The role of a governmental agency in regulating the Brazilian domestic telecommunications market

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1 Introduction

The Brazilian government is implementing a major change in the domestic telecommunications market. Poor service performance in some public telecommunication companies, as well as managerial misbehavior and an inadequate fare structure, drove the government towards privatizing Brazil's public telecommunications system. Macroeconomic problems, like a growing public debt, also played an important role in the decision. Public opinion tends to support this new policy and the debate has been focusing more on its implementation than on the strategy itself, usually seen as being sound. The agenda involves issues like the best model to suit the Brazilian market, what to do with the revenues of the privatization process, and how should the market be regulated.

In privatizing its telecommunications, Brazil follows a trend that advocates that government should leave the delivery of public services to the private sector, which appears to be more efficient in doing business and allocating resources. An important step in this process was the approval of a new telecommunications law in July 1997. One of the major changes introduced by this new law was the creation of a governmental agency to supervise the Brazilian domestic market. This agency, called Agência Nacional de Telecomunicações

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(Anatel), is similar in structure, functionality and scope, to the American agency, the Federal Communications Commission (FCC).

This paper examines the role of the new agency, its instruments and some of the challenges it will face, using examples from the FCC's background as a reference. It is recognized that an independent agency is needed because a monopolistic trend still exists in the telecommunications market, as high initial capital investments are required to enter its most traditional segments, and costs may not change significantly when the number of users or the traffic volume increases. But the agency will have a role also in defining non-market issues, such as universal service targets and the strategies to achieve them, and eventual conflicts between it and the industry may arise regarding these items.

Section 2 briefly examines the telecommunications sector in Brazil. Section 3 discusses the structure of the agency. Section 4 examines the various stakeholders with whom the agency will be involved. Sections 5 through 7 discuss typical problems of telecommunications market regulation, set a theoretical framework to support the analysis of the tools available to the agency, and examine how the agency may address some issues related to the telecommunications market, such as the competition for privileges, the regulation of market-entry rules, control over tariffs, preservation of a competitive market and the definition of social values in telecommunications services. Finally, section 8 presents the conclusions.

2 Brazilian telecommunications sector: its history and recent problems

From the 1880's to 1962, a privately owned service

Brazil has a long history of dealing with communication infrastructure. The first telephone line was installed in the country in 1879. In the following years, many of the largest towns in the country installed a telephone infrastructure, but the number of local lines grew at a slow rate (Mulano, 1997, p. 23). Table 1 illustrates the development of the telephone network from 1907 to 1980.

Until the end of the Old Republic in 1930, the Brazilian government exercised weak control over public service providers. Although a national agency granted concessions for interstate operation, regulation for public services was kept at the municipality and state levels, with decentralized control (Topik, 1989, pp. 91-92). There were no substantial infrastructure investments, as most of the cities were small and the economy had an agrarian base. Most services were provided by foreign companies, although a large number of small local companies were created to install and operate urban plants. In the thirties, the Brazilian network experienced a dramatic rate of growth and, by 1960, there were nearly one thousand different companies operating in Brazil, and more than one million users (Vianna, 1993, p. 41 and IBGE, 1986, p. 430).

The largest company was, at that time, Companhia Telefônica Brasileira (CTB), that operated local telephone services in Rio, Belo Horizonte, São Paulo, and in a few other large cities. It was owned by Canadian investors and held nearly 80% of Brazilian local telephone traffic. Other large cities were also served by foreign companies[1]. Most long-distance and international services were provided by Western Telegraph, Radional and Italcable. Equipment was supplied, in the most part, by Ericsson and by Standard Electric[2]. Regulation was still kept at the state and county levels for local service and at the federal level for long-distance calls (Vianna, 1993, pp. 41-42).

By the end of the fifties, as Brazilian industrial growth lost momentum and economic problems led to a political crisis, investments in telecommunications ended. The average annual growth rate of the number of main lines, historically around 9%, was around 5% during these years. Telecommunications companies were, though, unable to support the growing demands of users, especially for long-distance calls. Frequent gridlocks were caused also by inadequate infrastructure and by conflicting standards and

[1] As an example, the states of Rio Grande do Sul, Paraná, and a few northeastern states were served by CTN, a company owned by International Telegraph and Telephone (ITT), an American company.

[2] All these companies were also owned by foreign capital. Western Electric and Radional were American, Italcable was Italian, Ericsson was Swedish and Standard Electric was an ITT company, therefore American.

technologies. Telecommunications services became chaotic, and a user could wait several minutes for a line signal. For a long-distance call, a waiting time of one full day may be required (Vianna, 1993, p. 43).

The creation of state-owned enterprises

The Brazilian answer to this crisis was to transfer gradually all these services to state-owned companies in order to improve their quality at a fast pace through public investments. In doing so, Brazil was copying a model previously used by European countries and other Latin-American countries. The government intervened first in the long-distance services with the creation of Empresa Brasileira de Telecomunicações (Embratel), in 1962, thanks to a telecommunications law released by the Congress, known as the Brazilian Code of Telecommunications (Brazil, 1962). It was the beginning of a new regulatory regime, with a large state-owned corporation and strong controls over the sector.

To regulate the telecommunications market, an agency was created, Conselho Nacional de Telecomunicações (Contel)[3]. After a few years, during the military government, its regulating powers were transferred to the Ministry of Communications, demonstrating that Brazilian executive branch was not used to independent decisions at the time[4].

During the late sixties and the seventies, this new approach was applied also to local telecommunications. A state-owned holding company was created in 1972, Telecomunicações Brasileiras S.A. (Telebrás), which had 27 regional and local companies providing telecommunications services in all states. The capital ownership of this corporation, albeit in the hands of the federal government in the very first years of Telebrás operation, was gradually transferred to the public and has become very fragmented. The

[3] To be more precise, Contel was actually created by the Decree nº 50.666, of May 30, 1961, but the Code and the subsequent regulation defined its structure and duties (Vianna, 1977, p. 130).

[4] The Executive Law nº 200, of Feb 25, 1967, reduced Contel to an advisory board of the Minister of Communications. A few years later, Contel was abolished.

Brazilian government still retains full control of the company, but owns just 24.83% of the total shares of Telebrás (table 2).

Initial investments allowed for a global improvement in telecommunications services, and the Brazilian plant grew from 2.4 million telephones in 1972 to 5 million in 1978, at a 13% average annual growth rate. The quality of service steadily improved. But in 1973, with the oil crisis, the Brazilian government began to face a fiscal deficit that would became endemic in the following years. Investments in infrastructure services were gradually reduced, and by the beginning of the eighties quality of telecommunications deteriorated in certain regions, like the urban nuclei of Rio de Janeiro and São Paulo. The adoption of digital technologies was delayed (Jornal do Brasil, 1977-2). The companies were unable to expand the system at an adequate rate, thus leading to waiting lists for receiving a telephone and to a black market for second-hand sales of telephone lines. It could take an average of twenty-four months in Rio and São Paulo to have a telephone installed. In other regions, things were less dramatic, but the mean waiting time was still high, around one year.

Tariffs were kept inexpensive for the basic services, thanks to a cross-subsidy policy that allowed Telebrás to balance expensive long-distance calls with subsidized, inexpensive local calls[5]. In this way, it was possible to offer inexpensive services to the users already connected to the service, but initial high leasing costs were a barrier to entering the system, and prevented an expansion of telephone services.

In the eighties, the Federal Government depressed telecommunications tariffs as part of a strategy to fight inflation, and created the Secretaria de Controle das Empresas

[5] Until September 1997 the average basic local fare was around US$ 11.00 and included 90 free pulses. The local tariff was around US$ 0.018 for a three-minute call (above the 90 pulses), one of the cheapest in the world. The tariff for a three-minute long-distance call was, on average, US$ 0.81. This was an expensive fare if costs of interLATA communications in the US are considered, but was similar to the prices practiced in Europe. In spite of the high cost of long-distance communications, the cost of a service basket was one of the most competitive in the world. But the price of local calls was unrealistically low and the price of long-distance services was too high (Telebrás, 1994-1). The resulting tariff system was, thus, strongly unbalanced and required high cross-subsidy transfers to stay in place. In September 1997, the Ministry of Communications changed the fare structure. Today fares reflect the cost composition of the services.

