SENEGAL URBAN WATER SECTOR

Interim Report for

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Assessing the Impact of Privatization in Africa.
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By

Yahya Jammal
Leroy Jones

Boston Institute for Developing Economies (BIDE)

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This case study is part of a larger project begun only in March 2004, which is still work in progress. Interim and partial results are presented here solely to stimulate discussion and seek feedback from the PPI conference. Anything said here is preliminary and should not be quoted. The broader study focuses on eight transactions involving private sector participation in infrastructure and other sectors in four Sub Saharan African countries. The main goal is to measure performance impacts and to highlight the factors that led to the outcomes. The analysis covers equity as well as efficiency, measuring the impact on various stakeholders: primarily consumers, workers, the government, and the new owner or operator. In sum, a successful privatization is not just one where the deed gets done, but where performance improves substantially and the results of that change are distributed equitably enough to sustain the process. The companies selected for the study include failures as well as successes. One can learn at least as much from the former as the latter and the goal is to help replace faith-based policies with ones that are fact-based.

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1. WHAT WAS DONE?[1]

In assessing the state of Senegal's water sector at the outset of reforms, you need to distinguish between financial and technical conditions. Technical standards at the state-owned SONEES (*Societe Nationale d'Exploitation des Eaux du Senegal*), though far from ideal, were quite good for Africa (figures provided below in Section 2) and the managers and workers were generally well regarded. Financially, it was another story, especially following the 1994 devaluation of the CFA which halved the value of the currency and created a severe financial crisis for the country. The GOS was unwilling to set tariffs to cover costs and the company lacked the power to collect bills, particularly from public sector clients. By 1995 it was unable to settle its accumulating arrears with suppliers, let alone undertake necessary investments. The government (especially the responsible Minister at the time) then decided that a reform of the ***sector*** was necessary in order to build a ***sustainable*** structure that could provide the necessary improvement and expansion of the system without having to depend on government subsidies.

A steering committee was created with representatives of all government agencies concerned with water at the time (the ministries of Finance, Hydraulics and Industrial Development) as well as the offices of the President and the Prime Minister. The Committee carefully evaluated various reform options and studied the experience of other countries with the aid of an international consulting firm. It then decided to dissolve SONEES and designed a new structure for the sector with the following key elements:

- Unbundling the sector with separate organizations for sewerage (ONAS), rural water (becoming the responsibility of the Directorate of Hydraulics) and urban water.

- A new state-owned asset-holding company (*Societe Nationale des Eaux du Senegal,* SONES) to own the assets, oversee the entire sector, and be responsible for planning and financing investment. It would have a 30-year concession contract and shorter performance contracts with the government).

- A private operator responsible for production, distribution and collection of urban water under a 10-year *affermage* contract.

- Notably, there was no regulatory agency: operator tariffs were set in the affermage contract and SONES sets consumer tariffs.

- A financial model to help set tariff levels to ensure both financial viability

[1] In this section, we rely heavily on: Clarissa Brocklehurst and Jan Janssens, *Innovative Contracts, Sound Relationships: Urban Water Sector Reform in Senegal* (Washnington DC, World Bank, 2004). This is an excellent and comprehensive study, in part because one of the co-authors was a major player in the reform. If you are familiar with this, you'll learn nothing from this section and should move on to Section 2. Here we only give a summary of their much more comprehensive work.

of the sector and help the government achieve its goals in that sector.

- Long-Term Water Project at the Ministry of Agriculture and Hydraulics officially to coordinate planning and policy. Unofficially, it (or least its coordinator) has played a very important role in executing the mediation part of regulation.

An international competitive bidding process was then organized in two stages:

- pre-qualification, in which four pre-bidders were invited to comment on a Request For Proposal, then the final version was sent to all four;

- Actual bidding, which in turn was done in two stages: first submission of a technical proposal (all four participated). One bidder was eliminated for non-compliance. Following clarifications with other bidders, another was eliminated (for non-compliance with further essential requirements). The remaining two were then asked to submit financial bids. The winner was then selected based on the lowest rate per cubic meter.

The winning bidder was *Senegalaise des Eaux* (SDE), which was established in December 1995 with the following shareholding: the French Societe d'Amenagement Urbain et Rural (SAUR) (57.8%), private Senegalese investors (32.2%), the government (5%) and former SONEES staff (5%).

This has been the structure governing the sector since about the middle of 1996.

2. WHAT WERE THE RESULTS?

Senegal water is widely regarded as a success story, with even persistent critics acknowledging this. Get quote from Nilgun. But conventional wisdom is sometimes wrong. To what extent do the data support this conclusion?

2.1. Consumers

One primary goal of the reform was to increase the quantity of water to consumers. To what extent was this achieved? Figure 1 provides a historical series of the quantity of water produced, sold and paid-for since 1990 while Table 1 compares growth rates for the pre (1990-1995) and post (1996-2004) periods.

First consider production. The pre-privatization period saw steady but unspectacular growth at an average annual rate of 1.2% whereas the post-privatization period saw unsteady growth averaging 2.3%. Just comparing the growth rates makes it look like progress was twice as fast under private management. However the latter average ignores the sources of the variance in the later period. In 1996 it appears that peak use of the existing capacity was reached. Then deterioration of the existing network, coupled with significant cuts in electricity, resulted in a decline in production in 1997 and 1998.

