REGULATORY CHALLENGES: COMPETITION DEFENSE IN THE BRAZILIAN ELECTRICITY SECTOR

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ABSTRACT

The main goal of this paper is to show that in the Brazilian Electricity Sector the Regulatory Authority (ANEEL) faces a significant challenge. We show that due to the physical features of the Brazilian Electricity Sector coordination is more important than competition, so bundled transactions are more efficient than transactions through verticalized firms. We concluded that firms strategies are to be organized as holding companies, and this lead them to have a high market power, which demands from ANEEL a strong position against the abuse of market power.

1. INTRODUCTION

The very intense dynamics of recent electricity sector development worldwide have, with few exceptions, followed a common path. Reforms in the industry structure in the 1980s and 90s reduced quite substantially the State’s participation as a direct stakeholder in production
and financing. The main goal was to enhance social welfare and introduce competition in generation segment. The financial crisis of the 80s acted as the main factor driving those changes, which were directed essentially to attracting private investment to the infrastructure sector. Given the sector’s intrinsic features, the State built structures to enable a regulatory framework to be formatted to prevent market concentration, which would be prejudicial to the competition that it was intended to introduce.

From the late 90s, these reforms began to show a series of problems resulting from errors of design, planning and execution, which led to a new process of restructuring that is now being intensified by the world energy crisis and efforts to achieve security of supply. The aim of this chapter is to examine this process in relation to Brazil. To that end, the text is divided into three sections. The first examines – in general terms and highlighting the most important and decisive aspects – the reform and restructuring process in Brazil’s electricity sector. The second analyses what are regarded as the major problems and the adjustments needed to bring better balance to the sector. The third addresses the issue of the trend towards economic concentration in favour of companies structured in the holding format. Lastly, we present our conclusions, indicating in general terms the need for the sector regulatory agent (ANEEL) to examine the issue of holdings, so as to prevent market capture and greater difficulties for the operations of the agency itself.

2. BRAZIL’S ELECTRICITY SECTOR: REFORM AND RESTRUCTURING

Since the 1980’s the electricity industry, in many countries, has being restructured. So, electric energy is being considered and being traded like a commodity. But, energy is not an ordinary commodity, because it cannot be stored (Collins, 2002).

The guarantee of energy supply is crucial to economic development. The cost of a shortage of energy can be measured by its effect on society. Therefore, reliability is the main goal in electricity markets. In a competitive industry, the demand should be responsive to changes in the spot price, so, consumers would choose to consume or not. To assure an optimal level of capacity reserve, installed capacity (ICAP) of generation must be greater than the forecasted demand. Especially, in a competitive market there must be market mechanisms to stimulate firms to invest in installed capacity.

In this sense, reliability can be achieved through market mechanisms (Stoft, 2002). One important characteristic of a capacity market (ICAP Market) is the establishment of a penalty to assure that all generators will deliver power if required. If a generator is required by the System Operator to generate power, and it does not deliver it, the generator will be punished by the regulator.

In line with a trend observed in numerous countries, the central purpose of Brazil’s electricity sector reform beginning in 1990 was to introduce a competitive environment and increase private participation in sector investment, after the crisis of the 1980s had rendered the public sector-based pattern of investment a thing of the past. Initially the purpose was to set up a system where competition and prices defined by the wholesale market would encourage new investment to expand capacity – from generation through to distribution. In practice one can define the new Brazilian model as a mixed model with wholesale and retail. In these cases, especially wholesale, free entry and free access to the transmission network (or
essential facilities as in Armstrong (2001)) must be compulsory instruments of regulatory policy.

However, it is well known that the Brazilian electricity is mainly hydro electrical and, in this case, important gains of energy efficiency can be obtained with the joint operation of hydroelectric plants. So, the transmission lines are essential elements to optimize the operation of the system. Actually, in a system like this, in which the plants are located far from the load centers and different regions have complementary hydrological regimes, the “transfer of water” through the network is one of the factors that determine the expansion and the operation of the system at minimum costs. In other words, free access to the network in a system like this is not just an instrument to facilitate competition. It is, maybe, a mechanism to optimize the use of energy resources.

From 1950 until the mid-80s, the electricity sector was financed from public capital and grew at significantly high rates, accompanying and outstripping electric power demand deriving from the expansion of Brazil’s economy. In the 1980s, however, the financial crisis that befell public finances left the State with insufficient capital to effect necessary investments.

