

# **PUBLIC UTILITIES PRIVATIZATIONS IN OPEN ECONOMY: A LITERATURE REVIEW**

**Kostas Karamanis**

TECHNOLOGICAL EDUCATIONAL INSTITUTE OF EPIRUS

**Eirini Triarchi**

TECHNOLOGICAL EDUCATIONAL INSTITUTE OF EPIRUS

## **ABSTRACT**

The purpose of this paper is to record important studies and to draw useful conclusions on the effects of structural changes in public utilities. As a case study the telecommunications markets will be analyzed, since in almost all developed and developing countries the telecommunication sector has experienced a transition process from a highly regulated state-owned monopoly to a liberalized competitive market regime. In particular, the impacts of the privatization of the traditional organizations, introduction of competition and the establishment of an independent regulatory authority related to market performance indicators such as telephone penetration, amount of investments, prices and quality of service, employment and labor productivity, will be examined.

**Keywords:** Public Utilities, Privatization, Competition, Regulation, Telecommunication

**JEL Classification:** L11, L12, L32, L96

## **Introduction**

Globally over the last decades, public utilities have undergone significant structural changes. Most of the developed and developing countries implemented policies leading to privatization and reorganization of state-owned enterprises (SOEs). These initiatives are justified by the fact that SOEs operating as cumbersome bureaucratic state organizations with limited expertise could not respond adequately to the new conditions created in the markets, such as technological developments, increasing customer demands for new services, for highest quality of existing service, lower prices, etc. Therefore, globally policies started to be implemented leading to the reform of industries which until then were operating exclusively under state control and supervision. An interesting case is the telecommunications sector which from the 80s onwards has experienced rapid development and growth worldwide (*Karamanis and Georgopoulos, 2006*). In particular, almost all developed and developing countries have implemented privatization policies of Public Telecommunications Organizations (PTOs) while at the same time gradually the markets were liberating to the competition and a regulatory framework was establishing.

Internationally, there is a significant number of studies trying to evaluate the impacts of these strategic changes. In these studies which are based either on empirical econometric analysis either on descriptive analysis (cases studies), the effects of reforms both at market and enterprise level, are examined. The purpose of this paper is to record important studies and to draw useful conclusions on the effects of structural changes in public utilities. As a case study the telecommunications markets will be analyzed, since in almost all developed and developing countries the telecommunication sector has experienced a transition process from a highly regulated state-owned monopoly to a liberalized competitive market regime. In particular, the impacts of the privatization of the traditional organizations, introduction of competition and the establishment of an independent regulatory authority related to market performance indicators such as telephone penetration, amount of investments, prices and quality of service, employment and labor productivity, will be examined.

## **Telephone Penetration**

Of all the recorded studies in this paper, it is found that the implementation of the reform programs has significantly improved the level of telephone penetration (*Thamae, 2015; Gasmı and Virto, 2010; Fink et.al, 2003; Chung and Ypsilantis, 2003; Li and Xu, 2002; Ypsilantis, 2002; Ros and Banerjee, 2000; Fink et.al., 2001; Mueller and Lovelock, 2000; Hughes and Phillips, 1999*). The number of

main telephone lines, simultaneously being digitized, grew rapidly as did the number of coin-operated machines / payphones and telecentres (*Laffont and N'Guessan, 2003; Haggarty and Shirley, 2003; Tusubira et.al., 2002; Dia et.al., 2002*). In particular, the competition raised the number of main lines and coin-operated machines. By itself privatization was negatively correlated with the penetration of main lines, while appeared to have a positive effect only on the number of coin-operated machines. In the cases where the privatization took place before the advent of competition, the penetration of main lines became moderate (*Fink et. al., 2003*). The telephone penetration was positively influenced when before the privatization, an independent regulator and an independent regulatory framework were established (*Djiofack-Zebaze and Keck, 2009; Wallsten, 2002; Wallsten, 2001; Galal and Nauriyal, 1995*). The greater was the degree of independence of the regulatory authority of a country, the greater the increase in penetration of main telephone lines (*Montoya and Trillas, 2007; Baudrier, 2001*).

