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"Social policies and private sector participation in water supply – the case of Brazil"

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1. Introduction

Up until the 1960's, the provision of water and sanitation services in Brazil was very deficient, lack of appropriate water and sewage treatment, inefficient operation and faulty regulation being the norm. Moreover, there were different management models in place. Some municipalities provided water and sanitation services independently, while others formed consortia with neighboring municipalities. The most successful model was apparently one where state departments were in charge of the entire production process, including planning, construction and operation (Turolla 2002).

Recognizing the close connection between economic and social development and access to basic public utility services, the military government instated in 1964 elected as one of its priorities the promotion of universal water and sanitation services. One of the actions taken by the government in that direction was the creation of the National Housing Bank (BNH) in 1964. Its initial mission was to implement an urban development policy, but it was later expanded to include assessing the situation of the water and sanitation sector in Brazil and financing of its expansion.

In order to have access to the financial resources made available by BNH through the Sanitation Financial System (SFS), municipalities were required to organize service provision in the form of autonomous departments or mixed ownership companies (Turolla 2002). This model resulted in a water and sanitation sector where supply of water and sewage services by municipalities was predominant, with only a few municipalities relinquishing operation of those services to the state.

The establishment of the National Sanitation Plan (Planasa) in 1971, however, changed the picture. The plan laid out investment schedules for the sector, as well as tariff, credit and other sector policies. It also promoted the creation of state water and sanitation companies (CESBs), encouraging municipalities to grant long term concessions to those companies in exchange for financial resources coming mostly from BNH. This centralization was defended at the time based on two arguments. The first one was that there existed economies of scale in large metropolitan areas to be captured and a need to reduce planning costs. The second was the alleged need to introduce cross subsidies, whereby more profitable regions would finance less profitable ones.

The incentives faced by the CESBs under Planasa were such that construction and expansion plans were privileged, with a detrimental effect on operations (Rezende 1996). Loans from BNH, for instance, were not available for activities pertaining to companies' operations, a consequence of the government's directive to finance the expansion of infrastructure. This eventually resulted in the deterioration of water and sewage systems, leading to high system losses. At any rate, coverage of water provision in urban areas in Brazil augmented from 60% in 1970 to 86% in 1990 under Planasa, while coverage of sewage collection increased from 22% to 48% in the same period of time (Seroa da Motta 2004).

By the end of the 1980's, though, the performance of the highly centralized Planasa system had deteriorated significantly. The Brazilian economy was facing a hyperinflationary process which led the government to keep companies' tariffs under tight control in order not to fuel inflation. Dwindling investments due to lack of appropriate financing (BNH ceased to exist in 1996 and there was a sharp decrease in foreign capital inflow), political meddling and mounting debt service from previous loans anticipated a gloomy future for the water and sanitation sector.

Brazil has been experimenting with the PSP through various forms such as concession contracts. In the urban areas, it is estimated that there are some 1,350 water and sewerage entities, of which 32 have been privatized (Owen 2006). Currently, 25% of the population is served by the private sector and this figure could grow to 36% within 10 years.

The main objective in this chapter is to study past and ongoing experiences with private provision of water services in Brazil and to assess the impact on access and affordability indicators. We will also try to analyze the social policies in place to help the poor. The chapter is divided in seven sections, including this Introduction. In the second section we provide, as background, an account of the recent evolution of the sanitation sector in Brazil, with particular interest in the participation of private capital. We also present a literature review on private provision of water services in Brazil. The following Section looks at social policies and regulation and describes in detail the specific programs implemented in the country. Next Section discusses some indicators of access to and affordability of water supply in Brazil that bear out the main problems in the sector. In the subsequent Sections we bring the results from a plethora of estimations of different econometric models that try to measure the effects of private provision on access and affordability. The last section concludes.

2. Private provision of water services in Brazil

2.1. Current developments in water sector

As discussed above, the Planasa system was dismantled by the Brazilian Constitution of 1988, conspicuously pro-decentralization, and was subsequently abandoned. After its collapse, no consistent set of policies for the water and sanitation sector was put in place to fill the void, a situation that has persisted until now. A law regulating the management of water resources in Brazil was passed by Congress (Law 9.433, January 8, 1997), but it was difficult to pass legislation specific to the water and sanitation sector, mainly because of disputes between municipalities and states over the right to grant concessions.

The Constitution established that public services such as water and sanitation should be provided by the State either directly or through concessions, and also authorized municipalities to grant concessions. The Constitution and the "Concessions Law" of 1995 (Law 8.987), however, are ambiguous when it comes to establishing which level of government is responsible for the provision of water and sanitation services and who has the power to grant concessions. The Constitution gave the municipalities the right to grant concessions of public services of local interest, but recognized that the federal and state governments should guarantee efficient and adequate regulation of water and sanitation services. These two provisions caused confusion as to how water and sanitation services in municipal and metropolitan areas, in most cases part of the concession areas of regional companies, should be regulated.

The "Concessions Law" also determined that the municipalities should have the power to grant concessions or provide the services themselves. However, it kept the door open for the regional companies (CESB's) to play a role by specifying that the municipalities could only renew concession contracts through public tenders, in which the regional companies could participate.

With the monetary stabilization achieved by the Brazilian economy through the "Real Plan" (Real is the name of the currency introduced in 1994), the water and sanitation companies tried to recuperate their investing capacity and align revenues and costs, to no avail. Inappropriate management practices and lack of incentives for efficiency played a significant role in that

failure. It should be noted that after investments reached their lowest value in the biennium of 1993-1994, they recovered in 1998, but then immediately experienced another reduction. The improvement in the period 1994/1998 can be attributed to weak fiscal controls that led to a significant reduction in the primary fiscal surplus in those years. When those controls were tightened up again and a sound primary surplus received high priority, investments in the sector suffered a deep reduction. The renewed effort to balance the budget led to the approval of the "Law of Fiscal Responsibility" in 2000. The law established limits on public indebtedness, both on the direct administration and on companies where the government was the majority shareholder. Moreover, credit ceilings to public sector borrowing prevented the financial system from lending to public companies. Therefore, even when financial resources were available, service providers could not tap into them due to their public status.

In an attempt to restructure the sector, in 2001 the government submitted a project of law to Congress, known as PL 4.147, which gave sanitation companies administrative and financial autonomy, established pricing principles and concession criteria. Moreover, it established the state as the authority with the power to grant concessions in metropolitan areas, instead of the municipalities. The idea was to assure the financial viability of the state sanitation companies by allowing them to keep, at least in part, their ability to reap scale economies. These gains should be available to finance cross subsidies to poor municipalities within the area covered by the firm.

The pricing principles introduced by the bill were based on incentive regulation, more specifically on price cap and yardstick competition methods. The main objective was to promote efficiency and participation of private capital. The weak flank of the bill was its inability to set a governance structure for the sanitation sector, shying away from a proposal to create a regulatory agency.

The bill ran into the opposition of many stakeholders. The municipalities were against it mainly due to its provision that states were to have the power to grant concessions in metropolitan areas. There was also resistance to the project coming from segments reluctant to accept its directives regarding privatization, universal service and other issues. In particular, some questioned the participation of the private sector in sanitation, arguing that its profit-seeking motive was inconsistent with the provision of such essential services like water and sewage.

One of the major concerns of the government of President Lula da Silva, which came to power in January of 2003, was to restructure and restore investments in the sanitation sector. The federal administration set up a task force within the Ministry of Cities to elaborate a draft bill to be submitted to Congress with the new regulatory framework for the sector. In a nutshell, the proposal suggests that the concession power should be assigned to municipalities when the service is of local interest and that pricing as well as concession procedures should be regulated by autonomous authorities. It should come as no surprise that this proposal has run into the same kind of difficulties as the one submitted by the previous administration, opposing those who support municipalities' powers against those who want to preserve the cross subsidy system operated by state sanitation companies (Seroa da Motta and Moreira 2004).