Then in 2000 production jumped due to the coming on line of the Ngith treatment plant which expanded capacity by 23%. That expansion appears to be the primary reason output increased in the latter period. Adjusting for that, there is no convincing evidence that private management was any better than public management at using existing capacity. Since it is doubtful that funding for Ngith would have been obtained without the reforms, the growth can be attributed to the process in general, but not to the heightened technical and managerial skills of the private operator.

Figure 1: Production and Sales of Potable Water (million m^3)

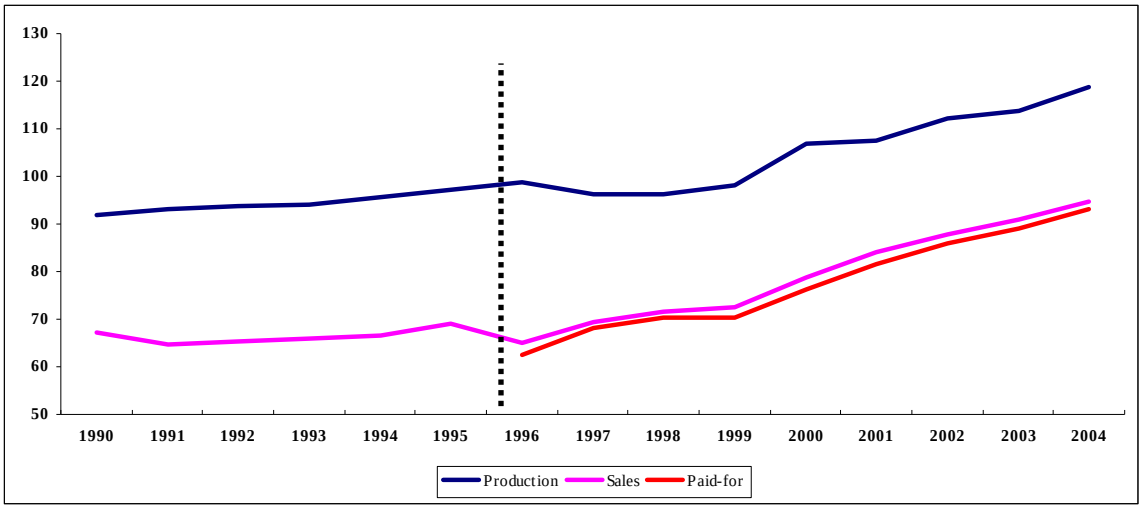


Table 1: Average Annual Compound Growth Rates Before and After Privatization (%)

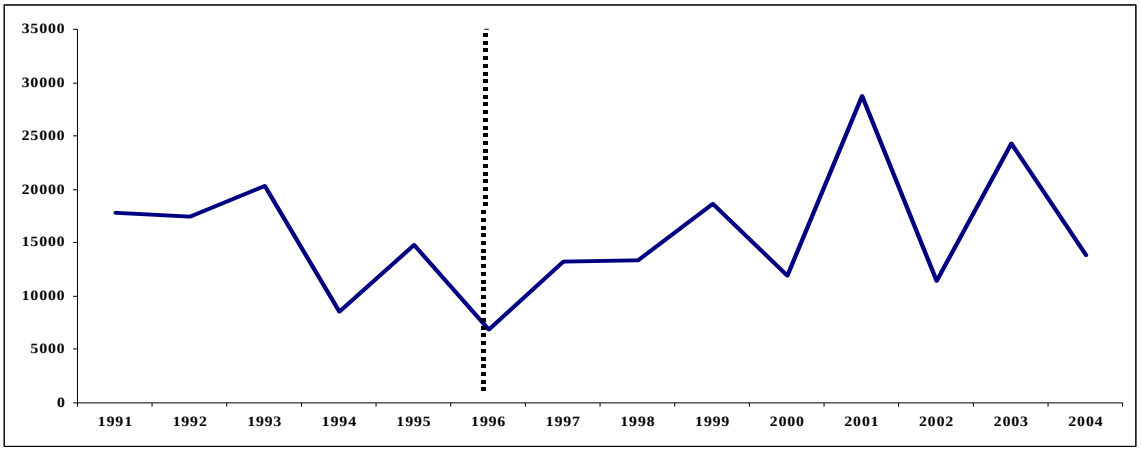
	1990-1995	1996-2003
Production	1.2	2.3
Sales/Billed	0.5	4.8
Paid-for Water	NA	5.1

Water distributed, however, shows a very different picture, going from flat-line to steady growth at about 5% per year. This is the sort of clear performance kink that one looks for as evidence of improved management. The paid-for water series shows similar growth in the post- period, but at the moment, no pre- data are available. So, we have no evidence of improvement in produced water, but marked improvement in distributed water (and almost certainly in paid-for water as well). Why this differential performance by the private operator? And just how good is 5% anyway? We'll try to answer both questions below. Here we only emphasize that the most important thing is water to the consumer; that is better measured by billed than produced water; and it is billed water where the performance kink occurred, so reform has helped make consumers better off in terms of the quantity of potable water.

How was this gain distributed? Did it go to more water for old consumers or to increased **access** by new consumers? This is an important question, because water is storable, so

getting water for more hours per day just adds convenience while getting access for the first time means drinking safe water. For example, you could argue that giving two consumers access for 12 hours a day is better than giving it to one for 24 hours. We aren't ready to answer this question definitively, but Figure 2 provides some glimmers by showing the annual increase in connections. There is a 7% increase in the post- period average over the pre-, but the average ignores a clear change in trend, from downward in the pre-period to upward in the post-. So, though we don't yet know how much of the growth went to new consumers, we do know that it was probably more than would have been under continued public management.