Moreover, countries that proceed in the privatization of their national telecommunications operator at least by 50%, experienced a significant increase of the main telephone lines. Instead, the ensuring of exclusive provision of basic telecommunications services from traditional telecommunications operators for a specified period of time, reduced the growth rate of main telephone lines (*Wallsten, 2000*). In addition, the impact of the reform on the telephone penetration is not dependent on the country's per capita income. There is no evidence to prove that privatization led to a higher increase of the main lines in those countries with higher per capita GDP (*Ros, 1999*). In contrast, *Lam and Shiu (2010)* found out that there is a bidirectional relationship between real gross domestic product (GDP) and telecommunications development (as measured by teledensity) for European and high-income countries.

More specifically, the reform of this sector caused a rapid increase in the rate of penetration of new telecommunications services mainly in mobile telephony (*Thamae, 2015; Gasmi and Virto, 2010; Clarke et.al., 2003; Ypsilantis, 2002; Ypsilantis, 2002; Xavier and Ypsilantis, 2001; Ypsilantis and Min, 2000; Xavier and Ypsilantis, 2000; Sato and Ypsilantis, 2000; Yamada and Ypsilantis, 2000; Samarajiva, 2000; Min, 1999; Min and Ypsilantis, 1999; Bloendal and Dirk, 1997*). The introduction of competition related positively with the growth of mobile telephony market (*Djiofack-Zebaze and Keck, 2009*). However, the penetration of mobile telephony was influenced positively by competition only in the case that competition concerned digital operators (*Fink et.al., 2001*). Both the ownership and the eventual privatization appeared to have no clear relation to the market growth (*Nicoletti, 2001*).

On the contrary, the internet market especially in developing countries presented lower rates of growth (*Thamae, 2015; Laffont and N' Guessan, 2003; Lee, 2002; Vanyai, 1998; Serra, 1998; Gonzalez et.al., 1998; Athreya, 1996; Sinha, 1996;*). The competition and the privatization had no direct impact on the growth of users and internet hosts. The internet growth was higher in countries that had democratic political system, encouraging the entrepreneurship and investment. Additionally, the higher the per capita income, the installed telephone lines and the use of English language, the higher was the number of internet users (*Giullen and Suarez, 2001*). Moreover, significant for the growth of the internet market was the relation of the internet penetration rate to P/C's penetration. As higher the P/C's penetration rate of a country was, the more positive were the prospects of the specific market's growth (*Lee and Ypsilantis, 2002*). In contrast, the monitoring of internet by government organizations resulted in the slowed growth of this market (*Chung and Ypsilantis, 2003*).

Finally, extremely important are the findings that the increased penetration of mobile telephony and the internet has improved the efficiency of telecommunications, and pushed for expansion and modernization of telecommunications infrastructure (*Jha and Majumdar, 1999*). The increase in main telephone lines, which appeared intense in the first years of the reform, decreased after the complete liberalization of the market due to high competition in mobile telephony (*Ypsilantis and Min, 2001; Sacripanti 1999*). However, the study of *Gutierrez and Berg (2002)* leads to the opposite conclusion, which is that the growth of mobile telephony either functioning complementary to the fixed telephony either competitively, significantly increased the main lines level per 100 inhabitants.

As an important problem remained the goal of universal service , since the poorest regions, particularly in developing countries, continued after the reform of the telecommunications sector to be excluded from more and better telecommunications services (*Haggarty et.al., 2003; Laffont and N' Guessan, 2003; Tsubira et.al., 2002; Gonzalez et.al., 1998*). While, there is no clear conclusion as to whether the competition was beneficial or not for achieving the goal of universal service (*Wen et.al. 2012; Barros and Seabra, 1999*). The study of *Lumanto and Kosuge (2005)* provides evidence that the performance of the telecommunications sector after reform is largely determined by how well the institutions in the reform process work, rather than depending on reform strategies such as privatization, market competition, creation of a regulatory body, or an increase in the number of players.

In any case, the delay of telecommunications sector reform caused significant negative impacts to the penetration rate of both fixed and mobile telephone lines, as well as to the extent of use of internet services (*Coldstein, 2003*).