After a long period of discussions and some modifications, the bill was approved by Congress and sanctioned by the President in January 2007. It establishes criteria for municipalities and states to access federal financing and determines the constitution of councils with the participation of the civil society. These councils have leverage to influence municipalities' decisions regarding tariff setting and termination of service due to lack of payment. The bill does not clearly define powers of concession, a matter that apparently will have to be decided by the country's highest court. It does, however, establish that investments made by

concessionaires will have to be reimbursed in case their contracts are unilaterally terminated by the municipalities.

It stands to reason that the new bill will change the face of the Brazilian water and sanitation sector, which still reflects the guidelines set by Planasa in 1971. The sector is dominated by the regional companies, the CESBs, which still hold concessions from municipalities. Municipal provision of water and sanitation services is concentrated mainly in the states of São Paulo, Minas Gerais and Rio Grande do Sul, either through agencies under direct municipal control, autonomous agencies or municipal companies. There are a small number of cases corresponding to private companies currently holding partial or full municipal concessions.

2.2. Private sector participation in the water sector in Brazil

In the North region of Brazil, Manaus, the capital of the state of Amazonas, and Novo Progresso, in the state of Pará, are the only cities where water is supplied by private companies. In the Midwest, there are private enterprises in the states of Mato Grosso, Mato Grosso do Sul and Tocantins. The Southeast concentrates most of the private experiences, mainly in the states of São Paulo and Rio de Janeiro, but also in Espírito Santo and Minas Gerais. In the South, the states of Paraná and Santa Catarina have tried private provision of sanitation services.

There is considerable diversity in private enterprises undertaken so far in terms of financing and tariff structures. In some cases, companies subscribed the totality of their initial capital, while in others relatively sophisticated financing schemes including equity and debt were set up. However, many loans pledged to the new concessionaires by private and public institutions did not materialize (Parlatore 2000). Tariff structures are in line with those adopted in the past by the sector, based on minimum consumption rates, increasing block-rate tariffs, and differentiated according to user groups. In some cases, price cap regulation was implemented.

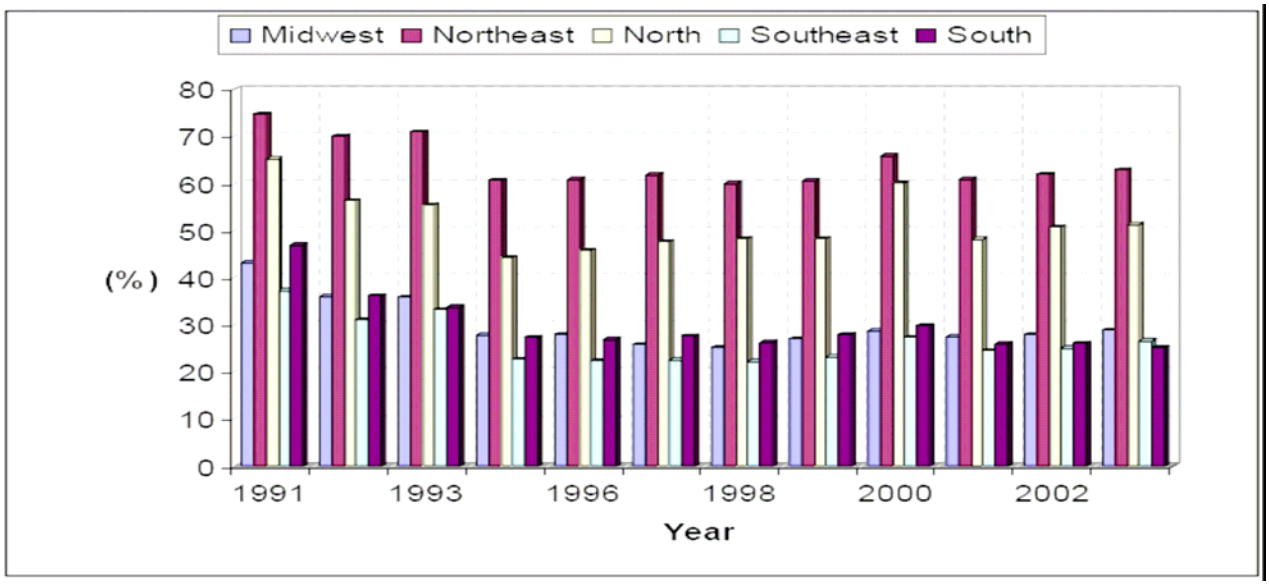
Concessions are the contractual instrument of choice in most cases. The municipalities in the state of Rio de Janeiro that privatized their sanitation services have opted mostly for full concessions (including water and sewage), whereas those in the state of São Paulo have preferred partial concessions and, in some cases, permissions.

The private groups that acquired the concessions were typically comprised of construction companies in the public works business lured into the sanitation market by the possibility of restoring their core business (shaken by the decline in public investments) through their concessions. There were a few cases of concessions granted to consortia of domestic and international companies where the domestic partner was usually a contractor and the international partner was a company with experience in the sanitation business (Parlatore 2000).

3. Social policy and regulation

Despite its abundant natural and human resources and its great potential for economic development, Brazil faces many social and economic challenges. One of them is to promote better income distribution and rescue from poverty a large part of the Brazilian population. As the figure below shows, not only is a large portion of the Brazilian population below the poverty line, but the poverty rate is very unequal across geographical regions. Poverty rates in the North and Northeast regions, around 50% and 60% in 2003, respectively, are much higher than in the Midwest, Southeast and South regions, all between 20% and 30% in 2003. Moreover, poverty rates have not decreased significantly since the mid 1990's in any of the five regions.

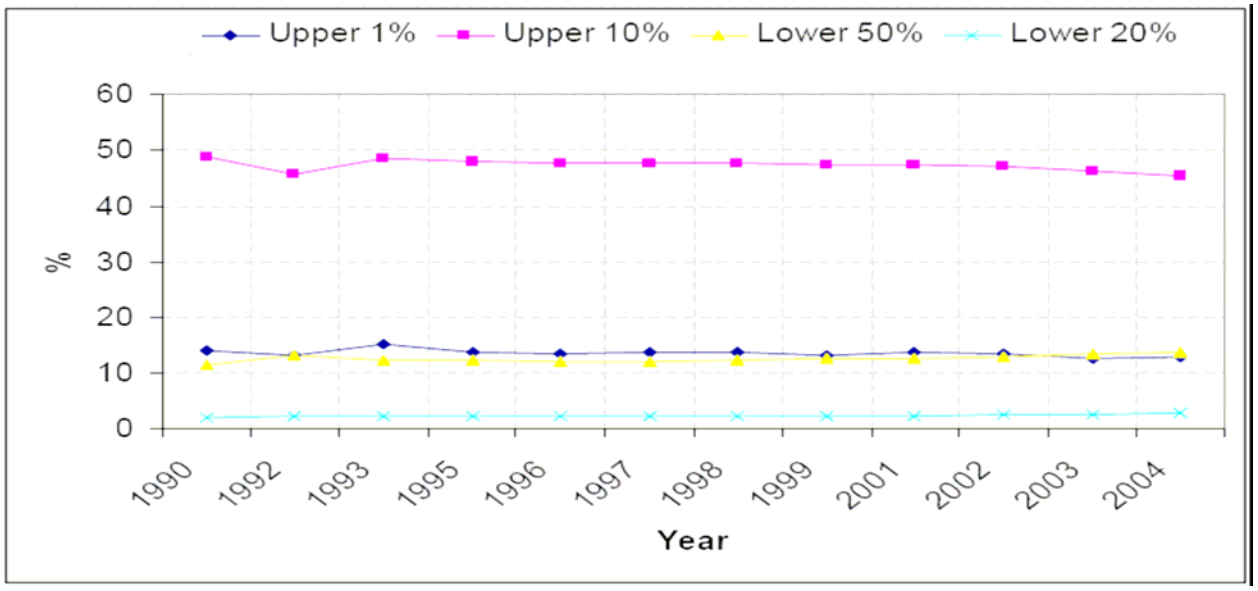
Figure 1: Poverty rates by geographical region



Sources: IBGE – 1991 and 2000 demographic censuses; 1992-1999 and 2001-2003 PNADs

The inequality in poverty rates across regions depicted above, however, is only one facet of socio-economic inequality in Brazil. As can be seen in the figure below, income distribution is also highly unequal.

