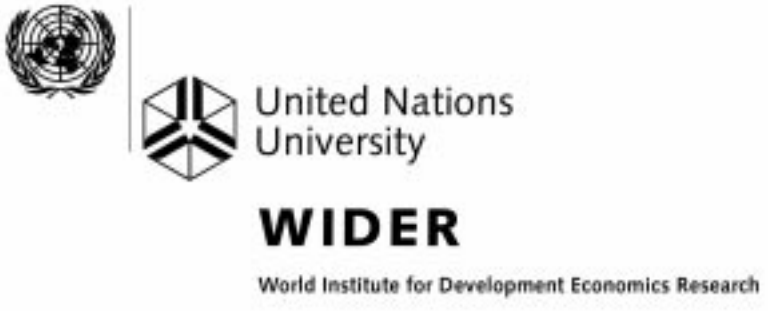

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Can the Gains from Argentina's Utilities Reform Offset Credit Shocks?

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Abstract

Relying on a general equilibrium model of Argentina's economy calibrated for 1993 and internalizing all productivity and scale gains achieved up to 1999, this paper isolates the distributional effects of utilities reform from the impact of other reforms taking place in the country during the 1990s. The analysis shows that both private and public agents gain from the increases in productivity and in service access made possible by the utilities reform. In the short term, the public sector benefits from the proceeds of the sale of firms and the associated debt reduction, but greater advantages in the long term accumulate from the expanded taxbase and from the reduction in expenditure flows. Private agents gain from lower costs, lower average tariffs, and improvements in service quality as well as greater employment opportunities resulting from lower production costs. These welfare gains, however, are substantially offset by the 'tequila' and 'vodka'

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shocks that hit the country during the 1990s and increased rationing in the credit markets. The distributional effects of the utilities reform are generally positive at this macroeconomic level of analysis, but this often implies a strong commitment to an effective regulatory regime to prevent capture of the contributions of reform by the capital owners of the utilities sector.

1 Introduction

In the early 1990s, Argentina began the transfer of the operations and sometimes the ownership of infrastructure services to the private sector.[1] Since then, performance indicators clearly show that quality and access have, on average, improved in electricity, gas, water and sanitation, and telecommunications. However, since 1995, the cost of Argentina's external financing has been subject to a series of increases—notably the 'tequila' effect and the 'vodka' effect resulting from the Mexican and Russian crises, respectively. The increased costs to its external credit have decelerated the Argentinean economy and decreased the standard of living for a large portion of the middle- and lower-income classes. These shocks have also had an impact on the effects of the utilities reform and have, in many ways, confused the perceived contributions from the reforms and their distributional influence.

One of the agents commonly ignored in any discussion of the longer-term winners and losers of the utilities reform is the government, which has benefited in more ways than is usually acknowledged. The initial financial proceeds and debt reduction resulting from the privatization transactions are widely recognized. However, improved efficiency of public expenditure, increased taxbase and additional economic activity have further, longer-lasting effects which, under certain conditions, may have the strongest impact in present net value terms. This is not to say that the importance of the initial shock should be underestimated. Indeed, debt reduction tends to reduce the cost of borrowing for the government and also for private agents, as the country risk improves. This factor, however, is difficult to assess and is thus not included in this study, which means that we may be underestimating the fiscal and macroeconomic payoffs from the reform. The results are, however, reliable enough to enable us to study the fiscal distributional impacts of the utilities reform and to highlight the relative social importance of the various fiscal changes faced by the government.

Since the expenditure and tax implications of reform extend to all activities and all relative prices, a general equilibrium approach is the most appropriate method of evaluation. The model presented is a short-term model of a small open economy, trading goods and financial services internationally, with four main groups of agents: firms producing goods and services, families classified according to their income group, a government sector and a foreign sector. With this modelling of workers and consumers, we can also fully trace the distributional consequences of the fiscal effects of reform. The method, however, is not perfect: there is a limitation in assessing the shadow value of the scarce resources available to the public sector in the pre-reform period. Indeed, since the model is calibrated for today's economy, several behavioural parameters and

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[1] The transfer is complete for telecommunications, gas, electricity generation and transmission. It is only partial in water and sanitation, and electricity distribution since some of the poorest provinces have yet to agree to the concession of these services. In terms of population coverage, privatized utilities services are the norm for over 75 per cent of the population. Throughout the paper, we assume that the changes observed in water and electricity distribution in Buenos Aires are representative of developments for the whole country if 100 per cent of the population were connected to private operators.

variable levels (investments in particular) already reflect the results of the reform process. This may also cause an under-evaluation of the utility reform contributions.

The rest of the paper is organized as follows. Section 2 reviews the sources of the fiscal gains to be assessed. Section 3 discusses the database and the design of the social accounting matrix. Section 4 presents the computable general equilibrium model and summarizes the main simulations. Section 5 examines the relative importance of international interest rate shocks for the utilities sector. Section 6 concludes.

2 What are the fiscal gains from reform?

The utilities reform created both direct and indirect fiscal gains that have significant distributional consequences. There are three main types of direct fiscal gain: first, there are proceeds to the government from the transfer of ownership to private operators, or for the concession of public services. In Argentina, these were made either in cash or as public sector bonds repurchased in the secondary market. Second, an increased taxbase was generated by the transformation of service provision from the public to the private sector, where these services are subject to value added tax (VATs) and income tax. The third type of direct gain results from the elimination of operational subsidies paid to public enterprises for intermediate inputs and salaries.

There are also several important sources of indirect gains. First, service obligations imposed on private operators increase the level of public services available and improve access in high cost areas—often serving poor users—that would otherwise need to be subsidized by the public sector. These network expansions are, to some extent, self-financing because of network externalities and scale effects, as well as because of the tolerance for cross-subsidies generated within the sector. Second, fiscal revenue is generated when the public sector manages to capture additional indirect taxes collected by privatized firms acting as indirect collection agencies, a process that reduces evasion. Evasion in value added tax is easier to control when all agents of the payment/production chain are liable than when one of them is a tax-exempt public provider. Finally, the reallocation of public expenditures resulting from the transfer of some of the financial responsibilities to the private sector contributes to an improvement in services in education, health, rural infrastructures—areas which otherwise would be neglected. The transfer to private operators has also helped the government cover losses from poor macroeconomic cycle years.

These dividends can be added to the gains primarily attributed to the reform of utilities and their privatization or concession. Relying on the same basic general equilibrium model, Chisari, Estache and Romero (1999) show that the productivity gains from increased private sector participation are significant and tend to favour the poor, particularly if efficiency gains were redistributed by the regulators throughout the economy, avoiding their conversion into rent for the owners of private capital.

