United Nations University
WIDER
World Institute for Development Economics Research

Discussion Paper No. 2001/13

The Reform of the Utilities Sector in Spain

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June 2001

Abstract

This paper analyses the reforms that have taken place in the utilities sectors in Spain, with a focus on the political role in shaping the process of these reforms. We argue that the deregulation process was marked by the historical close collaboration between the government and the industry, which led to the formation of powerful interest group and to the insufficient development of strong independent regulatory institutions. Further, the government gave the priority to other political objectives through the privatization programme which are not compatible with the introduction of competition.

Political constraints also limited the scope of tariff rebalancing and delayed removal of the cross-subsidies embedded in the inherited tariff structures. We assess the distributional impact of the actual and expected changes in fixed and variable charges on the welfare of households, particularly with regard to lower-income and most vulnerable consumers. Our results show that all categories of households gained on aggregate through lower prices over the period 1996-2000, though the most vulnerable consumer groups benefited less than average. Further, the poorest households lose chiefly from tariff rebalancing in telecommunications. In addition, our estimates show that further expected rebalancing of prices would result in larger losses, because of the substantial increase in fixed charge across all utilities. However, such a negative impact would be compensated by the overall elimination of the profits that firms obtain from the domestic market as competition develops.

Keywords: regulation, utilities, Spain, tariff rebalancing

JEL classification: L50, L97

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This study has been prepared within the UNU/WIDER project on The Social Impact of Privatization and Regulation of Utilities in Latin America, which is co-directed by Dr Cecilia Ugaz, UNU/WIDER (Helsinki) and Professor Catherine Waddams Price, University of East Anglia (Norwich).

UNU/WIDER gratefully acknowledges the financial contribution to the project by the Ministry for Foreign Affairs of Finland.

1 Introduction

As in many other countries, the utilities sector in Spain is involved in an ongoing process of fundamental reform, largely driven by European Union's initiatives towards market liberalization. In a relatively short period of time, the historical monopoly of telecommunications has been dismantled and control of the industry has passed to private hands. In the energy sector, some important state-owned companies have been privatized and the market progressively liberalized at an even faster pace than that proposed by the European directives.

Parallel to regulatory reforms, the 1990s were witness to a large number of mergers and acquisitions that lead to massive horizontal and vertical concentration. On the other hand, the interrelation between telecommunications, oil, gas and electricity companies resulted in the creation of big industrial and financial groups, whose individual boundaries and interests are often difficult to recognize. Also at the beginning of the 1990s, the Spanish utilities initiated their international expansion through an aggressive policy of investments and acquisitions in the privatization programmes carried out in most Latin American countries. This corporate growth shaped the Spanish utilities as a group of prominent players both in the European and the Latin American arenas, while simultaneously utility prices in Spain were among the highest in Europe.

The objective of this paper is twofold. First, we describe the reforms that have taken place in the utilities sectors in Spain and assess the role of politics in shaping the process of such reforms. Second, we assess the distributional impact of these reforms on households' welfare, particularly on the most vulnerable consumers. Special emphasis is given to explore the actual and expected changes in fixed and variable charges set by the incumbents in response to the thread of competition and entry.

The paper is organized as follows. The next section offers a brief description of the industry structure, pricing policies and reforms in each sector. Section 3 explores the role played by the interlocking-ownership structure of the main industrial and financial groups in Spain and by the multiplicity of political objectives in the process of carrying out the reforms. Section 4 assesses the changes in relative prices from the start of the reforms (1996) to 2000, as well as the future changes we may expect as competition develops. Section 5 analyses the impact on different household's welfare of actual and expected tariff rebalancing across the utilities sectors. A conclusions section completes the paper.

2 The reform of the utilities sector in Spain

In this section we summarize the basic features of the reform in the telecoms, gas and electricity sectors. It should be noted that the water sector is not included in the present study, as this sector in Spain is mostly publicly managed. The state, through the National Hydrologic Planning carries out investments and supervision for water transfers between rivers, given the insufficient flow of some basins for irrigated agriculture. Water for residential sector is also managed by the administration. All households have consumption meters and the municipalities and regional institutions,

by themselves or through public concessions, are responsible for setting tariffs, metering and billing as well as for the quality. Through the recent approval of a new Water Act (Ley de Aguas 46/1999) would arguably permit the creation of markets for water exchanges between river basins, there still has not been any further legislative development in this sense.

2.1 Telecommunications

The *Compañía Telefónica Nacional de España* (hereafter Telefónica) provided telecommunications services in Spain until 1997 when its monopoly was dismantled. Telefónica, created in 1924, was at that time under the control of the North American ITT (41 per cent). In 1945 ITT sold its share to the state, and in 1946 a contract was signed between the state and Telefónica, giving the company the monopoly on telecoms. The government, nevertheless, kept the right to intervene in Telefónica through its representatives in the company (the *Delegación del Gobierno en Telefónica*) and the annual approval of tariffs. Thus for fifty years, telecoms in Spain has been a public service, provided by one firm with mixed ownership, quoted on the Stock Exchange, and subjected to governmental control.

The technological revolution of the 1980s and Spain's admission to the European Union encouraged the country to follow Europe's lead towards the liberalization of the sector. In this respect, the approval of the *Ley de Ordenación de las Telecomunicaciones* (LOT) in 1987 opened the way for dismantling the monopoly and for the future liberalization of telecoms. LOT was successively updated to conform with the subsequent European directives. Full competition in the services and networks of telecommunications was made possible with the approval of *Ley 12/1997 de Liberalización de las Telecomunicaciones* and *Ley 11/1998 General de Telecomunicaciones* which are a translation of European Directives 96/19/EU, 97/33/EU and 98/10/EU. The state sold its remaining shares in Telefónica in 1995 (10.7 per cent) and 1997 (18.2 per cent).

The first companies to challenge Telefónica in basic voice telephony in 1998 were Retevisión, UNI2 and EUSKALTEL (which operates only in the Basque Country). The list of new players increased in 1999 with JAZZTEL, RSL COM and COMUNITEL, being the most important ones. After two years, Telefónica's market share in long-distance calls fell by 10 per cent (Table 1).