## Investments

Referring to the level of investments, from the examined studies found that this significantly increased in countries that have reformed the sector in relation to countries that did not release their markets to competition and the state retained the majority of the traditional telecommunications organization (*Gutierrez and Berg, 2002; Li and Xu, 2002; Ypsilantis, 2002; Ros and Banerjee, 2000; Yamada and Ypsilantis, 2000; Vanyai, 1998; Gonzalez et.al., 1998*). *Biancini (2011)* concluded that competition seemingly helps stimulating investment in the most developed areas, but does not seem to have a significant impact on the less developed ones.

In particular, intense investments are presented in new technologies with focus on optical fiber, thus enhancing the digital technology, which increased the productivity and efficiency of the sector (*Li, 2012; Madden et.al. 2003; Haggarty and Shirley, 2003; Tusbira et.al. 2002; Heracleous, 2001*). Additionally, an important percentage of the total investment in the sector is in the mobile telephony market, which presented rapid growth (*Lee and Ypsilantis, 2002*).

It also emerged that while public investment declined steadily in recent years, the total investment in the sector has increased mainly due to considerable investments made by new entrants to the market. Particularly important was the investment in the fixed spinal infrastructure using the existing infrastructure of electricity, road network, railway network and bridges consortium (*Xavier and Ypsilantis, 2000; Sato and Ypsilantis, 2000*). *Lestage et.al. (2013)* concluded that greater competitive pressure fosters infrastructure investment by state-owned incumbents but reduces investment by private incumbents. Moreover, the entry of foreign multinational companies on the market, either through partnerships or through acquisitions, significantly increased the level of investment (*Athreya 1996; Sinha 1996*).

The expansion of telecommunications services which was not combined with an analogous modernization of infrastructure, has resulted in fewer investments. Furthermore, ensuring a period of exclusive provision of basic telecommunications services to traditional telecommunications operators had negative impact on the level of investments (*Wallsten, 2000*). According to *Howell et.al. (2010)* competition between vertically integrated telecommunications providers would likely induce more efficient and sustainable investment and competition than would separation.

Finally, the establishment of an independent regulatory authority prior to privatization positively affected the level of investments. *Paleologos and Polemis*

(2013) analysis reveals that there is a strong and positive relationship between effective regulation and investment. Positive effect on investments also had the economic situation and the size of country's population (*Gutierrez and Berg, 2002*). On the contrary, the level of investments remained low due to the weakness to implement a successful regulatory policy (*Wallsten 2002; Galal and Nauriyal 1995*). The malfunctioning in the independent and impartial operation of the regulator as well as the government influence at receiving regulatory decisions, prevented potential investors to invest in the market (*Clarke et.al., 2003*). Overall, the results suggest a higher social rate of return on telecommunications infrastructure investment for the aggregate economy (*Nadiri et.al., 2009*).

### **Pricing of Telecommunications Services**

The prices in telecommunications services reduced steadily after the sector's reform. (*Djiofack-Zebaze and Keck, 2009; Parker, 2004; Haggarty et.al., 2003; Min, 1999; Ypsilantis, 2002; Dia et.al., 2002; Heracleous, 2001; Xavier and Ypsilantis, 2000; Holder, 1998; Vanyai, 1998; Spiller and Cardilli, 1997; Xavier, 1996*).

More specifically, it is clear that the increasing competition (number of competitive companies or business new entrants' market share) and the technological advances resulted to a decrease in services prices. Alike, the prospect of competition (as represented by the number of years which falls short before the market liberalization) had a strong negative price effect (*Boylard and Nicoletti, 2000*). As the competition becomes more intense, the more the average price is falling (*Lee and Ypsilantis, 2002; Nicoletti 2001; Galal and Nauriyal, 1995*). The fall of price under conditions was also caused by mergers and acquisitions, which usually intensify competition (*Cricelli et.al., 1999*).

