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GOVERNMENT CONCESSION CONTRACTS IN CHILE: THE ROLE OF COMPETITION IN THE BIDDING PROCESS

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ABSTRACT

Over the last 12 years, Chile has been very successful in attracting private participation into the provision of Public Infrastructure. Private capital has gone into road infrastructure, ports and airports all over the country in the form of Concessions. The aim of the 1991 Concession Law, and that of the specific contracts associated with each project, has been to provide much-needed infrastructure efficiently and without committing government resources better employed elsewhere. Using the contracts of four infrastructure projects involving the private sector in Chile, we show that even though these projects and the Concessions Program are positively evaluated, design flaws in the auction setup directly or indirectly reduced competition in the bidding process, negatively affected performance, created incentives for ex-post renegotiation and precluded welfare maximization.

JEL Classification: L21, L33.
Keywords: Contracts, concessions, bidding.

1. INTRODUCTION

It is well known that contract design affects the efficiency of the productive outcome through effects on performance and on the incentives generated for ex-post renegotiation. The effects of contract design on commitment, performance and development have been highlighted in several settings, such as regulation and privatization (see Levy and Spiller, 1996). In this paper we focus on concessions. It has also been recognized in the literature that differences in institutional settings produce different results, making cross country comparisons of limited use. A more promising approach to the crucial question of the effect of contract design on performance and development is to look at different contracts within a single country, thus controlling for differences in institutional endowment.

One of the most important economic reforms implemented in Chile over the last fifteen years was the enactment of an Infrastructure Concessions Law, aimed at increasing private sector participation in infrastructure projects. The law heralded an important change in the whole concept of infrastructure investment. Between 1993 and 2001 thirty road and airport concession projects were awarded, making up a total investment of US$5 billion: an increase of more than 500 percent in infrastructure

investment over the decade. Analysis of Concession Contracts in Chile requires an awareness of the legal framework in which these are situated. The most relevant regulations are contained in the 1991 Concessions Law and the specific Auction Rules governing the bidding process and the technical and economic bids put forward by participants. It is worth noting that the winning bid itself makes up an integral part of the final concession contract as do the bidding rules under which the auction takes place. Chile's concessions program has performed relatively well, but some criticism of design, renegotiation incentives and performance has made itself heard.[1]

The Infrastructure Concessions Law and recent government infrastructure programs have two main aims. The first of these is to increase investment and improve efficiency by bringing in private firms with experience in the sector. Efficiency improves because direct price regulation becomes unnecessary, thus eliminating the need for the regulator to obtain cost information from firms: a traditional problem of asymmetric information. Secondly, by charging users of the infrastructure the investment is financed by them, which is both an equitable and an efficient finance structure, and one that frees government resources for other ends.

The purpose of this paper is to test the hypothesis that even with a relatively successful Concession Program experience such as Chile's, design issues and specific provisions added to the contracts by interested parties negatively affect the bidding rules. In particular, we analyze how these issues and provisions reduced competition in the bidding process and affected performance, generating incentives for ex-post renegotiation and precluding welfare maximization.

We analyze the contracts behind four infrastructure projects involving private participation. All these contracts are currently in force. The main problems in these cases arose because the regulator did not take full advantage of the competitive forces available. We conclude that each contract's performance was adversely affected by the design of the auction rules and specific contract provisions: the design flaw shared by these contracts is that they made only limited use of competition in the bidding process.

The paper has four sections. Section 2 describes the contracts, the objectives of the different parties and the institutional setting. Section 3 analyzes four contracts, three

[1] See, for instance, Guash and Spiller (1999); Rufian (1999), Engel, Fisher and Galetovic (1997, 1998); and Harstad, R. and M. Crew (1999).

of them written in accordance with the Infrastructure Concession Law (The El Melon Tunnel, the Santiago - San Antonio Freeway, and the Santiago International Airport). A fourth contract, also analyzed in this section, operates under a different legal framework, but also required a concession by the government (the allocation of the 1900 MHz frequency for Personal Communications Systems, PCS). Section 4 concludes.

2. THE NATURE OF THE CONTRACTS

In most cases where a monopoly right for the provision of public infrastructure is auctioned off, the number of potential bidders is relatively small. Thus, the situation is generally one of bilateral monopoly, which standard economic theory suggests could lead to indeterminacy in the distribution of the gains from trade. The theory of auctions solves this indeterminacy by considering the seller to be a Stackelberg leader with the first move, which results in a commitment to a certain set of Auction Rules known to the bidders when the auction begins. These rules bind the auction organizer such that bidders know that the auction procedures cannot be changed after bids are observed, even though it might be in the organizer's interest to do so ex-post (McAffee and McMillan, 1987).[2] Thus commitment to previously established rules is a central element of the auction theory. These rules determine the incentives that bidders face during the bidding process and also the ex-post incentives present once the monopoly right has been granted, in particular the incentive to renegotiate.