Telefónica has about 70 per cent of the mobile market. The second largest operator is AIRTEL, after winning a public competitive bid in 1995. AIRTEL paid 511 million euros for its licence. This was considered by the European Community as a preferential treatment in favour of Telefónica, since it had not paid anything for its first licence. In compensation, the EC urged the Spanish government to accelerate its timetable for liberalization, and the third mobile operator, Retevision Movil, got its license in 1999.

Table 1
Market shares in long-distance calls

	1998	1999
Telefónica	93.48	90.00
Retevisión	5.59	5.73
UNI2	0.03	1.82
EUSKALTEL	0.90	1.01
JAZZTEL	–	0.48
RSL Com	–	0.28
American tel	–	0.17
Communitel	–	0.13
Others	–	0.38
Total	100.00	100.00

Source: CMT (1998,1999).

In June 1996, the *Comisión del Mercado de las Telecomunicaciones* (CMT) was created as the independent national regulatory authority, and began operations in 1997. Its three main objectives were to safeguard the effective competition of the market, to supervise the correct price formation and to act as an arbitrator in conflicts between participants in the industry.

The *Secretaría General de Comunicaciones*, located within the Ministry for Development, had been traditionally responsible for regulating the telecommunications sector. Up to 1998 telecom prices were set jointly by Telefónica and the government. The structure contained considerable cross-subsidies between long-distance calls and metropolitan calls (Ocaña and Sánchez 1994; MOPTA 1993). Since 1998, final prices are set competitively, though the government still approves inter-connection charges and final rates of local calls, where competition is still very weak. Even though CMT evaluates tariff proposals for services provided by the dominant operator, it is the government body, *Commission for Economic Affairs*, that authorizes Telefónica's tariff change applications for the specific services under price control. Therefore, the ministry's involvement in price regulation continues to be significant.

2.2 Electricity

The Spanish electrical power industry is the fifth largest in the European Union with 53,753 MW of installed capacity and 185,011 MWh demanded in 1999. It is also home to two of the world's largest electricity companies—Endesa and Iberdrola—which also have expanding worldwide interests, particularly in Latin America.

In the mid-1980s, the industry comprised eleven vertically integrated companies operating in generation, transmission and distribution, and one state-owned company (Endesa) exclusively involved in generation. As a result of the mergers and acquisitions carried out over the last ten years, in 2000 these firms are clustered into four private

groups: Endesa, Iberdrola, Unión Fenosa and Hidroeléctrica del Cantábrico. Endesa (which was privatized at the end of 1997) and Iberdrola have a dominant position (80 per cent market share) both in the generation and the distribution market. These four companies are vertically integrated between generation and distribution, making the Spanish market one of the most concentrated in the world.

The first step towards a more liberalized regime was taken in December 1994 with the approval of *Ley 30/1995 de Ordenación del Sistema Eléctrico Nacional.* The most salient measure of this legislative reform was the creation of an independent regulatory agency, the National Electricity Regulatory Commission (CNSE), to guarantee the transparency and objectivity of the operations of the entire system.

Three years later, in December 1997, the approval of *Ley 54/1997 del Sector Eléctrico* (Spanish Electric Power Act) fostered the introduction of competition in the industry. A competitive wholesale electricity spot market based on generators' and consumers' bids has been in operation since 1st of January 1998. The wholesale market is organized in several segments: daily, intra-daily, constraint management and ancillary services. At the same time, both financial and physical bilateral contracts will be developed. An independent system operator runs the physical national electricity grid and a market operator determines the power exchange and the hourly market-clearing prices. Both operators are private, regulated firms. The reform also introduced a legal distinction between regulated and non-regulated activities; ownership separation is not required.

Even though an advanced and ambitious design for market arrangements was introduced by the new legal framework, the reform has been subjected to some criticism (Arocena *et al*. 1999). The massive level of horizontal market concentration, the vertical integration between generation and distribution, the imperfections of the gas markets, the quotas of domestic coal consumption and the remuneration for the costs to the incumbents hindered the competitive development and the entry of new players. Thus, the presence of European and North American companies (Enron, SKS, Electrabel, and REN among others) with licences to operate in the supply business is virtually nominal.

Total liberalization of supply activities is scheduled to be completed by the end of 2007. Until then, the law specified a transitory period during which the degree of deregulation will be much more limited. Until 2000, only those clients with an annual electricity consumption exceeding 15 GWh will be free to choose from competing suppliers. This threshold will be reduced to a level of 9 GWh by the year 2000, to 5 GWh by 2002 and to 1 GWh in 2004.

Privatization of the state-owned ENDESA marked another important milestone in the reform process. Prior to privatization, the government strengthened ENDESA by acquiring a majority share in FECSA and Sevillana, the largest distributors in Catalonia and Andalusia, respectively. The CNSE strongly opposed this course of action because of the substantial increase in the degree of market concentration, but the government ignored the regulator's arguments.

2.3 Gas

In comparison with other European countries, the gas sector in Spain—both consumption and infrastructure—is still in its early stages of development, albeit rapidly growing. In 1987 natural gas accounted for 3.5 per cent of the primary energy consumption in Spain. In 1997 it reached 10.7 per cent, but it still well below the European average of 22.1 per cent (Eurogas 1998). Likewise, as a result of huge investments in infrastructure undertaken during the last few years, the internal transport and distribution network has tripled in length (SEDIGAS 1998). According to a reliable forecast, gas consumption in 2010 will be twice the 1997 level.

Various factors explain this relative underdevelopment of the Spanish gas industry compared to most European countries, where growth began in the early 1960s. On the supply side, Spain has no gas fields and before the international connections began operating in the mid-1990s, most of gas demand was satisfied with imports by sea in liquefied state.[1] The absence of competitive gas supplies was compounded by the lack of infrastructure, which extended to only 159 towns in 1984 (about 1,000 in 1999). On the demand side, the mild climate of many regions in Spain meant that the demand, both in the domestic and commercial markets, is significantly lower than in countries located in northern Europe. On one hand, heating needs have traditionally been satisfied with oil fuels (fuel oil and gas-oil) as well as LPGs (butane and propane) and electrical heaters. The majority of gas used for cooking and heating water is bottled. The popular orange butane canister is still by far the favoured option of the poorer population. On the other hand, in 1999, gas based power generation barely account for 6 per cent. Gas demand for the generation of electricity was stagnant because of the construction of nuclear and coal-based over-dimensioned capacity during the 1980s. Therefore, it may be said that the Spanish gas market was born in the 1990s, when development of the internal network and construction of the international pipelines fostered both supply and demand.

