Market's liberalization and consequent changes in the Telecommunication Sector

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Abstract

During the last two decades important structural policies have taken place worldwide in the telecommunication sector. Although a comprehensive appraisal of the telecommunication sector reform may still be precipitate, a significant number of studies attempt to assess the consequences of the aforementioned changes. Two types of analysis are usually encountered in the relevant literature: empirical econometric analyses and descriptive analyses. These research papers mainly examine the consequences of the telecommunication market reform and the corporate restructuring of traditional telecommunication organisations, which were fully or partly privatised through public offer or through direct sale to one or more investors.

The objective of this paper is to present a survey of the relevant literature and to draw useful conclusions concerning the consequences of the structural changes in the telecommunication markets, which have been internationally adopted. Especially, there has been an attempt to closely examine the consequences of enhanced competition and of PTOs privatization, as well as the impact of an independent regulatory authority on market performance ratios such as telephony coverage, level of investments, labor productivity, prices and quality of the provided services and employment.

Keywords: *Telecommunication, Privatization, Competition*

The rapid progress and developments that have taken place in the telecommunications area, mainly from 1980 onwards, have created the requirement to enact substantial structural changes in the sector. Neither the clients' increasing demands for lower prices and for higher quality of available services, nor the important technological advances could not be satisfied by the lumbering bureaucracy of national organisations which were typified by limited technological know-how and which had been dominant in all the countries for many decades. Therefore, policies have been implemented on a global scale leading to the reform of the telecommunications sector. More specifically, there has been a restrained worldwide trend to increasingly open the market to competition while simultaneously establishing a regulatory framework, as well as a trend towards the privatisation of the public telecommunications organisations (PTOs).

Although a comprehensive evaluation of the reform in the telecommunications sector is still precipitate, there already exists a substantial body of studies attempting to assess the impact of the substantial changes that have taken place. Through these studies, which are either empirical financial analyses or descriptive case studies, the effects of the reforms are examined both as regards the marketplace and as regards the corporate world. The purpose of the present article is to record the significant studies and to extract useful conclusions concerning the way the telecommunications markets have been affected by the structural changes which have been adopted

internationally, both in developed and in developing countries.

Reform of the Telecommunications Markets

In the case of the market reforms we shall examine how indices of market efficiency such as telephone penetration, the level of investments, work productivity, prices and quality of services offered and employment have been effected by the introduction of competition, by the privatisation of the traditional telecommunications organisations and by the establishment of independent regulatory authorities. More specifically, the most important conclusions that emerge concerning each of these indices are as follows:

1. Telephone Penetration

From all the studies reviewed, one is led to the conclusion that the application of reform programmes substantially improves the level of telephone penetration (*Fink and Matto et al. 2003, Chung and Ypsilantis 2003, Li and Xu 2002, Ypsilantis 2002, Fink and Matto et al 2001, Ros and Banerjee 2000, Mueller and Lovelock 2000, Hughes and Phillips 1999*). The number of main telephone lines and their simultaneous digitisation increases rapidly, as does the number of payphones / card phones and of Telecenters (*Haggarty and Shirley 2003, Laffont and N' Guessan 2003, Tusubira and Gebreab et al 2002, Dia and N' Guessan et al 2002*). More specifically, the number of main lines and the number of payphones proliferates because of competition. On its own, privatisation correlates negatively with the penetration of main lines, while it appears to exert a positive impact on the number of payphones only. By contrast, when privatisation is combined with the existence of an independent regulatory framework, a substantial mitigation of the negative effect in the penetration of main lines is observed (*Wallsten 2001*). At the same time, if privatisation takes place prior to the introduction of competition, the penetrativeness of main lines is lessened (*Pink and Matto et al 2003*). Telephone penetrativeness is positively affected if an independent regulatory authority is established prior to privatisation (*Wallsten 2002, Galal and Nauriyal 1995*). The greater the degree of independence in a country's regulatory authority, the greater the increase is in the penetration of main telephone lines (*Baudrier 2001*). Moreover, the greatest increase in main telephone lines is evidenced in those countries where the public telecommunications organisation has been privatised by at least 50%. By contrast, the stipulation of exclusive provision of basic telecommunications services by the traditional telecommunications organisations for a specific period limits the degree of growth of main telephone lines (*Wallsten 2000*).