These direct and indirect gains did not develop in a vacuum, as Argentina's external financing conditions have changed since 1995. The tequila and vodka crises have increased by about 2 per cent the cost of credit needed to finance the country's deficit.

This started a deceleration of the economy and a deterioration in the Argentinean welfare levels that affects so many of the poor (Chisari *et al.* 1996). The 2 per cent interest rate increase may have induced a GDP decline of more than 1 per cent annually and a reduction of almost 2 per cent in welfare measured by the equivalent variation for household revenue. The question is thus, To what extend has the combined impact of these direct and indirect fiscal payoffs from privatization offset the adverse effect of external shocks?

3 A general equilibrium model for Argentina

The first step in providing the answer to this question is to develop a Social Accounting Matrix (SAM) of the economy to consistently combine and summarize the information on major macroeconomic transactions. The SAM prepared here corresponds to the post-privatization period. This was a challenge in itself as the changes in most economic indicators have been quite dramatic and have resulted, at times, in a spectacular reshuffling of data trends, a fact which increases the difficulty of creating a consistent database. Indeed, this period is characterized by strong fluctuations in economic activity and by price changes that are the severest ever observed in the country. Similarly, unemployment levels by Argentina's standards are relatively high.[2]

The matrix covers four types of markets—the domestic production and investment market (for final and intermediate use), the investment goods market, the labour market and the bonds (or credit) market. The firms range over 21 productive sectors, covering both goods and services. The firms need labour and capital which are owned by the households and the foreign sector. The public sector is a net demander of goods and labour and offers bonds for amounts equivalent to the level of expenditures not covered by tax revenue. The government demands sector-specific labour but can also recruit from other sectors, as needed. Since the model is short term, there are rigidities in the system. One of the rigidities adopted here is the constraint that private-sector workers can transfer to the public sector but not vice-versa. Tables 1 and 2 show a summary of the input-output matrix uses for the SAM and labour and capital sharing by type of consumer.

Table 2 confirms the expectation of many researchers with regard to the distribution of assets and factor income. As shown in the table, the richest income class stands to gain the most from an unequal distribution of the quasi-rents generated by privatization because about 90 per cent of the total economic capital is concentrated in the two highest income groups.

A more technical and detailed description of the SAM is provided in Appendix A1.

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2 Although unemployment in 1993 was 9.33 per cent, which was consistent with past levels, it has since peaked at almost 20 per cent with some degree of fluctuation prevalent.

Table 1
Summary input-output matrix uses for the SAM
(% of gross output value)

	Agriculture	Industry	Infrastructure	Construction	Services
Agriculture	8.5	13.3	5.9	3.3	0.4
Industry	7.1	20.4	8.9	41.7	10.1
Infrastructure	0.1	2.2	18.4	0.4	1.6
Construction	0.0	0.0	0.0	0.0	.0
Services	12.3	12.8	8.9	12.6	17.4
Imports	0.2	6.0	0.5	0.9	0.4
Value added	71.5	45.4	57.5	41.1	70.2
Output	100.0	100.0	100.0	100.0	100.0

Table 2
Distribution of factor income per income classes

	Composition (as % of total class income)				Shares (as % of total factor income)		
		Capital					
Households	Labour	Physical	Financial	Transfers	Labour	Capital	Total income
1 (poorest)	71.7	19.4	0.4	8.5	11.2	3.8	7.3
2	64.0	26.7	0.4	8.9	14.5	7.6	11.0
3	64.3	27.0	1.0	7.8	21.4	10.7	15.4
4	62.8	29.2	1.9	6.0	27.9	16.3	22.2
5 (richest)	28.9	61.0	5.7	4.4	25.0	61.5	44.1

Table 3
Development of the main indicators for privatized utilities
from the date of transfer until 1999 (in %)

	Electricity				
Indicators	Generation	Distribution	Gas distribution	Water distribution	Telecom-munications
Efficiency gains:	17.2	5.5	25	7.0	10.9
Measured as the reduction in intermediate purchases as share of gross value added					
Labour productivity gains:	17.4	31.5	13.4	-29.0	23.5
Measured as Gwh, cubic meter, population served, lines in service per employee					
Changes in average real tariffs: [1]	-38.1	-5.9	-0.5	11.1	-4.9
Changes in production scale:	36.3	19.7	15.7	14.4	39.4
Measured as investment as share of initial capital					

Note: [1] For water, they represent the changes in costs observed as a result of ‘privatization’. All tariffs are deflated through a consumer price index.

The data used to estimate these effects were collected from the annual reports of private operators or public enterprises, from the General Public Enterprise Association (Sindicatura General de Empresas Públicas, SIGEP) and from the regulatory agencies. Changes in these variables, summarized in Table 3, are sufficiently consistent with Chisari, Estache and Romero (1999) to allow comparisons. In this respect, the update to reflect production and access levels as of 1999[3] is an improvement over the earlier study.

Table 4 summarizes the fiscal revenue paid by operators in cash or bonds for the concession. Funds accruing to the government from the utilities transfers were equivalent to about 4 per cent of the 1994 GDP; 7 per cent for the rest of the privatization transfers. Payments in bonds also enabled a more rational management of the residual debt which certainly had a beneficial impact on the cost of debt servicing for the country as reflected in the figures.

Table 4
Direct fiscal outcome of the privatization programme (1994 US$ million)

		Debt withdrawal			
Sector	Cash	Cash equivalency	Nominal value	Transferred debt	Total
Telephones	2270.9	1257	5000		3527.9
Airlines	260.0	483	1610		743.0
Electricity	879.4	1933.9	3772.5	1556.4	4369.7
Ports	9.8				9.8
Shipping	14.6				14.6
TV-radio	13.9				13.9
Oil	5100.2	884	1271.1		5984.2
Gas	820.6	1541.1	3082.1	1110.0	3471.7
Fridges	1.9				1.9
Petrochemicals	55.7	28.4	133.6		84.1
Shipyards	59.8				59.8
Steel	143.3	22.1	41.8		165.4
Financial	86.3				86.3
Real estate	202.5				202.5
Others	15.0	2.4			17.4
Total	9933.9	6151.9	14923.1		18752.2

3 The tariffs presented here correspond to the regulated prices except in electricity generation where the price is competitive. Tariffs used are those observed in the area of Gran Buenos Aires, based on the assumption that they reflect the development across Argentina if all utilities were operated privately. For electricity, gas and telecommunications, they correspond to the typical consumption level of residential and commercial users.