As in the electricity sector, the industry also experienced a fundamental reorganization at the beginning of the 1990s. In 1991, Catalana de Gas merged with Gas Madrid and incorporated the piped gas distribution assets of the oil company Repsol. This merger gave rise to Gas Natural SDG, the leading gas company in Spain. The process was completed with the acquisition of the state-owned ENAGAS in 1994, the company in charge of gas supplies and the management of the transport network and regasification plants. This led to the creation of Gas Natural Group, the third largest player in the European Union after British Gas and Gaz de France, with a significant and increasing presence in Argentina, Brazil, Colombia and Mexico. The acquisition of ENAGAS meant the creation of a vertically integrated group with an almost monopolistic position in all phases of the gas business. Today, GAS NATURAL Group dominates gas distribution and supply through fourteen regional companies, covering 86 per cent of the residential and commercial market, and 98 per cent of the industrial market in 1998. It also has minority interests in another three gas distribution companies in Aragón and

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1 The scant and poor fields are virtually exhausted. Domestic supplies only accounted for 3.6 per cent in 1999. The first international connection, the French pipeline, came into operation in October 1993, and the Maghrib-Europe Gas Pipeline in November 1996.

the Basque Country. The majority shareholders of the group are the oil company Repsol YPF (45.3 per cent) and the largest Spanish savings bank, La Caixa (25.5 per cent).

Nevertheless, recent reforms in the gas sector and the liberalization of electricity generation are likely to encourage new players to the gas activities. In fact, some electricity and oil companies have already announced their intention to enter the field with combined cycle generation turbines (CCGT). Thus, the large existing energy groups (Endesa, Iberdrola, Repsol, Cepsa-ELF) have started a policy of aggressive investments in gas and agreed to strategic alliances to construct and to bring into operation 8,750 MW of CCGT capacity in the next three years (SEDIGAS 2000).

Two legislative reforms led the sector to liberalization: the Hydrocarbons Law (*Ley 34/1998 de Hidrocarburos*) and the Royal Decree-Law of Urgent Measures of Deregulation and Increase of Competition (*Real Decreto Ley 6/1999 de medidas urgentes de liberalización y aumento de la competencia*). The aim of these reforms is to advance the deregulation process, along principles similar to the European Directive 98/30/EC on common standards for the natural gas domestic market. In this respect, the construction of facilities for handling transport, distribution and regasification is liberalized, and a regulated third-party access is introduced for qualified consumers and retailing companies. The Law also created the *Comisión Nacional de la Energía* (CNE) which oversees all energy industries.

The pace of market liberalization introduced by the Hydrocarbons Law was faster than that of the European Directive and was accelerated further by the Royal Decree-Law six months later. Eligible consumers are currently those whose annual consumption exceeds 5 million therms. This threshold will be reduced to 3 million by January 2003 and fully liberalized by 2008. Therefore, domestic consumers remain subjected to a regulated tariff regime until 2008. Residential prices are set according to a cost-plus system, where the final reference price is the sum of the average cost of acquisition, transportation, storage and distribution. In any case, the lack of transparency in cost allocation among consumers can cause potential distortions by Gas Natural, given the incentives to overestimate the base rate. Prices are to be approved by the government and are revised annually, except when the cost of gas induces variations of less than 2 per cent in the end-user prices. Tariffs are uniform nation-wide; i.e. all customers within the same category are charged the same price, regardless of their location in relation to infrastructure.

In summary, the Hydrocarbons Law attempts to harmonize deregulation with the development of the gas system throughout the country. Furthermore, it promotes assurance of supply through the obligation to diversify supplies and to co-participate in strategic storage.

3 The politics of the Spanish reforms

As stated above, the reform of the energy sector in Spain has been characterized by an increase in market concentration and vertical integration, allowing companies to maintain and even to increase the market power they had before liberalization. This

strategy supported by the government contradicts the objective of introducing competition in any market.

To explain this paradox, both the government and firms have cited the popular argument that in an era of 'globalization', companies have to be large in order to be able to effectively and efficiently compete in the world market. This argument is based on some form of economy of scale: a larger market allows for the realization of greater economies of scale, and for this purpose firms have to grow. At the same time, the integration of markets means that competition is intensified so that such growth in scale does not imply a significant increase in prices. The theory that firms have to be large at a national level to be viable competitors in global markets has often been supported by the argument that this national concentration would not lead to an increase in market power. In particular, it has been argued that Spanish utilities will compete in a larger European arena.

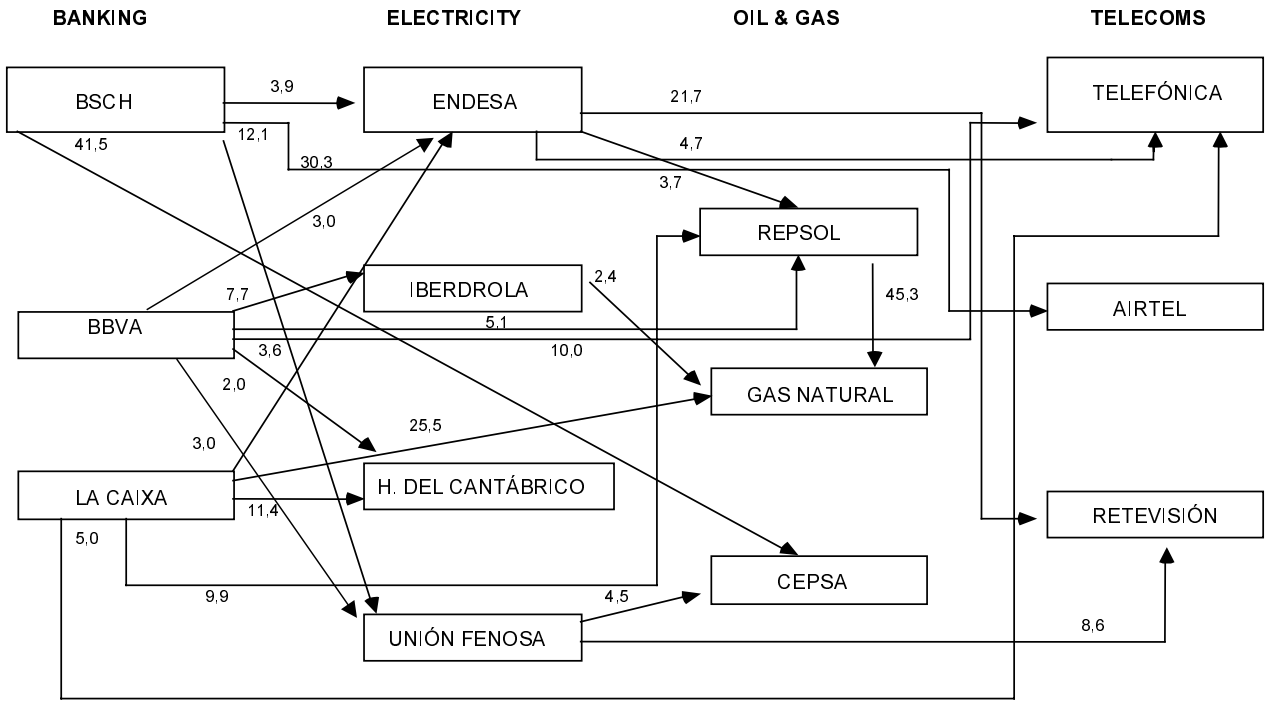
However, this argument does not apply to all industries. Particularly, the economic foundations of its application to the energy industries are relatively weak, given the need of connection lines (wires or pipes) to import and transport electricity or gas. Many companies, significantly smaller than Endesa, Iberdrola, Repsol, Gas Natural and Telefónica, have been quite successful abroad. Thus, efficiency gains from greater size are likely to be limited.