The financial crisis in the State led to dwindling levels of investment in Brazil’s electricity sector, which paralysed construction of generating plants and left transmission and distribution systems inadequate. In parallel with this, public utility tariffs were used as a tool to control inflation, eroding electric utilities’ self-financing capability still further, as signalled by Castro & Francescutti (1998). The proposal to reform Brazil’s electricity sector thus gained force on the political agenda in the 1990s in the wake of State reform.

One important feature of electricity sector reform in Brazil, as in other countries, was the change in the structure of electricity industry firms. Companies were unbundled, i.e. the three segments of their operations – generation, transmission and distribution – were separated. Unbundling was designed to prevent predatory behaviour and, given free access to the grid, to increase the number of competitors in the generating industry. In that regard, and as compared with other international experiences, the expression “sector reform and restructuring” does not necessarily refer to a programme of privatisation although in the Brazilian case, sale of public assets was on the agenda of the State reform that began in 1990.

Brazil’s electricity sector restructuring in the 1990s was designed along lines similar to reform of the UK system, particularly as regards mechanisms to encourage competition and efficient production (Leite, 2003). Monetary stabilization from 1994 onwards paved the way for infrastructure enterprises to be included in the privatisation process. Four factors contributed to this situation.

Firstly, a constitutional amendment abolished the public monopoly over infrastructure industries. Secondly, differential treatment for domestic and foreign capital was eliminated, enabling foreign firms to dispute auctions to purchase Brazilian companies. Thirdly, Law No. 8.987/95, the law of concessions, laid down the basic conditions for entering, leaving and operating in infrastructure sectors. Lastly, negotiation of states’ debts to the federal government was made subject to a certain level of amortisation, which state governments could only meet by divesting assets.

In order to attain the level of competition desired in the electricity sector, it was proposed to:

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1 Constitutional amendment No. 6/95.
a. Unbundle the enterprises by activity, i.e. power generation, transmission, distribution and sale;

b. Set up a National System Operator (Operador Nacional do Sistema, ONS), acting independently of the owners of transmission assets;

c. Set up a spot market (Mercado Atacadista de Energia, MAE), where short-term power sale and purchase transactions would take place;

d. Set up an independent National Electric Power Agency (Agência Nacional de Energia Elétrica, ANEEL), responsible for regulating and overseeing electricity services;

e. Establish new economic agents – independent producers and free consumers – in the electricity sector; and

f. Lay down specific rules under which to monitor the market and ensure free competition. These include horizontal segregation of the major generators and limits on market shares, restrictions on cross ownership and a ceiling on self-supply.

As proposed and implemented, the reform suffered from significant failings of both planning and execution. Some of the deficiencies deserve specific analytical attention here. The first was the sale – privatisation – of two distribution companies (Escelsa and Light) owned by the Eletrobrás Group, before the regulatory agency, ANEEL, was in place.

Both the reform and the privatisation process fell behind schedule. There was no consensus, either in society or in political circles, as to whether the privatisations were really necessary, as described by Peci (2007). The privatisations were accompanied by significant shortcomings in the new contract rules. Clauses of the concession contracts and the initial contracts between generators and distributors comprised potential sources of conflict of interest between the parties (Correa et alii, 2006). The contracts tended to contribute to inflating the value of the assets to be privatised, so as to boost competition at auction and, most importantly, ensure higher premiums. This policy indicated that the process of privatising state enterprises, i.e. the reform overall, was subordinated to the endeavour to overcome macroeconomic imbalances by obtaining revenue to reduce the public deficit.

In addition to this hasty start marred by inconsistencies, another error in the implementation of the new model was the priority given to privatising distribution enterprises, an activity typically classified as a natural monopoly. It would have been logical, given the aim of increasing competition and economic efficiency, to privatise the generators – especially the federal ones. That idea was abandoned, however, for lack of political consensus on the matter. The distributors, meanwhile, were defaulting (as a result of the macroeconomic policy to curb inflation by controlling public tariffs in 1970 and 80). This deterred private investment in generation, because there were no concrete guarantees that distributors would be able to pay for power supplied, which would depress the value of the generators and consequently the extent to which revenues from their sale could contribute to the macroeconomic adjustment (Carvalho, 2001). Accordingly, the solution was to give priority to selling off the federal distributors and encouraging the state governments, via public debt settlements, to sell their distributors.

