Infrastructure Restructuring and Regulation - Building a base for sustainable growth

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Abstract

While the link between improved provisions of infrastructure services and greater economic growth may be unproven, it is clear that reforms aimed at creating competition where possible and strong, independent, economic regulation of natural monopolies is able to establish an environment conducive to:

- private sector participation;
- incentives for companies to strive for efficiency savings that can ultimately be passed on to consumers; and
- greater provision of services (such as faster roll-out of infrastructure or innovative solutions to service delivery for customers not connected to an existing network).

When policy makers are determining which form of infrastructure restructuring to undertake or how to design a regulatory agency, it is important that the right decisions are taken. A key element of any decision making process should be a review of the evidence on the impact of the various types of reform. This paper provides an overview on the evidence from Latin America, one of the first regions to adopt wholesale reform of its infrastructure service providers.

Further, lessons can also be learned from the mistakes made during a reform process (no country has been 100% successful in its reforms, there are always aspects that could be improved). As such, this paper also reviews some of the other lessons from Latin America.

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The potential for economic growth of nations is related to the state of their infrastructure. In this connection, it has been estimated that one percent growth in GDP requires an investment of one percent of GDP in energy, transportation, telecommunications, and water and sanitation infrastructure.

Enrique V. Iglesias, President
Inter-American Development Bank
Foreword to *Can Privatization Deliver? Infrastructure For Latin America* (1999)

1. Introduction

At the heart of the market reforms that have swept both the developed and developing world is the reform of the infrastructure service provision industries that underpin every economy and that provide an environment in which economic growth can occur. This paper:

- considers the types of reform that have been undertaken;
- evaluates the impact of reform on the level of growth; and
- draws lessons from countries who have reformed which can be applied to those who are still preparing to embark on the process.

If it is possible to draw core lessons from the experience of other countries, it should be possible to provide governments with better information as to how they should structure a reform package to make the best of the growth opportunities within their countries. This should help bring about the economic growth that is central in helping to alleviate poverty in developing countries and moving these economies out of the stagnation that they face.

Of greatest importance to developing countries are the experiences of other developing countries, although some lessons can be learned from developed countries. As such, this paper focuses heavily on the experience of Latin America.[1] This is because:

- the countries involved display many of the social and economic problems experienced throughout the developing world, such as significant migration from rural to urban areas and the consequent need for rapid expansion of service delivery combined with low levels of per capita income;
- within Latin America there are countries who have been at the forefront of reform. Chile was among the first in the world to undertake significant reform of the electricity industry, Argentina has introduced a power-pool and Bolivia's capitalization program is a model of whole-scale reform; and
- while the reforms have, on the whole, been successful, there are also lessons of how well intentioned reforms can have a negative impact on growth.

It must be borne in mind that the link between improved infrastructure service provision and faster or more sustainable economic growth is unproven. Consequently, the impact of private sector involvement and economic regulation on economic growth is equally unclear. However, establishing an environment within which infrastructure service provision can become more efficient should, in principle, create conditions that could lead to greater, or more sustainable, economic growth. As such, the approach of this paper is based on a consideration of the micro-economic environment, how it affects the provision of infrastructure and utility services, and the

[1] Evidence presented by Sheshinski and Lopez-Calva (1998) show that over the period 1990 to 1996 the three countries that received the most revenue from privatization proceeds were Latin America – Brazil, Mexico and Argentina (in that order). Other countries that were important included Peru and Venezeula.

consequent implications for the macro-economy. Of primary importance in this micro-economic consideration is the analysis of incentive structures – both through the establishment of competitive markets and through the application of conduct regulation.

The remainder of this section briefly considers some of the issues that arise with respect to how reforms should be categorized, as well as the problems with making the type of comparison that this paper undertakes. Section 2 considers the evidence on the links between reform and economic growth, both from a country level and sectoral perspective. Some case studies of how reforms can have a negative impact is provided in Section 3. Finally, Section 4 draws out some lessons for countries who are preparing to initiate reforms, or who are still in the process of reform.

1.1 Why reform?

Before considering the types of reform and what impact they have, it is worth briefly reviewing why infrastructure reform is such a key issue. Several complementary reasons are frequently proposed:[2]

- a need for private finance to meet increasing demands for infrastructure – governments throughout the world, in both developed and developing countries, are finding that their own resources are insufficient in meeting growing investment demands;
- a need for additional government resources – even when a government may have sufficient funds to meet infrastructure investment, other growing demands on government funds, such as expanding or deepening social welfare, are leading governments to seek new sources of funding, such as concession fees from private infrastructure operators or the proceeds from asset sales as a way of releasing funds for other 'social' activities; and
- a belief that private sector operators will bring about greater efficiency and therefore, relatively lower prices, *ceterus paribus*, than can be achieved by the public sector.[3]

Given these reasons for reform, many countries have put together packages of actions, some of which are discussed below.

1.2 Types of reform

There are several aspects of reform that need to be considered. These include:

- industry structure – structural reform which is primarily concerned with the introduction of competition into a sector or the removal of barriers to entry so that contestability is a real option;[4]
- operation – conduct reform whereby a natural monopoly is constrained by rules covering areas such as quality, pricing and access. Key to the successful implementation and

2 Another reason that is often put forward, especially for Chile and the UK, is an ideological one. While this does have some credence, the more pragmatic reasons noted in the main text are of the greatest practical relevance.

3 General research on a mixed sample of utility and non-utility privatizations by D'Souza and Megginson (1999) shows that when revenue is the primary reason for privatization (linked to the belief that the private sector is a better performer) rather than control, the results are less impressive – especially relating to employment and consequently, efficiency.

4 Industry reform is most often associated with the horizontal and vertical separation of an existing monopoly. In the case of electricity, horizontal separation is often seen in the distribution (creation of regional rather than national companies) and generation activities (breaking a single generating company into a group of companies, each responsible for one or more stations). Vertical separation involves breaking the stages of production. Again in the electricity sector, vertical separation can take the form of separate generation, transmission, distribution and retail companies being established.

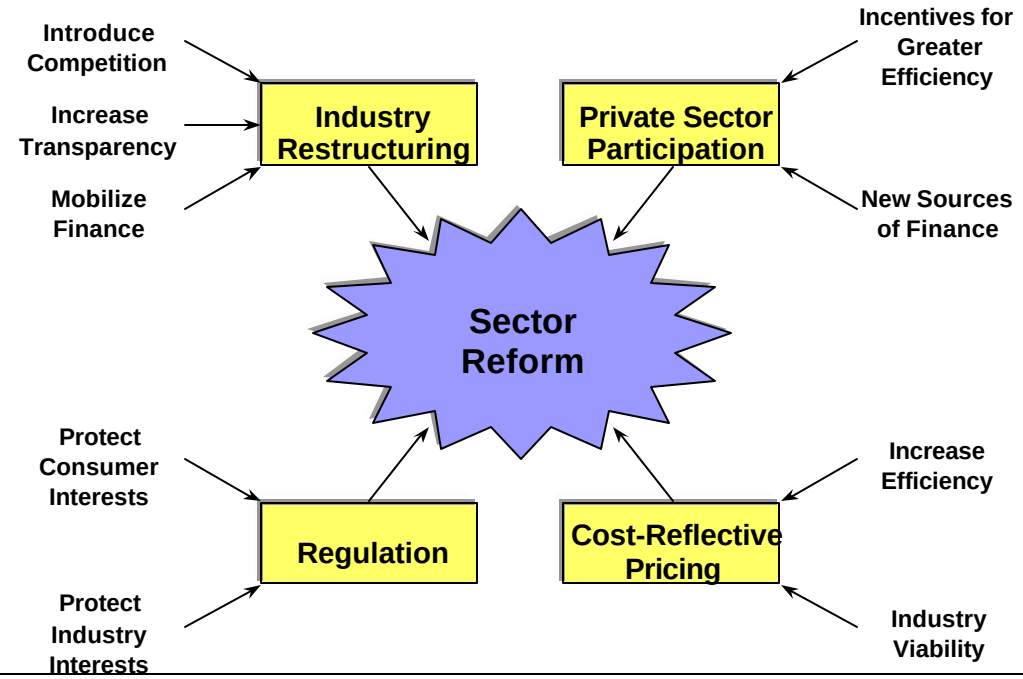
enforcement of these rules is an effective regulatory system which ideally requires the establishment of an independent agency; and

- ownership – reforms are often associated with a change in the ownership of previously state-owned enterprises to some form of private sector ownership.[5]

A further reform that is often linked to the above reforms is pricing. Traditionally, since governments have effectively used infrastructure companies as an arm of the social welfare system, few of these companies have been able to charge cost-reflective prices. As part of the reform processes, many countries have included a move, possibly phased over time, to cost-reflective pricing, since this helps ensure the long-term viability of an efficiently operated industry.