Indeed, instead of the globalization argument, there are a number of alternative factors to explain the pro-incumbent bias of the Spanish reforms. The first of these is the role played by interest groups and the manner in which regulatory policy has been traditionally conducted.

The start of the reform process in the 1990s was characterized by strong historical links between the utilities, the major banks and the government. As Tortella and Palafox (1984) show, since the early 1900s, a few large Spanish banks, evolving as 'holding' companies through portfolio operations, long-term loans and a network of common directors, became the centre of a diversified group of industrial and public utilities. All the Spanish energy companies were organized around these large banks (Sudrià 1995), which indirectly achieved enormous lobbying power just through the ownership structure, and exerted substantial influence on economic policy in the country (Lancaster 1989). This lobbying power was also reinforced with the appointments of common board members to different electricity firms (private as well as public) and to the corresponding private banks (see Tamames 1970).

Furthermore, the lobbying power of banks and energy companies was strengthened in 1944 with the creation of *Unidad Eléctrica*, *S. A*. (UNESA), an industry association founded to further the interest of electrical companies (including public enterprises). Having close links and cooperation with the Ministry of Industry, UNESA soon became the dominant lobby, and its influence extended not only to the design of technical aspects of the industry, but also to the regulation of the electrical power sector. In fact, tariffs, fiscal policy and the allocation of resources for the sector were worked out by UNESA and submitted to the Ministry for approval. For example, it was on the instructions of the Ministry of Industry that UNESA drafted the National Electricity

Figure 1
Cross-ownership between utilities sectors



Source: Adapted from Lasheras (1999).

Plan 1972-1981 (approved by the government in 1969) which was to provide detailed forecasts on demand and to estimate the generation capacity required to meet this demand, together with information on the type, size, and location of plants and fuels to be used.

This closeness between the companies and the Ministry progressively led to a completely opaque regulation process. All important decisions were made behind closed doors in industry-government committees whose neither membership nor operations were subjected to any formal ruling. The former chairman of the electricity regulator (Fernández-Ordóñez 1996) described the situation of the electricity sector as 'unbearably obscure'.

As a consequence, when the first independent regulator (CNSE) was created in 1995, its enforcement powers were limited in scope. Thus, the key elements of the reform affecting the changes in the structure and organization of the industry were negotiated between the government and the companies. This resulted in the so-called 'protocol',[2] which constituted the basis of the Electricity Law passed in 1997. Moreover, in drafting the legislation, the government ignored the regulator's concerns about both market structure and the magnitude of the 'costs of the transition to competition'. These costs, which are stranded costs accruing to the incumbents, are still today under review by the European Commission. In addition, further liberalization of the gas market is essential to enhance competition in the electricity sector through new entry. However, the regulation of the gas industry remained under the charge of the Ministry until the independent Comisión Nacional de la Energía (CNE) began operations in 1999 with a mandate to oversee all energy industries.

In the telecoms sector, the CMT was created as the independent regulator. However, the Ministry for Development retained a major role in the new regulatory regime. Thus, the Ministry is responsible for the quality control of the services, development of new administrative regulations, and application of penalty procedures, i.e. issues, which in many other countries are designated as the responsibility of the independent regulator. This causes concern about the lack of clarity in the division of regulatory responsibilities (OECD 2000). In addition, the Commission for Economic Affairs is responsible for regulating the dominant operator's prices (the former monopoly Telefónica). This also raises concerns about the potential impact of tariff rebalancing on competition, as the government may be interested in keeping local prices artificially low as an instrument to control inflation.

Since the early 1980s, successive Spanish governments have advocated the creation of large Spanish groups in order to able to compete with large international rivals. In fact, the government has attempted to further integrate the private oil companies in order to establish another private Spanish grouping in addition to Repsol (Correljé 1994) and, through the merger of HidroCantábrico and Unión Fenosa, to create a 'third electrical leg' along side Endesa and Iberdrola.

Politicians have repeatedly declared their hope that privatized firms 'remain in Spanish hands' (Cano 1998). The administration has used the privatization programme to create

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2 'Protocolo para el Establecimiento de una Nueva Regulación del Sistema Eléctrico Nacional'. Madrid, 1996.

groups of stable shareholders (called *núcleos duros*) with the goal of keeping control of privatized firms with the participation of Spanish shareholders. To that effect, the Ministry of Industry has issued guidelines to encourage the investment of Spanish capital in the utilities sector (MINER 1995). As a result, the privatization of REPSOL, TELEFONICA and ENDESA has expanded the complex network of cross-participation between financial and industrial groups (see Figure 1), resulting in an enormous concentration of power in a few hands. The extensive cross-ownership has generated a web of common interests, raising concerns about their ability to distort entry and competition.