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2 Law No. 9.427, of 31 November 1997.
The complexity of Brazil’s electricity sector – in terms of the volume of investments, its continental scale and installed capacity – prevented the reform process from being pursued to the limit (unlike in Argentina, for instance, where all the assets came under the control of private capital). In Brazil, generation remained predominantly under federal government ownership, while distribution – a natural monopoly with captive consumers – was 80% privatised.

The main – and crucial – evidence of faulty institutional design was given by the supply crisis that led to electricity rationing programme adopted in May 2001, which resulted in a 20% reduction in nationwide consumption (Pinto Jr. et al., 2007). Pires, Giambiagi & Sales (2002) list four major, interrelated reasons for the 2001 power supply crisis. They are:

a. exhaustion of the State model;
b. faulty planning of the transition from the former model to the private model;
c. contractual and regulatory problems; and
d. a lack of coordination among government departments.

The risk of a supply shortage forced consumers to reduce demand in 20%, excluding the three states in the South of Brazil. The main reasons of this crisis were the scarcity of rain and, most important, the lack of investments in generation and transmission. The lack of investments was the consequence of the hybrid market structure, where the government was also an investor and the regulator. This fact created unstable rules to private investor, especially rules concerning the rate of return, pricing process and the uncompleted privatization process. The financial consequences for utilities were severe, because consumers demanded less energy and they were exposed to debts in foreign currency, which value has raised since then (Von der Feher and Wolak, 2003).

Note that in the post-rationing period the utility companies faced a serious liquidity crisis and operating losses (Pires et al., 2002). In Brazil’s electricity sector, the price of electric power is a function of conditions in the electricity industry, i.e., the availability of water in reservoirs and the level of rainfall. In predominantly hydro systems, the price of power tends not to be very volatile in the short term, but more so in the medium term. That is because, in the short term, reservoirs transfer power from low load times to peak times, modulating supply and reducing spot price volatility. In the medium term, meanwhile, the price of power is more volatile, because hydro systems are designed to guarantee load under adverse hydrological conditions.

From 2003 onwards, Brazil embarked on a process of electricity sector adjustment and restructuring determined by the recently elected Government. The Ministry of Mines and Energy (MME) conducted a series of studies in order to formulate and implement a new model for Brazil’s electricity sector, the legal and institutional bases for which were approved by the National Congress in Laws 10.847 and 10.848 of 2004. The two aims of the new model can be summarised as follows: to guarantee electricity supply and to ensure moderate tariffs.

As regards secure supply, Brazil’s new (present) model incorporated:

a. a reversal in the focus of electric power contracts, from the short to the long term, with a view to reducing price volatility and creating a market of long-term contracts
(Power Purchase Agreements, PPAs) that could be used as firm guarantees for financing;

b. compulsory contractual coverage, by distributors and free consumers, of 100% of their electric power consumption;

c. an Electric Sector Monitoring Committee (Comitê de Monitoramento de Setor Elétrico, CMSE) with the function of monitoring the balance between supply and demand to short-, medium- and long-term time horizons;

d. prior environmental licensing as a requirement for any new project to participate in the tender process; and

e. a return to integrated, centralised sector planning by the State, through the Power Research Enterprise (Empresa de Pesquisa Energética, EPE), set up by the new law.

In order to secure moderation in tariffs, one of the key aims of the new model, a virtual pool was formed among the distributors to act as sole purchaser on the electricity market. The distributors individually forward their electric power demand estimates to 3- and 5-year time horizons to the EPE. The EPE, in a monopsonistic environment, effects the purchases via auction at the lowest price and issues the sale contracts for thermoelectric and hydroelectric supply for 15 and 30 years, respectively.

The 2003 model divided the Brazilian electric power market into two trading environments, with clearly distinct logics and structures. The first was designed to meet demand from captive – primarily residential, service and industrial – consumers with lower levels of consumption: this is termed the Regulated Contract Environment (Ambiente de Contratação Regulada, ACR). The second is directed exclusively to firms, referred to as free consumers, consuming larger volumes. This market, denominated the Free Contract Environment (Ambiente de Contratação Livre, ACL), seeks to ensure that its participants compete and operate freely. In the ACL, players can enter freely into bilateral contracts setting prices, volumes, timeframes and hedge clauses with minimal government intervention.

On the captive market (ACR), power supply contracts can be of two types:

a. Contracts for a set quantity of electricity, where the generators assume all risks (of loss or gain) of integrated power operation and all costs relating to supplying the power contracted; and

b. Power availability (capacity) contracts, where the risk of supply varying from assured power are allocated to the pool and transferred to regulated consumers.