Estatais (SEST), an agency whose main duty was to reduce operational costs and investments of public companies. Telebrás investments were thus severely restricted (Gazeta Mercantil, 1981). As a consequence of this lack of investment, Embratel could no longer offer long-distance services of adequate quality in certain trunk lines, such as the ones that linked Rio, São Paulo, Brasilia and Belo Horizonte, during peak hours. These problems were partially resolved with the launch of Embratel's communication satellites BrasilSat-I and BrasilSat-II in 1985 and 1986, and other additional investments, as table 3 illustrates. On the other hand, the quality of local telecommunications in some areas, such as the Rio de Janeiro and São Paulo metropolitan areas, deteriorated. Users became visibly dissatisfied with telephone services, fuelling a trend towards privatization of the telephone system. Problems with local providers still remain unsolved.

The nineties

During the nineties, two new services became important in the Brazilian telecommunications market: cellular telephones and Internet. When cellular phones were initially offered, they were seen as a niche market. However, as the price of the equipment declined, the public discovered in these small technical wonders a way to avoid the long waiting period for a conventional telephone. Obviously, cellular phones are also practical for people who spend all day out of their homes, a common profile in crowded cities like São Paulo. The growing demand for cellular telephony sparked the same commercial behavior that existed in conventional telephony, with long waiting lists for a telephone in Rio de Janeiro and São Paulo, Telebrás' largest markets. As a consequence, the Brazilian market is still small if compared with other countries (see table 5), in spite of strong demand. It is no surprise that users heavyly criticized the company.

On the other hand, the Brazilian analog cellular system offers services that are unusual in most large countries, such as automatic roaming all over the country and access in many rural areas.

Internet was a challenge of a different nature. Its expansion was supported by CNPq, the Brazilian agency for science and technology. An independent organization, Rede Nacional de Pesquisa (RNP), was created to develop and to expand the Net. Thanks to its strategy, thousands of private service providers and access providers, most of them small firms, operate today in Brazil, and a large number of Brazilians are using the network. It is not an overstatement to say that Internet became a part of their lives. As an example, in 1997, more than 470,000 taxpayers sent its annual income reports to the Secretaria da Receita Federal (SRF), Brazilian tax collection authority, using the Internet[6].

This service brought a new set of problems for Telebrás and for the Ministry of Communications, as regulations that had created separate commercial services for data communication and voice communication were not adequate to all the innovative options that this service offered. Internet made it clear that service integration is a trend. Internet is also a by-pass of long-distance services and its intense use suggested that a change in the structure of tariffs and in cross-subsidy policies was needed. Thanks in part to this service, some telephone companies also improved the speed of local infrastructure, forcing a digitalization of the system.

Brazilian telecommunications still face many problems: users' strong dissatisfaction with services in some regions, low density of main lines per inhabitants and low productivity of the telephone companies are a few among them[7]. The privatization process, if led correctly, could be the first step into a major process of promoting competition in the telecommunications sector.

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[6] According to the Secretaria da Receita Federal, 473,322 taxpayers sent their tax forms through the Internet. This figure represents nearly 5.6% of the total number of taxpayers that submitted their income reports in 1997. As this was the first year that Internet was used by the SRF, and 55% of Brazilian taxpayers are already sending their reports through diskettes, that number is expected to grow significantly in the next few years (Brazil, 1997-3).

[7] Some indicators of the Brazilian telecommunication service industries show the evident gap between Telebrás and other telecommunication companies. Telephone density is still below 10 main lines per 100 inhabitants, far below the levels of developed countries (see table 3), although the difference between Brazil and the developed countries in terms of real GNP is partly determinant of this difference. Productivity of Telebrás in main lines per worker is around 127, far below the industry benchmark of 299 main lines per worker.

The privatization of Telebrás

During former President Collor de Mello's term (1990-1992), a major privatization effort was launched by the government. It was backed up by the need to eliminate major bottlenecks in the Brazilian economy (the so-called "Brazil cost"), by the perspective of earnings that could relieve the public deficit, and by the people's increasing mistrust on public companies, seen as inefficient if compared with privately owned companies. The current President, Fernando Henrique Cardoso, has supported this trend, and major public companies are being sold to private groups. The privatization of Telebrás is planned for 1998, and was made possible by changes in the Constitution and by a new telecommunications law, the General Telecommunications Law.

According to the model suggested by the Ministry of Communications, the system will be divided in three holdings, one for São Paulo, the second one for the southern region, plus Goiás and Mato Grosso, and a third one responsible for the other states. Each of them will be privatized through a public bidding process. The A-band analog cellular services will be separated from the fixed telephone services and nine companies will be created and sold separately. The B-band digital cellular services will be released to compete with the A-band services. The first steps were the auctions for the B-band cellular telephone concessions, that took place in July 1997.

Summary

In summarizing this brief overview, three different regulating regimes can be identified in the telecommunications sector: from the 1870s to 1962, a regime of privately owned providers regulated at a state or municipal level, with no significant technical or economic constraints from the regulatory authority; from 1962 to 1997, the state-owned monopoly of Telebrás; and since 1997, a return to a private system, but with a different regulatory approach, as principles, rules and contracts will be issued by a federal agency.

3 The telecommunications agency: a new model for the Brazilian civil administration

Scope, duties and internal structure of the agency, as defined by the law

The Brazilian agency (Agência Nacional de Telecomunicações, or Anatel) was recently created by the new General Telecommunications Law (Law nº 9.472) that came into effect on July 16, 1997. This law defines the basic structure of the Agency, its scope, and its duties.

The Agency is structured around a five member Board of Directors[8] appointed by the President of the Republic for a five year term[9]. The Senate has to approve the appointees. The members of the Board, or Counselors, will be responsible for the telecommunications policy, whose main objectives will be determined by the President[10]. The Counselors will have independent authority to decide telecommunications policy issues[11]. They will also be responsible for the Agency's internal management[12]. A Board of Advisors ("Conselho Consultivo"), composed by representatives of the government, the telecommunications operators, consumer groups, and other interest groups, will analyze the plans and policies for telecommunications, and eventually recommend changes[13].

The Agency will have operational units, but the law does not detail their structure. The law defines a few ancillary functions, such as an ombudsman ("Ouvidor"), an auditing

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8 Article 20 of Law n° 9.472, of 1997.

9 Article 24 of Law n° 9.472, of 1997.

10 These main points will be part of two plans issued by means of a presidential decree, and will include universal service goals and a concession plan. A presidential decree will define also which services are considered to be part of the public regime (i.e. subject to universal service targets and tariff limitation) and which ones will be private. Participation of Brazilian firms in international consortia also has to be approved by the President (Article 18 of Law n° 9.472, of 1997).

11 The Board of Directors has to recommend on the telecommunications policy; approve any standards and rules related to Anatel; approve any action related to the bidding, approval, renewal or extinction of concessions of telecommunications services when in public regime; and approve general rules for private services and for the administration of the radiofrequency spectrum, the orbital positions, and the telecommunication networks (Article 22, items I to IX, of Law n° 9.472, of 1997).

12 This includes the approval of the purchase of any goods and services (Article 22, items X to XII, of Law n° 9.472, of 1997) and the day-to-day management of the agency (Article 29 of Law n° 9.472, of 1997).

13 Articles 33 to 37 of Law n° 9.472, of 1997.

function (a watchdog or "Corregedor") and a library (sic)[14]. Presidential Decree nº 2.338, of October 7, 1997, defined some other units: there will be five departments ("Superintendências"), for public services, private services, mass media, radiofrequency, and general management[15]. Their duties are not described in the Decree. Illustration 2 shows a tentative description of Anatel's structure. Each Counselor will be responsible for one department[16]. The Board of Directors may create also temporary committees to examine specific issues and recommend possible actions[17].

The law uses some innovative approaches when defining the Agency's duties and instruments. Some of them are not strictly compatible with the Constitution and have no precedent in the Brazilian civil administration. Thus, their validity is being disputed in the courts. Among these innovations, the law will allow the Agency to create its own rules for bidding processes, for hiring specialists, and for the purchase of goods and services[18].

Anatel will have also its own budget, thanks to a fund (FISTEL) that will receive contributions from the Treasury, as well as revenues from the issuance of concessions and permits, fees, and donations[19].