On the other hand, Latin American markets constituted the natural expansion for the Spanish firms, as Latin American privatization programmes offered opportunities for growth that East European countries did not. The significant increase in the size of firms guarantees large free cash flows to finance the international expansion of the utilities. Table 2 shows the sizeable investment made by Spain's largest firms in Latin America over the last decade. The Spanish 'champions' of Figure 1 were responsible for about 80 per cent of total investments made in the region.

Finally, the privatization programme also reflects the government's goal of procuring as large a financial contribution as possible to the budget, at the expense of market restructuring and consequently, of a more rapid and effective liberalization of the market. Indeed, more money can be extracted from a sale if the prospects of market rivalry are low and entry difficult, since these would translate into higher profit expectations.

In summary, the traditional style of regulation in Spain based on close collaboration between the government and the industry has led to the formation of powerful interest groups and to underdevelopment of regulatory institutions. Furthermore, through these reforms the Spanish government gave priority to achieving other objectives, which are not always compatible with the goal of encouraging a competitive environment.

Table 2
Spanish investments in Latin America, 1991-99 ($ million)

	$ million	%
Repsol	20,000	28.9
Telefónica	10,000	14.4
Endesa	10,000	14.4
BSCH	5,300	7.7
BBVA	4,500	6.5
Iberdrola	2,440	3.5
Iberia	1,000	1.5
Gas Natural	900	1.3
Others	15,084	21.8
Total	69,224	100.0

Source: ECLAC (1999) and annual reports.

4 Changes in relative prices and the tariff structure

The introduction of competition forces tariffs to become more cost-reflective, since new entrants will target market segments where current prices are above supply costs. In the case of telecommunications in 1998, Retevision cut its long-distance rates by an average of 16 per cent, and international rates by 8 per cent. In 1999, Jazztel announced prices that were to be approximately 20 per cent lower than Telefónica's. To survive, the incumbents will need to end internal cross-subsidies, and for this purpose, the government approved various changes to Telefónica's tariff structure. This has led to increases both in the line rentals and the price of metropolitan calls, and to decreases in the rates for long-distance calls. As shown in Figure 2, since 1996, Telefónica has increased its line rentals by 13.3 per cent in real terms, and reduced the average cost of calls by 36 per cent.

Even with these adjustments, Telefónica complains that full price rebalancing has not occurred yet, and claims for higher line rentals in order to finance its access deficit. Indeed, price comparisons by OECD indicate that Spain's long-distance prices are still amongst the highest of the OECD countries, while line rentals are below average (OECD 1999). A recent proposal by CMT for setting a new price-cap regulatory regime would allow a further 20 per cent increase in line rentals and a 18.5 per cent decrease in the price for calls (CMT 2000). Further changes are likely to follow as competition develops.

By contrast, in the gas and electricity sectors, the balance between the fixed standing charge and the unit price of energy has not been significantly altered, as is shown in Figures 3 and 4.

Figure 2
Change in telecom prices in real terms

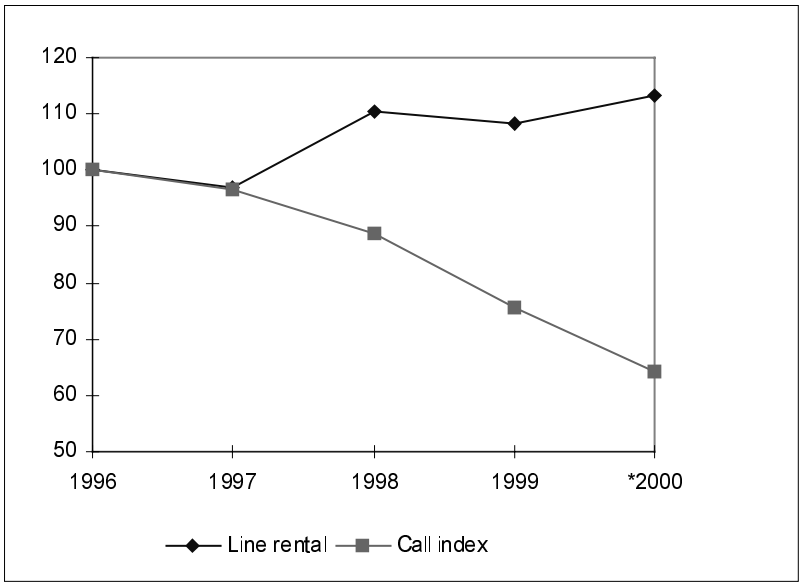


Figure 3
Electricity price changes in real terms

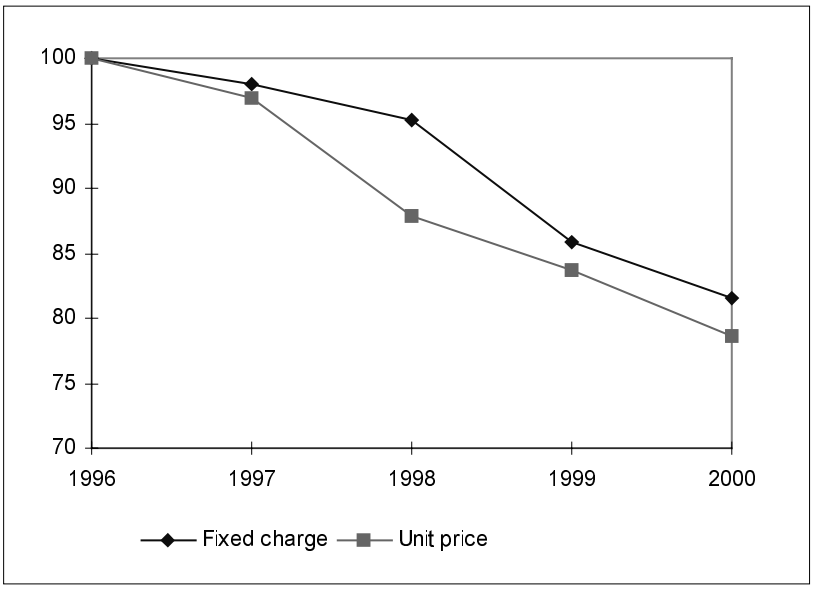
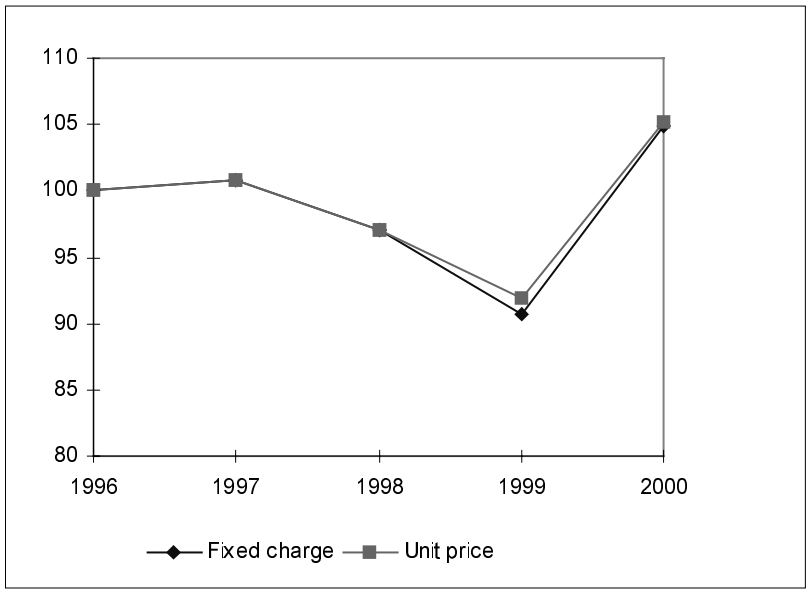