Most reforms that have been undertaken involve a package that is comprised of a mixture of the three key aspects, as well as pricing. In fact, as will be seen later, the greatest overall impact is observed when the reform involves all three key aspects. A typical package is shown in Figure 1.[6]

Figure 1: Components of sector reform



Source: London Economics

When ever regulation is considered, the narrowly defined aspect of conduct regulation is usually investigated—often because conduct regulation is an ongoing activity while structural regulation

[5] One aspect of this investigated by D'Souza and Megginson (1999) relates to the impact of privatization when a majority of the Board of Directors or the Chief Executive Officer are replaced. Box 3 reports some of the results relating to this.

[6] The way in which different aspects of this reform package works to create incentives are discussed in Alexander and Mayer (1997). It is interesting to consider the 'corporatization' debate that has been underway in the UK for the past few years concerning the postal service and air traffic control.

is perceived as once-and-for-all reform at the outset of the reform process. It is important, however, to consider both structural and conduct regulation when assessing the impact on growth.

1.3 Choosing the counter-factual

Assessing the impact of a reform package on an economy or group of economies raises a number of important concerns. Uppermost is what is the counter-factual and how can it be measured?

Can all the change that is observed be attributed to the reform package? Clearly, this is a simplistic assumption, and so the following aspects should be considered:

- What was the performance trend prior to the reform package and was there any reason to suppose that the trend would have changed if no reforms had been imposed?
- What is the experience of industries within that country that have not undergone reform? Did they change their performance in line with that of the sectors that were reformed?
- What are the experiences of other countries, especially those who did not undertake similar reform packages? For some industries, especially telecommunications and energy, world-wide pressures may even be observed in countries who have not undergone reform.

Clearly, addressing all these issues is not possible within the bounds of the available information. Therefore, any lessons drawn from the results should be carefully considered to ensure that the impact of the counter-factual is given due consideration.

Two examples to consider in terms of the chosen counter-factual are briefly explained below:

- when considering the impact of the privatization of the electricity industry in England and Wales, Newbery and Pollitt (1997) addressed this problem by establishing two counter-factuals. Three factors were considered for the counter-factuals, with one pessimistic model and one more optimistic. A whole range of counter-factuals would have been possible, but these two established the sensitivity of the results to the assumptions; and
- in his 1995 book, Pollitt considered the impact of different forms of ownership, public versus private, on the performance of electricity companies. The approach that he adopted was based on complex econometric approaches that control for size differences, etc. between the companies and measure them against the 'industry frontier'. So in this approach, the counter-factual is that the company achieves productive and allocative efficiency and any divergence from this optimal position can be measured. The differences between each of the different ownership types under consideration determines if this has an impact on the results.

As can be seen from these examples (although the counter-factual problem is one that deserves consideration), there are practical solutions that provide an acceptable benchmark against which reforms can be measured. Another good description of the type of counter-factual that can be postulated is provided in the recent report on the impact of the reform of the rail industry in New Zealand, conducted by the New Zealand Institute for the Study of Competition and Regulation Inc. (1999).

2. Evidence on the impact of reform on growth

The impact of reforming an infrastructure or utility industry on economic growth can be seen in two primary ways:[7]

- reform can provide a stimulus for the economy through:
  - attracting foreign investment, both when privatizations occur and when new investment opportunities become available;
  - cheaper (relative) prices for infrastructure services as efficiency gains accrue, due to greater incentives for operators so helping ensure the country can utilize its competitive advantages and that markets will allocate resources appropriately;
  - increased 'product' competition due to greater incentives for innovation and growth;[8] and
  - increased employment opportunities as service expansion and quality improvements are implemented;
- providing a platform for economic expansion. For example, availability of adequate 'public' electricity supplies at an acceptable quality is key to increasing output without costly self-generation each new factory, etc. Furthermore, having an adequate communications infrastructure (both transport and telecommunications) is vital for efficient operations.

From these two relationships between infrastructure and economic growth, it is easy to postulate why effective regulatory reform is key to unleashing greater economic growth. However, the problem that has continually hampered an empirical investigation of these relationships is that of data.

Two sets of data are available:

- economy-wide studies that attempt to determine the impact of infrastructure reforms throughout the whole economy; and
- studies that focus on the impact of reforms on just one infrastructure sector.

The latter type of study is less informative than the former but is more prevalent. It is possible, however, to infer from these studies implications for the whole economy.

2.1 Economy wide

There are two types of economy-wide studies available:

- those that seek to consider panel data from several countries; and
- studies that concentrate on just one country.

Both types of study are reported below.

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7 Two papers are especially useful in this area. Sheshinski and Lopez-Calva (1998) provide a more detailed analysis of the relationships that are expected to exist. Fine (1997) provides an interesting critique that argues against the perceived wisdom in this area, claiming both that the general case is not strong and that if there is a case, it is for a change in structure not ownership .

8 The interaction of market structure and product market competition and its impact on growth and innovation is investigated in a series of papers by Aghion, Harris, Howitt and Vickers. They find that the dynamic aspects of product market competition outweigh the gains from monopoly (greater profits, increased returns to research and development, etc.).

2.1.1 Cross country studies[9]

Investigating the impact of infrastructure on growth has long been hampered by the lack of available data. A recent study by Canning (1999) attempts to start to redress this by considering information from 152 countries from 1950 to 1995. Some of the more relevant findings from this study are presented below. While this is an important step forward, it does still contain a significant flaw. Only physical stocks of infrastructure are available; it is not possible to measure the quality of the service being derived from those stocks. This problem should be kept in mind when considering the results of this survey.

Canning was able to consider the impact of infrastructure on economic growth from the period 1970 to 1990 (this sub-sample was chosen to ensure a sufficiently large number of countries had continuous data series). The results, shown in Table 1 below, are suggestive of the impact of infrastructure on economic growth. A noteworthy result of the study is that telephone lines are a significant explanatory factor while electricity capacity has a negative impact. Without further investigation, it is possible to build plausible explanations as to why electricity capacity could have a negative impact, however, these would be purely speculative.[10]

Table 1: Cross country growth regressions:
Dependent variable: Growth in GDP per capita 1970-1990
Two stage least squares

Variable	***Model 1***	***Model 2***	***Model 3***
Constant	1.148 (3.45)	1.061 (0.77)	3.028 (4.31)
Log GDP per capita 1970	-0.211 (3.89)	-0.303 (1.92)	-0.449 (4.23)
Log education per worker 1970	0.152 (1.67)	0.197 (1.60)	0.069 (0.78)
Average investment rate 1970-1990	0.036 (3.11)	0.029 (3.04)	0.030 (3.12)
Log telephone main lines per capita 1970		0.226 (2.41)	0.169 (2.51)
Log paved roads per capita 1970		-0.012 (0.26)	
Log electricity generating capacity per capita 1970		-0.230 (2.05)	
Log area		-0.062 (2.88)	
Ratio urbanized 1970		0.185 (0.75)	
Number of observations	88	58	72
R^2 adjusted	0.386	0.472	0.456

Source: Table 7, Canning
Note: Heteroskedastic consistent t ratios in parenthesis

Further evidence on the country level linkage between infrastructure and economic growth is provided in Box 1.

9 An overview of developed country studies on the links between infrastructure and economic growth was provided in Kessides (1993). Kwoka (1996) provides a review of studies on a sectoral basis, primarily from developed countries and split according to whether the focus is deregulation or privatization. D'Souza and Megginson (1999) provide an overview of the impact of all privatizations, infrastructure and non-infrastructure related, during the period 1990 to 1996.