Similarities between the Brazilian agency and the FCC

At a first glance, many similarities between the Agência Nacional de Telecomunicações and the FCC can be pointed out. Both have a collegiate organization, with a five commissioner board. In both cases, each commissioner will be responsible for one department of the agency. The responsibilities of the agencies' chairmen are similar. Both have also a similar degree of independence from the Executive branch. The duties are even described in a similar manner, although the American law has more details about the

14 Article 8 of Law n° 9.472, of 1997.
15 Article 61 of Decree n° 2.338, of 1997.
16 Article 62 of Decree n° 2.338, of 1997.
17 Article 60 of Decree n° 2.338, of 1997.
18 Articles 54 to 59 of Law n° 9.472, of 1997.
19 Articles 47 to 53 of Law n° 9.472, of 1997.

Commission structure, organization and *modus operandi.* The Brazilian law, on the contrary, left these specifics to be detailed by a Presidential decree and by the agency itself.

The Brazilian government is applying similar models to other agencies (e.g. the agencies for energy and for the oil industry) in a clear effort to reproduce a public administration success story .

On the other hand, the FCC has more obligations to the Congress than does Anatel. This is a result of the strong emphasis put by Americans on the need for a system of "checks and balances", by which every branch can verify and outweigh any action of another branch of the government. Brazilian civil administration procedures do not put such emphasis on this system, although it exists. Instead, they ensure more flexibility and power to the Executive branch. One consequence of this different approach is that the Executive can slightly limit the expenditures of the government, and spend less than what is foreseen in the budget. This is the reason for an independent budget for the Anatel, ensured by Law nº 9.472. In the United States, control over the budget is a form of "check and balance" of the Legislative power over the FCC. In Brazil, this control would be shared by the President and, therefore, is undesirable. But, even in this case, although the Brazilian Executive cannot transfer to it less money than established by the federal budget, it can limit its access to additional resources.

Agency vs. direct government regulation: two different approaches

The reasons for the success of the American model are easy to understand: independent agencies can concentrate on the "best practice" for supervising the activities within their scope. They are specialized organizations, able to develop technical knowledge and skills, thus establishing a professional relationship with the controlled sector. Because they are independent, the Executive branch will have limits on its power over the market (e.g. it may not impose tariff changes for the purpose of limiting inflationary pressures, a common practice in Brazil) and will have to look at the fundamentals when defining the

overall economic policy. This will keep the market protected from arbitrary changes. And the Legislative branch has power to take a look at the agency's activities and correct any diversion in a very effective way, i.e., through budget constraints.

This model is new for the Brazilian civil administration, because Brazilian agencies never have had such a degree of independence. On the contrary, the tradition of Brazilian public policy shows that troubles may appear when an agency achieves a certain degree of autonomy. Ministries that work with strong agencies, such as the Ministry of Science and Technology with CNPq, or the Ministry of the Agrarian Reform with INCRA, find it difficult to establish their role in the political spectrum of the Executive branch, because they do not have the instruments needed to exercise power. In a sense, they are in the hands of the agencies. A permanent conflict, sometimes subtle, sometimes open, may then arise between the ministry and its related agency.

Regulation through agencies or direct regulation are different approaches, but the success stories of the American administration seem to point to a consistent advantage in using independent agencies. Direct regulation is a simple and straightforward way of doing the job, but the civil administration tends to focus on the general management problems and to be less skilled. It is therefore subject to inadequate decision making, to political pressure, and to collusion with the actors of the supervised market. Supervision through agencies implies more conflicts. Indeed, the American experience shows that in fact it is very complex, but it allows for more effective control, and probably leads to more adequate results.

4 Public policy and stakeholders of the Brazilian agency

To outline the nature of the conflicts that Anatel will face, its stakeholders have to be described. Stakeholders of Anatel are shown in illustration 3. A brief analysis of each one will highlight their situation relative to the Agency.

Consumers -- they are very distributed in geographic terms. A simple,

straightforward segmentation of this group of stakeholders into small and large consumers shows also that their spectrum of interests may be quite broad. Individual consumers and small firms are usually represented through the Procon, a civil agency oriented to consumer protection. Their main concerns are the availability of basic services, pricing, and billing practices. The service contract between them and the operator has its limits clearly set by the Brazilian Consumer Defense Code. The Agency will need to address their expectations with urgency, but on the other hand their power is limited and they are not a threat to the Agency's survival. Large users, such as commercial banks and the automotive industry, have different concerns as they want specific services, specific contracts, and bulk rates, whenever possible. They are individually powerful and may form user groups to negotiate their issues. Some of their needs will have to be considered when creating the new regulation for telecommunication services. However, it seems clear that the General Telecommunications Law did not foresee their specific interests[20], but mainly addressed the needs of the individual user.

Taxpayers -- In Brazil, taxpayers are a very distributed group, and they are not well organized. At times, they massively reacted to certain taxes by suing the government for undue taxation, but they are not a critical stakeholder. Taxpayers may oppose to additional taxes included in the services, or to the allocation of public budget to implement social targets in telecommunications, such as universal service targets.

Unions and workers -- currently, workers are concentrated in the Telebrás system, and they are represented by the Sinttel. This union has no professional category denomination (such as a union of engineers, or journalists), but it represents all the workers

[20] Article 3 of Law n° 9.472, of 1997, defines the user rights: access, free choice of provider, non-discriminatory commercial conditions, access to information about service tariffs, prices and conditions, privacy of the communication, non-disclosure of access codes, continued services (unless in the case of debt), and privacy of personal information available to the service provider. He/she also has the right to submit a petition to the Agency and to consumer protection agencies, and to a compensation in case of damages. Article 4 defines obligations, such as to adequately use services, equipment and networks, to respect any public installation, and to communicate any illegal act against the service providers that may come to his/her knowledge. These generic rights and duties fit the individual users, but in some cases may limit the flexibility for contracting specific services with corporate users.

of telecommunications companies, regardless of the nature of their jobs. It is already a powerful stakeholder. It fought the privatization process because of ideological reasons, as well as because of concerns about the reduction in the number of job positions and about the possibility of technological dependence on foreign firms.

The international community -- it includes international agencies, financial institutions, foreign governments, and Mercosur. Some of them are focused on telecommunications, such as the ITU, or are involved with negotiations regarding this market, as the WTO, for example. These are critical stakeholders in terms of urgency, and Anatel should keep track of their agenda. In fact, they are important arenas for multilateral negotiations, the results of which may bind or limit the flexibility of the Agency, or may force significant changes in its policies.

Investors -- they are powerful, extremely important stakeholders, who require clear and fixed rules, but they may involve themselves in competition with each other for privileges. The Agency may be subjected to pressures from other stakeholders responding to the influence of investors.

Telecommunications operators -- service providers are also strong stakeholders, and their interests may differ from those of the investors. Operators are in the market, and new investors are trying to enter the market. In this case, operators may press for barriers to entry and restrictions on competition, in order to preserve their assets, and newcomers will press for free entry and less restrictions, in order to break into the market.

The Congress -- it is critical for the survival of the Agency as an institution, but has some practical limits imposed on its power by some specific provisions of the Brazilian Constitution. The Congress, for example, can require a minister to attend a hearing, but it cannot demand this from any other civil servant, including the counselors of Anatel. But, as was previously pointed out, the Congress can limit the access of Anatel to additional budget resources, and can substantially change its structure and scope, or even extinguish it, through a law.

The Executive branch -- the Telecommunications Law was designed to ensure independence to the Agency directors from the Executive branch. But this innovation may prove to be inefficient, and the Agency may be submitted to strong control by the Ministry of Communications and by the President. The President has, in fact, two powerful instruments to control an agency: he has the provisional measure procedure ("medida provisória"), that has the power of a law and comes into force immediately, and he can limit the execution of the budget. In other words, he has more control than the Congress over the Agency, and independence in this case is more nominal than real. As there is a permanent risk of collusion between government officials and other stakeholders, and therefore, of conflicts of interests between the agency directors and policymakers, the Executive branch is a critical stakeholder.

Illustration 4 summarizes the criticality of these stakeholders in terms of power to influence Anatel's framework, of the urgency of their interests, and of the possibility of threatening the survival of the agency.