Figure 4
Gas price changes in real terms



Thus, both fixed and unit gas prices have increased since 1996 by 5 per cent, while fixed and variable electricity charges decreased by 18.4 per cent and 21 per cent, respectively in real terms. However, a generalized conviction exists that the inherited tariff structure in both electricity and gas sectors contains considerable cross-subsidies (Lasheras 1999). According to a recent study of the electricity regulator (CNSE 1999), Spain is the European country—together with Belgium—that has the highest differentials between domestic and industrial prices. Likewise, industrial gas prices in Spain are among the lowest in Europe whereas domestic and commercial prices are among the highest (MINER 1998).

There is also a fundamental difference between the reforms in telecoms and the reforms introduced in the energy sectors. While telecommunication consumers were eligible from the start of the reforms, the transition period of the gas and electricity sectors considerably limits the scope for competition. Only qualified consumers can be supplied in a free market, whereas non-qualified consumers remain subject to regulated tariffs. In this respect, the existence of cross-subsidies between regulated and liberalized segments of the market may be strategically used by the incumbents to deter entry. Furthermore, the prevailing unbalance between fixed and variable charges may raise concerns about the distributional consequences of rebalancing between these two components when competition takes place.

It is difficult to establish the exact magnitude of the cross-subsidies given the available information but it is possible to make a rough estimation of the focus of these subsidies. Basically, one has to compare revenues to the nature of costs associated with different categories of consumers. In order to do so, we first estimate costs as the sum of fixed and variable costs. On one hand, fixed costs, which are associated to capital, are computed as the sum of the annual depreciation of operating assets and a capital charge for the capital equipment. This capital charge represents the cost of using the funds the company has invested in it, and is computed through the weighted average cost of capital (WACC).

$$\text{Capital costs} = \text{Depreciation} + \text{WACC} * \text{Operating Assets}$$

$$\text{WACC} = k_e * s_e + (k_d * s_d)\,(1 - t)$$

where k_e= cost of equity; k_d= cost of debt; E= equity; D= Debt; s_e= E / (E+D); s_d= 1-s_e; t= tax rate.

The cost of equity (k_e) is estimated through the Capital Asset Pricing Model:

$$k_e = r_f + \beta\,(r_m - r_f)$$

where r_f = risk-free rate (5 years national debt); r_m = expected rate of return on the market; and β = systematic risk.

On the other hand, variable costs are computed as the sum of operating costs: energy purchasing, personnel costs, and other operating expenses.

Fixed and variable costs are estimated separately for generation, transport, distribution and supply activities in the case of electricity, and for supply/transport and distribution/retailing in the case of gas.

Second, we allocate fixed and variable costs to two categories of consumers in each sector. We distinguish between low voltage (LV) and high-voltage (HV) electricity consumers. LV consumers (< 1 kilovolt) are residential and small businesses, whereas HV (> 1 kilovolt) are mainly industrial consumers.

Fixed costs are allocated on the basis of the amount of megawatts of capacity contracted for each category. There are some HV consumers (> 132 kilovolts) connected directly to the transport network who incur neither distribution nor retailing costs.

Table 3
Cost coverage of electricity revenues (1998 thousand million PTAs)

	Costs			Revenues			Margin		
	Fixed	Variable	Total	Fixed	Variable	Total	R_f/C_f	R_v/C_v	R/C
Low-voltage	556	682	1238	353	1082	1435	0.63	1.59	1.16
High-voltage	122	619	742	91	580	671	0.74	0.94	0.91
Total	679	1301	1980	444	1662	2106	0.65	1.28	1.06

Table 4
Cost coverage of gas revenues (1995 thousand million PTAs)

	Costs			Revenues			Margin		
	Fixed	Variable	Total	Fixed	Variable	Total	R_f/C_f	R_v/C_v	R/C
Domestic/ commercial	41	38	78	18	74	92	0.44	1.96	1.17
Industrial	17	129	146	1	137	137	0.04	1.06	0.94
Total	58	166	224	19	211	229	0.32	1.27	1.02

Operating costs have been allocated on the basis of the total amount of kilowatts-hour demanded. Distribution operating costs have been estimated taking into account the differential losses of each level of voltage, since the distribution of LV has more network losses than medium voltage (>1 and < 36 kilovolts) and HV (>36 and < 132 kilovolts) power.

It should be noted that our estimates of cost associated to LV consumers are overestimated, because the accounting practice of the companies include most of the transport assets and costs within the distribution business (UNESA 2000).

We proceed in the same way to estimate fixed and variable costs for gas consumers. In this case, two markets are distinguished: domestic-commercial and industrial. The allocation of transport costs to each category is done according to the total therms supplied by ENAGAS to each market.[3] All distribution fixed costs have been assigned to domestic consumers, a fact which again is likely to overestimate the actual figure since 57 per cent of the distributor sales are realized in the industrial market.