10 One explanation, for example, could be linked to a consideration of actual peak demand and its relationship with capacity. This may show capacity far outstripping peak demand and so imposing an additional burden on the economy rather than facilitating growth.

Box 1: First the good news…..

In the 1999 microeconomic competitiveness report, Porter identifies the importance of establishing the right micro-level conditions for an enabling environment where economic growth can exist. This conclusion would seem to come from the high scores for countries that have started or completed the reform of their infrastructure and utility industries – Chile is placed 24th, the highest place for any Latin American country (Brazil, placed 35th, is the next Latin American country).

However, for many of the Latin American countries where reform has been undertaken, as well as the UK, the poor quality of infrastructure is marked as a competitive disadvantage for the country.

Source: Porter (1999)

Argentina and Brazil[11]

Another way in which the impact of infrastructure (both physical and human) on economic growth has been assessed is through an analysis of the determinants of per capita income. Estache and Fay (1997) focused on Argentina and Brazil and investigated the impact of infrastructure on:

- average per capita income; and
- differentials in per capita income between states and provinces.

The results of the investigation of the impact on average per capita income is provided in Table 2. Given the way that the econometric relationship was expressed, the coefficients for the explanatory factors can be treated as elasticities. Although education is by far the most important determinant, the proxies for physical infrastructure are significant in the majority of cases.

Table 2: Determinants of per capita income (1990)

Aspect	*Argentina*	*Brazil*
Human capital	3.36*	1.17*
Access to sanitation services	0.24	0.25*
Access to road services	0.25*	0.36*
Adjusted R^2	0.79	0.66
Number of observations	23	26

Source: Estache and Fay (1997), tables 4a and 4b.
Note: (*) implies statistical significance at the 95% level of confidence.

Furthermore, when considering differentials in regional per capita income, physical infrastructure is a key determinant. Table 3 provides some examples from Argentina and Brazil.

Table 3: Explaining deviations from national average of provincial income per capita (1990)

Country	*Province*	*Total deviation from national average*	*Deviation explained by the model*[1]	*Importance in explaining the deviation:*		
				Education	*Roads*	*Access to sewers*
Argentina	Cordoba	-0.120	-0.045	0.227	-0.143	-0.130
	Tierra del Fuego	-0.325	-0.274	-0.025	-0.284	-0.015
Brazil	Acre	-0.192	-0.078	-0.095	-0.201	0.027
	Minas Gerais	0.602	0.566	0.039	0.122	0.406

Source: Estache and Fay (1997), tables 5a and 5b.
Note: The deviation explained by the model is the weighted sum of the deviations explained by each of the infrastructure factors. An error term represents the difference between the total deviation and the explained deviation and captures any other explanatory factors. This is not reported here.

[11] This section is based on Estache and Fay (1997).

The way in which these results should be interpreted is as follows. In the case of Tierra del Fuego, income per capita is 32.5% below the Argentinean average. Of this, almost 80% of the difference, i.e. a 27.4% difference in income per capita, can be explained by the three infrastructure factors. Access to sewers and education levels are only slightly below the national average, 1.5% and 2.5% respectively, while road infrastructure is almost 30% below the national average. As can be seen in some of the examples, the relative position *vis-à-vis* the national average is not always consistent.

These results, although tentative, due to the quality and quantity of the information available, show that infrastructure is clearly linked to the growth of an economy in general and it significantly explains divergences in per capita income across regions within a country. So, when formulating policies to address regional growth it is vital to address the infrastructure question.

2.1.2 Single country studies

Argentina[12]

An attempt to investigate the general equilibrium impact of the reforms in Argentina was recently undertaken. It considers the changes that have happened in four key sectors and how they interact with the economy as a whole. The starting point is the impact of the reforms on the industries themselves, which is summarized in Table 4. An overview of some of the actual reforms that occurred is provided in Section 2.2.

The way that these changes in performance affect the whole economy depends on several factors, including the importance of each of the utilities to:

- other productive sectors;
- household consumption; and
- the allocation of factor incomes.

Establishing the overall impact of these changes in performance also depends on the way in which the gains are shared. This is basically a question about the effectiveness of regulation and can be modeled through considering the two extreme cases:

- the private operator gains all the benefits, implying that utility service prices are unchanged even though improvements in performance have occurred; or
- 'consumers' gain all the benefits and prices reflect the changes in performance.

The first option provides a lower bound for the impact of reform, and then, depending on the effectiveness of the regulation, there would be a move to the second option.

Table 5 summarizes the impact of a general equilibrium calculation on the levels and distribution of gains across income classes from the efficiency and quality improvements due to the privatization process and those that could be achieved from effective regulation. To provide a perspective, the gains are presented in terms of the annual expenditures of each income class on utilities in 1993.

[12] Information on the impact of the reforms in Argentina is drawn from *Winners and Losers from Utilities Privatizations: Lessons from a General Equilibrium Model of Argentina* by Chisari, Estache and Romero (1997).

Table 4: Changes in performance between 1993 and 1995 (%)					
Sector	***Electricity***	***Electricity***	***Gas***	***Water***	***Telecoms.***
Industry	Generation	Distribution	Distribution	Distribution	
First year of private operation	1992	1992	1992	1993	1990
Efficiency gains (measured as reductions in intermediate input purchases as a share of total sales value)	19.51	6.26	8.84	4.86	11.28
Labor productivity gains (measured as GWh/staff for electricity, $000m^3$/staff for gas, population served/staff for water and lines in service/staff for telecoms)	23.1	17.59	4.79	-27.58	21.25
Increases in Investment (concession contracts for gas and actual investments for the other sectors)	8.65	n.a.	4.56	75.97	28.10
Improvements in quality (measured as reductions in losses: net of consumption by transmission/production for electricity and gas, water unaccounted for/production for water, lines in repair/lines in service for telecoms)	n.a.	10.00	27.80	6.12	4.56
Changes in real average tariffs (defined as total sales value by a physical indicator of production)	n.a.	-9.5	-0.5	5.5	-4.9

Source: Table 4.1 Changes in performance between 1993 and 1995, Chisari, Estache and Romero 1997.

The table summarizes some of the key findings of the review of the impact of the privatization process in Argentina. These are:

- operational gains strongly benefit all income groups: on average, these gains represent the equivalent of 41% of what households tend to spend on utilities services, even when the new owner of the sector is allowed to keep as much as possible of these gains as quasi-rent. These gains represent about 0.9% of Argentina's GDP;
- the gains from effective regulation average a 16% savings, when the regulator is effective. This additional gain is about 0.35% of Argentina's GDP;
- the direct gains are relatively significantly higher for the higher income classes and this is explained by the fact that when regulation is not effective, the gains from privatization are turned into a quasi-rent captured by the richest who are the largest domestic owners of capital of the infrastructure services; and
- the indirect gains through effective regulation, in contrast, tend to relatively favor the poorest income classes, even if all income classes tend to gain from effective regulation, showing that effective regulation can be redistributive as well as value enhancing.

Table 5: Annual gains from private operation of public utilities				
Income class	***Savings from operational gains*** (A) (in millions of 1993 US$)	***Savings from effective regulation*** (B) (in millions of 1993 US$)	***(A)/income class expenditure on utilities***	***(B)/income class expenditure on utilities***
1 (poorest)	197	138	29%	20%
2	259	142	31%	17%
3	373	121	37%	12%
4	403	214	32%	17%
5 (richest)	1047	302	59%	17%
Total	**2279**	**915**	**41%**	**16%**

Notes: (A) is the 'fixed-price' model, in which the gains accrue to the private operators while (B) reflects the difference between the fixed and flexible price models, i.e. the maximum impact that an effective regulator could have.

These, and other key lessons, are discussed in detail in Section 4.

Other single-country evidence was presented in the Galal and Shirley (1994) book. Galal considered the impact of restructuring and reform on the electricity and telecommunications companies. Three companies were considered, Chile Telecom (responsible for 95% of local telecommunications), Chilgener and Enersis (a major electricity generating company and the distribution company for the capital). In all three cases there were overall net benefits to the country through the privatization process. These are shown in Table 6.