Since the Auction Rules are decisive for both the terms of the final contract and the contractual outcome (Klemperer, 2002), and the incentives faced by different players affect the design (Aghion, Alesina, and Trebbi, 2002), both incentives and the clauses and provisions contained in contracts are vital to performance evaluation.

2.1. Infrastructure Concession Contracts

Infrastructure concessions are contracts between the State and a private firm through which the latter obtains the right to provide a service to a market in which the provider has significant market power (Kerf et al., 1996, p.1). A key aspect of

[2] However, it is important to note that the ability to extract all the gains from trade by the first mover is limited by the informational asymmetries, since he does not know the bidder's valuation for the item on sale.

concession contracts is that the State may induce private actors to compete among themselves for the contract. Such an outcome may be equivalent to second best regulation (Demsetz, 1968)[3]. However, this result requires close attention to design, implementation and the specific terms of the contracts.[4]

It is well known that contract design affects efficiency. For instance, granting the concession to the firm who pays the government the largest amount redistributes monopoly rents. In turn, granting the contract to the bidder that promises the lowest consumer price may solve the efficiency problem for a single product monopolist, but may not be the appropriate criteria in the case of a multi product monopolist. Using simple clauses that enhance competition within the field is an important lesson drawn from Demsetz (1968). However, for a variety of reasons, including the fact that unexpected events may occur once the monopoly right is granted and operating, it may be important to have ways of adjusting the contract to unexpected conditions. The problem with such flexibility is that it may induce renegotiation, which in turn may distort the spirit of the process and lead one party to take advantage of sunk investments made by the other. Thus, writing contracts so as to attain a balance between flexibility and the risk of renegotiation must be a central goal of good contract design.

2.2. Objectives and the Parties Involved

Demsetz obtains the theoretical result that an auction for the right to be a monopolist – with the winning bid being that promising to charge the lowest consumer price – will yield second best efficiency. However, this is for a one period model with a single product and no externalities. While relaxing some of these assumptions should not change the main result in theory, in practice it may do so. These processes tend to have more than a single variable to be bid upon because the regulator generally has additional concerns, such as avoiding the exertion of monopoly power once the contract is granted, improving the access of the poorest consumers to the sector, and managing externalities.

One way to cope with such problems has been to include more auction variables. However, the problem with introducing more variables and especially non-economic

[3] Because of the difficulty of getting information on investment costs, there are advantages to be had from replacing price regulation with an auction of monopoly rights, where the winner is the bidder that proposes the lowest price at which the service is to be provided.

variables (i.e., variables which are difficult to quantify) is that it becomes more difficult to rely on economic competition to obtain the desired result. In addition, while including more variables permits the pursuit of more objectives, these will not only differ from maximization of social welfare, but may in fact clash directly with it.

Pursuing a single clear objective is difficult in institutional settings where there tend to be many objectives and interests in play which must be balanced. Such clarity becomes much more important when one of the objectives has direct consequences for the institution setting the rules. This occurs for instance when the institution loses funding when infrastructure investment is transferred to a private firm: in such a case a different source of funding may be required once the concession is granted. Moreover, there is a risk that the institution – especially if it is directly involved in the process of granting the concession – will attempt to shape the design for its own benefit, or even effectively boycott the process by imposing obligations on the private firm that are difficult to fulfill.[5]

On the other hand, public officials in charge of the process usually have rather narrow and limited objectives. For example, goals such as "privatize firms", "maximize the number of private firms interested in the project", or "obtain the largest possible payment for the government" are common among public sector officials. It is rare that public sector officials in charge of implementing such projects are evaluated on how effectively they sought long-term efficiency. Most Latin American privatization processes have been judged on the proceeds obtained from the sale of privatized firms, rather than on how these firms performed when in the private sector. The situation is the same when the performance is judged by the number of firms participating in the bidding process: the lack of participation is considered a failure.[6]

Recent experience of privatization in Latin America suggests that goals tend to be narrowly defined – maximize sales revenue, obtain a speedy end to the process, build the project as quickly as possible – and successful attainment of these goals is rewarded by promotions for the government officials in charge, with the blame for poor regulation falling on others. This, in part, is due to the absence of a real civil service in Chile, as it

[4] The design matters not only in attaining theoretically efficient output, but also by determining the risk of renegotiation. See, Engel, Fisher and Galetovic (1997); and Bester and Sákovics (2001).
[5] For a more general view, see White (2002).

is in fact the case in most Latin American countries. The continuous changes in the government officials responsible for policies, reduces their incentives to keep historical reputation high.[7]

3. LESSONS FROM INFRASTRUCTURE CONTRACTS

In this section we analyze four contracts between the private sector and the Chilean government. Three of them were signed under the framework of the 1991 Infrastructure Concessions Law. A fourth contract, under a different law, exemplifies the traditional relationship between the government and private sector. This contract, and the similarity of the problems encountered, serves to illustrate the fact that these issues are not simply the product of the Concessions Law.

