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# The opening up of the network industries to competition: regulatory aspects and effects on prices

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## 1. INTRODUCTION

The network industries cover a wide range of activities such as electricity, gas, information (sound and images), water, freight and passenger transport. All of these are of great significance in the current economy, as much of the technological progress made in recent years is channeled through them. What are involved are industries that have traditionally operated under limited degrees of competition owing, above all, to the presence of sizeable economies of scale and of natural monopoly factors. The monopolistic organisation of these activities first began to be re-assessed in the Anglo-Saxon countries in the eighties. This review was due, among other reasons, to the influence of technological changes altering their modus operandi and to the possibility of singling out activities in the same industry, as well as to the strong increase in demand to which they have been subject. In Europe, the development of the single market also boosted the liberalisation of the network industries, albeit at an uneven rate across countries. Spain has participated in this process, significantly amending and adding to the regulation of various industries, including energy and telephony.

The experience of the different countries shows that heightened competition in the network industries reduces prices, improves quality, widens the supply of goods and services, and increases efficiency in the allocation of resources. Further, the use of the goods and services produced by these industries as inputs for other productive branches enables the initial fall in prices to bring about significant synergies, whereby the gains in efficiency and the reduction in prices spread to other sectors of the economy. The contribution of the ongoing liberalisation of these industries to price stability and to growth in recent years has therefore been most considerable.

This article, which seeks to provide information on the process in recent years whereby these industries have been opened up in Spain, is structured as follows. The following section briefly refers to the most significant regulatory aspects raised by the opening up to competition of the network industries and discusses the regulation-based initiatives that seek to smooth the co-existence of monopoly activities with those conducted on a competitive footing. The third section discusses how these matters have been resolved in Spain. The fourth section analyses

certain direct effects on consumer prices of heightened competition in the air transport, telecommunications and electricity industries, comparing their performance in Spain and in the euro area. The fifth section performs a simulation with the Input-Output tables to assess the impact of the some of these industries on output prices in the Spanish economy. The article closes with some brief conclusions.

## 2. CHIEF REGULATORY ASPECTS OF THE LIBERALISATION OF THE NETWORK INDUSTRIES

The main challenge facing network industry regulators is how to organise activity in those segments of the industry remaining outside the reach of competition, so as to enable the entry of new competitors. This aspect is fundamental since the network industries show a high degree of maturity that hinders the entry of new participants. Moreover, liberalisation should not give rise to a situation where certain consumers may be denied access to those goods and services considered as essential. It has been sought to tackle this type of problem in several ways, including most notably: establishing independent regulator agencies; the unbundling of the various activity segments; and with price regulation and the setting in place of the so-called universal service.

Indeed, in order to square consumer interests (low prices and quality services) with those of shareholders (a profitable return on their investment), governments have established independent regulators in some of the network industries undergoing liberalisation. The independence of these agencies from political power limits the risk of the regulator's decisions being affected by pressures of any type. Furthermore, as the agencies are for specific industries, their actions are based on a much deeper knowledge of the actual conditions governing the industry in question.

The network industries have traditionally been characterised by the vertical integration of the various segments of activities of which they are comprised (depending on the industry, these may be production, wholesale distribution, retail distribution and commercialisation). The main advantage of this type of organisation is co-ordination, and its main drawback the possibility of using the structure to discriminate against competitor firms in the liberalised segments. As a result, in many cases segregating activities has been considered as the means to ensure the existence of competition in these segments. If it is decided to unbundle activities as a means of fomenting competition, it must be

decided at which level this is to be done (accounting, legal, a ceiling on ownership share or total segregation).

Another previously mentioned fundamental aspect of network industry regulation is the determination of the pricing system for non-liberalised activities. Such a system should be designed so as to encourage productive efficiency, quality of service, technological change and innovation. Likewise, in the liberalised activities, it may be advisable temporarily to regulate the prices of the incumbent operators, so as to encourage the entry of new firms. The choice of procedure and of the prices subject to regulation is not easy; among other reasons this is because the regulator does not have full information. Table 1 shows some of the procedures that may be used to regulate prices although, as indicated in this table, they all have advantages and disadvantages.