Table 6: Impact of privatization in Chile

Company	*Primary sources of benefit*	*Main groups benefiting*
Chilgener	Productivity	Buyers (excluding workers) Foreigners
Enersis	Output diversification Price changes	Buyers Consumers
Chile Telecom	Output diversification Investment	Consumers Foreigners Government

More update detail on some of these specific companies is provided later in this paper.

2.2 Sector specific

Much more prevalent than general equilibrium type studies are those that focus on just one sector, sometimes on a multi-country basis, but more frequently on a single-country basis. Several such studies have been undertaken in the past few years and the results for two of the key sectors, electricity and telecommunications, are presented below. Some evidence for the water sector is also presented, this is, however, much less prevalent than for the other two sectors.

2.2.1 Electricity

One of the areas where the greatest impact has been seen is the electricity sector. An overview of the liberalization of electricity markets is provided by a paper by Pollitt (1997). Table 7 summarizes the international experience with restructuring and privatization of the electricity industry.

Table 7: International experience with electricity restructuring and privatization

Geographic area	*Number only:*				*Total*
	Restructuring	*Privatizing*	*None*	*Both*	
OECD	11	0	4	9	24
Transition	3	1	2	5	11
Latin America	5	0	2	8	15
Asia	4	1	1	6	12

As can be seen from the table reform is widespread. Pollitt's paper also highlights the six different approaches that can be adopted to studying the impact of reform and classifies 18 studies according to the approach utilized.[13] Two of the studies are specifically about Latin

[13] The six approaches that are identified are: Simple comparisons of prices and costs; Simulation models; Financial and physical indicators; Labor and total factor productivity; Frontier analysis; and Social cost benefit analysis.

America while another three consider the developing world in general. These studies are considered later in this paper.

A recent report by Estache and Pardina (1999) investigated the reforms in Chile and Argentina, a brief overview of which is provided in Table 8. Some further information relating to the experience in Argentina was provided earlier in this section. The primary lesson that can be drawn from this evidence is that if the right incentives are established for a sector or company, significant increases in productivity can be achieved. Furthermore, the private sector can provide the bulk of the required investment in a sector, such as electricity, that traditionally was considered a public sector domain. Not all, however, was perfect with these reforms. The negative lessons learned from them reforms and are discussed in Section 3 of this paper.

Table 8: Overview of the reforms in Chile and Argentina

Aspect	***Chile***	***Argentina***
Start date	1986	1989
Completion	By 1990 all but two generators had been privatized	Still under way
Industry structure	Horizontal and vertical separation[1]	Horizontal and vertical separation[3]
Regulation	New framework introduced in 1982	New framework approved in 1992
Generation market	Competitive	Competitive power-pool established
Distribution	Natural monopoly with price and quality regulation for customers of less than 2MW. Above 2MW is competitive	Although retail is competitive, the distribution activity remains a natural monopoly and is subject to conduct regulation
Prices	Recalculated every four years based on an efficient company's costs and then allowing a 10% real rate of return. When applied to real companies, the overall industry rate of return must lie within the range 6% to 14%	Price reviews for transmission and distribution occur once every five years. Clear quality targets are set and penalties, returned to the consumers, can reach up to a maximum of 10% of the company's annual revenue
Regulatory institutions	Three. Overall lack of independence is a concern	Ente Nacional Regulador de la Electricidad (ENRE), an independent agency
Performance measures:		
Coverage rate	Increased to 97%	
Private investment	70% of total	
Average consumption growth rate	8%	
Energy losses	Under 8%[2]	
Labor productivity	Doubled from the late 1980s to 1997	
GW/h generated per worker	Increase from under 5 to 8	Has increased by over 23%[4]

Notes:

1 The two existing Chilean companies Endesa and Chilectra were split into 14 (six generation, six distribution and two combined generation and distribution) and three (one generating company and two distribution companies) respectively. Supply was not established as a separate activity.

2 This is about one third of the historic level.

3 One example is SEGBA (Servicios Electricos del Gran Buenos Aires), which was reformed into seven separate units (four generation and three distribution).

4 Other data is less available. However, efficiency savings are estimated to have reached 20% and a reduction of 16% between 1993 and 1996 was seen in residential tariffs (industrial tariffs fell by an even greater amount, around 25%).

2.2.2 Telecommunications

Multi-country study

In a recent study, Wallsten (1999), considers information from 30 countries in Africa and Latin America from 1984 to 1997. Using a range of physical quality indicators, such as main line penetration, telecom employees per main line and the price of a three-minute local call, the impacts of liberalization are studied through competition, privatization and conduct regulation.

The findings of this research indicate that:

- competition (structural regulation) has tangible benefits on performance;
- privatization by itself has a negative impact on performance; and
- privatization combined with the establishment of conduct regulation has a positive impact on performance.

A key finding here is that structural regulation improves company performance and, as such, governments that are considering granting a period of exclusivity to the incumbent as part of the privatization process should think very carefully.

What this study does not consider is the depth of the conduct regulation that is established. Box 2 provides some evidence from a study that did address this specific issue.

Box 2: Regulation: Is it all in the details?

Analysis of the performance of the telecoms sector before and after conduct regulatory reform appears to depend on how well some of the details of regulation are tackled. Galal and Nuriyal (1995) considered three areas of conduct regulation:

- commitment;
- information asymmetry; and
- pricing issues.

Their findings were that the one country that had tackled all three issues (Chile) achieved the greatest improvement while the one country that did not (the Philippines) experienced the worst performance.

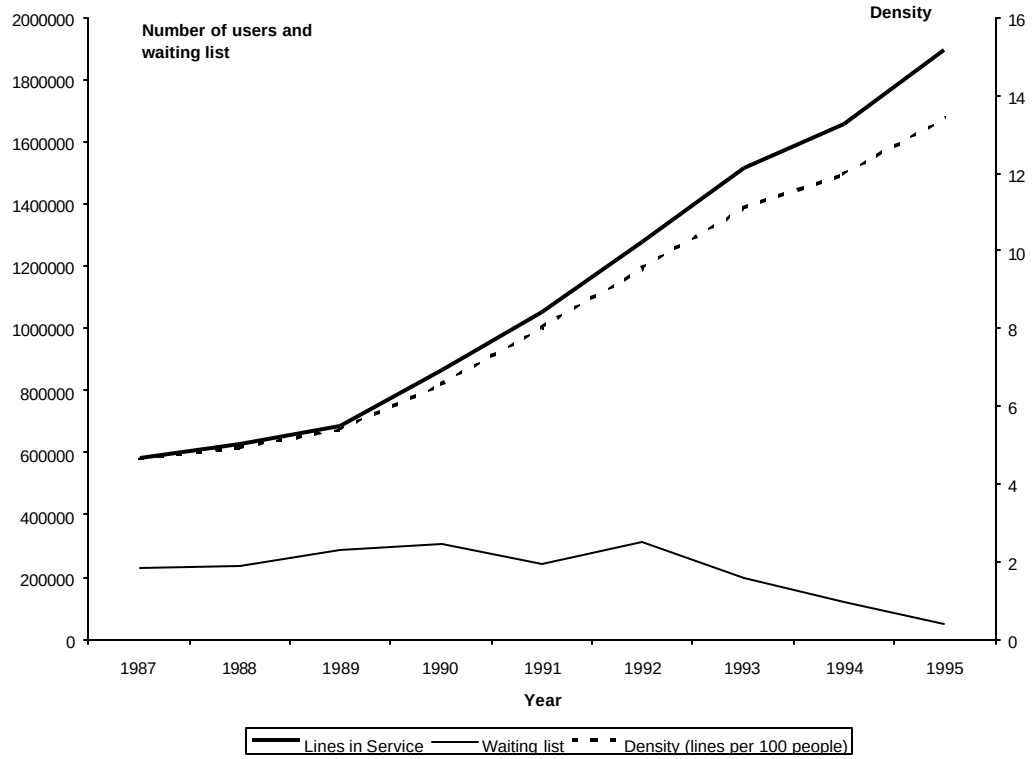
Source: Galal, Ahmed and Bharat Nauriyal, *Regulating Telecommunications in Developing Countries*, Policy Research Working Paper Number 1520, October 1995

Chile

Although telecommunications reforms in Chile started after those in electricity, great advances can be seen. Consider Figure 2, which summarizes several quality indicators.