Figure 2: Share of total income by income class



Source: IPEA (Institute for Applied Economic Research)

The richest 1% earn a higher percentage of total income than the poorest 20% and almost the same as the poorest 50%. In addition, the richest 10% earn almost half of total income in Brazil, and that situation has hardly improved over the past one and half decade.

Social policies in Brazil have tried to address this situation. In the water sector, public policy, be it regulatory or social, was until the late 1980's centralized by the federal government in the National Housing Bank (BNH), which managed the FGTS,[1] a sort of retirement trust fund whose resources could be used to finance projects in the sanitation sector, among other uses. As mentioned before, under the Planasa system those resources were used to entice municipalities into turning the provision of water and sewage services over to the CESBs, the regional (state) sanitation companies, which would then receive loans at interest rates lower than market rates. For an extended period of time, social policy for the sector amounted to heavy investments in the expansion of water supply systems (sewage was not a priority), thereby increasing coverage, and a system of cross subsidies put in place by the CESBs. According to that system, the same tariff was applied to all the different localities served by the company, irrespective of the cost of service. As a consequence, users in municipalities where the cost of service was smaller than the tariff subsidized those where the tariff was not high enough to cover the cost.

The Planasa system of cross-subsidies, low interest loans, (almost) unlimited resources and heavy investments, resulted in an impressive expansion of coverage of water services. The expansion was uneven, though. Municipalities that didn't sign up for Planasa, commissioning their water and sewage services to municipal companies or autonomous entities, in general did not fare as well as those that did. Moreover, low-income families were by and large excluded from the system, since projects financed by Planasa were in general required to yield a reasonable rate of return.

With the cessation of BNH and Planasa, the scheme put in place over the years to monitor projects financed by the plan was dismantled. Some cross-subsidies remained, but now lacking transparency and control. As a consequence, companies became less efficient and different parties started to claim rights over the surplus generated by subsidies in places where revenue was higher than cost. No coherent policy for the sanitation sector replaced the Planasa system. Different ministries and federal government departments were put in charge of designing one, to no avail. There are many initiatives aimed at increasing investments in low-income population areas and improving services in sanitation. Nevertheless, there is no integrated planning for the sanitation sector, with different ministries, like the Ministries of Cities, Health, Environment and National Integration, besides Tourism, Defense and Agriculture, being in charge of programs that finance projects in the sanitation sector. One can claim that this decentralization ends up lowering the quality of the projects implemented and the efficiency of public expenditure. In what follows, we briefly discuss some of the most important programs put in place.

3.1. Program Pro-Sanitation

The objective of this program was to promote the improvement of health and quality of live conditions through actions in sanitation integrated and articulated with other sectorial policies. It financed states, the Federal District, municipalities and public companies and its source of funds was the FGTS. To participate in the program, the interested party must submit an application to *Caixa Econômica Federal*, the public bank that manages the FGTS fund, and is subject to a credit

[1] In Portuguese, Fundo de Garantia por Tempo de Serviço.

risk assessment. Projects related to this program included the development of water supply and sanitation infrastructure and institutions.

3.2. Program Pro-Sanitize

Pro-Sanitize (Prosanear in Portuguese) was the first initiative by the State aimed at increasing water supply and sanitation services for low income families. Created in 1988, it was one of only two credit lines available for the sanitation sector and funded by FGTS. The objective of the program was to solve, in a self-sustainable way, sanitation problems in densely populated urban areas, usually occupied by low income families, where water supply, sewage collection and treatment, solid waste disposal, drainage and other sanitation services were precarious. Financing was available to states, municipalities and state and municipal concessionaires.

The first stage of the program, Pro-Sanitize I, running from 1988 to 1996, obtained a 100 million dollar loan from the World Bank, which amounted to 50% of the program's funding. Caixa Econômica Federal, a public bank, funded 25%, with resources coming from the FGTS, and the remaining 25% came from local sanitation companies and municipal and state governments. Instead of promoting the implementation of conventional sanitation systems, with state of the art and thus expensive technologies, the program invested in simpler systems, which, despite their lower cost, used technologies tailored to the communities where they were implemented. In many places, families were grouped together in a sort of "condominium," and as a result water supply and sewage collection systems were more efficient and less expensive.

The program was by and large successful, having surpassed its initial targets. It made drinking water available to 900 thousand people, when the target was 200 thousand, and sewage services available to one million people, 43% more than the target of 700 thousand people. Moreover, the unit cost of the expansion of the system was relatively low.

After the successful experience of Pro-Sanitize I, in 2000 the government started the second stage of the program, named Pro-Sanitize II but also known as Project of Technical Assistance to Pro-Sanitize (Projeto de Assistência Técnica ao Prosanear – PAT Prosanear). It was funded by a 30,3 million-dollar loan from the World Bank (85% of total) and money from the Federal Government (15% of total). It is managed by the SNSB and scheduled to last until December 15, 2006.

The program consists of supplying technical assistance to projects designed to increase the supply of basic water and sewage services to urban low-income regions, and has as main objective to reach poor communities in the outskirts of large cities. It is estimated to bring benefits to between one and two million people and is targeted to auto-sustainable projects with community involvement, much like Pro-Sanitize I. In addition, it is based on the principles of use of technologies tailored to the communities served, cost savings and coordination with local government urban development plans.

3.3. Pro-Community – Program of Improvements in Communities

The target group of this program is individuals with incomes lower than twelve minimum salaries. They could get loans of up to R$5,000 at below market interest rates for joint projects with public entities concerning construction and improvement of facilities in the following areas: water supply, sewage, solid waste disposal, improvement of public ways, drainage, electricity distribution, sports and leisure. The program was funded by FGTS and the federal budget and was managed by *Caixa Econômica Federal*.

3.4. FCP/SAN – Program to Finance Private Concessionaires of Sanitation Services

This program could be used only by private operators of sanitation services, who were entitled to loans at special interest rates to finance ventures that could lead to the enhancement of water supply and sewage collection and treatment access rates for low-income populations (less than twelve minimum salaries). Projects in the following areas were entitled to financing: water supply, sewage collection and treatment, institutional and operating development, solid waste.

The program's funds came from FGTS, but the private concessionaire had to match at least 25% of the value of the loan. The *Caixa Econômica Federal* bank was in charge of managing the program.

3.5. Rural Sanitation Program

This program was part of the 2005 federal government budget, and its objective is to increase coverage and improve quality of "environmental sanitation"[2] service in rural areas. The target population is people living in rural areas, especially those in settlements awaiting land reform and localities with up to two thousand, five hundred inhabitants, as well as communities of ethnical minorities.

3.6. Program Sanitation is Life

A program of the National Department of Environmental Sanitation, its goal is to "assure fundamental human rights of access to potable water and to life in a sanitary environment, both in cities and the countryside, through the provision of universal water and sewage services, collection and treatment of solid waste, drainage systems in urban areas, and control of reservoirs and vectors of transmittable diseases."

The program finances projects by states, municipalities, the Federal District and sanitation companies designed to augment coverage of water supply, sewage and drainage services, as well as to increase efficiency of the providers of public sanitation services. Part of the program's actions is funded by the federal budget and international institutions.

3.7. Program Sanitation for Everyone

Created in May of 2005, this program replaced other programs that were active until then and used FGTS lines of credit (Pro-Sanitation, Pro-Sanitize, Pro-Community and FCP/SAN). One of the main differences in comparison with the previous programs is the focus on giving incentives for public and private operators to provide sanitation services efficiently, generating real benefits for the population. The aim of this program to improve health and quality of life of the population by means of providing incentives for service providers to be efficient (who would be entitled to lower interest rates) and sanitation actions.

Both public and private entities are entitled to tap into the resources from this program, which come from the FGTS and the FAT,[3] a special fund that finances unemployment benefits and economic development programs. In order to do that, they have to sign a contract where

[2] This is a new concept concocted by the government to convey the message that water and sewage services cannot be thought of dissociated from their environmental impacts.
[3] Portuguese, *Fundo de Amparo ao Trabalhador*.

performance targets are established. Those who manage to achieve the targets on schedule are awarded reduced interest rates and longer loan maturities.