In addition, electricity purchase auctions are differentiated into old power auctions (power from existing projects) and new power auctions (from projects to be built). Contracts for new generation projects are decided at auctions five and three years ahead of initial delivery (known as A-5 and A-3 auctions). The former are designed for construction of hydroelectric-based generating plants able to come on-line within five years and the latter for projects for conclusion in three years, directed to thermoelectric-based generating plants. Contracts signed for the purchase of new power should cover terms of from 15 to 35 years (depending on the time necessary to amortise the investments) and should contain provisions to encourage moderation in tariffs. This, it is hoped, will significantly reduce the investment risk for generators, which will be able to start the project with a guaranteed revenue flow at acceptable rates of return and be able to raised inexpensive financing, particularly via project
finance and by granting guarantees (receivables) to financial institutions (Correia et alii, 2006).

The results obtained to date warrant the conclusion that the present model is managing to ensure expansion and moderation in tariff rates. Under the present model, Brazil’s electricity sector is taking shape as more stable, sound and predictable than under the model in place in the 1990s.

However, there are still numerous challenges to be met by Brazil’s electricity sector. Although there is a substantial – 160 GW estimated – hydro potential to be harnessed, the environmental legislation issue has to be resolved more precisely. This is currently one of the major restrictions on expansion of the hydroelectric matrix. Another imperative is to refine certain points in the regulatory framework, which would mitigate uncertainties in the sector.

From the foregoing, given an environment still gaining in maturity and with challenges ahead, it can be inferred that the firms, especially the larger ones (which in the case of this study are those structured into holdings), tend to set strategies designed to maximise their reliability, contract compliance and larger profit margins. These strategies can lead, in the medium term, to levels of market concentration that could jeopardise sector stability and, on the other hand, hinder the activities of the regulatory agency. That is the issue to be examined in the next section.

3. REGULATORY CHALLENGES: EMPHASIS ON COMPETITION DEFENSE

ANEEL’s various duties include defending competition. It is the agency’s duty to set down restrictions on players’ participation in the industries that make up the electricity sector production chain. It also oversees concentration in Brazil’s electricity sector, under Resolution 278/2000, which sets limits on electricity sector firms’ market-share.

The limits specified by this Resolution are:

a. no generator may hold more than 20% of national installed capacity or of the national distribution market;
b. participation in the South/Southeast/Mid-West System may not exceed 25% of installed generation capacity (or the distribution market) and, in the North/Northeast System, 35% of installed generation capacity (or the distribution market);
c. no player may hold a share greater than 20% of final or intermediate brokerage in the national system or greater than 25% the sum of final and intermediate brokerage in the system.

In principle, these limits constitute per se prohibitions against any act that would raise a firm’s share above the allowances (Pinto Jr. & Borges, 2002). However, when the new electricity sector model – and the new trading rules – came into force in 2004, it became possible to modify Resolution 278/2000, which was not properly suited to the institutional arrangements of the new model.

In the Regulated Contract Environment (ACR), where long-term electric power purchase transactions are carried out by way of regulated auctions, the focus in appraising practices
conducive to market power shifts from the market environment as such to the stages prior to
the auction. This viewpoint stems from the fact that firms compete for the market, but not on
the market. That is to say that, at the time of the auction, the process of competition has taken
place ex-ante. In this case, the distributor companies are obliged to close 100% of the
contracts (PPAs) and are required to inform the EPE of their load needs, which form in
aggregate the marginal market demand for three or five years ahead. After the auction, the
distributors that estimate demand growth in their concession areas close contracts with several
generators. As the distributors do not know in advance which generators they will be signing
contracts with, they cannot discriminate among sellers, which minimises any incentive to
bundling or self-dealing.

The auctions are held by the ANEEL on the basis of studies conducted by the EPE. One
such study is crucial to ensuring a basic minimum of tariff moderation. This is the setting of
an upper limit on the monetary value of the MW, on the basis of which the auction will be
disputed. This upper limit is referred to as the “ceiling price”. This minimises any likelihood
of gaming. Thus any move towards concentration in the distribution industry has little or no
anti-competitive effect, because the distributors operate in a natural monopoly environment in
their concession areas. Even an increase in concentration in the generation industry will have
little effect, given the nature of the ACR.

In the Free Contract Environment (ACL), meanwhile, generators and brokers compete for
contracts with the group of free-consumer firms. In this case, the competition takes place on
the market. Free-consumer firms have autonomy to celebrate contracts with generators and/or
brokers. On this market, the volumes, delivery dates and prices are settled between the agents,
either directly or by way of sale/purchase auctions.