In all these contracts, the Auction Rules established that the bidders had to submit a technical and a financial offer. The technical offer usually included a description of the firm and a summary of its experience on similar projects, and the technical and financial specifications. The Auction Rules also defined the responsibilities of each party, the services to be provided and who was to pay for the service. Contracts were granted to the bidder that offered the best conditions as defined by the Auction Rules. The Technical and Financial Offers became an integral part of the contract for the auction winner.

Whilst all the contracts we analyze involved private sector participation, and three employed the concession legislation, it is clear that interested parties' involvement in the design of the rules negatively affected performance from an efficiency point of view. The interests of such parties were often quite different in nature (and were not necessarily directed towards narrow self-interest), but they all had a pervasive effect on allocative efficiency. Our analysis also shows how the design, and in particular the choice of the auction variable affects the incentives for post contractual negotiation, a dynamic efficiency issue.

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[6] Private firms' lack of interest may be efficient if that avoids the construction of white elephants or projects of very low social benefit.

[7] See, for empirical analyzes, Paredes (1995) and Bitrán et al. (1999).

3.1. The El Melon Tunnel: contract design and post contractual incentives.

The El Melon Tunnel was the first infrastructure project built and operated under the Concessions Law in Chile. It is a tunnel located 130 kilometers North of Santiago allowing drivers to avoid the El Melon hill, a steep single-lane hill road. The tunnel reduces travel time considerably and does not merely improve existing infrastructure, which has been the case with most of the infrastructure projects put up for concession up to 2003.[8]

The Auction Rules specified the construction period, operations startup and penalty procedures in case of delays, unauthorized service interruptions, charges above those authorized, delays in providing information required by the Ministry of Public Works (MPW) and other delays. The Rules also established procedures for the land expropriations required to build the project, an important source of risk. The expropriation would be carried out by the MPW and the payment, within a certain range, would be made by the concessionaire. The Fiscal Inspector was charged with monitoring the project's progress during the construction stage. The Auction Rules also established a maximum debt-equity ratio and a minimum equity requirement to reduce the risk of the concessionaire going bankrupt. A detailed budget and financing program were required, together with an investment analysis and an estimate of expected costs.

Several simultaneous bidding variables were used: the toll charged per vehicle, an inflation adjustment rule, the length of the concession period, warranties requested from the State, additional services offered and a payment from or to the State. That is, a bidder could (and all eventually did) offer a payment to the State financed from the toll charged to the vehicles using the tunnel. More precisely, the bidder had to offer an average toll per vehicle per hour, without discriminating among users, with a cap established in the Rules. The adjustment formula was for 100 percent of the CPI, but it was left to the bidder to decide on the length of the adjustment period as part of their offer: it could be every 3, 6 or 12 months, with a longer lag length making for a more competitive offer.[9]

In April 1993, the project was awarded to a consortium led by Endesa S.A., their offer defeating the three others that fulfilled all the technical requirements.

[8] The degree of monopoly power the concessionaire is to enjoy (limited for example by the existence of alternative products or routes) is a key determinant of the extent and form of the regulation finally applied. A high degree of monopoly power requires detailed and often extensive regulation.

However, the financial offers of all these bidders (Belfi, Chilquinta, Dragados and Endesa) were almost identical. They all offered the maximum toll allowed, the maximum concession period, requested the maximum guaranteed income from the State and the minimum length for the adjustment period. The only variable in which there was competition and which was obviously decisive was the payment offered to the State. There were large differences among the bids on this variable: Belfi offered an annual payment of US$ 1 million, Chilquinta US$ 1.4 million, Dragados US$ 24,000 and Endesa US$ 3.4 million.

Thus despite a seemingly sophisticated auction formula, competition was in fact focused on a single variable: the size of the payment to the State. This should not be cause for surprise however as technology exists that assists firms in structuring their bids. Firms compare the change in the score received by their bid with the effect of a change in each variable on net present value. For a given change in the net present value of the project the variable that increases the score the most is chosen by the firm. Each variable is set to an optimum level, restricting competition to the most bid-score effective variable for a given cost. Variables set to maximum allowed levels (uncompetitive) will be those that have a very low effect on the bid score for a given cost in net present value. Therefore, it is no coincidence that all concessionaires chose to compete on the same variable. The relevant question, given that this was common knowledge for the auction designers, was why the auction included so many variables if only one was relevant.

Our interpretation is that the rules were designed to ensure that this first concession project would be made and thus, perceived as a success. The MPW feared that if the project was awarded using the toll charge as the bidding variable, the revenues might have not been enough to cover the costs. Furthermore, provided that a substitute road existed, the maximum revenue for the concessionaire required a toll where the elasticity of demand was -1. Higher tolls would reduce revenues. Uncertainty as to demand made the project risky and it was in the interest of the government for the first project in the concessions program to appear attractive to the private sector. It is likely that this induced the government to design an auction that would ensure such a result.

