information, but the cost of equity capital needs to be estimated from market data using such techniques as the capital asset pricing model.

In developing countries, however, concessionaires are often unlisted, so market data are not available. And concessionaires may be part of a larger conglomerate, so market data will cover not only the regulated activity but others as well. In most recent Latin American privatizations a few large local groups involved in many activities joined foreign investors and operators in a consortium, and little information on their infrastructure activities could be extracted from local stock markets.

TABLE 1 INCENTIVE EFFECTS OF ALTERNATIVE VALUATIONS OF NEW INVESTMENTS

Approach	Positive incentives	Negative incentives
Ex ante valuation	<p>Since the company keeps efficiency savings forever, it faces the maximum incentive to push the actual cost of investment down as low as possible.</p> <p>The company has an incentive to delay the projects that should be delayed.</p>	The company has an incentive to quote high prices for investments to maximize its savings, increasing the need for intrusive regulation.
Ex post valuation	<p>The company has an incentive to undertake investment as cheaply as possible, since it keeps the gains for a maximum of five years.</p> <p>Since the company keeps efficiency savings only for the lifetime of the project, there is a bias toward undertaking investment early in the control period. This may be desirable when there is an important need to expand coverage fast.</p>	<p>The company may not seek small efficiency gains if the additional return is minimal.</p> <p>The company's incentive to delay investments is minimized, which may lead to unnecessary investment.</p>

A common solution to these problems is to rely on close comparators. Other domestic or regional companies quoted locally or similar international companies can provide useful comparators in such sectors as telecommunications, where private operators are common in many regions. An alternative is to use benchmark ratios based on international best practice, information increasingly available from international organizations and watchdogs. For the water sector, for example, the Asian Development Bank and the World Bank are putting together a database that includes data on the cost of capital. Many publications provide information for the energy and telecommunications sectors. Although the quality is not always ideal, the data do provide a feeling for the international experience.

No solution is perfect, of course. But a mix of approaches suited to the types of problems faced is likely to provide an acceptable range for the allowed rate of return.

How to monitor investment

Regulatory reviews are required at periodic intervals to adjust prices to reflect the underlying cost structure of the business, to maintain business viability in the face of bad outcomes, and to share the benefits with customers when outcomes are better than expected. In the absence of profit sharing mechanisms built into the price formula,

it is preferable to specify the period ex ante to preserve the operator's incentives.

Prices may be reset by moving the regulated price level to the prevailing level of costs; thereafter, a new X factor would apply. Companies would keep the profits from extraordinary or unexpected efficiency improvements until the end of the price control period (up to five years), when the gains would be transferred to customers through lower prices. Alternatively, the regulator could choose not to impose a price cut and instead set the X factor so that expected economic profits are zero at the end of the period rather than throughout the period, allowing the company to enjoy the profits from its efficiency gains longer. In either case a kind of intertemporal profit sharing system operates.

During the price control period, however, the treatment of capital expenditure poses some difficult questions. Investment may be postponed or even canceled—often because the new concessionaire overestimated demand on the basis of the information made available by the government (public enterprises typically have little relevant information on demand). Investment also is often lumpy rather than spread uniformly over a number of years, and the assets invested in are long-lived. That makes forecasting investment extremely difficult, and regulators will almost inevitably make errors in the early years of concessions. Moreover, once they have forecast

investment, the firm has an incentive to pass the cash that would have been used for investment to shareholders, to boost the value of the business. Northern Ireland Electricity, for example, spent £50 million less on investment by the end of the first price review period than was expected at the beginning.

The regulatory treatment of this problem has implications for the incentive to invest. When regulators update the regulatory asset base from one price review to the next, they can use ex ante or ex post data. Using ex ante values maximizes the incentives for the company to undertake investment at a lower price than that forecast (table 1). The decision to use ex ante or ex post data, or a possible compromise between the two that might allow the company to keep efficiency savings for a maximum of ten years (two review periods) rather than five, depends on several factors. These include:

- The importance of the investment program.
- The expected efficiency savings.
- The ability of the regulator to establish the efficient level of investment for the company.
- The strength of the incentives applied to operating expenditure and investment (where possible, these incentives should be symmetric).

Whether to claw back capital investment underspend

In developing countries, where one of the main reasons for privatization is to attract private investment to meet pressing needs for expanded service, an important concern is that the investors will face incentives to underinvest. In Argentina's toll road concession program, for example, investment was behind schedule from the beginning. The issue is also relevant in some industrial countries. It was recently debated in

If companies believe unspent money will be clawed back, they will spend all they are forecast to spend, undermining efficiency

the United Kingdom by the Monopolies and Mergers Commission with respect to the price review of Northern Ireland Electricity. The debate provides a useful conceptualization of the problem.

The issue at stake was whether underspend on investment should be clawed back. In principle, clawing back unspent money goes against the philosophy of incentive-based regulation. The first step is to understand the reasons for underinvestment.

There are three possible reasons that a company would underspend on capital expenditure (or even operating expenditure):

- Owing to unexpected efficiency savings, the money was not needed (except as an incentive to be more efficient).
- The expenditure was delayed for a variety of reasons that may not be equally valid.
- The company misled the regulatory body about the expenditure required.

The first reason is an entirely acceptable justification of underspending. The last reason, while not acceptable, is the fault of the regulatory body (or its design) and so is part of a learning process—and a sign that some rules and processes need to be clarified.