Lastly, so that the liberalisation of the network industries should not mean that certain consumers are denied access to specific basic goods and services, what is known as universal service has been established in some industries. The aim here is to oblige operators to supply all users – at affordable prices – with a series of services with a specific level of quality. On many occasions it is further required that prices should be uniform across different regions and/or different types of consumers. The two key issues relating to universal service are the definition of the component services and their financing.

## 3. THE LIBERALISATION OF THE NETWORK INDUSTRIES IN SPAIN: BASIC FEATURES

The opening up of the network industries in Spain has been pursued gradually. In this process the various segments of single industries have been successively incorporated, following pre-set liberalisation timetables. This strategy has been used, for instance, in the liberalisation of air transport, telecommunications, electricity, natural gas and rail transport. In certain telecommunications activities, such as basic or mobile telephony, the increase in the number of operators has also come about gradually. In the electricity and natural gas industries, the possibility of choosing a supplier has been confined for the moment to large users, although it will be extended step-by-step across the board to all consumers.

The network industries in Spain have followed various liberalisation arrangements, depending on the particularities of each and on the option chosen regarding the regulation of the fac-

TABLE 1

Price regulation procedures		
Procedure	Disadvantages	Advantages
<i>Return on capital or rate of return:</i> prices are set so as to enable all costs to be recovered, including a return on capital.	There are no incentives to reduce costs and it may give rise to over-capitalisation. Moreover, the correct assessment of costs and determining the return on capital may prove difficult.	Facilitates investment and ensures the financial soundness of the company.
<i>CPI-X rule:</i> maximum prices are set in terms of the growth rate of a price index deducting an amount X, which represents potential productivity gains.	Does not encourage service-quality improvements and runs the risk of curbing investment. Incomplete information on the part of the regulator may lead to excessive profits.	Promotes productive efficiency.
<i>Profit-sharing or incentives:</i> a portion of profits is earmarked to reduce (increase) rates if profits exceed (do not reach) a specific level.	Book profits are difficult to measure.	Excessive profits resulting from incomplete information on the part of the regulator are avoided.
<i>Referential competition:</i> in the event of horizontal unbundling, prices are set in accordance with the actual average costs of the whole group of firms.	Application requires that sources of uncertainty be uniform between companies.	Companies have incentives to declare and reduce their costs. Cost cuts translate into price reduction.

tors described in the preceding section. Indicated below are several aspects: first, the industries in which a sectoral regulatory agency has been established; second, some of the measures applied to encourage the emergence of new competitors; third, the industries where unbundling has been introduced and the extent thereof; fourth, how prices have been regulated; and lastly, those industries in which universal service has been introduced and how its financing has been addressed. Table 2 draws together the main characteristics of this process and several illustrative references are given in connection with the telecommunications, electricity, liquid and gaseous hydrocarbon (fuel and natural gas), railway transport and postal service industries.

With regard to independent regulatory agencies with a sectoral remit, 1996 saw the creation of the Telecommunications Market Board (CMT by its Spanish initials) and 1998 that of the National Energy Board (CNE) (1). The latter was entrusted with the electricity market along with the liquid and gaseous hydrocarbon markets.

(1) In the electricity market, the CNE replaced the National Electricity Network Board created in 1994.

As to the measures applied to encourage the entry of new competitors, these have been varied, depending on the initial industry position. For instance, in the basic telephony sector, where there was initially only one company, it was decided to break the monopoly by authorising a second operator in 1996. However, in the case of cable telephony, as this was a new activity and given the initial advantage of the basic telephony operator, it was decided to impose a moratorium on the telephony industry incumbent. In the electricity and hydrocarbons industries, where – despite the absence of entry restrictions – there remains a high degree of concentration, temporary ceilings were imposed (June 2000) on maximum market shares (2).

In terms of the means of unbundling the various segments of activity in a single indus-

(2) Specifically, electricity generators with a share exceeding 40% may not increase this over the next five years. And those with more than 20% but less than 40% may not increase it for three years. Likewise, from January 2003 suppliers of natural gas may not have a market share of more than 70%. Retail distributors of oil products with a market share of more than 30% may not, until June 2005, increase the number of service stations, while those with a share of more than 15% but less than 30% may not increase it until June 2003.