[9] The details of how the other variables were included in the formula are described in Paredes, Sánchez and Sanhueza (2001).

Moreover, if no firms had participated in the process it might have been interpreted as a failure for the newly created Private Concessions Law and a signal that, despite the rhetoric, the new center-left political coalition was uninterested in working with the private sector.[10]

To avoid this, the MPW effectively provided the project with two safeguards:

i) guaranteed minimum traffic levels for the system as a whole [11], and

ii) the payment requested from the State (which could be positive or negative) was included as a bidding variable.

Thus, the relevant bidding variable (the payment to or from the State), guaranteed that some firms would be interested in the project even if it were not socially profitable. In this respect, the auction design ensured that even proposed projects adversely affecting efficiency would be considered. Moreover, given that the payment to the government was the bidding variable and thus the variable set at the most competitive level, the design implied a high toll, creating efficiency losses associated with the traffic reduction and thus generating incentives for ex post renegotiation.

Since operations began in 1995 the operator has consistently lost money despite charging high tolls relative to those charged in the rest of the country, including other newly privatized roads. Simultaneously, and despite the losses, it must make the regular payment to the State that was promised in its bid, plus an extra amount associated with an income sharing clause depending on the traffic through the whole system, that includes the alternative road.

Other political economy consequences are clear. The high tolls faced by consumers result in some vehicles avoiding the tunnel, creating pressure for renegotiation not only from the concessionaire but also from consumers. The latter argue that the concessionaire could reduce the tolls if it did not have to pay the more than US$ 3 million it promised in its (winning) bid. The lobby suggests that a change in the

[10] The new political coalition took office in 1990, after 17 years of the military government that had overthrown Allende's socialist regime. The coalition's commitment to cooperating with the private sector had been questioned in the presidential campaign. This is a political economy argument that was more important than the usual concern cited in the auction literature about the need to attract bidders to an auction as an auction with too few bidders will be both unprofitable for the auctioneer and potentially inefficient (Klemperer 2001).

[11] Correctly, given that there was a cup on tariffs, this minimum guaranteed traffic level was for both the new tunnel and the existing hill road taken together.

contract would benefit consumers (of course, to the detriment of taxpayers who do not use the tunnel and need to finance the US$3 million).

While the government has resisted pressures to renegotiate thus far, these pressures are direct consequences of the auction design. Though there are reasons to explain the poor performance exhibited by the firm, strategic behavior and low-balling in the bidding process cannot be discarded.[12]

3.2. The Santiago International Airport: maximizing proceeds from a monopoly.

An airport's location can provide its concessionaire with monopoly power. This explains why not only the runway, but the airport itself may be considered a type of natural monopoly and a clear candidate for the concessions program. [13]

Different institutions are responsible for regulating the airport concession in Chile. The MPW designs and enforces the contract, while the General Directorate of Civil Aviation (DGAC), the civil aeronautical authority, monitors security and aeronautical services. In addition the Ministry of Finance has veto power over the design of the Auction Rules, since keeping a balanced budget is its responsibility. While all these institutions participated in the concession design, the DGAC had a central role in defining the terms and conditions under which the services were included and in defining the bidding variables. This point is of relevance because pre-concession the DGAC was in charge of operating both the airport and all relevant services.[14]

The concession of the Santiago International Airport (AMB) consisted of a leasing, development and operation contract for both aeronautical and non-aeronautical services for fifteen years. The project required building new facilities in the passenger

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[12] Construction cost exceeded the budget estimated by the MPW and by the concessionaire by about 30 percent. A technical error in the prediction of traffic is unlikely. An error in estimating demand elasticity is more probable.

[13] Some of the services offered by an airport face enough competition and hence do not need to be regulated, such as the duty free shops and food and beverage services, all of which can be obtained outside the airport at some additional but not significant cost. Other services such as communications and parking are not strictly necessary to an airport's operation but are highly complementary. Some of these may not face enough competition because of their privileged location with regard to their competition and therefore may need to be regulated to some extent. Finally, there are services that are an essential part of an airport, such as the embarkation/disembarkation system, airside platform services and catering, counters and support areas for the airlines. There are some differences in the degree of competition in these essential services. The embarkation/disembarkation systems, for instance, lack good substitutes. As these services are essential for airline competition, it is important that they be price regulated and provided on a non-discriminatory basis.

[14] Some were directly provided by the DGAC while others were offered through concessions granted by it.

and freight terminals that would increase the existing capacity by a factor of 3 and 1.5 respectively, with total investment estimated at US$ 100 million.

The process began in June 1997 with the publication of the Auction Rules and the concession was granted in February 1998. During the four-month period between the publication of the Auction Rules and the submission of the bids, 13 firms participated in the process and over 1,000 questions about the Rules were received. The answers to the questions were published in 14 documents that became part of the Auction Rules.