It can be seen from this figure that the demand for telephones was being met, accompanied by a reduction in the waiting list toward the end of the period. Furthermore, this increase exceeded the natural growth of the population, as evidenced by the increase in the density of telephones, as measured by the number of telephone lines per 100 people. From this information, however, it is not possible to establish whether all the gains were in urban areas or whether rural areas were also benefiting.

Figure 2: Quality performance in Chilean telecommunications 1987 to 1995



Source: Table 8-3 *Chile: Recent Policy Lessons and Emerging Challenges*

2.2.3 Water and Sewerage Services

A sector that has attracted much less attention, primarily because of the paucity of the data that exists, is the water and sewerage sector. Few water privatizations or restructurings have a sufficient track-record of information than that required to undertake these types of review. However, one concession that has attracted significant attention and for which sufficient information does exist is the Buenos Aires' concession.

Some partial information on the impact of the concession was provided by Crampes and Estache – summarized in Table 9 below.

Table 9: Impact on indicators (May 1993 to December 1995)	
Indicator	*Change*
Increase in production capacity (%)	26
Water pipes rehabilitated (kilometers)	550
Sewers drained (kilometers)	4,800
Decline in clogged drains (%)	97
Meters upgraded and installed	128,500
Staff reduction (%)	47
Residents with new water connections	642,000
Residents with new sewer connections	342,000

Further work has been undertaken on the Buenos Aires concession. A partial equilibrium model was employed by Abdala (1996) to compare the impact over the first ten years of the concession with a counter-factual that assumed all observed changes were exogenous unless they were clearly directly caused by the privatization. Sensitivity analysis was then used to test the robustness of the results.

Similar simple indicators to those presented by Crampes and Estache were found. These included a fall in unaccounted-for-water from 45% in 1993 to 30% in 1995. Further, while average productivity gains of 6.4% per annum had been made over the decade to 1992, gains of 82%, 55% and 12% were achieved for 1993, 1994 and 1995 respectively. The 1993 and 1994 figures are explained by a greater than 50% fall in the workforce owing to voluntary redundancies. A significant overall gain for the economy was found. The distribution of this gain is shown in Table 10.

Table 10: Distribution of gains from the Buenos Aires concession

Group	*Amount ($m)*
Consumers	1,277
Foreign buyers	212
Domestic buyers	147
Employees	40
Competitors	(3)
Government	(155)

It can be seen from the table that about 80% of the benefits are believed to accrue to consumers. This number may be an understatement since some aspects of the concession that benefit consumers have not been measured. The result also appears to be robust to the assumptions underlying the calculations.

3. The unforeseen consequences of some reforms

As shown earlier in Box 1, the effectiveness of any reform program depends as much on the details of the reform as it does on the general principles that are followed. Section 1.2 provided a check-list of the aspects of reform that need to be considered. However, *how* each of these reforms is applied has an equally, if not more important impact on the overall effectiveness of the reforms on the growth of the economy. This section considers some examples of the way in which even well intentioned reforms in each of the key areas can have less than the desired impact on the economy and in some cases, can even have a negative impact.

Also included in this section is a consideration of transitional problems that may arise, especially when reform of the utilities outstrips other reforms in an economy.

3.1 Market structure

As discussed earlier, no matter how effective the conduct regulatory system that is put in place, this will always be a second-best solution to the establishment of a competitive environment.[14]

[14] There are some cases when the cost of establishing the competitive market may outweigh the benefits that can be derived. One example of this is the case of full retail competition in electricity supply, which has recently been established in England and Wales. Here it is unclear that the benefits outweigh the costs, although the majority of commentators appear to support the benefits outweighing the costs.. However, in principle, competition will always be better than conduct regulation.

When possible, it is better to introduce real competition since conduct regulation issues are then simplified.

One of the aims of restructuring public utilities is to make those sectors more competitive. There are four different forms of competition:

- competition in the market (product market competition or head-to-head competition);
- contestability (a version of competition in the market based on potential competition for the market);
- competition for the market (one-off competition, e.g. franchising); and
- comparative competition (when no actual competition occurs, but through comparisons of costs and quality, a proxy is created; e.g. five local electricity distribution companies are compared).

Competition can be expected to bring benefits in productive, allocative and dynamic efficiency.[15] **Productive efficiency** requires that production be undertaken using the lowest cost technology. **Allocative efficiency** requires that the market price for a product is equal to the cost of the marginal unit of production. When allocative inefficiency becomes locked into the industry, it has profound implications for the **dynamic efficiency** of the market, which requires that new investment be made when the cost of producing from the marginal source of production exceeds the cost of making the new investment. In this way, old, obsolete or inefficient production is supplanted by new cheaper production.

While competition is, in theory, not necessary in order to achieve full efficiency, competition sharpens the incentives for productive efficiency and productivity improvements and acts as a spur to innovation in the provision of new services and lower-cost methods of production. Regulatory regimes can be set up to mimic competition when this is absent from the market, although this is likely to be an unsatisfactory alternative because of problems with imperfect information. Furthermore, the costs of acquiring and analyzing the data will ultimately have to be paid by the consumer.

Because of the problem of information asymmetry and its associated data collection costs, there is an inverse relationship between the degree of competition and the scope and depth of conduct regulation that is needed (with its consequent data costs). However, even when designing the competitive aspects of an industry mistakes that require regulatory intervention are still made.[16]

The first example discussed here also ties in with the ownership and conduct regulation examples provided later in this paper.

Chile

Evidence from the electricity distribution and telecommunications industries shows that where competition has been allowed to flourish, rates of return are lower than in those industries and

[15] In simple terms, productive efficiency is associated with reducing the cost of production. Allocative efficiency is associated with ensuring that prices match the costs of supplying a product. Dynamic efficiency is associated with lower price producers replacing higher priced producers over time.

[16] Again, England and Wales provides a nice example of this. When the electricity reforms were implemented early in the 1990s, a power-pool was established – the most competitive solution for the generation market. However, three dominant companies were established, National Power, PowerGen and Nuclear Electric. Of these, National Power and PowerGen owned plants that 95% of the time were the price setting plants. This did not change as independent power producers entered the market since they were being run as base-load plants. The problem was only rectified after a 'voluntary' cap was imposed by the regulator, OFFER, and the two dominant companies were forced to divest themselves of generating capacity.

sector segments where monopolies have been retained. Tables 11 and 12 provide some evidence on this issue.

Table 11: Annual rate of return on equity for Chilean firms, 1995-97	
Sector and Industry	***Rate of return (%)***
Electricity distribution (regulated)	30
Electricity generation (competitive)	12
Basic telephony (regulated)	18
Long distance (competitive)	6.5

Source: Table 8.1, Chile: Recent Policy Lessons and Emerging Challenges (1999)
Note: Some difference will depend on the risk faced by the industry, but this is unlikely to differ by such a great degree. For information on the different levels of risk faced by different industries (and under different regulatory regimes) see Alexander, Mayer and Weeds (1996).

Table 12: User's prices for selected years in Chile			
Price	***1988***	***1997***	***% change***
Electricity distribution price (KW/h) (in current U.S.$)	9.44	12.00	27.1
Average household telephone bill (in constant Ch$ of June 1998)	7,773	11,403	46.7

Source: Table 8.1, Chile: Recent Policy Lessons and Emerging Challenges (1999)

One of the reasons for this is the fact that the market structure has not been fully developed as a competitive market. In the case of telecommunications, the 1982 law established that open competition should exist in all segments of the telecommunications market, but no actions were taken to break up the two powerful monopolies that existed at that time (one covering local and the other national and international traffic). Furthermore, since a competitive philosophy had been adopted, no price regulation was proposed. The law was amended late in the 1980s, after the competition authority determined that the industry was still dominated by the original monopoly providers. Even by 1994, the five new entrants in the local telephony market had achieved only 2% of the market.[17]

In the electricity sector there are also concerns about the concentration of ownership of generation assets, which is discussed in more detail in the following section.