Figure 2: Number of Additional Connections

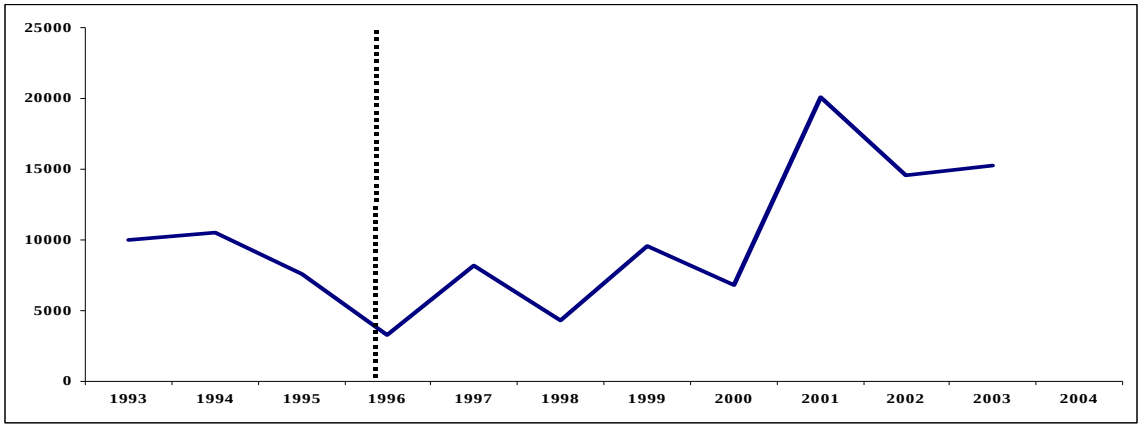


Cutting distribution on a different dimension, have the poor benefited? Special benefits to the poor were to have been provided in four ways:

- Subsidized tariff at low consumption levels: household consumption under 10 m^3 per month is priced at a "social tariff", which is cross-subsidized from higher consumption levels;
- Expansion of Public Standpipes: which usually serve poorer neighborhoods;
- "Distributing the Deficit": meaning shifting from a policy that cuts off poor neighborhoods at the expense of rich ones, to equal cuts; and
- Social connections: which are subsidized connections for households meeting particular poverty criteria.

With no adequate data presently available on the first three points, let us examine the fourth. As Figure 3 shows, the number of social connections had been on a declining trend until 1996 and an upward trend since then. So, while the program was designed to give special assistance to the poor, there is only a single piece of evidence to show that this happened.

Figure 3: Number of Social Connections



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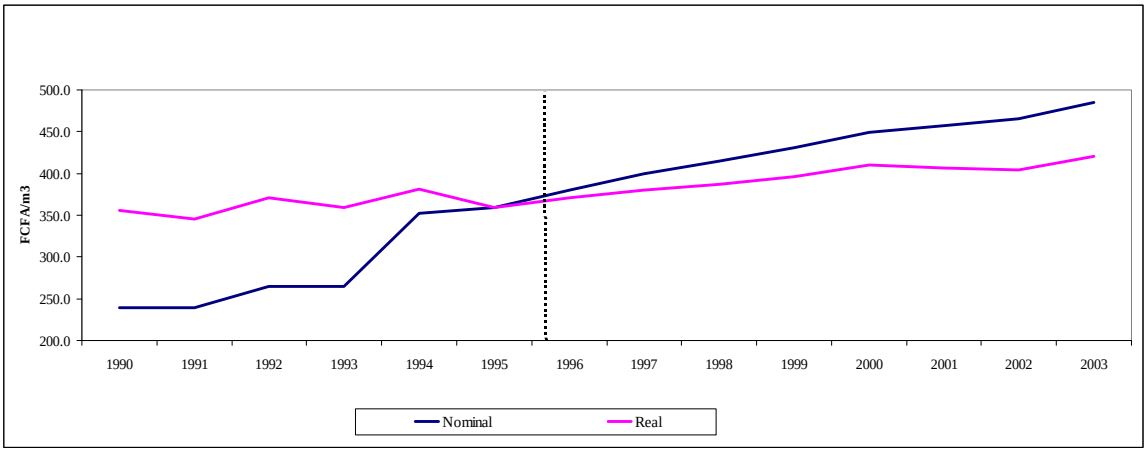
So overall, privatization has resulted in a noticeable increase in the quantity of water that reaches consumers and in the number of customers with access to water. What about the quality of water provided to these customers?

Water quality data are available only since 1996: microbiological conformity increased from 96.0% in 1996 to 97.7% in 2004 against a target of 96%; physical-chemical conformity from 95.0% to 99.0% in 2003 against a target of 95%. That is, starting from a very high level, things got better a bit faster than targeted.

The other dimension of water supply is quality of service. No data are presently available on this to allow comparison of pre- and post- periods.

