

Privatization and Income Distribution in Argentina*

Huberto M. Ennis

Research Department, Federal Reserve Bank of Richmond

and

Santiago M. Pinto

Department of Economics, West Virginia University

November 29, 2002

(Preliminary. Comments Welcome)

Abstract

We study the impact that the privatization process in Argentina had on income distribution and the welfare of the poor. We divide our study in three main areas: the consumption effect, the employment effect, and the fiscal effect. We use household survey data to try to identify those changes in the economic organization of Argentina that could be associated to the privatization process. We find that the main effects of the privatization process were on the consumption side of the economy. The paper also provides a collection of stylized facts that document the significant structural reform that the Argentinean economy underwent during the 1990's.

* This paper is part of the project "The Effects of Privatization on Income Distribution in Latin America" supported by the Inter-American Development Bank. The authors would like to thank the project coordinator, Luis Felipe Lopez Calva, and the other participants in the project for their helpful and thorough comments. We would also like to thank John Nellis and Nora Lustig for their comments, and Leonardo Gasparini, Fernando Navajas, and Sebastian Galiani for their help in collecting the data. The view here do not represent the view of the Federal Reserve Bank of Richmond or the Federal Reserve System.

TABLE OF CONTENTS

I. Introduction.....	3
II. Overview of the Reform Period.....	4
1. Macroeconomic Situation and Evolution of Inequality and Poverty.....	4
2. The Privatization of Public Utilities.....	7
3. The Data.....	15
III. The Consumption Effect.....	16
1. General Aspects.....	16
Budget Shares.....	16
Evolution of Prices.....	18
Access to Public Utilities.....	28
Take-up Decision.....	30
Logit Regression for Access.....	31
2. Change in Consumer Surplus.....	33
Engel Curves: Non-Parametric Estimation.....	33
Change in Prices: First and Second Order Approximation to Consumer Surplus.....	35
Change in Prices and Access: First and Second Order Approximation to Consumer Surplus.....	39
Inequality and Poverty.....	45
Hedonic Rental Regression.....	47
3. Concluding Remark.....	49
IV. The Employment Effect.....	49
1. Changes in Employment: Firm Level Data.....	49
2. Changes in Employment: Permanent Household Survey (PHS) Data.....	51
Education Profile.....	54
Hours Worked.....	58
Tenure.....	59
Hourly Wages.....	60
Wage Regression.....	63
Income and Employment.....	66
3. Inequality and Poverty.....	68
Changes in Employment Level.....	69
Changes in Relative Wages.....	70
4. Concluding Remarks.....	71
V. The Fiscal Effect.....	71
Capital markets.....	79
VI. Review of Previous Literature.....	80
VII. Conclusions.....	84
VIII. References.....	85

I. Introduction

Up until the beginning of the nineties the government in Argentina was directly administering a substantial portion of the economy. Telephone services, the provision of electricity, fuel production and distribution, railways, banks, and a large number of other activities (that even included hotels and TV stations) were all part of the public sector.

In August 1989 a plan for Public Sector Reform was signed into law (Law No. 23696 of 18-08-89). The law stated a set of general rules to be used in the process of privatizing most of Argentina's Publicly Own Enterprises (POEs). In 1990, the first major privatization was completed (that of the national telephone company) and by 1997 most of the plan for privatization had been completed.

One major concern among those evaluating the consequences of implementing a widespread privatization reform like the one undertaken in Argentina is the distributive impact that such a process can have. In this paper we attempt to evaluate this impact by estimating the effect of privatization on consumers and workers. We use survey data when available and we provide some estimates of the change in standard measures of income distribution and poverty that can be attributed to privatization.

Two important factors limit our ability to obtain definitive results: First, the available data is of very poor quality, and in most cases we restrict our analysis to the sample of households from the Greater Buenos Aires area. Second, during the same period that the privatization took place the Argentinean economy experienced a number of other important transformations like a substantial trade liberalization and a long-lasting macroeconomic stabilization. The existence of these different simultaneous changes in the organization of the economy makes the identification of the impact of each separate change very difficult.

We study three main effects of privatization: the consumer effect, the employment effect, and the fiscal effect. In Section II we start the analysis by discussing some general aspects of the reform period. In Section III we study the effect on consumers of the privatization of Argentina's public utilities (telephones, electricity, natural gas, and water). We estimate the benefits associated with the changes in prices and the changes in the levels of access for those selected public services. First and second order approximation to the changes in consumer surplus are calculated and used to estimate the change in inequality and poverty that can be associated to the privatization. In Section IV we study the effect of the privatization on the levels of employment and on the wage structure prevailing in the sectors where the main privatizations took place. We also provide some rough estimate of the impact that these changes may have had on the measures of income inequality and poverty in the period. Section V discusses the fiscal implications of the transfer of ownership (from public to private) of substantial portions of the Argentinean economy. The section provides information on the magnitude of the payments in cash and, in the case where public bonds were used to pay for the sale, the amount of public debt that was recovered by the government. We also provide some evidence of the existence of a positive effect on the ability of the government to dedicate more resources to social assistance (and away from interest payments on the debt). Finally, Section V presents a short review of the related literature and Section VI concludes.

II. Overview of the Reform Period

1. Macroeconomic Situation and Evolution of Inequality and Poverty

During the privatization period, the Argentinean economy experienced several important macroeconomic changes. A strict stabilization program was implemented at the beginning of 1991 to bring to an end the hyperinflationary episode that had started in 1989. On December 1994, the collapse of the Mexican economy also had an important impact in the macroeconomic aggregates of Argentina.

Table 1. Argentina: Macroeconomic Indicators, 1970-1999.

Year	Inflation Rate (%)	Real Exchange Rate (1980 = 100)	Urban Unemploy. Rate (%)	Real Wage Ind. (1990 = 100)	Fiscal Surplus (% of GDP)	GDP Growth Rate (%)	GDP Per Capita (US\$)
1970	13.6	56.7	5.0	329.9	-2.0	5.4	1,238
1971	34.6	49.7	5.9	334.9	-4.6	3.7	1,474
1972	58.5	52.9	6.6	309.7	-6.1	1.8	2,191
1973	60.3	58.6	5.5	339.0	-8.6	3.5	3,592
1974	24.2	71.2	4.2	355.6	-8.5	5.7	4,710
1975	182.8	36.9	3.6	330.8	-15.6	-0.4	3,133
1976	444.0	46.4	4.8	200.2	-10.6	-0.5	1,445
1977	176.0	50.7	3.3	150.7	-5.0	6.4	2,422
1978	175.5	64.7	3.2	96.8	-6.7	-3.4	3,195
1979	159.5	83.4	2.5	93.9	-6.7	6.7	5,248
1980	100.8	100.0	2.5	112.6	-8.6	0.7	7,410
1981	104.5	89.0	4.8	126.8	-18.0	-4.6	5,923
1982	164.8	93.0	5.3	130.5	-18.9	-4.5	3,440
1983	343.8	92.0	4.7	197.6	-9.6	3.3	3,537
1984	626.7	137.0	4.5	203.6	-7.0	1.8	3,924
1985	672.2	145.0	6.1	157.8	-4.0	-6.7	2,918
1986	90.1	145.0	5.5	155.4	-3.1	7.1	3,440
1987	131.3	118.0	5.8	147.4	-5.0	3	3,479
1988	387.7	125.0	6.3	132.9	-6.0	-2.1	4,001
1989	4923.6	122.0	7.6	116.4	-3.8	-6.9	2,533
1990	1343.9	67.0	7.4	100.0	-1.5	-2.3	4,251
1991	84.0	48.9	6.4	101.4	-0.5	11.8	5,687
1992	17.3	42.9	7.0	102.7	0.6	11	6,830
1993	7.4	40.2	9.6	101.3	1.2	6.4	7,507
1994	3.8	42.9	11.5	102.0	-0.1	5.8	8,165
1995	1.6	47.6	17.4	100.9	-0.5	-2.8	8,110
1996	0.1	48.9	17.2	100.6	-1.9	5.5	8,527
1997	0.3	47.6	14.9	100.0	-1.5	8.1	9,171
1998	0.7	48.0	12.9	100.2	-1.4	3.9	9,355
1999	-1.5	48.0	14.3	100.4	-2.3	-3.1	8,953
Average							
1970-1975	62.3	54.3	5.1	333.3	-7.6	3.3	2,723
1976-1982	189.3	75.3	3.8	130.2	-10.6	0.1	4,155
1983-1990	1,064.9	118.9	6.0	151.4	-5.0	-0.4	3,510
1991-1999	12.6	46.1	12.4	101.1	-0.7	5.2	8,034

Source: Gasparini and Bebczuk (2000)

Table 1 provides a long-run perspective on the macroeconomic conditions under which the process of privatization in Argentina was conceived and finally undertaken. Significant government deficits were one of the main factors explaining the increasing pressure towards a privatization reform. In fact, those fiscal needs were a major consideration for the specific design of the basic framework used to implement the program, especially at the beginning of the process. In several cases, the privatization was organized so as to maximize the

immediate revenue accrued to the government. Section V discusses the fiscal aspects of the privatization in more detail.

The other main factor was the need to increase the inadequate investment levels in most of the public utilities. This lack of investment was part of a more general phenomenon reflected also in the almost twenty years of no aggregate economic growth.

Table 2. Investment, 1980-1998 (Constant Prices 1980).

Year	Total Gross Fixed Investment (% of GDP)	Public Investment (% of GDP)
1980	25.05	6.16
1981	22.57	5.50
1982	18.69	4.34
1983	18.01	5.20
1984	17.20	4.36
1985	15.84	4.03
1986	16.48	3.70
1987	18.39	5.70
1988	17.47	5.73
1989	14.73	4.39
1990	12.66	3.54
1991	15.07	2.20
Average 1980-1991	16.32	4.22
1992	18.24	1.81
1993	19.92	2.13
1994	22.35	2.07
1995	19.61	1.14
1996	20.48	1.21
1997	23.90	1.18
1998	24.45	1.12
Average 1992-1998	21.28	1.52

Source: Moguillansky and Bielschowsky (2001).

Per capita income in Argentina bottoms out in 1990 after the hyperinflation of 1989-90. Starting in 1991, per capita income grows steadily (until 1998) with only a short slowdown during 1995 as a consequence of the Tequila crisis (see Table 1). Income inequality increases steadily since 1991. The inflation stabilization during 1990 and the plan of structural reforms that came with it, had significant implications for the increase in the level of inequality. The Gini coefficient drops 12 % in 1990 but after that it increases to reach the 1989 levels around 1997/98 (see Table 3). The Atkinson measure of inequality shows a similar behavior.

However, the economic conditions that determined the evolution of income inequality during the nineties are of a very different nature than those that did so during the eighties. While annual inflation during the 1980's averaged 50%, the last decade in Argentina has been characterized by sustained price stability. Canavese et. al. (1999) have shown that the eighties' inflation was specially harmful for low income households. The tendency to increasing inequality in the nineties had to more than compensate the potential improvement associated with the decreased in the level of inflation.

**Table 3. Income Distribution in Argentina, 1980-1998.
Different Indicators (1980 = 100).**

Year	Mean	Gini Coefficient	Atkinson (v = 1)
1980	100.0	100.0	100.0
1982	93.9	103.2	107.2
1985	82.4	102.4	103.6
1986	87.8	102.1	105.1
1987	93.6	107.9	113.5
1988	91.7	108.6	118.6
1989	82.5	113.8	124.7
1990	80.9	99.8	99.9
1991	85.4	97.4	93.1
1992	91.9	99.7	99.3
1993	97.5	99.7	99.3
1994	101.7	105.1	108.9
1995	98.9	112.5	124.1
1996	103.2	111.5	122.2
1997	108.8	112.5	126.6
1998	110.4	115.4	129.6

Source: Gasparini and Sosa Escudero (1999) using data from the PHSs.

Note: The Atkinson index with $v = 1$ is the simple average of the log of income per capita.

The poverty indicators show an important decline immediately after the period of hyperinflation. Since 1993 the percentage of poor households experiences a steady increase (one household corresponds to approximately 3.3 persons). The percentage of households below the poverty line increased significantly in 1995 and 1996 and since then it has never recovered to the low levels reached around 1993. Finally, from 1991 to 1996 the fraction of households with unsatisfied basic needs (UBN) decreases from 10.1 % to 6.1 %. This decline may, in fact, be directly associated with the increase in access to public services associated with the privatization that we will discuss later.

Table 4. Poverty 1989-2000, Households.

Year	Households	Poor (%)	UBN (%)	PL (%)	UBN & PL (%)
1989	2,454,049	42.7	4.3	25.3	13.1
1990	2,402,101	32.9	7.6	16.2	9.1
1991	2,438,498	26.4	10.1	10.6	5.7
1992	2,708,341	23.2	9.6	8.6	5.0
1993	2,957,260	21.4	8.3	7.8	5.3
1994	3,057,137	23.1	8.9	8.7	5.5
1995	3,053,578	24.4	6.2	12.5	5.7
1996	3,015,566	26.1	6.1	13.2	6.9
1997	3,179,442	26.0	7.0	10.7	8.3
1998	3,243,848	26.1	7.8	9.6	8.6
1999	3,151,904	27.6	8.7	9.8	9.1
2000	3,151,416	28.5	7.8	11.1	9.6

Source: INDEC.

Note: UBN: Unsatisfied Basic Needs; PL: Poverty Line. The values correspond to the month of October of each year.

The structural reforms (government rationalization, privatization, and trade liberalization) brought with them a pronounced increase in the level of unemployment in the economy as shown in Table 1. This high and sustained unemployment rate can partly explain the evolution of inequality that is shown in Table 3.

2. The Privatization of Public Utilities

The privatization program was very important relative to the size of the economy: 154 privatization contracts were signed during the 1990s. The privatization revenues collected by the federal government reached more than 19 Billion US dollars.¹ During the initial years (1991 and 1992), these revenues represented more than 1% of GDP and approximately 10% of public revenues.

Table 5 shows the sectors subject to privatization, the total revenue from sale, and the date of privatization. The list only includes companies privatized or given in concession by the Federal Government. From 1990 to 1999, the total income from sales was US\$ 19,442 millions. Oil and Gas were the main sources of income and together with electricity they account for 60 % of the total.

Table 5. Privatization of Federal Argentine SOEs.

Sector Privatized	Total Revenue (Millions of US\$)	Dates Privatized
Oil and Gas Production	7,594	1990 to 1999
Electricity	3,908	1992 to 1998
Communications	2,982	1990 to 1992
Gas Transport and Distribution	2,950	1992 to 1998
Transportation (Airlines, Rail, Ships)	756	1990 to 1994
Petrochemical and Oil Derivatives	554	1991 to 1995
Banks and Finance	394	1994 to 1999
Steel	158	1992 to 1992
Other	126	1991 to 1999
Railways	Concession	1991 to 1995
Highways	Concession	1990 to 1993
Ports	Concession	1990 to 1994
Airports	Concession	1998
Radio and TV	Concession	1990 to 1991
Water and Sewage	Concession	1993
Mail Service	Concession	1997
Total Revenue from Privatization	19,422	

Source: Ministerio de Economía (2000).

Note: The total revenue from privatization does not include royalty payments from companies privatized through concessions or revenues from the privatization of state and local SOEs.

In terms of the general characteristics of the process, the selling mechanism mostly used was international open bidding. Public utilities were awarded by price after a pre-qualification

¹ This figure understates the true amount of revenues obtained from privatization, as it does not include revenues from royalties received from SOEs that were privatized as concessions and revenues from the privatization of provincial and local SOEs.

stage. In the case of concessions, exclusivity was usually granted for a fixed period of time. But, when possible, competition was favored (for example in the wholesale energy market). In addition, several features of the sale contract were used to please special interest groups and hence find political support (for example, in most cases employment stability was guaranteed to some of the personnel of the companies, and in some cases tenure and the level of unionization were maintain).

We now review some general information about the privatized sectors that are the main focus of this study: telecommunications, electricity, water, and natural gas.

Telecommunications: Up to 1990, there was a national public telephone company, Empresa Nacional de Telecomunicaciones (ENTEL), which controlled most of the service in the country. In November 1990, the government transferred the company to the private sector (the first public service concession in Argentina). For this, the company was divided in two: the north market (Telecom) and the south market (Telefónica de Argentina). The companies had exclusivity in the provision of basic telephone and international services in their respective areas (north and south of the country). Initially, the exclusivity of the concession was granted for seven years, but was then extended for two more years (this was contingent on high performance).

Tariffs were regulated using an RPI-x mechanism adjusted every five years.² Some service and quality obligations were imposed in the concession contract. The companies' control (51% of the shares) was sold in an international competitive public bidding. Of the total number of shares, 10% were reserved for the employees, and 5% for cooperatives. French (32.5%), Italian (32.5%), USA (10%), and Argentinean (25%) shareholders acquire the Telecom shares. For Telefónica de Argentina the major shareholders were from USA (20%), Argentina (14.56%), and Spain (10%). A large proportion of the initial payment was cancelled with public bonds.

The National Commission of Communication (CNC) is the regulatory entity. Since 1996-97 consumers were separated in four groups: households, commercial consumers, professionals, and government. Fixed charges reflect this categorization, but charges are uniform across different areas of the country (especially after a recent tariff re-balancing reform). There is up to a 25% discount for pensioners collecting minimum pension. Recent changes also favor low consumption customers by the use of increasing block tariffs. Before January 1997 inter-urban calls were cross-subsidizing urban services. In this way, the rest of the country was subsidizing Buenos Aires Metropolitan Area (see Chisari and Estache (1997)).

The supplier can suspend the service when a bill is not paid after 30 days of the due date. Because of high charges for reconnection this tends to increase the cost for users with credit constraints and high-income variability. Recent changes in the regulation limits the suspension of the service only to outgoing calls for 60 days (after that the full service is discontinued). In 1997-98, both companies were forced to install 1,000 semi-public phones for receiving calls located in schools, aid centers and other intermediate associations, and without charging connection or fixed monthly fees.

² The RPI-x mechanism adjusts prices according to the variations in the retail price index minus a factor associated with technological progress/productivity.

In October-November 1999 competition was introduced in the long distance market (two new companies were allowed to operate in the market, and each of the two initial companies were allowed to offer services in the other's previously exclusive areas).

Table 6 and Table 7 provide information useful to compare the performance of ENTel prior to privatization, with that of the companies after privatization.³ In Table 6 we can see that there is a substantial increase in the number of lines available and public phones associated with the privatization. Also the number of lines available per worker and the lines installed per worker have increased considerably.

Table 6. Infrastructure Indicators.

	Average	
	1980/89	1991/97
Lines Installed	3011489	5569708
Lines in Service	2570470	4946011
Public Telephones	926	61893
Number of Workers	45909	30952
Lines Installed per Worker	65.5	189.7
Lines in Service per Worker	56	169.4
Lines Installed Every 100 Hab.	10	17
Network Digitalization (%) ^(*)	13	58.9
Average Annual Growth Rates (%)		
Lines Installed	5.2	12.2
Lines in Service	5.6	13.5
Public Telephones	7.6	25.3
Number of Workers	0.4	-6.7
Lines Installed per Worker	4.8	20.4
Lines in Service per Worker	4.7	21.9
Lines Installed Every 100 Hab.	3.7	11.6

Note: (*) The level of digitalization in 1990 was 13 % and by 1998 the whole system was digitalized.

Source: SIGEP, CNC.

Table 7 shows some indicators associated to the quality of the service provided and their evolution through time. However, these values would need to be adjusted by technological changes and other trend factors that we have ignored. Aside from this caveat, the percentage of lines that needed to be repaired, the waiting time for repairing, and the number of unfilled orders have all clearly improved with the privatization.

³ In the Appendix we provide yearly data from 1980-1997.

Table 7. Telecommunications Sector, Quality Indicators.

Year	Repairs		Unfilled Orders (as % lines in service)
	Avg. Pending Repair Orders (as % of lines in service)	Avg. Repair Waiting Time (days)	
1982	1.0	10.0	42.2
1983	1.3	8.0	45.7
1984	1.9	12.0	50.6
1985	1.4	10.0	52.7
1986	1.5	10.0	44.1
1987	1.3	10.0	31.3
1988	1.6	10.0	24.0
1989	2.0	11.0	9.3
1990	2.5	11.0	11.7
1991	1.3	5.9	10.3
1992	0.4	2.5	10.0
1993	0.3	3.0	11.0
1994	0.2	3.0	10.0
1995			2.0
1996			0.5

Source: Abdala (1998).

Electricity: Before the reform, the generation, transmission, and distribution of electricity were all provided by POEs. The distribution in the different regions was under the control of the Provincial governments and, in the case of the Greater Buenos Aires, a single public company called SEGBA was the only provider.

The restructuring began in 1991. Each of the three stages of production was subject to a different regulatory framework. Competition was allowed at the generation level and the transmission and distribution, when privatized, became regulated private monopolies (concessions). The regulatory mechanism for these monopolies was basically an RPI-x system with the productivity gains x adjusted every five years. Private distribution companies hold roughly 70% of the market (covering more than 60% of the total population of the country).

Table 8. Electricity Sector in Argentina.

	Generation	Transmission	Distribution
Private Sector Participation (%)	60	100	70
Market Share of the Three Largest Firms (%)	30	80	50
Price Setting Mechanism	Market	Price Cap	Price Cap

Source: Millan, Lora, and Micco (2001).

Generation is handled by private firms that trade daily in the wholesale market, Mercado Eléctrico Mayorista (MEM). The Compañía Administradora del MEM SA (CAMMESA) determines the spot price every day according to the estimated demand for the day and the cost-quantities schedules submitted by the generation firms. Distribution companies and

large users represent the demand in the wholesale market. They also submit expected needs to CAMESA that uses this information to determine the spot price (See Bosch, et. al. (1999) for a careful description of this system). Large users can also sign contracts directly with firms in the generation stage.

Transmission is done through two systems: Sistema de Transporte de Energía Eléctrica de Alta Tensión (STEEAT) and Distribución Troncal (STEEDT). Transener has a 95 years concession of STEEAT (connects every region in the country to the same electricity network). STEEDT distributes electricity within a specific region from the generators to the distribution companies. The entire transmission system is subject to the principle of open access (indiscriminate access to the network when committed capacity is not compromised).

Finally, distribution has been partially privatized (70 % as of 2000). Edenor, Edesur and Edelap are the main private companies at this stage, which were created after the privatization of SEGBA (described below).⁴ The law establishes that pricing should be in accordance with cost and hence rules out cross-subsidization. There are some subsidies for pensioners, charities, and non-profits organizations that are financed by the government (the ANSES reimburses the companies for pensioners collecting minimum pension).⁵ There is also a National Electricity Fund that finances broader regional subsidies. In 1994, Edenor and Edesur entered an agreement with the government to provide electricity to “very poor” neighborhoods in especial ways (collective meters, etc.). The agreement affected 650,000 users that before the agreement would usually be illegally connected, with the inefficiencies and safety issues associated to it. In principle, the program was fairly successful: the companies rate collection reached 85% with a significant improvement in the quality of the service.

The privatization process at the national level considered two different concession areas: (i) the concentrated market (market connected to the national or provincial distribution system); and (ii) the scattered market with no electricity supply. The users in the scattered areas are supplied using alternative systems (diesel-run systems, etc.). They have special tariff and the provinces pay the associated subsidy.

Greater Buenos Aires: In 1992, energy generation, transmission, and distribution facilities in the Greater Buenos Aires were separated and sold (the privatization of SEGBA). Three companies were created to handle the distribution stage: Edenor, Edesur, and Edelap.

Edenor has a 95-year concession with the exclusive franchise to perform electricity distribution services in the northern section of the Greater Buenos Aires. The concession area comprises a territory of approximately 4,650 km² with a total population of more than 7 million and 2.2 million customers. During the first two years Edenor suffered losses due to energy losses, oversized payroll, and inadequate management system. From 1992 to 1995 they invested US\$ 400 million with great success: mainly reducing the energy losses from 30% to 16% at the end of 1995 – for example through the correct metering, invoicing and

⁴ Some of the distribution in the rest of the country is under provincial governments control, but privatization is well under way.

⁵ The pensioners subject to these benefits are given a 50% discount on the fixed charge and on the first 210 kwh of electricity used in the last two month. All consumption above 210 kwh is billed at the normal tariff. And users with bimonthly consumption above 430 kwh receive no discount.

collection of electricity actually delivered but not paid for. Edesur performs electricity distribution in the southern section of the Greater Buenos Aires. The company has approximately 2 million customers and started operations in September 1992, at the same time as Edenor. Edelap performs electricity distribution in the area of Greater La Plata. The company has 270 thousand customers and started operation in December 1992.

Water and sewerage: The privatization of water and sewerage services has been localized in particular geographic areas. There is a national organization, Ente Nacional de Obras Hídricas de Saneamiento, that provides financing to projects in water and sewerage across the country, and strengthens the regulatory capacity at the provincial level. The main markets are the City of Buenos Aires and the Province of Buenos Aires. Low-income households have been influenced in different ways by the privatization of these services. Some people took advantage of the increased access opportunities and in some cases they were hired to carry out the construction of the new infrastructure. However others, having problems to afford all the new obligations, tended to migrate to more informal districts, where the privatization was not yet effective (like some very marginal neighborhood in the Greater Buenos Aires).⁶

The City of Buenos Aires: Aguas Argentinas S. A. is the sole provider of potable water and services. The company entered a 30-year exclusive concession in April 1993. As of June 30, 1998, the company supplied potable water to approximately 7.8 million inhabitants and sewerage services to approximately 5.9 million inhabitants. Tariff adjustments are based on a cost-plus rule. The concession contract stipulates service obligations, investment requirements and quality standards. At the time of the privatization, micro-measurement of water consumption was not widespread (only 15% of the connections). After privatization, the users in neighborhoods where the service is not measured can decide to shift to this option. When there are no meters, a fixed charge is billed; if there is a meter, the fixed charges are reduced 50% (see Chisari and Estache (1997) and Abdala (1996) for details about the pricing structure). The licensee can charge interest if the bills are not paid on time and cut off the service after 180 days of the due date (very poor users and hospitals may be exempt after government evaluation). Inhabitants in the serviced area are forced to enter the network. If they wish to have their own water well and not be connected to the network, they must request permission from the licensee, who will accept the request as long as the water from the alternative source fulfills some established quality standards.

Province of Buenos Aires: In 1998, the provincial government of Buenos Aires decided to privatize the main water and sewage service utility, AGOSBA (Administración General de Obras Sanitarias de la Provincia de Buenos Aires) which provided services in 50 of the 134 municipalities of the Province. AGOSBA's territory was divided in six concession areas and potential private operators were invited to bid on any combination of the six. The privatization process consisted of two parts: (i) a technical offer consisting of credentials from the prospective operator of the concession demonstrating that they met legal, technical, and financial requirements; and (ii) an economic offer, which was a one-time payment to the Province. The rules stated that the bidders could bid for more than one area, but a single bidder could not be awarded all the areas. Five concession areas went to one

⁶ Water tariff and fixed charges were only part of a number of new obligations associated with regularizing the property rights over the land and houses in those areas.

operator, Agua de Buenos Aires (ABA), and one to another, Aguas del Gran Buenos Aires (AGBA), a consortium. ABA began operations in July 1999 and AGBA in January 2000. The two concessions gave exclusive rights for the provision of the services in the areas for 30 years.

The five areas served by ABA included 49 municipalities with a total population of around 2 million (15% of the total population of the province). The area covers the cities of La Plata and Bahia Blanca (together, 750,000 inhabitants). Average coverage levels over the concession area are 88% for water and 70% for sewerage. Under the concession contract, ABA's primary obligations were to comply with quality standards for the potable water supplied (water pressure, metering, and continuity of service) and to expand the potable water and sewage networks (a 95% coverage level to be attained by the end of the concession contract).

AGBA paid US\$ 1.26 million to the Province in a one-time payment. All assets associated with the provision of the water and sewage services, including those acquired by the concessionaire, were to be returned to the Province at the end of the 30-year concession period. Population in the area is approximately 1.7 million with estimated potable water coverage of 35% and sewerage coverage of 13%. The population in this region has the lowest average income level of the Province (Escobar, General Rodriguez, Jose C. Paz, Malvinas Argentinas, Merlo, Moreno, and San Miguel – the west of the Federal Capital). All users in the region are (or were) non-metered.