Besides usual sanitation projects in water supply, sewage collection and treatment, institutional development, solid waste and pluvial waters management, the program also finances the preservation and recovery of water fountains and construction and demolition waste management.

The initial amount of financial resources allotted to this program was R$2.2 billions.

In 2005, the federal government pledged R$700 millions to finance public sanitation projects, and R$640 millions to private company projects. From the federal budget, another R$800 millions in grants to state and municipal governments were laid out through individual and party parliamentary bills.

3.8. Policies addressing affordability

The description of the current programs available for the sector depicts a type of social policy mainly based on loans (investments) to expand and improve quality of sanitation services, some of them designed exclusively for low income families. Thus, the main concern is to improve access, affordability being given a much lower priority. Policies that target affordability issues are essentially those based on cross subsidies, which allow companies to charge "social tariffs" to low-income families. These are usually expressed in terms of a certain percentage of the full tariff.

Virtually all sanitation companies, public and private, adopt social tariffs. In the case of state regional companies, their tariff structures generally have to abide by rules specified in state and/or municipal laws, but there are many cases in which they have a lot of leeway to set tariffs.

There is widespread use of increasing block tariff. For example residential tariffs follow an increasing block scheme, with higher prices per cubic meter for higher consumption rates. Some companies charge a flat rate up to a certain consumption level, usually around 10 cubic meters. There are exceptions, though, like SANEPAR, the state company in charge of sanitation services in the state of Paraná. It currently adopts a two-part tariff, with a fixed rate (independent of consumption level) and a per cubic meter charge.

Most private companies also use social tariffs. Prolagos, for instance, a company that provides sanitation services to some municipalities in the state of Rio de Janeiro, does not have a social tariff, although it does use an increasing block tariff scheme intended not only to favor low income families but also to rationalize the use of water. According to the company, it is currently studying possible designs of special tariffs for low-income families.

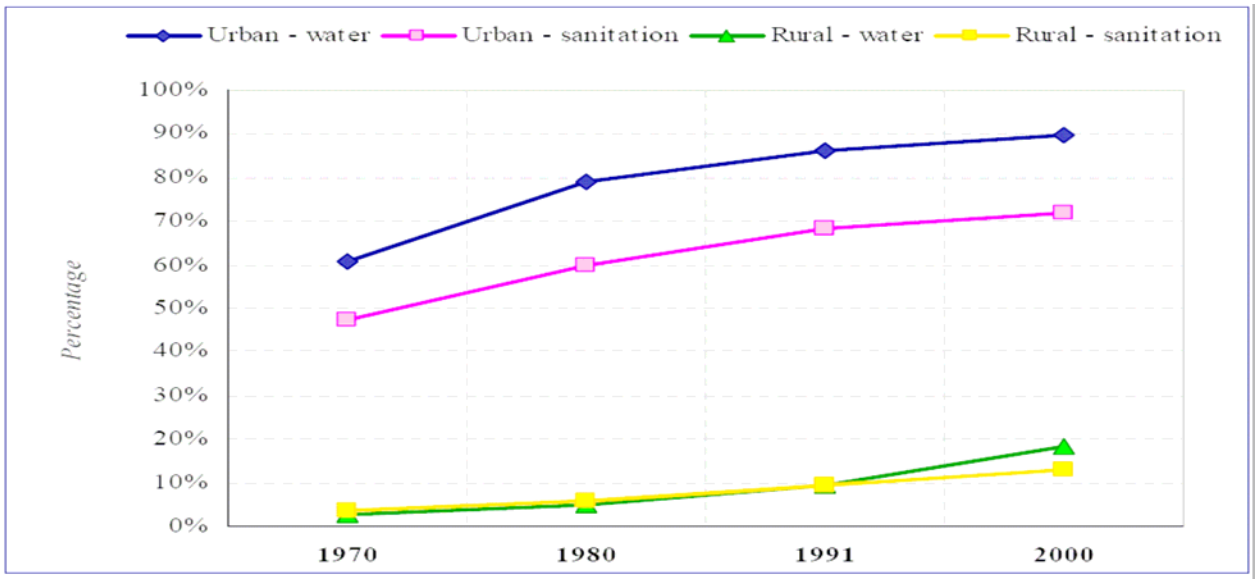
Some private companies, like Citágua, in Cachoeiro de Itapemirim, state of Espírito Santo, actively engage in tariff policies designed for low-income families, usually in cooperation with the municipalities. Citágua has a joint program with the city of Cachoeiro de Itapemirim that gives waivers to low income families with up to 10 cubic meters of consumption. Families have to register with the municipal department of social works in order to be eligible.

4. Access to and affordability of water services in Brazil

In this section, we provide a depiction of the evolution and current situation of the water sector in Brazil.Access to water as well as sewage services increased significantly in Brazil from 1970 to 2000, as can be seen in the figure below. This has been possible as result of heavy investment by the government and water and sanitation was a priority. In spite of the strong expansion, though,

water coverage rates in rural areas are still very low. The percentage of households with connection to water supply was 76% in 2000, with 90% coverage in urban areas and only 18% in rural areas[4]. Indicators of access to sewage services (including system connections and septic tanks) are even worse: 59.9% access overall, with 72% for urban and 13% for the rural population.[5]

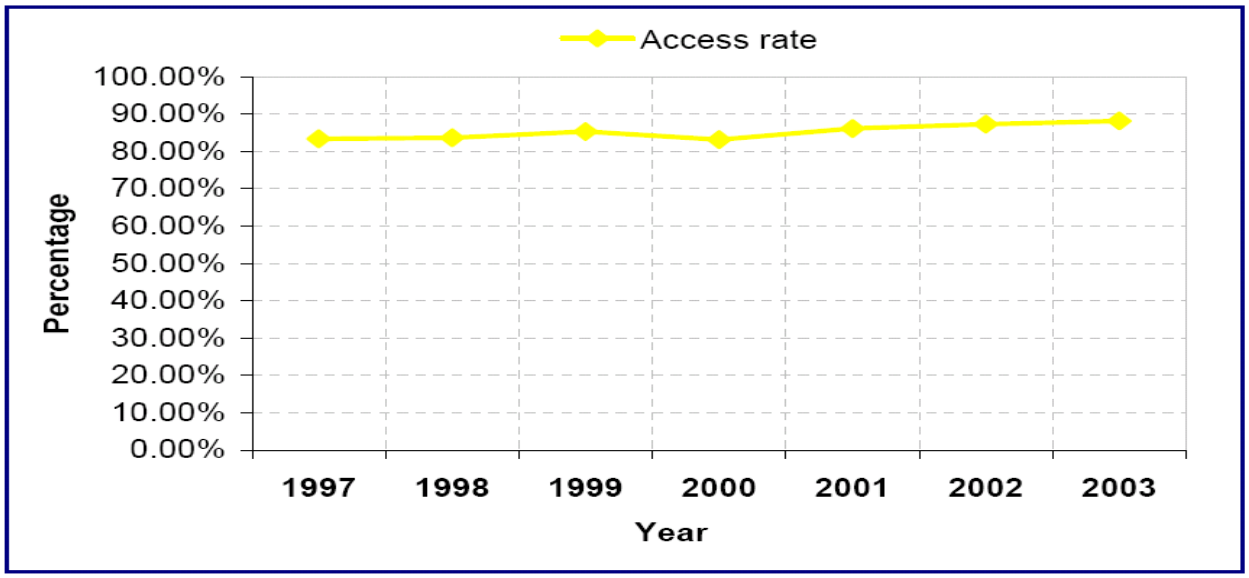
Figure 3: Access to water and sewage services (national averages) – Percentage of Households, 1970, 1980, 1991, 2000



Source: IBGE – 1970, 1980, 1991 and 2000 demographic censuses.

[4] These are all national figures.
[5] Since our main concern in this paper is with water services, sewage numbers are only mentioned here in this broad picture of the evolution of access to sanitation services in Brazil.