What about prices that consumers paid? The actual tariff structure is rather complex but Figure 4 provides an indicative average price paid by consumers both in nominal and real 1995 prices. Prior to the reform, the average tariff undertook two major increases (one of 10.5% in 1992 and the other of 33.6% following the FCFA devaluation in 1994). In inflation-adjusted terms, this translated into a mere 0.2% annual increase during that period. Since 1996, the nominal tariff has increased steadily, at an average annual rate of 3.5%, which translates into 1.8% in real terms. The 3.5% rate of increase after privatization was a decision made before privatization. Using the financial model, this was the compromise reached between maintaining a politically acceptable rate of increase on the one hand and the need to eventually cover all costs and make the sector sustainable. So the increase in tariff that came with privatization has been noticeable but small.

Figure 4: Nominal vs Real Average Price of Water for All Consumer Groups



What about the impact of this increase on various groups of consumers? Table 2 gives the average annual increases in the tariff of major consumers before and after privatization. With the exception of small gardeners, all groups appear to have been subjected to comparable increases in tariffs in both periods. As for small gardeners, their tariffs were subjected to higher increases in order to encourage conservation. The most important result is that prices went up half as fast in nominal terms under the reform structure but by several multiples in real terms.

Table 2: Average Annual Increase in Tariff Before and After Privatization (%)

Major Consumer Group	Nominal		Real	
	1990-1995	1996-2003	1990-1995	1996-2003
Consumers with meters < 15 mm	8.1	4.1	-0.1	2.4
Establishments	8.9	4.8	0.6	3.1
Senegalese administration	8.9	4.2	0.6	2.5
Public standpipes	6.7	4.4	-1.4	2.7
Small gardeners	12.2	5.2	3.6	3.4
All groups	8.5	3.5	0.2	1.8

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Table 3 compares the average tariff paid by consumers in Senegal with that in other countries/regions. Two points are worth noting:

- Pre-privatization tariffs in Senegal were already high in comparison with other countries, in Africa as well as Asia; and,
- Privatization in Senegal brought prices to a comparable level to other West African countries.

Table 3: Average Prices ($/m^3) Paid by Consumers in Senegal vs Other Countries

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Senegal	0.85	1.00	0.93	0.64	0.72	0.74	0.68	0.70	0.70	0.63	0.62	0.67	0.84	
Uganda						1.05	1.06	0.81	0.73	0.54	0.56	0.54	0.54	0.58
Mozambique						0.20	0.29	0.28	0.40	0.32	0.31	0.36	0.41	
West Africa					0.67	0.73	0.68							
Asia					0.36						0.24			

In sum, high prices have not been a contentious issue with Senegalese consumers: prices were high before privatization and grew only slightly faster after. But the quantity of water, access and quality all improved, so consumers almost certainly were net winners from privatization.

2.2. Employees

How did employees fare with privatization? Typically, labor unions complain of layoffs and of substantial benefit cuts. As Figure 5 shows, employment in SDE, and therefore in the sector (SDE + SONES), declined steadily at 1.8% per year. By contrast, employment in the new SONES was steady. Personnel costs, on the other hand, increased by an average annual rate of 4.1% for the sector with SDE's at 3.8%. Figure 6 shows the trend in nominal and real labor cost for SDE and the sector as a whole. The main conclusion for the sector is that while the cost per employee has increased steadily, both pre- and post-privatization, the real cost per employee has remained steady for the entire period (

Figure 7), compared to a steady increase for SONES employees (Figure 8).

Figure 5: Number of Employees

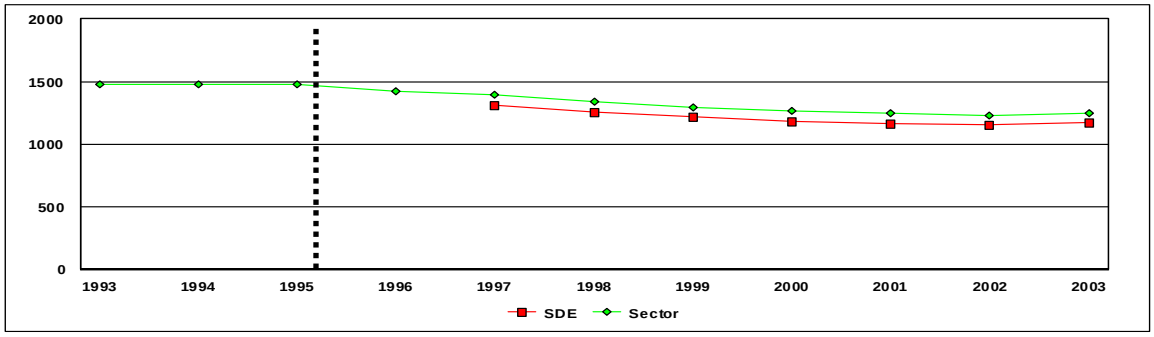


Figure 6: Labor Cost, Current vs Constant 1995 Prices (billion FCFA)