TABLE 2

## Characteristics of some Spanish network industries

Industry	Independent regulatory body	Regulated activities	Market shares	Regulated prices and margins	Operator responsible for universal services	Licences, concessions or authorisations	Other characteristics
Telecommunications	Telecommunications Market Commission		<ul style="list-style-type: none"> <li>In fixed telephony the former monopoly has a share of 94%</li> <li>In mobile telephony the two main companies control close to 90%</li> </ul>	Prices regulated for the former monopoly	Telefónica	Licence arrangement whereby the number of operators is controlled	Strict town-planning and environmental requirements
Postal services			<ul style="list-style-type: none"> <li>For mail transfer (of funds) services, national and international postal services for letters and postcards of up to 350g, and general government-addressed registered and declared value mail services, the former monopoly is the sole operator</li> <li>The wholesale distribution of stamps is by a single operator.</li> </ul>	<ul style="list-style-type: none"> <li>Prices are regulated for the former monopoly. There are no restrictions for the rest except for national postal services for letters and postcards of up to 350g., prices for which must be at least five times those of the former monopoly.</li> <li>Fixed margins for stamp distribution.</li> </ul>	Correos y Telégrafos	Authorisation required for letters and postcards of up to 2kg., postal packages of up to 10kg, and registered and declared value services.	
Electricity	National Energy Commission	Distribution and transmission	In generation, distribution and commercialisation, two companies control between 74% and 86%	<ul style="list-style-type: none"> <li>Maximum prices for small consumers</li> <li>Compensation for transport and distribution is regulated</li> </ul>		Administrative authorisation for generation	<ul style="list-style-type: none"> <li>National coal must be used as a source of energy in a proportion of at least 15%</li> <li>Close links between generation and distribution, on one hand, and transport and distribution, on the other</li> </ul>
Natural gas	National Energy Commission	Transport, regasification, storage and distribution	In imports, regasification, transport, storage and wholesale distribution, there is a virtual monopoly	Maximum prices for small consumers		Administrative authorisation for production, regasification, storage, transport, distribution and commercialisation	<ul style="list-style-type: none"> <li>Until end-2004 the current distributors will continue operating in their zone as a monopoly</li> <li>Maintenance of minimum stocks for hauliers, distributors and major consumers that make use of right of access to the network</li> </ul>
Oil	National Energy Commission		Three companies control more than 70% of refining, distribution and commercialisation			<ul style="list-style-type: none"> <li>Administrative operating concession</li> <li>Administrative authorisation system for distribution and installation of service stations</li> </ul>	<ul style="list-style-type: none"> <li>Most service stations have commission contracts</li> <li>Requirement that a minimum amount be stored for distribution</li> <li>Strict safety rules</li> </ul>

## Characteristics of some Spanish network industries (continuation)

Industry	Independent regulatory body	Regulated activities	Market shares	Regulated prices and margins	Operator responsible for universal services	Licences, concessions or authorisations	Other characteristics
Water				Regulated prices		Concessionnaire system	Price not determined by use
Town transport			Companies generally operate exclusively within their designated area	Maximum prices. Occasionally, prices are fixed		Concessionnaire system if the company is not state-owned	Long-term duration of concessions
Road transport				<ul style="list-style-type: none"> <li>Reference rates for public transport of goods</li> <li>Regulated motorway tolls</li> </ul>		<ul style="list-style-type: none"> <li>Authorisation system for public transport</li> <li>Concessionnaire system for certain motorways</li> </ul>	<ul style="list-style-type: none"> <li>Authorisations for haulage granted on a vehicle-by-vehicle basis. The company is required to have more than one vehicle</li> <li>In charter-service passenger transport, a minimum fleet of 5 vehicles and capacity for no fewer than 90 passengers are required</li> <li>Authorisations for regular-service passenger transport are subject to contract duration</li> <li>No parallel routes allowed in regular-service transport</li> <li>Long-term motorway concessions</li> </ul>
Rail transport			A single operator in the Integrated National Network	Regulated prices for local and regional lines		Licence system	
Air transport				Regulated prices for services arising from use of public domain of airports		Licence system	The allocation of slots rewards companies that are already established
Sea transport			A single company has control of regular-service lines between the mainland, the islands and North Africa	<ul style="list-style-type: none"> <li>Maximum prices set for essential public services</li> <li>Port services prices will be liberalised in 2001</li> </ul>		<ul style="list-style-type: none"> <li>Authorisation for regular-service lines between the mainland, the islands and Ceuta or Melilla</li> <li>Concessionnaire system for port services</li> </ul>	<ul style="list-style-type: none"> <li>Long-term contracts in transport services</li> <li>Long-term concessions or exclusive-basis system in port services</li> <li>The port authority sets pilot numbers</li> <li>Dockers must belong to port-workers union</li> </ul>