Figure 4: Access to water and sewage services (national averages) – Percentage of Households, 1996-2003



Note: The figure for year 2000 comes from the Demographic Census

As mentioned earlier, income distribution in Brazil is very uneven. As a result access to public services are also very unevenly distributed. Water supply is no exception. The following table shows the evolution of access to water services by income deciles for the period 1995-2003.

Table 1: Access to water supply by deciles 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
1th decile	51.73%	52.37%	53.83%	56.34%	60.05%	60.94%	61.85%	68.16%	68.29%
2nd decile	54.12%	54.66%	56.90%	59.73%	62.41%	69.19%	71.65%	73.22%	75.41%
3rd decile	67.26%	68.15%	69.45%	72.81%	80.13%	77.94%	81.33%	81.98%	81.15%
4th decile	76.47%	78.22%	79.42%	81.95%	82.68%	84.70%	84.07%	82.26%	85.63%
5th decile	84.52%	86.89%	88.57%	86.66%	87.76%	89.19%	87.68%	90.26%	91.02%
6th decile	89.89%	90.02%	91.26%	91.65%	91.71%	93.05%	92.46%	93.26%	94.18%
7th decile	95.12%	94.29%	94.19%	94.61%	95.73%	95.51%	94.91%	94.25%	97.26%
8th decile	95.37%	96.44%	98.21%	97.72%	98.08%	96.97%	97.45%	97.84%	98.26%
9th decile	98.52%	98.79%	99.11%	98.97%	98.74%	98.08%	98.63%	98.74%	98.90%
10th decile	98.79%	99.12%	99.79%	99.53%	99.90%	98.90%	99.02%	99.64%	99.64%

Note: Access to water supply is defined as percentage of households with piped water in at least one room of the house.
Source: IBGE – PNADs 1995-1999 and 2001-2003, Demographic Census 2000

Despite the significant increase in coverage for the lowest deciles, the gap between them and the highest deciles is still very large. In 2003, for instance, the access rate for households in the top 10% income bracket was 31.35 % points above that for households in the bottom 10%. Not only is the distribution of access to water by income groups uneven, but also the distributions by region and location (urban or rural). The table below gives us a better idea of how skewed those distributions are:

Table 2: Access to water supply by region and location 2001-2004

Region		2001	2002	2003	2004
North	Total	--	--	--	69.54%
	Urban	73.47%	77.43%	76.48%	79.66%
	Rural	--	--	--	39.19%
Northeast	Total	67.02%	69.52%	71.02%	72.83%
	Urban	83.99%	85.91%	86.80%	87.73%
	Rural	22.85%	25.82%	28.59%	31.49%
Midwest	Total	90.36%	92.26%	93.35%	94.02%
	Urban	93.96%	95.31%	96.21%	96.47%
	Rural	67.17%	72.03%	75.56%	78.69%
Southeast	Total	96.83%	97.32%	97.60%	98.11%
	Urban	98.13%	98.42%	98.54%	99.01%
	Rural	81.76%	83.82%	85.95%	86.76%
South	Total	96.55%	97.41%	97.65%	97.87%
	Urban	98.28%	98.78%	98.64%	98.74%
	Rural	88.43%	90.92%	92.80%	93.52%

Source: IBGE – *PNADs 2001-2004*

Coverage rates in rural areas are significantly lower than in urban areas in all geographic regions, but remarkably so in the North and Northeast, where overall coverage rates are well below those in the Midwest, Southeast and South regions. The North and Northeast regions of Brazil are much less developed than the other regions, and low water supply access rates only reinforce that.

It is also worth drawing a profile of households with and without access to piped water[6]. This will help us understand what types of households need to be targeted by social policies. In terms of regional location, we find that a third of households with access to piped water supply are in the Southeast region. In addition, around one half of the population without access to water is in Northeast region. This is linked to the fact that Planasa's emphasis was on projects that could generate reasonable rates of return, and this were usually associated with more industrialized and developed regions.

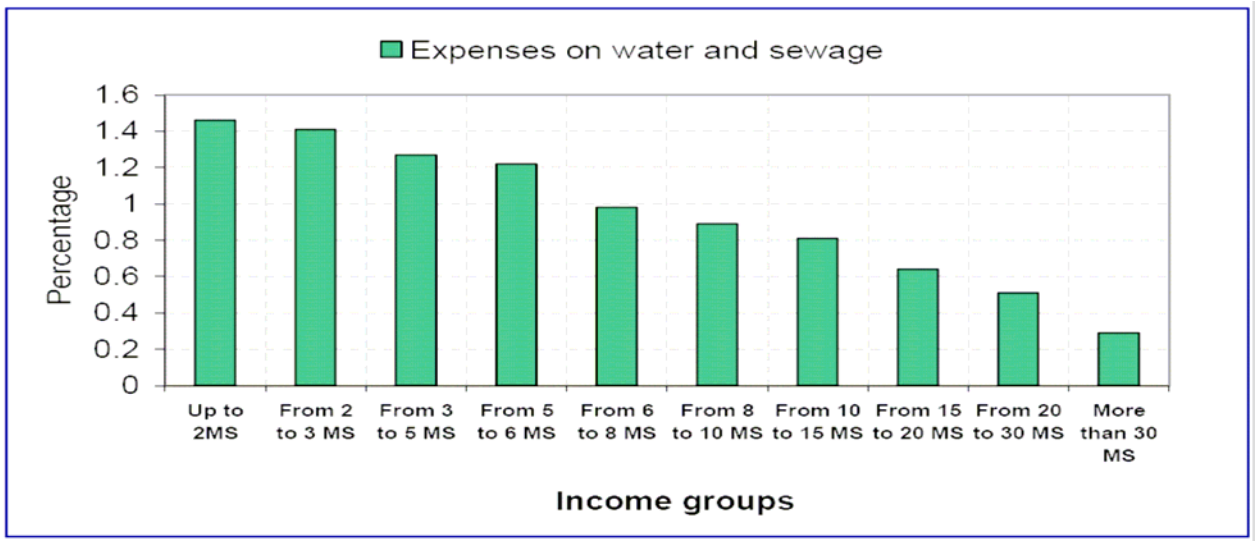
We find that the profile of households and individuals without access to the piped water system is that the characteristics associated with those without access are consistent with those

[6] The discussion that follows is mostly based on a monograph by Marcelo Quintão entitled "Setor de Saneamento Básico no Brasil: Características do Setor, Perfil de Acesso do Usuário e Participação da Iniciativa Privada." The monograph was written under the supervision of this paper's author.

usually found in low income families. Therefore, an increase in coverage of water services should benefit primarily poorer families.

Affordability of water services in Brazil is also a critical issue. The first indicator we can look at is the percentage of the household's income spent on water and sewage payments. The figure below shows the average percentage of household income spent on water and sewage bills by income groups, where these groups are defined in terms of multiples of the minimum salary on January 15, 2003.[7]

Figure 4: Affordability by income groups



Source: IBGE – 2002-2003 Survey of Household Budgets (POF)

The graph above is striking evidence of how water and sewage bills are much more burdensome for low-income families than high-income families. For instance, whereas families with incomes no greater than two minimum salaries (MS) spend 1.46% of their monthly budget on water and sewage payments, families in the top tier, those who earn more than 30 MS, only spend 0.29 percent of their monthly budget on those services.

5. Impact of private provision on access to water service

Using data from the National Sanitation Information System (SNIS)[8] for 2001-2004, we tried to get a clearer picture of the water sector. The table and figures below depict the evolution of access for four different types of company: direct public administration, autarky, privately-owned or managed company and publicly-owned or managed company[9]. We also analyze the access rate by different categories of operators: local, micro-regional or regional [10].