Adjustment and settlement transactions are conducted at a spot price, by way of the
Difference Settlement Price (Preço de Liquidação das Diferenças, PLD). PLD is a proxy to
the spot price. The PLD is an extremely volatile indicator, because it is calculated essentially
on the basis of water volumes in reservoirs and rainfall. As the electricity sector involves
large volumes of water dammed in very small areas and the rainfall regime is tropical, the
PLD is not a good price indicator for electric power. Its volatility – in the course of a year it
can vary from R$17 to R$570 – indicates that the PLD does not provide grounds for long-
term investment decision-making processes. That deficiency imposes very high – and as yet
not precified – financial risks on generator and distributors.

On the free market, negotiation is open and unrestricted, and there the ANEEL must be
more alert to any increase in market concentration in the generation industry. This calls for
more thorough studies of possible consequences and trends. Even in the distribution industry,
there is a possible loophole in the unbundling provisions. This is the possibility, apparently
not prohibited by the regulations, that a generator forming part of a holding may successfully
bid for a plant that is to offer power for marginal demand from a group of distributors. There
may then be a firm from the same group among the distributors named in the power sale
contract.

The problem is how to anticipate and comprehend such outcomes beforehand with a view
to taking the proper measures. For example, depending on whether the action towards
concentration occurs in the same Submarket or in different Submarkets, the regulatory agency
will proceed differently in its appraisal. If the action occurs in two different Submarkets, the
analysis of a possible increase in a firm’s market power will be framed mainly by restrictions
on transmission between these Submarkets. If on the other hand, it occurs in a single
Submarket, where the restrictions on transmission are lesser, although not negligible, the ANEEL must ascertain the possibility of market power being exerted at peak load times.

Thus, the market share ceiling imposed on the electricity generation, transmission and distribution industries may represent a constraint on system expansion, given the trend towards concentration inherent in capitalist economies. However, the regulatory agency should centre its efforts on minimising the market power of sector firms, especially in the free contract environment (ACL).

4. THE MARKET POWER OF THE HOLDINGS

One important concern arises, however, when one considers the increasing numbers of firms in holdings subordinated to a single controller. In the model for Brazil’s electricity sector, firms were unbundled. However, the law places no restriction in terms of market share on firms structured into holdings. In this regard, the law – i.e. the electricity sector and antitrust regulatory agencies – assume in fact that a holding plays a neutral role. That interpretation is mistaken and if not recognised and corrected can lead to firms of the holding type gaining considerable market power.

There is empirical evidence, although for a relatively short time period, indicates that the trend is for the holdings operating in the four industries to gain in strength, particularly in generation, distribution and trading. This market power stems not just from the holding’s financial capacity, which makes for greater leverage. It also enjoys greater competitive advantage in terms of market knowledge, especially as regards the market in the concession area of the distributor in the group. This fact points to an information asymmetry that, in practice, acts as a barrier to entry by other competitors in the generation and trading industries. The competitive advantage consists in the opportunity to capture the distributor’s customers with the potential to enter the free contract market. Thus the regulatory agency’s role, which ultimately is to eliminate the power that the natural monopoly structure gives the distributor, is surmounted by the bundled operation of the holding. This argument gives grounds for saying that the larger the distributor’s market, and the larger the influence of industrial consumption, the greater will be the potential for it to bring billing gains into the holding by creating barriers to entry. Thus, according to the line of reasoning presented here, there is a strong likelihood of a process of full re-bundling taking place through contracts.

Table 1 shows the firms structured into holdings in Brazil. The firms showed in the table are responsible for, approximately, 75% of generation and 65% of distribution capacities in the Brazilian system. The main tendency is for a generator company to integrate with a trader. Shortly after the rationing period, the PLD was very low. In this sense, the ACL became more attractive for free consumers. So, generators companies created their own traders to attract free consumers to have contracts with one – or more than one – generator of the group.

So, the holdings show their market power in two ways: First, in financial terms they can cross-subsidize controlled firms. Secondly, they have a larger competitive advantage derived from the knowledge of the market, specially their geographical area, which is concession from public authorities. In this case, specially when a distributor company is part of the group, there’s a significant information asymmetry, which, in turn, act as a barrier to entry.
So, our hypothesis is that holdings use their market power to attract free consumers through their distributor company.