Instead, the privatization of public organizations by itself without the existence of an independent regulatory authority did not lead substantially to the reduction of prices (*Wallsten, 2001*). In addition, the problems that were presented at licensing new entrants, restricted competition and had eventually significant effect on the price level (*Yamada and Ypsilantis, 2000*). A modest reform policy, with many problems in its implementation, resulted not to reduce the prices. Thus, often resulted to higher prices not only for mobile telephone services but also for the local and long distance calls (*Clarke et.al., 2003*).

Regarding the effects of the reform on the level of prices in the individual telephone services, the results were ambiguous. Specifically, the study of *Ros and Banerjee (2000)*, found that privatization mainly reduced the connection prices to the

telecommunications network and the cost of the minimum local call. Two other studies (*Sato and Ypsilantis 2000; Hughes and Phillips 1999*) concluded to the sharp fall of prices of long distances, international and mobile telephone services. Instead, other studies (*Ypsilantis and Min, 2000; Cho et.al., 1996*) concluded that despite the significant fall in prices, however this did not apply for international services and prices of leased lines, which still remained relatively high. The study of *Min and Ypsilantis (1999)* found that stronger price fall was mainly at business market (leased lines) and the international market. Another series of studies (*Tusubira et.al., 2002; Serra, 1998; Gonzalez et.al., 1998; Bloendal and Dirk 1997*) concluded that the price of international and long distance telephone services decreased significantly, while the price of local fixed telephony first appeared to increase and then to decrease very slowly. *Ypsilantis and Min (2001)* like *Sacripanti (1999)* observed significant price reduction both in mobile telephone and internet services, due to the strong competition which prevailed in these markets. On the contrary, the lack of fierce competition in the leased lines market maintained high lease prices, thereby reducing the decline in prices for the internet access (*Xavier and Ypsilantis, 2001*).

Finally, important is the conclusion that the growth of digital technology pushed down the level of prices (*Madden et.al, 2003*). However, there is a lack of clarity about what is the impact on one hand of the reforms and on the other of the technological advances at reduction of prices (*Bloendal and Dirk, 1997*).

### **Quality of Telecommunications Services**

The index of service quality, which is measured cumulatively or disjunctively by the waiting time for the main telephone lines, the percentage of defects repaired within 24 hours, the annual number of defects per 100 lines, the average duration of outages and the number of complaints, found to be significantly improved by the sector's reform (*Parker, 2004; Dia et.al., 2002; Ypsilantis, 2002a; Ypsilantis, 2002b; Ypsilantis and Min, 2001; Yamada and Ypsilantis, 2001; Samarajiva, 2000; Xavier and Ypsilantis, 2000; Ros and Banerjee, 2000; Hughes and Phillips, 1999; Sacripanti, 1999; Min, 1999; Holder, 1998; Vanyai, 1998; Gonzalez et.al., 1998; Xavier, 1996*). Moreover, *Ypsilantis and Min (2000)*, specialized even more, studied the rate of the success of the call and the rate of access in order to examine the quality of mobile telephone services and found that the reform is positively associated with the quality of mobile telephone services.

The growing competition and the privatization of public organizations had a strong positive effect not only on the previous performance indicators, but also on the quality of provided services (*Nicoletti, 2001; Boyland and Nicoletti, 2000; Spiller*

and Cardilli, 1997). A positive effect on the quality of services had also the definition of the regulatory policy and the establishment of an independent regulatory authority (Fink et.al., 2001, Serra 1998; Galal and Nauriyal, 1995). Instead, the limited competition and the problematic establishment of regulatory authorities fixing the function of the markets, significantly delayed the improvement of quality (Coldstein 2003; Clarke et.al., 2003; Laffont and N 'Guessan, 2003).

Additionally, very significant impact on the quality had the new technological advances, especially digitization and modernization of telecommunications infrastructure, such as broadband networks, fiber optics, etc. (Madden et.al., 2003; Lee and Ypsilantis, 2002; Xavier and Ypsilantis, 2001; Boyland and Nicoletti, 2000).

However, in some cases, especially in the developing countries, the total quality of services provided didn't not present improvement despite the reform of the sector remaining approximately to the levels that existed before the introduction of the reform (Leong, et.al., 2012; Haggarty et.al., 2003; Tsubira et.al., 2002).