The contract specified that the company had to comply with six five-year investment plans. If the company does not achieve some objectives previously set, the regulatory entity can impose fines. In the event of persistent non-compliance, the concession could be terminated. Also, a 95% coverage level must be attained by the end of the concession. The company had to maintain a minimum capital requirement (US\$45 million). Employees, through an Employee Stock Ownership Plan, hold 10% of the company's stock. Metered customers are billed every two months according to water consumption as per actual meter reading. Owners of properties in the areas of expansion pay a one-time charge. Ordinary revisions of the tariff take place every 5 years. Extraordinary revisions can occur if there is an increase or a reduction in the cost indices of 3%.⁷

Natural Gas: Prior to privatization, the natural gas industry consisted of two companies: Gas del Estado (GE) and YPF S.A. In 1992, GE was privatized by granting concessions for thirty-five years. A new regulatory institution was created, Ente Nacional Regulador del Gas (ENARGAS), and a new set of regulations were established for the sector. The industry was divided into three different segments: production, transportation and distribution. The reform of the sector also implied the creation of a retail and a wholesale market. In the wholesale market, prices and volumes are determined by producers and distributors, large costumers, and wholesales, while in the retail market a ceiling price is set by the regulator, ENARGAS. Some additional measures were introduced to encourage competition in the sector: access to transportation and distribution must be open to third parties; transportation capacity can be resold; and agents involved in the natural gas business are subject to several

⁷ The concessions have been terminated at the beginning of 2002 due to financial problems in the concessionaire and extreme disagreements between them and the provincial government.

limitations to avoid monopolistic behavior. Among the latter restrictions, producers and transmission companies cannot hold stocks of distribution companies; producers, consumers and distribution companies cannot hold stocks of companies that transport natural gas; and transportation companies cannot trade natural gas.

Table 9. Natural Gas, Efficiency Indicators.

Year	Capacity Utilization (%)	Consumption Restrictions (Millions m3/day)	Restrictions/Natural Gas Distributed (%)	Leak (Millions m3)	Leak/Production (%)
1993	75	21.4	35.7	2.7	10.3
1994	82	2.2	3.6	3.4	12.1
1995	89	5.1	7.9	3.2	10.4
1996	92	8.1	12.2	3.4	9.8
1997	97	2.4	3.5	1.8	5.0
1998				1.3	3.2

Source: ENARGAS.

Since the privatization, the sector has achieved higher efficiency levels as shown by various indicators presented in Table 9. Capacity utilization has increased, there are lower consumption restrictions, and the amount of leakages has substantially decreased. The users of natural gas have increased at an average rate of 3% per year since the privatization in 1992 (however, Abdala (1998) suggest that this percentage is not much different than the penetration rate achieved by GE in the previous decade).

Table 10. Natural Gas, Number of Users.

Year	Residential Users	Total Users	Percentage Change	
			Resid.	Total
1992	4,351,300	4,552,700		
1993	4,522,400	4,739,900	3.9	4.1
1994	4,716,500	4,947,300	4.3	4.4
1995	4,842,000	5,076,200	2.7	2.6
1996	4,998,300	5,238,800	3.2	3.2
1997	5,150,700	5,398,800	3.0	3.1
1998	5,340,300	5,596,700	3.7	3.7

Source: ENARGAS

The number of claims by users increased substantially in the first years after the privatization, but after 1995 they have tended to stabilize. The number of claims may have increased as the perception of users that their claim would be attended increased. There is also a natural trend upward as the number of users increases.

Table 11. Claims Received by ENARGAS.

Year	Claims	Claims/Total Users (%)
1993	1252	0.026
1994	2985	0.060
1995	4441	0.085
1996	4259	0.081
1997	4880	0.090

Source: ENARGAS.

There has been an important expansion of investments in this sector since the privatization took place: investments increased from an annual average of U\$S 84 millions under public ownership to U\$S 143 millions (see Table 12).

Table 12. Investments in Natural Gas Sector (in Millions of U\$S).

Year	GE	Transp.	Distrib.	Total Priv.
1991	22.1			
1992	132.4			
1993	96.3	50.3	92.7	143.0
1994		233.8	236.9	470.7
1995		174.0	189.6	363.6
1996		188.5	175.8	364.3
1997		244.3	152.2	396.5
Average	83.6	50.3	92.7	143.0

Note: GE: Gas del Estado.

Source: ENRE.

3. The Data

In this section we provide a general discussion of the data used in this paper. In general, the data in Argentina is of very low quality. We gathered partial information about the situation of firms from several places. We use systematic data from three sources, the Household Expenditure Surveys (HES), the Permanent Household Surveys (PHS), and the Social Development Survey (SDS).

There are two HES, one for 1985/86 and one for 1996/97. The variables considered in these surveys are household expenditure and household income, in addition to occupational, demographic and educational variables. The 1985/86 HES was relatively simple and short. For example, there were no questions about home-telephone availability. Another important problem of the survey conducted in 1985/86 concerns monetary variables. Annual inflation for the year of the survey was 41.3% and since the interviews are spread along the period comparing nominal values from different interviews can be problematic. Moreover, this survey was only directed to households living in the Federal Capital and Great Buenos Aires. Unfortunately several important survey questions available for 1996/97 are not available for 1985/86. The survey in 1996/97 covers urban household at a national level. However, for

the purpose of comparison we only use the survey portion concerning the Greater Buenos Aires metropolitan area.

From 1980 to 1999, biannual PHSs are available. These surveys are conducted twice a year, during May and October, in the area of Greater Buenos Aires. Other metropolitan areas were incorporated later. This is the main source for tracking the employment performance of the Argentinean economy. Labor force participation, income, educational composition of the labor force, and other household characteristics are the main components of this survey.

In August 1997 a national SDSs was conducted by INDEC. It provides data on the quality of life of the household and their access to social services all across the country. Some of the information from this survey is interesting but cannot be used in pre-post privatization comparisons.

III. The Consumption Effect

To study the distributional impact of privatization due to its influence on the consumption side of the economy, we concentrate the analysis in four main sectors: telecommunications, natural gas, electricity and water. These sectors present some properties that make them convenient for the study of the elusive consumption effect. First, they are probably the four sectors with the most direct effect on household consumption. Second, the goods and services they produce are less easily substitutable by other privately produced goods (although in general this will still be a problem; for example, in the case of natural gas, the alternative of gas in carafe is readily available and used in most places in Argentina). From the consumption point of view, two important factors should be considered. The first one is the change in relative prices, and the second one is change in the accessibility to public services.

In this section we review the different aspects associated with the consumption effect and we provide some rough estimates of the change in consumer welfare due to the privatization process. First, we look at the changes in expenditure in the selected public services and the corresponding budget shares per decile. Then, we report the evolution of prices, provide some possible measures of the changes in access, and estimate the change in consumer welfare. The last calculation is done first by abstracting from the issues associated with access to the service and then by adjusting those measures to account for the change in access. Using these results we examine the change in inequality and poverty that can be attributed to the privatization of the different public services. Finally, we estimate an hedonic rental regression and compute the premium associated with having access to the public services.

1. General Aspects

Budget Shares

Table 13 shows the budget shares on telecommunication, natural gas, and water and electricity by deciles. The budget shares have experienced a remarkable boost from 1985/86 to 1996/97, for all deciles and all public services (with the only exception of the budget share on electricity for the tenth decile).

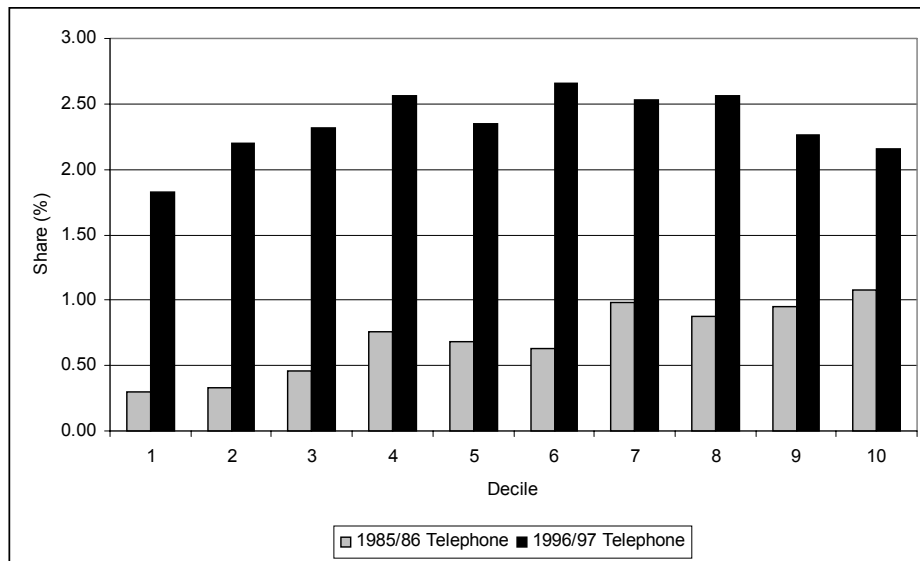
Table 13. Budget Shares by Decile.

Decile	1985/86			1996/97			Percentage Change (%)		
	Telecom	Natural Gas	Water & Elect.	Telecom	Natural Gas	Water & Elect.	Telecom	Natural Gas	Water & Elect.
1	0.30	0.50	2.25	1.82	2.91	4.69	513.04	478.58	108.46
2	0.33	0.73	2.64	2.19	2.64	4.20	570.27	259.53	59.44
3	0.46	0.94	2.63	2.32	2.47	3.73	406.39	163.62	41.95
4	0.75	0.94	2.93	2.57	2.49	3.62	240.81	166.05	23.39
5	0.68	0.94	2.29	2.35	2.18	3.10	245.04	132.90	35.61
6	0.63	0.96	2.61	2.65	2.05	2.94	323.84	112.71	12.69
7	0.99	0.99	2.44	2.53	1.94	2.74	156.63	95.42	12.33
8	0.87	0.95	2.32	2.56	1.65	2.48	194.34	73.58	6.62
9	0.95	0.74	2.00	2.27	1.38	2.10	137.68	87.64	5.00
10	1.08	0.54	1.78	2.15	0.94	1.45	99.21	73.91	-18.42
Total	0.80	0.81	2.28	2.33	1.74	2.61	189.27	115.75	14.28

Source: HES 1985/86 and 1996/97, INDEC.

Figure 1, Figure 2, and Figure 3 also show this information. The largest increase seems to be concentrated in telecommunications and natural gas and the increase is more important for lower deciles. The pronounced increase in the shares can be partly an indication of the existence of important binding quantity constraints prior to privatization. We also found that it is not generally true that budget shares decrease with income as is expected for normal goods. Only the budget shares in natural gas and water & electricity for 1996/97 follow this pattern. As it will become clear later, this has important consequences in terms of the redistributive impact of the privatization process.

Figure 1. Telephone Shares.



The substantial increase in the budget shares in telephone for the middle ranges of the income distribution is probably an indication of the important quantity restrictions and rationing that were in place prior to the reforms in this sector. Similarly, the fact that the budget shares were increasing in income for 1985/86 is most likely a consequence of those

direct limitation in access and the fact that high income groups were able to get around the restrictions more easily by paying special fees or bribes. One important factor determining this pattern is the fact that prior to the privatization there were long waiting times for repairing the telephone line (see Table 7 in Section II). Furthermore, the quality of the telecom services was very low prior to the privatization and this presumably tended to lower the desired budget shares.

Figure 2. Natural Gas Shares.

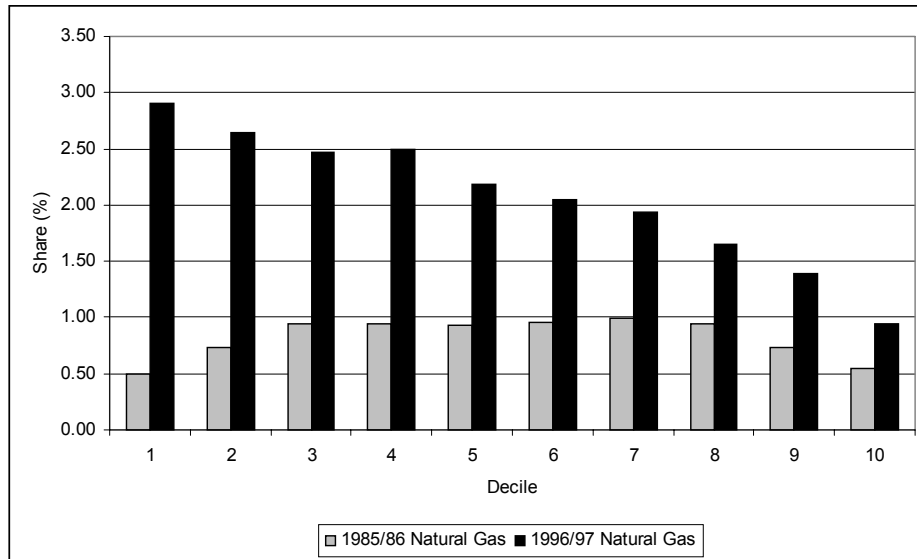
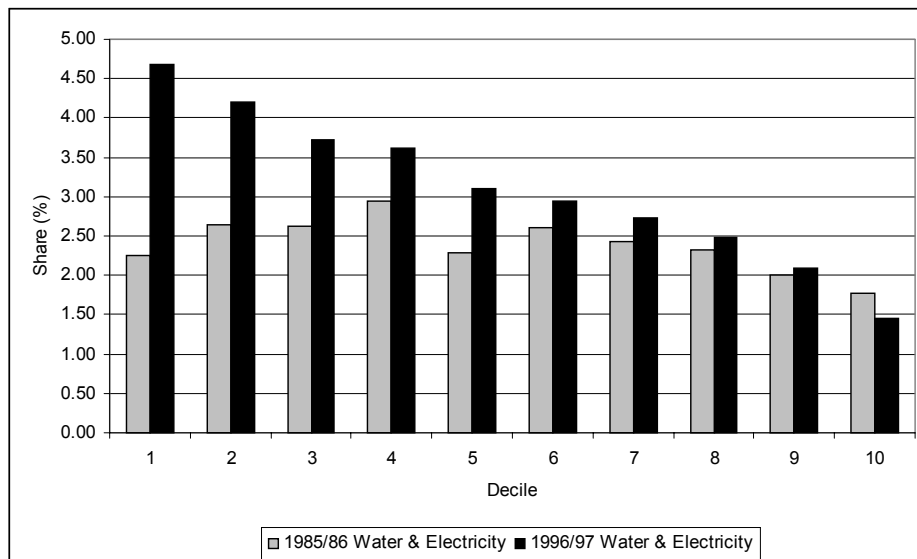


Figure 3. Water and Electricity Shares.



Evolution of Prices

One of the most important issues, both from a political and an economic perspective, is that of determining the impact of privatization on the prices of those public services directly affected by the process. Several papers have evaluated the performance of prices since the

years of privatization. However, it must be kept in mind that those years in Argentina coincide with a period of high macroeconomic instability. As much as possible, the comparison should be done between periods in which all variables are around their long run “equilibrium” values. Implementing this criterion though introduces some degree of arbitrariness through the choice of the relevant initial and terminal dates. In order to adequately study the effect of privatization on prices, first we provide a general discussion of the evolution of prices along the period and then we select a pre- and a post-privatization date and evaluate the effect on consumer welfare of the change in prices between these two dates.⁸

In general, prior to privatization, when the government was administering the firms, tariffs were used as macroeconomic instruments to control the level of inflation. Also, prices were designed in most cases to incorporate a distributional component (see Navajas and Porto (1990)). Table 14 shows the behavior of a tariff index for all POEs (and for some specific companies) during the period prior to the beginning of the privatization process.

Table 14. Tariff Index, Pre-privatization Period. Dollar Deflated, Dec. 1989 = 100.

M-Y	All POEs	SEGBA	AyEE	GE	OSN
Jun-85	172.76	187.03	198.50	232.44	151.36
Aug-88	187.41	232.35	193.00	213.16	162.83
Avg. 89	128.81	145.40	138.11	141.28	147.08
Aug-89	153.37	178.30	168.97	171.76	181.55
Dec-89	100.00	100.00	100.00	100.00	100.00
Jan-90	104.23	105.99	97.88	93.27	78.72
Feb-90	96.44	153.01	119.28	85.03	71.60
Mar-90	132.62	148.43	112.71	137.58	108.91
Apr-90	166.83	234.06	163.64	156.39	105.92
May-90	183.06	248.73	176.89	181.10	174.48
Jun-90	182.56	269.22	197.45	171.92	180.91
Jul-90	190.53	266.60	195.65	170.40	237.19
Aug-90	188.85	256.01	174.90	173.84	210.24
Sep-90	257.30	316.81	234.48	219.51	249.54
Oct-90	270.41	330.23	243.89	228.82	260.12
Nov-90	293.30	349.34	257.34	242.05	275.16
Dec-90	303.10	359.46	264.37	249.07	283.14
Jan-91	255.08	293.17	220.03	240.49	220.33
Feb-91	240.09	262.20	229.28	255.29	185.20
Mar-91	234.38	260.00	227.47	263.51	191.87
Apr-91	233.79	277.29	248.06	248.64	239.59
May-91	234.52	275.03	246.04	246.61	237.64
Jun-91	232.68	272.87	244.10	244.68	235.77
Jul-91	232.50	272.66	243.91	244.48	235.59

⁸ The data on consumption is available for two points in time, one before the privatization (1985/86) and one after the privatization (1995/96). This limitation in the data is what determines that we need to identify only one overall change in prices abstracting from any type of dynamic behavior in prices during the period.

Note: SEGBA (Electricity), AyEE: Agua y Energía Eléctrica, GE: Gas del Estado, OSN: Obras Sanitarias de la Nación, All POEs incluye: YPF, YCF, HIDRONOR, FFAA, Administración General de Puertos (AGP), and ENCOTEL.

Source: FIEL (1993).

In 1989 real tariffs declined significantly due to the hyperinflation process. Immediately before the privatization took place (1990-91) however, prices started to increase again in real terms. Part of this increase in tariff was the consequence of an explicit government policy intended to make the POEs more attractive for sale. In what follows, we discuss the evolution of prices in each of the three sectors separately.

Telecommunications: Connection charges dramatically decreased after the privatization. For instance, for residential users, connection charges decreased 88%, but the change was even greater for commercial and professional users (see Table 15).

Table 15. Telecommunications, Connection Charges (U\$S).

Year	Com.	Prof.	Resid.
1985	4000	2400	1250
1990	2627	2627	1050
1991	1250	1250	750
1993	500	500	500
1995	250	250	250
1998	150	150	150

Note: Com.: Commercial, Prof.: Professional, Resid.: Residential.

Source: Gerchunoff (1992), Abdala (1998).

Table 16 shows the evolution of tariffs in the telecommunications sector prior to privatization. The real tariff decreased in the high inflation period (1989), but then increased since 1990, to fully recover before the change of ownership. This is consistent with the behavior of prices in other sectors.

Table 16. ENTEL, Tariff Index Evolution, Pre-privatization Period.

M-Y	(1)	(2)
Aug-85	171.23	226.45
Dec-87	101.90	143.28
May-88	118.44	183.19
Dec-88	91.15	181.44
Aug-89	107.69	147.58
Dec-89	100.00	100.00
Mar-90	155.74	201.64
Jun-90	135.09	328.32
Sep-90	204.32	574.38

Note: (1) Pulse w/o taxes, constant australes, Sept. 1990; (2) Pulse w/o taxes, U\$S.

Source: Gerchunoff (1992).

Even though the value of each pulse in current dollars went from U\$S 0.0484 in November 1990 to U\$S 0.0455 in December 1997, the comparison of these prices is not straightforward as time per pulse has changed for different types of calls since 1990. Table 17 shows the evolution of a telecommunications index for the commercial and residential sector. The

index considers a basket of calls and services corresponding to 1996, it does not incorporate connection costs, and takes into account the changes occurred in the time-per-pulse for different calls. When tariffs are deflated by the Wholesale Price Index (WPI), residential tariffs decrease nearly 18% from 1990 to 1998, while residential tariffs expressed in dollars decline 4%. The decrease in commercial tariffs is even greater (55% and 44% respectively).

Table 17. Evolution of Telecommunications Tariffs, 1990-1998 (1996 Basket).

Year	Current \$		Constant \$ (WPI)		Current US\$	
	Com.	Resid.	Com.	Resid.	Com.	Resid.
1990	106.28	18.33	258.94	44.65	207.42	35.76
1991	161.56	27.86	187.02	32.25	162.85	28.08
1992	151.27	31.05	165.20	33.90	152.84	31.37
1993	152.88	31.59	164.28	33.95	153.64	31.75
1994	154.69	32.08	166.55	34.54	155.07	32.16
1995	147.62	31.59	149.27	31.94	147.62	31.59
1996	148.76	32.12	145.81	31.48	146.41	31.61
1997	118.09	36.76	115.63	35.96	118.09	36.73
1998	115.81	36.41	115.81	36.41	115.81	34.41

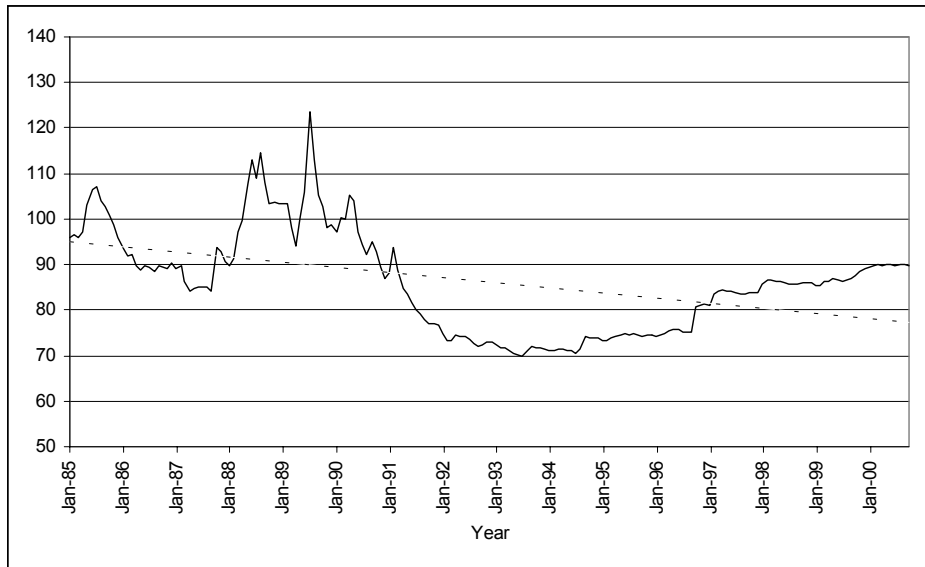
Note: Com.: Commercial, Resid.: Residential, WPI = Wholesale price index.

Source: FIEL (1999).

For the residential sector, the behavior of real tariffs has not been uniform since 1990: there has been a clear decline until 1996, while tariffs rise thereafter. The rebalancing of tariffs in 1997 partly explains the change in this tendency. In that year, fixed charges and local calls tariffs were increased, while the price of long distance calls decreased. Due to data limitations, this index cannot be constructed for the pre-privatization period.

An alternative index is provided by the INDEC. Figure 4 presents the monthly evolution of this relative price of telecommunication between January 1985 and January 2000.

Figure 4. Communications Price Index/CPI, Evolution (Monthly).



Source: INDEC.

Table 18 presents the annual averages of this price index between 1985 and 2000, relative to the CPI.⁹ In the welfare calculation that follows, we use the numbers in this table to determine the change in telecom prices associated to privatization.

Table 18. Communications Price Index/CPI, Evolution (Annual Average).

<u>Year</u>	<u>Price Index</u>
1985	100.00
1986	89.79
1987	89.27
1988	87.39
1989	105.14
1990	95.79
1991	82.08
1992	73.06
1993	70.96
1994	71.78
1995	73.93
1996	76.26
1997	83.32
1998	85.72
1999	86.49
2000	89.29

Source: INDEC

An international comparison of different telecommunications charges shows that in 1998, connection charges in Argentina were somewhat above the world average. Fixed charges

⁹ The year 1988 is the base year of the CPI, which is calculated using information from the HES of 1985/86.

were relatively high, and even after the re-balancing of tariffs in 1997, long distance tariffs were still high.

Table 19. International Comparison of Telecommunication Tariffs (US\$, 1998).

Country	Connection Charges		Fixed Charges		Variable Charges Local Calls		Variable Charges LD Calls	
	Com.	Resid.	Com.	Resid.	Normal	Reduced	Normal	Reduced
UK	166.69	166.69	20.96	12.71	0.0566	0.0212	0.1133	0.0598
Italy	170.29	170.29	14.31	9.19	0.0195	0.0107	0.1909	0.0859
Spain	144.30	144.30	9.79	9.79	0.1081	0.1081	0.3718	0.2717
France	44.66	44.66	15.36	9.95	0.0406	0.0212	0.1660	0.0830
Argentina	150.00	150.00	33.39	13.02	0.0462	0.0462	0.5700	0.4100
Brasil	44.58	44.58	17.99	12.00	0.0694	0.0174	0.4166	0.2083
Uruguay	263.68	169.99	15.87	6.95	0.0483	0.0161	0.3869	0.2321
Chile	119.13	119.13	10.29	10.29	0.0317	0.0050	0.1700	0.1200
Canada	46.36	33.60	32.59	12.26	n/a	n/a	n/a	n/a
Australia	108.56	108.56	12.55	7.31	0.1599	0.1599	0.1380	0.1318
Average	125.83	115.18	18.31	10.35	0.0645	0.0451	0.2804	0.1781

Note: LD: Long Distance, Com.: Commercial, Resid.: Residential. Values correspond to different months of 1998 for each country. Normal: calls made at normal hours of the day, Reduced: calls made at reduced price hours of the day.

Source: Colome, Neder, Ferroglio.

Electricity: Table 20 shows the evolution of electricity tariffs for the different consumption segments, with and without taxes. Residential tariffs are deflated by CPU, and residential tariffs with taxes include VAT and National Taxes. Commercial and industrial tariffs are deflated by WPI, and tariffs with taxes for these sectors only incorporate National Taxes. Moreover, all tariffs include fixed and variable charges.

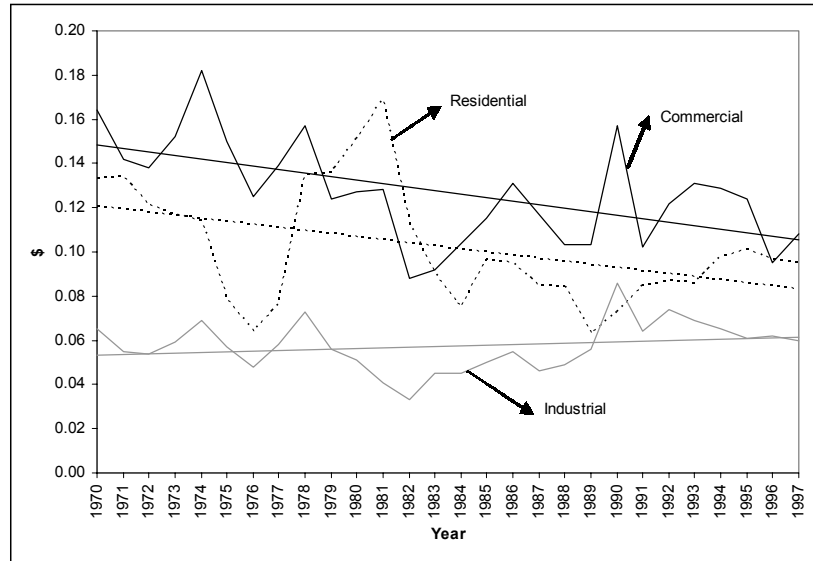
Prices in the residential segment experienced a declining tendency from 1970 to 1997, as well as prices charged to the commercial users. In particular, for the residential consumers, prices decline until 1989, and they increased thereafter (but never fully recovering to the mid-eighties levels). On the other hand, industrial prices seem to move around with a slightly increasing trend. In general, a declining tendency should be the rule as technological improvements lower generation and distribution costs. However, the extensive organizational changes in the electricity sector in Argentina and the fact that pricing was used for political and distributional purposes prior to privatization can make the technological trend less important in explaining the behavior of prices in the sector.

Table 20. Electric Sector, Tariff Evolution (\$/kWh, Constant Prices 1997).

Year	Residential		Commercial		Industrial	
	w/Taxes	W/o Taxes	w/Taxes	w/o Taxes	w/Taxes	w/o Taxes
1970	0.251	0.133	0.166	0.164	0.067	0.065
1971	0.259	0.134	0.143	0.142	0.057	0.055
1972	0.250	0.121	0.139	0.138	0.055	0.054
1973	0.236	0.117	0.153	0.152	0.060	0.059
1974	0.225	0.114	0.184	0.182	0.070	0.069
1975	0.150	0.079	0.151	0.150	0.058	0.057
1976	0.118	0.064	0.125	0.125	0.048	0.048
1977	0.133	0.076	0.139	0.139	0.058	0.058
1978	0.214	0.135	0.158	0.157	0.073	0.073
1979	0.213	0.136	0.124	0.124	0.056	0.056
1980	0.236	0.151	0.132	0.127	0.053	0.051
1981	0.298	0.169	0.147	0.128	0.047	0.041
1982	0.227	0.113	0.101	0.088	0.038	0.033
1983	0.198	0.090	0.106	0.092	0.051	0.045
1984	0.159	0.075	0.120	0.104	0.052	0.045
1985	0.191	0.097	0.132	0.115	0.058	0.050
1986	0.172	0.095	0.151	0.131	0.064	0.055
1987	0.152	0.085	0.135	0.117	0.053	0.046
1988	0.161	0.084	0.116	0.103	0.055	0.049
1989	0.117	0.063	0.115	0.103	0.063	0.056
1990	0.119	0.073	0.182	0.157	0.099	0.086
1991	0.122	0.085	0.112	0.102	0.070	0.064
1992	0.108	0.087	0.123	0.122	0.074	0.074
1993	0.102	0.086	0.132	0.131	0.070	0.069
1994	0.114	0.098	0.130	0.129	0.065	0.065
1995	0.118	0.101	0.125	0.124	0.062	0.061
1996	0.124	0.097	0.096	0.095	0.062	0.062
1997	0.121	0.095	0.108	0.108	0.060	0.060

Source: FIEL (1999).