These indirect fiscal contributions are not the only important changes that could be overlooked by a simple statistical review. Indeed, these are only a part of the fiscal impact of reform. An assessment also needs to be made of the consequences of the government's decision to cut subsidies and to tax the new private operations. In addition, the productivity improvements shown in Tables 3 also imply further efficiency gains than those obvious on first inspection. Reductions in the use of intermediate goods and factors of production represent significant potential gains for the economy in terms of freeing resources for better allocation to other sectors.

In addition, these changes hide potential indirect distributional effects, which our analysis may not pick up unless explicitly modelled to do so. For instance, the government can also suffer losses if the affected dwindling sectors had been substantial taxpayers. This, however, may be compensated by increased taxable profits driven by cost reductions in the privatized sectors. The poor will be at a disadvantage if the provision of public goods (e.g. education, health) is reduced, since they tend to benefit proportionately more from these services. On the other hand, the poor will benefit as costs and prices drop due to an increase in the scale of production. All this needs an explicit modelling of the behaviour of the various agents represented in SAM, and of the interactions of sector-specific reforms with the rest of the economy. This is why developing a computable general equilibrium model enriches the analysis, showing direct and indirect contributions of the reform to each of the liberalized sectors.

4 Main results and policy implications

The basic analytical structure of the model is summarized in Appendix A2. and is very similar to that discussed in detail in Chisari, Estache and Romero (1999). This section attempts to justify its use, to explain the minor changes adopted and to discuss the main simulations conducted. The general equilibrium model is one of the most effective tools to analytically isolate the various effects of reform. In particular, it can distinguish the economic effects of improved productivity from the effects of increased access to various services. This breakdown is needed to assess the changes in consumer welfare and in public finances that result from the better management of public services by private operators. We focus on three different scenarios to highlight the relative importance of the main achievements of reform:

- First scenario assumes that operational productivity has not changed (i.e., it has remained at the pre-reform level). It focuses on the effect of the increase in the level of output in the privatized sectors;

- The second scenario assumes that operational productivity has improved, but the scale of operation has not changed with respect to the public sector era.[4] This scenario incorporates the effect of improvements in productivity and quality and changes in tariffs (measured and indexed in dollars). Productivity

4 This exercise is similar to the one in Chisari, Estache and Romero (1999).

gains are modelled by a reduction in the direct input coefficients of the production functions;

— The third option computes the combined effects of the two changes; here it may be useful to point out that the total of the results of the previous two simulations may differ from the effects of the joint simulation due to the many non-linearities or constraints in the specification of the model.

This section is divided in two parts. In the first one, we eliminate the consequences of credit-market rationing of the 1990s, with the objective of isolating the effect of privatization. In the second part, we introduce the effect of credit rationing in an effort to assess the net impact of the economic reforms.

In addition to analysing these effects, it is also interesting to assess the relevance of the regulation of private monopolies operating in the utilities services. The reliance on price caps in many of the sectors has led to tariff levels which provide scope for rents for operators who improve efficiency significantly. These rents are possible at least until tariffs are reviewed by the regulator, and caps changed to redistribute the rents. But regulation can also influence rents through its effects on the production scale. Many of the regulated industries have high fixed costs with decreasing average costs for relevant production levels. This suggests that we need to model explicitly the effects of regulation: this can be done by comparing the results of the above-mentioned simulations under the following two regimes:

- *Good regulation:* Prices of public services are fixed by the regulator at levels prevailing in competitive markets that reflect the explicit balance of demand and supply. Thus, this is equivalent to flexible prices operating under a regime which prevents the capture of efficiency gains by the monopolies. Rents are thus redistributed in the form of lower costs which, in turn, increase production levels and demand for inputs, including labour.[5]

- *Bad regulation:* Tariffs are set at levels that allow monopoly owners to capture the rent, thus ignoring the tariff levels established by competition for the market in connection with concession contracts or licenses. Bad regulation increases fiscal revenues from profit tax levied upon privatized utilities. But, these revenue increases need to be balanced against the potential extra income from an expanded taxbase that results from positive growth triggered by a more competitive economy.

The difference in economic performance under these two regimes highlights the value of regulation and of the social cost of poorly supervised monopolies in these sectors.

An important aspect of good or bad regulation is the transfer of sector-specific efficiency gains to the rest of the economy. If these gains are passed to the economy in the form of lower prices, the rest of the economy is able to increase its scale of operation which lowers unemployment, and to reallocate resources in order to maximize

5 We are not considering whether good or bad regulation was anticipated and whether it affected the initial down-payment.

welfare. However, under bad regulation, efficiency gains are rents which are not transferred to the rest of the economy. These rents may not be a total loss, as they are captured in the welfare levels of the shareholders.[6] However, as the computation is calculated on a short-term basis, we have avoided the problem of sunk costs and of incentives to invest in these sectors. Therefore, the difference between good and bad regulation cannot be associated just to the provision of incentives to the owners of the privatized utilities; it is the transfer of scale and efficiency gains to the rest of the economy. The difference between good and bad regulation is also related to income distribution and to how these benefits are distributed among population quintiles and used to finance consumption.

4.1 The pure effect of privatization without credit market rationing

Table 5 presents the effects of the simulations on the some of the main macroeconomic indicators. The results are clearly of a short-term nature. Indeed, while the economic agents include investment goods in their utility function, the capital is sector-specific: it does not move across sectors nor can it influence short-term production. Bearing these restrictions in mind, we focus on a few crucial macroeconomic indicators: GDP, industrial GDP, a weighted rate-of-return per sector with the weights given by the sectoral GDP, rate of investment, and the ratio of exports versus imports. The level of the unemployment rate is presented in the table, but to be consistent with the rest of the information presented, it needs to be compared to the 9.33 per cent rate observed at the beginning of the period.

The large increases in investments since privatization have resulted in an overall growth in economic activity. The gains are due in part to decreasing technical and non-technical losses (reduced evasion, improved metering, etc.) and to reduced credit costs resulting from improvements on the fiscal side. Fiscal recovery would, in particular, explain the significant improvements in the rates of return to capital as well as in investment and export rates. A comparison of the results under the two regulatory regimes shows that all macroeconomic indicators improve under good regulation, particularly unemployment, which is reduced. All sectors benefit from a competitive environment in the utilities sector. The only indicator that improves with a deterioration of regulation is investment, which suggests that firms tend to have the incentive to invest some of the rents generated by an ineffective regulator. Most of these results are discussed in detail in Chisari, Estache and Romero (1999) and hence the focus of the discussion here is on the new results.