Mexico

During the late 1980s and early 1990s, Mexico undertook extensive reform in its transport sector. One of the key decisions was the introduction of full competition to the inter-urban transport sector. On average, freight rates fell, but there is concern that this may not be the result of competition but rather of predatory pricing. In one state, Oaxaca, the freight rate did not fall. Rather, an association of companies were sanctioned by the competition agency for following price-fixing policies.

So, stating that competition is to occur is, by itself, not enough. Real policies need to follow that involve both the encouragement of new entrants and also the control, whether through sectoral economic regulation or competition policy, of existing operators.

[17] A similar story is seen with the experience of the UK and telecommunications reform. Real competition, and the greatest benefits of reform, did not occur until the government decided to abandon its 'duopoly' approach that had allowed Mercury Communications to be established by Cable and Wireless as a competitor to British Telecom. Once the duopoly was removed, a significant number of new entrants appeared.

3.2 Ownership

When the ownership of an industry is moved out of public hands and into private hands, there are many possible factors that need to be considered. Some of these are linked to the industry structure aspect discussed above. For example, vertical ownership can raise significant problems for conduct regulation. Furthermore, depending on the type of owners that are encouraged, the wrong incentives may be established for innovation and investment.

One of the primary problems that may arise with the ownership of multiple companies (either vertically or horizontally linked) is that of transfer pricing. Transfer pricing is the situation when one business within a group charges another business within that group for a product that it needs as an input. A good example of this is a holding group that owns a water company and a construction company. One example of a transfer price would be the charge that the construction company would levy on the water company if it were to contract with the construction company to provide services for the laying of pipes. This raises concerns for conduct regulation since it provides ample opportunity for a regulated company, such as the water company, to pay an abnormally high price for a service – the cost of which is then passed on to the regulated consumers while the abnormally high price leads to abnormal profits in the 'competitive' business.[18]

A further, although possibly more esoteric, consideration for governments or regulators who might wish to allow multiple ownership, especially on a horizontal basis, is the problem that is created for any regulator applying yardstick (comparative) competition. Although it is possible to keep the same number of comparisons (at least for physical, if not for market based financial information), there is a real concern that the commonality of ownership means that management independence is lost and consequently, the ability to undertake effective comparative competition based conduct regulation is hampered.[19]

This is a problem that it is best to avoid through the establishment of an appropriate industry structure and limitations on common ownership. If that is not a viable solution then definite attention, should be given to the conduct rules that are needed to limit the problems that may arise. The two case studies below highlight some of the types of problem that might be encountered and, to an extent, suggest possible remedies. Box 3 also considers some of the general considerations relating to the ownership and control question.

Brazil

The first example to be considered is one that exemplifies the latter aspect of ownership concerns. The Brazilian government has undertaken a significant program of rail privatization, where the

[18] This may sound abstract, but it is a real concern. Vast literature has been generated considering transfer pricing, especially from the viewpoint of taxation. Some high tax countries believe that international companies use transfer prices that differ from the competitive price as a way of moving profits out of the high tax country to a lower tax country. This has been a major concern for the US tax authorities. Among regulators, there is also a growing body of literature on appropriate conduct-based solutions to transfer pricing. In the UK, OFWAT, the water regulator for England & Wales, led the way with its publication of Regulatory Accounting Guideline 5 on Transfer Pricing. This has been followed up by consultant studies assessing the impact of the application of the guideline.

[19] A discussion of this issue is provided in the 1997 UK Monopolies and Mergers Commission report on the proposed merger between Severn Trent and South West Water (a similar report on the proposed merger between Wessex Water and South West Water was produced at the same time since it was a contested merger). An analysis of these arguments and decisions taken by the MMC with respect to other similar cases is provided in Francis and Alexander (1999), which can be downloaded from the London Economics web-site.

freight systems, including the track, station and rolling stock infrastructure has been shifted into private hands.[20] However, as is partly shown in Table 9 below, the most significant shareholders in the newly privatized rail systems are existing customers, especially mine operating companies and large iron and steel producers (some of the customers are subsidiaries of the owners and so the links appear less obvious).

Box 3: The value of control

In their 1999 review of privatizations of infrastructure and non-infrastructure companies from 1990 to 1996, one of the issues that D'Souza and Megginson consider is the impact of the type of ownership reform that is undertaken. This is considered in two ways:

- the impact of selling a stake in a company that takes the government shareholding below 50%; and
- the impact of changing more than 50% of the Board of Directors, or the Chief Executive Officer (CEO).

Selling a controlling stake

When the privatization led to the government's residual shareholding being less than 50%, the following impacts compared to those privatizations where less than 50% was sold were found:

- a greater, and more significant, impact on returns on sales, real sales and dividends to sales;
- the level of employment fell; and
- on most measures, the sales efficiency of the privatizations where control was sold increased by more than for the other privatizations.

Although these results suggest a better response when full privatization occurs, it must be remembered that the sale of less than 50% to a strategic investor (not covered in the study) is normally associated with the provision of management control to the strategic investor.

Management change

When a greater than 50% change in the Board of Directors occurred, the companies performed better than the other privatizations in relation to:

- efficiency;
- capital investment; and
- reduction in employment (i.e. a larger number of workers were released).

Surprisingly, when there was a change in CEO the level of employment rose relative to other privatizations. This may be a reflection of the drive to diversify and /or willingness to take business 'risks' for a new CEO relative to an existing manager.

Source: D'Souza and Megginson (1999)

An issue that is currently creating problems for the diffuse regulatory bodies in the Brazilian rail industry is the fact that potential customers that are not owners of the rail systems are having problems establishing:

- prices and rules for their use of the rail system (an interconnection pricing issue that should be covered under conduct regulation); and
- approval for traffic that would run North-South rather than East-West, as the majority of traffic currently runs.

Although the latter point could be solved through detailed conduct regulation rules, it would be better if the right incentive existed for the companies to come to a mutually acceptable solution. However, since the existing owners are customers that are interested in the East-West traffic they

[20] An overview of rail privatization around the world is provided by Thompson (1997).

are unwilling to consider the potentially lucrative North-South traffic, since it is seen as a possible threat to their access to the rail system.[21]

Table 13: Brazilian Rail Company ownership and customer base

	OESTE	*CENTRO-LESTE*	*SUDESTE*	*TEREZA CRISTINA*	*SUL*	*NORDESTE*	*PAULISTA*
Main Customers	Petrobas Petroleo Ipir. Shell Cia Cimento Port Itau Nestle Cival Al. COSIPA	Petrobras Petroleo Ipir. Shell Cimento Caue Copebras Usiminas Nitrofertil	MBR CSN COSIPA Ferteco CBA Cimento Tupi Fosfertil	ELETROSUL	Petrobas Petroleo Ipir. Shell ESSO Votorantim Incobrasa	Petrobas Petroleo Ipir. Shell ESSO Adubos Trevo, Gerdau, Milho Brasil	CBA COSIPA Shell Holdercim Cargill Glencore
Private operator	Ferr. Novoeste (FNV)	Ferr.Centro Atlântica (FCA)	MRS Logística (MRS)	Ferr. Tereza Cristina (FTC)	Ferrovia Sul Atlântico (FSA)	Co. Ferr. Nordeste (CFN)	Ferroban (FBN)
Shareholders (main ones in italics)	*Noel Group*, Brazil Rail Partners, Western Rail Invest., Bankamerica DK Partners, Chem Lat, Amer Eq	*Min.Tacumã*, Interférrea, *CSN*, Tupinam., *Railtex*, Varbra *Ralph Partners*, *Judori* CVRD	*CSN* *MBR* Ferteco *Usiminas* Celato Caemi Cosigua	*Banco Interfinance*, *Gemon G Eng Mont*, *Sta. Lúcia*	*Ralph Partners*, Varbra, Judori Ad Emp Part Railtex *Judori* Interférrea Brazil.	*CSN* *ABS* *Taquari* *CVRD*	Previ Funcef U. de Comercio Chase Latin *CVRD*

Source: RFFSA (1998).
Abbreviations: MGS=Rio Grande do Sul, SP=São Paulo, Ser=Sergipe, Bah=Bahía, MG=Minas Gerais, Goi=Goiás, ES=Espiritu Santo, RJ=Rio de Janeiro, DF=Distrito Federal, SC=Santa Catarina, Mar=Maranhão, Pia=Piaui, Cea=Ceará, RGN=Rio Grande do Norte, Pab=Pariba, Per=Pernambuco, Ala=Alagoas.