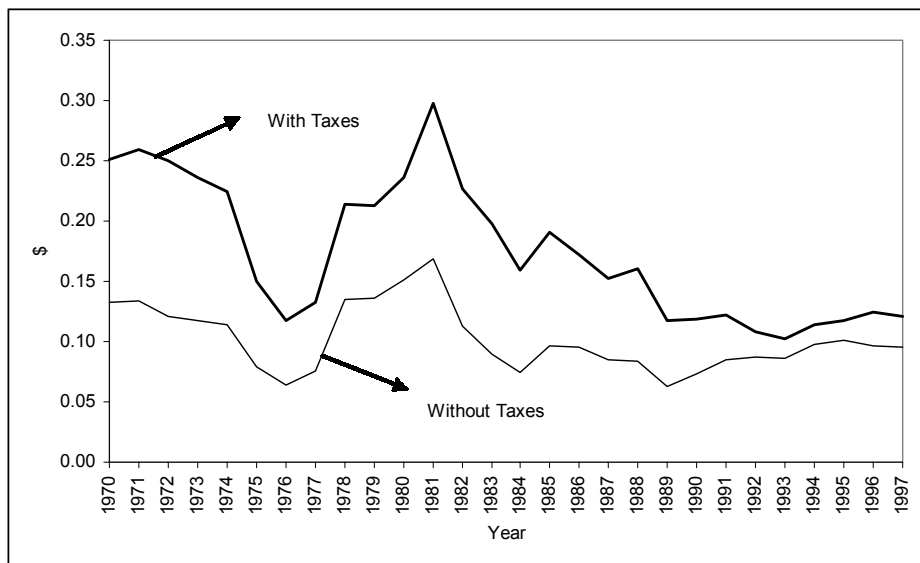
Figure 5. Electric Sector, Evolution of Tariffs With Taxes, 1970-1997 (\$/kWh, Constant Prices 1997).



Source: FIEL (1999).

Taxes significantly affect final prices faced by consumers. For instance, residential tariffs with taxes decreased from \$0.172 in 1986 to \$0.124 in 1996, but tariffs before taxes increased in that same period, from \$0.095 in 1986 to \$0.097 in 1996. This is an important fact because the demand elasticity of electricity tends to be low and taxes were a significant component of prices in the periods prior to privatization.

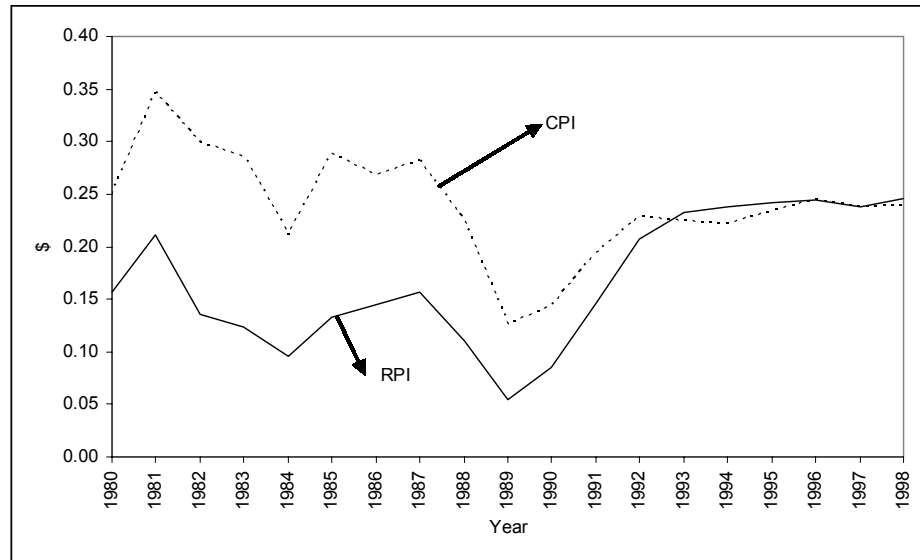
Figure 6. Electric Sector, Residential Tariff Evolution, With and Without Taxes, 1970-1997 (\$/kWh, constant prices 1997).



Source: FIEL (1999).

The index used to deflate prices (CPI or RPI) also affects the evolution of real tariffs, especially in periods of high inflation and instability. Figure 7 shows that depending on the deflator, residential tariffs may show a decreasing (CPI) or increasing (RPI) tendency.

Figure 7. Electricity Sector, Evolution of Residential Final Prices , 1980-1998 (\$/kWh, Different Deflators).



In order to complete the analysis, electricity prices in Argentina are compared to those prevailing in some selected countries. Table 21 shows that the prices charged in Argentina in 1996 were relatively competitive and even below the international averages in all segments.

Table 21. Electricity Tariffs, International Comparison (US\$).

Country	Residential	Industrial	Industrial
	275 kWh per month	500 kW - 219 Wh per month	2500 kW - 1460 MWh per month
Canada	0.0728	0.0503	0.0372
Argentina (EDENOR)	0.0968	0.0599	0.0540
UK	0.1513	0.0813	0.0748
France	0.1630	0.0740	0.0691
Germany	0.1777	0.1024	0.0902
Spain	0.1963	0.0914	0.0753
Japan	0.2213	0.1257	0.1003
Average	34.5099	35.1981	495.0626

Note: All countries except Argentina, January 1996; EDENOR, May 1996.

Source: FIEL (1999).

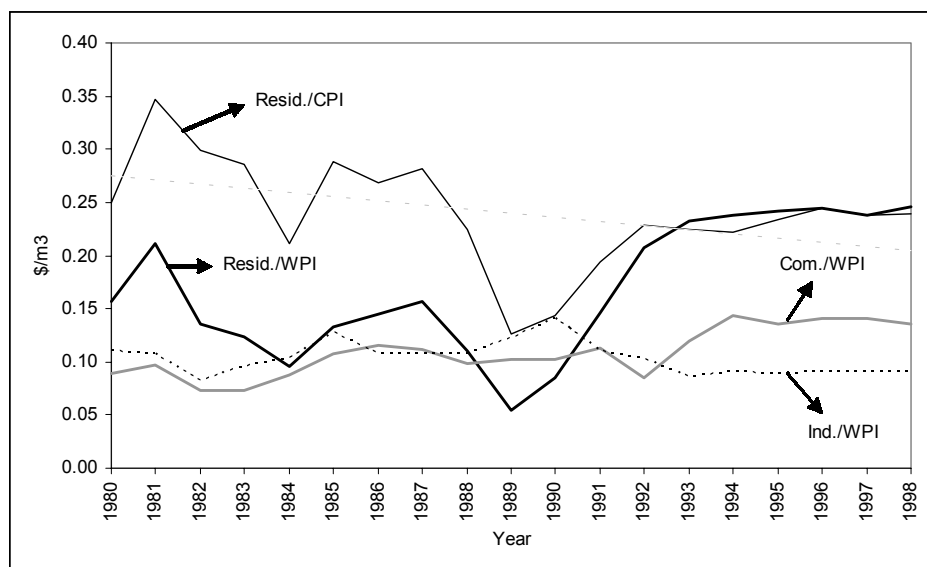
Natural Gas: The prices in the natural gas sector for residential consumers in Argentina, when deflated by the CPI, also showed a decreasing trend from 1980 to 1998. However, the behavior of these prices was not uniform during the period: they decreased in real values until 1989, rose from 1990 to 1992, and stabilized thereafter. Commercial and industrial tariffs were relatively stable during the eighties and while commercial tariff showed some tendency to increase after 1993, industrial tariff tended to decrease.

Table 22. Natural Gas Sector, Tariff Evolution, 1980-1998 (Final Prices, \$/m3, Constant Prices 1997, Different Deflators).

Year	Residential CPI	Residential WPI	Commercial WPI	Industrial WPI
1980	0.250	0.157	0.089	0.110
1981	0.347	0.211	0.097	0.108
1982	0.299	0.135	0.073	0.083
1983	0.286	0.123	0.073	0.096
1984	0.211	0.096	0.088	0.104
1985	0.289	0.133	0.108	0.127
1986	0.269	0.145	0.115	0.107
1987	0.282	0.157	0.112	0.107
1988	0.224	0.110	0.098	0.107
1989	0.126	0.054	0.102	0.122
1990	0.144	0.085	0.102	0.141
1991	0.194	0.146	0.113	0.110
1992	0.229	0.207	0.085	0.102
1993	0.224	0.232	0.120	0.086
1994	0.222	0.238	0.143	0.090
1995	0.234	0.242	0.136	0.089
1996	0.245	0.244	0.141	0.090
1997	0.238	0.238	0.141	0.091
1998	0.239	0.246	0.136	0.091

Source: FIEL (1999).

Figure 8. Natural Gas Sector, Tariff Evolution (Final Prices, \$/m3, Constant Prices 1997, Different Deflators).



Tariffs in Argentina's natural gas sector are in general below international averages for all type of users as the following table indicates.

Table 23. Natural Gas Tariffs, International Comparison (\$/m3, Final Prices).

Country	Resid.	Com.	Ind.
Argentina	0.1901	0.1244	0.0851
U.S.A.	0.2170	0.1860	0.1110
UK	0.3678	0.1858	0.0956
France	0.4251	0.2775	0.1110
Germany	0.4305	0.2268	0.1151
Average	0.3261	0.2001	0.1036

Note: The values for Argentina, UK, France and Germany correspond to 1995. The values for U.S.A. correspond to 1993. Resid.: Residential, Com.: Commercial, Ind.: Industrial.

Source: FIEL (1997) and FIEL (1999).

Access to Public Utilities

Using data from the expenditure surveys (HES) we now study the effects of privatization on the accessibility levels for the selected public services. For the year 1985/86 we call "household with access" those households that reported a positive expenditure for the corresponding public utility.¹⁰ For the year 1996/97, we measure access in two alternative ways: (1) in Table 24 we consider household-with-access those households with positive expenditure (useful to compare with the 1985/86 data), and (2) in Table 25 we consider a more direct measure by using the following available questions on the 1996/97 household survey: In the block where your house is located, is there: water network, electricity network,

¹⁰ In the case of natural gas, we considered only expenditure on natural gas provided by the network.

gas network?, and Does you house has telephone? Unfortunately this type of information was not available for 1985/86.

Measuring access using positive expenditure is not without problems. First, illegal connections tend to be reported as zero expenditure, even though in this case the household should be counted as having access to the service (this issue is especially relevant in the case of electricity). Second, in the case of water and natural gas, for example, private substitutes (like wells and gas in carafe, respectively) were not uncommon in Argentina. The observed changes in our measure of access during the reform period can in a lot of cases be associated with the household's decision to switch from those alternative means towards the provision through the network.

The degree of access to public utilities has clearly changed as a consequence of privatization. Access has significantly increased in water. There has been a 30% increase in access in both telephones and natural gas. The increase in access to electricity was around 11%. Table 24 and Table 25 below show the change in access by income groups. The first two panels in the tables show the percentage of household in the sample that had access to each of the services. The third panel shows the change in these percentages from 1985/86 to 1996/97.

Table 24 compares the change in access when the level of access is calculated using the number of households (by decile) that report a positive expenditure on the corresponding public service (for both 1985/86 and 1996/97). An additional limitation arises in this case, as there is only information about expenditure on water and electricity as a single category for 1996/97, so these categories are aggregated into one for 1985/86. It is interesting to note that the changes in access to telephone are similar using either of the two alternative methodologies for measurement (i.e., comparing with Table 25). In the case of Natural Gas, Table 25 seems the most appropriate for across time comparisons because the expenditures for 1985/86 are only accounting for payments on natural gas obtained through the network (not on other possible substitutes). In general, however, by looking at the expenditures in 1996/97, when the question was more general (i.e., accounting for all expenditures in natural gas) we can see that substitutes to the network were relatively popular in Argentina (especially for low-income households).

Table 24. Access by Income Group (expenditure based).

Decile	1985/86			1996/97			Percentage Change		
	Natural Gas	Water & Elect.	Telephone	Natural Gas	Water & Elect.	Telephone	Natural Gas	Water & Elect.	Telephone
1	21.98	64.84	18.36	94.50	82.48	24.64	337.27	27.22	37.30
2	41.11	81.53	26.48	96.78	91.55	42.25	135.39	12.28	59.56
3	50.20	87.84	33.73	95.25	94.01	52.27	89.75	7.02	54.99
4	54.95	91.21	43.59	97.56	94.51	60.57	77.56	3.62	38.95
5	65.56	93.33	47.04	96.32	94.89	68.30	46.93	1.67	45.21
6	68.35	93.88	49.64	95.32	94.70	77.19	39.46	0.87	55.50
7	78.65	97.38	61.42	95.52	95.93	82.89	21.45	-1.49	34.95
8	77.74	96.35	67.15	95.51	96.12	85.10	22.86	-0.24	26.73
9	85.04	97.81	75.91	95.71	96.12	88.16	12.56	-1.73	16.14
10	90.94	99.25	82.26	96.53	96.94	91.63	6.14	-2.32	11.39
Total	63.29	90.28	50.41	95.90	93.72	67.28	51.52	3.81	33.48

Note: For both periods, households that reported expenditure greater than zero were considered to have access to the corresponding public utility.

Source: HES 1985/86, HES 1996/97, INDEC.

Table 25. Access by Income Group (direct measure).

Decile	1985/86				1996/97				Percentage Change			
	Natural Gas	Water	Elect.	Telephone	Natural Gas	Water	Elect.	Telephone	Natural Gas	Water	Elect.	Telephone
1	21.98	10.26	65.20	18.32	46.44	46.44	98.98	22.81	111.28	352.75	51.81	24.55
2	41.11	25.44	80.49	26.48	62.78	61.37	99.60	39.64	52.69	141.27	23.74	49.68
3	50.20	28.63	87.45	33.73	77.48	68.39	99.79	53.51	54.35	138.89	14.11	58.67
4	54.95	38.83	90.48	43.59	83.13	75.81	100.00	57.72	51.30	95.25	10.53	32.42
5	65.56	34.07	92.96	47.04	86.50	75.05	99.59	68.51	31.95	120.26	7.13	45.65
6	68.35	43.53	93.53	49.64	91.24	79.84	100.00	78.21	33.50	83.43	6.92	57.55
7	78.65	47.19	97.00	61.42	93.69	84.32	99.80	82.69	19.12	78.67	2.88	34.62
8	77.74	55.84	95.99	67.15	96.33	87.14	100.00	86.73	23.91	56.06	4.18	29.16
9	85.04	58.03	97.45	75.91	97.96	91.22	100.00	89.80	15.20	57.20	2.62	18.29
10	90.94	63.02	99.25	82.26	99.18	96.33	100.00	92.86	9.06	52.85	0.76	12.88
Total	63.29	40.43	89.91	50.41	83.45	76.57	99.78	67.22	31.77	89.41	10.97	33.26

Note: Access to public utilities for 1996/97 was based on the following questions of the household survey: In the block where your house is located, is there: water network, electricity network, gas network? Does your house has a telephone? For 1985/86, those that reported an expenditure greater than zero were considered to have access to the corresponding public utility.

Source: HES 1985/86, HES 1996/97, INDEC.

Take-up Decision

When evaluating the impact of privatization on access it is useful to get a sense of how binding is the accessibility constraint for consumers. If a high proportion of consumers that have potential access, do not choose to use the service (i.e., if take-up is low) then the benefits of increasing access by privatizing the service are somewhat limited. The HES 1996/97 allows us to consider take-up decisions by decile. This variable is constructed by determining the number of households that are connected to the corresponding public service when the service is actually available to them. Take-up decisions are on average quite high: 87.49% for natural gas, 99.88% for electricity, and 97.39% for water. Electricity and

water show a high percentage of households adopting the public services for all deciles, while for natural gas, the percentage increases with income, starting with 45.61% for the poorest households. These numbers are consistent with the fact that gas in carafe is mostly used by poor households. At this point it is important to note that in Argentina the electricity, gas and telecom service-connection is not mandatory for consumers. In the case of water, connection to the network is also not mandatory but proof of an alternative source of potable water is required (private wells are relatively popular).

Table 26. Percentage of Take-up per Income Group, 1996/97.

Decile	Take-up (%)		
	Natural Gas	Electricity	Water
1	45.61	99.38	92.54
2	73.08	100.00	94.75
3	81.33	99.79	96.98
4	83.37	99.80	96.78
5	90.31	99.79	96.46
6	90.18	100.00	97.45
7	92.83	100.00	97.34
8	94.49	100.00	98.59
9	96.88	100.00	99.55
10	98.56	100.00	99.79
Total	87.49	99.88	97.39

Source: HES 1996/97, INDEC.

Logit Regression for Access

To get a sense of what factors determine access to public services we run a logit regression of the probability of access as a function of different household characteristics for 1985/86 and 1996/97. Table 27 shows the results. The main purpose is to identify some of the possible determinants of access to public services and if these have changed after the period of privatization.

The independent variables are measures of access to the different public utilities: access to telephone (tacc), access to natural gas (gacc), access to electricity (eacc), and finally, access to water (wacc). The explanatory variables included are the age (age), years of education (edu), and gender of the household head (male), household size (memb), household income per capita (incpc), a dummy for home ownership (own), proportion of household members with 65 years of age or older (gr65), and proportion of household members that are 14 years old or less (less14).

Table 27. Logit Regression.

1985/86												
	tacc			gacc			eacc			wacc		
	Coef.	Std. Err.		Coef.	Std. Err.		Coef.	Std. Err.		Coef.	Std. Err.	
Age	0.0190	0.0046	**	0.0378	0.0051	**	0.0457	0.0079	**	0.0254	0.0048	**
Edu	0.1249	0.0112	**	0.1635	0.0132	**	0.1461	0.0227	**	0.0971	0.0111	**
Memb	0.0845	0.0350	**	-0.0194	0.0370		-0.0209	0.0524		-0.0650	0.0372	*
Male	-0.1743	0.1194		0.1086	0.1307		0.3492	0.1982	*	-0.1640	0.1220	
Inpc	0.0000	0.0000	**	0.0000	0.0000	**	0.0000	0.0000	**	0.0000	0.0000	**
Own	0.3048	0.1043	**	0.4095	0.1098	**	0.5908	0.1496	**	1.3855	0.1213	**
Gr65	0.1423	0.1948		0.0541	0.2213		-1.3344	0.3543	**	0.0998	0.1960	
Less14	-0.6146	0.2807	**	-0.5864	0.2979	**	-0.4440	0.4502		-0.6291	0.2888	**
_cons	-3.0586	0.3081	**	-3.6228	0.3404	**	-2.3407	0.4975	**	-3.5585	0.3183	**
Nobs	2716			2716			2716			2716		
Pseudo R2	0.15			0.21			0.19			0.16		

1996/97												
	tacc			gacc			eacc			wacc		
	Coef.	Std. Err.		Coef.	Std. Err.		Coef.	Std. Err.		Coef.	Std. Err.	
Age	0.0285	0.0039	**	0.0301	0.0048	**	0.0386	0.0353		0.0233	0.0040	**
Edu	0.1596	0.0121	**	0.1676	0.0160	**	0.3943	0.1172	**	0.1371	0.0124	**
Memb	0.0611	0.0245	**	-0.0172	0.0270		0.3678	0.2854		-0.0289	0.0240	
Male	0.0495	0.0875		-0.0821	0.1133					-0.3727	0.0955	**
Inpc	0.0038	0.0002	**	0.0056	0.0004	**	0.0043	0.0036		0.0022	0.0002	**
Own	1.0201	0.0823	**	0.2599	0.0984	**	-0.6436	0.6997		-0.4840	0.0886	**
Gr65	-0.0680	0.1604		0.8309	0.2422	**	-0.7045	1.8224		0.6313	0.1787	**
Less14	-0.4126	0.2256	*	-0.0813	0.2651		-4.4238	2.4012	*	0.0127	0.2269	
_cons	-4.2897	0.2702	**	-2.9244	0.3231	**	0.3689	2.0317		-1.3148	0.2605	**
Nobs	4905			4905			3702			4905		
Pseudo R2	0.24			0.25			0.21			0.14		

Note: tacc = access to telephone, gacc = access to natural gas, eacc = access to electricity, wacc = access to water, edu = years of education of household head, male = gender of the household head is male, memb = household size, inpc = household income per capita, own = dummy for home ownership, gr65 = proportion of household members 65 years of age or older, less14 = proportion of household members 14 years old or less.

** : significantly different of zero with 95% confidence, * : significantly different of zero with 90% confidence.

In general, households are more likely to have access to public services when they have an older and more educated household head, or a female household head,¹¹ when they have higher income per capita, a higher proportion of individuals that are 65 years or older, or a lower proportion of individuals 14 years old or younger. Home ownership has a positive effect on the likelihood of access for all utilities in all years except for Water in 1996/97. The effect of household size is not the same for all utilities. For instance, large households are more likely to have access to telephone in 1985/86, but they are less likely to have access to water.

¹¹ The dummy variable *male* is not significantly different from zero in most cases for 1985/86.

Comparing the results of the regressions before and after privatization, the main changes seem to have occurred in the electricity sector. After the privatization, only the variables *edu* and *less14* are significantly different from zero. However, after privatization the level of access to electricity was almost 100 % across all income groups and this limits the possibility of identifying relevant correlations.

2. Change in Consumer Surplus

Engel Curves: Non-Parametric Estimation

A change in the price of a good or service will have a greater impact on consumers who devote a larger share of their budget to purchase that good or service. Hence, in order to obtain an approximation of the welfare effects originated in a change in the price of electricity, natural gas and water, we use a nonparametric method to estimate both Engel curves for the different services and the distribution of consumers across expenditure levels. Given a change in price, knowing the budget share for each income level and the distribution of agents across income allow us to get a sense of where the main winners and losers are and how important in number they are.

The following figures present the budget share on the different public services for different levels of total expenditure per capita (expressed in logarithms, *lexppc*). The vertical lines indicate the cutoff expenditure levels for the first and ninth decile. For these set of figures the agents reporting zero shares were included in the sample and we assume they represent consumers without access (in this sense, the estimations here are comparable with the budget shares reported in Table 13). Also we perform the same calculations without including these zero-share consumers (the corresponding figures are in the Appendix). Considering households with zero shares as not having access represents an upper bound in the number of households with no access. Some households will report a zero share even when they do have access because they consume a minimum amount of the service or because they intend to misrepresent their consumption.

For 1996/97, the cases of natural gas and electricity show budget share curves that monotonically decrease. For telephones 1985/86, the curve monotonically increases, and in all other cases, the curves increase, reaches a maximum, and then decrease suggesting that the corresponding public service is a normal good for low expenditure levels and becomes an inferior good for higher income households.

Figure 9. Engel Curve: Telephone.

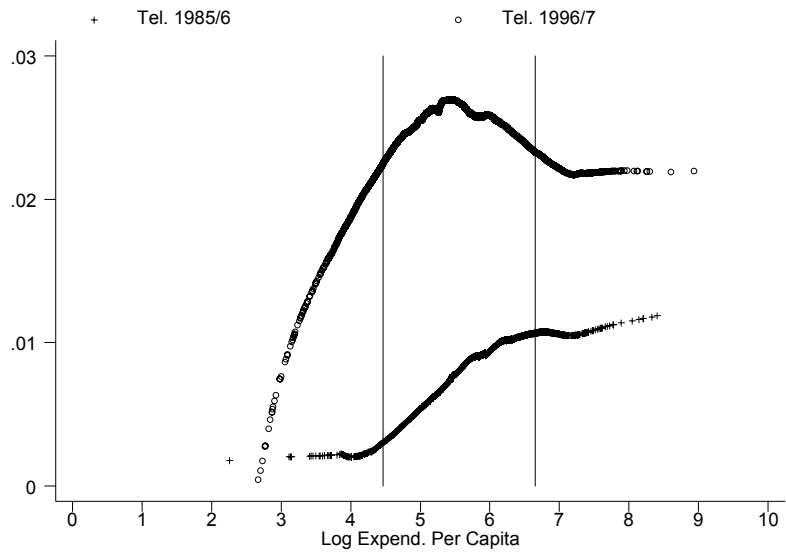


Figure 10. Engel Curve: Natural Gas.

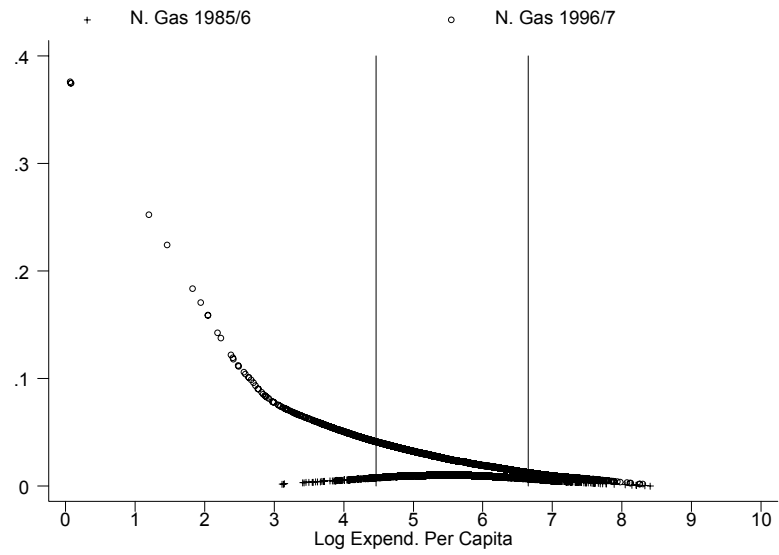


Figure 11. Engel Curve: Water and Electricity.

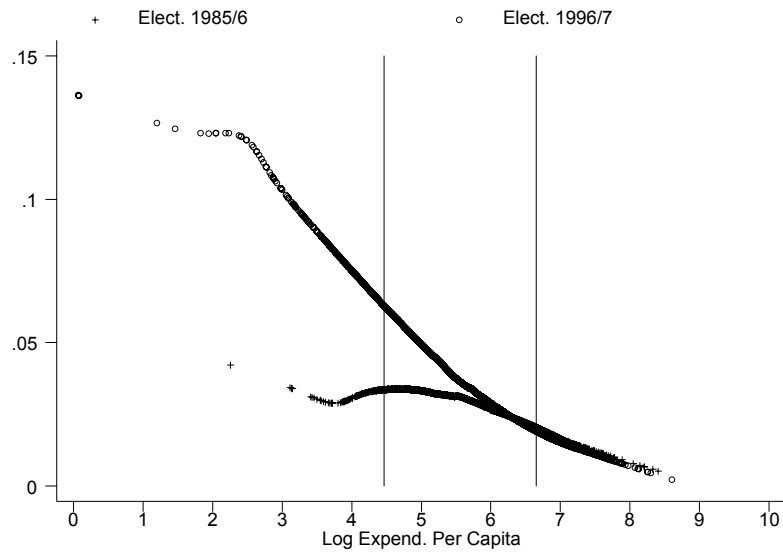
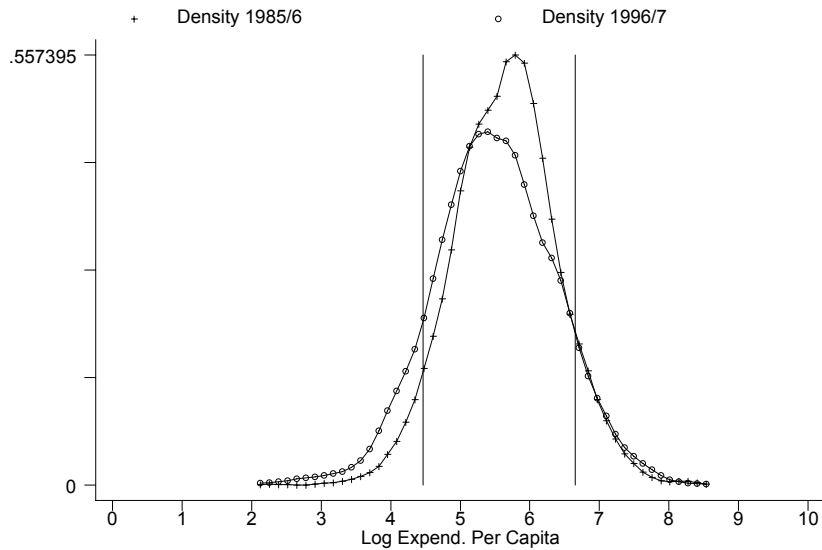


Figure 12 shows the density of household across expenditure per capita. This figure gives us a sense of the mass of consumers at different levels of income/expenditure.

Figure 12. Density of Household Expenditure Per Capita.