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6 Some of the shareholders may not be domestic agents; consequently the effects on their welfare are not included in the computations. This can make a difference also in the case of good regulation.

Table 5
Macroeconomic effects of the utilities privatization
(compared to the base year)

	Scale		Productivity		Combined	
	Bad regulation	Good regulation	Bad regulation	Good regulation	Bad regulation	Good regulation
GDP	0.72	0.91	0.70	0.79	1.47	1.70
Industrial GDP	-0.34	-0.04	0.16	0.66	-0.13	0.62
Rate of return to capital	0.13	0.55	1.60	1.68	1.63	2.23
Investment	0.45	0.30	1.08	0.71	1.41	1.01
Exports/imports	-9.31	-7.86	-2.47	-2.52	-10.46	-5.34
Unemployment rate	8.38	7.62	9.55	8.91	9.00	7.32
Tradable outputs	-0.33	0.11	0.08	0.48	-0.21	0.63
Non-tradable outputs	0.32	0.44	0.57	0.80	0.84	1.23
Tradable/non-tradable prices	-0.78	0.19	0.49	2.48	-0.27	2.67

Source: Own calculations.
Notes: The equivalent variation is measured in terms of total government revenue.

Table 6
Fiscal effects of the utilities privatization
(% change over base year)

	Scale		Productivity		Combined	
	Bad regulation	Good regulation	Bad regulation	Good regulation	Bad regulation	Good regulation
Tax revenue/GDP	0.54	0.09	0.72	0.19	1.23	0.28
EV (1) for government	2.53	0.44	3.41	0.88	5.82	1.32

Source: Own calculations.
Note: The equivalent variation (EV) is measured in terms of total government revenue.

Table 6 focuses on the effects of privatization on the government fiscal stance in an single year. One short-term gain is the immediate revenue generated by the privatization process. This is reflected in stock adjustment, particularly in debt adjustment. The long-term gains reflect the effect of changes in flows, in particular tax revenue flows, as well as some revenues from minority shareholding in some of the privatized companies or from bond holdings. Expenditures include purchases of goods and services, salaries, transfers and debt service.

Table 6 shows somewhat unexpected results when comparing the fiscal effects under good or bad regulation. The government benefits from bad regulation for two reasons. When the regulator eliminates rents, it also eliminates tax revenues accruing from the profits of strong monopolists. Moreover, good regulation increases export-oriented output, which is subject to fewer indirect taxes, thus reducing the country's taxbase.

Table 7
Present net value of fiscal revenue
(as % of GDP)

Indicator	Combined	
	Bad regulation	Good regulation
Tax revenue/GDP	7.03	1.59

Note: Discount rate of 11.78% for 10 years.

Table 8
Indicators of welfare and income distribution

	Scale		Productivity		Combined	
	Bad regulation	Good regulation	Bad regulation	Good regulation	Bad regulation	Good regulation
EV 1 (poorest)	0.7	1.1	1.1	1.9	2.0	3.1
EV 2	0.5	0.7	1.0	1.5	1.5	2.3
EV 3	0.5	0.7	1.0	1.3	1.5	2.0
EV 4	0.4	0.6	0.7	1.2	1.1	1.8
EV 5 (richest)	0.1	0.2	1.0	1.3	1.0	1.5
IGI	-0.3	-0.4	-0.1	-0.2	-0.4	-0.6
IGIN	-0.5	-0.4	-0.3	-0.1	-0.9	-0.5

Source: Own calculations.

Note: The EV is measured in per cent of the revenue of each agent. IGI and IGIN stand for changes in the Gini coefficient and the Gini coefficient corrected by public section implicit transfers, respectively; a positive change in IGI or IGIN indicates an increase in income concentration.

Further government gains can be approximated by calculating an equivalent variation from additional long-term revenue.[7] The government has a choice between privatization or tax reform which increases tax rates to achieve the same levels of revenue gains as with privatization. With an equal-yield replacement[8] (Shoven and Whalley 1992), the adoption of tax reform under bad regulation implies a loss of well-being of US$ 988 million for all private agents. Under good regulation, the loss is reduced to US$ 211 million On the other hand, adoption of an infrastructure reform under a bad or good regulatory regime implies gains in the magnitude of US$ 3,000 million and US$ 4,390 million, respectively.

7 The equivalent variation (EV) is the minimum amount that an individual gaining from a particular reform is willing to accept to forgo the reform. For a potential loser from a change, EV is the maximum he/she would be willing to pay to prevent the change from happening.

8 An equal-yield replacement is a conceptual exercise, which entails replacing a tax with another so that the total government revenue is constant (in real terms).

Table 7 estimates the accumulation of fiscal effects in the event that productivity expansion can be sustained and that the increased access to services is permanent.[9] Thus, based on the assumption that the 1999 debt level (11.78 per cent) is constant over the next decade, the present value of fiscal gains would vary from 1.59 per cent of GDP under good regulation to about 7 per cent under a bad regulatory regime. This means that eventual income earnings of the government are greater than those obtained from privatization transactions.

Table 8 summarizes the effects of reforms on private sector's welfare. The well-being of each agent is approximated by an equivalent variation expressed in terms of the income of each of them. Income distribution is measured with a Gini index, which is adjusted to include the effect of the availability of public goods and services on the distribution of income.

Table 8 shows that the effects of scale and of productivity improve the welfare of all income groups, and that the productivity effect dominates for all groups. Both factors improve the distribution of income.[10] This happens in spite of the increase in the return-to-capital observed earlier, which essentially accrues only to the 5th quintile (richest quintile). Nevertheless, the poorest quintile receives the greatest benefit from infrastructure privatization, which is only one of the many reforms that took place in Argentina in the 1990s. In fact, the simple Gini coefficient may underestimate the distributional benefits of infrastructure reform. Indeed, the poor tend to benefit relatively more from the government having additional resources available as a consequence of reforms, if these additional resources are allocated to the provision of goods and services the poor tend to use relatively more. Ahumada *et al.* (1994 for Argentina) suggest that the Gini can be corrected by allocating total public expenditures to each quintile. This implies that the gains to the poor resulting from increased access are not limited to efficiency improvements. An alternative approach to assess the distributional effects of the reform-generated public revenue is to adjust the measure of the equivalent variation. So far, the equivalent variation computed here is private:

$$\nu_i(p_0, m_i + VE_i, \gamma) = \nu_i(p_1, m_i, \gamma),$$

where ν_i is the indirect utility, p_0 and p_1 are the initial and final prices, respectively, and m_i is the income of agent i, VE_i is the equivalent variation of the agent and γ is a variable representing the rationing of the agents before (γ_0) and after (γ_1) privatization. While the adjusted Gini can already highlight some of the benefits derived from the government's additional resources, a more robust approach would factor in the improvements in government revenue. Thus, this approach can be improved by computing the EV with adjustments for the specific incidence of access to *new* goods and services (health, education, housing) per quintiles. This results in a new corrected indirect utility function:

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9 We are assuming, in fact, that firms will continue to produce the same quantity over the next 10 years. We do not need to assume any specific value for population (or geographical) coverage, just the same quantity observed in 1999.