The Auction Rules defined the services to be provided by the concessionaire, and explicitly excluded a number of services that would continue to be provided by the DGAC. Some concessionaire-provided services were subject to price regulation, such as the embarkation and disembarkation system, rental of the airside platform service areas and the catering areas. Among the non-aeronautical services, some were mandatory: food, parking, communications, counters, offices, duty free shops and public transport, while the rest were voluntary. The Rules also specified conditions that would lead to an early termination of the contract.

The Ministry of Finance sets an airport tax per passenger (about US$ 8 and US$ 18 for national and international passengers respectively at the moment the auction took place). The revenues from this tax had always gone to the DGAC and they make up its core budget. When the Auction Rules were published, they established the bidding variable as the lowest amount requested from this airport tax, with a cap of US$ 7 per passenger. The difference between the tax set by the Ministry of Finance, which was not modified as a part of this process, and the amount requested by the successful bidder would still be revenue for the DGAC. Therefore, the bidding variable was not the final price paid by consumers and airlines, but rather the net price received by the DGAC. However 15 days before the closing date the MPW modified the bidding variable by adding two further conditions: i) the minimum amount that could be requested by bidders was set at US$1.5, and ii) the percentage reduction in the prices of the regulated services could not exceed 70 percent. The new Auction Rules also obliged the winner to pay the DGAC US$2.5 million annually for the first 5 years and US$2 million thereafter.[15]

[15] This amount was equivalent to the revenues the DGAC claimed it received before the process.

In addition, the Auction Rules specified two types of performance goals, one associated with the construction of airport facilities and another associated with airport operation. The first was clearly defined and thus, there was no room for discretionary behavior from any party. However, this was not the case for the performance indicators for airport operation. Given the nature of the services provided by the airport, quality considerations are relevant and each bidder had to include an Operations Manual as part of their technical offer. This manual established the airport's operational procedures and quality standards, and defined them with reference to a similar airport abroad managed by one of the members participating in the consortium. [16]

In short, the Auction Rules ensured that the concession would be granted to the bidder requesting the lowest fee per passenger within an allowed range, and offering the largest reduction from the maximum prices specified in the auction rules for regulated services provided by the concessionaire. If the bidding process resulted in a tie in terms of economic offers, the winner would be the consortia with the best technical offer.

The result was that the seven consortia that presented bids made exactly the same economic offer. They requested the minimum possible amount per passenger and offered the maximum reduction allowed for prices in the regulated services. Thus the project was awarded according to the maximum score obtained by the technical offers, turning the process into a "beauty contest" in which technical aspects such as experience, "quality of the project" and the quality of the "Operating Manuals and Procedures", were all evaluated and assigned scores. Since all these concepts are hard to define objectively, the losers challenged the scores assigned to each consortium in court, but eventually the scores were upheld.

The incentives involved in this process are more easily understood when we look at which economic agents were directly affected. Two types of consumers were involved in the airport concession: passengers (and freight customers) and airlines. Passengers face high costs of organizing themselves into an effective lobby and thus were not actors of any relevance in the process. Moreover, competition in the bidding process was not guaranteed to affect them directly: it would only do so if competition in the airline industry forced airlines to pass cost reductions through to consumers or through

[16] It was a requirement that each consortium had a member with experience of managing an airport of similar size abroad. For instance, the manual includes commitments as to the maximum waiting time for baggage claim and counter assistance.

increases in the quality of the services provided. On the other hand the airlines were both interested and successful in modifying the bidding variables, resulting in significant price reductions in regulated services with regard to the levels initially stated in the Auction Rules.

Another interested party, as described above, was the DGAC. This institution was a major beneficiary of the auction design. Restricting competition in the bidding process by setting regulated prices "too high," imposing a floor on reductions in regulated prices, and requesting an annual amount from the winning consortium limited the percentage of the airport tax necessary to finance the project. In fact, this minimized the difference between the fee set by the Ministry of Finance and the amount requested by the bidder that won, setting it to the lowest level allowed under the Rules. Effectively, the rules maximized the DGAC's final budget.

Finally, in addition to the factors mentioned which all suggest the existence of welfare costs, competition was restricted to a non-economic variable. The winner was not necessarily or even probably the most efficient consortium because the lack of transparency involved in such a subjective but supposedly technical decision: the weights attached to non-economic aspects are seldom even defined technically. By changing the Auction Rules only slightly – for instance by awarding the project to the bidder who offered to return the facilities the earliest – the beauty contest type allocation that occurred could have been avoided. This type of clause was ruled out on unconvincing grounds (it was argued that a minimum period was required to make the project profitable). The opposition of the DGAC to such clause is easily explained: competition on any economic variable would reduce rents, and hence the consortia would have requested a larger share of airport tax, reducing the revenue received by the DGAC.