[7] The minimum salary was R$200 (two hundred Reais) then, approximately US$58 at the average exchange rate at the time, and approximately US$88 at the exchange rate in November of 2005.
[8] Published by the Program for the Modernization of the Sanitation Sector (PMSS) of the Brazilian Ministry of Cities
[9] Direct public administration means a department of the local or state administration. An autarky is an autonomous entity under federal, state or local government control. A privately owned or managed company is a company whose capital is predominantly private or is managed by someone appointed by the private partners or shareholders. Finally,

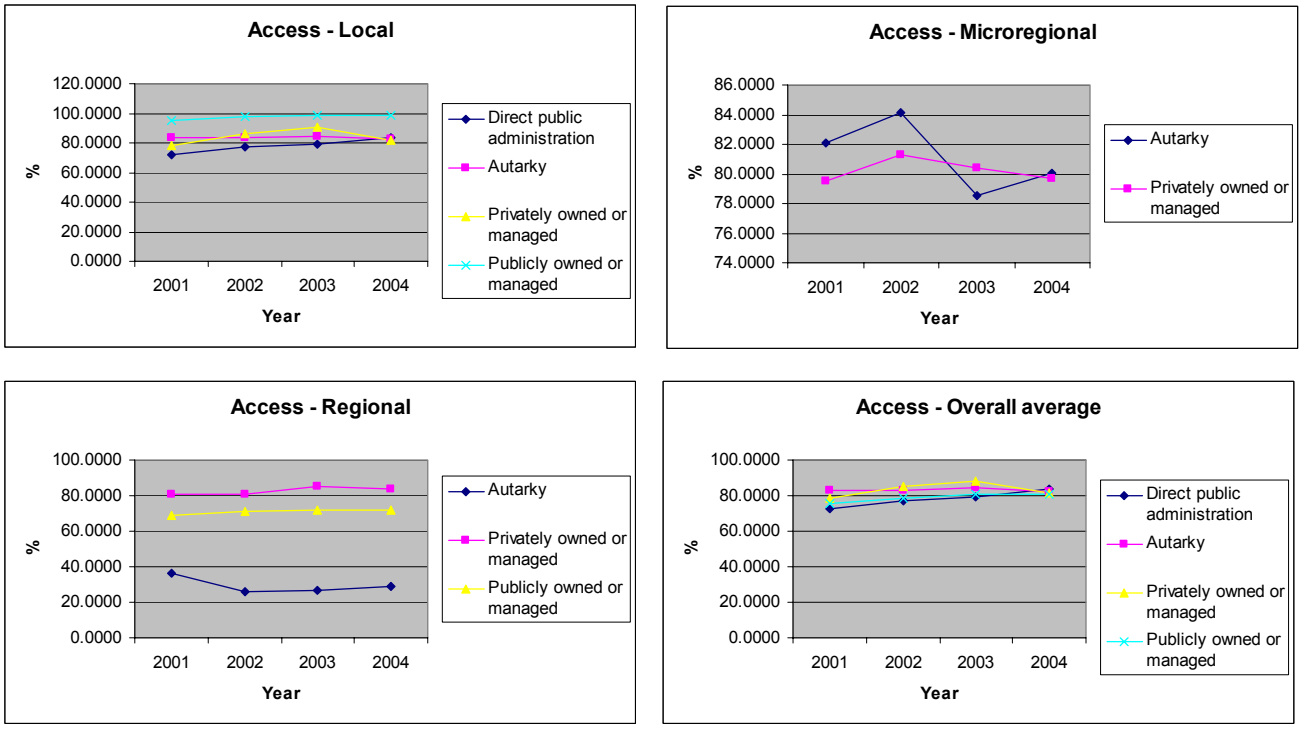
Table 3: Access to water supply by type and size of operator

	2001	2002	2003	2004
Direct Public Administration	72.4143	76.9811	79.1727	83.6724
Local	72.4143	76.9811	79.1727	83.6724
Microregional	--	--	--	--
Regional	--	--	--	--
Autarky	83.2240	83.3201	84.2267	82.3152
Local	83.5663	83.6728	84.7061	82.6169
Microregional	82.1144	84.1454	78.5357	80.0057
Regional	36.4918	26.0451	26.8835	29.1208
Privately-owned company or public company with private management	78.4824	84.9842	88.2946	81.4891
Local	78.0273	86.0125	90.4376	81.5314
Microregional	79.5160	81.2885	80.3788	79.6817
Regional	80.8620	80.9683	85.1671	83.5037
Publicly-owned company or public company with public management	75.5677	78.6962	80.9021	80.9004
Local	95.4283	97.4501	98.9350	98.3338
Microregional	--	--	--	--
Regional	68.6596	71.0241	71.8857	72.1837

a publicly-owned or managed company is a company with public capital only or managed exclusively by public appointees

[10] Local operators are those that provide water service only to the municipality where they are located. Micro-regional operators are those which provide services to more that one municipality, normally in small number and adjacent to each other, including intermunicipal consortia. Regional providers are those that serve several municipalities, including the CESB's (state companies).

Figure 5: Access to water supply by type and size of operator



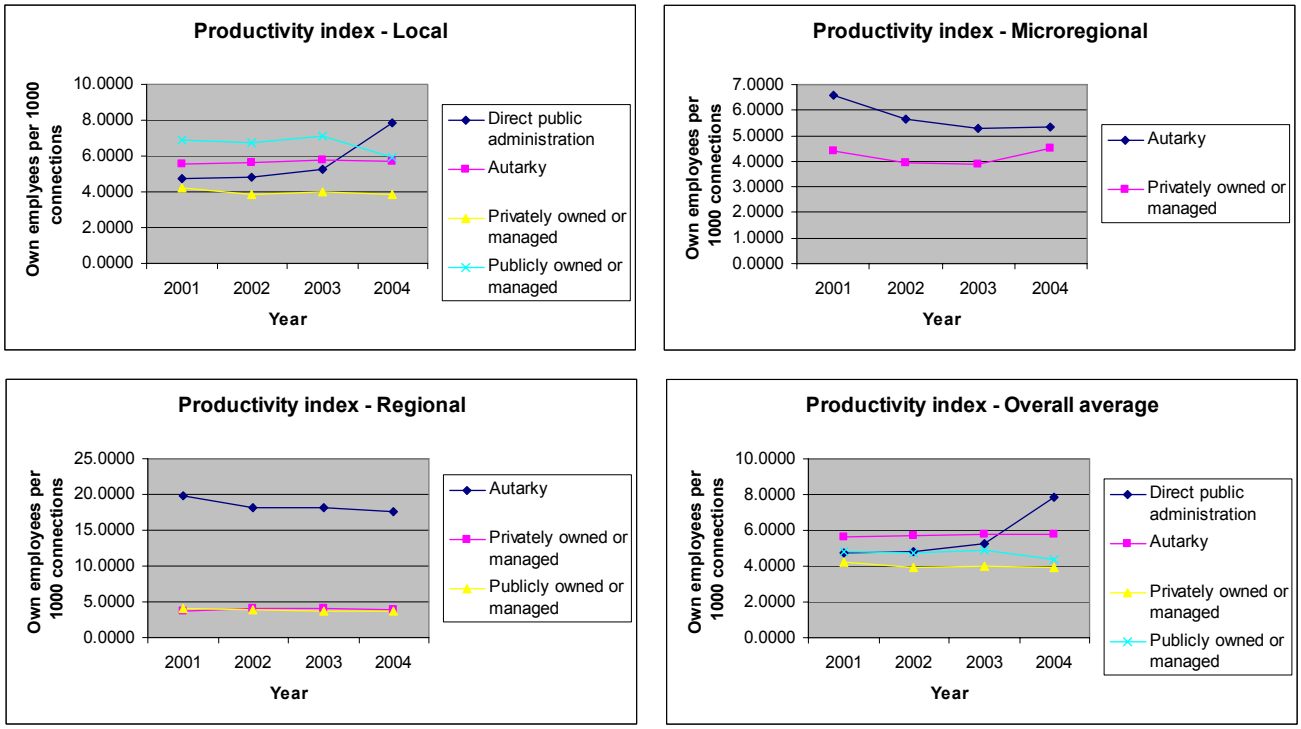
When considering the overall access, data reveals that the privately owned or managed companies tend to have a higher access rate than other types of companies in 2002 and 2003, but very similar for all types of companies in 2004. When we take into account the size of the companies, we notice that those results comes mainly from the performance of regional private companies, whose access rates are superior to autarky and publicly-owned or managed companies. Local publicly-owned or managed companies and micro-regional autarkies do better than their private counterparts in that respect.