10 Negative values imply a smaller concentration of income as compared to the original situation.

$$\nu_i(p_0, m_i + VE_i + \psi_i, \gamma_0) = \nu_i(p_1, m_i, \gamma_1),$$

where ψ_i represents public spending (in education and health, for example) assigned to household i, from the additional government income. Table 9, introducing the results, shows that while both scale and productivity effects are relevant, productivity effects dominate and that the payoffs from good regulation are even stronger than those given in Table 8.

This table suggests that the incidence of good regulation is not only desirable, but also strong enough to offset potential government arguments advocating weak regulation for generating additional revenue. Indeed, in spite of lower fiscal revenues, a good regulator is better able to target assistance to the poorest groups. This is confirmed by a quick look at the EV measured in terms of household expenditures for utilities in each quintile shown in Table 10.

Table 9
Indicators of welfare: corrected EV

	Scale		Productivity		Combined	
	Bad regulation	Good regulation	Bad regulation	Good regulation	Bad regulation	Good regulation
EV 1 (poorest)	2.51	2.95	2.98	3.78	3.82	4.94
EV 2	1.52	1.77	2.03	2.57	2.58	3.94
EV 3	1.39	1.54	1.90	2.22	2.41	2.92
EV 4	0.95	1.17	1.30	1.72	1.66	2.37
EV 5 (richest)	0.36	0.49	1.27	1.56	1.33	1.79

Source: Own calculations.

Table 10
Gains from better operations and regulation

Indicators	Operational and scale gains	Spending on utilities (% of total)	Additional savings from good regulation	Spending on utilities (% total)	Total savings	Spending on utilities (% total)
EV 1 (poorest)	341	50	188	28	529	78
EV 2	400	48	192	23	592	71
EV 3	556	55	182	18	738	73
EV 4	584	46	362	29	946	75
EV 5 (richest)	1119	63	465	26	1584	89
Total	3000	54	1390	25	4390	79

Note: The savings considered correspond to the annual EV in US dollars at 1993 value. The savings for regulation are calculated as the difference between good and bad regulation. 'Spending on utilities' are those gains as a per cent of total spending of the income bracket in 'public' services.

As has been observed thus far, households and the government are potential beneficiaries of reform. But reform also changes input prices and factor income which, in turn, have an impact on sectoral production levels. As shown in Table 5, utilities reform increases the level of activity in the economy as a whole. The main observation of this simulation is that even though both tradable and non-tradable sectors tend to gain from the privatization of utilities, the tradable sector tends to gain less than the non-tradable when the regulation is good. However, in a bad regulatory regime, the tradable sector loses, meaning that the competitiveness of the country deteriorates, thus eroding the long-term sustainability of the reform process.

4.2 How much does an international interest rate shock hurt utilities users?

Since the utilities sectors often require high investments with long amortization periods, tariffs tend to be very sensitive to changes in the cost of capital. Table 11 summarizes the impact of a 2 per cent increase in international interest rates on the economy of Argentina and on the users of utilities services, after the implementation of the utilities reform and after all the efficiency gains were achieved.

The results remain consistent: with a better regulator, there is definite advantage for Argentina as a whole. Negative effects from an interest rate shock extend to all income groups, particularly the middle class. But the consequences on the poorest sectors of the population can be alleviated with effective regulation. The main risk for the poorest and the middle-income classes comes from the strong adverse impact on investment and subsequently on employment. The current upsurge in Argentina's unemployment rates is, to a large extent, a possible reflection of the tequila and vodka shocks compounded by the weakness of the internal financial market. From a distributional viewpoint, the adjusted Gini shows that under bad regulation income distribution worsens, but it still improves under good regulation.

Table 11
Effects of a 2% interest increase in the post-reform period

	Effects under:	
Indicators	Bad regulation	Good regulation
GDP	0.2	0.6
Industrial product	-0.5	0.9
Investment/GDP	-1.55	-2.14
Rate of unemployment (absolute value)	13.6	11.1
EV 1	-1.2	0.9
EV 2	-1.5	0.0
EV 3	-1.7	-0.7
EV 4	-2.0	-0.7
EV 5	-1.3	-0.3
IGI	0.1	-0.3
IGIN	-0.5	0.2
Taxes/GDP	1.0	0.0
EV for government	4.9	1.1

Source: Own calculation. Changes in % with respect to baseyear.

5 Conclusions

The general equilibrium approach adopted here has allowed to us to isolate the effects of the utilities reform on the public and private sectors respectively and to examine the distributional consequences of these effects. The main conclusions are that these reforms are good for the income levels of the country, that reforms have improved the fiscal situation of Argentina and have promoted, when capital markets have been stable, the competitiveness of the country. Reforms have led to greater efficiency and equity, but have created less fiscal revenue under a good regulatory regime than in a bad regime.

It is also clear that a better understanding of the full fiscal effects of reform is crucial to an assessment of its long-term sustainability. Since the public sector tends to gain in many ways from reform, reversibility on purely fiscal grounds is unlikely. More problematic is the weak incentive for governments worried about finances to adopt good regulation because stronger rents in regulated sectors would translate into significant additional revenue. Under good regulation, revenue gains in current net value are equivalent about 0.28 per cent of GDP compared to 1.23 per cent under bad regulation. The difference is significant, but still insufficient to compensate the welfare loss imposed on consumers by bad regulation.

From a strictly distributional viewpoint, the conclusion emerging from the examination of the achievements of the utilities reform is comforting. The poorest families can benefit in the magnitude of US$ 341 million in equivalent variation, about 50 per cent of their utilities bill. Globally, the EV for households is US$ 3,000 million or 54 per cent of their expenditures on utilities. The poorest groups would tend to benefit the most from improvements both in access and productivity.

The most pessimistic note comes from the fragility of the gains from the utilities reform. Although many of the gains appear modest in comparison to the distress caused by the interest shocks of the 1990s, they can help to soften the blow, particularly if good regulation is in place. Unfortunately, this generally is not enough to counteract the blow. Thus, to the answer the question introduced in the title of this paper as to whether the gains from Argentina’s utilities reform can offset credit shocks, we must acknowledge that those gains are not enough.