When we repeat the previous exercise excluding those households with zero budget shares from the non-parametric regression all Engel curves are downward sloping, that is, the share of the budget spent on each corresponding public service decreases systematically with the rise on living standards.

Change in Prices: First and Second Order Approximation to Consumer Surplus

We now estimate the change in agents' utility due to the observed change in public services prices in Argentina after the privatization. We calculate two possible approximations: (1) a

first order approximation (FOA) and (2) a second order approximation (SOA). The FOA of the change in utility is calculated using the following formula:

$$\Delta U^h = -(\Delta \log p_i) x_0^h w_{i0}^h$$

where p_i is the price of service i and w_{i0}^h represents the expenditure share of household h on public service i prior to privatization, and x_0^h is the total household expenditure per capita. This is just a weighted average of the log change in prices where the weights are given by amount that each household type spend on each particular public service, prior to the change in prices.

The second order approximation (SOA) allows for some quantity response to the change in prices. In terms of the expenditure share of household h , w^h , the SOA to the change in utility for household h of a change in price in public service i can be expressed as:

$$\Delta U^h = -(\Delta \log p_i) x_0^h w_{i0}^h \left[1 + \frac{\Delta \log p_i}{2} \frac{\partial \log w_i^h}{\partial \log p_i} \right]$$

We use the absolute numbers (ΔU^h) in our calculation of the change in inequality and poverty due to privatization. When we assess the changes in welfare across different income/expenditure groups, these utility changes are expressed as a proportion of the household expenditure prior to privatization, i.e., $\Delta U^h/x_0^h$. In order to compute both the FOA and the SOA, it is necessary to estimate the change in prices before and after the reform period. In addition, the calculation of the SOA requires some estimation of $(\partial \log w_i^h / \partial \log p_i)$.

Based on the information presented above when we discuss the evolution of prices during the period, we conclude that the price changes associated with the privatization are best approximated by the numbers provided in Table 28 below.

Table 28. Change in Relative Prices.

Utility	1985/86	1996/97
Telephone	100.00	83.94
Natural Gas	100.00	86.56
Electricity	100.00	67.49

The determination of the actual change in prices that can be attributed to the privatization of public utilities is a controversial issue. Different studies reach different conclusions. For example, in a recent study by Delfino and Casarin (2001), the authors suggest that privatization in fact produced an increase in prices. On the other hand, Urbiztondo et. al. (1999) conclude that prices actually decreased in similar percentages as the ones presented in Table 28.

Our criterion for constructing Table 28 was the following. The changes in the relative prices of the selected public services were computed using an index of final prices and deflating them by the retail price index. We chose 1985/86 and 1996/97 as the years used for the comparison. Those are the years of the available expenditure surveys. Our results are of course sensitive to the years of choice. Nevertheless, we think that these are reasonable years

to use in the comparison. The period between 1988-89 was a period of very high inflation in Argentina (that concluded with the hyperinflation of June 1989). Prices of public services suffered an important real devaluation during that period. Choosing as the initial prices the ones prevailing at the time immediately before the privatization would clearly be influenced by this fact. The period starting in 1991 was a period of relative stability and by 1996 the prices in the privatized firms had probably adjusted to what we can consider their “normal” levels. Hence, 1996 seems a good year for measuring the post-privatization prices. Choosing a later year would certainly imply smaller decreases in prices (or even increases, as in Delfino and Casarin (2001) that used the prices in 1999). But the reason may be that the economy entered another abnormal path in 1998 with an overall deflation that was not translated to the prices of public services because of regulatory reasons (prices were dollar indexed). By 1999, the prices of public services seem to again be misaligned as a consequence of macroeconomic instability. We will abstract from including these episodes in our calculations. An important lesson from the increase in prices in the late nineties is that the regulatory framework in an unstable country like Argentina should be accordingly adapted to handle abnormal macroeconomic situations (on this issue, see Estache et. al. (1997) for an evaluation of the potential gains of improving the regulation of the privatized public utilities in Argentina).

In order to estimate the expression $(\partial \log w_i^h / \partial \log p_i)$, we use the results of the following Engel equation:

$$w_{hi} = \alpha_i + \beta_i \log p_i + \gamma_i \log x_h + \delta_i (\log x_h)^2,$$

so that:

$$\frac{\partial \log w_i^h}{\partial \log p_i} = \frac{\hat{\beta}_i}{w_i^h}.$$

The accuracy of this estimation is of course limited by the quality of the data available and the fact that only two data points are available.

Table 29. Engel Curve Regressions.

Variable	Telephone (tsh)				Natural Gas (gsh)				Electricity (wesh)			
	All obs.		tacc = 1		All obs.		Gacc = 1		All obs.		eacc = 1	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Lp	-0.1017	0.0042**	-0.0990	0.0061**	-0.0951	0.0040**	-0.0429	0.0042**	-0.0196	0.0020**	-0.0291	0.0015**
Lexppc	0.0206	0.0031**	-0.0674	0.0070**	-0.0797	0.0024**	-0.0727	0.0029**	-0.0313	0.0033**	-0.0835	0.0025**
Lexppc2	-0.0017	0.0003**	0.0047	0.0006**	0.0062	0.0002**	0.0051	0.0003**	0.0014	0.0003**	0.0065	0.0002**
_cons	0.4158	0.0198**	0.7029	0.0321**	0.6960	0.0187**	0.4609	0.0197**	0.2520	0.0121**	0.4076	0.0089**
Number of obs	7620		4666		7620		5812		7620		7335	
R-squared	0.07		0.14		0.28		0.30		0.17		0.29	
Adj R-squared	0.07		0.14		0.28		0.30		0.17		0.29	

Note: tacc = 1: households with access to telephone, gacc = 1: households with access to natural gas, eacc = 1: households with access to electricity, tsh: telephone expenditure share, gsh: natural gas expenditure share, esh: electricity expenditure share, lp: log of price, lexppc: log of expenditure per capita. (**): significantly different of zero with 95% confidence, (*): significantly different of zero with 90% confidence.

Table 29 shows the value of the corresponding estimated parameters of the previous equation when all households are considered (first column) and when only those with access (second column) are taken into account.

Combining the price variation and the previous results, we can compute the FOA and the SOA for every income group and for each of the sectors previously considered. The values (when only considering households with access) are shown in Table 30. The table also shows the estimates of $(\partial \log w_i^b / \partial \log p_i)$ and the virtual prices, p_v .

Table 30. First Order and Second Order Approximation to Consumer Surplus. Percentage Change in Utility (Ignoring Changes in Access).

Sector	Decile	FOA (%)	SOA (%)	$\frac{\partial \log w_i^b}{\partial \log p_i}$	Virtual Price (p_v)
Telephone	1	0.1972	0.3489	-50.7229	111.3780
	2	0.2464	0.3981	-46.0762	114.2182
	3	0.2589	0.4106	-44.5010	114.9379
	4	0.4189	0.5706	-42.3263	124.1717
	5	0.2749	0.4266	-37.6296	115.8603
	6	0.2493	0.4010	-40.7909	114.3819
	7	0.2960	0.4477	-24.4071	117.0760
	8	0.2572	0.4089	-21.9830	114.8402
	9	0.2605	0.4122	-26.0341	115.0322
	10	0.2693	0.4210	-16.7336	115.5382
	Total	0.2765	0.4283	-30.9495	115.9556
Natural Gas	1	0.3648	0.4095	-3.8739	125.5318
	2	0.3033	0.3479	-3.5851	121.2238
	3	0.3308	0.3755	-3.7489	123.1511
	4	0.2792	0.3239	-3.8678	119.5400
	5	0.2330	0.2777	-5.1853	116.3044
	6	0.2300	0.2747	-4.5689	116.0998
	7	0.2034	0.2481	-5.5703	114.2333
	8	0.1812	0.2259	-9.9550	112.6819
	9	0.1493	0.1940	-8.9284	110.4506
	10	0.1059	0.1506	-13.2546	107.4145
	Total	0.2141	0.2588	-7.0171	114.9867
Elect. & Water	1	1.5862	1.8112	-1.3827	238.6348
	2	1.5473	1.7723	-1.2981	235.2339
	3	1.5066	1.7316	-1.3511	231.6768
	4	1.5965	1.8214	-1.3126	239.5278
	5	1.1680	1.3929	-1.6173	202.0784
	6	1.3277	1.5527	-1.4729	216.0400
	7	1.2032	1.4281	-1.6417	205.1567
	8	1.1280	1.3530	-1.8356	198.5881
	9	0.9530	1.1779	-1.9210	183.2894
	10	0.8555	1.0804	-2.2584	174.7655
	Total	1.2682	1.4932	-1.6273	210.8419

Note that the average percentage change in utility in Electricity and Water is substantially higher than in either Telephones or Natural Gas. This is also the case when we adjust the calculation for sample-selection effects later in the paper (see Table 33). Also note that, for Telephone those in the middle part of the distribution of income per capita tend to obtain the highest benefits, while for both natural gas and electricity the percentage change in utility generally decreases with the level of income.

Change in Prices and Access: First and Second Order Approximation to Consumer Surplus

The previous measures ignore the effect of changes in access. As the privatization process may have affected households differently in terms of access, we divide the total number of households into four different groups: households with access before and after privatization, households that gain access after the privatization, households that no longer have access after the privatization, and households with no access in every period. The first group of people is essentially affected through the change in prices of the privatized services, so the change in consumer surplus is calculated as before. For those who gained access the change in consumer surplus can be approximated using the difference of the virtual price (the price that would make their expenditure in the service equal zero) and the price after privatization. The last two groups are basically affected through the change in prices of goods and services that are substitutes to those that have been privatized. Given the information available, we cannot assess the impact on these two groups.

The results in Table 30 were obtained by using the price elasticity estimated with the sub-sample of households with access to each respective public service (see Table 29). Those estimates could be inconsistent if omitted variables correlated with access also affected the demand of the services. Therefore, in Table 31 we recalculate the Engel curves using a Heckman two-step correction method to take into account the possible bias. The variable lambda in the regression of Table 31 is the inverse Mills ratio constructed using the estimates of the logit regression in Table 32. This variable is significantly different from zero for natural gas and electricity.

Table 31. Heckman Two-Step Correction.

Variable	Telephone (tsh)		Natural Gas (gsh)		Electricity (weacc)				
	Tacc = 1		gacc = 1		eacc = 1				
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.			
Lp	-0.0997	0.0063	**	-0.0342	0.0043	**	0.0033	0.0021	
Lexppc	-0.0673	0.0070	**	-0.0739	0.0029	**	-0.0408	0.0033	**
Lexppc2	0.0047	0.0006	**	0.0051	0.0003	**	0.0017	0.0003	**
Lambda	0.0005	0.0011		-0.0067	0.0008	**	-0.0156	0.0010	**
_cons	0.7047	0.0324	**	0.4323	0.0198	**	0.2063	0.0120	**
Nobs	4666			5812			7335		
R-squared	0.14			0.31			0.22		
Adj R-squared	0.14			0.31			0.22		

** : significantly different from zero with 95% confidence, * : significantly different from zero with 90% confidence.

Table 32. Logit Regression.

Variable	Telephone (tacc)		Natural Gas (gacc)		Electricity (weacc)				
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.			
Age	0.0254	0.0029	**	0.0351	0.0034	**	0.0485	0.0073	**
Dsex	-0.0952	0.0691		-0.0987	0.0828		-0.1297	0.1817	
Edu	0.1623	0.0081	**	0.2083	0.0100	**	0.3065	0.0242	**
memb	0.0768	0.0197	**	-0.0044	0.0212		0.0724	0.0469	
realincpc	0.0028	0.0002	**	0.0030	0.0002	**	0.0021	0.0005	**
own	0.6963	0.0636	**	0.2229	0.0711	**	0.2494	0.1398	*
gr65	0.0637	0.1214		0.4135	0.1580	**	-1.2336	0.3336	**
less14	-0.6720	0.1724	**	-0.6563	0.1916	**	-1.5383	0.4126	**
_cons	-3.7964	0.1988	**	-3.1737	0.2269	**	-1.6136	0.4534	**
Nobs	7621			7621			7621		
Pseudo R2	0.20			0.24			0.20		

** : significantly different from zero with 95% confidence, * : significantly different from zero with 90% confidence.

Using the price elasticities of the budget shares computed in Table 31, we can obtain the prices that would make those shares equal to zero even under unrestricted access. These prices, called virtual prices, are used for the calculation of the change in welfare associated to those consumers that had no access prior to privatization. The virtual prices (per decile) are shown in the last column of Table 33 (see also the figures in the Appendix). They are in general decreasing in income.

We are now ready to compute the approximations to the change in consumer surplus employing the elasticity values obtained in Table 31. In order to compute the FOA and SOA incorporating changes in access, we begin by assuming that people do not lose access to the formal sector after privatization. We then proceed as follows. Let N_t^d be the total number of households sampled from decile d in period t , F_{jt}^d the number of households in decile d at time t with access to the formal sector j , and I_{jt}^d those households with informal connection (or no access), so that $N_t^d = F_{jt}^d + I_{jt}^d$. As before, we consider 1985/86 as the pre-privatization period ($t = 0$), and 1996/97 as the post-privatization period ($t = 1$). It then follows that (F_{j0}^d/N_0^d) represents the proportion of households with formal access in both periods, and $[(F_{j1}^d/N_1^d) - (F_{j0}^d/N_0^d)]$ the proportion with no access (or informal connection) that later gained access to a formal connection. To compute the change in welfare for those households that gained access after the privatization, we employ the post-privatization period as the reference period. We use the values from the budget share regressions obtained from the Heckman Two-Step Correction procedure and the observed expenditure share in period $t = 1$ to back out a virtual price for each household b and service j , $p_{b,j}$. Therefore, the first-order approximation of the mean decile change in welfare due to privatization of public service j is:

$$E\Delta U_j^d = -\frac{F_{j0}^d}{N_0^d} \frac{1}{F_{j0}^d} \sum_{h \in d: A_{h,j0}=1} (\Delta \log p_j) w_{h,j0} x_{h,0}$$

$$- \left(\frac{F_{j1}^d}{N_1^d} - \frac{F_{j0}^d}{N_0^d} \right) \frac{1}{F_{j1}^d} \sum_{h \in d: A_{h,j1}=1} (\log p_{h,jv} - \log p_{j1}) w_{h,j1} x_{j1}$$

where $A_{h,jt}$ is an indicator variable of whether household h has access ($A_{h,jt} = 1$) or not ($A_{h,jt} = 0$) to service j at time t . For the SOA we adjust the previous calculations by allowing some quantity response, so the formulas for the changes in utility become:

$$E\Delta U_j^d = -\frac{F_{j0}^d}{N_0^d} \frac{1}{F_{j0}^d} \sum_{h \in d: A_{h,j0}=1} (\Delta \log p_j) w_{h,j0} x_{h,0} \left[1 + \frac{\Delta \log p_j}{2} \frac{\partial \log w_{w,j0}}{\partial \log p_j} \right]$$

$$- \left(\frac{F_{j1}^d}{N_1^d} - \frac{F_{j0}^d}{N_0^d} \right) \frac{1}{F_{j1}^d} \sum_{h \in d: A_{h,j1}=1} (\log p_{h,jv} - \log p_{j1}) w_{h,j1} x_{j1} \left[1 + \frac{(\log p_{h,jv} - \log p_{j1})}{2} \frac{\partial \log w_{w,j1}}{\partial \log p_j} \right]$$

The following table reports the percentage change in expected utility (i.e., the expected change in utility as a percentage of initial total expenditure).¹² The third and fourth columns show the results of calculating the first term of the above expressions, while the fifth and sixth columns show the values related to the second term. The seventh and eighth columns show the expected change in utility, which is the sum of the corresponding previous columns. For electricity, since the price elasticity in Table 31 is not significantly different from zero (and with the wrong sign), we use for our calculations the elasticity without the Heckman adjustment (also showing a very inelastic demand).

¹² The Appendix shows the expected absolute (i.e. not in percentage) change in utility due to privatization. These numbers will be employed later in the calculation of the change in inequality and poverty that can be attributed to the privatization process.

**Table 33. First Order and Second Order Approximations to Consumer Surplus.
Household with Access in both Periods and Households with Access after
Privatization.**

Sector	Decile	Access Both Periods		Access After Privatiz.		Total		Virtual Price (p_v)
		FOA	SOA	FOA	SOA	FOA	SOA	
Telephone	1	0.0354	0.0626	0.0622	0.0763	0.0975	0.1389	164.7599
	2	0.0653	0.1054	0.2230	0.2653	0.2883	0.3707	152.7779
	3	0.0873	0.1385	0.3792	0.4673	0.4666	0.6058	146.8454
	4	0.1826	0.2487	0.2906	0.3442	0.4732	0.5930	147.1503
	5	0.1293	0.2007	0.3823	0.4708	0.5116	0.6715	138.4307
	6	0.1237	0.1990	0.5401	0.6615	0.6639	0.8605	136.1053
	7	0.1818	0.2750	0.3646	0.4486	0.5464	0.7236	134.0514
	8	0.1727	0.2746	0.2782	0.3561	0.4510	0.6307	129.4471
	9	0.1978	0.3129	0.1970	0.2521	0.3948	0.5650	128.1028
	10	0.2215	0.3463	0.1361	0.1746	0.3576	0.5209	124.9354
	Avg.	0.1609	0.2495	0.2978	0.3685	0.4588	0.6181	136.3856
Natural Gas	1	0.0788	0.0885	0.7015	0.7933	0.7804	0.8818	229.8922
	2	0.1247	0.1431	0.5583	0.6203	0.6829	0.7633	210.1655
	3	0.1661	0.1885	0.7291	0.8226	0.8952	1.0111	198.1320
	4	0.1534	0.1780	0.8125	0.8940	0.9660	1.0720	198.1804
	5	0.1527	0.1820	0.5506	0.6167	0.7033	0.7987	188.9667
	6	0.1572	0.1878	0.4899	0.5591	0.6471	0.7469	175.2390
	7	0.1600	0.1951	0.2818	0.3221	0.4418	0.5172	168.8682
	8	0.1409	0.1756	0.2668	0.3115	0.4077	0.4871	156.0288
	9	0.1270	0.1650	0.1334	0.1590	0.2604	0.3240	145.1724
	10	0.0964	0.1370	0.0568	0.0693	0.1531	0.2063	133.0477
	Avg.	0.1378	0.1690	0.4250	0.4801	0.5628	0.6491	175.2874
Electricity & Water	1	1.0284	1.1743	2.0229	2.1496	3.0513	3.3239	350.6822
	2	1.2616	1.4450	0.9598	1.0355	2.2214	2.4804	310.8645
	3	1.3235	1.5211	0.4617	0.5056	1.7852	2.0266	273.4237
	4	1.4561	1.6613	0.2566	0.2802	1.7128	1.9415	275.2321
	5	1.0901	1.3000	0.1009	0.1115	1.1910	1.4115	255.8005
	6	1.2465	1.4577	0.0430	0.0483	1.2895	1.5060	235.3945
	7	1.1716	1.3907	-0.0652	-0.0743	1.1064	1.3164	221.0698
	8	1.0869	1.3036	-0.0087	-0.0100	1.0782	1.2936	205.8540
	9	0.9321	1.1521	-0.0495	-0.0586	0.8826	1.0935	188.3328
	10	0.8490	1.0722	-0.0397	-0.0506	0.8093	1.0217	161.9198
	Avg.	1.1423	1.3478	0.3427	0.3665	1.4850	1.7144	245.9665

The following figures show the change in utility that is associated with the changes experienced by agents that had access before and after privatization and by agents that gained access to the public services after privatization (as reported in Table 33). The change in consumer surplus for households with access to telephones in both periods is similar to the one found in Table 30. For natural gas and electricity the low income deciles show a noticeable change (relative to Table 30). This is because the percentage of agents in the lower deciles that benefited from the changes in prices is quite low (something that was not taken into account in our calculations before). In telephone and natural gas, the change in utility due to the increase in access is more important than the change due to the decrease in price. In electricity this is not the case since access was already relatively high before the

privatization. The access effect though was very important for the low income households gaining access to electricity. For telephone and natural gas, the households in the middle part of the income distribution are the ones that benefited the most.

The values in the changes in consumer surplus associated to electricity are considerably higher than those for the other services. In Table 33, the average change in consumer surplus in the electricity sector is 1.7 while in telecommunications and natural gas sector this number is about one half.

Table 34. Telephones, FOA and SOA. Incorporating changes in access.

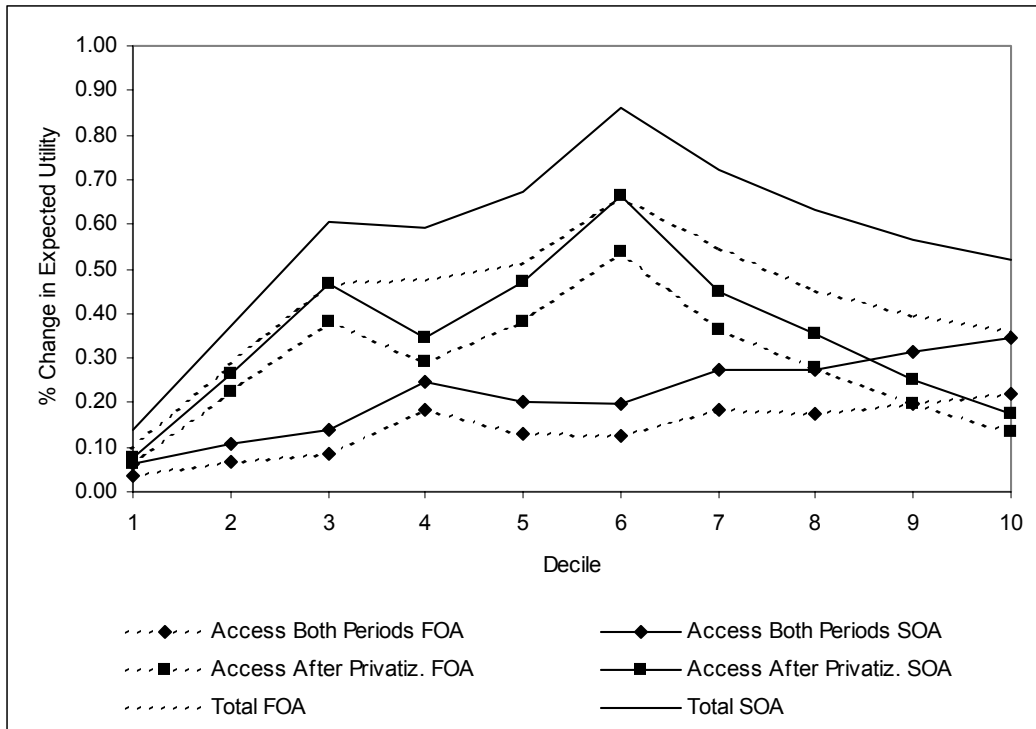


Table 35. Natural Gas, FOA and SOA. Incorporating changes in access.

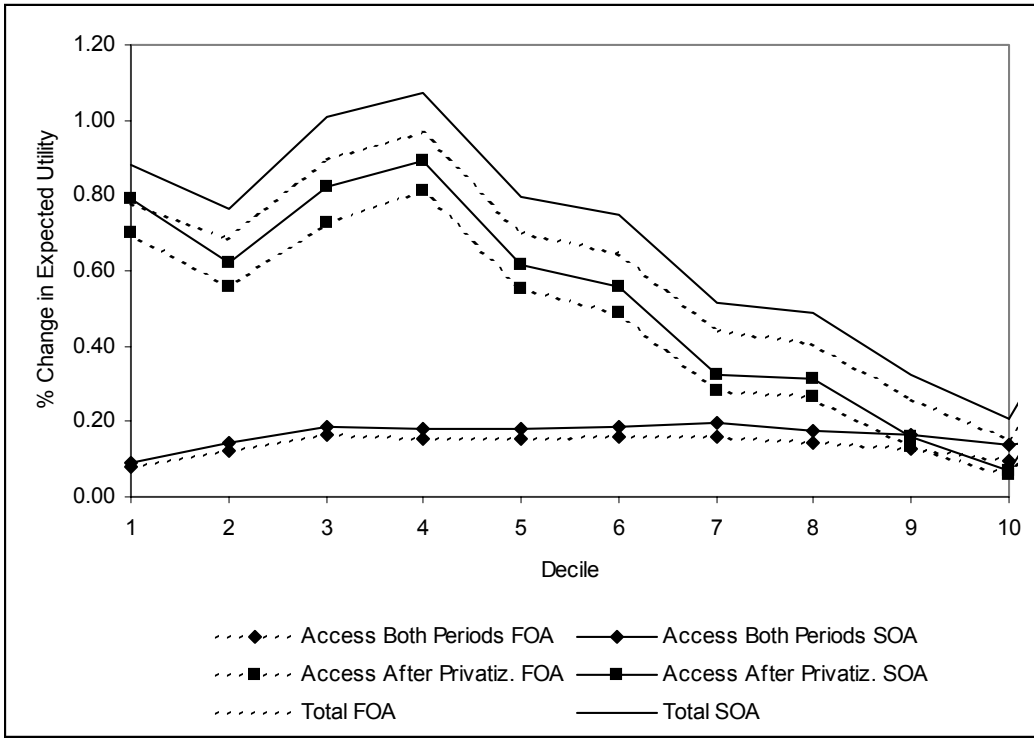
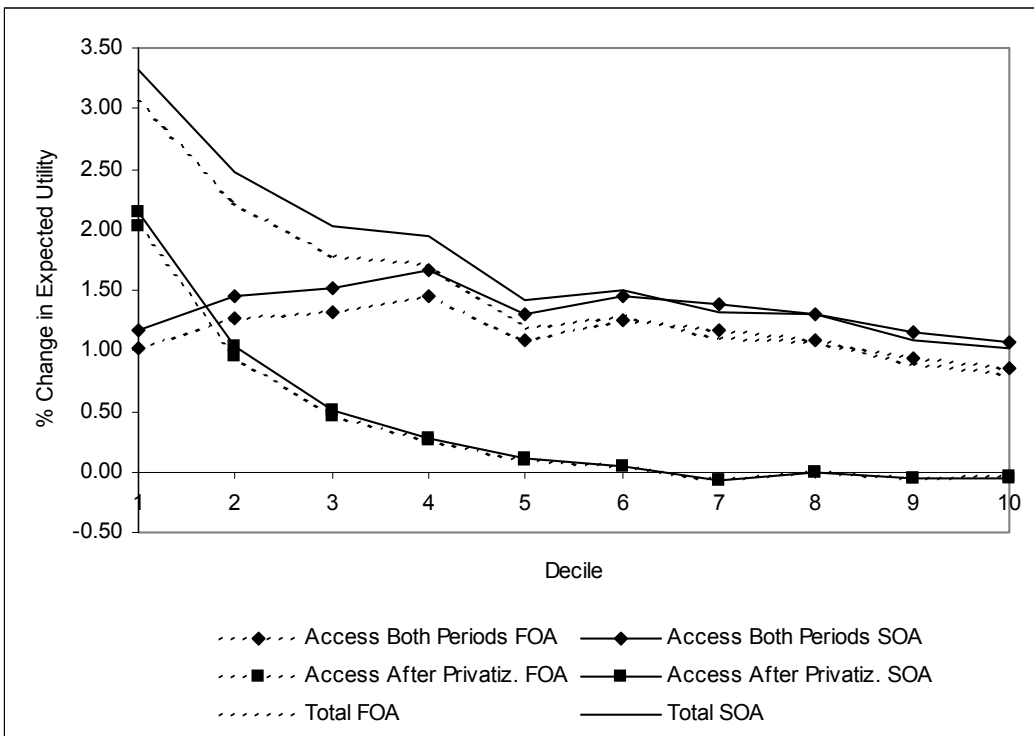


Table 36. Electricity & Water, FOA and SOA. Incorporating changes in access.



Inequality and Poverty

Given that the changes in utility are expressed in terms of pesos, we can use these values to assess the impact of privatization on inequality and poverty. In terms of inequality, we calculate Gini coefficients and Atkinson inequality measures under different assumptions considering the effect on utility both through changes in prices and access. We assume that the expected change in utility explained in the previous section is the only change on initial household expenditure. In particular, for households with access prior to privatization we take pre-privatization household expenditure per capita, and add to it the change in utility (per capita) due to the change in price calculated previously (see section “Change in Prices: First and Second Order Approximation to Consumer Surplus.”). For households that gained access after privatization, the procedure to compute post-privatization utility is less straightforward. First, we assume that the change in utility of households that gained access in decile d after the privatization of public service j is given by the following first order and second order approximations:

$$E(\Delta U_j^d \mid A_{h,j0} = 0, A_{h,j1} = 1) = \frac{1}{F_{j1}^d} \sum_{h \in d: A_{h,j1} = 1} (\log p_{h,jv} - \log p_{j1}) w_{h,j1} x_{j1},$$

and

$$E(\Delta U_j^d \mid A_{h,j0} = 0, A_{h,j1} = 1) = \frac{1}{F_{j1}^d} \sum_{h \in d: A_{h,j1} = 1} (\log p_{h,jv} - \log p_{j1}) w_{h,j1} x_{j1} \left[1 + \frac{(\log p_{h,jv} - \log p_{j1})}{2} \frac{\partial \log w_{w,j1}}{\partial \log p_j} \right]$$

The previous equations represent the expected change in welfare attributed to the change in access for decile d , and consist on the average difference between the virtual price and the price after privatization weighed by the amount spent on public service j . Note that the expressions are estimated using post-privatization survey data.