3.3. The Allocation of Radioelectric Frequencies for the PCS mobile telephone system

In November 1995 the Undersecretary of Telecommunications (Subtel), the Telecoms regulator, opened a bidding process to auction off three national concessions in the 1900 MHz band for mobile telephony (Personal Communication Systems). The process was not without controversy because of the uncertainty produced by a set of

Auction Rules which even made it very difficult for bidders to evaluate their own projects. Nonetheless, in October 1996 the frequencies were granted.

The main elements of the Telecommunications Law are that final consumer prices are unregulated[17], and that Subtel must assign concessions at no cost to those who request them, except when there is excess demand in which case Subtel run a competitive tender process. The Law also determines what the Auction Rules must consider, and the technical requirements the bidders must fulfill. Specifically, bidders are required to present a technical project with details of service provision and operation, and a financial project. The law also prohibits ex post modifications to winning bids and establishes penalties for cases in which the concessionaire fails to meet the technical conditions, stages and terms under which the concession was granted.

The Auction Rules stated that the most relevant bidding variable in the economic offer was coverage, which was calculated by weighting population densities in different areas. The Rules contained detailed requirements with respect to installation, operation, types of services and the project's execution time frame, which was not to exceed 5 years. The Rules also considered two financial guarantees, one of US$ 750,000, and the other amounting to US$ 42.5 million, to ensure the investment and operation of the project. The second guarantee was to be reduced progressively with the completion of successive stages. In June 1997, official results were published granting the three concessions as table 1 shows.

TABLE 1
RESULTS OF THE SPECTRUM AUCTION IN THE 1900 MHZ BANDWIDTH

	1st place	2nd place	3rd place
Firms	Entel Telefonía Personal (Entel PCS)	Chilesat Telefonía Personal	Entel Telefonía Móvil
Partners	Entel : 59.16 % Motorola : 40.84%	Télex : 50% Qualcomm : 50 %	Entel : 80% Qualcomm : 20%
Score	98.35	85.98	76.77
Technology	CDMA	TDMA (original)	GSM
N° Stations	136	188	167
Bandwidth	C	B	A
Counties Served	302	228	249
Execution Period	6 months	18 months	60 months

[17] Unless the Antitrust Commission considers that there is a lack of competition in a market in which case the prices would have to be regulated.

Source: Subtel.

As in the previous cases, the interests of the institutions and parties involved in the process diverged greatly. The mobile telephony companies tried to delay the process and thus the entry of new competitors. In May 1996 the Antitrust Commission recommended that the concession should not be granted to a firm already holding a concession. Subtel, the institution that finally decided on the Auction Rules, did not follow this recommendation as Subtel's objective is to guarantee universal service, which is clearly not the same as promoting competition. Furthermore, it became apparent that Subtel was pushing for the implementation of the PCS as quickly as possible, wishing to place the sector on the technology frontier.[18]

When maximizing welfare there are more efficient and more transparent ways of allocating frequencies than through competition on coverage. Given that the number of frequencies is fixed and no monopoly right was involved, the most direct and efficient method was to allocate frequencies to the firms willing to pay the most. Allocating frequencies on the basis of providing the greatest coverage in the shortest period of time leads to inefficiencies such as coverage provision in areas where it is not economically convenient to do so. Whilst it may be true that more traffic should be associated with lower tariffs, more traffic is not necessarily associated with geographical coverage but with demand which naturally varies across counties and regions. The weights placed on coverage in the Auction Rules were based upon population, which is consistent with a universal service objective rather than with the aim of satisfying mobile telephony demand. In addition, the incentives created by the Auction Rules provided an incentive to speed up investment and cross subsidize with little regard for economic efficiency.

As in the case of the El Melon tunnel, incentives to renegotiate rapidly emerged. Renegotiation to allow delays in investment in some counties was easily justified on theoretical grounds. Increasing coverage and speeding up investment timing was economically inefficient, providing an incentive to renegotiate the contract. This made

[18] The above considerations may also explain why Subtel did not resolve some apparently minor problems ex ante, such as the repossession of frequencies operated by the military. Instead, it left this issue to the firms. How these frequencies were to be repossessed, and the cost of the process were extremely uncertain, eventually leading to court appearances.

itself felt in two ways: firstly by exerting pressure to push back the deadline for coverage fulfillment, and secondly by forcing changes in favor of the firms providing the service.

In January 1998 Entel asked for permission to merge its two projects and thus fulfill only the total coverage offered by its two projects. Whilst merging the projects was efficient, it was in complete contradiction with the aim of maximizing coverage by granting the concession to three firms. However, it was allowed by a provisional permit which was later challenged in Court by rival firms, arguing that this was against both the Auction Rules and the law.

The sequencing of inspection and execution of the projected investment illustrates how renegotiation occurred. On December 30th 1997 Subtel declared itself unsatisfied with the supposedly finished Entel PCS project, because 10 of the 210 stations due were not ready. According to the contract, the guarantee was forfeit. However, Entel moved quickly to certify by Public Notary that in the period between Subtel's report and the final date, it had solved the problem (that is, between 21:00 and 24:00 hours on December 30th). Entel presented the report to Subtel and simultaneously presented a legal appeal to the courts on January 5th 1998.[19] Subtel accepted Entel's position and decided after several delays and in conjunction with a report from the Comptroller General not to execute the guarantee. This led to Subtel receiving two formal complaints.