try, the situation is also very heterogeneous. Legal separation is required among the regulated and non-regulated activities of the electricity and natural gas industries (3), while in the liquid hydrocarbons industry it is obligatory to separate transport and distribution. As for the various regulated activities in the natural gas industry (4), independent accounting records must be kept. Likewise, there is a separation of accounts for rail transport infrastructure and services; for the universal postal service and other services under mail services; and for the various activities performed by the incumbent operators in telecommunications. The restrictions imposed on the ownership shares of certain operators or companies in the electricity and natural gas industries (5) may also be cited.

In most of the network industries there remains some type of price regulation, with fairly heterogeneous price-setting procedures. For natural gas, a regime of maximum prices is applied which takes into account international prices, freight and commercialisation costs. However, in the coming months this procedure is to be changed to tailor it to costs in the industry. In the case of the electricity industry, the rates paid by small electricity consumers have been negotiated, along with other aspects of the industry, as part of the ongoing and staggered opening up of the sector. As regards telecommunications, the prices of the main operator are regulated. Since 1 August 2000 the CPI-X rule has been applied, with certain restrictions being imposed on the maximum changes (upward or downward) that may be recorded in some of the services included in the baskets subject to assessment. One basket includes fixed telephony services and fixed-to-mobile phone calls. This basket may not exceed the forecast CPI of minus 9% in the year 2001, and minus 8% in the year 2002. Two additional baskets have been established, comprising various circuit rental prices. There re-

(3) Distribution and transmission are regulated in the electricity industry while generation and commercialisation are not. In the natural gas industry the only non-regulated activity is commercialisation.

(4) In particular for transport-regasification, storage and distribution.

(5) In the electricity industry in particular, ownership interests have been restricted in the case of both the Market Operator (the agent entrusted with the management of the pool) and the System Operator (the agent entrusted with the management of the transport network) to 10%, for individuals or corporations, and to 40% in the event of the sum of shares of parties engaging in activities in the electricity industry. In the natural gas industry, a ceiling of 35% has been set for the maximum interest any group of companies may have in the capital or in the voting rights of the company owning the network of gas pipelines and the three regasification plants.

mains, moreover, a whole range of fixed telephony and line-rental services adhering to a maximum price regime. As to the Telefónica fixed network interconnection rate, this must be adapted to service costs. The regulator periodically approves interconnection reference prices of which operators may avail themselves, although they may opt to negotiate other prices with the incumbent operator. In respect of reference prices, the CMT takes into account the recommendations of the European Commission, which sets a range of rates whose lower band coincides with the lowest prices applied in EU countries and whose upper band matches the third cheapest country (6).

Lastly, universal services have been established for mail and telecommunications. In telecommunications, the universal service has been awarded exclusively to Telefónica until 1 January 2006 (7). Further, if the universal service should entail a net cost for the operator offering it, the Universal Service Fund shall be set up, subsidised by all mobile and fixed telephony companies in proportion to their revenue. The obligation to provide the universal service in postal services (8) falls to Correos y Telégrafos. This entity has a monopoly on part of the services (9), while it competes for the remaining services with the authorised operators. To finance the universal service a Universal Postal Service Compensation Fund has been set up. In addition to the State, private companies engaging in universal postal services contribute to this fund through payment of rates. The contributions of private operators are restricted to 20% of the public system's needs, the remainder being financed with public funds.

(6) This procedure is a variation on the prices-via-reference-competition method.