Appendix Table A1
Summary SAM and economic features of the model for 1993
(in billion US$; 1993 GDP: US$256.329 billion)

	Domestic production sectors	Private consumption	Government consumption	Investment	External sector
Domestic production sectors (21 sectors, including separated infrastructure services)	Domestic purchases: • CES value added for private firms; • Leontief value added for privatized firms; • non-tradable prices are market clearing for given levels of rationing in factor markets; • combination with other goods and services in fixed proportions. (132,370)	Spending on domestic goods: • Cobb-Douglas utility in goods; • Fixed proportion with goods for retail trade; • Separate quantity, price and quality for each privatized service; • Rationing possible. (175,082)	Spending on goods and services: • Cobb-Douglas social welfare function in purchases of goods and service, bonds, retirees services and investment; • Purchases of goods and services are in fixed proportions. (6,085)	Final demand for investment goods: (42,816)	Exports: • Foreign consumer has a Cobb-Douglas utility in exports and imports; • Bonds can be used to pay for net imports; • Argentina is a price taker in exports and imports; • Surplus not consumed in Argentina can be sold abroad at a given price. (16,237)
External sector	Imports: • Fixed proportion with value added; (8,182)	Spending on imports: • Imperfect substitution with domestic substitutes (8,727)		Imports of capital goods: • Fixed proportion with value added (4,150)	
Government	Trade tax revenue: (1,282) Direct taxes paid by firms: (22,461) Indirect taxes: (25,283)	Trade tax revenue: (1,133) Direct taxes paid by households: (4,519)			
Families (five income groups)	Labour income net of taxes: • Initial unemployment (60,786) Capital income net of taxes • Can be domestic or foreign (122,266)		Salaries and public sector transfers: (43,645)		
Investment		Private savings (37,196)	Public savings: (4,948)		Foreign savings: (4,822)

Appendix

A1 SAM (Social Accounting Matrix) for Argentina, 1993

This is the matrix used in Chisari, Estache and Romero (1999) and is summarized in Appendix Table A1.

It may be helpful to summarize here the main assumptions we had to make.[1] First, some of the basic production data were not readily available for 1993 and we had to fill the gaps with 1986 data, the last year for which detailed information was available. Second, the matrix of intermediate purchases is based on the 1984 data adjusted to the values of the 1993 national census. Third, the distribution of the factor income across income groups is based on the distribution observed in the province of Buenos Aires in 1991. Finally, the distribution of the consumption basket per type of goods and services is based on the 1986 household consumption survey. In both the input and output matrix and the household consumption, consistency for consumption and production with the national accounts data was obtained by relying on the RAS method.[2] As for the governmental distribution between goods and services, data are available for 1993 for the national and provincial governments. Municipal expenditures are assumed to be distributed in the same proportion as the average for the two other government levels. The infrastructure data are based on information on assets, inputs and expenditures available in the annual balance sheets of the companies of the sector and complementary data provided by the national regulatory entities and the sector secretariats (energy, water resources, communications).

A2 The basic analytical structure of the general equilibrium model

The specific equations are detailed and explained for each agent.

A2.1 Consumers

The representative consumer of income group h has a utility function:

$$U^h = U^h [c^d(h), c^m(h), I^d(h), S(h), B(h), C_r(Q_{C(h)}, \pi)]. \quad (1)$$

It is modelled as a Cobb-Douglas between all goods except for retail trade, assumed to be purchased in fixed proportions with the rest of the goods and services. The preferences of domestic agents are assumed to follow an Armington specification which

1 Details on the data sources used to construct the accounts are provided in an appendix available from the authors. This appendix explains the data-collecting procedure (this was a labour-intensive exercise as we needed to visit all the privatized utilities to verify and complement the information given in their annual balance sheets). The appendix also explains the various techniques used to check for the consistency of the collected information and the robustness of the results.

2 See Bacharach (1970).

implies no perfect substitutability in preferences between domestic and imported goods.[3]

Expenditures are distributed as follows:

- domestic consumption goods c^d, and investments I^d at price p,
- imported goods c^m at prices p_m,
- 'bonds' services B at prices p_b, and

goods and services of 'privatized' firms represented by an index C_r, combining the quantity Q_C with quality π at price r_C per unit of Q_C; a change in quality is not necessarily associated with a change in the price of the service provided by the privatized firm. C_r can follow a multiplicative form such as: $C_r = Q_C\, v(\pi / \pi^N)$ where π^N is the normal quality level and v is a non-decreasing function of π / π^N. An increase in service failures increases costs for the buyer of the services because the consumer needs to buy a larger number of physical units to reach the desired flow of services. This 'naive' modelling approach allows, for instance, to model the costs of power losses or interruptions as a share of unit costs.

In some simulations, prices are differentiated per income groups r_C.

Equation (2) gives the budget constraint for income group h:

$$(1+t_i)[pI^d(h) + pc^d(h)] + (1+t_m)p_m c^m(h) + (1+t_{ir})\, r_C\, C_r(h) + p_b B(h) \qquad (2)$$

$$= [wS(h) + w_g S_g(h) + \theta(h)(r_p K_{po} + r_p K_{pxo} + N^p + N^{px})$$

$$+ \theta_r(h)\,(r_r K_{ro} + N^r)]\,(1-t_d) + p_b B^o(h) + p_R\, R^o.$$

The family pays indirect taxes at rates t_i and t_{ir}, depending on the type of good and service, and direct taxes t_d and taxes on imports t_m. Its income sources are labour income in the private sector S at salary w, in the public sector S_g with salary w_g and capital K_{po} in private firms remunerated at rate r_p; revenue from profits on domestic sales N^p and sales abroad N^{px} and revenue from participation in the privatized firm N^r in proportion to the shares owned, indicated as θ_r; θ_r also represents the participation of the income group in each sector specific capital $r_p K_p$, $r_p K_{pxo}$ and $r_r K_r$. In the scenario in which capital is specific, the profit rates enter fully r_p or r_r . B^o represents holdings of private sector bonds. The initial 'holdings are negative if the consumption group is a net debtor in the benchmark simulation; in this case, an increase in p_b probably results in an increase in the supply of labour and a reduction in the expenditures of the quintile. Families also get public sector transfers represented as the purchase by the government of a service with an inelastic supply, R^o at price p_R.

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3 Although not necessary to ensure that the economy does not become specialized, by assumption the capital earmarked to the tradable sectors cannot be reallocated.