Next, as we cannot determine which households in the pre-privatization period (1985/86 in our exercise) actually gained access, we randomly select households from decile d without access prior to privatization and add the expected change in utility from access shown above. Assuming that all households in 1985/86 (period 0) had the same probability of gaining access after the privatization (period 1), the fraction of households chosen from decile d is given by

$$\tau = \frac{\left(\frac{F_{j1}^d}{N_1^d} - \frac{F_{j0}^d}{N_0^d} \right)}{\left(1 - \frac{F_{j0}^d}{N_0^d} \right)},$$

where τ is the conditional probability of having access in period 1 given that the household did not have access in period 0.¹³

After incorporating these changes in utility, we compute different inequality indicators. The results are shown in Table 37. The corresponding measures using the unmodified data for 1985/86 and 1996/97 are shown in the first and last column of the table. The six middle columns show the effects on income inequality of the privatization of telephone, natural gas, and electricity and water. In general, we can say the effect of privatization on income inequality appears to be rather small. In all cases, the Gini coefficients decrease. However, the Atkinson measure shows that as the index of inequality rises, i.e., as the importance of households with lower income increases, the privatization of natural gas and electricity and water seem to have importantly increased inequality.

The purpose of the exercise is to show the impact on income distribution of the privatization of each sector considered in the paper separately. The calculation of an aggregate effect considering all these sectors would involve making arbitrary assumptions on the patterns of access across the privatized sectors or the joint probability of access to public services after privatization.

It is also interesting to compare the order of change of the inequality measures from privatizing the public services with the actual changes that occurred from 1985/86 to 1996/97. Whereas the first effects seems to be small (for example, the Gini coefficient changes -1.2% in the case of Electricity and Water, SOA, which constitutes the largest change), Argentina experimented an important increase in the inequality indicators in that period (the Gini coefficient increases almost 16%).

Table 37. Inequality Indicators.

Index	1985/86						1996/97	
	No Privatiz.	Telephones		Natural Gas		Elect. & Water		
		FOA	SOA	FOA	SOA	FOA		SOA
Gini	0.4003	0.3964	0.3963	0.3994	0.3993	0.3961	0.3955	0.4637
A(0.5)	0.1304	0.1285	0.1284	0.1311	0.1310	0.1278	0.1274	0.1746
A(1.0)	0.2406	0.2371	0.2371	0.2429	0.2426	0.2375	0.2366	0.3213
A(2.0)	0.4235	0.4172	0.4173	0.7785	0.6925	0.5190	0.4821	0.5930

Note: Based on HES (INDEC) data.

To evaluate poverty we use the Foster, Greer, and Thorbecke measures:

$$P_{\alpha} = \frac{1}{N} \sum_{i=1}^N \left(1 - \frac{x_i}{z}\right)^{\alpha} 1(x_i \leq z),$$

where z denotes the poverty line, x_i total expenditure per capita in household i , N is the total number of households, and $1(\cdot)$ is an indicator function. Different values of the parameter α describe different poverty measures. For $\alpha = 0, 1$ and 2 , we have that P_0 is the headcount ratio, P_1 is the poverty gap, and P_2 considers the distribution of the poor.

¹³ The fraction of households without access in period 1 given that they did not have access in the previous period, $(1-\tau)$, will only be affected by the privatization process if the price of substitutes changed. In this exercise we do not consider this effect.

We follow the same procedure as before to calculate post-privatization consumers' utility: we take pre-privatization per capita expenditure and add the corresponding estimated change in utility to it. Table 38 reports our estimates of the change in the poverty measures that can be attributed to the privatization. The values in the first and last column are obtained using the observed household total expenditure per capita for 1985/86 and 1996/97, while the middle columns show the effect on poverty that can be attributed to the privatization of the public services analyzed in the paper. All poverty indicators decline and this reduction is more important in the case of electricity and water.

Table 38. Poverty, Households.

α	1985/86							1996/97
	No Privatiz.	Telephones		Natural Gas		Elect. & Water		
		FOA	SOA	FOA	SOA	FOA	SOA	
0	0.1127	0.1016	0.1016	0.0994	0.0994	0.0954	0.0950	0.1965
1	0.0316	0.0285	0.0285	0.0287	0.0286	0.0270	0.0266	0.0681
2	0.0133	0.0118	0.0118	0.0123	0.0123	0.0110	0.0108	0.0346

Note: Based on HES (INDEC) data.

Hedonic Rental Regression

The idea in this subsection is to run a hedonic rental regression with household rent-payments or household imputed rents as the dependent variable, and to include as explanatory variables indicators of access to the different public services, in addition to a set of other control variables. This kind of regression is useful to try to infer the implicit value that the marginal renter assigns to the possibility of having access to public services. An important limitation of this analysis though, is that due to the lack of data it is not possible to include neighborhood characteristics into the regression (like amenities in the neighborhood, crime levels, etc.). Also due to data availability, we were able to estimate this hedonic rental regression only for the year 1996/97. For the year 1985/86 the survey does not contain information about house characteristics.

Before presenting the actual regression, we provide some background information about the housing market. Table 39 shows that for the Greater Buenos Aires, the fraction of relatively poor households that rent is very low compared to high-income groups. The category "Other" is the second in importance for households with relatively low income. For example, households that illegally occupy houses are included in this category.

Table 39. Proportion of Households that Own or Rent (%), 1996/97.

Decile	Own	Rent	Other
1	62.93	3.26	33.81
2	66.80	8.05	25.15
3	70.45	8.26	21.28
4	69.31	11.79	18.90
5	73.01	11.66	15.34
6	77.19	12.42	10.39
7	76.78	13.85	9.37
8	70.20	20.41	9.39
9	72.65	17.76	9.59
10	68.78	26.33	4.90

Total	70.81	13.37	15.82
--------------	--------------	--------------	--------------

Source: Own calculations based on PHS (INDEC).

In 1996/97, from a total of 4905 households, only 733 report a positive amount of money in concept of rent or imputed rent. From these 733 households, 635 are renters, 87 are owners, and 11 are occupiers. However, this does not imply that most households in Argentina rent their homes, or at least not in the proportions represented by these numbers. Presumably, the report of imputed rents is not well implemented in the survey and most households do not report this information.

Table 40. Summary Statistics for Rent, Different Categories (%), 1996/97.

	Obs	Mean	Std. Dev.	Min	Max
Owner	87	101.98	45.39	20	280
Renter	635	358.25	263.13	5	5000
Occupier	11	131.36	104.36	30	300
Total	733	324.43	260.37	5	5000

Source: Own calculations based on PHS (INDEC).

Table 41 shows the results from estimating the hedonic rental regression for renters (excluding any household reporting imputed rents). We do not include a variable to represent access to electricity in the regression because all houses with positive rent happen to also have access to electricity.

Table 41. Hedonic Rental Regression.

Variable	Coef.	Std. Dev.		Coef.	Std. Dev.
tacc	63.7592	23.1011	**	30.7167	23.9974
wacc	47.8828	44.3359		41.5874	43.7762
sacc	52.1729	34.7819		35.4562	34.4235
pavement	48.2502	46.3944		42.2323	45.9047
bedr	84.6010	11.0158	**	84.7228	11.9834
type	-29.3619	26.4521		-18.6871	26.3199
gar	71.8223	26.6008	**	65.0119	26.2145
gard	31.6959	29.0788		30.6692	28.6628
edu				13.1813	2.9554
age				1.1137	0.7628
memb				-5.0858	6.6919
_cons	-15.8857			-159.5345	65.6521
Nobs		590.00			590.00
F(8, 581)		16.50			14.49
R-squared		0.19			0.22
Adj R-squared		0.17			0.20

Note: tacc: access to telephone, wacc: access to water; sacc: access to sewer network; pavement: the block where the house is located has pavement; bedr: number of bedrooms; type: apartment = 0, house = 1; gar: the house has a garage; gard: the house has a garden; edu: years of education of household head; age: age of household head; memb: household size.

** : significantly different from zero with 95% confidence, * : significantly different from zero with 90% confidence

The coefficients for the variables tacc, wacc, and sacc represent the premium associated to having access to the telephone, water and sewage networks. The table shows the results of

two regressions. In the first regression, from the three variables that represent the value of access to different public services, only *tacc* is significantly different from zero, and indicate that individual would be willing to pay a 64 pesos premium per month for having access to the telephone network. When years of education of household head, age of household head, and household size are incorporated into the analysis (the estimations are presented in the last two columns of Table 41), neither of the variables mentioned before become significantly different from zero, providing some evidence that the omitted variables are importantly affecting the results.

3. Concluding Remark

We close this section with some brief concluding remarks. In general, the process of privatization has tended to increase access and lowered prices for the privatized public services in Argentina. Low income households benefited the most from the increase in accessibility, especially in the cases of natural gas, and electricity and water. In the case of telephones, the benefits from access seem to be mainly directed to households in the middle part of the income distribution. Although in general tariffs were lower in relative terms comparing with the situation prior to privatization, their trend seems to be increasing. The distributive impact of the changes in prices during the privatization process is somewhat different for the different public services. In the case of telecommunications, households with medium to high expenditure per capita are the one gaining the most. For natural gas and electricity and water, it seems that the households in the lower end of the income distribution obtain the highest relative utility gains. The main welfare improvements are associated to the price change in the electricity and water sectors given that households spend a significant proportion of their budget on these services. The implications of the privatization on the standard measures of inequality and poverty do not seem very significant.

IV. The Employment Effect

In order to study the employment effect, we take a more general approach. We look at the evolution of employment and wages in all those sectors that were most influenced by the privatization process and examine qualitative changes experimented in the labor market during the reform period. We also calculate the change in inequality that can be attributed to privatization on the basis of the employment survey. We first estimate an upper bound of the change in inequality as a result of the layoffs that occurred in the privatized sectors, and then we examine the change in wage inequality.

1. Changes in Employment: Firm Level Data.

The privatized industries that were the main employers prior to the reforms were railways (FFAA), the oil-company (YPF), the electricity, and the telephone company. Table 42 shows some of the main (and largest) individual firms in these sectors and the changes in employment that they experienced. On average, those firms decreased the number of jobs in 67%. FFAA experienced the most important reduction in the workforce (75,000 jobs that represented a decrease in 82%), but the major proportional change occurred in YPF (a reduction of 83% of the jobs).

Even though these are large variations in the employment of the specific sector, the relative importance in terms of aggregate employment in Argentina are probably not very significant. As a percentage of total employment in the country, the employment in the privatized sector before privatization amounted to approximately 2.3 percent (see the fourth column of Table 42). At the same time, the impact of the change in employment in these firms on the rate of unemployment was more important, and accounted for around 13 percent of the change in unemployment from 1987/90 to 1997 (see the last column of Table 42).¹⁴

Table 42. Employment in Privatized Firms as a Proportion of Total Employment and Change in Total Unemployment.

Company	Employ.		Employ./Total Employ. (in %)		Layoffs	Layoffs/ Δ Total Unempl. (in %)
	1987/90	1997	1987/90	1997		
SEGBA (Electricity)	21,535	7,945	0.22	0.07	13,590	1.20
GE (Natural Gas)	9,251	3,462	0.10	0.03	5,789	0.51
OSN (Water)	9,448	4,251	0.10	0.04	5,197	0.46
ENTel (Telecom.)	45,882	29,690	0.48	0.27	16,192	1.43
YPF (Oil)	34,870	5,700	0.36	0.05	29,170	2.57
AA (Airline)	10,283	4,840	0.11	0.04	5,443	0.48
FFAA (Railways)	92,000	17,000	0.96	0.15	75,000	6.61
TOTAL	223,269	72,888	2.32	0.66	150,381	13.24

Note: GE: Gas del Estado; OSN: Obras Sanitarias de la Nación; ENTel: Empresa Nacional de Telecomunicaciones; AA: Aerolíneas Argentinas; FFAA: Ferrocarriles Argentinos.

Source: CNC, SIGEP, ENRE, ENARGAS, Data on FFAA is from Estache et al. (1999).

It should be said, however, that the changes in employment were relatively abrupt and concentrated in a short period of time. Furthermore, the overall economy was experiencing widespread restructuring during this period (the unemployment rate raise from 5.3% in 1987 to 8.6% in 1990, and 14.3% in 1997, see Table 1) making the re-insertion to the employment pool of the laid off workers harder and probably very costly (see for example, Galiani et. al. (2001)).

Table 43 reports that there were large employment reductions in the privatized firms during the early periods of the process of reform (with some of the largest firms experiencing over 20% reductions in a period of less than two years). Estache et al. (1999) report that employment in the railways company (FFAA) was reduced by around 72,000 jobs in the first three years after privatization (this constitutes 90% of the total reduction in employment in that company).

Prior to privatization, the government estimated the optimal workforce size for each publicly owned enterprise. The last column of Table 43 shows the estimated reduction in the actual employment level that would have been necessary to reach the estimated optimal workforce. These estimated reductions seem to have been a sub-estimation of the actual reductions in the workforce that finally took place, as can be seen by comparing these numbers with those presented in the first two columns of Table 42.

¹⁴ These numbers are calculated using total urban employment and unemployment in Argentina. If we only consider the corresponding numbers for GBA, the percentage of the change in unemployment goes up to 25%.

Table 43. POE Workforce.

	Dec-89	Dec-90	Jun-91	Estimated Reduction (*)
GE	10186	10444	10253	1948
SEGBA	22032	20271	19809	4538
OSN	9347	8328	7815	2740
YPF	37271	36935	32117	15317
FFAA	93332	86856	84006	30000

Note: (*) Government estimated necessary reduction to reach the optimal workforce size.

Source: FIEL (1993)

A large proportion of the employment reduction in FFAA was arranged by the federal government prior to privatization (in a plan sponsored by the World Bank, see Ramamurti (1997) for details). The petroleum company also implemented an aggressive program of voluntary retirements (for a study of job displacements in the privatization of YPF and its effects on the displaced worker's earnings see Galiani et. al. (2001)). Table 44 shows the percentage of workers that joined the voluntary retirement programs by firm.

Table 44. Voluntary Retirements.

	Number of Workers	Percentage
YPF	22208	33.3
YCF	1277	1.9
GE	1170	1.8
SEGBA	2741	4.1
AyE	3134	4.7
Hidronor	100	0.1
AGP	675	1.0
ELMA	2140	3.2
ENCOTEL	4000	6.0
FEMESA	1825	2.7
FFAA	27419	41.1
Total	66689	100.0

Note: YCF: Yacimientos Carboníferos Fiscales; GE: Gas del Estado; AyE: Agua y Energía; AGP: Administración General de Puertos; FEMESA = Ferrocarriles Metropolitanos S.A.; ENCOTEL: Empresa Nacional de Correo y Telégrafos; ELMA: Empresa Líneas Marítimas Argentina S.A..

2. Changes in Employment: Permanent Household Survey (PHS) Data.

Using data from the PHS on employment, it is possible to obtain a different perspective of the changes in employment during the time of privatization. By looking at this survey data we find no clear evidence of a significant change in the total participation of the privatized sectors on aggregate employment (even though, as we have seen, the level of employment in some of the main pre-privatization firms changed substantially). Rather, while the public side of these sectors was shrinking, the private side gained some participation and partially compensated the reduction in public employment.

Two main sectors considered in the Survey were directly affected by the reforms: (1) Electricity, Natural Gas, and Water, and (2) Telecommunications and Transports (we will call these the "privatized sectors"). The PHS does not allow us to distinguish those

individuals working in the company that was actually privatized from all other workers performing activities related to that specific sector. Table 45 below shows employment level in these sectors considering workers publicly and privately employed. Some important changes did take place in these sectors. In fact, by looking at Table 45, it can be seen that public employment in the privatized sectors decreased from around 2% to almost zero, while employment in the private sector increased from 5.37% to 6.97%. The total employment directly affected by the process of privatization was 7.32% of the total employment in 1989. Even though this percentage decreased immediately after the beginning of the privatization process, it then recovered to 7.06% due to an increase in employment in the private sector of the privatized enterprises.

Table 45. Employment in Privatized Sectors as a Proportion of Employment in All Sectors (in %).

Year	Public			Private			Total		
	E, NG & W	Telec. & Transp.	Total	E, NG & W	Telec. & Transp.	Total	E, NG & W	Telec. & Transp.	Total
1989	0.51	1.44	1.95	0.05	5.32	5.37	0.56	6.76	7.32
1990	0.83	0.83	1.66	0.10	3.92	4.03	0.93	4.75	5.69
1991	1.00	0.68	1.68	0.02	4.17	4.19	1.02	4.85	5.87
1992	0.14	0.43	0.58	0.48	4.08	4.56	0.62	4.51	5.14
1993	0.00	0.11	0.11	0.41	4.97	5.38	0.41	5.08	5.49
1994	0.02	0.24	0.27	0.61	6.32	6.93	0.63	6.56	7.19
1995	0.07	0.12	0.19	0.53	5.72	6.25	0.60	5.84	6.44
1996	0.05	0.00	0.05	0.73	6.47	7.20	0.78	6.47	7.25
1997	0.05	0.05	0.09	0.53	6.44	6.97	0.58	6.49	7.06

Note: E, NG & W: Electricity, Natural Gas and Water; Telec. & Transp.: Telecommunications and Transportation.

Source: Various PHS, INDEC.

In the Electricity, Natural Gas and Water sector public employment decreased from an average of 0.78 percent in the years prior to privatization (1989-91) to almost 0 percent in 1997, which is partially compensated by the increase in private employment. The participation of the sector on total employment decreased to 0.58 percent (from an average of 0.84 percent in the period 1989-91). Telecommunications and Transportation decreased from 6.76 percent in 1989 to 6.49 percent. Even though, the participation of the private sector increased it was not enough to compensate for the decrease in the public employment of that sector.

The following figures describe the evolution of employment according to Table 45. It is interesting to observe the inverse relationship between the behavior of public and private employment during this time. The figures show that most of the reduction of public employment had taken place by 1993. Private employment, however, was growing during most of the decade. These dynamics may be indicative of the adjustment process that first reduced the total labor force employed in the privatized sectors to then slowly recover as the new private organizations normalized the provision of the services. As shown in the previous table, the increase in the private sector did not compensate for the reduction in public employment, so the participation of the privatized sectors in total employment declined.

Figure 13. Electricity, Natural Gas and Water, Public and Private Employment.

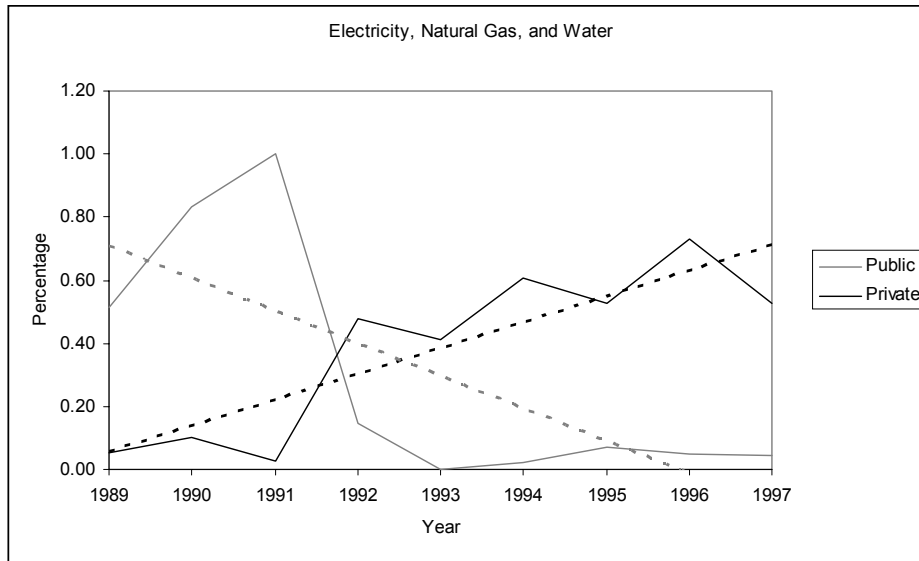
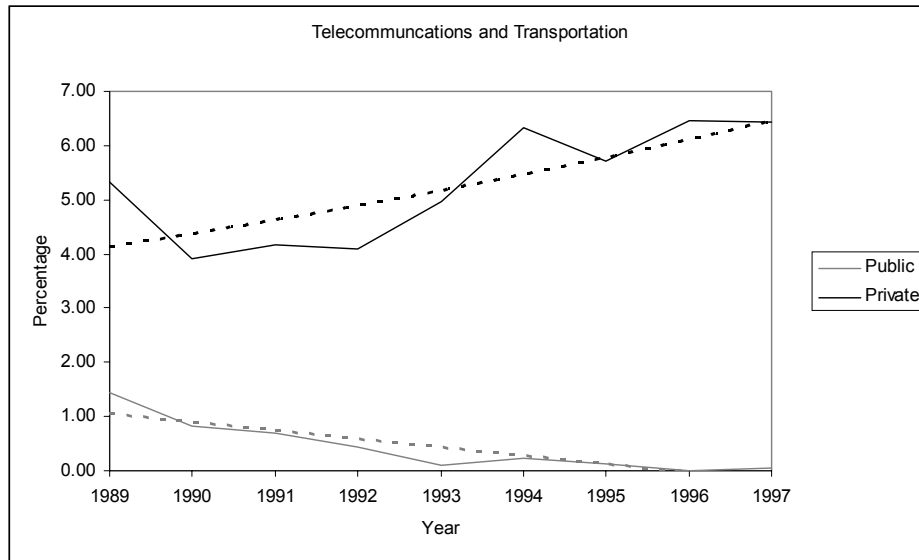


Figure 14. Telecommunications and Transportation.



We will compare the evolution of the employment variables in the privatized sectors with those in four control sectors: Textiles, Machinery, Construction and Retail. Except in Construction, the participation of employment decreased in all the selected control sectors (see Table 46).

Table 46. Employment in Selected Sectors (as Percentage of Total Employment).

Sector	Average	
	1989/90	1991/97
I. Textile	7.02	5.01
II. Machinery, Equip., Metallic Prod.	6.61	5.75
III. E, NG & W	0.75	0.66
IV. Construction	6.35	6.86
V. Retail	13.42	11.96
VI. Telecom. & Transp.	5.75	5.69

Source: Various PHS, INDEC.

Education Profile

We now present evidence on the education level of the workers employed in the public and private sector pre- and post-privatization. A particular education level includes workers that have partially or fully completed the education specified by that level. Table 47 shows that the public sector employs a relatively large proportion of workers with higher education compared to the private sector. Almost half of the workers employed in the private sector are low-skilled individuals, while those in the public sector are predominantly employees with secondary and superior studies.

Table 47. Education Levels in the Public and Private Sectors (%).

Year	Public			Private		
	Prim.	Sec.	S.S.	Prim.	Sec.	S.S.
89	28.12	37.32	34.57	46.29	36.96	16.75
90	26.15	36.07	37.78	47.46	35.72	16.82
91	24.14	38.31	37.55	45.68	37.45	16.87
Avg.	26.14	37.23	36.63	46.48	36.71	16.81
92	22.03	34.34	43.63	44.08	38.98	16.94
93	21.09	38.21	40.69	41.48	38.77	19.75
94	21.18	34.32	44.5	41.06	39.05	19.9
95	21	36.58	42.42	40.62	36.88	22.49
96	16.67	33.33	50	38.75	39.58	21.68
97	20.77	29.42	49.81	37.3	39.35	23.34
Avg.	20.46	34.37	45.18	40.55	38.77	20.68

Note: Prim.: Primary School, complete or incomplete; Sec.: Secondary School, complete or incomplete; S.S.: Superior Studies, complete or incomplete.

Source: Various PHS, INDEC.

Table 48 and Table 49 describe the composition of employment according to the education level of workers in the two privatized sectors. It distinguishes between public and private employment and presents data for the periods pre- and post-privatization. The main finding from the tables is the significant change in the composition of employment by education level that these two sectors suffered after privatization. Electricity, Gas, and Water seems to have had a transition towards a more qualified labor force (especially through changes in the

extreme groups of the distribution of education levels: reducing the relative participation of the workers with primary education and increasing that of the workers with Superior Studies).

Table 48. Education Level per Sector: Electricity, Natural Gas, and Water (%).

Year	Public			Private		
	Prim.	Sec.	S. S.	Prim.	Sec.	S. S.
89	34.48	48.28	17.24	n/a	n/a	n/a
90	43.75	40.63	15.63	n/a	n/a	n/a
91	34.15	43.90	21.95	n/a	n/a	n/a
Avg.	37.46	44.27	18.27	n/a	n/a	n/a
92	n/a	n/a	n/a	35.00	40.00	25.00
93	n/a	n/a	n/a	38.89	33.33	27.78
94	n/a	n/a	n/a	24.00	48.00	28.00
95	n/a	n/a	n/a	31.82	50.00	18.18
96	n/a	n/a	n/a	30.00	40.00	30.00
97	n/a	n/a	n/a	34.78	47.83	17.39
Avg.	n/a	n/a	n/a	32.42	43.19	24.39

Note: Prim.: Primary School, complete or incomplete; Sec.: Secondary School, complete or incomplete; S. S.: Superior Studies, complete or incomplete. n/a: no data available.

Source: Various PHS, INDEC.

Table 49 shows that the changes in the composition, by education levels, of the labor force in the Telecommunications and Transports sector is somewhat different than the changes observed in the Electricity, Natural Gas and Water sector. First, there was an increase in the participation of workers with secondary education. The percentage of employees with secondary studies prior to privatization was 41% in the public sector and 45.5% in the private sector. This percentage increased to almost 50% after the privatization. Second, workers with high education levels increase their participation in the private sector. The public sector before the privatization was employing a higher proportion of workers with superior studies than the private sector. Employment in the public sector was significantly reduced by the privatization, so it seems that these changes can partly account for the increase in the participation of workers with superior studies within the private sector in the post-privatization period (qualified employees that lost their jobs in the public side might have been rehired in the private side).

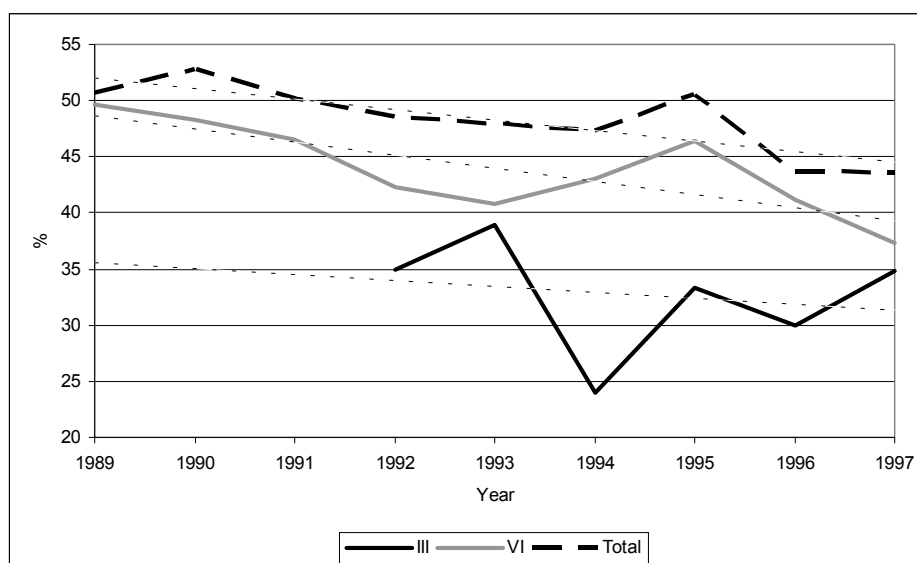
Table 49. Education Level by Sector: Telecommunications and Transportation (%).

Year	Public			Private		
	Prim.	Sec.	S. S.	Prim.	Sec.	S. S.
89	48.81	39.29	11.90	49.68	43.55	6.77
90	43.75	37.50	18.75	48.32	46.31	5.37
91	39.29	46.43	14.29	46.47	47.06	6.47
Avg.	43.95	41.07	14.98	48.16	45.64	6.20
92	n/a	n/a	n/a	42.35	54.71	2.94
93	n/a	n/a	n/a	40.83	49.54	9.63
94	n/a	n/a	n/a	43.08	46.15	10.77
95	n/a	n/a	n/a	46.44	40.59	12.97
96	n/a	n/a	n/a	41.13	52.45	6.42
97	n/a	n/a	n/a	37.28	52.69	10.04
Avg.	n/a	n/a	n/a	41.85	49.36	8.80

Source: Various PHS, INDEC.

The following figures (Figure 15, Figure 16, and Figure 17) suggest that the privatized sectors (Sectors III and VI) have, in general, a lower percentage of workers with primary school compared to the average of the other sectors considered. Even though the evolution of these percentages for sector III is more erratic due to the reduced number of observations, it seems evident that the sector employed more workers with superior studies than any other sector. Sector VI, on the other hand, employs a high proportion of workers with secondary school. In general, the tendency observed is that on average, for all the sectors considered, there has been a decline of the percentage of workers with primary school, and an increase of the percentage of workers with secondary school and superior studies.