### **Employment**

The total of the examined studies (Li and Xu 2002; Ypsilantis and Min 2001; Xavier and Ypsilantis, 2001; Ypsilantis and Min, 2000; Xavier and Ypsilantis, 2000; Sacripanti, 1999; Cho et.al., 1996) found that despite staff reductions in traditional telecommunications organizations, total employment in the telecommunications sector after the reform, increased due to the entry of many new enterprises in the market.

In the beginning, a decrease in employment in traditional telecommunications organizations was mentioned, while after the complete liberalization of the market the total employment in the sector increased (Yamada and Ypsilantis, 2001). Greatest contribution to this increase had the new entrants in the market of new services such as mobile telephone and internet services (Ypsilantis, 2002; Ypsilantis and Min, 2001; Guillen and Suarez, 2001; Hughes and Phillips, 1999; Jha and Majumdar, 1999).

### **Work productivity**

The telecommunications sector's reform contributed to the increase in labor productivity, as measured by the number of subscribers per employee or after dividing the total revenue to employment (Fink et. Al, 2003; Haggarty et.al., 2003; Laffont and N 'Guessan, 2003; Li and Xu, 2002; Ypsilantis, 2002; Lee and



*Ypsilantis, 2002; Fink et.al., 2001, Ypsilantis and Min, 2000; Xavier and Ypsilantis, 2000; Min and Ypsilantis, 1999; Holder, 1998; Cho et. al., 1996*). Specifically, it is found that the labor productivity increased rapidly in countries that fully released to competition on the telecommunications market compared with the countries that have made partial liberalization (*Bloendal and Dirk, 1997*).

Increased competition and technological advances have improved labor productivity (*Fink et. Al., 2003; Boyland and Nicoletti, 2000*). Also, positively to labor productivity contributed the rise in production, expressed mainly by the level of telephone traffic flows (*Madden et.al, 2003*), and the reduction of employees in traditional telecommunications organizations (*Dia et.al, 2002*). Instead, the impact of privatization for this performance index was ambiguous (*Nicoletti, 2001*). Only when the privatization was combined with the existence of an independent regulatory framework, contributed positively to labor productivity (*Wallsten, 2001*). Countries that managed to effectively regulate the market presented significant improvement in productivity. In countries that failed to implement a successful regulatory policy, labor productivity did not improve (*Galal and Nauriyal, 1995*).

However, it is important to be mentioned that high productivity profits, acquired by privatized enterprises, benefited consumers only when the market experienced a healthy competition (*Serra, 1998*). *Palcic and Peeves (2010)* find no clear evidence that ownership change had a significant impact on productivity. Improvements were associated with competition and the impending deregulation of the market as well as considerable changes in the internal organizational structure of the firm.

## **Conclusions**

The world's current policies of privatization of state enterprises with the simultaneous release of the markets to competition have changed enormously the organization and operation of these markets. Typical is the case of the telecommunications sector, where applicable reform policies have led to significant changes in key market performance indicators such as the telephone penetration, the amount of investments, prices and quality of provided services, employment and labor productivity.

More specifically, the study of the international literature revealed that the level of telephone penetration has been significantly improved. The number of main telephone lines simultaneously digitized grew rapidly as also the penetration rate of new telecommunications services, especially of mobile telephone and internet services. On the contrary, as an important problem remained the goal of universal service, since the poorest regions, particularly in developing countries, continued

after the reform of the telecommunications sector to be excluded from more and better telecommunications services.

Regarding the level of investments, all the examined studies found that this increased significantly. In particular, it is observed that while public investment declined steadily in recent years, the total investment in the sector has been increased mainly due to the significant investments made by the entry of new enterprises in the market. The major percentage of the total investment in the sector is in mobile telephony market. Moreover, important were the investments in new technologies with focus on optical fiber thereby enhancing the digital technology.

Referring to the price index, most of the examined studies found that this declined steadily after the reform. Increased competition and technological advances reduced the prices of the provided services.

Concerning the quality of provided services, it is proved that the reform has contributed significantly to their improvement, a fact that attributed mainly to new technological advances and especially to the digitization of telecommunications infrastructure. However, in some cases the quality of provided services mainly in the developing countries did not improve, despite the structural changes, remaining approximately to the levels before the introduction of reform.