A second avenue of renegotiation was found in the implementation of the so-called "calling party pays" protocol. This system was considered critical to the mobile companies' competitive position. Throughout the process Subtel consistently held that "calling party pays" was not part of the Auction Rules. However, by then it was clear that to avoid problems and accusations of defining the rules of the game on an ex-post basis, it was wisest to explicitly deal with the protocol as part of the process. Subtel had no legal tools to implement such a policy and was only able to create the "calling party pays" system through interconnection charges. That is, Subtel made it possible for mobile companies to charge local companies an access fee so that an incoming call fee was not required.

[19] In the argument, it was noted that the Auction Rules established that if work was rejected by Subtel the concessionaire was obliged to correct the problem within the initial time period. This gave Entel only three hours to solve the problem: grounds enough to argue in court that Subtel's condition was unreasonable.

3.4 The Santiago-San Antonio Highway

The Santiago - San Antonio Highway contract consisted of building and operating a highway between Santiago and San Antonio – arguably Chile's largest cargo port – located about 100 kms east of Santiago. The project essentially consisted of improving the existing road. The Auction Rules stipulated an ad-hoc committee in charge of evaluating technical aspects, minimum service standards, a 23 year operation period and financial guarantees to allow penalization in case of delays. As in the case of the El Melon tunnel, the Auction Rules guaranteed minimum traffic levels and an income-sharing clause for extraordinarily high revenues based on estimated cost. The concessionaire was forced to take on all the risks, including that associated with the toll charging technology which was to be defined by the MPW after the concession was awarded. Moreover the Government required a payment for pre-existing infrastructure, consisting of 20 annual payments of US$ 4.8 million and an additional payment of approximately US$ 145,000 per year for the first four years. Finally, as with other infrastructure contracts the Auction Rules had some flexibility to allow the MPW to modify some project characteristics. In such cases, the MPW would pay any additional costs.

The bidding variable was the lowest toll charged (with a cap of US$ 5)[20] and the Auction Rules established that in case of a tie the winner would be the bidder requesting the lowest subsidy from (or offering the largest payment to) the State. Thus, there was no polynomial equation with different weights, but rather a recursive process with a payment which was relevant to the bidding only if the toll reached a predefined cap.

Among the six offers considered technically acceptable, the winner was Consorcio Infraestructura 2000, which offered a toll of US$ 1.74. The other bids offered US$ 1.88, US$ 1.97, US$ 2.68, US$ 3.41, and US$ 3.53. Thus, the auction process was relatively transparent and used a competitive economic mechanism that favored consumers.

Notwithstanding the above, two years after the concession was granted and in accordance with its rights under the Concessions Law, the MPW decided to modify the

[20] The Auction Rules established a relationship among different tolls such that once bidders made an offer for one type of toll, the rest were determined automatically.

contract by requiring improved services, additional service roads, more accesses to the highway, bypasses, improvements in local traffic, higher traffic flow standards and additional safety measures. In addition, the project began operations late as a result of expropriations delays which the MPW was responsible for.

These changes sparked a renegotiation process, focusing on three aspects: the cost of the new facilities, the period that the concessionaire was not operating due to the delay caused by the MPW and the amount and method of payment for the additional costs. As such a change to the contract was legal it should not have allowed the private sector to obtain any advantage in subsequent negotiations. However, the MPW's overriding desire to implement the changes led them to pay compensation by changing the value of the auction variable: a non transparent and likely inefficient way of resolving the matter.

Negotiations over compensation for costs caused by the delay in beginning operations were difficult because rules for such a contingency were not included in the Auction Rules. However, foregone revenue was easily estimated since once the operation was underway traffic flow data was available.

A second major problem centered on estimating the opportunity cost of the idle resources, an issue that was absent in the contract. This was unusual as these costs are regularly included in standard contracts between the MPW and private parties.

With regard to the cost of the additional investment required by the MPW, the obvious way of obtaining unit costs was to make use of the prices the MPW was using for its other contracts. This did not occur. The Auction Rules required the bidder to report estimated unit costs for the facilities, but there was no incentive for them to declare their real estimated values. Quite the contrary: reporting higher values placed them in a superior negotiating position.

A third component of the negotiations was the method of compensation for additional cost. There were three legal alternatives: increased tolls, a longer operation period or direct payments. The relationship between these alternatives is not trivial and was the subject of negotiation. In practice, part of the compensation took place through an increase in tolls. The negotiation focused on the effect on revenues that such an increase would have, that is, on the value of the price elasticity of demand. The result of the negotiation was an 18.1 percent increase in tolls, under the assumption that such an

increase would lead a revenue increase of 11.9 percent (the implied price elasticity was -0.25).