Moreover, the reform of the sector has caused the rapid increase in the proportion of penetration of novel telecommunication services, most notably mobile telephony and the Internet (*Clarke and Gebreab et al. 2003, Ypsilantis 2002, Xavier and Ypsilantis 2001, Ypsilantis and Min 2000, Yamada and Ypsilantis 2000, Samarajiva 2000, Xavier and Ypsilantis 2000, Sato and Ypsilantis 2000, Min and Ypsilantis 1999, Min 1999, Bloendal and Dirk 1997*). The growth of the mobile telephony market has been more noticeable, compared to the Internet market, which exhibits slower growth rates, particularly in developing countries (*Laffont and N' Guessan 2003, Lee 2002, Vanyai 1998, Serra 1998, Gonzalez and Gupta et al 1998, Athreya 1996, Sinha 1996*). It is important to note that the proliferation of main telephone lines, which appears more intense during the initial years of the reform, is

reduced after the full liberalisation of the market due to the intense competition of mobile telephony (*Ypsilantis and Min 2001, Sacripanti 1999*).

By contrast, competition and privatisation do not directly affect the increase of Internet users and hosts. The Internet exhibits greater development in countries where the political system is democratic and which favour entrepreneurial thinking and investments. Moreover, the higher the per capita income, the deployed telephone lines and the use of the English language, the larger the number of Internet users is (*Giullen and Suarez 2001*). Furthermore, an important factor for the development of the Internet market is the connection between the proportion of Internet penetration and the PC penetration. The higher the percentage of PC penetration in a country, the more positive the perspectives of growth are for that particular market (*Lee and Ypsilantis 2002*). By contrast, the control of the Internet by governmental agencies results in the growth of the particular market at a very slow rate (*Chung and Ypsilantis 2003*).

Finally, the goal of universal service remains a significant problem. The poorest regions, especially in the developing countries, remain restricted from the most and the best telecommunications services, even after the reform of the telecommunications sector (*Laffont and N' Guessan 2003, Haggarty and Shirley et al. 2003, Tusubira and Gebreab et al 2002, Gonzalez and Gupta et al 1998*). In the meanwhile, no unequivocal findings exist concerning whether competition is beneficial to the achievement of the goal for universal service (*Barros and Seabra 1999*).

2. Investments

As regards the level of investments, all of the studies reviewed reveal the existence of a general increase in countries where the sector was reformed compared to the countries that did not open the markets to competition and where the majority of the traditional telecommunications organisation was retained by the state (*Gutierrez and Berg 2002, Ypsilantis 2002, Li and Xu 2002, Ros and Banerjee 2000, Yamada and Ypsilantis 2000, Vanyai 1998, Gonzalez and Gupta et al. 1998*).

More specifically, there is an apparent escalation of investments in new technology, focusing on optical fibres and thus enhancing digital technology, which increases the productivity and efficiency of the sector (*Madden and Savage et al 2003, Haggarty and Shirley et al. 2003, Tusubira and Gebreab et al. 2002, Heracleous 2001*). In addition, a significant proportion of the overall investment in the sector pertains to the mobile telephony market, which exhibits rapid growth (*Lee and Ypsilantis 2002*).