5 The agency as an enforcing authority and its influence on market expectations, on technological development, and on social value of telecommunications services

Regulation and market issues: telecommunications as a natural monopoly

The agency is an enforcing authority. It will regulate telecommunications services, audit the results of service providers, and enforce changes in the market whenever needed. In telecommunications, regulation is usually intended as a way of pushing the market towards its possible best situation (that is, a second best of Pareto), because a *de facto* monopoly has to be admitted, as a consequence of the nature of the industry. When fixed telephony is the chosen technology, telecommunications infrastructure has, in fact, a high fixed cost. The size of the urban infrastructure is huge, and the cost to build it and to

manage it does not vary significantly with the number of users. Initial costs are, therefore, the most significant barrier to entry into this market (Illustration 1). The mere existence of more than one service provider could drain the profits of the service and overturn it. Having more than one provider would also create problems for urban administrations, as telephone infrastructure requires the installation of ducts, conduits and cables to connect every point-of-service.

Government regulates the market to ensure that, given the existence of a single service provider, users would pay a fair price, that is, a price similar to the one they would pay if a competitive market existed. Government will ensure also a protection for the service provider by granting it a monopoly, in order to avoid pressures for the entrance of new players, to secure an adequate return on the investment, and to keep the service improving and expanding.

A few models are available to calculate fair prices for the services. In the case of fixed telephony, they cannot be based on marginal costs, because these costs are excessively low, due to the high relative fixed cost of the services. Then, the average cost of the services can be used as a reference, but the Agency, in order to establish this cost, will need to have access to the companies' accounts and to statistics on the use of the services. An alternative method can be a comparative analysis of the cost elements of various telephone providers in order to determine the influence of the technology of choice and of the plant size on the overall costs, and avoid giving a premium for inefficiency. The agency, in this case, will be looking at the sector as a whole to determine the tariff. A third approach is to keep the tariffs at a competitive level, compared to other countries.

Is natural monopoly "natural"?

This picture is changing, thanks to the spread of cellular telephony. This technology provides urban mobile phones at a price that is increasingly competitive. It also has the advantages of using a more flexible and less expensive infrastructure, compared with fixed

telephony. Although mobile telecommunications are still considered a niche market, many expect that they will outperform fixed telephony and become the preferred communication option for voice telephone users.

One of the main limitations that cellular telephones must overcome, relative to the fixed service, is its limitation as a means of data communications. Although recent developments in the quality of transmission may provide higher speed and reliability to the mobile infrastructure, the technology of mobile computer networks is still bound to short term market needs, and R&D is focused on incremental development. The available technology suggests that in the near future it will be possible to rely on this service for intensive data processing, as well as voice communications, but this segment is growing slowly. Thus, real competition between mobile and fixed telephony is still far from possible (Hultén et al., 1995, p. 54-55).

Cellular telecommunications will allow for a limited level of competition, i.e., for voice communication purposes, because a number of companies, at least two or three, can compete in the same area and still offer an adequate service. Moreover, competition between services (for example, competition between fixed telephony, cellular, and cable TV providers) may arise. In this case, any strict barrier to entry would result in an "unnatural" monopoly. The adequate role of a regulatory agency would be different, as market competition would determine, at least in part, the price of the service. The concerns, in this case, are related to the possibility of inadequate use of a limited resource (the electromagnetic spectrum of radiofrequencies), of a collusion among competitors, that would drive the prices up, or of a price war, that could end up with the bankruptcy of one or more operators, leaving the public without service. A "regulated competition" may be a possible policy for this market, as regulatory barriers would allow for a limited number of firms, in order to maintain control of the use of a limited resource, in this case the spectrum of radiofrequencies.

It turns out that natural monopoly is a concept that does not fit the cellular phone

market and that, as this market becomes more relevant, the model will prove to be arbitrary. The main barrier to entry is not the initial costs anymore, but only the regulation. As more actors become interested in entering the market and regulation is the relevant barrier, a competition for privileges may arise. This specific concept will be further developed in section 6.

Flexibility of the regulatory framework and market expectations

In any case, the role of the agency puts it in the very center of a complex contract negotiation, in which prices and conditions are to be set for the services. The way this negotiation is performed will affect the overall performance of the operators and the price and quality of the services provided to the final users. Regulation will be bound to the chosen economic model and to the various externalities that the Agency will have to establish. The flexibility of Anatel will be limited also by legal restrictions, although the General Telecommunications Law has significantly expanded its autonomy, as compared to the current legislation for the public sector. And another limit may arise from the initial market conditions of the telecommunications sector.

Let us suppose, as an example, that an operator pays US$ 300 million for a ten year concession, and that he will have to give back the infrastructure to the State after the concession period. The tariff, in this case, would have to allow the initial investment to be recovered with, at least, the normal expected profit margin. In fact, the tariff will have to cover all initial costs, plus all operational costs, plus all costs related to universality targets, plus all investments, plus profits. After the definition of the initial value of the tariff, any change should be negotiated on the basis of changes in these cost elements.

But the service will have a certain elasticity of demand and excedingly high tariffs may result in low demand, and the concession would be a bad deal. So, the government may have to get rid of some cost elements, such as universal service targets, to keep tariffs at acceptable levels. In other words, there may be a tradeoff between the government's

revenues in the short run and the desired results in the long run. If the government wants to maximize the bidding price of existing companies, it may impose a burden on investors that will result in higher tariffs, in slower growth of the plant, in sacrificing social targets, or in excessive protection privileges, such as monopoly grants, limits to market access, or artificial business segmentation.

For the government, the price to be paid in the long run might be a loss of flexibility when negotiating with operators. Generally speaking, the market will always seek rigid regulatory rules, because adjustments imply added risk for the business. If profit margins are already tight because of initial costs, the market will overreact to any minor change in the rules of the game.

American experience suggests that, once regulation is up and running, it may be difficult to implement significant changes. In part, the issue arises from the inherent inefficiency of the Agency in dealing with new situations that demand new approaches and that require a new working doctrine. On the other hand, operators may deal with new market rules in trying to preserve their established market positions while trying to entry new markets. This may lead to a tricky situation.

One example comes from the implementation of the Telecommunications Act of 1996 in the United States. The law was expected to induce local Bell companies to offer long-distance services and to grant access to local services to the large long-distance carriers like AT&T and MCI, thus throwing down the costs of local telephone services. It simply did not happen. The FCC, in interpreting the Act, created strict rules for local Bell companies[21]. To be free to operate an interLATA connection, they have to apply to the

[21] The FCC has to consider the antitrust decision of the AT&T Consent Decree of 1982 when examining competitiveness issues, although it is not up to the FCC to decide on antitrust. In particular, the district judge examined the activities of the BOCs and, after a careful scrutiny, he considered that regional monopolies were far more manageable to the FCC than the previous AT&T national monopoly. So, he ruled that baby-Bells should be prohibited from entering a market only when "public interest", as defined by the Tunney Act, was an issue, i.e, when a baby-Bell could use monopoly power to impede competition in that market (Harrison et al., 1997, p. 147-152). This "public interest" analysis is translated as two main tests: (a) it should be examined if the baby-Bell would have the incentive and the opportunity to act anticompetitively and (b) it should be examined whether the participation of the baby-Bell in that market would enhance its

Commission and prove that they have effectively opened their local networks to competition. As no other carrier would replicate a billion dollar local network, it means that the baby-Bells would have to offer right-of-way access to competitors, at special bulk rates. None of them has, up to now, opened its markets. On the contrary, they try to blunt competitors advances with such tactics as delaying the installation of telephones at competitors' clients, or challenging the terms of mutual agreements (TIME, 1997-1), or denying their telephone number to information desks (TIME, 1997-2). FCC rules, in the end, are preserving existing market segmentation and ensuring that no market will be assaulted by hungry competitors with privileged positions, so to speak. As a consequence, long-distance tariffs are being pushed down by competition between large operators like AT&T, MCI, GTE and Sprint, while local and cellular telephone tariffs are kept high by local monopolies.

Some conclusions

One conclusion is that Anatel should approach market segmentation with a true concern about the effects that new technology may have on market segmentation, and should preserve a certain degree of flexibility in order to allow for some competition. As new uses of telecommunications are made possible by new technology, predefined segments may become artificial barriers to competition among services. A practical rule for preserving regulatory flexibility in this environment is not to rule what each agent can do, but what it cannot do. But the initial bidding process may turn it impossible to regulate in such a way, if maximum revenue is the main target and the government "pushes too much" in this direction.