(7) The universal service includes, among other services: (i) the right of all citizens to have the possibility of having a telephone connection, to make and receive national and international calls and have access to voice, fax and data transmission at an "affordable" price and one "relatively comparable" across regions; and (ii) the installation of one public telephone booth in each municipality and one further booth per 1,500 inhabitants.

(8) The universal service comprises mail transfer (of funds) services, national and international postal services for letters and postcards of up to 2 kg. and postal packages up to 10 kg, and registered and declared value mail services.

(9) Particularly on transfers, the international service for letters and postcards up to 350 g. and registered and declared value mail addressed to general government bodies. Moreover, it retains the inter-city service for letters and cards up to 350 g. under privileged conditions, since any other operator has to set a price for these at least five times greater than that of the public rate.

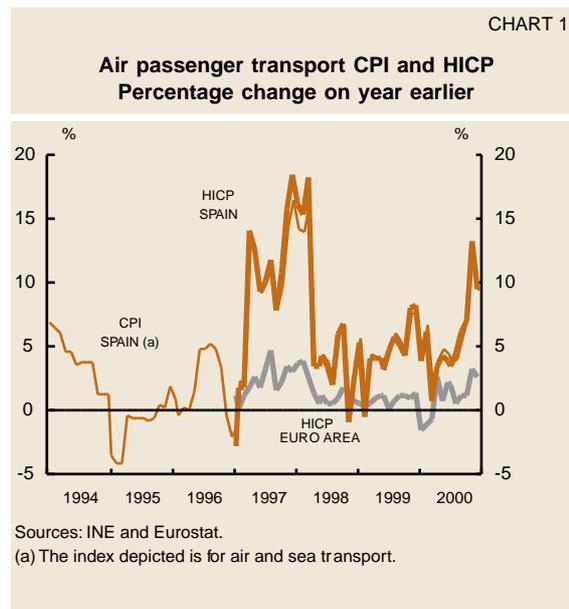
#### 4. SOME DIRECT EFFECTS OF THE LIBERALISATION AND EXTENSION OF COMPETITION IN THE NETWORK INDUSTRIES ON CONSUMER PRICES

One albeit incomplete way of analysing the incidence of liberalisation on price developments is through its direct impact on consumer prices. This section thus analyses the direct effect on the related components of the harmonised index of consumer prices (HICP) of the industries at a more advanced stage of liberalisation (air transport and telecommunications) or those which, though at a less mature stage, have recently undergone significant regulatory changes (electricity). Also, the performance of Spanish prices is compared with those of other euro area countries.

The conclusions drawn from this analysis should be viewed with substantial caution. Firstly, it is difficult to isolate that part of the observed change in price due to liberalisation from that responding to the incidence of other types of factors that may have exerted an effect in the same direction: for instance, technological advances. Moreover, international comparisons may be affected by the different timing of liberalisation processes across the various countries. Thus, while as at 1 January 1998 most EU countries had liberalised telephony services (10), it took Spain 11 months more to do so. Likewise, at present only household consumers in the United Kingdom, Sweden, Finland and Germany can choose their electricity supplier and, therefore, negotiate prices (11). A final word of caution is in order in connection with certain methodological aspects relating to the HICP; these may lead to price falls brought about by liberalisation being understated. For example, as is well known, the HICPs only compute information on households, as a result of which the impact on corporations, which in many cases entails the biggest effect, cannot be taken into account under this first approach. Furthermore, the HICP includes information relating to new operators' offers with a lag and only takes into account those directed at the entire population, thereby excluding tailor-made rates,

(10) The exceptions include Luxembourg (which completed liberalisation on 1 July 1998), Ireland and Spain (1 December 1998), Portugal (1 January 2000) and Greece (31 December 2000).

(11) As for the other countries, national timetables to enable all consumers to choose a supplier are as follows: Austria, 2001; Denmark and Spain, 2003; the Netherlands, 2004; and Ireland, 2006. Belgium, France, Greece, Italy, Luxembourg and Portugal only plan to open the electricity market to big consumers.