Chile electricity

Ownership problems relating to the vertical nature of the electricity industry were encountered in Chile. There are three areas where concerns have been raised.

1. As mentioned above, the degree of concentration within the generation sector experienced by the three dominant players is significant. Endesa owns 60% of the installed capacity while Chilgener and Colbun own 22% and 11% respectively of the installed capacity.
2. In a form of up-stream vertical control, Endesa owns 60% of the non-consuming water rights, and the majority of potential new hydro-stations are covered by these rights.
3. Endesa also exhibits down-stream vertical control through the fact that it owns the transmission grid and is itself owned by ENERSIS, a company that controls 40% of the distribution system in Chile.[22]

[21] This problem is not unlike to the problem that has been encountered in many transitional economies when a significant stake in the ownership of the company has been given to existing managers and workers. They are then able to use this stake to block structural reform that would threaten their livelihood. It is a difficult tight-rope to walk between giving existing staff a sense of involvement in the reform process and ensuring that the control that they achieve is not sufficient to block or hamper the development of the reforms.

[22] The issue of whether vertical reintegration should be allowed in an electricity sector that has been vertically disaggregated as part of a government reform program has arisen in the UK. The dominant electricity generating companies in England and Wales both wanted to acquire distribution companies at a time when distribution companies were allowed to establish their own generating capacity (although limited, in principle,

These examples of common ownership make the job of conduct regulation more difficult since there is always an expectation that companies that are commonly owned will work together to exploit any information asymmetries or to create opportunities for abnormal profits (possibly by using transfer pricing).

In 1997, the Resolutory Commission ruled on some actions that should be taken in Chile to address some of these points. However, there is a question as to whether the ruling is too little, and too late.

3.3 Conduct regulation

The final area where concerns can be raised regards the details of the conduct regulation that has been put in place. As was shown in Box 1, the greatest impact of reform in the telecommunications sector was seen when the details of conduct regulation had also been addressed.

Conduct regulation potentially needs to address a wide range of areas, these include:

- the establishment of average tariffs (and possibly the tariff level);
- the quality of service to be provided and penalties that should be applied when those quality levels are not met;
- the rules by which interconnection (one company using the infrastructure of another to deliver services to a customer) is allowed.

These issues are far from simple. Vast literature exists on even relatively minor aspects of the detail of establishing these conduct rules. The amount that has been written on the cost of capital, one element of the price determination process, is in itself, staggering. Regulatory offices need to establish detailed rules. Often, expediency leads to the rules being determined over a period of time (often the first price review)[23], but great care needs to be taken since what may seem to be good solutions to the intractable problem of information asymmetry may have unforeseen results.

Many of these problems are also associated with whether real independence is established for the regulatory office. When independence is limited, or non-existent, then some of these issues take on even greater importance.

Some examples from Latin America of problems with the details of conduct regulation are provided below.

Chile electricity

Since electricity distribution is a natural monopoly at the local level there is a need for some way to establish an efficient cost level when establishing the appropriate price level. Many countries have adopted versions of yardstick regulation or benchmarking. In Chile, the approach adopted is a form of consensus based system where:

- the regulator establishes three different size groups of electricity distribution companies;
- for each size group a 'model' company is determined from which an engineering estimate of the efficient cost of operation is determined;

to 15% of their electricity needs). At first, the government blocked these proposals, but more recently a renewed bid by PowerGen was allowed to proceed.

[23] The recent book by Green and Pardina (1999) provides a nice overview of the actions that need to be taken during a price review and consequently the broad scope of for which the regulator needs to determine an appropriate policy.

- each company within the size group is asked to estimate the efficient level of operating costs; and
- a weighted average of the studies carried out by the NEC and the companies is used.

Clearly, the incentive for companies is to boost the value of their estimate since they will gain from the higher value (equally, the regulator has an incentive to push values down). During the 1992 price review, discrepancies of 50% were found.

Argentina electricity

Transmission investment is considered a problem in Argentina at the moment. More than 90% of power outages in the system have their origins in transmission problems that could be substantially avoided with increased investment. Yet the investment has not been forthcoming. One of the primary reasons for this problem is the transmission pricing system that was established during the reforms. An element of the transmission price is an administratively set congestion charge – this has been found to be insufficient to meet the costs of investment required to overcome system congestion and constraints. This means that alternative sources of funding are also required.

A further consideration for investment in transmission is that the rules governing investment decisions only define generators as beneficiaries (not distributors or large consumers). This impacts on the investment decisions since it is the beneficiaries that are levied to finance the project and, correspondingly, if sufficient beneficiaries object the project is vetoed. These issues are under review with several options for improving the system being proposed.

3.4 Transitional problems

The issues that so far have been discussed in this section arose from deficiencies in, or constraints/problems with, the designs of the reform packages. There is, however, another series of problems that need to be considered. These arise from:

- a lack of reform in other areas of the economy; or
- a mismatch in the timing of reform.

The former can lead to unforeseen problems that run for a significant amount of time while the latter leads to a more transitional problem.

At the heart of this discussion is the fact that reforming the utility and infrastructure sector leads to a series of demands being placed on the economy. These demands include:

- the ability to handle an influx of workers that have been released from the utilities as part of the efficiency drive;
- the necessary depth of financial markets to meet domestic investment requirements; and
- a suitably flexible institutional arrangement, both within the utility and infrastructure sector and outside of it, that is able to meet the unforeseen consequences of the reform package.[24]

[24] A recent paper, Turnell (1999), considers three key conditions that should be met to ensure the success of the restructuring and privatization. These are the establishment of unitary control rights, hard budget constraints and a non-corruptible judicial system linked with transparent bankruptcy procedures. Turnell also addresses the question of whether reform should be initiated when some, or all, of the conditions have not been met. Depending on the probability of other political windows of opportunity for privatization and the conditions that have not been met the answer seems to relay on a fram ework of trade-offs, with no hard and fast answer.

Each of these issues is briefly discussed below.

- **Labor**. Throughout the world, one of the major sources of efficiency gains when utility and infrastructure companies have been reformed is achieved by shedding surplus labor. In many countries, utility and infrastructure companies have traditionally been used as a source of social employment. However, the shift to a more incentive based approach has, on the whole, been linked to a removal of the social aspects of employment in these industries and the consequent shedding of labor.

  To be able to handle the workers that have been released it is necessary to have a flexible working environment, without barriers to retraining and redeployment of labor. Otherwise, the workers are likely to remain unemployed until they either exit from the workforce or there is a growth in employment opportunities, arising from a growing demand for the utility and infrastructure services, arising from the relatively lower prices, increased reliability and quality, and general economic growth. In growing economies, this latter point may mean that the unemployment is only temporary, however, even when this is the case, a flexible labor market can better handle these problems. The case study presented below investigates this issue with respect to a comparison of what happened in the UK and Argentina.

- **Financial markets**. Reform of the utilities and infrastructure companies often is linked with a significant increase in demand for domestic sources of finance. This is because the back-log of under-investment needs to be made up and furthermore, meeting additional investment needs is often one of the root reasons for introducing the reform package. However, international companies are unlikely to want to completely finance investments from overseas sources and local firms may have only limited recourse to the international financial markets.[25] So, if the reform is to be entirely successful, it is important that any reforms of the domestic financial markets are also implemented.[26]

- **Institutional flexibility and depth**. An issue that has already been addressed to some extent is the fact that no matter how well prepared the package, there are bound to be some issues that arise. A rigid institutional structure adopted outside of the utility and infrastructure sector may hamper the ability of the regulatory agencies to react to the circumstances in a fast and effective way. A second case study below considers the issue of institutional depth in Mexico's transport sector.

The following case study investigates some of the issues that have arisen by comparing the labor situation in the UK and Argentina during the utility and infrastructure reform period.

Comparison of the handling of labor shedding in the UK and Argentina

One of the fastest ways in which improvements in productivity have been achieved in reformed infrastructure companies is through labor shedding. This is true in both developed and

25 Traditionally, access to the international financial markets for companies from the developed countries has been limited to the top few hundred. Access to the Eurobond and syndicated credit markets has as much to do with name recognition of the company being financed as it has with the underlying financial position of the borrower.