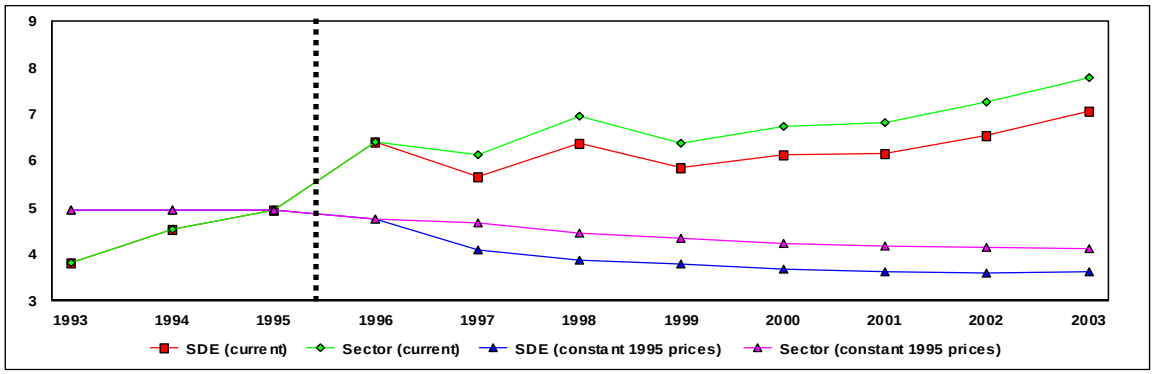


Figure 7: Average Unit Labor Cost for the Sector (Nominal vs Real)

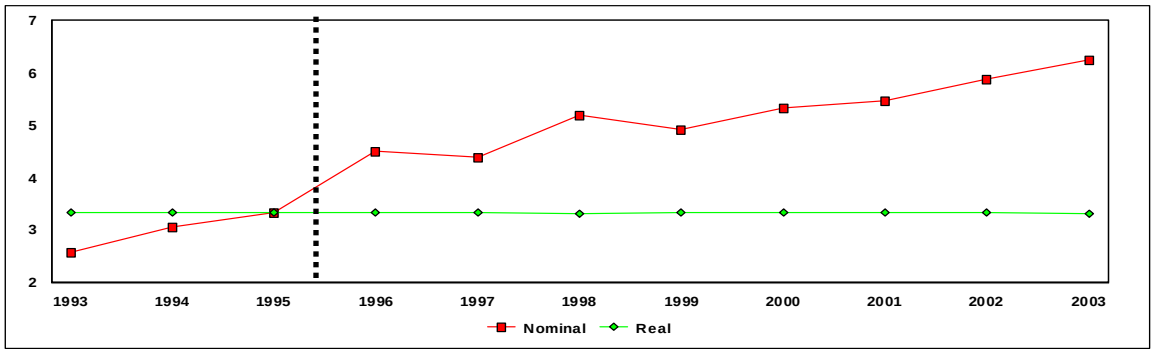
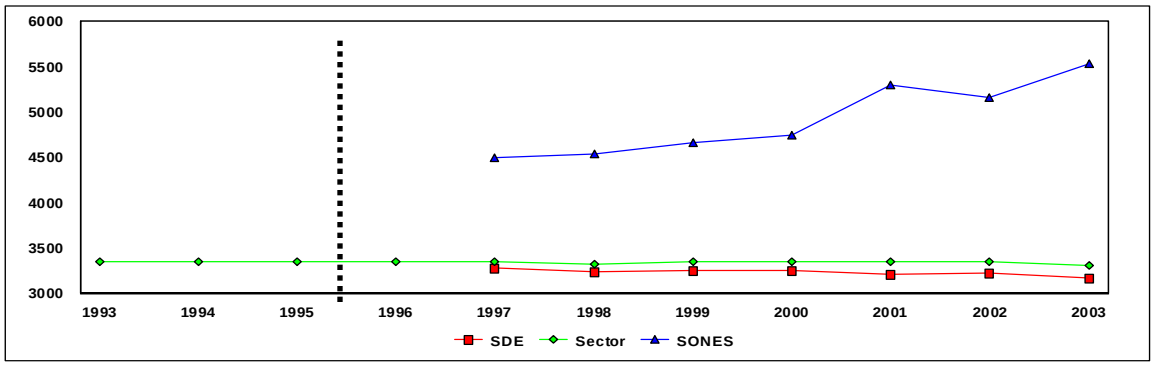


Figure 8: Average Real Unit Labor Cost (000 FCFA/person)



SDE's labor union had two main complaints: the first was the decline in employment and the second was the decline in worker payments. On both counts, these claims appear to be substantiated by facts, at least in the aggregate. The decline in employment, averaging about 20 through 2003, is due to normal attrition (retirements, deaths, voluntary resignations) according to the company, but include about 10-15 "involuntary" resignations according to the union. Still, the magnitude is hardly dramatic.

More important is the issue of the decline in pay. Whereas the average SONES employee (who is already paid about 40% more than the average SDE employee) has seen his pay