A2.2 Private firms

Private firms are those for which there was no change in ownership.[4] They produce goods and services intended for intermediate and final consumption as well as for export and investment. This differentiation is necessary in order to be able to properly account for differences in the tax treatment of various production destinations (for instance, exporters do not pay VAT and benefit from discounts on gross income tax). However, there is no technological differentiation across these sectors. In other words, the production function used for a specific product (say food) at different stages of the production process (intermediate, final or exports) is the same.

Exporters of goods are price-takers abroad and exports of services are price inelastic (i.e., they are constant). Non-tradable prices are determined as solution variables and adjust with factor income until markets are in equilibrium.

The profit function for a private firm can thus be written as:

$$N^p = [p - ap_b - \alpha_{pE}(zr_E+(1-z)r_C)- f(1+t_i) - f_m(1+t_m)p_m]Q^p - wL_p(1+t_{v1}) - r_pK_p(1+t_{v2}), \quad (3)$$

and for exporters, it can be adjusted as:

$$N^{px} = [p_x - ap_b -\alpha_p(zr_E+(1-z)r_C) - f(1+t_i) - f_m (1+t_m)p_m]X^p - (wL_{px} + r_pK_{px}). \quad (4)$$

where parameter **a** is the credit requirements per unit of output, while α_p represents the quantity of services provided by the privatized company to obtain a unit of output. Moreover, **1-z** indicates the share of privatized services requirements per unit of output purchased through distribution companies at price r_C, while **z** is the share purchased on the wholesale market at prices r_E. Purchases of electricity in the wholesale market correspond to generation, purchases on the retail market correspond to distribution.[5]

The inter-industrial transactions in these simplified expressions are represented by a coefficient f for national goods and f_m for imported intermediate inputs. These requirements are proportional to total production Q^p, and to exports X^p, respectively. Privatized goods and services are also proportional to output which is different from the assumption made for consumers where rationing could take place. However, firms can be subject to adjustment in quality of services just as consumers and hence can face differences in cost for the same service.[6] An improvement in service quality is represented by a reduction in parameter α, i.e.

$$\alpha'( ) < 0.$$

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4 The former public oil company, YPF, was, however, considered a private firm.

5 While the model projects no substitutability between the two types of inputs, some evidence in other countries suggests that this may be a strong assumption (see Seitz 1994).

6 This is based on the assumption that there is no possibility of using 'home-made' substitutes for infrastructure services.

If $\{A\}_{nxn}$ is the input-output matrix, this quality improvement is measured indirectly through its effect on the increase in productivity of the input requirements.[7] Remuneration r_p includes total payments to capital and hence amortization. Saving and investment decisions are taken by households. The tax t_{v1} corresponds to VAT and to labour taxes collected at the firm level while t_{v2} corresponds to similar taxes on capital. To simplify, taxes on labour and capital levied on exports are not included here, even if this is done more accurately in the model.

The product combines intermediate inputs and value added in fixed proportions. The value added itself is obtained by combining labour and capital inputs in a CES production:

$$VA_p = F(L_p,K_p) = [b_1 L_p^{\ k} + b_2 K_p^{\ k}]^{1/k}, \quad (5)$$

where k is the elasticity of substitution of labour and capital while the b_i are distribution parameters used in the calibration of the model.

For exports, the value-added function is similar:

$$VA_{px} = F(L_{px},K_{px}). \quad (6)$$

More generally, the product of sector j, QT_{pj}, is obtained from a fixed coefficient function (Leontief) between intermediate consumption and value added:

$$QT_{pj} = \text{mín } \{Q_{1j}/a_{1j},...,Q_{nj}/a_{nj}, VA_{pj}/av_j \} \quad (7)$$

where Q_{ij} is the quantity consumed of good i for producing j.

A2.3 Privatized utilities

The privatized firms sell mostly to the domestic market. With the exception of some differentiation due to regulation, service obligations or to taxes according to their final users, each utility sector is assumed to sell a single product. Their profit function includes any subsidy TG that could be transferred by the public sector and is written as:

$$N^r = r_C Q_C + r_E Q_E + r_G Q_G - [a^r p_b + \alpha_r (z r_E + (1-z) r_C) \quad (8)$$

$$+ f(1+t_i) + f_m (1+t_m) p_m](Q_C+Q_E+Q_G) - wL_r(1+t_{v1}) - r_r K_r(1+t_{v2}) + TG ,$$

where Q_C is the quantity of product sold to households at a unit price r_C, Q_E corresponds to the goods and services sold to the firms at price r_E y the index G is used for the public sector wherever a distinction is relevant. This also allows a differentiation of tariffs into retail, wholesale or commercial and residential as necessary. The quality variables are modelled as an improvement in the overall efficiency of the sector and TG is modelled

7 The actual modeling of the quality variable is discussed in section 4 in connection with the modeling of the effects of private operations.

as a subsidy to capital set to zero or to shrink to zero as spelled in the privatization documents.[8]

It is important to note that all outputs are limited by capacity and transmission constraints incorporated through the value added function. The product of the privatized sector is also based on a fixed proportion production function:

$$Q_{ri} = \text{mín } \{Q_{1i}/a_{1r}...,Q_{ni}/a_{nr}\ VA_{ri}/av_{ri}\ \}, \quad (9)$$

where a_{ji} is the input requirement of j by firm i.

The value-added functions in the privatized sector are assumed to be Cobb-Douglas.

$$VA_{ri} = A\ L_{ri}^{a}\ K_{ri}^{1-a}, \quad (10)$$

where A is a constant. The installed capital of the firm was taken as given:

$$K_{ri} = K^{o}_{ri}, \quad (11)$$

This description of the technology of the private and privatized firms was used to model the changes in productivity, efficiency and quality.

Price regulation is modelled as RPI- X, where X is set to 0 at the beginning of the contract. This implies that the r_C is:

$$r_C/r_C^{O} = (PQ^{O}/P^{O}Q^{O} - X)\ \beta$$

where P is the price vector of private and privatized domestic goods composing the Laspeyres-index of retail prices in the based year with weights given by Q^{O} and where β is a correction coefficient for the tariffs (with β =1 in the benchmark scenario).