Further, we looked into the efficiency of private and public entities. We look at two indicators: a productivity index, defined as the number of employees per thousand water connections; and an index of losses in distribution. The results are presented in the tables and figures below.

Table 4: Productivity index by type and size of operator

	2001	2002	2003	2004
Direct Public Administration	4.7742	4.8514	5.2623	7.8864
Local	4.7742	4.8514	5.2623	7.8864
Microregional	--	--	--	--
Regional	--	--	--	--
Autarky	5.6661	5.6753	5.7957	5.7753
Local	5.5528	5.5950	5.7414	5.7264
Microregional	6.5836	5.6416	5.2774	5.3406
Regional	19.7956	18.1661	18.1562	17.6457
Privately-owned company or public company with private management	4.2171	3.9062	3.9879	3.9161
Local	4.2573	3.8862	4.0055	3.8642
Microregional	4.3998	3.9577	3.8824	4.4958
Regional	3.7734	4.0043	4.0233	3.9046
Publicly-owned company or public company with public management	4.8325	4.7369	4.8889	4.3840
Local	6.8786	6.7092	7.1408	5.9078
Microregional	--	--	--	--
Regional	4.1208	3.9300	3.7629	3.6221

Figure 6: Productivity index by type and size of operator

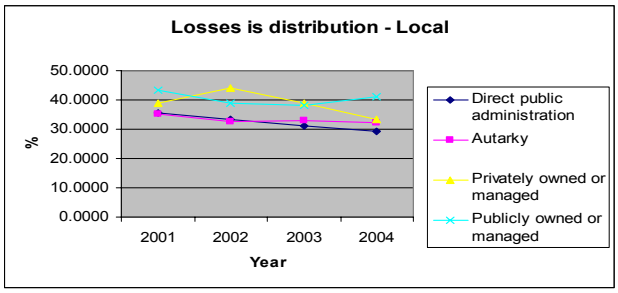


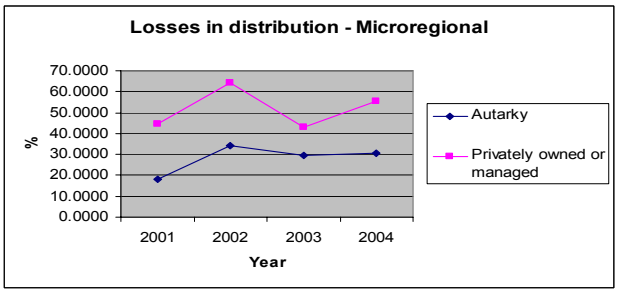
The productivity seems to be higher in privately owned or managed companies than their public counterparts in all size categories. This may be explained by the fact that these companies are more efficient. The amount of leakage is also lower with private sector. They also tend to improve leakages faster than other types of companies. But if we take the average figures, direct public administration and autarkies do better than private enterprises.

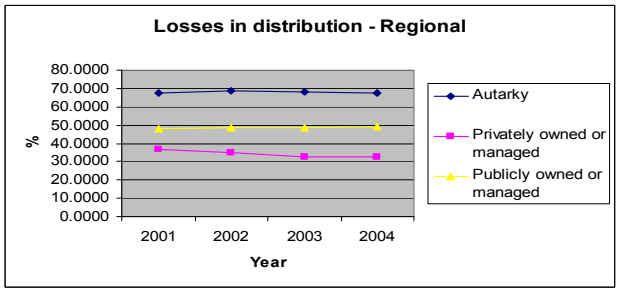
Table 5: Losses in distribution by type and size of operator

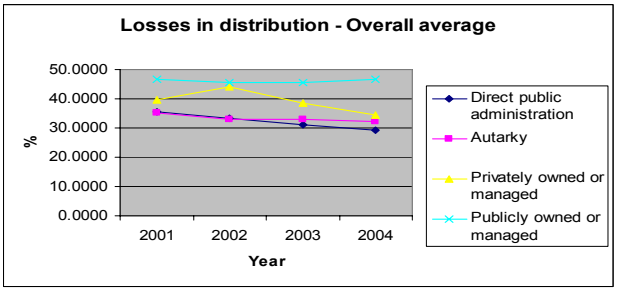
	2001	2002	2003	2004
Direct Public Administration	35.4624	33.2233	31.1140	29.3982
Local	35.4624	33.2233	31.1140	29.3982
Microregional	--	--	--	--
Regional	--	--	--	--
Autarky	35.0251	33.0191	33.0799	32.2099
Local	35.0331	32.7090	32.9390	32.0487
Microregional	18.3834	34.3347	29.7127	30.4882
Regional	67.5202	69.0022	67.9623	67.3603
Privately-owned company or public company with private management	39.4643	44.0475	38.6725	34.6116
Local	38.9376	43.9177	38.9689	33.2285
Microregional	44.6544	64.2918	43.2017	55.5503
Regional	36.4577	34.7038	32.6617	32.3440
Publicly-owned company or public company with public management	46.7111	45.6699	45.3754	46.5903
Local	43.4314	38.7891	38.1291	41.1698
Microregional	--	--	--	--
Regional	47.7546	48.4848	48.6691	49.3006

Figure 7: Losses in distribution by type and size of operator







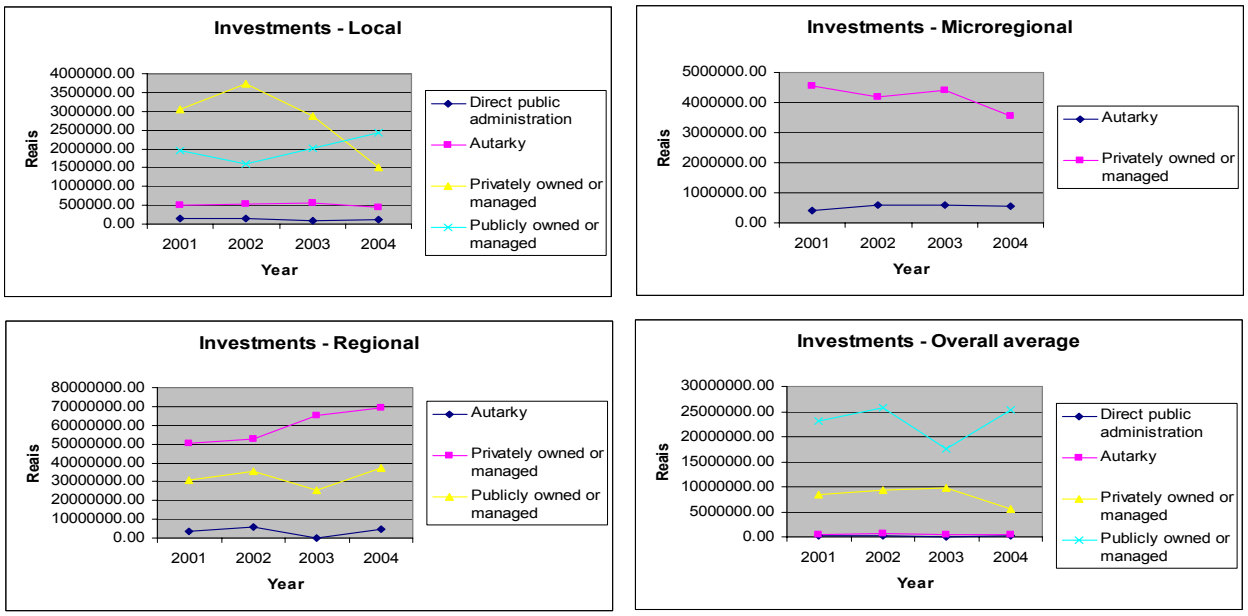


Finally, we look at investment of public versus private provision. Overall, the investment by private firms is lower than the public firms. However, results are different if it's a local, micro-regional or regional company. For example, (micro) regionally owned private firms invest more compared to other forms of companies. Similarly, the locally owned private firms invested more than public companies in the early 2000s, but this trend changed in 2004.