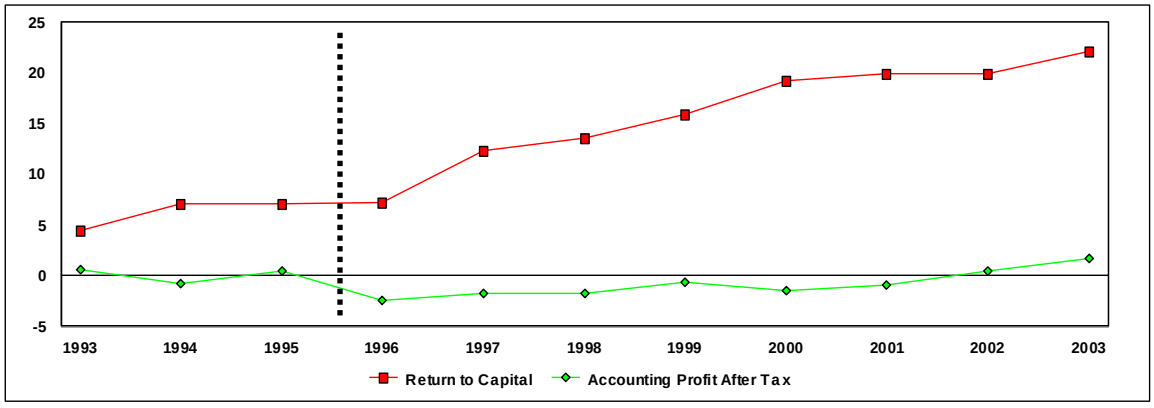
rise by an average 10% per annum, the average SDE employee's pay has risen by a more modest 5.7% per annum, which when adjusted for inflation translates into an annual decline of 0.5%. The realization that labor payments were not keeping up with inflation may have been behind the new SDE salary grid beginning in February 2005, which resulted in increases averaging annual rates of 2.4% for laborers, 1.5% for mid-level workers and 0.8% for executives. That one-time increase roughly adjusted for inflation during the period.

Our tentative conclusion, therefore, is that thus far labor is likely to have been a net loser from privatization, though by a very small amount. The pay increase of 2005 may offset some of this and jobs may eventually grow as profits are poured into expanding the system, but that is the story as of 2004.

2.3. Enterprise Performance

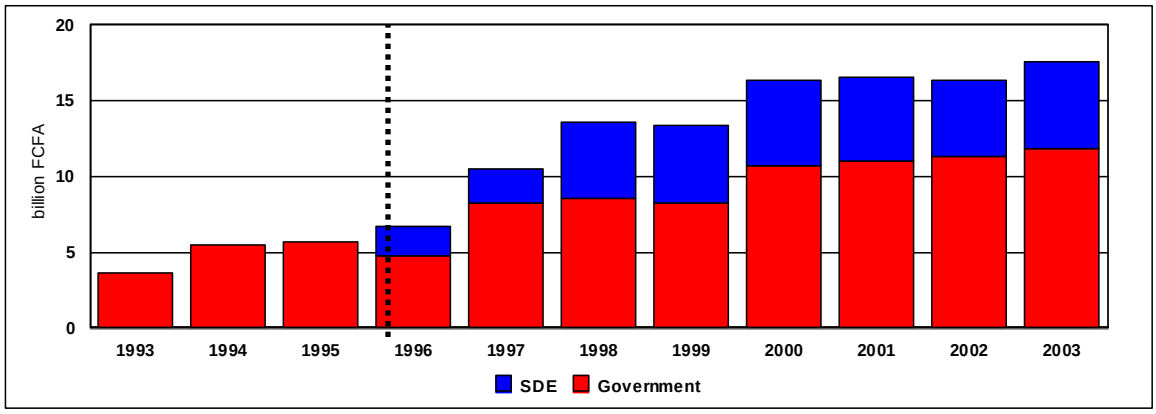
Figure 9 shows both accounting and total return to capital (TRC) (for SONEES before and SONES plus SDE after). Not surprisingly, accounting profit was essentially zero in the pre- period, but the fact that it then turned negative may surprise some. TRC shows a quite different trend, from flat to steady growth at 17.4% per year. Why the difference? Largely depreciation. TRC is technically quasi-rents, but is closely approximated by the accountants' concept of EBDIT (earnings before depreciation, interest and taxes). The details needn't concern us here. What is important is that the sector is clearly making significant strides towards financial sustainability as per the financial model.

Figure 9: Water Sector Return to Capital vs Accounting Profits



Who gets this surplus? Some goes to creditors as interest but the rest is divided between SDE and the government (as direct taxes plus return to SONES for investment). How much to each? **Error! Not a valid bookmark self-reference.** gives a preliminary estimate of the shares going to each side.

Figure 10: Distribution of Sector Surplus



This is a key figure for understanding the impact of this privatization. It says that about two thirds of the surplus goes to the government and one-third to SDE. Or, by giving SDE surplus equivalent to what the government was getting before privatization, the government doubled its own return. Or, the increment in the surplus was divided roughly 50/50 between the government and the private operator.

If performance, measured by TRC, has clearly improved after privatization, was it due to improved efficiency or to favorable price effects? Table 4 sheds some light on this issue by decomposing annual changes in profit into price and quantity effects for its main components and averaging them for the pre- and post-privatization periods. This table is one of our favorite ways of comparing enterprise performance in different periods. To interpret it, look at output in the pre- period: the table says that while sales went up an average of 2.58 billion per year, all of the gains were due to favorable price effects: quantities actually went down.

Table 4: Price and Quantity Effects: Pre vs Post Privatization

(annual average in billion fcfa)

	Pre (1993-96)	Post (1996-2003)
Output		
Price Effect	2.90	1.37
Quantity Effect	-0.32	1.45
Total (Value) Change	2.58	2.81
Intermediate Inputs		
Price Effect	0.55	0.05
Quantity Effect	0.14	0.51
Total (Value) Change	0.69	0.56
Employee benefits		
Price Effect	0.57	0.50
Quantity Effect	0.01	-0.14
Total (Value) Change	0.58	0.36
Profit		
Price Effect	1.78	0.82
Quantity Effect	-0.48	1.07
Total (Value) Change	1.31	1.90

The bottom line here is that while increases in annual profits after privatization were due more or less equally to favorable price effects (mainly output prices) and improvements in real efficiency, increases in profits before privatization were due solely to favorable prices. It looks as though pre-privatization prices were set to keep the enterprise from losing money, consistent with the soft-budget constraint theory and, as expected, efficiency gains were negative. Efficiency (measured as the ratio of intermediate inputs to output) also showed a clear improvement.