A2.4 The public sector

The government maximizes a social welfare **y** including current collective goods H produced with goods and services purchased G, G_r, employment L_g, bonds B_g (which can be sold domestically or internationally), retirees services R, and a proxy for future collective goods I_g, public investment:

$$y = y[H(G,G_r,L_g), B_g, R, I_g]. \quad (12)$$

The function y(.) is a Cobb-Douglas and H(.) is a Leontief in G, L_g and G_r which includes all the privatized services in fixed proportions. Pensions, bond services,

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8 TG is used as an adjustment variable (a 'fine tuning' variable) to ensure that the rate of return in the regulated sector continues to be consistent with the rate of return observed in the rest of the economy. While this is an income transfer, it does not generate significant distortions. First, the transfer goes to sector-specific capital and hence there is no reallocation across sectors. Second, while the transfers go to the highest income group, their effect is offset by the reduction in other public expenditures within the same income group. Third, the amounts involved are quite small in comparison to the total public resources to be allocated.

investments, and current operative expenses are a constant proportion of total government income in this model.

The government faces a budget constraint given by:

$$t_i[f(pQ + p_xX) + pI^d + pc^d] + t_{v1}\, w(L_p+L_r) + t_{v2}\,(r_pK_p+r_r K_r) + \quad (13)$$

$$t_m p_m f_m(Q+X) + t_m p_m c^m + t_d(wL + w_gS_g + rK^o + N^r + N^p - pI^d) + p_b B_g{}^o +$$

$$\alpha_g\,(r_rK_{ro}+N^r)$$

$$= p(G + I_g) + r_G\, G_r + w_gL_g + p_bB_g + p_RR + TG.$$

In this equation, α_g is the participation of the public sector in the ownership of capital of the 'privatized' utilities. This is an important parameter since through α_g, the government is able to share monopoly rents.

A2.5 The rest of the world

The foreign consumer has a Cobb-Douglas utility function:

$$u^F = u^F(M^c, X^c, B_x); \quad (14)$$

subject to the following constraints,

$$p_mM - z^*V^d = 0, \quad (15)$$

for imports M, produced with a single factor V^d at price z^*,

$$p_x\, X^s - z^*V^x = 0, \quad (16)$$

for exports X, where V^x is the quantity of the foreign factor needed to produce X^s, a perfect substitute to Argentina's exports.

This foreign consumer faces the following budget constraint:

$$p_xX^c + p_mM^c + p_bB_x = p_bB_x{}^o + z^*(V^d + V^x) + (r_r{}^*\, K_{ro} + N^r)\,, \quad (17)$$

i.e. his revenue comes from payments to V, from its share of capital in the privatized sector and from bonds and his expenditures are X^c in the exports markets and M^c in the imports markets.

Equation 18 sets the export prices at the international level:

$$p_x\, X^a - pX = 0. \quad (18)$$

Considering that A_m and A_x are the foreign technological parameters, (19) and (20) determine a linear transformation curve abroad and fixes the relative prices faced by Argentina:

$$M = V^d/A_m, \quad (19)$$

$$X^s = V^x/A_x. \quad (20)$$

A2.6 The labour market

Constraint (219 describes the imbalance in the labour market and in the model is replaced by equation (22) determining the salary in the private sector of the economy. The labour market for the public sector clears as shown by (23) accounting for the fact that S_g is an observation:

$$L_p + L_{px} + L_r \ < \text{or} = S, \quad (21)$$

$$w = b\, w^* , \quad (22)$$

$$L_g = S_g. \quad (23)$$

Parameter **b** is calibrated for the equilibrium salary in the economy, so that the initial unemployment rate is equal to the observed unemployment rate; this value of **b** is then kept constant throughout the counterfactual exercises.

A2.7 Investment goods industries

Investment goods industries were divided into two main categories: those providing capital goods for private firms and those that construct specific capital for each one of the privatized utilities (electricity, gas, water and telecommunication). This procedure allows the recognition of the differential impact of investment schedules established by the regulatory contracts, for example, as network expansion commitments on the economy (mainly on the rate of unemployment and the trade balance); therefore, special effort was devoted to determine the input composition of each industry. The model has not been fully exploited in this sense. For example, investment in water and sanitation has not been simulated and yet they represent the major gains of privatization.

A2.8 The market for 'bonds'

The financial market is highly simplified in this model in contrast to the complexity of Argentina's financial sector. As already mentioned, there are fixed requirements of credit per unit of output in each production sector, including the recently privatized utilities. Additionally, domestic consumers can be separated into net debtors (typically the four poorest income brackets, to meet their demand for durable goods) and net creditors (the fifth income bracket); the rest of the world was also considered a net creditor for the benchmark. In terms of the bonds market, debtors were represented as issuers and creditors as subscribers. Therefore, for domestic families and for foreign consumers, bonds were introduced in the model giving them initial endowments but also introducing preferences for bond holdings as arguments in their utility functions.[9]

9 The information on sectoral and personal net financial positions was obtained from financial authorities and estimated using purchases of durable goods and total capital holdings.

The market for bonds is therefore represented as:

$$B(h) + B_g + B_X + a(Q^p + X^p + I^p) + a^r (Q^C + Q^E + Q^G) \quad (24)$$

$$= B^o(h) + B^o_g + B^o_X.$$

The information on sectoral and personal net financial positions was obtained from monetary authorities and estimated using purchases of durable goods and total capital holdings.

The domestic bonds market adjusts to the internal credit disequilibria of the families and of the government and to Argentina's disequilibrium with the rest of the world. Internally, the first four quintiles sell 'bonds' (which is basically a credit instrument) to the richest. A net increase in the demand for bonds thus reduces the purchasing power of the four poorest income groups. An increase in the price of bonds is compensated by a decline in the purchase of other goods and with an increase in the labour supply which can contribute to an in increase in unemployment. The firms also demand bonds as a fixed proportion of their value added. For them, an increase in the price of bonds implies a cut in the marginal product of labour; which in turns leads to a reduction in the demand for labour, adding to the unemployment problem.

Note that because the simulations of the model include both a positive unemployment level and a commercial deficit, in addition to a disequilibrium in the labour market, the rest of the world is financing consumption and domestic investment. For the bond market, this means an increase in the demand for bonds issued by domestic agents and purchased by foreigners. With an increase in the international interest rate, as in the case of the tequila effect, foreign investors stop buying domestic bonds.[10]

10 In the two-year period from October 1993 and October 1995, the LIBOR jumped from 3.4 per cent to 5.8 per cent and the PRIME from 6 per cent to 7.8 per cent, while the domestic interest rate increased from 9 per cent in October 1993 to 14 per cent in November 1994 and over 33 per cent in March 1995. Simultaneously, unemployment increased from 9.3 per cent to 12.2 per cent and the share of problem bad debt portfolio over total portfolio increased to over 10 per cent in the 3rd quarter of 1994 and to over 30 per cent in the 2nd quarter of 1995. This fact was used in the calibration of the model.

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