All data are extracted from the Spanish Electricity Industry Association (UNESA 1997 and 2000), the annual reports of ENAGAS and GAS NATURAL Group and the *Comisión Nacional de la Energía*. Tables 3 and 4 summarize our estimates.

3 Sales to ENAGAS's direct industrial market approximately constitute 52.5 per cent of the total, while the remaining 47.5 per cent were supplied to the distribution companies.

The last column in Table 3 shows that total electricity sales are 6 per cent above costs, evidence of positive profits for firms. However, revenues from the HV market do not cover its corresponding costs—just 91 per cent, while revenues in the LV market generate a 16 per cent profit margin.

The conclusion is similar in the gas sector. Total profit margin amounts to 2 per cent. Revenues from the industrial market only cover 94 per cent of costs, while revenues in the domestic and commercial market are 17 per cent above costs. Therefore, current tariffs allow incumbents to subsidize, with revenue from the regulated markets, low prices in the segments open to competition (i.e., big consumers, industrial gas consumers and HV power consumers). Consequently, the inherited tariff structure could be used to deter entry, since new entrants would need to compete against subsidized prices.

Moreover, as can be seen in Table 3, the revenue raised in 1998 from the standing charge to LV consumers cover only 63 per cent of their corresponding fixed costs, while the revenue obtained from the unit price exceeds their variable costs by 59 per cent. Therefore, total rebalancing of electricity tariffs for domestic consumers would imply a 57.5 per cent increase of the 1998 standing charge and a 37 per cent decrease of the kilowatt-per-hour rate. On the other hand, Table 4 indicates that revenues in 1995 from fixed charges on gas cover only 44 per cent of the fixed costs of supplying the domestic market, while revenues from the energy component are almost twice the value of variable costs. Accordingly, total rebalancing of gas prices would require a 126 per cent increase of the 1995 standing charge and a 49 per cent decrease in the price charged by therm consumed.

After adjusting for the actual gas and electricity real price variations since 1995 and 1998 respectively,[4] these figures suggest that further rebalancing can be expected from 2000 onwards, as summarized in Table 5 below.

Table 5
Actual and expected price changes

	Electricity		Gas		Telecoms	
	Standing charge	Unit price	Standing charge	Unit price	Line rental	Call charge
Actual	-18.4	-21.4	5	5.2	13.3	-36
Expected	84	-36	122	-50	20	-18.5

4 It is also implicitly assumed that costs have not raised in a higher proportion than revenues since then. While official figures have not been released, such assumption may be questioned by (UNESA 2000) and Arocena *et al.* (2001). The former estimates that operating margins in the electricity sector have decreased in the last two years. The latter shows the opposite, as profit margins have increased even faster than the productivity gains in the gas industry.

The first row in Table 5 shows the actual real price changes in each sector for the 1996-2000 period. The second row shows the potential future price changes based on our estimates for the two energy sectors and those suggested by the telecoms regulator reported above. These potential price changes should be considered as benchmarks of the direction of changes to be expected in the near future as markets progressively become open to competition.

5 Welfare consequences of tariff rebalancing

In this section we assess the impact of tariff rebalancing on the welfare of households categorized by income groups. For this purpose, we use data from the 1996 Household Budget Continuous Survey (*Encuesta Continua sobre Presupuestos Familiares*, *ECPF*) provided by the National Statistics Institute. The ECPF provides information on incomes, expenditure, and personal characteristics of household members collected through interviews of approximately 2,600 households a year.

Table 6 below shows the percentage of households using each utility and the relationship between the households' income and the annual household consumption of each utility. We distinguish five categories of consumers according to income levels provided by the ECPF. Two groups of vulnerable consumers are also added: pensioners and unemployed on income support.

We see that connection to the telephone and gas systems increases with income, whereas the access to electricity is almost universal. Rates of penetration for natural gas are significantly lower than those for electricity and telecommunications. This reflects the underdevelopment of the gas network mentioned in section 2. There is also a major difference across income groups in the telecoms connection: 98 per cent of the richest households have a telephone versus 69 per cent for the poorest groups. Among the unemployed, telephone ownership is lower than average, but telephone use for those who have it, is about average. By contrast, pensioners are more likely to have a telephone but use it less than average. Likewise, among the lowest income level, total consumption of all services is also substantially lower than average.

Following Waddams Price and Hancock (1998), changes in consumer welfare (ΔW) are estimated according to the expression $\Delta W = q_t (p_1 - p_2)$. Here, p_1 and p_2 represent the real prices for the pre-reform and post-reform periods, respectively. Also q_t represents the consumption for each household before the reforms (t=1) and after (t=2). Hence, ΔW is close to a Paasche measure if $q_t \approx q_2$ and to a Laspeyres measure of welfare change if $q_t \approx q_1$. In the former case, there is an overestimation of welfare changes and in the latter case an underestimation. If demand is linear and $q_t \approx (q_1 + q_2)/2$ then ΔW is close to the Marshallian consumer surplus. Our expenditure was observed in 1996,[5] approximately at the start of reforms for all three utilities. Therefore, our measure is closer to a Laspeyres measure of welfare change and we would expect it to underestimate gains.

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5 The 1996 ECPF is the last survey available, which includes information on pensioners and unemployed people.

Table 6
Use of electricity, gas and telecoms

	Electricity		Gas		Telecommunications	
Income levels	Use (%)	Annual consumption*	Use (%)	Annual consumption*	Use (%)	Annual consumption*
Lowest (<600 euros/month)	97	1,792	6	2,862	69	24.1
Medium low(600-1,200)	99	2,532	11	3,652	80	34
Medium (1,200-1,500)	98	3,014	21	4,827	92	45.6
Medium high (1,500-1,800)	100	3,428	26	5,798	97	51.4
Highest (>1,800)	100	4,153	38	5,891	98	70.6
Unemployed	99	2,697	12	4,052	70	43.8
Pensioners	99	2,485	16	4,825	89	37.1
All	99	2,970	19	5,116	87	45.4

* KWh, therms and hours respectively.