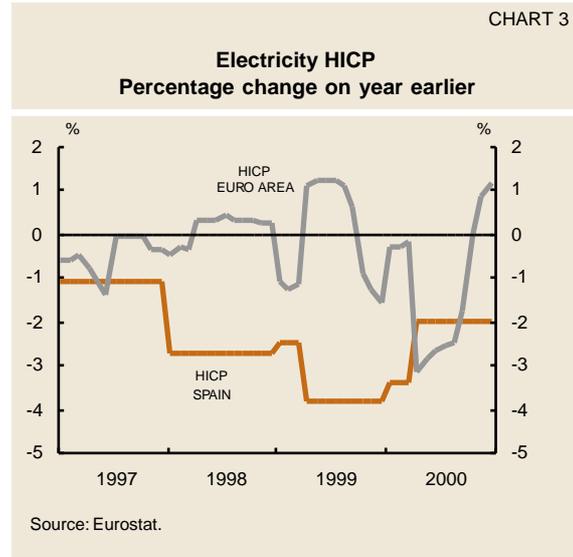
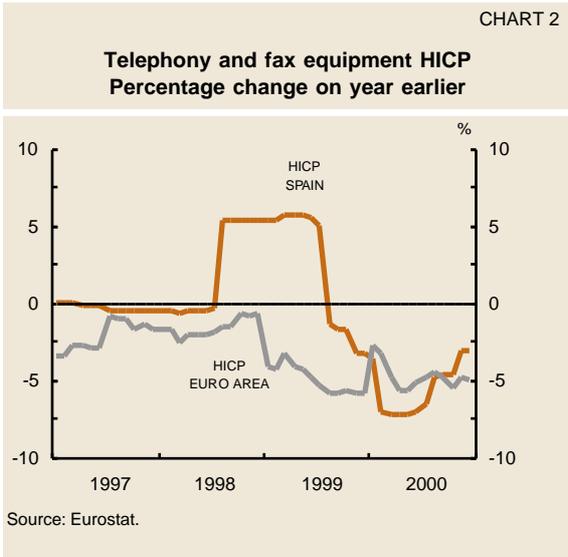


which have been much used in the opening up of the sector.

Chart 1 depicts the HICP air passenger transport series for Spain and the euro area. Moreover, as the opening up of air transport began in January 1993 and the first HICP figure available is for January 1996, it was deemed advisable also to depict the Spanish consumer price index series for air and sea transport (12). The aim here was to have some reference on price developments in the early years of liberalisation (most new operators began offering services in 1994). As can be seen in this chart, air rates moderated appreciably in Spain after the industry was liberalised, and even fell in 1995 and 1996. Since the break in this decline in rates in 1997, this HICP sub-class has posted higher growth rates than the overall index, owing perhaps to the dearer price of oil in pesetas. As to comparison with the euro area as a whole, Spanish rates can be seen to have trended more unfavourably.

Some of the caveats indicated at the beginning of this section are particularly relevant when analysing price developments in telephony services. Competition has led to changes in billing formulas. For instance, billing per second has been introduced, the rate for establishing a connection on each call has been eliminated, and off-peak periods have been extended and discounts applied to specific population segments or user groups. All this has given rise to cheaper calls which, in some cases, are not captured, owing to their construction, in the assessment made

(12) There is no CPI series that includes only air transport.



via the HICP. Likewise, the HICP may not be picking up operators' latest rates.

In any event, as can be seen in the HICP component relating to telephony and fax equipment and services (see Chart 2), price falls had begun in this industry before liberalisation, perhaps in anticipation of heightening competition. They were followed by rises brought on by the partial rebalancing of the former monopoly's rates (local calls and subscription charges became dearer and other calls were reduced). Following liberalisation, the biggest falls in this index took place between the second half of 1999 and the first six months of the year 2000. Telephony price cuts have been common to the euro area as a whole. Indeed, since 1997 the euro-area HICP series for telephony and fax equipment and services has been posting negative year-on-year growth rates. As indicated, the difficulty with an international comparison is that the introduction of competition has not been fully synchronised across the member states. However, the telephony and fax equipment and services HICP has fallen in Spain by 6.3% since December 1998, a slightly lesser amount than in the euro area.