The second explanation is more subtle. It can be interpreted in two ways: Capital expenditure was not undertaken because it was possible to delay the project, achieving the desired output from a cheaper alternative. Or capital expenditure was not undertaken because the company simply did not get around to it. The first option is an acceptable efficiency savings, but the second is unacceptable. It was this reason that Northern Ireland Electricity put forward for some of its underspend—that management was distracted

from investing by the need to concentrate on the privatization of the company. Since the underspend exceeded £50 million, both the regulator and the Monopolies and Mergers Commission decided that some clawback was required, especially since it was unclear whether Northern Ireland Electricity had included the delayed projects in its new capital expenditure forecast.

Clawing back money creates perverse incentives for companies, however. If companies expect that unspent money will be clawed back, they will spend all that they are forecast to spend and there will be no incentive to become efficient. There are ways to overcome this problem when it arises primarily from unexpected efficiency savings. Regulators in the United Kingdom are looking at how companies should report their annual investment outcomes to provide the regulatory body with sufficient information to determine the levels, and possibly the causes, of unexpected savings.

This approach may seem intrusive. But there are tradeoffs between allowing companies to keep what may be significant amounts of underspend and creating perverse incentives through arbitrary clawback, and between requiring intrusive regulation at the price review and requiring annual reporting. Once more the core issue is the design of the information needed to support effective and fair decisions by regulators.

How and when to define the rules of the game

Information provision is a two-way street. The flow should start at the time the concession contract and the bidding process are being designed. The government first needs to provide enough information to potential bidders to ensure the long-term success of the concession strategy. This includes:

- The bidding rules and the success criteria.
- The duration of the contract.
- The scope of the contract (operational or investment requirements).
- The regulatory principles that will apply.

- The targets for the outputs (including quality).
- The information required from bidders.

Although concession processes vary, they normally have three stages. First, there is a prequalification assessment. Before the tender is formally opened, the authorities define the minimum requirements for bidders, such as relevant experience as a utility business and financial ability, with the experience and resources to invest in and operate the system. Next, groups that have prequalified are invited to submit technical bids to run the system. The technical submission covers a wealth of information, and it is in making the information requests for the technical bid that the concession process has a significant impact on future regulation. The technical bid should contain engineering reports that reveal how the bidder intends to meet the targets in the draft concession. It should also contain financial information relating to expected operating and capital expenditure. Finally, each rival submits a financial bid—the amount it is willing to pay to operate the system or the price it would be willing to charge to customers.

The key concerns of regulated businesses are whether their assets will be expropriated, whether changes in exogenous factors will be recognized by the regulator, and how long they will be able to keep the benefits of efficiency improvements. It is, of course, impossible to write a regulatory or concession contract that covers every eventuality, because monitoring and enforcement would be costly and the contract would encourage game playing by the concessionaire. Thus many issues have to be resolved over the course of a concession. It is important that the information provided by the government give clear signals to the bidders about the set of principles that will apply in resolving these issues.

Clear signals also need to be given about the process for adjusting prices. The concession for the Manila water franchises stipulated the principles for rebasing prices to cost at each review. If prices are below cost at the time of a review, they

would be immediately adjusted upward; if they are above cost, a glide-path would be put in place so that they fall to cost over time. This provides the concessionaire with financial safeguards while also giving it incentives to make efficiency improvements by allowing it to keep the profits from those improvements longer. An important issue, however, is defining cost appropriately, so that raising prices to cost does not reward inefficiency. Establishing this definition requires that bidders provide relevant information during the bidding process, as discussed below.

Why, how, and when to size up the players

Ideally, the regulator would like the bidding process to reveal each bidder's expectations about the future so that it can benchmark them against outcomes. If the outcomes are the same as the expectations, good information provided at the time of the bid will enable the regulator to prove this and thus to resist any demands by the business to relax the regulatory regime. If the outcomes differ from the expectations, however, the information will enable the regulator to act reasonably to change the regulatory parameters.

The regulator should therefore request from the bidders all the information that any sensible business would use before committing itself to a twenty-five-year investment (the duration of many concessions): customer connections, customer volumes, cost of connections, and disaggregated investment and operating costs. Since the cost estimates will be commensurate with the regulatory targets and with the bidders' expectations about volumes and connections, they should reveal information about costs under different volume scenarios.

Pro forma accounts for each business, including standards for the allocation of fixed and common costs, are a good technique for extracting comparative information from all the businesses for use at regulatory reviews. These accounts cover not only operating costs but also existing assets and investment in disaggregation.

The regulator should also obtain financial information from the bidders to evaluate the winning bidder's financial soundness throughout the concession. The cost information they provide should be unified with the turnover information in a financial model to provide forecasts of:

- The debt profile (both short and long term).
- Liquidity.
- The dividend policy.
- The targeted minimum rate of return.
- The equity rate of return.
- Interest cover.
- The debt-equity ratio.

Conclusion

Adequate information makes it easier to scrutinize regulatory decisions because it makes it easier to understand who gains and who loses from them. And that makes it easier to understand the underlying politics and the incentives of the players to pull strings. Thus the information should be used to increase the transparency of regulatory decisions and reduce the risk of capture of the regulators by private providers. More transparent decisions are not only possible given the regulatory tools that exist, but also desirable because they will mean fairer and often more efficient decisions.

In Chile, for example, the privatization of monopolies led to significant gains in efficiency, but it took a long time before even part of the gains were passed on to consumers. Neither the firms nor the regulators were held accountable for this situation until recently, when the Congress became reluctant to endorse a new wave of privatization in the water and ports sectors, arguing that consumers benefited too little from earlier waves of infrastructure privatization.

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