Table 6: Investments by type and size of operator

	2001	2002	2003	2004
Direct Public Administration	136453.49	143025.42	103051.10	111429.17
Local	136453.49	143025.42	103051.10	111429.17
Microregional	--	--	--	--
Regional	--	--	--	--
Autarky	532386.30	557997.06	547126.94	457645.92
Local	513055.39	521468.55	548444.20	434981.40
Microregional	405257.85	602674.69	608623.33	541248.61
Regional	3454309.86	5785506.69	5174.13	4792124.56
Privately-owned company or public company with private management	8480585.47	9251176.07	9686443.71	5560120.69
Local	3041880.35	3725373.26	2876372.75	1516335.76
Microregional	4537491.10	4189316.61	4408820.93	3548444.67
Regional	50494615.71	52993655.18	65273374.62	69234408.74
Publicly-owned company or public company with public management	23075693.54	25684752.22	17500182.89	25234027.12
Local	1950978.61	1587030.93	2007809.76	2431744.95
Microregional	--	--	--	--
Regional	30757408.07	35542910.92	25246369.46	37178079.69

Figure 8: Investments by type and size of operator



We could argue that private companies have a higher level of productivity and have a tendency to improve leakages better than other of firms. They have invested substantially higher than other forms of companies. The above data also points towards the fact that private firms have contributed to increasing access. Access also increased by other forms of firms.

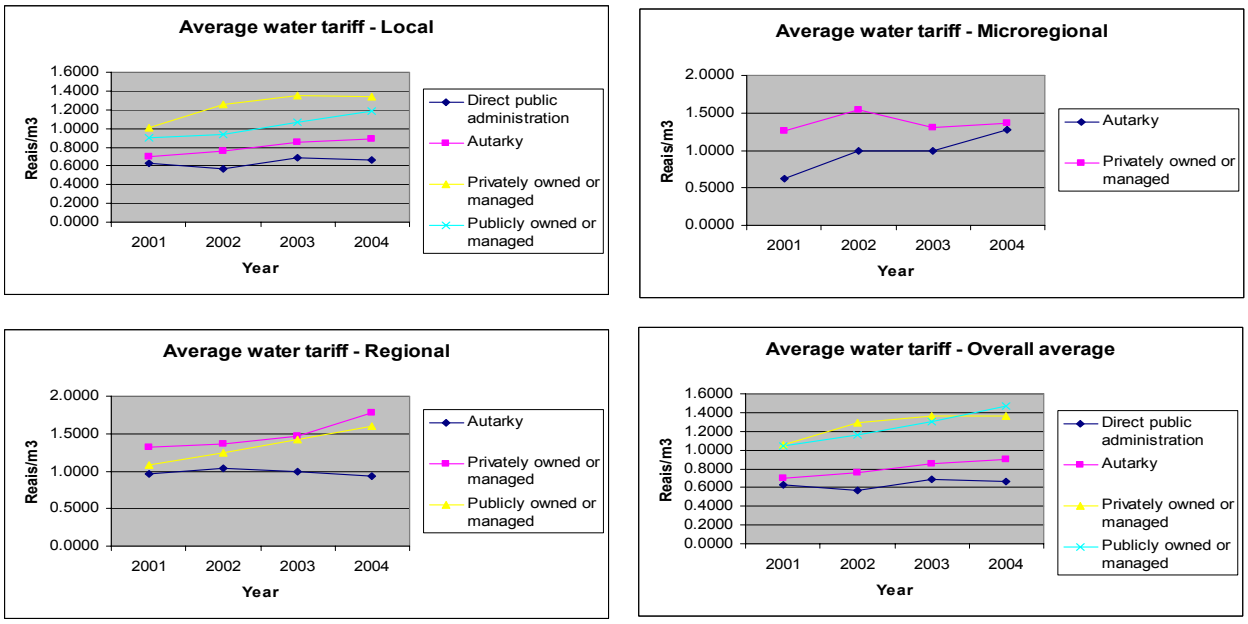
6. The effect of private provision on affordability of water services

As mentioned earlier, affordability of water services is a major issue in Brazil. What is the impact of PSP on the affordability of water services? Data reveals that tariffs charged by private entities are higher than those charged by public entities. However, overage the average tariffs of publicly owned or managed companies in 2004 have been higher than private firms. Direct public administration is the category with the lowest tariffs on average.

Table 7: Tariffs by type and size of operator

	2001	2002	2003	2004
Direct Public Administration	0.6316	0.5648	0.6884	0.6682
Local	0.6316	0.5648	0.6884	0.6682
Microregional	--	--	--	--
Regional	--	--	--	--
Autarky	0.7033	0.7613	0.8579	0.8968
Local	0.7025	0.7529	0.8529	0.8890
Microregional	0.6206	0.9941	0.9989	1.2714
Regional	0.9597	1.0358	0.9922	0.9406
Privately-owned company or public company with private management	1.0511	1.2867	1.3580	1.3660
Local	1.0027	1.2573	1.3527	1.3392
Microregional	1.2546	1.5426	1.3049	1.3641
Regional	1.3213	1.3651	1.4725	1.7715
Publicly-owned company or public company with public management	1.0397	1.1582	1.3087	1.4641
Local	0.9030	0.9378	1.0687	1.1797
Microregional	--	--	--	--
Regional	1.0872	1.2484	1.4178	1.6063

Figure 9: Tariffs by type and size of operator



We could conclude that private firms generally have higher tariff.

7. Conclusion

The provision of sanitation services in Brazil is by and large very deficient. As was shown in this chapter, the main problems can be found in rural areas and the poorest regions of the country, which usually display lower access rates and bear a greater burden from water and sewage bills. The poorer households are also having difficulties accessing and paying for water.

Nevertheless, there have been some improvements lately. That can be at least partially attributed to the investment and social policies implemented in the sector. Those policies have been mainly structured in the form of programs managed by different ministries. The main objective of most of those projects is to increase production capacity and coverage of water supply. Some of those programs have targeted projects aimed at increasing water supply and sanitation services for low-income families, while others were tailored to increase coverage and improve quality of service in rural areas. There has been relative success in that area, with coverage rates for the lowest three deciles having increased. This is indication that the poor have benefited from social policies put in place in the sanitation sector. In spite of the relative success of social policies in reducing inequality, the distribution of access across income deciles continues to be very uneven in Brazil.

We have argued that these social policies, mainly encouraging investments through loans have focused essentially at increasing coverage and neglecting the affordability issue. Policies that target affordability issues are essentially based on cross subsidies and IBT, which allow companies to charge "social tariffs" to low income families, usually expressed in terms of a certain percentage of the full tariff. The state regional companies generally abide by rules specified in state and/or municipal laws for social tariffs. However, the private companies are more reluctant for having social tariffs.

There is no federal regulatory agency in charge of tariff setting or other regulatory functions in the water sector. In addition, the few state regulatory agencies are not yet effective and small municipalities' administrations lack the knowledge and staff to regulate effectively. Tariff setting rules are either the result of negotiations between the companies and the state or municipal administrations, in the case of public companies, or are already written into concession contracts, in the case of private companies. Despite some limited success, water (and sewage) bills are much more burdensome for low-income families than high-income families.

To solve the problem of access and affordability, one option is to rely on public investments and state-owned companies. Although this model has served the sector well in the past, it seems to have reached its limit. Restrictions imposed on public investment by a macroeconomic policy with strict targets combined with constraints on state-owned companies' ability to increase debt have sharply decreased investments in the water sector. In this case, the government has been involving the PSP. Despite the limited experience of PSP in the country, we show that the private sector has managed to increase coverage. This has been achieved by higher levels of productivity, increasing efficiency, reducing leakages, and increasing investment. All these improvement have benefited mostly the poor. However, private firms generally charge higher tariffs.

We argued that the impact of the PSP would have been greater if there were better social policies by placing emphasis on tariff design, so that low-income families were not adversely affected. Universal service obligations, currently absent from most concession contracts, could be negotiated with or even imposed on private providers.

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