As regards electricity, rates have undergone continuous falls since 1997 (see Chart 3), despite the fact that the opening up of the market has not yet reached household consumers. A maximum reduction of 9% is expected in the average rate for the period 2001-2003. In the euro area, price reductions have alternated with rises brought on by the introduction of ecological taxes. This hinders quantification of the effects on prices of the opening up of the electricity industry. That said, the cut in electricity rates for Spanish households has been greater (9.4% between December 2000 and January 1996)

than for their euro-area counterparts (1.4% for the same period).

## 5. EFFECTS ON OUTPUT PRICES OF LIBERALISATION AND THE HEIGHTENING OF COMPETITION IN THE SPANISH NETWORK INDUSTRIES

As indicated, the direct effect on consumer prices referred to in the previous section gives a partial view of the potential impact that the liberalisation of the network industries has on the economy as a whole. Indeed, the use of goods and services produced by these industries as inputs in other productive branches set indirect and second-round effects in train which have a bearing on overall output prices and, through this channel, on consumer prices and overall final prices.

This section seeks to evaluate the scale of the potential effect on output prices of a fall of 10% in the prices of goods and services produced by the network industries undergoing liberalisation: air and space transport; postal services and telecommunications; production and distribution of electricity; production and distribution of gaseous fuels via urban pipelines and production and distribution of steam and hot water (including natural gas). The choice of this figure of 10% should be seen as a point of reference for assessing the changes that have taken place in prices in these industries and those which may arise in the future.

Table 3 offers the results of this exercise, conducted using the productive structure of the 1995 Input-Output Tables. The first column shows the decline in output prices in the econo-

TABLE 3

**Effects on whole-economy output prices of a 10 % reduction in prices in branches of activity related to the network industries**

Branch of activity	Effects (%)			
	Direct		Total (c)	Total with adjustment (d)
	Of the branch(a)	With the other branches (b)		
Air and space transport	-0.05	-0.07	-0.08	-0.20
Postal services and telecommunications	-0.16	-0.24	-0.30	-1.38
Production and distribution of electricity	-0.20	-0.33	-0.41	-1.63
Production and distribution of gaseous fuel through urban channels, except pipelines, and production and distribution of steam and hot water	-0.02	-0.04	-0.05	-0.17
Rail transport	-0.03	-0.04	-0.05	-0.15

Source: Banco de España.

(a) Direct effect on output prices of a 10% reduction in prices in the branch.

(b) Direct effect of the branch itself plus the direct effect on the other productive branches.

(c) Sum of direct and indirect (second-round) effects.

(d) Sum of direct and indirect (second-round) effects when the exercise is performed under the assumption that factor costs that are not inputs maintain their weight in the final price.

my as a whole that would come about as a result solely of the fall of 10% in prices in the related productive branch. Naturally, the differences in magnitude observed in this column reflect the notable discrepancies in the weight of the productive branches as a proportion of total output. To this impact on the branch itself, the second column adds the price reductions that would be triggered in the other productive branches, initially, owing to the cheaper price of the input that they use in their productive processes. The third column shows the overall impact, which includes, in addition to the foregoing direct effects, those second-round effects brought about by the generalised fall in output prices. Completing this information is the final column of Table 3, where the results that would arise if the fall in input prices were not to alter the proportion accounted for by the remaining productive factors (labour, capital and taxes) in the industry's final price (13).

As can be seen in Table 3, price reductions in the electricity and telecommunications branches are those that would most influence the economy as a whole. This is due to the weight of these productive branches in total out-

put and, to a lesser extent, to their greater importance as productive inputs in other industries. A fall of 10% in their prices would lower the level of output prices in the economy as a whole (third column of Table 3) by 0.4% and 0.3%, respectively. However, these estimates might be understating the total effects since, against a background of heightening competition, it is reasonable to think that the initial fall in input costs may prompt a downward revision of the return on the other productive factors (14), the proportion of which in the final price would, as earlier indicated, be maintained. To resolve this problem an alternative simulation has been performed in which this last assumption is introduced, obtaining considerably higher total effects. In this case, a 10% fall in electricity prices would cause a 1.6% fall in output prices in the economy as a whole. And a reduction by this same amount in postal and telecommunications prices would lead to a corresponding decline of 1.4%. These estimates should be considered as an upper bound to the potential effect, because they are obtained under highly optimistic

(13) In relation to the gross operating surplus, this assumption means that, following the increase in competition, the profit margin holds. As regards the compensation of employees, this hypothesis can be justified if it is considered that the fall in prices in the economy will translate into fewer wage demands. In the case of taxes, the assumption would be in line with the tax burden being maintained.