The stipulation of a period when the basic telecommunications services will be exclusively provided by the traditional telecommunications organisations has a significant negative impact on the level of investments (*Wallsten 2000*). Moreover, it is apparent that despite a steady reduction in public spending in recent years, overall investment in the sector has increased, mainly through the substantial investments, which took place by new enterprises entering the market. Investments in fixed modular infrastructure which exploit pre-existing infrastructure of the power grid, the road and rail networks and the bridge conglomerates are particularly noteworthy (*Xavier and Ypsilantis 2000, Sato and Ypsilantis 2000*). Moreover, the entry of foreign multinational corporations in the market, either

through joint ventures or through acquisitions, has significantly increased the level of investments (*Athreya 1996, Sinha 1996*).

Finally, the establishment of an independent regulatory body prior to privatisation is associated with a higher level of investments, while the level of investments remains low in case of failure to implement a successful regulatory policy (*Wallsten 2002, Galal and Nauriyal 1995*). An unsatisfactory function of the regulatory agency in terms of independence and impartiality, coupled with governmental influence in the formulation of regulatory decisions, discourage potential investors from investing in the market (*Clarke and Gebreab et al. 2003*). A powerful regulatory body and a stable political system have been shown to increase the level of investments. The financial situation and the population size of a country both exert a positive effect (*Gutierrez and Berg 2002*).

3. Prices of Telecommunications Services

Regarding the index of prices for telecommunications services, it is evident that there is a steady decrease after the reform of the sector (*Min 1999, Parker 2004, Haggarty and Shirley et al 2003, Ypsilantis 2002, Dia and N' Guessan et al 2002, Heracleous 2001, Xavier and Ypsilantis 2000, Holder 1998, Vanyai 1998, Spiller and Cardilli 1997, Xavier 1996*). However, Nicoletti's study (*2001*) observes that the effects of privatisation in the level of prices are equivocal. More specifically, it is demonstrated that the increased competition (numbers of competing companies or market share for new enterprises) and the technological developments cause a reduction of the price for services. Similarly, the prospect of competition (expressed in the number of years remaining until the full liberalisation of the market) exerts a strong negative effect on prices (*Boyland and Nicoletti 2000*). Privatisation on its own without the existence of an independent regulatory body does not effectively bring any amelioration in prices (*Wallsten 2001*).

Furthermore, any problems observed in the licensing of new ventures in the market limit competition, thus exerting a significant effect on the level of prices (*Yamada and Ypsilantis 2000*). The limited competition results in retaining the price index in high levels (*Lee and Ypsilantis 2002*), while the more intense the competition, the lower the average prices become (*Nicoletti 2001*). A mild policy of reform, facing several problems in implementation, results in the prices not being reduced. Additionally, it often leads to an increase of prices both for mobile telephony services and in prices for local and long-distance calls (*Clarke and Gebreab et al 2003*). By contrast, countries that are successful in regulating the market to a satisfactory degree exhibit the most substantial reduction in prices following the reform of the sector (*Galal and Nauriyal 1995*).

As regards the effects of the reform on the price levels for particular telephone services, the results are equivocal. Specifically, the study by Ros and Banerjee (*2000*) indicates that privatisation mainly reduces the fee for connecting to the telecommunications network and the minimum charge for a local call. Two other studies (*Sato and Ypsilantis 2000, Hughes and Phillips 1999*) conclude that there is a more intense decline in prices for long-distance, international and mobile phone services. By contrast, certain other studies (*Ypsilantis and Min 2000, Cho and Byung-il et al 1996*) deduce that although there is a substantial drop in prices, this is not the case for the fees for international services and

leased lines, which remain relatively high. The study by Min and Ypsilantis (*1999*) claims that the greatest reduction in prices has been observed in the corporate market (leased lines) and the international market. A different range of studies (*Tusubira and Gebreab et al 2002, Serra 1998, Gonzalez and Gupta et al 1998, Bloendal and Dirk 1997*) conclude that the charges for international and long distance telephone services have been significantly reduced, whereas the price of local fixed telephony appears to increase initially and decrease at a very slow rate following that. Ypsilantis and Min (2001) as well as Sacripanti (1999) observe a greater reduction of prices in mobile telephony services and Internet services, due to the more intense competition in these markets. By contrast, the lack of substantial competition in the market of leased lines retains the prices of leasing high, resulting in a restriction of the decrease in Internet access prices (*Xavier and Ypsilantis 2001*).