Another remarkable concern for Anatel derives from the need to access internal information of service providers, in order to exercise its regulatory authority in setting

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competitiveness. The FCC also has to impose a "competitive checklist" on the local operator that applies to offer interLATA services. The checklist is described in section 271 of the Communications Act, as modified by the 1996 Telecommunications Act (47 USC 271).

tariffs. Such a need will expose the agency's officials to permanent conflict with the operators, as they will require classified business information to be disclosed and they will audit the correctness of such data. Concerns about the fairness and the reliability of Anatel may arise, as a result. This problem will be examined in the next section.

6 The agency as an arena for competition between telecommunications firms and the other stakeholders

The "arena" concept

The arena is the space where an issue is put into discussion. This concept is comparable to the economic concept of a market. "Just as a product is up for sale in a given market (theater of transaction) so too is a position on an issue put up for discussion (and purchased by the various stakeholders in the form of active support) in a given forum." (Mahon & McGowan, 1996, p. 221). The concept can be applied at two different levels to Anatel: the Agency has its stakeholders and will compete with them on various issues, and the arenas of these discussions will be the Congress, the Executive branch and the media. Discussions related to the fundamentals of regulation, for instance, will arise from time to time, and will involve Anatel as an interested party. But once the rules are set, Anatel becomes the formal arena for conflict resolution in the telecommunications industry, and will observe the competing arguments in deciding the solution of each contention, through mediation, arbitration or regulatory action.

The arena, as an organization, has to satisfy some basic properties: it needs public recognition as being the authority to decide or solve the conflict, it has to be transparent to the public, it has to ensure equal treatment to all contenders, and its rules have to be stated *a priori*.

Recognizing Anatel as an independent arena

Recognition, in the case of Anatel, is established in the Telecommunications Law,

but this is just the first step. To establish itself as the formal arena for the resolution of conflicts in telecommunications, the Agency will have to evolve from the legal to the legitimate. In other words, the other agents will have to recognize its authority at the levels of technical proficiency, of moral fairness, and of capacity to enforce its decisions. Legitimacy will be built over time, and it will require action in order to build a team of skilled officials, to create and apply a code of ethics, and to practice the decision process. The sense of technical excellence and of moral fairness will be perceived by the market as the various stakeholders test Anatel through practice.

Power to enforce its decisions, however, will be a specific challenge for Anatel. It is expected that the agency will be able to build a regulatory relationship with the industry in the form:

Anatel ===> Industry

A generalization of this scheme in hierarchical terms, suggested by Caillaud (Vickers & Yarrow, 1997, pp. 107-110), may be:

Government ===> Anatel ===> Industry

And, supposing that the general public might get involved with the results of the privatization process and of the regulatory action that will follow, a further generalization would be[22]:

Voters ===> Government ===> Anatel ===> Industry

[22] Vickers and Yarrow applied this scheme to the analysis of the introduction of certain pricing schemes in Britain. In the Brazilian case, however, it may be applied to a more generic scenario, because the privatization process will be held in 1998, a national election year.

The analysis of this scheme can be done at two different levels. If the agency is able to preserve its independence and power, the critical link will be Anatel ===> Industry. The analysis of this relation is presented in the next subsection. But if Anatel proves to be unable to establish itself as the only regulator, government might wish to limit its discretionary power and to negotiate directly with the industry stakeholders. In this case, evidence may arise that a new relationship is built:

Industry ===> Government ===> Anatel

In this case, the industry would be able to "capture" the government and to create collusion patterns with it, in order to by-pass Anatel or to influence its ability to establish controls and tariffs. Moreover, this situation may lead to a permanent inability of Anatel to decide the most critical issues of the regulatory action. Although public opinion may reduce this kind of influence and become a balance to this process, the agency's independence would be in jeopardy.

Unfortunately, Anatel does not have the instruments to avoid this kind of situation. Political negotiation and public exposure seem to be the only available options to deal with this kind of conflict.

Transparency, impartiality and rent-seeking

Transparency and impartiality are mainly a question of attitude. Anatel counselors and officials have to be aware of their public role and of the need for transparency and equilibrium in all their actions. It does not mean, for example, that no classified information could exist in the Agency, but rather that any classification has to obey clear and predefined rules, known and accepted by the participants as adequate and legitimate. It implies also that officials will be trained and advised to follow the rules, and that specific auditing functions have to exist, in order to examine if rules are followed correctly.

An interesting view of the consequences of a lack of transparency for the interaction between government and industry is offered by the rent-seeking theory, that addresses the problems of lobbying and privilege appropriation. This approach does not focus on the reasons for government regulation of a sector, in this case the telecommunications sector, but rather on some of its possible consequences.

Authors that advocate rent-seeking theory pose that whenever a market access control or a monopoly privilege are granted to a certain agent, there will be a source of added revenues for that agent. These additional revenues could not be obtained if the privilege did not exist, as in a free market, for example. The difference between the larger revenue obtained with a privilege and the smaller revenue that a free market would permit is called a rent. In the words of Ashoff, rent is “that part of a resource owner’s return which is in excess of that which could be achieved by a second-best use, or under competitive conditions” (Ashoff, 1989, p. 9).

Agents will try, thus, to obtain privileges, i.e., rents, when a regulation is issued by the government. State intervention will be exposed to lobbying, corruption and other forms of influence, because the agents will invest money in defending their particular standpoints, and maybe will hire lobbyists, offer personal advantages to public officials, or use media coverage and publicity, in order to obtain the privilege.

In this framework, rent-seeking activities are the set of actions performed by agents to obtain a rent, in a non-competitive environment. As market competition is impossible, a non-market competition is established. The target of the competitors is exclusive market access. The prize is the rent.

As Ashoff asserts, rent-seeking is possible under two conditions: “there must be artificial restrictions on market access”, or “there must be the possibility of obtaining a government-fixed monopoly right” (Ashoff, 1989, p. 10). Both conditions are satisfied in the case of the Brazilian telecommunications regulation.

The disadvantages of such a situation are quite clear on the government side, as

rent-seeking activities tend to undermine the ethical and professional conduct of officials[23], and a complex control mechanism will be required to minimize the possibility of corruption, information disclosure or other illegal or unethical behavior. In other words, the government will not only allocate people to manage the privilege, but will also need to look after them. In the case of telecommunications, the Agência Nacional de Telecomunicações will be the privilege manager and an external auditing activity will be performed by the Legislative branch of the government, through the Tribunal de Contas da União. But the public will require Anatel to provide an internal audit function, as well as transparent and public action, in order to accept and support its regulatory action. The General Telecommunications Law tries to address this problem through the creation of the "Ouvidoria", an ombudsman function, and the "Corregedoria", a watchdog function.

In fact, rent-seeking can be even more damaging to the consumers than to the government, as they will almost certainly pay a higher price for the telecommunications services, and the overprice will cover not only the rent, but also the costs of the rent-seeking process. They will pay also for the added size of the public sector in the form of higher taxes.

The vision of the rent-seeking theory is logically and economically sound, but does not properly reflect real facts and figures. Although it is difficult to assess the real amount of rents that result from a privilege, as most of the overprice is frequently used by the favored firm to cover the costs of inefficient resource allocation, it is quite evident that the costs of rent-seeking are very modest, when compared with the huge privileges the agents can obtain (Beck & Connoly, 1996, p. 30; Tullock, 1989, pp. 4-7), meaning that government officials are unable or unwilling to secure a significant part of the rent[24]. But

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[23] According to the economic theory of regulation, a government official or agent will always try to maximize his/her personal or political wealth, or the wealth of his/her party, if no control mechanisms are in place (Paul & Shöening, 1991, pp. 186-187).

[24] Possible explanations for these results are the public support to rent appropriation, the social control over unethical behavior and the role played by doctrine. Public support for rent appropriation may seem weird, but the fact is that rent is usually granted whenever the society understands it is in some way important. Privileges must have a politically acceptable justification, such as job protection or long-term investment. It

the fact that rent-seeking relative costs are low does not mean that rent-seeking practices do not exist. On the contrary, they are intense in almost every country, and they will exist in the case of the Brazilian telecommunications reform.

In fact, although the existence of regulation is not inherently positive or negative in itself, it will certainly influence the various agents' behavior, and a competitive rent-seeking game may develop between the various stakeholders. Lobbying activities are done also on a long term basis, in order to shape the administration doctrine of telecommunication regulation, of market structure and of public non-market values. They will surely exist after the rules are issued because of the ever existing imperfections of the law and the flexibility of the agency. But one may expect their overall costs to be low if compared with the total amount of rents that the industry will expect to appropriate, because the government is already willing to sell its telecommunication carriers and to promote privatization, and public opinion supports the whole process, thus reducing the cost of rent-seeking efforts.