At least two lessons can be learned here. Firstly, even when a parameter is not defined in the Auction Rules other readily available sources of parameter values should be used to limit renegotiation. Secondly, when the Auction Rules are centered on a single clear and transparent bidding variable – such as the price charged to users – it should not be used to compensate the firm in renegotiations, since it is the result of a competitive bidding process and was used to grant the monopoly right. Changing it later through a renegotiation process or through an administrative decision reduces the transparency of the process. If additional investments must be made, it is more transparent to use available cost parameters to determine the total cost of required investments and to pay this amount directly to the concessionaire without altering the price that resulted from a competitive tender process. Of course, had the additional investments been included in the original project, the price would have reflected all the required investment.

We interpret the course of the renegotiation process as the result of the MPW's powerful interest in seeing the project completed. This lay behind the failure to use readily available data to estimate additional costs and also the decision to use the toll charged as the compensation method, thus reducing the transparency of the process.

4. CONCLUSIONS

Chile's well developed institutions and early commitment to private initiative suggest that the problems highlighted in these concession contracts were not the product of either corruption or incompetence. We have considered four different contracts from which a number of lessons and policy implications may be drawn.

Firstly, all the contracts had more than one objective and these objectives were often at least partially contradictory. A significant general objective was the government's desire to ensure that the project was undertaken. In the case of El Melon Tunnel, where the bidding variable was the minimum sum requested from (or paid to) the State, an efficiency problem emerged. High prices and the concessionaire's losses, taken together with payments promised to the State, created a consumer and concessionaire coalition to lobby for a review of the contract.

As is evident from the PCS frequency and road infrastructure concessions, contract design and especially the choice of the bidding variable are vital to the auction outcome because of their effect on incentives. Making use of some bidding variables makes post-contractual renegotiations more likely than when others are used. The contract is less efficient and renegotiations are more difficult to resolve when the bidding variable is not an economic variable. Additionally, renegotiations in the case of the PCS frequencies and the El Melon Tunnel were made more challenging because the bidding variable did not affect consumers. It is important to remember that in most cases, and in spite of the existence of complicated polynomial formulas that were supposed to include several variables in the bidding process, there was only one bidding variable that was the subject of competition. If the overriding objective is to ensure the participation of several bidders and more than one bidding variable is used, it is worth making use of the relevant economic variables so as to focus competition on economic aspects of the project. This prevents the concession competition descending into a "beauty contest" at the cost of both efficiency and transparency.

Secondly, design problems were worsened when an interested party was involved in the process. The DGAC affected the Auction Rules in a way that finally led to a beauty contest instead of an objectively competitive process based on an economic variable. As this case shows, the design of the contract matters: efficiency and the incentives for ex-post renegotiation are at stake. Hence it is vital to separate the ex post role of each party in the process from its role in the contract design. In the airport concession case, there was no clear definition of the DGAC role, and by distorting the auction design this entity increased its budget at the cost of consumers. The DGAC not only affected the choice of bidding variable, but also the tariff structure and floors, and the size of the fixed annual payment. Moreover, from an efficiency point of view, the concessionaire should take on as many commercial activities as possible. In short, the absence of both a budget and a clear ex post role for the DGAC, meant that the MPW and the Ministry of Finance should have limited the DGAC's participation in contract design. A poorly defined contract also afflicted the PCS frequency auction, illustrating that such problems are not strictly a product of the Concessions Law. In this case, Subtel's goal – attaining the largest possible coverage as quickly as possible – clashed with the Antitrust Commission's recommendation to avoid granting frequencies to the incumbent firm. Furthermore, Subtel's goals induced renegotiation since forcing the firm

to comply with inefficient investment scheduling plans could have put the firm in financial risk.

Thirdly, the MPW prioritized the realization of the project and the reduction of conflicts in the very short run instead of providing a general framework for renegotiation. The government was keen to guarantee that it would not expropriate sunk investments. Renegotiations may enhance efficiency by allowing both parties to react to unanticipated contingencies, but a limit on such renegotiations must be imposed to avoid corruption and excess. In the renegotiation cases reviewed the government paradoxically introduced new criteria for cost determination that favored the concessionaire instead of using parameters that were both at hand and constituted the natural solution. This approach has effects not only on the current project but also on the behavior of contractors on future projects. Moreover, while the law is flexible with regard to methods of compensation in the case of negotiations, the contracts surprisingly fail to include some obviously logical variables and fail to make explicit how compensation will be paid.

Finally, changing the Auction Rules near the closing date for bids reduces transparency and raises questions as to the agenda of the regulator. While the change affects all participants, clearly some are affected more than others. Furthermore, a design change in which the effective bidding variable becomes the “technical project” will benefit those with more experience and with more effective lobbyists, a change that often brings efficiency costs in its wake.

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