The ECPF does not report data on the quantities consumed. These have been estimated by dividing the household expenditure on each service by the tariffs prevailing for each utility at the time of the survey (1996). As stated in section 2, since annual gas and electricity tariffs were uniform nation-wide, all consumers within the same category are charged the same price, irrespective of their location. Price for telecoms are Telefónica's line rentals, while the average price of calls is estimated from the national residential tariff basket[6] (CMT 1998 and 1999). Then the quantity of each good consumed annually (Q_i) can easily be estimated as $Q_i = (E_i - n_l * F_i) / V_i$ where E_i, n_i, F_i and V_i respectively stand for the expenditure, the number of households, the fixed and the variable charges for each service.

To assess the effect of price changes on each household group, we first measure the real gains from actual price variations given in Table 5. The first three columns in Table 7 show the financial gains/losses in expenditure on each of the three utilities for each household category over the period 1996-2000 measured in 2000 euros. The last two columns show respectively the aggregate over the three utilities, and the difference between the gain made by each group and the average gain. We see that all groups have gained on aggregate through lower prices, despite losses registered in the gas bill. As shown in the last column, the most vulnerable consumer groups have benefited less than average.

As stated above, we can expect further changes in the price structure as competition develops. We use the estimates reported in the second row of Table 5 to assess the potential impact on the welfare of households, should such changes occur in the near future. Table 8 below gives the results. Under such a scenario, all consumer categories

6 It should be noted that heavy consumers of long-distance and international calls are more likely to be better-off.

except the poorest would achieve substantially larger gains than those actually experienced. Once again, the richest households would gain greater benefit with respect to all three utilities than the less well-off groups.

Table 7
Real gains and losses (2000 euros)

	Electricity	Gas	Telecoms	Aggregate	Diff from average
Lowest	44.6	-8.8	27.0	62.8	-58.2
Medium low	61.3	-10.3	43.5	94.5	-26.5
Medium	72.2	-12.6	62.7	122.3	1.2
Medium high	81.6	-14.5	72.3	139.4	18.3
Highest	98.0	-14.7	104.2	187.5	66.5
Unemployed	65.1	-13.2	48.6	100.5	-20.6
Pensioners	60.3	-11.1	59.8	108.9	-12.1
All	71.2	-12.6	62.4	121.0	0.0

Table 8
Estimated future gains and losses (2000 euros)

	Electricity	Gas	Telecoms	Aggregate	Diff from average
Lowest	38.3	-26.4	-9.1	2.8	-91.6
Medium low	60.5	-10.7	-3.7	46.1	-48.3
Medium	74.9	12.6	2.6	90.1	-4.3
Medium high	87.3	31.9	5.8	124.9	30.5
Highest	109.0	33.7	16.3	159.0	64.6
Unemployed	65.4	-2.8	1.7	64.3	-30.1
Pensioners	59.1	12.6	-2.0	69.6	-24.8
All	73.6	18.3	2.5	94.4	0.0

Furthermore, both actual and anticipated future changes involve productivity gains resulting from fuel cost reduction, technological progress and efficiency improvement. On the other hand, because of the still limited entry and the significant market power of the incumbents, extraordinary profits and internal cross-subsidies exist. In order to isolate the effect of just tariff rebalancing on each household group, instead of changes in their overall level, we compare, using the 1996 price structure, the actual 2000 household expenditures with the same level of total revenues for the supplier as in 2000. The first two columns in Table 9 reflect the null effect of the price changes in electricity and gas since there was no significant shift in their price structure. The third column shows that the poorest households lose from rebalancing in telecoms, where the increase in line rentals had an adverse effect despite the reduction in call prices. Finally, our

estimates from Table 10 show that further rebalancing of prices would result in larger welfare losses for the poorest, because of the substantial increase in fixed charge across all utilities.

Table 9
Gains and losses due to actual price rebalancing (2000 euros)

	Electricity	Gas	Telecoms	Aggregate
Lowest	-0.3	0.0	-15.2	-15.4
Medium low	-0.1	0.0	-7.9	-8.0
Medium	0.0	0.0	0.6	0.6
Medium high	0.1	0.0	4.9	4.9
Highest	0.2	0.0	19.0	19.2
Unemployed	0.0	0.0	-0.7	-0.7
Pensioners	-0.1	0.0	-5.6	-5.7
All	0.0	0.0	0.0	0.0

Table 10
Gains and losses due to further rebalancing (2000 euros)

	Electricity	Gas	Telecoms	Aggregate
Lowest	-8.1	-38.7	-11.0	-57.7
Medium low	-3.0	-25.1	-5.9	-34.0
Medium	0.3	-5.0	0.1	-4.6
Medium high	3.1	11.7	3.0	17.9
Highest	8.1	13.3	12.9	34.4
Unemployed	-1.9	-18.3	-0.8	-21.0
Pensioners	-3.3	-5.0	-4.3	-12.6
All	0.0	0.0	0.0	0.0

6 Conclusions

In this paper, we have analysed the reform of the utilities sector in Spain with a focus on the political role of the deregulation process. Reforms in Spain were marked by traditionally strong links between the utilities, large banks and the government. This close collaboration between the government and the industry led to the growth of powerful interest groups and to an insufficient development of strong and independent regulatory institutions. Furthermore, the government prioritized, through the privatization programme, other political objectives that were not always compatible with the introduction of competition. The government's interest in protecting the incumbents' *status quo* prevented the necessary restructuring of the market. This

inevitably delayed the development of effective market competition and the removal of cross-subsidies embedded in the inherited tariff structures.

Although political constraints may have limited the scope of tariff rebalancing, their effect will inevitably be eroded by competitive forces. After 1996, gas and electricity price changes have not modified the balance between fixed standing charges and energy rates. In telecoms, only partial rebalancing has occurred. However, the rebalancing of fixed and variable charges is unavoidable in a competitive market. Accordingly, as deregulation continues over the next several years, much greater changes are anticipated. Finally, we have estimated these potential price changes in order to assess their distributional implications. Our results show that expected increases in fixed charges and decreases in unit prices would have an adverse impact on the lower-income and most vulnerable consumers.

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UNU World Institute for Development Economics Research (UNU/WIDER)
Katajanokanlaituri 6 B, 00160 Helsinki, Finland

Camera-ready typescript prepared by Liisa Roponen at UNU/WIDER
Printed at UNU/WIDER, Helsinki

ISSN 1609-5774
ISBN 952-455-150-0 (printed publication)
ISBN 952-455-151-9 (internet publication)