All these *consideranda* do not imply that Anatel officials have all the homework done and can relax. The General Telecommunications Law suggests a structure that might address the watchdog and audit requirements to keep illegal or inadeaquate behavior under control, but a lot is to be done. Strict rules of conduct and a well defined code of ethics are

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means, in other words, that agents that will receive the rent are pre-qualified. Rent-seeking will just mean a "push" in the process. Social control can also be acquainted for limited costs of rent-seeking. Although unethical or inadequate behavior clearly exists in most civil administration structures, it is not socially accepted. Society tends to build a set of basic rules of conduct, and to repress diversion from it. The third possible limit to rent-seeking is doctrine, be it based on economic theory or on ideology. Government officials tend to create doctrines and to apply them quite rigidly in order to assure a framework for public discussion of government action. This means that the rent appropriation is not just a result of continuous pressures or negotiations between agents and government, although they exist, but it is also built into the doctrines and values of the civil administration.

In other words, rent-seeking is successful when society is willing to concede rents, be it the case of small farmers, universities or the telecommunications industry. The government will institute the privilege upon its public acceptance or upon political and technical evidence that supports it. The idea of a rent-seeking society, in which rent-seeking activities would outgrow productive activities and become a burden to development (Krueger, 1974), is appealing, but the failure of most studies to measure significant rent-seeking costs seems to indicate that all modern societies have a certain degree of rent-seeking as an inherent cost of democracy, and that this cost is kept under very reasonable levels in most countries, as legal and ethical limits are set for lobbying and other similar procedures.

also needed, to preserve fair practices and the good image of the agency. Auditing, both internal and external, both corrective and preventive, will have to be combined with training, education and analysis of relevant cases to build a consistent doctrine and ensure transparency and impartiality.

Clear rules

Predefined rules are also an essential attribute of an arena. They come from the legal framework, from the code of ethics, and also from a formal or informal set of principles and beliefs that all officials share, or at least admit. This set of principles can be seen as a doctrine that the agency will follow, and will be built by formal statements as well as internal procedures, team or peer-to-peer discussion, day-by-day behavior and personal attitude of the commissioners and officials. They are essential to the reliability of the agency as an arena and they have implications for the acceptance of the agency as a referee. Good managerial practice suggests that an effort has to be made to formalize the doctrine and to make it available to the public in the form of mission statements, rules, process descriptions, or case studies.

7 The agency as a champion of the social role of the telecommunications business

Regulation and non-market issues

The agenda of Anatel includes a number of non-market issues, as shown in illustration 5. Most of them will imply increased operating costs for the service providers, but the legitimacy of the agency will be strongly influenced by its success in championing some of them. Especially important among them are:

Provision of universal services -- this issue was explicitly included in Law nº 9.472, and was intensely discussed in the Congress. The law does not make clear what meaning and what limits will exist for the universal service concept. This is a convenient flexibility,

as universal service is a moving target and will evolve, in a few years, from a very basic understanding of providing social telephones to all communities to a more sophisticated concept of provision of special and advanced services to community organizations, such as schools, health care units or NGOs.

Obscenity, harassment and wrongful use of telecommunication services -- this is a difficult issue, involving the principle of freedom of speech, that is absolute in Brazil. But the Brazilian society is increasingly concerned with the use of telecommunication services for obscenity (such as erotic 900 services) and for lottery games, among others. Anatel should be aware of this trend, as it might demand responsibility of local operators in limiting access to these services. Wrongful use of the telephone might also include violation of privacy issues.

Commercial practices -- this issue is strongly bound to the Consumer Protection Code. Many limits are imposed for customer information disclosure, non-discrimination, and billing practices.

Telecommunications integration -- technical issues such as equal access to infrastructure, equipment standardization and testing, approval and arbitration of contracts, and supervision of numbering practices will be demanded, especially when newcomers will be entering the market.

Technological advancement -- it is another critical issue for some sectors of the civil society. In the past years, the research center of Telebrás, CPqD, succeeded in developing optical fiber technology, switching equipment, capacitive card technology and ISDN terminals. Brazilian universities developed also a certain number of successful projects. There is a general notion that Brazilian engineering has the potential to develop commercial solutions, at least in some niche applications, and Anatel will be required to support projects and to stimulate local research, development, manufacturing and use of hardware and software.

Non-market issues as externalities

Most of these non-market issues are externalities that will ultimately increase the costs of the services. Users who are already in the system consider some of them to be public goods (e.g., rules for preventing privacy violations) and other ones to be bads (e.g., universal services targets). But people outside the system will see all of them as goods. Thus, the role of the agency as a public institution is to ensure that social values of the market and of the service will be attained, that is, to internalize these externalities and turn them into unavoidable components of the telecommunications operation. As inadequate as it may sound, this is a relevant role of the agency, as it will add value to the services in the form of social legitimacy. And, as illustration 1 underlines, these non-market issues constitute substitute issues in the discussion of the regulation's objectives. This framework is supported by the evidence that the General Telecommunications Law defines the need of a social perspective in telecommunications services[25].

But, in some cases, the support for these non-market issues may stimulate market growth. An interesting situation may arise, for example, when the public good configures a barrier to entry to a certain market. Let us suppose, as an example, that a rural community of a thousand homes is located a hundred miles from other urban centers and that, for the telephone company, it is not worth providing a connection to this small town, because the cost of the installation of a long-distance line would not be covered by billing the local users in the town. But, as a universal service obligation, a trunk line and a public telephone are installed, and its cost will be paid by taxes, direct subsidy, or cross-subsidy. Now, it

[25] In Article 2 of Law n° 9.472, of 1997, it is stated that the government, among other obligations, has to ensure that all the people will have access to telecommunications, with adequate tariffs, prices and conditions. It will also have to boost the expansion of public services to all networks and services, to promote competition and diversity of services, and to create conditions for investment and for technological and industrial development. Article 6 states that the government will correct the affects of imperfect competition and enforce the economic order. Article 7 determines that the general rules of the economic order (e.g. free market, private property and social value of property) will be applicable, and that any action of service providers to establish economic concentration, such as fusion, incorporation or merger of firms, are subject to controls and conditions (§ 1), and that it is a felony to act in any way, through contracting or purchansing of goods and services, to limit or to overturn free competition (§ 3).

may be attractive for the company to provide local telephones to everyone, because the barrier to entry has been eliminated.

Similar examples may occur when the use of new technology is at risk. The stimulus of an initial implementation would make it possible to drive its adoption.

The affect of non-market issues on measuring the efficiency of the agency's decisions

An important implication, if one accepts the legitimacy of the process of internalization of these non-market targets, is that the plain and simple increase in the productivity of the telecommunications firms will not be the only relevant measure of Anatel's efficiency. To have a complete picture, this kind of metric will have to be adjusted by the amount of social value that the service achieves. And a new problem arises as it is not enough to estimate if the social targets have been achieved. It is also important to estimate if the social targets are valid and adequate.

8 Conclusions and remarks

How much regulation is needed for the Brazilian telecommunications market? What kind of regulation will be produced? There are no answers to these questions. The regulatory framework will result from the clash of different perspectives, depending on the interests of the various stakeholders.

From the government standpoint, regulation is a way to improve service efficiency, and to address issues like public expectations, universal service, and availability of high technology, in order to drive economic development. It could be also an instrument to maximize political wealth (and, for the market, this is the darkest side of regulation).

But the incumbent carriers will also want regulation to protect their investments, and give them access to privileges. Investors will demand regulation for similar reasons, but new entrants will press for flexible rules for market entry. The situation of consumers will be determined by such issues as pricing and availability of services.

The agency is needed because the monopoly is still a fact in the telecommunications market. But this configuration might change in a few years as personal communication becomes the major choice of users. However, some limits to this kind of competition among services have to be set. Although recent developments in mobile computer networks suggest that in the long run it will be possible to rely on this service for intensive data processing, there is a long way to go. Real competition between mobile and fixed telephony in data communications is still far from possible.