The development of digital technology has a negative influence on the level of prices for services (*Madden and Savage et al 2003*). However, it is unclear to what extent the reduction of prices is influenced by the reform and to what extent it is influenced by technological advances (Bloendal and Dirk 1997). In addition, a reduction of prices is achieved, under certain conditions, through mergers and acquisitions, which usually intensify competition (*Cricelli and Mastaldi et al 1999*). Finally, when a study investigates only a limited time period, the effects of the reform on the average price of telecommunications services both for residential and for corporate consumers are to a great extent indeterminate (*Barros and Seabra 1999*).

4. Quality of Telecommunications Services

According to international practice, the quality of telecommunications services is estimated additively or alternatively by calculating the waiting period for the main telephone lines, the number of malfunctions repaired within 24 hours, the annual number of malfunctions per 100 lines, the average duration of interruptions in service and by the number of recorded complaints. As regards the quality index, the studies reviewed generally conclude that the reform of the sector has a significant positive effect on its improvement (*Parker 2004, Ypsilantis 2002, Dia and N' Guessan et al 2002, Ypsilantis and Min 2001, Yamada and Ypsilantis 2001, Samarajiva 2000, Xavier and Ypsilantis 2000, Ros and Banerjee 2000, Sacripanti 1999, Hughes and Phillips 1999, Holder 1998, Vanyai 1998, Gonzalez and Gupta et al 1998, Xavier 1996*).

To be more specific, the prospect of competition and the increased competition exert a strong positive effect on the quality of services offered, as was the case in the other indices (*Nicoletti 2001, Boyland and Nicoletti 2000, Spiller and Cardilli 1997*). Both the competition and the privatisation substantially increase the quality of services offered. In addition, the formulation of a regulatory policy and the establishment of an independent regulatory body impact positively on the quality (*Fink and Mattoo et al 2001, Galal and Nauriyal 1995*), while the combined effects of a new regulatory environment and of privatisation of the national telecommunications organisation result in a more robust improvement of the quality of services (*Serra 1998*). By contrast, limited competition and a problematic establishment of regulatory agencies to monitor the function of the market significantly delay the improvement of quality (*Goldstein 2003, Clarke and Gebreab et al*

2003, Laffont and N' Guessan 2003).

Additionally, new technological developments, and the digitisation of the technological infrastructure in particular, exert a very substantial effect on quality (*Madden and Savage et al 2003, Lee and Ypsilantis 2002, Boyland and Nicoletti 2000*), while the further modernisation of the infrastructure (broadband networks, optical fibres etc.) is expected to ameliorate it even more (*Xavier and Ypsilantis 2001*). Besides, Ypsilantis and Min (*2000*) in an attempt to specify even further, examine the percentage of successful calls and the proportion of access in order to examine the quality of mobile telephony services, and conclude that the reform is positively associated with the quality of services in mobile telephony. Nevertheless, in some cases, the quality of services on offer showed no indications of improvement, despite the reforms of the sector, thus remaining at the approximate level before the reform (*Haggarty and Shirley et al 2003, Tusubira and Gebreab et al 2002*).

5. Overall employment in the Telecommunications Sector

All the studies under review (*Li and Xu 2002, Ypsilantis and Min 2001, Xavier and Ypsilantis 2001, Ypsilantis and Min 2000, Xavier and Ypsilantis 2000, Sacripanti 1999, Cho and Byung-il et al 1996*) suggest that despite the reduction in personnel in the traditional telecommunications organisations, overall employment in the telecommunications sector increases following reform due to the introduction of many new enterprises in the market. More specifically, employment is initially reduced due to the privatisation of traditional telecommunications organisations, while subsequently it exhibits a steady increase due to the full liberalisation of the market (*Yamada and Ypsilantis 2001*). The greatest effect on the overall increase of employment stems from the new enterprises in the market for novel services, such as mobile telephony and the Internet (*Ypsilantis 2002, Ypsilantis and Min 2001, Giullen and Suarez 2001, Hughes and Phillips 1999, Cha and Majumdar 1999*).