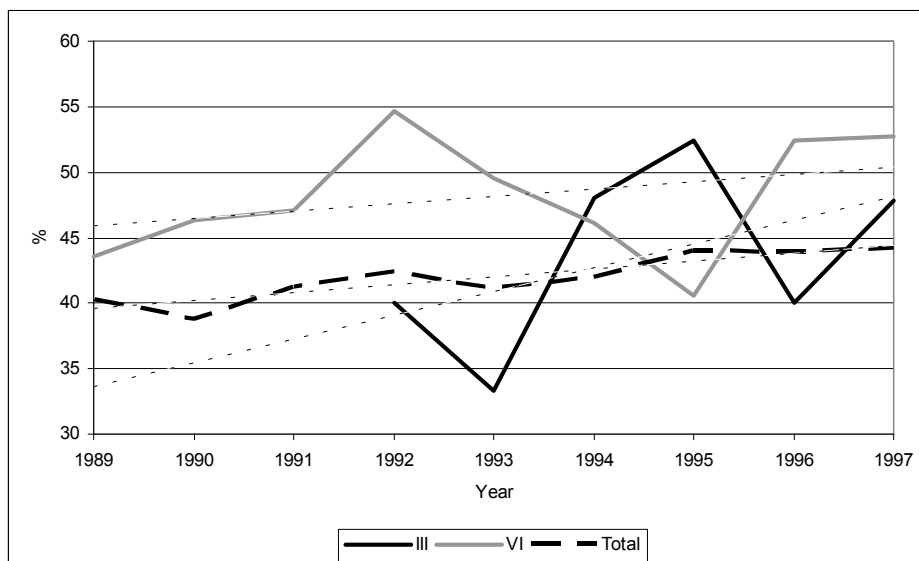
Figure 15. Percentage of Workers in Each Sector with Primary School.



Note: Total includes the following sectors: Textile, Machinery, Equipment and Metallic Products, Construction, and Retail Services; III. Electricity, Natural Gas and Water; VI. Telecommunications and Transportation.

Source: Various PHS, INDEC.

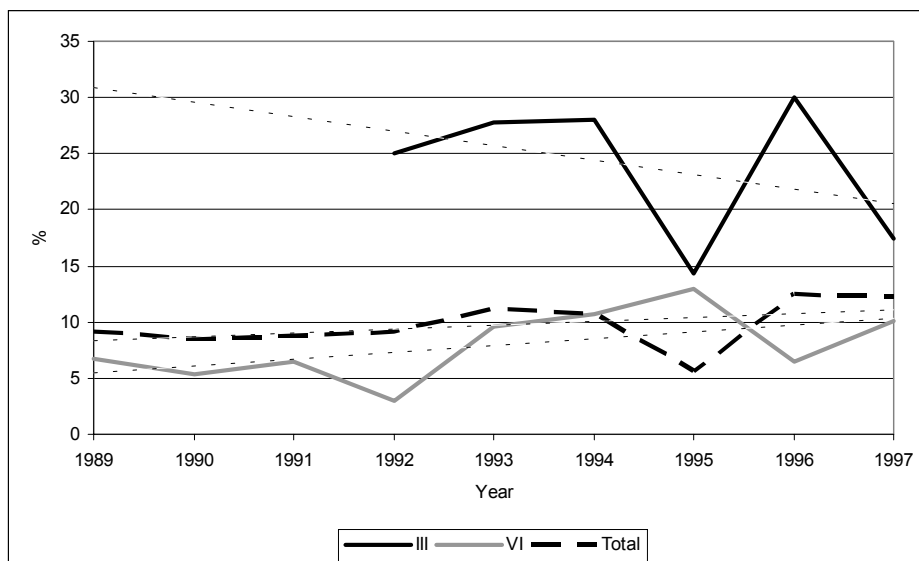
Figure 16. Percentage of Workers in Each Sector with Secondary School.



Note: Total includes the following sectors: Textile, Machinery, Equipment and Metallic Products, Construction, and Retail Services; III. Electricity, Natural Gas and Water; VI. Telecommunications and Transportation.

Source: Various PHS, INDEC.

Figure 17. Percentage of Workers in Each Sector with Superior Studies.



Note: Total includes the following sectors: Textile, Machinery, Equipment and Metallic Products, Construction, and Retail Services; III. Electricity, Natural Gas and Water; VI. Telecommunications and Transportation.

Source: Various PHS, INDEC.

Hours Worked

Table 50 shows that, on average, individuals work more hours in the private sector than in the public sector. Moreover, the average number of hours worked in the public sector decreased from 42 to 36 during the nineties, while in the private sector this number slightly decreased from 45 to 44 hours per week.

Table 50. Average Hours Worked. Totals.

Year	Public		Private	
	Mean	Std. Dev.	Mean	Std. Dev.
89	42.00	16.17	45.31	17.22
90	41.22	16.15	45.87	16.76
91	41.14	13.78	45.60	16.50
Avg.	41.45	15.37	45.59	16.83
92	40.46	16.97	45.65	17.13
93	41.47	16.81	45.98	18.21
94	40.29	16.05	45.12	17.96
95	38.02	15.93	43.88	19.75
96	37.28	14.74	43.91	19.69
97	36.25	13.23	44.08	19.26
Avg.	38.96	15.62	44.77	18.67

Source: Various PHS, INDEC.

There is more variability of hours worked in the private sector, and this variability increased since 1991 in that sector. This could be related to a tendency to increase flexibility in the Argentinean labor market during the nineties that allowed firms to offer a broader set of labor contracts (the frequency of part time jobs seems to have increased significantly).

Table 51. Average Hours Worked, Privatized Sectors.

Year	Public		Private	
	Mean	Std. Dev.	Mean	Std. Dev.
89	46.49	14.95	53.37	20.04
90	44.18	9.45	56.63	18.03
91	43.45	8.26	55.21	19.67
Avg.	44.71	10.89	55.07	19.25
92	n/a	n/a	52.47	19.13
93	n/a	n/a	58.81	19.56
94	n/a	n/a	55.36	19.98
95	n/a	n/a	58.01	22.90
96	n/a	n/a	56.34	20.01
97	n/a	n/a	54.27	21.14
Avg.	n/a	n/a	55.88	20.45

Similar conclusions hold for the privatized sectors. The private portion of these sectors tend to employ workers for longer time and with a higher dispersion of the number of hours. The fact that after 1991-92 the public portion is mostly taken over by private hands implies that the majority of workers in these sectors have become subject to the private sector regime. This type of regime is probably more likely to induce income heterogeneity than the low-

variance-in-hours-worked public sector regime. Looking at Table 50 and Table 51, it can also be observed that, comparing with the averages for total public employment (first and second column of Table 50), average hours worked in the privatized sector prior to privatization was higher and the standard deviation smaller. These differences may be indicating a systematic difference in labor contracts in POE, comparing with the rest of the public administration.

Tenure

It is also useful to analyze the evolution of tenure in different sectors of the economy. The following figures show the structure of tenure in the public and private sector, in Sector VI (Telecommunications and Transportation), and in the whole economy (Total) for two years, 1989 (before privatization) and 1997 (after privatization). In the vertical axis we measure the proportion of workers employed by the sector that have the corresponding level of tenure (measured in months). The public sector seems to be offering more job stability than the private sector. From 1989 to 1997, there has been an increase in those workers with less than 12 months in their job in both sectors.

Figure 18. Tenure in Public and Private Sector, 1989.

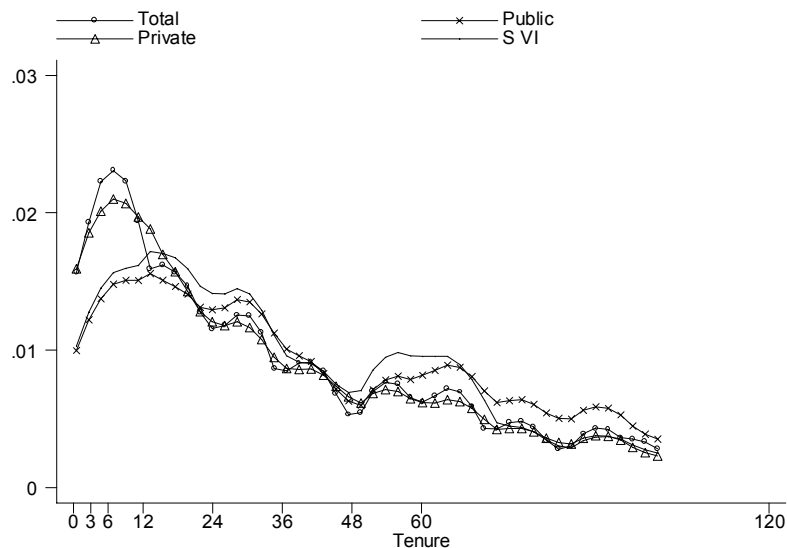
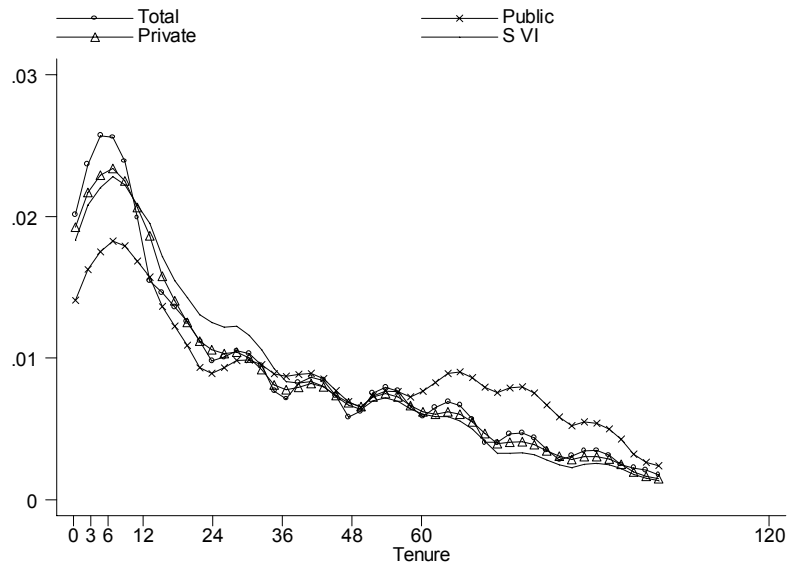


Figure 19. Tenure in Public and Private Sector, 1997.



The figures also show a significant change after privatization in the tenure structure of the telecommunications sector. In 1989, the tenure structure of the sector was very similar to the one prevailing in the public sector, while in 1997 it follows that in the private sector.

In addition, it seems clear that the process of reduction on the average job-tenure is widespread across the economy during the period under consideration (there is more frequency concentrated in the left side of the distribution). Similarly to what we suggested before about the changes in hours worked, these changes may be associated to an overall change in the labor market regulation and the usual practices in labor contracting. A general movement towards a higher rationalization of the productive system took place in Argentina during this period. This movement may have induced the main features of the changes in hours worked and tenure that are revealed by these figures.

Table 52. Tenure (in Months)

Sector		1989	1995	Percentage Change (%)
Total	Mean	96.95	69.67	-28.14
	Std. Dev.	111.08	97.40	-12.32
Public	Mean	126.76	109.74	-13.43
	Std. Dev.	121.32	107.32	-11.54
Private	Mean	91.84	64.87	-29.37
	Std. Dev.	107.98	95.08	-11.95
Privatized Sectors	Mean	193.99	57.00	-70.62
	Std. Dev.	144.27	77.09	-46.56

Tenure has decreased from 1989 to 1995 in all sectors, but the decrease has been significantly more important in those sectors subject to privatization. The important change observed in the privatized sectors (average tenure declines from almost 15 years to 5 years in 1995) suggest that those employees with long careers in the publicly owned enterprises might have predominantly suffered the consequences of the lay-offs in that sector. Moreover, these

individuals probably find their possibilities of re-insertion in the labor market highly diminished, as they tend to be very specialized and generally older.

Hourly Wages

The figures below present the structure of hourly wages for different education levels and different ages, for the whole economy and for the privatized sectors before (Figure 20) and after privatization (Figure 21). We measure wages in constant pesos of 1995. There is a positive correlation between the level of education and the level of wages. Also in both years, low skill workers in the privatized sectors had higher wages than the average low skill workers in the whole economy. For the year 1997, the hourly wage curves for individuals with primary and secondary schools behave very similarly. Finally, wages seem to increase with age in all cases (except for the case of the oldest low-education workers). However, all these relationships seem tenuous at best. Hence, in the next sub-section we run a wage regression with more control variables to see if some of these casual observations can be confirmed by a more formal econometric analysis.

Figure 20. Hourly Wages, 1989.

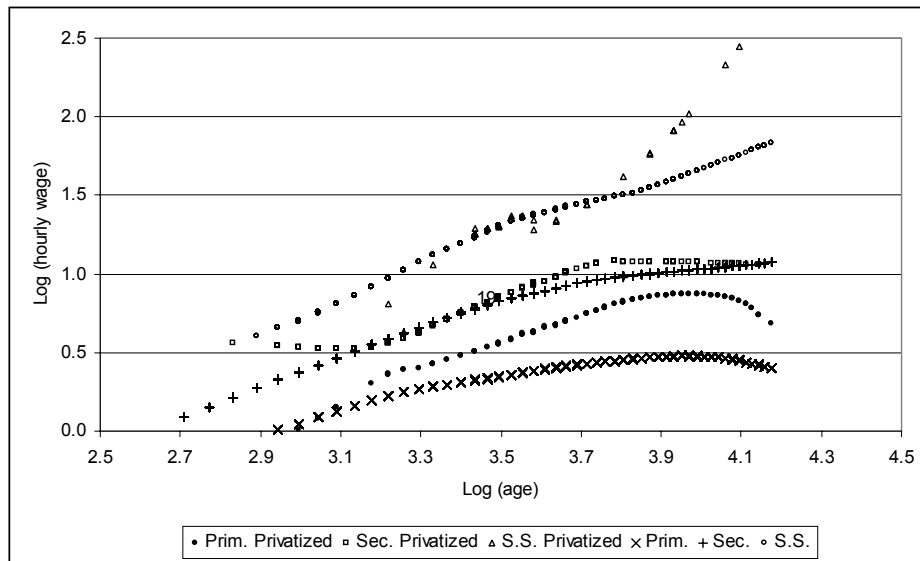


Figure 21. Hourly Wages, 1997.

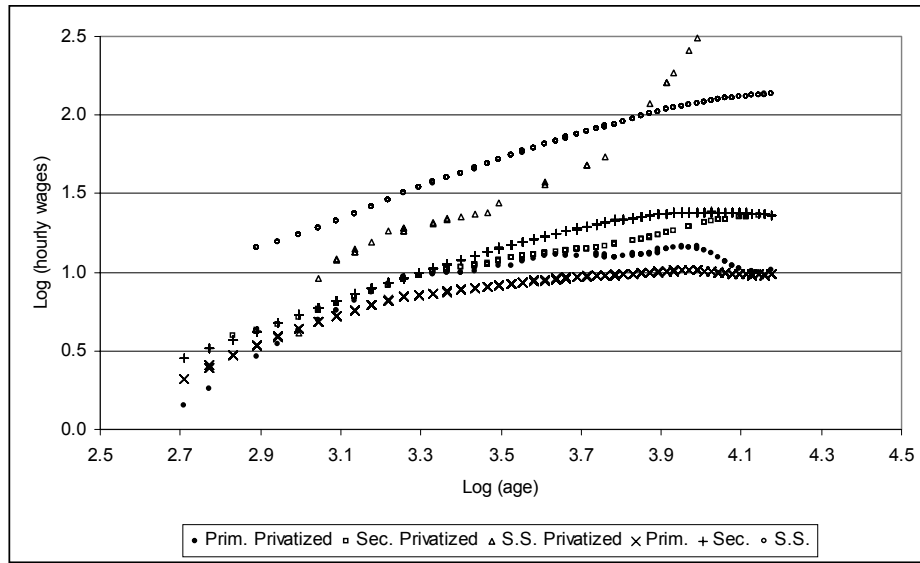


Table 53 shows the average wages by education level for 1989 and 1995. We can see that the public sector tends to have a lower skill premium than the private sector. The skill premium in the private sector and in the privatized sector has shown some decrease by 1995, but the skill premium in the public sector seems to have increase in general. The skill premium in the overall economy has decreased substantially between 1989 and 1995. Also note that real wages increased by 50 percent (from probably an unusually low level in 1989, due to macroeconomic instability) and the increase in real wages is lowest in the privatized sectors. In fact, the wages in the privatized sectors were equal to the aggregate average for 1989 but lower than the average for 1995. Furthermore, before the privatization the wage in the privatized sectors was higher than the average wage in all private sectors. After privatization this relationship is reversed and the wages in the privatized sectors (now part of the private employment) was lower than the average private wage.

Table 53. Hourly Wages by Education Level (Constant Prices, 1995).

Education	1989				1995				Percentage Change			
	Total	Publ.	Priv.	Privat'd Public	Total	Publ.	Priv.	Privat'd Private	Total	Publ.	Priv.	Privat'd
Prim. Incompl. (1)	1.68	2.14	1.65	3.43	3.17	2.85	3.18	3.23	89.15	33.35	92.34	-5.87
Prim. Compl. (2)	2.01	3.10	1.83	2.81	3.15	3.26	3.14	3.28	56.72	5.30	71.58	16.72
Sec. Incompl. (3)	2.72	2.49	2.80	2.75	3.62	4.01	3.59	3.37	33.32	60.91	28.25	22.18
Sec. Compl. (4)	3.55	3.22	3.62	3.08	4.66	5.05	4.55	4.73	31.28	56.81	25.86	53.48
S.S. Incompl. (5)	4.44	3.71	4.67	3.64	5.55	5.08	5.62	5.01	24.86	36.82	20.45	37.46
S.S. Compl. (6)	6.07	4.00	7.14	4.70	9.92	7.73	10.74	12.68	63.50	93.11	50.30	169.52
Average	3.02	3.27	2.95	3.09	4.62	5.28	4.52	4.32	52.94	61.62	53.25	40.10
(6) / (2) (in %)	301.6	129.1	390.1	167.5	314.6	236.8	341.8	386.7	4.3	83.4	-12.4	130.9
(6) / (4) (in %)	170.9	124.2	197.6	152.8	212.8	152.9	236.0	268.3	24.5	23.1	19.4	75.6
(4) / (2) (in %)	176.5	104.0	197.4	109.6	147.8	154.9	144.8	144.2	-16.2	48.9	-26.6	31.5

Wage Regression

We now run a set of wage regressions to get an idea on which are the main factors that determine the levels of hourly wages and to what extent those determinants have changed as a consequence of the process of privatization. Table 54 reports the average values for hourly wages, the dependent variable in all the regressions, the average age and the average tenure, for the whole sample and for the private- and public-employment sub-samples. The variable tenure is defined as the number of month that the worker has been employed in her current job.

Table 54. Description of Variables (I).

Variable	1989						1995					
	Total		Private		Public		Total		Private		Public	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
hwage	2.99	5.18	2.93	5.42	3.26	3.83	4.62	4.60	4.52	4.66	5.27	3.87
age	38.48	13.75	38.38	13.94	38.98	12.72	37.83	13.22	37.55	13.35	40.05	11.96
tenure	97.53	111.01	91.84	107.99	126.76	121.32	69.65	97.43	64.87	95.08	109.74	107.32

Note: hwage: hourly wage, in constant prices, 1995; SD: standard deviation.

Table 55 provides a list of the other control variables used in the regression analysis, and presents the percentage of workers with each characteristic in the sample (first and third column for 1989 and 1995, respectively). Public employment represented 16 % of the sample in 1989 and only 11 % in 1995. The table also presents the percentages for each characteristic in each of the sub-samples (Private and Public Employment). For example, 11.74 percent of the workers in the public employment sub-sample worked in the telecommunication sector in 1989 and only 2.59 percent in 1995 (see the row for the variable “Sector 6”).¹⁵

Table 55. Description of Variables (II).

Variable		1989			1995		
		Total	Priv.	Publ.	Total	Priv.	Publ.
Public employment	public	<u>16.32</u>			<u>11.08</u>		
Male	male	64.19	65.26	58.70	62.26	63.97	48.60
Married	married	57.00	56.57	59.22	53.27	53.20	53.78
Primary education, incomplete ¹⁶	ipri	11.99	13.28	5.35	8.28	9.04	2.16
Primary education, complete	cpri	30.65	32.23	22.54	29.91	31.30	18.79
Secondary education, incomplete	isec	19.22	19.78	16.35	19.26	19.97	13.61
Secondary education, complete	csec	17.22	16.55	20.65	17.35	16.66	22.89
Tertiary education, incomplete	iter	8.69	8.32	10.59	11.53	11.28	13.61
Tertiary education, complete	cter	10.69	8.15	23.69	13.02	11.06	28.73
Literacy	literate	98.82	98.69	99.48	99.45	99.41	99.78

¹⁵ Note that the column “Total” is the weighted average of the other two columns (for each year), where the weight is given by the public and private employment proportions in the sample (taken from the first row of the table). That is, $x^{\text{tot}} = \alpha x^{\text{publ}} + (1 - \alpha) x^{\text{priv}}$, where $\alpha = 16.32$ (11.08) is the proportion of public employment in the total sample in 1989 (1995) and x^j is the value of the variable for the sample j .

¹⁶ Primary incomplete includes individuals that have at least started first grade but did not complete primary studies. There is another category (not shown in the table) that accounts for those individuals with no studies at all.

Sector 1: Primary Activities	sector1	0.51	0.61	0.00	0.41	0.46	0.00
Sector 2: Manufactures	sector2	25.28	29.57	3.25	20.65	23.12	0.86
Sector 3: Elect., Water, and Nat. Gas	sector3	0.56	0.06	3.14	0.60	0.59	0.65
Sector 4: Construction	sector4	6.17	6.97	2.10	6.63	7.40	0.43
Sector 5: Commercial Activities, Restaurants and Hotels	sector5	19.70	22.71	4.30	19.60	21.80	1.94
Sector 6: Transportation and Communication	sector6	7.90	7.15	11.74	9.00	9.80	2.59
Sector 7: Financial Activities and Real State	sector7	7.78	8.17	5.77	10.84	11.36	6.70
Sector 8: Public Adm. And Defense	sector8	4.98	0.25	29.25	4.93	0.43	41.04
Sector 9: Education	sector9	5.87	3.52	17.92	5.96	3.12	28.73
Sector 10: Health and Social Services	sector10	8.33	6.21	19.18	9.14	8.21	16.63
Sector 11: Other Services	sector11	12.60	14.47	3.04	12.18	13.67	0.22
Prod. Activities, skilled workers	prodsk	26.65	29.37	12.68	22.47	24.65	4.97
Prod. Activities, non-skilled workers	prodnosk	3.22	3.74	0.52	8.38	8.80	4.97
Adm. Activities, skilled workers	admsk	11.41	9.77	19.81	14.31	12.24	30.89
Adm. Activities, non-skilled workers	admnosk	5.64	4.93	9.33	7.11	7.94	0.43
Com. Activities, skilled workers	comsk	10.91	12.69	1.78	11.84	12.19	9.07
Com. Activities, non-skilled workers	comnosk	6.38	7.40	1.15	20.65	18.00	41.90
Other activities, skilled workers	othersk	19.48	15.33	40.78	14.57	15.47	7.34
Other activities, non-skilled workers	othernosk	14.96	15.61	11.64	0.67	0.70	0.43

Table 56 presents the result from running a regression of the logarithm of hourly wages (lhwage) on the variables described in Table 54 and Table 55. The table has three panels for each year. First we run the regression using the total sample, and including a dummy variable for public employment. Then we run the regression for each sub-sample (the second and third panels). The first main result from these regressions is that the dummy variable for public employment is not significant. Second, hourly wages in the private sector increase with age, reach a maximum (at 50 years in 1989 and 40 in 1995), and decline thereafter (this is why the variable lage^2 , the squared log of age, is significant). In the public sector, hourly wages do not seem to be sensitive to variations in age (both in 1989 and 1995). Third, we can see that in general there is a substantial skill premium associated with the different levels of education (both for 1989 and 1995). However, in the public sector, this differential in wages only becomes important for those workers with tertiary education (and only in 1989). In constant prices, a worker that has complete tertiary education earns around 3 more pesos (dollars) of 1995 per hour than the uneducated worker (see also Table 53). Fourth, in 1995 the dummy indicating employment in the Transportation and Communication sector (sector6), one of the privatized sectors, became negative and significantly different from zero. An indication of this result appears already in Table 53 where one can see that wages in the privatized sectors are lower than the average for 1995 (but not for 1989). Fifth, the dummy for sex is significant when using the private-employment sample but not when using the public-employment one (both for 1989 and 1995). Males working in the private sector tend to earn higher wages. Finally, the variable indicating tenure is significant and positively correlated with hourly wages for all samples (except public employment in 1995) in both years. (The relationship between the type of job and wages seems to change between 1989 and 1995.)

Table 56. Wage Regression.

Variable	1989						1995					
	Total		Private		Public		Total		Private		Public	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
lage	2.066	0.551 **	2.453	0.589 **	0.068	1.685	3.784	0.694 **	4.034	0.734 **	-0.372	2.376
lage2	-0.255	0.077 **	-0.313	0.083 **	0.044	0.233	-0.512	0.098 **	-0.548	0.104 **	0.077	0.331
male	0.143	0.026 **	0.167	0.029 **	-0.071	0.063	0.091	0.032 **	0.099	0.035 **	0.089	0.074
married	0.061	0.025 **	0.046	0.028	0.120	0.058 **	0.113	0.030 **	0.110	0.033 **	0.111	0.076
ipri	0.069	0.102	0.079	0.108	0.054	0.324	-0.268	0.152 *	-0.301	0.160 *	0.012	0.638
cpri	0.195	0.100 *	0.179	0.106 *	0.294	0.311	-0.167	0.147	-0.209	0.155	0.361	0.576
isec	0.413	0.102 **	0.428	0.108 **	0.264	0.316	-0.086	0.149	-0.127	0.157	0.396	0.591
csec	0.619	0.103 **	0.639	0.110 **	0.456	0.317	0.090	0.150	0.058	0.158	0.449	0.589
iter	0.840	0.108 **	0.865	0.115 **	0.697	0.323 **	0.317	0.152 **	0.297	0.161 *	0.520	0.593
cter	1.020	0.108 **	1.164	0.117 **	0.689	0.318 **	0.754	0.153 **	0.768	0.163 **	0.944	0.591
sector2	0.031	0.045	0.022	0.047	-0.057	0.207	-0.145	0.054 **	-0.139	0.055 **	-0.703	0.506
sector3	0.324	0.149 **	0.523	0.717	0.122	0.211	-0.126	0.216	-0.114	0.236	-0.756	0.605
sector4	0.013	0.062	0.011	0.065	-0.190	0.239	-0.055	0.069	-0.047	0.072	-0.687	0.490
sector5	-0.038	0.052	-0.053	0.054	-0.222	0.226	-0.265	0.055 **	-0.262	0.057 **	-0.924	0.407 **
sector6	0.029	0.058	-0.021	0.065	-0.097	0.175	-0.143	0.064 **	-0.143	0.067 **	-0.478	0.393
sector7	0.080	0.058	0.008	0.062	0.181	0.196	-0.064	0.063	-0.090	0.066	-0.376	0.363
sector8	0.047	0.070	0.008	0.231	-0.068	0.164	-0.223	0.094 **	-0.367	0.199 *	-0.681	0.345 **
sector9	-0.279	0.065 **	-0.285	0.080 **	-0.484	0.172 **	-0.223	0.082 **	-0.221	0.099 **	-0.649	0.342 *
sector10	0.023	0.053	0.015	0.060	-0.170	0.165	-0.071	0.066	-0.061	0.071	-0.595	0.345 *
prodsk	0.137	0.059 **	0.124	0.061 **	0.200	0.219	-0.322	0.058 **	-0.306	0.061 **	-0.610	0.233 **
admsk	0.483	0.069 **	0.506	0.075 **	0.363	0.213 *	-0.191	0.063 **	-0.169	0.068 **	-0.474	0.170 **
admnosk	0.128	0.076 *	0.115	0.083	0.126	0.221	-0.144	0.074 *	-0.134	0.077 *	-0.102	0.446
comsk	0.410	0.075 **	0.397	0.078 **	0.860	0.314 **	-0.306	0.067 **	-0.278	0.072 **	-0.501	0.194 **
comnosk	-0.033	0.079	-0.031	0.082	0.085	0.366	-0.323	0.062 **	-0.307	0.067 **	-0.582	0.171 **
othersk	0.225	0.069 **	0.265	0.076 **	0.168	0.213	-0.226	0.066 **	-0.193	0.070 **	-0.712	0.218 **
othernosk	-0.078	0.067	-0.089	0.071	-0.120	0.224	-0.259	0.231	-0.062	0.255	-1.508	0.501 **
ltenure	0.077	0.008 **	0.076	0.009 **	0.053	0.025 **	0.092	0.009 **	0.095	0.010 **	0.042	0.029
_cons	-4.416	0.969 **	-5.057	1.032 **	-0.652	3.046	-5.783	1.220 **	-6.218	1.288 **	2.090	4.269
public	-0.021	0.038					0.005	0.060				
Nobs.	4331		3574		757		2105		1882		223	
R²	0.314		0.329		0.249		0.344		0.338		0.420	
Adj-R²	0.310		0.324		0.221		0.335		0.329		0.339	

Note: **: significantly different from zero with 95% confidence, *: significantly different from zero with 90% confidence.