The role of the agency, then, might gradually shift from regulation through pricing to regulation through service conditions as non-market issues become increasingly relevant. As competition becomes significant, the main goal of the regulation would shift, in the long run, from ensuring fair price to ensuring a strategy to achieve universal services, to stimulate the use of new technological breakthroughs, and to protect the market from monopoly power.

New technologies and applications that were seen as niche markets are becoming mainstream businesses, and will transform the telecommunications services. In this environment, regulation should be flexible enough to accomodate new services and a new market segmentation. An approach of stating the “don’ts” instead of the “dos” may be an answer. The agency has to go beyond the law and the current technological state-of-the-art and build a long term vision. It should adapt the initial decisions, such as the bidding process of Telebrás, to this vision, because they are critical for market performance and efficiency in the long run.

In the short run, however, Anatel has to gain legitimacy as the arena for the telecommunications industry. And the main threat seems to be the risk of collusion between the agency and its stakeholders, or collusion between them and the Executive branch in order to override the agency. In the first case, a combination of strict rules of conduct, a consistent auditing function, and a few success stories might be enough to set a standard of adequate regulatory relations. In the second case, political action is needed because the

government has strong instruments to limit the agency's independence.

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Tables and illustrations

Year	Main Lines	Main lines per 100 inhabitants	% of lines in SP, RJ and RS
1907	15208	0.072	76.1
1938	187225	0.482	84.5
1944	373499	0.826	83.5
1950	521222	1.003	83
1961	1108149	1.54	78.5
1964	1282942	1.63	77.4
1968	1667225	1.89	73.5
1972	2379077	2.43	71.9
1976	3995239	3.7	68.1
1980	7417527	6.23	62.7

Table 1 -- Evolution of main lines and telephone density in Brazil 1907-1980 (Source: IBGE, 1986)

Shareholder	Voting shares	Total shares
Bank of New York	0	24.83
Federal Government	50.04	21.45
PREVI		2.72
Fundo Mut. Inv.		2.38
FUNCEF		1.28
PETROS		0.83
CENTRUS		0.68
State Street	0.44	0.64
Templeton Dev.	0.59	
OTHERS	48.93	45.19

Table 2 -- Stock and control shares of Telebrás (Source: Ministry of Communications)

Year	Annual investments (US$ millions)	Annual difference
1986	1245	-
1987	1448	16.31 %
1988	1977	36.53 %
1989	2559	29.44 %
1990	2121	- 17.12 %
1991	2311	8.96 %
1992	3106	34.40 %
1993	2900	- 6.63 %
1994	2950	2%

Table 3 -- Telebrás investments in 1986-1994 (Source: Maculan & Legey, 1996)

Rank	Economy	Main lines per 100 inhabitants	Note
1	Sweden	68.11	
2	US	62.71	
3	Switzerland	61.34	
4	Denmark	61.29	
5	Canada	59.24	1994
6	Norway	55.85	
7	France	55.8	
8	Finland	54.93	
9	Hongkong	52.79	
10	The Netherlands	52.52	
11	Australia	50.88	
12	Germany	49.35	
13	Greece	49.32	
14	UK	48.81	1994
15	New Zealand	48.68	
16	Japan	48.02	
17	Singapore	46.86	
18	Austria	46.55	
19	Belgium	45.75	
20	Italy	43.62	
...			
	Brazil	9.6	

Table 4 -- Main line penetration: the top 20 countries in 1995, with more than one million inhabitants, and the Brazilian position (Source: ITU/BDT World telecommunications Indicators Database).

Rank	Economy	Subscribers (x1000)
1	US	33786
2	Japan	10204
3	UK	5000
4	Italy	3923
5	Germany	3750
6	China	3629
7	Australia	2500
8	Canada	2400
9	Sweden	2025
10	Korea (Rep.)	1641
11	France	1400
12	Brazil	1286
13	Thailand	1088
14	Finland	1039
15	Norway	982
16	Spain	944
17	Malaysia	873
18	Denmark	819
19	Taiwan	770
20	Hongkong	763

Table 5 -- Top 20 world cellular markets by subscribers in 1995, including the Brazilian position (Note: some figures are estimates). (Source: ITU/BDT World telecommunications Indicators database).

Rank	Operator	Country	Service revenue	Total change 94-95
1	NTT	Japan	84080	22.0 %
2	AT&T	US	47277	8.9 %
3	Deutsche Telekom	Germany	46151	7.40%
4	France Télécom	France	29613	5.3 %
5	BT	GB	22785	7.2 %
6	Telecom Italia	Italy	18463	2.3 %
7	BellSouth	US	17886	6.2 %
8	GTE	US	17374	0.1 %
9	MCI	US	15265	4.4 %
10	Sprint	US	13556	7.1 %
11	Bell Atlantic	US	13430	- 2.6 %
12	Ameritech	US	13428	6.8 %
13	Nynex	US	13407	0.8 %
14	SBC	US	12670	9.1 %
15	US West	US	11746	7.2 %
16	Telefónica	Spain	11008	14.9 %
17	DGT	China	10457	45.3 %
18	Telstra	Australia	10431	6.9 %
19	Telebras	Brazil	9388	- 8.7 %
20	Pacific Telesys	US	9042	- 2.1 %

Table 6 -- The top 20 telecommunications operators by telecommunications service revenue (1994-1995) (Source: ITU/BDT PTO database).

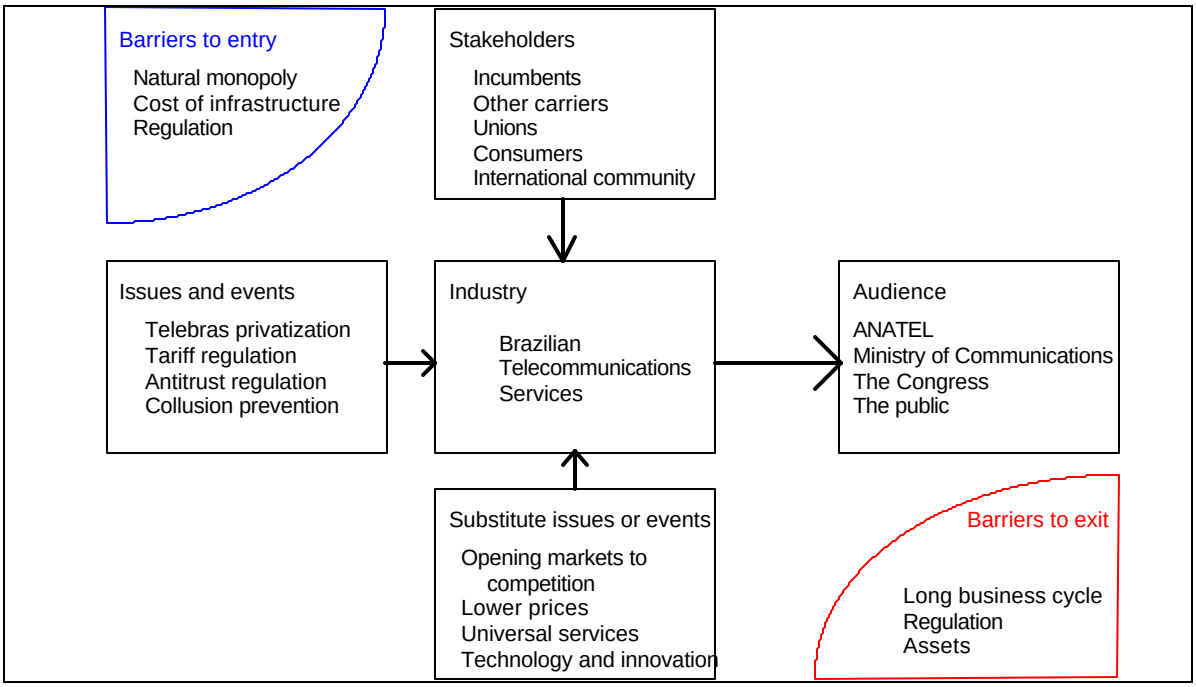

Illustration 1 -- Telecommunications market structure: a simplified model for market issues and substitute non-market issues (source: Mahon & McGowan, 1996)