A major source of these gains was: technical efficiency (the ratio of the volume of water billed to water produced) and collection efficiency (the ratio of the volume of paid-for water to water billed). Table 5 provides a time series for technical efficiency for Senegal since 1991 and compares it with levels achieved in other countries of sub-Saharan Africa and the average of 50 Asian cities. With an average pre-privatization level of 70%, a significant improvement has been achieved post-privatization with the steady rise to the 79.9% level in 2004 (a post-privatization average of 76.3%). Given that the standard in developed countries is about 85%, this is certainly an impressive achievement. But it also answers the earlier question of whether or not the 5% gain in water sales was "good". In one sense it is not good: in Mozambique comparable post-privatization gains were two or three times as high. But that is because it started with a technical efficiency ratio that was less than half as high, so there was a lot of room for improvement. Senegal, on the other hand, started with a level that was already good and improved it to something approaching standards in developed countries. And that would seem to qualify as "good" performance.

Table 5: Technical Efficiency Senegal vs Other Countries (%)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Senegal	69.6	69.9	70.2	69.5	70.8	69.5	72.1	74.4	73.9	73.9	78.1	78.5	79.9	79.9
Uganda					32.7	39.6	40.4	47.7	54.5	56.5	57.4	59.6	60.8	61.8
Mozambique								46.3		43.1	46.8	46.7	42.9	44.2
Asia					65.0									

Table 6 provides a similar time series for collection efficiency. As can be seen, the story is basically the same as for technical efficiency: good even under public management by developing country standards and then improvement to developed country standards.

Table 6: Collection Efficiency Senegal vs Other Countries (%)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Senegal	90.1	96.0	98.0	98.0	97.0	97.0	97.2	97.7	98.2	98.3
Uganda	60.0	60.0	60.0	60.0	61.0	75.0	85.0	92.0	92.0	100.1
Mozambique		64.1		70.1		58.3	58.1	68.1	64.9	71.7
Asia	87.7									

2.4. Investment and Capital

How much of the gains seen thus far were due to investment and hence a greater stock of capital? We know that international donors contributed over 250 million dollars to this end, and SONES surplus funded more. Taking this into account will certainly reduce the partial measures of efficiency gains noted thus far, and could conceivably even turn them into a loss. Unfortunately, at this point we have not had time to address this question because it requires constructing a capital stock measure using a perpetual inventory method. We will do so for our longer report.

In sum, work to date does nothing to dispel, and much to reinforce, the conventional wisdom that privatization of the water sector in Senegal was on balance a success. There were clear improvements for consumers (quantity, access and price), and government, with labor losing only a bit (and that showing signs of reversal in 2005). But without taking into account investment effects we can't make a final judgment. The following attempt to explain the partial results obtained thus far needs to be read with the caveat that it will need to be amended to include an explanation of investment effects.

3. WHAT EXPLAINS THESE RESULTS?

In answering this question, we will at several points find it informative to compare the results here with those in Senegal's electricity sector. You now know what happened in water. In Electricity, briefly, the company was fully privatized in 1999, but the Government of Senegal revoked the sale eighteen months later. A second tender was organized and a winner selected, but negotiations broke down and the company is once again a public enterprise. Details may be found in our companion paper. Here we only note that this was a markedly different result from water and cross-referencing success factors in some areas helps explain both results. We start with "external factors" outside the control of the players in the reform process.

Initial Conditions: From the technical side, SONEES was relatively well run, so good technical people were available to SDE from the start. But this also limited the degree of progress that could be achieved: for example, when you start with technical efficiency of 70% and the developed country standard is 85% you're not going to get major increases for long. And, the fact that consumers had been paying high prices before privatization made the necessary annual increases much less controversial than they would have otherwise been.

Crisis and Devaluation: World-wide, countries generally make tough choices such as privatization only in an environment of crisis. The 1994 CFA devaluation halved the value of the country's currency and forced the government to take, and the people to accept, reforms that would not have been possible in a more benign environment

Luck: The reform benefited from good timing in terms of the attitudes of the international community. The mid-1990s was the peak of the donors' enthusiasm and this helped Senegal get the critical $223 million that helped make the reform possible. More importantly, it was also the peak of private sector enthusiasm for bidding on such deals. If water reform had been delayed until 2001, for example, would the results have been any different from electricity, when only two bidders could be found and the winner bailed out before signing?

Turning to internal factors, what did the policy-makers do right? Well, pretty much everything, but here are some of the more important things. We won't bore you by reciting the liturgy (use transparent and competitive bidding…). Rather we will focus on the doctrinal elements which Senegal water sheds particular light on.

Do Your Homework. A senior official at SONES, when asked the reason for the difference in results between water and electricity, replied: "Because we did our homework". Having reviewed the written record of both cases, we think that this is an important part of the answer, though by no means the whole answer. They had a clear goal, learned from other countries, and the quality of the work in integrating their learning was excellent. Neither they nor the Bank skimped on the effort, with the latter putting in at least three times the manpower into water that they did into electricity.