26 D'Souza and Megginson (1999) investigate this and find that some differences between developed and developing countries can be found, such as the impact of privatization on capital investment, which might be linked to a weakness in domestic financial markets.

developing countries. Before considering the way the state of the labor market impacts the utility and infrastructure reforms, it is worth considering evidence from the UK and Argentina.

Figure 3 shows the annual change in employment for the 12 Regional Electricity Companies (RECs) that are responsible for the distribution of electricity in England and Wales – they also held the monopoly on the sale of electricity to consumers under 1MW from privatization, although full retail competition was finally introduced late in 1998. It can be seen from the figure that immediately after privatization (in late 1990) there were significant, but not large, reductions in employment of between 5% and 10% per annum. The most significant reduction in labor did not occur until after the first price review. In 1996 there was a reduction of over 20% of the workforce.

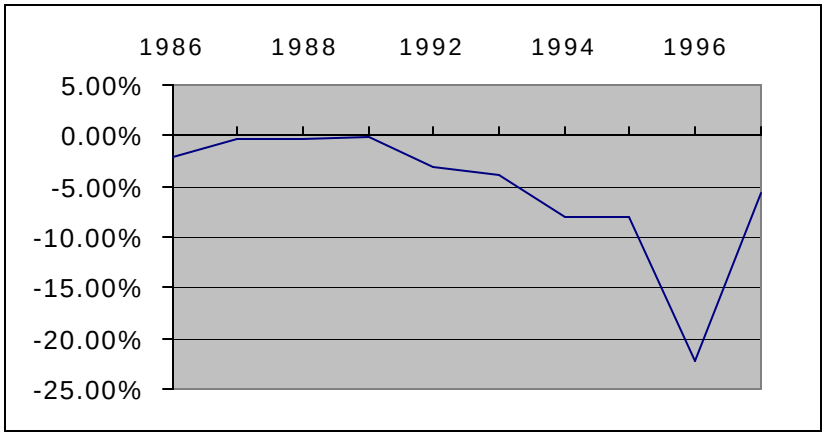
Evidence from Argentina is harder to gather. However, some evidence for two of the three distribution companies in Buenos Aires (the three account for 60% of the electricity distributed in the country) is available. Table 14 summarizes this information.

Table 14: Employment changes in key Argentinean distribution businesses

Employment	***Edesur***	***Edenor***
January 1992	7,417	6,368
October 1994	4,677	3,759
% change	-36.9	-41.0

Source: Reforming Provincial Utilities: Issues, Challenges and Best Practice (1996)

Figure 3: Employment changes by 12 RECs before and after privatization



Note: No data is given for 1990, the year of the reforms

As can be seen from the table, in the space of less than two years, there were reductions of around 40% of the workforce, significantly more than occurred in the RECs over a comparable time period. Furthermore, this table understates the true impact. In Arge,ntina not only was there significant over-staffing, there was also misuse of overtime. In 1992 the electricity distribution workers in the companies in the table worked an average 40 hours of overtime each month. By 1994, this had been reduced to between three and five hours per month. Part of this might be explained by the freeing-up of wages. Overtime may have been used by public sector management as a way of topping off low public sector wages for their staff. The move to the

private sector and consequently, to more realistic basic wages, may have removed the need for this use of overtime.

How did each of the economies react to the influx of labor from the utility and infrastructure companies? In the UK, the labor reforms of the early 1980s under the Conservative Party government of Margaret Thatcher meant that a flexible labor market existed, which was better able to handle the influx of workers. Argentina was less advanced in its labor market reforms and therefore, was less able to handle the influx of workers.

Institutional depth in the Mexican transport sector

When establishing a reform package, it is important to determine the institutional needs that will be created by the reforms. During the 1980s and early 1990s significant reforms were proposed for the transport sector in Mexico. Some of these have taken a while to implement. The privatization of the country's airports has only recently begun, but action has been seen in all the major transport sectors during the 1990s.

Reform of government control over these sectors has, however, been less pronounced. While the move to sectoral economic regulation is underway, there is a clear shortage of trained staff. This problem, accompanied by a slow development of the appropriate institutional framework, is limiting the success of the reforms in delivering lower prices and improved quality (an earlier example considered the shift of what was effectively a state monopoly to a private one in Oaxaca state). While this may only be a transitional problem, it is one that can lead to the effectiveness of the reform process being called into question, which could correspondingly impact other proposed reforms.

One example that brings together almost all the various problems discussed in this section is the Mexican toll-road problem. This is described in Box 4.

Box 4: Mexican Toll Roads

The Mexican Government undertook an ambitious toll road program in the early 1990s which has experienced a significant number of problems. These problems included:

- low institutional capacity that helped lead to poorly designed contracts and a tendering process that did not yield the best possible results;
- inadequate financial discipline. Government owned banks extended loans to the bidders without undertaking a full financial analysis owing to an assumption that the Government would guarantee any loans, even though this was not an official position. Effectively soft budget constraints were being set;
- underdeveloped local financial markets. The Peso markets were short-term and high cost. This pushed borrowers into the foreign markets for long-term debt. This created a problem when the Peso was significantly devalued in the 1994 currency crisis; and
- insufficient preparation had gone into some of the projects. Information on costs erred on the low side while revenue projections were optimistically high. Reality led to the toll road operators facing significant cash-flow problems.

These issues have seriously affected the existing toll road operators and quashed plans for further toll roads. Further, government credibility was called into question which could then impact on other privatizations.

Source: Ruster (1997)

4. Lessons for governments that wish to reform

This paper has shown that:

- reform of the utility and infrastructure industries is a key element to facilitate and even create economic growth in an economy;
- any reform process should involve a mixture of changes in industry structure, ownership and effective conduct regulation; and
- it is possible to take decisions that can damage the growth prospects, so great care must be taken, even with decisions that appear to be well-founded.

While these three points may seem self-evident, as this paper has shown, there are good examples in Latin America, a region that has been at the forefront of regulatory reform, that show that these are lessons that every government must recognize.

It is especially important that governments are aware of the potential problems with respect to conduct regulation. No government, in either the developed or developing countries, has been able to foresee every pitfall and so no perfect model of reform exists. Countries in Latin America that have led the reform process, such as Argentina and Chile, have their mixture of successes and failures, but even with these problems the reform process has been able to have an important impact on the performance of the economy.

What is important, however, is accepting that these sorts of problems will be encountered and then ensuring that sufficient flexibility has been established to allow the problems to be dealt with effectively and fairly. It should be acknowledged that reform is an on-going process and that governments should see initial major reforms as the start of a process that can yield great benefits to an economy.

However, there are things that governments can do to limit their exposure to these conduct regulation risks. These include the introduction of:

- the greatest degree of competition that is possible (although the cost-benefit trade-off should always be considered);
- rules to ensure that vertical and horizontal ownership issues that make conduct regulation even more difficult are limited (or hopefully non-existent); and
- rules to ensure that all the information that the regulatory office is likely to need is available in a timely, consistent and accurate format.

Finally, it is also important to place the reform of the utility and infrastructure companies in the context of broader institutional reform. Some of the successes of the utility and infrastructure reforms may be diluted if other broader reforms have not occurred. The impact of labor shedding created by providing the private operators with incentives to achieve the lowest costs of production is a good example of this. If the labor market still faces rigidities and consequently is unable to handle the labor that is released from the utility and infrastructure companies, then some of the benefits of the sector reform will be lost.

While it may not be possible to address all the broader issues at the same time as the sector reform, any government undertaking sector reform should be aware of these issues and prepare to face the consequent transitional problems.

Although this paper has been able to illustrate the benefits of reform, one area where little information is available relates to the distribution of benefits. The political and social

acceptability of reform requires that the poorest elements of society are made no worse off, and should actually benefit from the reform of the infrastructure service providers. While there are numerous examples of reforms that set roll-out targets for infrastructure connections etc there has, as yet, been little analysis of the impact of these reforms. This is an area that must be addressed during any reform program and is one where research is required.

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