We now run similar wage regressions using only the sample of workers employed in the main sectors directly influenced by the privatization process (our “privatized sectors”). In 1989, the wages in the public employment side of these sectors show no systematic changes associated to changes in the control variables (no variable turns out significant). For 1995, we only run the regression using the total sample since the level of public employment in these sectors became almost insignificant after privatization. Evidence of a positive skill premium is less conclusive in the case of the privatized sectors. Only the education variable associated with complete tertiary education is clearly significant (however it should be notice that the sample size is smaller).

Table 57. Wage Regression, Privatized Sectors.

Variable lh wage	1989						1995	
	Total		Private		Public		Total	
	Coef.	SD	Coef.	SD	Coef.	SD	Coef.	SD
lage	6.756	2.382 **	9.496	2.892 **	-0.896	4.373	1.682	2.572
lage2	-0.845	0.329 **	-1.234	0.400 **	0.207	0.603	-0.209	0.363
male	-0.032	0.136	-0.038	0.181	-0.105	0.206	0.158	0.162
married	-0.254	0.091 **	-0.314	0.113 **	-0.029	0.163	-0.015	0.105
ipri	0.112	0.502	0.312	0.813	0.433	0.597	0.650	0.638
cpri	0.283	0.495	0.548	0.804	0.075	0.575	0.758	0.617
isec	0.533	0.499	0.819	0.806	0.268	0.582	0.786	0.620
csec	0.473	0.497	0.778	0.798	0.223	0.600	1.112	0.620 *
iter	0.821	0.507	1.195	0.805	0.439	0.619	1.011	0.624
cter	1.502	0.518 **	2.824	0.842 **	0.680	0.618	1.374	0.651 **
prodsk	0.284	0.270	0.305	0.390	0.224	0.335	-0.846	0.279 **
admsk	0.196	0.273	0.321	0.380	0.081	0.354	-0.849	0.252 **
admnosk	0.082	0.287	-0.062	0.428	0.088	0.349	-0.787	0.328 **
comsk	0.072	0.385	0.009	0.495	0.354	0.661	n/a	n/a
comnosk	-0.650	0.532	-0.638	0.602	n/a	n/a	-1.115	0.241 **
othersk	-0.033	0.255	0.003	0.353	0.007	0.337	-1.133	0.261 **
othernosk	-0.300	0.274	-0.243	0.373	-0.430	0.374	-1.011	0.474 **
ltenure	0.003	0.033	-0.020	0.039	0.003	0.064	0.105	0.030 **
_cons	-12.740	4.323 **	-17.715	5.314 **	1.259	7.916	-2.502	4.582
public	0.011	0.088					0.043	0.254
Nobs.	353		242		111		199	
R²	0.277		0.332		0.265		0.393	
Adj-R²	0.235		0.278		0.130		0.332	

Note: **: significantly different from zero with 95% confidence, *: significantly different from zero with 90% confidence.

Income and Employment

We now present some data on the income composition of workers employed in the private and the public sector, and in the privatized sectors distinguishing the periods before and after the main privatizations.

Table 58 is divided in two panels: The right-hand side panel presents aggregate employment in the public sector and the left-hand side panel presents employment in the private sector. Each panel shows the income distribution of workers in the sector. The table is based on the per capita levels of household income arranged by quintiles that are constructed using the entire survey data. In general, the public sector tends to employ a higher proportion (compared to the private sector) of workers with medium to high-income levels. There does not seem to be a clear change in the income composition of employment between the pre- and post- privatization periods.

Table 58. Income Distribution Public and Private Sector.

Year	Quintile									
	Public					Private				
	1	2	3	4	5	1	2	3	4	5
89	7.64	15.99	15.56	24.50	36.31	17.96	20.29	17.46	23.05	21.24
90	8.13	18.90	15.82	26.81	30.33	17.58	19.83	17.76	22.18	22.65
91	10.58	13.85	16.12	30.98	28.46	16.28	18.46	20.26	22.81	22.19
Avg.	8.78	16.25	15.84	27.43	31.70	17.27	19.53	18.50	22.68	22.03
92	11.41	14.13	19.02	24.73	30.71	16.64	14.89	23.03	23.17	22.27
93	11.80	15.04	18.58	29.20	25.37	14.54	17.29	21.34	23.39	23.45
94	6.19	13.86	22.42	24.48	33.04	16.34	18.07	20.19	24.04	21.35
95	6.07	16.26	19.66	27.67	30.34	18.31	17.97	20.52	21.57	21.63
96	10.71	11.19	17.76	22.87	37.47	18.81	18.22	20.14	22.59	20.24
97	12.58	12.15	17.91	21.75	35.61	17.91	18.70	20.75	22.63	20.02
Avg.	9.79	13.77	19.23	25.12	32.09	17.09	17.52	21.00	22.90	21.49

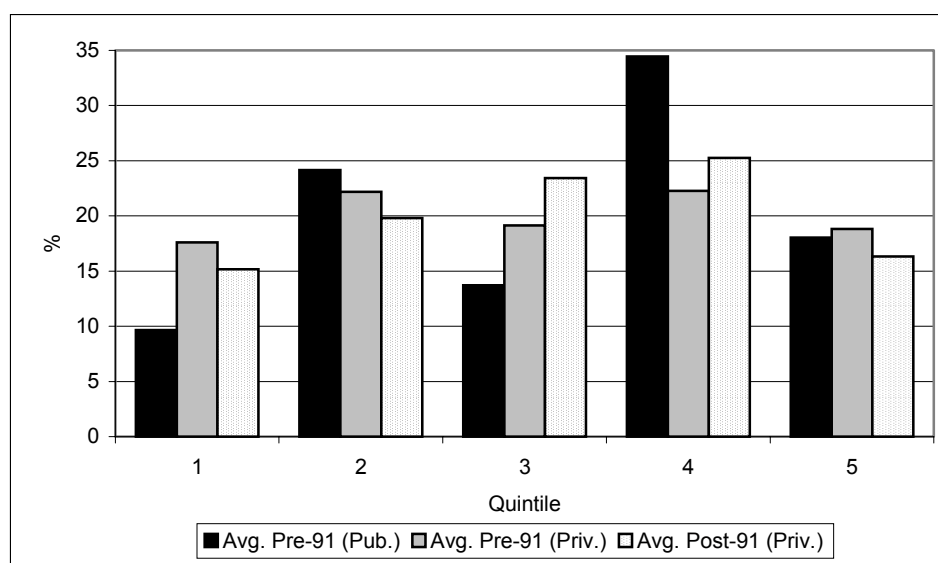
Table 59 is analogous to Table 58 but with data only for the privatized sectors. The income distribution in the private sector was more uniform prior to privatization (also comparing with the public sector). The income distribution in the private sector changed towards a higher concentration of workers in the third and fourth income quintiles. The distribution in the public sector prior to privatization is bimodal (with modes in the second and fourth quintiles) and this pattern appears more pronounced in the privatized sectors (Table 59).

Table 59. Income Distribution Privatized Sectors.

Year	Quintile									
	Public					Private				
	1	2	3	4	5	1	2	3	4	5
89	7.06	17.65	17.65	32.94	24.71	18.43	24.88	16.13	21.20	19.35
90	12.28	29.82	15.79	28.07	14.04	17.54	20.18	26.32	17.54	18.42
91	9.62	25.00	7.69	42.31	15.38	16.82	21.50	14.95	28.04	18.69
Avg.	9.65	24.16	13.71	34.44	18.04	17.60	22.19	19.13	22.26	18.82
92	n/a	n/a	n/a	n/a	n/a	18.75	19.44	20.14	20.83	20.83
93	n/a	n/a	n/a	n/a	n/a	7.61	16.75	29.44	24.37	21.83
94	n/a	n/a	n/a	n/a	n/a	12.83	15.09	26.79	28.30	16.98
95	n/a	n/a	n/a	n/a	n/a	19.66	21.79	23.93	21.79	12.82
96	n/a	n/a	n/a	n/a	n/a	16.33	23.11	19.52	29.08	11.95
97	n/a	n/a	n/a	n/a	n/a	15.77	22.58	20.79	27.24	13.62
Avg.	n/a	n/a	n/a	n/a	n/a	15.16	19.80	23.44	25.27	16.34

Figure 22 shows the histogram from the average rows in Table 59. The distribution has become more skewed to the left but the changes do not seem very significant. The private sector has a more evenly distributed income composition of workers with a mode in the fourth quintile.

Figure 22. Private and Public Employment Pre- and Post-Privatization



In Table 60 we present data on income distribution for the labor force of other private sectors in the periods pre- and post-privatization. The changes in the distribution are similar to those showed in Table 59 for the privatized sectors, except that the proportion of agents in the fourth quintile tend to increase in the privatized sectors after the privatization. It is possible that a lot of the workers employed in the public side before the privatization, and belonging to the fourth quintile, were rehired by the private side after the privatization. This could explain the increase in the proportion of these workers in the private side, after the privatization. Overall, the privatization does not seem to influence a lot the evolution of the income distribution of workers that remain in the sector (other sectors, not subject to widespread privatization, seem to present a similar evolution).

Table 60. Income Distribution of Employment in Other (Private) Sectors

Sector	Quintile									
	1		2		3		4		5	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
I	17.99	21.57	23.10	21.63	20.14	22.36	23.04	22.13	15.73	12.32
II	12.42	14.54	22.88	18.55	20.11	23.86	23.48	24.18	21.11	18.86
IV	31.20	30.69	24.09	20.97	18.22	23.05	17.13	14.37	9.37	10.91
V	16.75	16.32	18.10	18.25	16.15	23.00	28.90	24.21	20.11	18.22

Note: Sectors: I. Textile; II. Machinery, Equipment and Metallic Products; IV. Construction; V. Retail.

3. Inequality and Poverty

In this section, we estimate the extent to which income inequality and poverty were affected by the privatization process through the effect on workers. Two effects are considered in the following analysis. The first one is the impact of the privatization process on employment and unemployment. In this case, we provide upper bound estimates assuming that those who lost their jobs in the privatization period, failed to find a new one afterwards. Next, we

compute different wage inequality measures to determine the change in inequality among those employed.

Changes in Employment Level

We provide what it could be thought as an upper bound for the change in income distribution associated to the change in employment due to privatization. We compute two Gini coefficients for 1989 under different assumptions. The first one (Gini Coefficient (1) in Table 61) includes all individuals in the 1989 survey.¹⁷ For the calculation of the second coefficient (Gini Coefficient (2)), we assume that the change in public employment in the privatized sectors from 1989 to 1995 switched to unemployment (that is 1.86 percent of total employment according to Table 45); in other words, we treat those workers that were laid-off as if they would have remained unemployed since the privatization. We randomly select individuals from the pool of workers employed at the public side of the privatized sectors in 1989, impute them an income equal to zero, and recalculate the Gini coefficient with these new imputed incomes. The fraction of individuals chosen is given by the change in public employment from 1989 to 1995 in the privatized firms.¹⁸

The objective of this exercise is to determine the maximum change in inequality that could be attributed exclusively to the change in the level of employment (as if wages in the public and private sector would have remained constant at the level of 1989). Table 61 shows that the Gini coefficient would have been 3.14 percent higher if all the workers losing their public employment in the privatized sector had switched to unemployment. The actual change in the Gini coefficient between 1989 and 1995 is 0.55 percent. However, the Gini coefficient in 1995 is actually 2.51 percent smaller than the one given by our upper bound calculation (Gini coefficient (2)).

Table 61. Gini Coefficient.

1989			1995	Change (%)	
(1)	(2)	Change (%)		(1)	(2)
0.5376	0.5545	3.14	0.5405	0.55	-2.51

Note: Gini (1) is the Gini for 1989. Gini (2) is our constructed measure.

Source: PHS.

Table 62 shows the change in the Foster, Greer and Thorbecke poverty measure from 1989 to 1995. Measure (2) is calculated using the same approach that the one we used to compute Gini (2) above. The table shows that the number of poor (corresponding to the poverty measure when $\alpha = 0$) would have increased 8.4 percent if all workers that lost their job in the public side of the privatized sectors had remained unemployed. Note that the number of poor decreased by 22.8 percent between 1989 and 1995 (in 1989 poverty was high partly due to the macroeconomic crisis, see also Table 4).

The measure of poverty with $\alpha = 1$ indicates that a large proportion of the poor individuals in 1995 had income that was further away from the poverty line. This is why even though the number of poor decreases in 1995, comparing with 1989, (see the poverty measure with

¹⁷ Unemployed individuals were imputed an income equal to zero.

¹⁸ Given that some individuals have an income equal to zero, Atkinson inequality measures cannot be computed for some values of v , so only the Gini coefficient is reported.

$\alpha = 0$) the poverty measure with $\alpha = 1$ actually increases (from 16.6 to 20.6). The 15.5 percent increase in poverty when using the constructed measure (measure (2)) is a consequence of the fact that we are adding to the sample a large number of agents with income equal to zero. We can think that of the 24.3 percent actual change in poverty between 1989 and 1995, a maximum of 15.5 percent can be accounted for by the change in unemployment associated with privatization.

Table 62. Poverty, Individuals (in %).

α	1989			1995	Change (%)	
	(1)	(2)	Change (%)		(1)	(2)
0	29.47	31.95	8.41	22.76	-22.78	-28.77
1	16.56	19.14	15.55	20.59	24.30	7.57
2	13.15	15.75	19.79	19.90	51.39	26.38

Note: Measure (1) is the measure for 1989. Measure (2) is our constructed measure.

Source: PHS.

Changes in Relative Wages

In this section, we want to study the impact of the privatization process on wage inequality. We have already documented some of the changes in relative wages after the reform period (see the section on hourly wages). However, given the difficulties of separating the different factors affecting the changes in the labor market during the period, we should take the following analysis cautiously.

Table 63. Wage Inequality (Among Those Employed).

		1989	1995	Change (%)
Gini Coefficient				
Total		0.4886	0.4109	-15.90
Public		0.3968	0.3406	-14.16
Private		0.5012	0.4181	-16.57
Privatized		0.4362	0.4109	-5.80
Atkinson				
Total	A(0.5)	0.2029	0.1395	-31.24
	A(1.0)	0.3399	0.2507	-26.25
	A(2.0)	0.7389	0.4296	-41.85
Public	A(0.5)	0.1337	0.0946	-29.24
	A(1.0)	0.2438	0.1762	-27.74
	A(2.0)	0.7923	0.3169	-59.99
Private	A(0.5)	0.2169	0.1449	-33.21
	A(1.0)	0.3576	0.2583	-27.76
	A(2.0)	0.7347	0.4378	-40.42
Privatized	A(0.5)	0.2374	0.0779	-67.17
	A(1.0)	0.3685	0.1971	-46.52
	A(2.0)	0.7502	0.3888	-48.17

Descriptive Statistics				
Total	Mean	3.00	4.61	53.71
	Std. Dev.	5.17	4.58	-11.28
Public	Mean	3.26	5.27	61.84
	Std. Dev.	3.83	3.87	1.09
Private	Mean	2.93	4.52	54.11
	Std. Dev.	5.42	4.66	-14.09
Privatized	Mean	3.14	4.32	37.62
	Std. Dev.	4.34	4.23	-2.55

Table 63 shows wage inequality among those agents that were employed. Wage inequality across the economy seems to have substantially decreased from 1989 to 1995 as indicated by various inequality measures. According to the Gini coefficient and the standard deviation of wages the privatized sectors show a lower decrease in wage inequality, while the decrease seems relatively more important when looking at the Atkinson measures. In summary, overall wage inequality from 1989 to 1995 showed a tendency to decrease. However, in the privatized sector, perhaps due to the change in ownership, this tendency seemed to have been less strong.

4. Concluding Remarks

The proportion of total employment directly influenced by the process of privatization is relatively small (around 7.3 percent, of which 2 percent worked in the public side of the sectors subject to privatization). The distributional impact of the employment changes is hence somewhat limited. The sectors of the economy that were privatized move toward acquiring similar characteristics as the other existing in the private sectors. The privatized sectors lost employment at the beginning of the process (in the form of public employment), but they gradually recover it in the form of new private jobs. The Argentinean economy during the period of the privatization experienced a number of other reforms that change the labor market organization in significant ways and complicates substantially the assessment of the effects of privatization on workers.

V. The Fiscal Effect

The 1980s in Argentina was a period of marked fiscal imbalances with extreme inflation levels that had a significant regressive distributional impact. By 1989-90, the government had accumulated a large amount of public debt and the POEs demanded substantial transfers of resources. The reform period can be partly seen as a reaction to this situation.

Table 64 shows revenues and expenditures of the most important SOEs for the years 1989 and 1990. The table shows that in 1989 (1990) the main SOEs received fiscal transfers of 1.92% (1.06%) of GDP from the federal government. But the table also shows that current revenue (12% of GDP for 1989 and 7.82% for 1990) was higher than the sum of the expenditure in employees, goods and services, and other current expenditure (11.33% of GDP for 1989 and 7.22% for 1990). However, even after transfers, the SOEs had a negative balance that had to be financed with loans from private and public banks. This negative balance suggests that the spending in capital was probably very restricted. The federal transfers were not enough to finance the spending in new capital and the resulting

limitations on investment could explain the evident obsolescence of the infrastructure and the low quality of the services provided prior to privatization (as was documented in Section II).

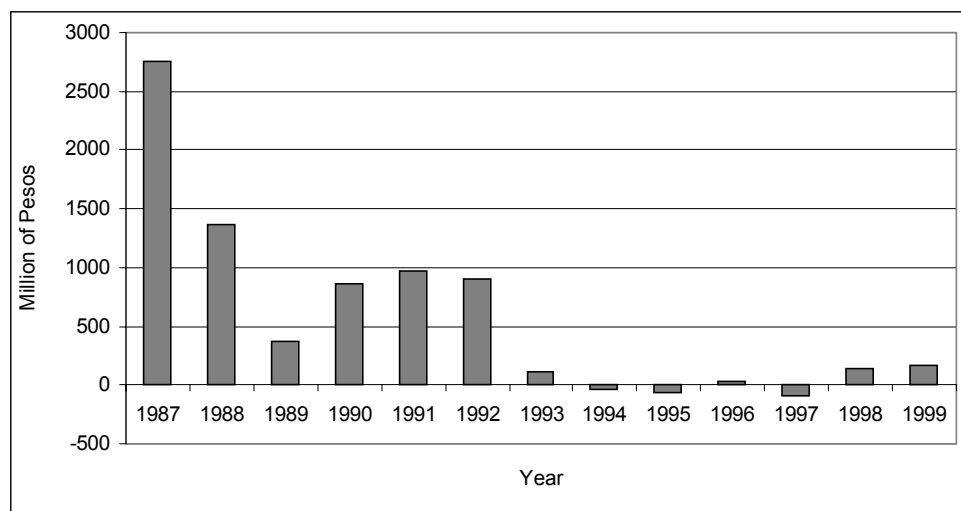
Table 64. Budget, Most Important SOEs (% of GDP).

	1989	1990
Total Revenue	14.16	9.05
Current	12.00	7.82
Capital	0.01	0.02
Specific	0.23	0.15
Transfers	1.92	1.06
Total Expenditure	17.18	9.42
Employees	2.95	2.07
Goods and Services	7.38	4.90
Interest	3.49	0.62
Other Current Expenditure	1.00	0.25
Capital	2.36	1.58
Result	-3.02	-0.37

Source: FIEL (1993).

Figure 23 shows that the POEs as an aggregate had an operative surplus for several years prior to privatizations. However, some of the individual firms were notorious for their large deficits. For example, Ramamurti (1997) documents that, prior to privatization, the Railways company (FFAA) was receiving \$829 million of dollars per year to cover operative deficit and \$298 million dollars per year to finance capital projects.

Figure 23. Operative Surplus of POE.



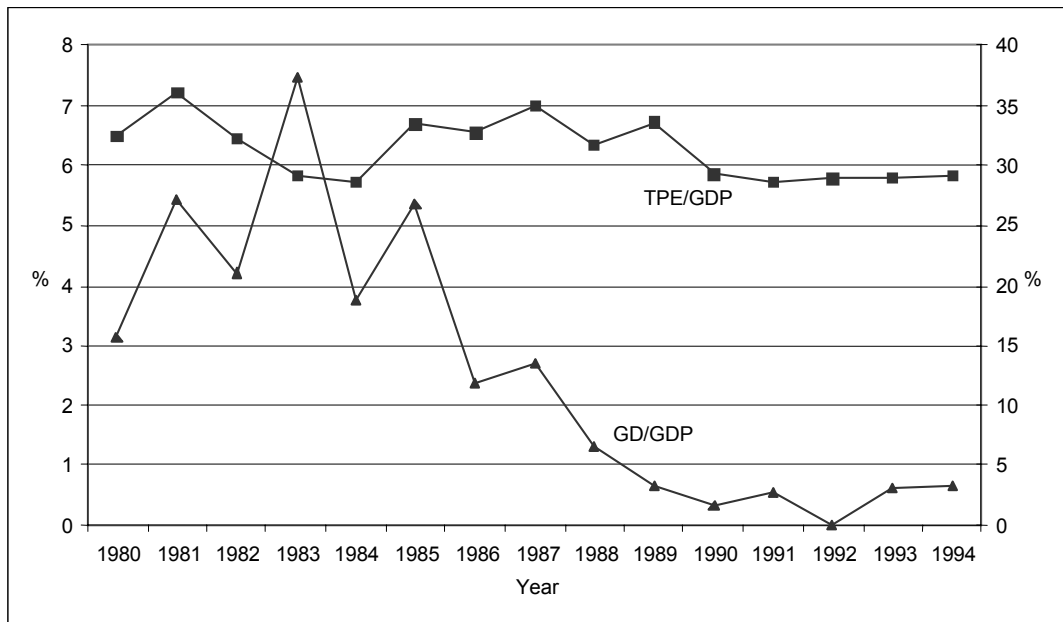
Note: Constant Pesos (IPC 1999=100).

Source: DataFIEL.

Figure 24 shows that the government deficit was historically low in the year before the beginning of the privatization reform (1990-91). However, 1989 was the conclusion of a long fiscal crisis in Argentina that started in 1986-87. There was a hyperinflationary episode in June 1989. The government deficit as an endogenous variable of the macro-economy was

probably artificially low as a consequence of the financial restrictions faced by the government during the crisis. Supporting this hypothesis is the fact that the total public expenditure as a percentage of GDP decreased from 34% to 29% during those years (1989 to 1991 in Figure 24).

Figure 24. Government Deficit as a Percentage of GDP



Note: Government Deficit (GD) and Total Public Expenditure (TPE) as percentages of GDP.

Source: IMF and DataFIEL

The total amount of debt outstanding in the form of public bonds grew steadily since 1990 (see Table 65). From 1990 to 1993 the government recovered with the privatizations an amount of public debt equivalent to 1/3 of the total amount of public bonds outstanding in 1990 (the government recovered \$10 billion dollars of public debt between 1990 and 1993, see

Table 67). This amount is equivalent to more than ten percent of the total amount of public debt in 1990 (which was around \$79 billion dollars). However, the government consistently created new debt during the nineties that more than compensated the reductions originated in the privatization.

Table 65. Argentina's Public Debt, Millions of Dollars.

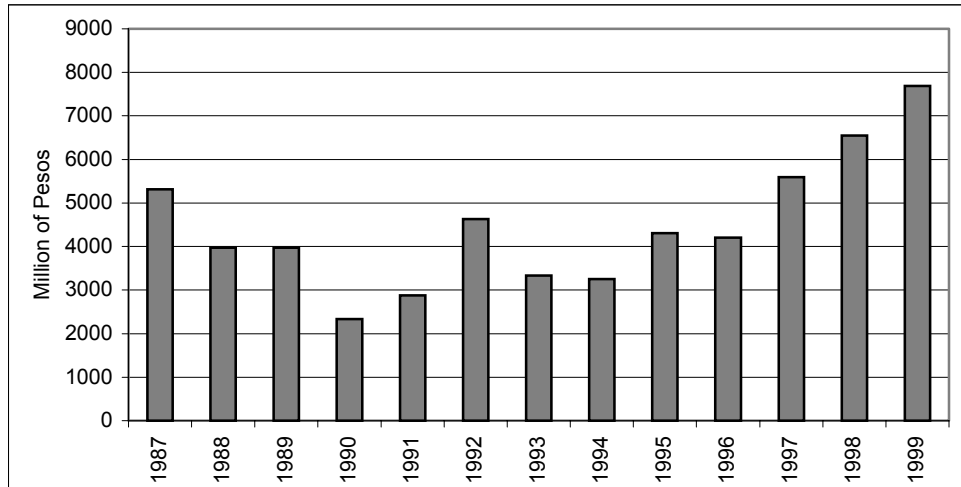
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Bonds	29713	35035	40523	47496	56357	58340	66706	71017	78212	85804
Internat. Org.	8222	7962	7104	11005	11773	15384	16367	16790	19122	20311
Bilateral	8159	8816	9001	9653	10966	11614	10162	8104	7456	5918
Comm. Banks	30944	32874	30265	984	1064	1816	1452	1423	3646	5029
Others	1851	1811	1083	488	518	437	283	731	628	641
Total	78889	86498	87976	69626	80678	87091	97105	101101	112357	121877

Source: Dal Din et. al., (1998) and Secretariat of Political Economy.

The recovery of public debt in turn help reduced the annual interest payments of the government. Interest payments fell considerably during 1990 and 1991 after two of the main

privatizations took place, ENTel and Aerolineas Argentinas (see Figure 25). These two privatizations heavily used debt recovery as a method of payment. In 1993 and 1994 public-debt interest payments also fell. These however, are especial years because in 1992 Argentina entered the “Brady Plan,” a global program oriented to the refinancing and securitization of most of the institutional public debt. In Table 65 we see that a large portion of the debt hold with commercial banks was transformed into bond under the “Brady Plan.”

Figure 25. Public Debt Interest Payments



Note: Constant Pesos (IPC 1999 = 100)

Source: DataFIEL

Both cash and government bonds were used to pay for the privatized companies. The main source of cash was the privatization of the petroleum company YPF, but also substantial amounts of cash were receive in the privatizations in the electricity, communications, and natural gas sectors (see Table 66). Revenues in cash were 72 percent of the total revenue (when bonds are valued at market prices).

Table 66. Privatization Revenues by Sector (from 1990 to 1999).

	Total Revenue (Mill. USD)	Total (%)	Cash (Mill. USD)	Bonds Market Value (Mill. USD)	Other (Mill. USD)	Bonds Nominal Value (Mill. USD)
Federal Privatizations						
Petroleum and Natural Gas	7,594	39.1	6,716	878	-	1,271
Electricity	3,908	20.1	1,989	1,451	468	2,586
Communications	2,982	15.4	2,279	703	-	5,150
Natural Gas	2,950	15.2	1,553	1,397	-	3,116
Transportation	756	3.9	284	183	290	1,314
Petrochemical	438	2.3	418	20	-	132
Banks and Financial Services	394	2.0	394	-	-	-
Steel	158	0.8	143	14	-	30
Deriv. From Petroleum and Gas	116	0.6	116	-	-	-
Pipelines	77	0.4	77	-	-	-
Construction	20	0.1	20	-	-	-
Other manuf. Industries	11	0.1	11	-	-	-
Hotels and Restaurants	8	0.0	3.5	-	13	-
Chemical	5	0.0	3	2	-	3
Electronics	2	0.0	1	-	1	1
Agriculture	2	0.0	2	-	-	-
Total Federal	19,422	100	14,009	4,653	759	13,615
Provincial Privatizations						
Electricity	2,085	47.1	2,068	-	18	-
Petroleum and Gas	1,703	38.5	1,703	-	-	-
Water and Sewages	589	13.3	589	-	-	-
Paper	50	1.1	50	-	-	-
Total Provincial	4,427	100	4,410	-	18	-

Note: Annual cannons paid for concessions are not included. Other revenues include the use of trusts and liabilities assumed by the companies.

Some of the most important privatizations, like the telecommunication company ENTel, involved large recoveries of public debt early on in the process. Also, by 1992 the privatization in the electricity and natural gas sectors allowed the government to cancel important amounts of outstanding bonds.