Involve All Stakeholders. An official of a Senegalese consumer advocacy group, when asked the same question, replied "Because the water people listened." Although his group had tried to get involved in both sectors, they were shut out in electricity but welcomed in water, including having a seat on the SONES board. Similarly, the attitude of labor unions has been quite different in the two cases. In water, they initially resisted the idea, but were brought on board through a variety of means. In electricity, workers felt ignored and angry enough to disrupt production in the early stages of the privatization.

Don't Skimp on the Financial Model. Much of what the reformers learned was embodied in a well-designed, comprehensive, financial model which allowed them to set both operator and consumer rates intelligently with due consideration of the tradeoffs involved. Further, as we understand it, it has since been regularly updated by capable Senegalese (something which hasn't happened in some other countries).

Build Political Commitment. Reform requires tough decisions, both at the outset and during the likely expected crisis along the way. Initially, that commitment, we are told, was unequivocal on the part of the Minister in charge of Hydraulics, who, as a senior member of the cabinet at the time, felt confident enough to take tough measures and was looking at the

reform as his crowning achievement. But what explains the commitment of the new government in 2000? In electricity, one result was throwing the private owner out. Why didn't that happen here? We're not entirely sure, but believe that part of the answer was SDE's record of success.

Pay Careful Attention to Regulation. Conventional wisdom is to have an independent regulatory body. Senegal water doesn't. They are quite proud of what they call "regulation by contract" because it avoids the well-known difficulty of regulation. Given the success of the model, their approach certainly deserves consideration. But it is misleading to say that they have avoided the problems with regulation. Rather, they have solved them in a non-standard way. The fact that the operator tariff is spelled out in the contract is hardly unique; rather, it is ubiquitous in lease and affermage contracts. And, someone still has to set the consumer tariff; here it just happens to be someone else. The key is the quality of the financial model and the understanding of the people who use it, and not the name on the building in which they sit. Similarly, someone still has to deal with dispute resolution, but here it is officially special tribunals. In practice, informal methods have been used. Most importantly and revealingly, in 1998 when SONES and SDE agreed to revise technical efficiency targets using objective arbitrators acceptable to both parties. The head of the Long Term Water Project at the Ministry of Agriculture and Hydraulics played a particularly important role as have international donors (one SDE official referred to the process as "regulation by the World Bank").

Choose an Appropriate Form of Contract. Use of the affermage lease/concession likewise deserves consideration given Senegal's success. To what extent was the success due to this choice? And to what extent was electricity's failure due to choice of full privatization? We'll defer comment until our longer study.

Get Incentives Right: this warrants more detail, so we will give it.

As economists, our bias is that more often than not, a private contractor will do exactly what the government asks, so long as it is made worth their while (and is technically feasible and within their control). What did the government seriously ask the enterprise to do? This is contained in a lengthy Annex to the contract full of boring formulae. Here, a translation into plain English will suffice. The starting point is that the government reasonably does not want to pay for water that is **lost** (dribbles into the ground or evaporates), **stolen** (illegal connections) or **given away** for free (not billed or bill not paid). So, primary compensation is based on water actually paid for, and not for water produced. The simple way to do this would be to just pay a flat rate per m^3 of water paid for. This is what many countries do. But Senegal does something cleverer. It uses what we call a "two-part operator tariff" with many of the same properties as the traditional two-part consumer tariff. The government says, in effect:

- For a given volume of water produced, we'll pay you at two rates. Up to a target paid-for volume we'll pay your bid price. But if you do better than the target, then the excess will be compensated at the full consumer tariff rate. And, symmetrically, if you do worse than the target then we will penalize you at the tariff rate.

- For a given level of combined technical and billing efficiency, if you produce more water, you will be paid at your bid price adjusted for the difference between the target and actual efficiency. That is, if your efficiency is the same as the target, then you will be compensated at your bid price. If your efficiency exceeds the target, then you will be compensated at a higher price than your bid. Conversely, if your efficiency falls short of the target, you will be paid less than your bid price.

That is, the government cares a great deal about improving technical and collection efficiency and is willing to pay a bonus for it. The bonus is potentially substantial since, for example, in 2003 the bid price (appropriately indexed) was $0.49 while the tariff was $0.83. This is a powerful incentive at the margin, and it's the margin that counts.

As a result, SDE has, among many other reforms, invested in establishing an impressive GPS-based system for dealing with water leaks and interruptions. SDE claims that some of the features of the system are state-of-the-art world-wide and groups come in from Europe to learn how they have done it. Given their incentives, is this particularly surprising? In our view, this two-part operator incentive structure is a particularly important determinant of success. Other, less important and unimportant incentives will be dealt with in our main report.

4. CONCLUSIONS

Our work thus far is consistent with the conventional wisdom that this was a success based on partial indicators: there were clear improvements for consumers (quantity, access and price), and government, with labor losing only a bit (and that showing signs of possible reversal in 2005). But we don't yet know the overall efficiency effects because investment costs have not yet been factored in. The Government of Senegal did things pretty much by the book, and in the process helped write a new edition. Particular attention should be paid to their two-part operator incentive scheme. Other notable features include: affermage, a state-owned asset holding company, and no independent regulator. The question is open for now, in our view, as to the extent to which it is these structural features themselves that help explain performance or whether it was the thoroughness of the underlying homework, especially the financial model. Might not these features embodied in a different institutional model have produced similar results?