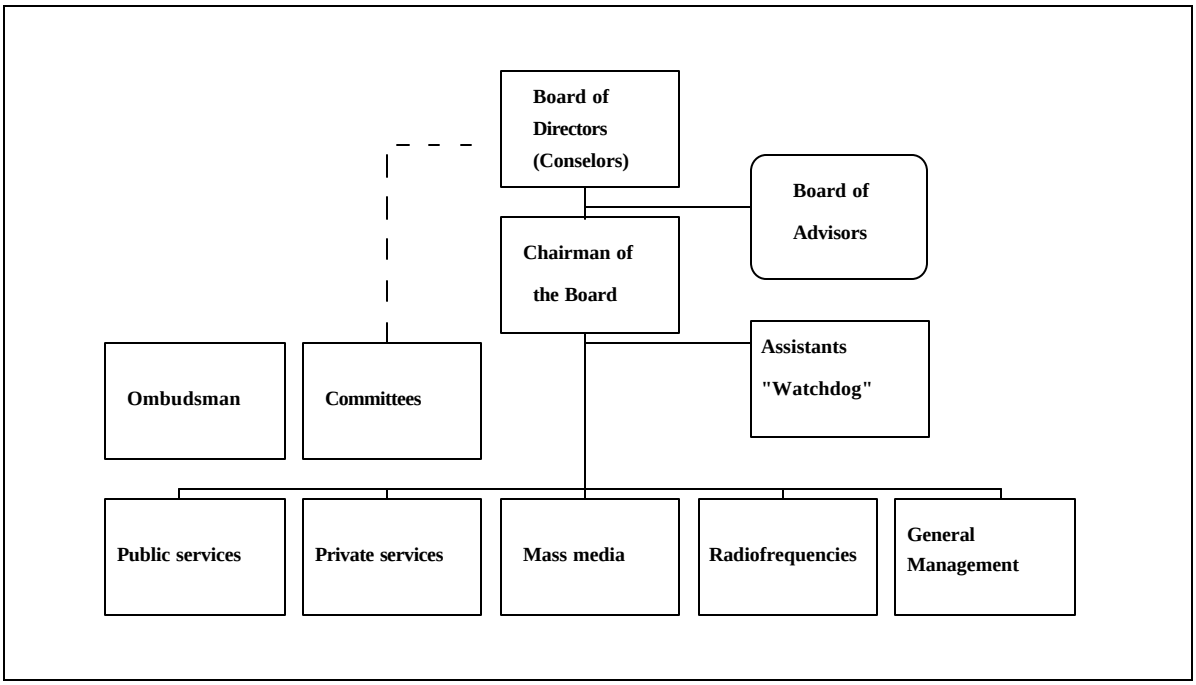

Illustration 2 - A tentative description of Anatel's structure

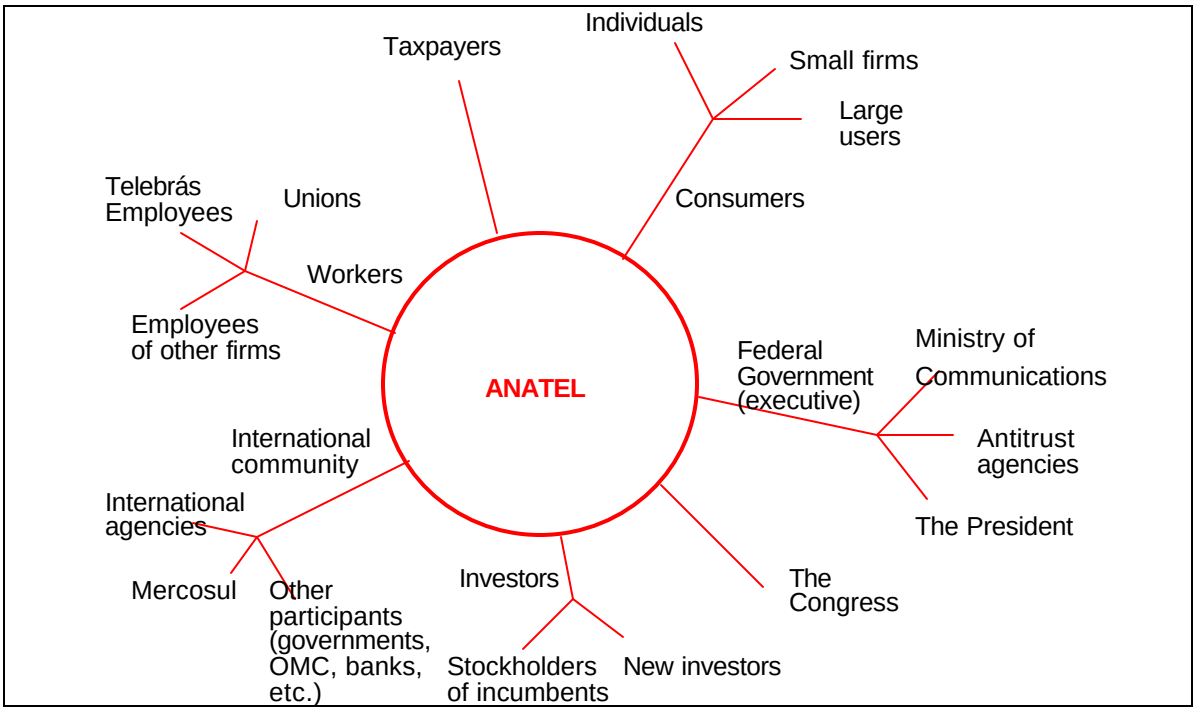

Illustration 3 -- Stakeholder map of Agencia Nacional de Telecomunicações

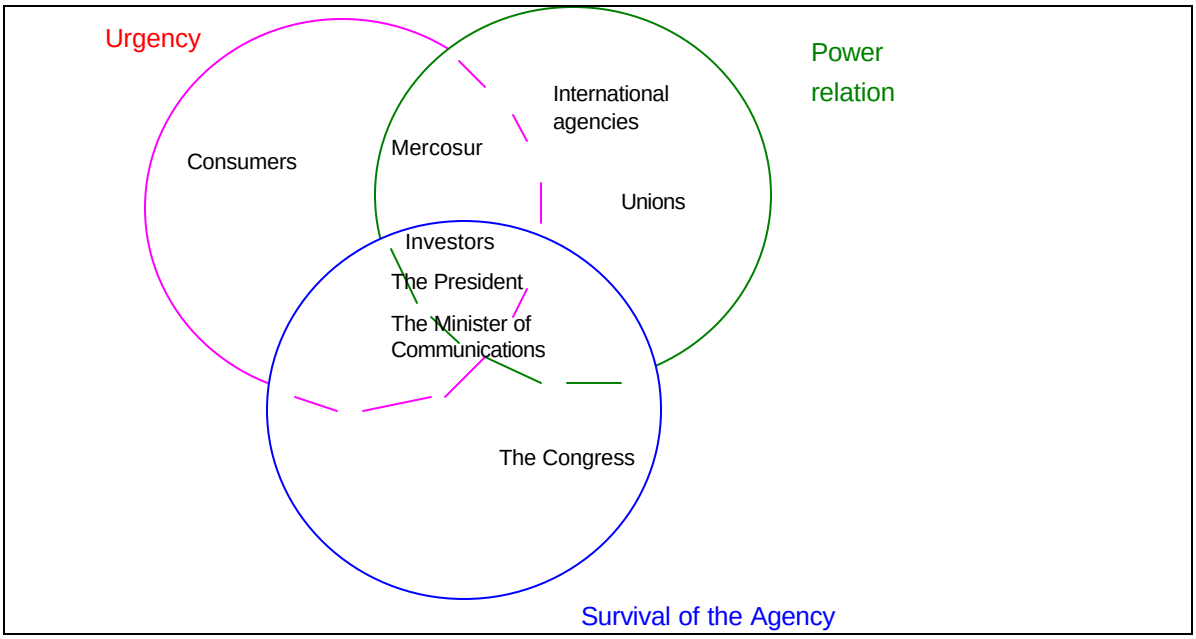

Illustration 4 -- Criticality analysis for the stakeholders of Agencia Nacional de Telecomunicações

ANATEL non-market issues agenda
Provision of universal services
Provision of special and advanced services
Equipment standardization and testing
Obscenity, harassment and wrongful use of telecommunication services
Privacy of connections
Privacy of custom information
Non-discriminatory commercial practices
Fair billing practices
Approval and arbitration of contracts
Opening local markets to competition
Technological advancement
International participation in economic rounds

Illustration 5 -- Non-market issues of the Agência Nacional de Telecomunicações