Table 67. Privatization Payments using Public Debt (Millions of US\$)

Year	Oil Indust.	Electricity	Natural Gas	Communication		Transport.		Other	Total
				Telecom	Telefon.	AA	Trains		
1990	131.10	-	-	2295	2705	1610	-	-	6741.10
1991	-	-	-	-	-	-	-	12.00	12.00
1992	-	1089.10	1540.9	-	-	-	-	41.80	2671.80
1993	0.66	765.00	-	-	-	-	-	4.44	770.10
1994	-	78.10	-	-	-	-	-	-	78.10
1995-97	1.01	-	-	-	-	-	-	-	1.01
Total	131.76	1933.21	1540.9	2295	2705	1610	-	58.24	10274.11

Source: Ministry of the Economy, Secretariat of Commerce and Investment (INDEC)¹⁹.

¹⁹ Additional information on the aggregate values of the privatization payments using public bonds for the 1990-2000 decade can be found in Table 4 of Benitez, Chisari, and Estache (2001) and in Table 1 of Galiani et. al. (2001).

Most of the cash revenue from sale of the oil company came at the early stages of the privatization process, between the years 1990 and 1992. Privatizations in the electricity industry provided resources in cash to the government but, in general, sparser through the years. The privatizations in the telecommunication sector generated extra cash revenue through the sale of the companies' shares that the government had retained at the time of the privatization. Those are not accounted for in Table 68.²⁰ The government also obtained some extra cash in 1999 with the sale of the remaining shares of the oil company (Table 69 shows the corresponding increase in federal revenue in 1999).

Table 68. Privatization Payments in Cash by Sector, Million of U\$S.

Year	Oil Indust.	Elect.	Natural Gas	Communication		Transport.		Other	Total
				Telecom	Telefon.	AA	Trains		
1990	45.70	-	-	100	114	260	-	-	519.70
1991	858.60	-	-	-	-	-	-	63.50	922.10
1992	536.20	312.9	300	-	-	-	-	145.30	1294.40
1993	181.59	311.4	-	-	-	-	-	30.89	523.88
1994	-	36.3	-	-	-	-	-	132.60	168.90
1995-97	375.50	383.6	-	-	-	-	-	-	759.10
Total	1997.59	1044.2	300	100	114	260	-	372.29	4188.08

Source: Ministry of the Economy, Secretariat of Commerce and Investment (INDEC).

The privatization process took place both at the federal and provincial government level. Table 69 shows that 81.5 percent of the total revenue was generated at the federal level. The provincial governments only obtained revenue from the privatization later in the process (starting in 1993).

Table 69. Revenue Generated by Privatization.

Year	Federal	Provincial	Total	% of Tot. Revenue	% of Accumulated Revenue
1990	1787		1787	7.49	7.49
1991	1963		1963	8.23	15.72
1992	5477	19	5496	23.04	38.76
1993	4496	960	5456	22.87	61.63
1994	848	74	922	3.87	65.50
1995	1319	91	1410	5.91	71.41
1996	291	445	736	3.09	74.49
1997	1	1219	1220	5.11	79.61
1998	88	439	527	2.21	81.82
1999	3156	1181	4337	18.18	100.00
Total	19426	4428	23854		
Percentage	81.44	18.56			

It is hard to disentangle the effects of privatization on the policy of social expenditure followed by the Argentinean government. Argentina experienced a broader public sector

²⁰ Delfino and Casarin (2001) provide an estimate of about two billion dollars for these extra cash revenues originated in the telecom privatizations.

reform during the 1990s. Total Public expenditures decreased from 33% of GDP during the eighties to 27% during the nineties (see Table 70). The Social Expenditure as a proportion of GDP however, increased during the same period. The main reductions in public expenditures were concentrated on government operational cost and on the cost associated with managing the POEs prior to privatization.

Table 70. Social Public Expenditures, All Government Levels.

Year	TPE/GDP	SPE/GDP	IPD/GDP	(TPE-SPE-IPD)/GDP
1980	32.55	16.26	2.58	13.71
1981	36.09	17.15	5.45	13.49
1982	32.22	12.51	7.03	12.69
1983	29.12	12.83	3.72	12.57
1984	28.71	14.00	3.32	11.39
1985	33.49	16.71	4.11	12.67
1986	32.73	17.55	2.88	12.30
1987	35.02	18.90	2.74	13.37
1988	31.77	16.47	2.23	13.07
1989	33.65	17.63	2.99	13.04
1990	29.35	17.94	1.52	9.89
1991	28.65	18.10	1.85	8.71
1992	28.93	18.19	2.30	8.43
1993	29.07	18.58	1.70	8.79
1994	29.20	19.24	1.61	8.35
1995	29.74	19.38	2.05	8.31
1996	27.69	18.18	2.00	7.51
1997	27.17	17.68	2.39	7.09

Note: TPE = Total Public Expenditures; SPE = Social Public Expenditures; IPD = Interests on Public Debt.

Source: Secretary of Political Economy and DataFIEL.

Table 71 shows that the major reduction in expenditures came from the reduction in the participation of the state on economic activities. Energy and Gas, and Communications were important categories that experienced major reductions due to the process of privatization. We can also see that the proportion of social expenditure on public expenditures has increased since 1980 reaching a maximum during the mid-nineties. The percentage of total expenditures that was dedicated to interest payments of the public debt decreased during the first years of the privatization period.

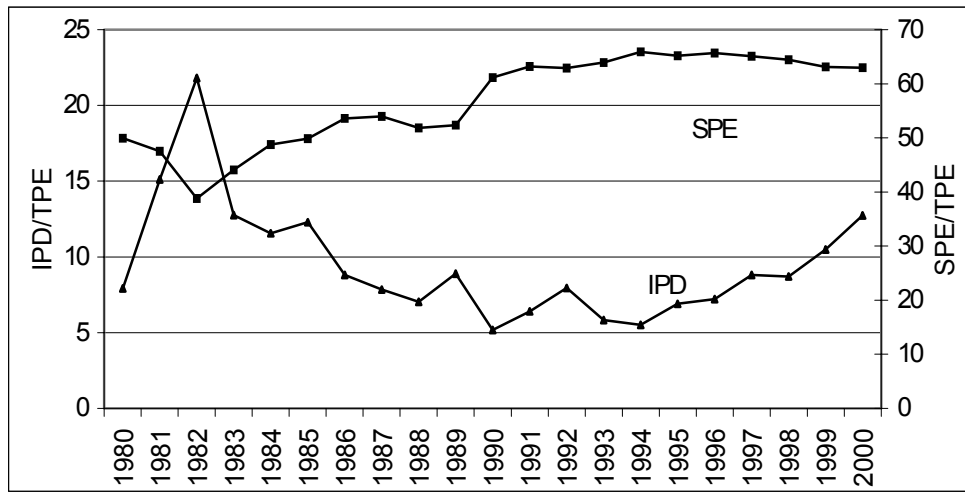
Table 71. Public Expenditures, Percentage of Total Expenditures, All Government Levels.

Year	Govt. Functions	Social Public Expenditure	Public Debt Interests	Public Exp. in Ec. Serv.		
				Total	Energy & Gas	Communic.
1980	18.51	49.96	7.92	23.61	8.33	1.78
1981	16.73	47.51	15.11	20.69	9.16	1.29
1982	15.53	38.81	21.81	23.86	11.35	1.37
1983	16.48	44.06	12.76	26.70	11.27	1.68
1984	14.52	48.78	11.55	25.15	10.08	1.16
1985	14.39	49.89	12.28	23.43	8.31	0.85
1986	15.89	53.62	8.81	21.68	7.24	1.23
1987	16.03	53.98	7.83	22.28	8.32	1.71
1988	16.28	51.84	7.03	24.87	7.91	3.74
1989	14.79	52.37	8.90	23.94	7.82	1.60
1990	16.20	61.14	5.17	17.48	6.04	0.41
1991	18.69	63.18	6.46	11.71	4.53	0.09
1992	19.32	62.89	7.96	9.84	4.18	0.14
1993	19.50	63.91	5.84	10.75	4.13	0.32
1994	19.97	65.88	5.52	8.63	2.35	0.19
1995	19.25	65.15	6.89	8.70	1.99	0.23
1996	19.23	65.66	7.23	7.88	1.44	0.18
1997	18.71	65.09	8.81	7.39	1.26	0.26
1998	19.28	64.42	8.70	7.60	1.19	0.23
1999	19.96	63.14	10.49	6.41	0.90	0.20
2000	18.89	62.94	12.73	5.43	0.88	0.14

Source: Secretariat of Political Economy and DataFIEL.

From Figure 26 we can see that there is a strong negative correlation (- 0.7) between the percentage of total expenditure dedicated to social purposes and the percentage of total expenditures that goes to pay interest on the public debt. There seems to be a crowding out effect of social expenditures. To the extent that privatization tended to reduce the amount of public debt outstanding, and hence the annual interest payments, more social expenditure might have been possible as a consequence of the reduction in fiscal pressure originated in the privatizations.

Figure 26. Crowding-out of Social Expenditures



Note: Social Public Expenditures (SPE) and Public Debt Interest Payments (IPD) are both expressed as percentage of Total Government Expenditures (TPE).

Source: Secretariat of Political Economy.

If the transfer of certain economic activities from the public sector to the private sector creates new value (when the private sector is more efficient performing those activities), then the process of privatization tends to loosen the intertemporal budget constraint of the government (see Mackenzie, 1998). The government gives up assets with low real value in its hands and receives in exchange some valuable assets (or cancels debt). Prior to privatization the POEs in Argentina were very poorly managed and their economic performance was very unsatisfactory. The creation of value associated with the change in ownership probably was an important factor in explaining the move towards implementing an extensive privatization program.

Capital markets

Another important effect associated to the privatization of POE in Argentina was the contribution from this process to the development of a more liquid and accessible local stock market. Table 72 shows the evolution of stock market capitalization. The value traded in the stock market has increased significantly (the jump in capitalization in 1999 is due to the government sale of the remaining shares of YPF).

Table 72. Average Daily Trade (Shares in the Stock Market) and Capitalization

Year	Trade (Mill. U\$S)	Capitalization (Mill. U\$S)	Capitalization (% of GDP)
1991	27.019	n/a	2.2
1992	82.256	18,613.863	2.6
1993	237.368	44,011.197	9.2
1994	513.776	36,867.223	8.1
1995	401.732	37,779.557	16.7
1996	659.997	44,670.349	12.8
1997	445.490	59,239.904	14.0
1998	266.330	45,291.520	16.0
1999	203.160	83,879.018	19.0
2000	181.605	165,802.581	-
2001	143.492	192,499.259	-

Note: The values correspond to the month December of each year.

Source: Comisión Nacional de Valores and www.bolsar.com

Table 73 shows that the utilities and dividends of the privatized firms became a significant proportion of the total utilities and dividends after privatization (38.5 percent).

Table 73. Utilities and Dividends (Millions of Dollars).

Year	Utilities and Dividends		
	Total	Privat'd Firms	Privt'd/Total
1992	1327	159	12.0
1993	1975	415	21.0
1994	2380	641	26.9
1995	2674	1128	42.2
1996	2578	957	37.1
1997	2857	1240	43.4
1998	3197	1325	41.4
1999	2606	1670	64.1
1992-99	19594	7535	38.5

Source: Machinea (2001)

In terms of the distributional effect associated to the fact that some groups of individuals became the owners of the privatized companies, this effect does not seem to appear very significant. Employees of some of the privatized companies did retained a portion of the shares issued. For example, ENTel employees were assigned 10% of the shares of the two privatized companies, Telecom and Telefónica de Argentina. The same proportion was assigned to SEGBA employees after its privatization. However, the significance of this ownership factor seems very limited.

VI. Review of Previous Literature

Navajas (1999) uses the Households Expenditure Surveys (1985/86 and 1996/97) to assess the distributional effects of changes in relative prices following the 1990s' economic reforms in Argentina (mainly privatization and international trade liberalization). The author uses the

methodology of computing “distributional characteristics” as in Newbery (1995). He finds that there is a substantial increase in consumption inequality from the mid-eighties to the mid-nineties in Argentina. He also finds that trade liberalization has a robust positive impact on welfare through changes in relative prices (especially lowering the relative prices of non-durable goods –food-, durable goods, and clothing). The changes in the relative prices of public services (associated with the privatization process) have an initial welfare improving effect, but since 1994 they are associated with welfare losses. Finally, Navajas attempts to take into account the changes in coverage associated with the privatizations in Argentina. He presents data that suggests that coverage has increased for all levels of income, but relatively more for low levels of income. Then, he constructs a “distributional characteristic for access to the service” and concludes that privatizations have had a positive welfare effect on this respect.²¹

Chisari, Estache, and Romero (1997) use a computable general equilibrium model to study the effects of changes in productivity, quality of the services, and pricing practices originated in the Argentinean privatization reform. A number of strong assumptions are made (presumably for tractability). This complicates the interpretation of their results.

The authors use the model to compute aggregate welfare changes and changes for different income groups. Also, comparing the response of the model under flexible and fixed prices of public services the authors try to evaluate the impact of effective regulation on the economy (fixed prices being a proxy for high monopoly power and ineffective regulation). Regulation has important implications for income distribution since under fix prices the gains in efficiency associated with privatization become rents to the high-income agents that own the firms.

In the model, the changes from privatization influence the welfare of the agents in the different income quintiles through three different channels: (i) price changes of the privatized services, (ii) factor remuneration (labor and capital); and (iii) changes in input costs for the rest of the economy.

The main findings of Chisari, Estache, and Romero are:

- Efficiency gains substantially benefit all groups, but there are even more gains to be achieved by an effective regulation (that increases the pass-through of the efficiency gains to the rest of the economy);
- The gains are relatively higher for high-income groups, but effective regulation is most beneficial for low-income groups;
- The overall distribution of income becomes less concentrated (more evenly distributed) due to the privatizations, but this is especially true under effective regulation. The poor gain most from efficiency improvements in gas and electricity (these are major components of the expenditures of the poor) (access to water is not modeled in the paper, though). If the regulator is effective, middle income groups gain most from improvements in telecommunications (otherwise they pay huge rents to the private operators of the services and hence lose);

²¹ The distributional characteristic of access to service i is defined as the weighted sum (with social distributive weights) of the proportion of households with access in each income group.

- The effect of the privatizations on unemployment is not very important (cannot account for the observed extremely high unemployment rates that were observed in Argentina during the nineties).

Perhaps the overall conclusion of the work of Chisari, Estache and Romero is that there exist important gains to be obtained from effective regulation of Argentina's privatized public utilities (both in terms of aggregate welfare and in terms of a more even distribution of income).

Benitez, Chisari, and Estache (2001) use a version of the computable general equilibrium model in Chisari, Estache, and Romero (1997) to study the fiscal effect of the privatization of the public utilities in Argentina and its distributional consequences. They consider both direct and indirect fiscal effects of the privatization. The main direct effects are the proceeds from the concession or transfer of ownership, the increased tax base, and the elimination of the operational subsidies. The indirect effects are less clear. The exercise is intended to isolate the effect of the utilities privatization from the effects of the changes in the cost of funds that Argentina experienced during the same period as a consequence of the Mexican and Russian crises.

One of the interesting findings of this study is that the fiscal situation of the government tends to benefit from poor regulation of the privatized companies. Bad regulation increases monopoly rents and hence the tax returns from taxing profits. Also, appropriate regulation tends to shift production to sectors that are less heavily taxed in Argentina. The authors evaluate the welfare effects of having good regulation. They take into account that bad regulation provides extra revenue to the government and that the government can target the additional resources to the income groups that most need them. However, they conclude that the direct effects of a good regulation more than compensate the indirect fiscal effect.

Benitez, Chisari, and Estache also study the effect that the reduction in government debt has in the interest rate and hence in the cost of capital. Here is where it becomes important to isolate the changes in the interest rate due to the privatization process and those due to the external shock associated with the Mexican and Russian crises. From their analysis, the authors conclude that the gains from privatizations are modest in relative terms and not enough to compensate the type of significant external shocks that Argentina suffered during the nineties.

Chisari and Estache (1997) study how the contractual obligations related to coverage performed in Argentina's infrastructure privatization. They identify two types of conditioning that regulators can use to handle coverage issues: the Universal Service Obligation (USO) and the Obligatory Service (OS). The USO rules are those used to guarantee access by all members of the community at an affordable tariff (subsidized pricing, for example, when the service is considered essential). OS rules are those that required that the company provide services to all users at the ongoing tariff (no discriminatory pricing) or that required that all the individuals consume the service being provided (for externality reasons for example – health).

The authors survey the experience of Argentina and suggest a number of principles to keep in mind in an evaluation of coverage obligations for public utilities:

- The usual moral hazard and adverse selection arguments associated with differential treatments and customized plans for provision (consumers misrepresenting their type and providers misrepresenting costs of provision);
- The need of providing credit to poor households (and unemployed people) for the financing of fixed-charges associated with the expansion of the infrastructure network. Also for handling the consequences for the poor of the elimination of leakages, misuse, and clandestine connections (a decrease in the availability of free of charge services);
- Coordinate regulatory and employment-social policies (for example, using workers from poor families in the infrastructure extension works);
- Subsidized tariffs (which tend to induce over- and miss-use) may be combine with quantity restrictions (for example, a maximum number of phone calls at subsidized tariffs).

Basically, Chisari and Estache set forth the main issues and concerns associated with implementing coverage requirements in privatized public utilities and provide some preliminary and limited conclusions that mostly reflect the intricacies of the problem. Their paper is also a useful survey of the coverage requirement used in Argentina.

Abdala (1994) evaluates the net impact on welfare of the privatization of Empresa Nacional de Telecomunicaciones (ENTel). The study estimates the effects of the change in ownership in a partial equilibrium context using the cost-benefit methodology developed by Jones, Tandon and Vogelsang (1990). It is assumed that the privatization of ENTel affected eight different groups: the domestic purchaser of the firm, the foreign purchaser of the firm, the employees, the firm's competitors, its suppliers, the consumers of the firm's services, the government and the citizens. The analysis focuses on the present value of the flows of Telecom and Telefónica treated as a single firm during the ten-year period after ENTel's transfer in 1990. Even though the net benefit to Argentina from the change in ownership was equal to US\$1,946 million in 1991 dollars, the impact differs significantly across groups.

Abdala (1996) studies the water privatization in the City of Buenos Aires by performing a counterfactual analysis using a similar methodology to the one in Abdala (1994). The paper provides a very detailed account of the organization and the provision of water and sewerage services before and after privatization in the City of Buenos Aires. The author evaluates the change in welfare due to the privatization taking into account consumer surplus, profits, and rents to input providers. According to his study, the benefits to Argentines of the privatization of water and sewerage in the City of Buenos Aires were of US\$ 1,306 (another US\$ 211 were benefits to international investors). More than 80% of this amount were gains to the consumers. The competitors of the company and the government were net losers (the government took over the liabilities of the company prior to privatization). Increases in coverage and lower relative tariffs were the main reasons for these positive results. The removal of the investment constraint that the public company would have had seems to be one of the most important consequence of the change in ownership.

Delfino and Casarin (2001) paper is closely related to ours in many respects. They concentrate specifically on what we call *the consumption effect* and study the changes in consumer surplus originated in the privatization of the public utilities in Argentina. They find evidence suggesting that among consumers that had access to the services prior to

privatization, those in the first quintile (the poorest) tend to experience a considerable loss of consumer surplus as a consequence of the reform. However, the consumers in the fifth quintile have clearly benefited from the reform according to their calculations. It is interesting to note that Delfino and Casarin find that while all except the poorest benefited from the telecom and electricity privatization, consumers in general have suffered a loss in consumer surplus as a consequence of the privatization of natural gas and water services. The authors provide also a rough estimate of the gains in consumer surplus that were experienced by those individuals that actually obtained access to the services as a consequence of the privatization. Delfino and Casarin computations seem to suggest that those gains were in general not at all significant (access to water being the only case providing some clear welfare gains).

Abdala (1994) quantifies in a monetary model the change in the welfare cost of inflation brought about by divestiture. The exercise is applied to the case of the telecommunications company (ENTel) in Argentina. The objective is to investigate by how much Argentinean citizens could be better or worse off, in terms of bearing the differential costs of inflation, if ENTel had not been divested. The paper finds that differential costs of inflation are relatively small.

Galiani, Gertler, Schargrotsky, and Sturzenegger (2001) study the privatization process in Argentina and its effect on firm performance using a similar methodology to that used for Mexico by La Porta and Lopez-de-Silanes (1999). The paper also includes two additional sections where two specific welfare effects of privatization in Argentina are studied: (1) the effect of the privatization of water and sewerage on child mortality, and (2) the long-term losses of displaced workers as a consequence of the privatization of the petroleum company. The authors find that non-financial firm profitability increased substantially after privatization. This effect is not very strong for financial firms (banks). They find that employment cuts and increased investment are the most important causes for this increase in profitability of the privatized non-financial firms. In the two sections on (partial-equilibrium) welfare consequences of privatization they find that the privatization of water and sewerage had a negative and significant effect on child mortality and that the privatization of the petroleum company had important distributive costs directly associated to the long term displacement of workers.

VII. Conclusions

We assess the redistributive impact of the privatization process in Argentina considering its effects on consumption, employment, and the fiscal performance of the government. The information available is scarce and generally of low quality. For the most part, we have restricted our analysis to the area of Greater Buenos Aires (which is the most important economic area in the country).

On the consumption side, we calculated the change in welfare due to changes in prices and changes in access to the privatized public utilities. We concentrate the study in the telecommunications, natural gas, water and electricity sectors. In terms of households' expenditures, the electricity sector is the most important sector before and after privatization, while the other sectors were relatively small before the privatization and notably increased their participation (in expenditures) after the privatization.

Concerning access, there has been a significant increase in the number of households connected to the telephone, natural gas, and water networks, and this is more evident for lower income households. The case of electricity is different; the change in access was not as important given that connection to the electricity network was already common even before the privatization.

Relative prices have changed since the privatization of public utilities, but it is of course not clear how much of this change can be attributed to the privatization process. In this paper we provided evidence that support the view that relative prices of (privatized) public services have actually decreased due to privatization, although this conclusion is sensitive to the specific reference periods being used. Even if actual prices have not decreased, it is clear that the services provided have significantly increased their quality since privatization.

We computed the consumer surplus resulting from the privatization and distinguished the impact on households with access in every period and on those who gained access. The combination of these two effects revealed that the change in welfare is mostly driven by the electricity sector. For both the telecommunications and natural gas sectors, the access effect is more important than the impact associated with the change in prices. In general, however, these effects are relatively small.

With respect to employment, we showed that some notable qualitative changes were observed after the privatization, but the quantitative effects appeared to be rather small. The privatized sectors have moved towards the labor organization predominant in the private sector. The measures of inequality and poverty do not seem to be significantly influenced by the effects of privatization on unemployment.

Finally, in terms of the fiscal effects associated with privatization, we presented some evidence that suggest that due to the relative reduction in the payments of interests on the public debt, there has been a reduction on the crowding out of social public expenditures. The evidence on this, however, is very preliminary.

VIII. References

1. Abdala, Manuel Angel (1994), "Privatization and Changes in Welfare Costs of Inflation: The Case of ENTel Argentina," *Journal of Public Economics* 55, 3 (November), pp. 465-93.
2. Abdala, Manuel Angel (1996), "Welfare Effects of Buenos Aires' Water and Sewerage Service Privatization," AAEP, Bahia Blanca, Argentina.
3. Abdala, Manuel Angel (1998), "Instituciones, Contratos y Regulación de Infraestructura en Argentina," Documento 15, Fundación Gobierno y Sociedad.
4. Bebczuk, Ricardo and Leonardo Gasparini (2001), "Globalization and Inequality. The Case of Argentina," Documento de Trabajo Nro 32, Departamento de Economía, UNLP.
5. Benitez, D., O. Chisari, and A. Estache (2001), "Can the Gains from Argentina's Utilities Reform Offset Credit Shocks?" WIDER Discussion Paper No. 2001/33.
6. Bosch, Ernesto, Ana N. de Gimbatí and Paula Giovagnoli (1999), "Eficiencia Técnica y Asignativa en la Distribución de Energía Eléctrica. El Caso de EPE SF," AAEP, Rosario, 1999.

7. Canavese, A., W. Sosa Escudero, F. Gonzales Alvaredo (1999), “El impacto de la inflación sobre la distribución del ingreso: el impuesto inflacionario en la Argentina en la década del ochenta”, en *La distribución del ingreso en la Argentina*, FIEL, Buenos Aires, 1999.
8. Chisari, Omar and Antonio Estache (1997), “Universal Service Obligations in Utility Concession Contracts and the Needs of the Poor in Argentina’s Privatizations,” World Bank and UADE, Argentina.
9. Chisari, Omar, Antonio Estache, and Carlos Romero (1997), “Winners and Losers from Utility Privatization in Argentina: Lessons from a General Equilibrium Model,” Policy Research Working Paper 1824, The World Bank, Washington (also in *The World Bank Economic Review* 13 (2), 1999).
10. Colome, Rinaldo A., A. Enrique Neder, and Carlos Ceballos Ferroglio (1999), “Regulación para la Competencia en los Mercados de Telecomunicaciones de Argentina”, AAEP, XXXIV Reunión Anual.
11. Dal Din, Claudio and Norberto L. Isnardi (1998), “La Deuda Publica Argentina 1990 – 1997,” Documento de Trabajo No. 56, FIEL, Argentina.
12. Delfino, Jose and Ariel Casarin (2001), “The Reform of the Utilities Sector in Argentina,” WIDER Discussion Paper No. 2001/74.
13. Estache, Antonio, Jose C. Carbajo, and Gines de Rus (1999), Argentina’s Transport Privatization and Re-Regulation: Ups and Downs of a Daring Decade-Long Experience, World Bank.
14. Estache, Antonio, Andres Gomez-Lobo, and Danny Leipziger (2000), “Utility Privatization and the Needs of the Poor in Latin America,” World Bank.
15. FIEL (1992), “Capital de Infraestructura en la Argentina. Gestión Pública, privatización y productividad 1970-2000.”
16. FIEL (1999), “La Regulación de la Competencia y de los Servicios Públicos: Teoría y Experiencia Argentina Reciente”, Ed. Manantial.
17. FLACSO (1998), “Privatización en la Argentina: Marcos regulatorios tarifarios y evolución de precios relativos durante la convertibilidad”, Facultad Latinoamericana de Ciencias Sociales, Sede Argentina, Buenos Aires.
18. Galiani, Sebastián, Paul Gertler, Ernesto Schargrodsky and Federico Sturzenegger (2001), “The Benefits and Cost of Privatization in Argentina: A Microeconomic Analysis,” IDB (December).
19. Gasparini, Leonardo and Walter Sosa Escudero (1999), “Bienestar y Distribucion del Ingreso en la Argentina, 1980-1998, AAEP, Rosario, Argentina.
20. Gerchunoff, Pablo, Editor (1992) “Las privatizaciones en la Argentina. Primera Etapa”, Instituto Torcuato Di Tella.
21. Givogri, Carlos (1989), “Las Tarifas Eléctricas Regionales Muestran Diferencias Ineditas,” *Novedades Economicas* (November), 5-6.
22. Jones, L., P. Tandon and I. Vogelsang (1990), *Selling Public Enterprises. A Cost-Benefit Analysis*. The MIT Press. Cambridge, MA.
23. La Porta, Rafael and Florencio Lopez-de-Silanes (1999), “The Benefits of Privatization: Evidence From Mexico,” *Quarterly Journal of Economics* 114 (4), pp. 1193-1242.
24. Mackenzie, G. A. (1998), “The Macroeconomic Impact of Privatization,” IMF Staff Papers 45, 2 (June), pp. 363-373.

25. Megginson, William L. and Jeffrey M. Netter (2001), "From State to Market: A Survey of Empirical Studies on Privatization," *Journal of Economic Literature* 39 (June), pp. 321-389.
26. Millan, Jaime, Eduardo Lora, and Alejandro Micco (2001), "Sustainability of the Electricity Sector Reforms in Latin America," Inter-American Development Bank, Research Department.
27. Moguillansky, G., and R. Bielschowsky (2001), "Investment and Economic Reform in Latin America," CEPAL.
28. Navajas, Fernando (1999), "Structural Reforms and the Distributional Effects of Price Changes in Argentina," FIEL and UNLP, Argentina.
29. Navajas, Fernando, and Alberto Porto (1990), "Aspectos de Equidad en el Diseño y Evaluación de Tarifas Públicas No Uniformes", in *Economía de las Empresas Públicas. Funcionamiento, Desregulación y Privatización*, Editorial Tesis, Instituto Torcuato Di Tella.
30. Newbery, David M. (1995), "The Distributional Impact of Price Changes in Hungary and the United Kingdom," *The Economic Journal* 105 (July), pp. 847-863.
31. Ramamurti, Ravi (1997), "Testing the Limits of Privatization: Argentine Railroads," *World Development* 25 (12), pp. 1973-1993.
32. SiGEP, Sindicatura General de Empresas Públicas, Varios Informes.
33. Urbiztondo, Santiago, Daniel Artana, and Fernando Navajas (1998), "La Autonomía de los Entes Reguladores Argentinos," IDB Working Paper R-340.
34. Vickers, John and George Yarrow (1991), "Economic Perspectives on Privatization," *Journal of Economic Perspectives*, Vol. 5 (2, Spring), pp. 111-132.