(14) There are other sources for the understatement of the estimates presented in the third column. It should be borne in mind that the productive structure of the Spanish economy may have changed since 1995, reflecting a more intensive use of some of the productive inputs subject to analysis here, this being due to technological advance or to changes in relative prices. Moreover, the very nature of the exercise means that the total effect does not compute the second-round price falls that may come about in the productive branch in which the initial fall in prices has arisen.

TABLE 4

## International comparison (a)

Country	Direct effect (%)	
	Telecommunications	Electricity
Spain	-0.08	-0.13
France	-0.08	-0.10
Netherlands	-0.14	-0.13
Italy	-0.06	-0.14
Portugal	-0.11	-0.22

Sources: ECB and Banco de España.

(a) International comparison of direct effects of a 10% reduction in telecommunications and electricity prices on output prices.

assumptions, especially as regards the wages reaction. Therefore, a prudent estimate would place the final effect somewhere between 0.3% and 1.4%.

The effects induced by price falls in the other branches undergoing liberalisation (air and rail transport and natural gas) are smaller, with total maximum reductions close to 0.2%.

For some European countries (France, the Netherlands, Italy and Portugal) the European Central Bank (ECB) has, using the same methodology, published the direct effects of a change in telecommunications and electricity prices on the other productive industries (see Table 4). Given a fall of 10% in telecommunications prices, the Netherlands is the country with the biggest direct effect (-0.14%), while the fall in the price of electricity is more significant in the case of the Portuguese economy (-0.22%). The differences observed show the different weights that these branches have as inputs in the respective economies. The results presented for Spain in this article are at a mid-point in respect of those estimated by the ECB. For example, in the case of the electricity industry, the impact on the Spanish economy of an exercise equivalent to that performed by the ECB would be -0.13% (the difference between the effects reflected in the first two columns of Table 3), very close to the results for the Netherlands and Italy. In the telecommunications industry, the incidence in the Spanish economy is -0.08%, a similar result to that for France and Italy.

## 6. CONCLUSIONS

The opening up of the network industries in Spain has followed a worldwide pattern involving the liberalisation of these activities. In the EU, the process has been driven by the under-

taking to accelerate the creation of the single market. In Spain, the liberalisation of the network industries has been pursued as a gradual process that has progressively incorporated the various segments of each industry, following pre-set liberalisation timetables and paying heed to the initial conditions in each of the industries concerned.

Significant results are already discernible as a consequence of the progress made in liberalisation, and further results will become apparent in the future. Generally, a notable increase in the number of participants in these industries is taking place, which will contribute to increasing levels of competition. And there are also widespread reductions in prices, albeit of differing degrees depending on the industry. In some cases, such price reductions have been on a lesser scale than those in other euro area countries. Headway in reducing the market shares of the incumbent operators has, generally, been more limited, although the introduction of new measures last June will allow progress in this direction once sufficient time has transpired to ensure their effectiveness.

The potential effects of the liberalisation of the network industries on prices in the economy have exceeded those initially perceived and are quantified via their direct impact on consumer prices (such as those mentioned in the preceding paragraph). This is because the use of goods and services produced by these industries as inputs in other productive branches sets in train indirect and second-round effects that bear on output prices and, in subsequent phases, on final prices.

In particular, both electricity and telecommunications significantly influence the output costs of other goods and services. The exercises performed with the Spanish economy's 1995 Input-Output tables show that a 10% reduction in the price of each of these industries might alone entail a fall in the overall level of the economy's output prices of around 1%, the scale depending on some of the assumptions made. Lower air and rail transport or natural gas prices may prompt reductions in output prices of some size. These figures, which are in line with those obtained for other European countries, illustrate the need to pursue the structural reforms undertaken in the network industries. The resulting benefits for the rest of the economy will be boosted if other obstacles constraining competition in other markets and services are lifted.

22.3.2001.

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