### Table 1. Holdings in the Brazilian Electricity Sector

<table>
<thead>
<tr>
<th>Holding</th>
<th>Generation</th>
<th>Transmission</th>
<th>Distribution</th>
<th>Trader</th>
</tr>
</thead>
<tbody>
<tr>
<td>Companhia Brasiliana de Energia</td>
<td>AES Tietê, AES Uruguaiana</td>
<td>Eletropaulo Metropolitana</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEMIG</td>
<td>CEMIG, UTE Barreiro, UTE Ipatinga, Cogeração S.A.</td>
<td>Transleste S.A., Centrooeste Minas, ETEP, ENTE, ERTE, EATE</td>
<td>CEMIG, CEMIG Trading S.A.</td>
<td></td>
</tr>
<tr>
<td>DUKE</td>
<td>Duke Energy Brasil</td>
<td></td>
<td>Duke comercializadora</td>
<td></td>
</tr>
<tr>
<td>ENERGISA</td>
<td>UTE-JF, Zona da Mata Geração</td>
<td>CFLCL, CENF, Energipe, CELB, SAELPA</td>
<td></td>
<td>Cat-Leo</td>
</tr>
<tr>
<td>NEONERGIA</td>
<td>Rio PCH, Termope, afluenae, UHE Baguari, Termoaoçã, Itapebi, Goiás Sul</td>
<td>COELBA, CELPE, COSERN</td>
<td></td>
<td>NC Energia</td>
</tr>
<tr>
<td>COPEL</td>
<td>17 UHE, 1 UTE</td>
<td>Copel Transmissão</td>
<td>Copel Distribuição</td>
<td>Copel comercialização</td>
</tr>
<tr>
<td>REDE</td>
<td>Tangará Energia, Juruena Energia, Rede Lajeado S.A.</td>
<td>CAIUA, CELPA, CEMAT, CELTINS, CFLO, CNEE, EEB, EDE VP</td>
<td></td>
<td>REDECOM</td>
</tr>
<tr>
<td>ENERGIAS DO BRASIL</td>
<td>Energest, EDP Lajeado, Enerpeixe, Enernova</td>
<td>Bandeirante, Escelsa, Enersul</td>
<td></td>
<td>ENERTRADE</td>
</tr>
<tr>
<td>VBC/CPFL Energia SA</td>
<td>CPFL Geração</td>
<td>CPFL Piratinha, RGE</td>
<td></td>
<td>CPFL Brasil Comercialização S.A.</td>
</tr>
<tr>
<td>ELETROBRAS</td>
<td>Furnas, Eletronuclear, Eletrosul, Eletronorte</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Therefore, the regulatory Agency faces a significant challenge in order to minimize the market power of large firms. So, we argument that, in this case, the larger the market and the number of industrial plants in the geographical area, the greater the possibility for the holding company to internalize gains from this strategy.

This process could lead to even greater growth of the short-term market, given the larger number of free consumers. This growth would tend to raise the average rate charged to captive consumers, because the tariffs include certain costs, such as the Energy Development Account (Conta de Desenvolvimento Energético, CDE) and the pro-rata cost of power from Itaipu. If more captive consumers become free, this account will have to be shared among a smaller number of regulated consumers, thus increasing their rates. On the other hand, the groups structured into holdings will come to command greater market power, which will hinder the regulatory agency’s activities in the future.

5. CONCLUSIONS

From the mid-1990s, the electricity sector in various countries underwent substantial modifications designed to yield a more competitive environment. This unprecedented process, for lack of economies of learning, led to errors of design, execution and planning in several countries. Brazil was no exception, as underscored by the supply crisis of 2001.

From that crisis onwards, Brazil went on to encounter a solution with the State playing a significant role, and introduced a regulatory framework for the sector. Even given this sound framework, there are important challenges to be met as regards sector regulation. This paper thus set out to discuss one of the regulatory challenges facing the sector: defending competition.

For competition to be introduced successfully into the sector, unbundling is one essential condition. It can thus be seen that, as in other sectors of the economy, there is a trend towards greater concentration, especially by way of mergers and buyouts.

The paper has shown that, in the electricity sector, however, unlike other sectors, concentration indices are inadequate to specify degree of market power precisely. This makes the regulatory agency’s task even more challenging, as its appraisal of any move towards concentration has to be made ex ante.

Another important point raised in the paper is the role of holdings, which can strategically attract captive consumers through broker firms. This issue becomes even more important given that – because of how tariffs for captive consumers are calculated in Brazil – an increase in the number of free consumers would lead to a rise in rates.

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