6. Work productivity

From the review of the international literature it is evident that the reform of the telecommunications sector raises work productivity, as assessed through the number of subscribers per employee or by the quotient of total revenue and employment (*Haggarty and Shirley et al 2003, Laffont and N' Guessan 2003, Fink and Mattoo et al 2003, Li and Xu 2002, Ypsilantis 2002, Fink and Mattoo et al 2001, Ypsilantis and Min 2000, Xavier and Ypsilantis 2000, Min and Ypsilantis 1999, Holder 1998, Cho and Byung-il et al 1996*). It has also been documented that work productivity increases more rapidly in those countries where the telecommunications market has been completely opened, compared to those countries that only have achieved a partial liberalisation of the market (*Bloendal and Dirk 1997*).

More specifically, the escalating competition technological developments all cause an amelioration of work productivity (*Boyland and Nicoletti 2000*). By contrast, the effects of privatisation on this particular efficiency index are ambiguous (N*icoletti 2001*). On the other hand, privatisation coupled with the existence of an independent regulatory framework is significantly associated with an increase of work productivity (*Wallsten 2001*). The countries that are successful in regulating the market to a satisfactory degree exhibit

a more marked improvement in productivity. In countries where there is a failure to implement a successful regulatory policy, work productivity remains at low levels (*Galal and Nauriyal 1995*). However, the profits associated with increased productivity, which are enjoyed by privatised corporations, only benefit the consumers provided healthy competition has been introduced and is at work in the market (*Serra 1998*).

Additionally, the competition that develops in the mobile telephony market impacts positively on the levels of productivity (*Fink and Mattoo et al 2003*). Similarly, the increase in production, mostly expressed in terms of phone call flows, increases the productivity index. The basic component of the increase in production is the international telecommunications traffic, which increased rapidly mostly during the 1990s (*Madden and Savage et al. 2003*). Moreover, the reduction in the number of employees in traditional telecommunications organisations promptly increases work productivity (*Dia and N' Guessan et al 2002*).

Conclusions

Important structural changes have taken place in the global telecommunications sector over the last two decades. The motivation behind these changes lies (a) on customers' demand for higher service quality, novel services and lower prices, and (b) on the bureaucracy and limited technological know-how of national monopolistic organizations which hinders the adoption of significant technological advances. Therefore, the gradual opening of these organizations to the competition, through privatization and reorganization, and the establishment of a regulatory framework are necessary for the smooth functioning and development of the telecommunications market.

The implementation of the reformative policy significantly affects market indices, such as telephone penetration, level of investment, prices and quality of services provided, level of employment and labor productivity. Nevertheless, this positive impact is mainly witnessed in developed regions. The poorest regions, especially in developing countries, do not have access in higher quality services.

The level of investment in the telecommunications sector has generally increased after reformation. Although public spending steadily decreases in recent years, total investment increases, mainly due to the entrance of new firms. In addition, a significant proportion of total investment, originates from the mobile telephone market which exhibits high growth rates. The surge of investment in optical fibres and digital technology leads to higher productivity and efficiency of the sector. The latter implies lower prices of services. Nevertheless, a number of studies indicate that the price impact of privatization is ambiguous. The impact on quality, however, is clearer. The relative studies show that new technological advances and the digitization of the technological infrastructure exert a significant positive impact on quality. Employment also increases with the extra demand originating from new companies in the market, specializing in mobile telephony and Internet. Finally, labor productivity, measured as the number of subscribers per employee or by the quotient of total revenue to employment, increases. This increase stems from the enhanced competition in the mobile market, the increase in phone call flows, and the reduction of employees.

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