Regarding to employment size is revealed that despite the reduction of staff in traditional telecommunications organizations, total employment in the sector increased mainly due to the entry of new enterprises in the market. Greatest contribution to this increase had the new entrants in the market of new services such as mobile telephone and internet services.

Finally, the labor productivity has been increased with the reform of the sector. The competition that introduced in the market, the rise in production and the reduction of employees in traditional telecommunications organizations had a positive effect on the productivity level.

## **References**

- Athreya B. (1996), «India's telecommunications policy», *Telecommunications Policy*, Vol. 20(1), pp. 11–22 (Elsevier Science)
- Biancini Sara (2011), «Behind the scenes of the telecommunications miracle: An empirical analysis of the Indian market», *Telecommunication Policy*, Vol. 35(3), pp. 238-249 (Elsevier Science)

- Barros Pedro and Seabra Carmo (1999), «Universal service: does competition help or hurt?», *Information Economics and Policy*, Vol. 11(1), pp. 45–60 (Elsevier Science)
- Baudrier Audrey (2001), «Independent Regulation and telecommunications Performance in Developing Countries», *Prepared for the Annual ISNIE Conference: Institutions and Governance, Berkeley, California, USA*
- Bloendal Sveinbjorn and Dirk Pilat (1997/1), «The economic benefits of regulatory reform», *Economic Studies No 28, OECD*
- Boyland Olivier and Nicoletti Giuseppe (2000), «Regulation, market structure and performance in telecommunication», *OECD*
- Cho Shin, Choi Byung-il and Choi Seon – Kyou (1996), «Restructuring the Korean telecommunications market – Evolution and challenges ahead», *Telecommunications Policy*, Vol. 20 (5), pp. 357 – 373 (Elsevier Science)
- Chung Inuk and Ypsilantis Dimitris (2003), «Review of the development and reform of the telecommunications sector in China», *OECD*
- Clarke George, Gebreab Frew and Gombelo Henry (2003), «Telecommunications Reform in Malawi», *World Bank*
- Cricelli Livio, Mastaldi Masim and Levaldi Nathan (1999), «Vertical Integration in International Telecommunication System», *Review of Industrial Organization*, 14 (4) pp 337 – 353 (Kluwer Academic Publishers)
- Dia Magueye, N’ Guessan Tchetché and Jean – Paul (2002), «Telecommunications Sector Reforms in Senegal», *World Bank*
- Djiofack-Zebaze Calvin and Alexander Keck (2009), «Telecommunications Services in Africa: The Impact of WTO Commitments and Unilateral Reform on Sector Performance and Economic Growth», *World Development*, Vol. 37 (5), pp. 919-940 (Elsevier Science)
- Fink Carsten, Mattoo Aaditga and Rathindran Randeep (2001), «Liberalizing Basic Telecommunications: The Asian Experience», *World Bank*
- Fink Carsten, Mattoo Aaditya and Rathindran Randeep (2003), «An assessment of telecommunications reform in developing countries», *Information Economics and Policy*, Vol. 15(4), pp. 443 – 466 (Elsevier Science)
- Galal Ahmed and Nauriyal Bharat (1995), «Regulating telecommunications in Developing Countries – Outcomes, Incentives and Commitment», *World Bank*
- Gasmi Farid and Laura Recuero Virto (2010), «The determinants and impact of telecommunications reforms in developing countries», *Journal of Development Economics*, Vol. 93 (2), pp. 275-286 (Elsevier Science)
- Giullen Mauro and Suarez Sandra (2001), «Developing the Internet: entrepreneurship and public policy in Ireland, Singapore, Argentina and Spain», *Telecommunications Policy*, Vol. 25, pp. 349 – 371 (Elsevier Science)

- Goldstein Andrea (2000), «Corporate Governance and regulation in Privatized Utilities: Telecommunications in Four European Countries», *Business and Politics*, Vol. 2 (2) pp 189 – 223 (Taylor & Francis Group)
- Gonzalez Adrian, Gupta Amar and Deshpande Sawan (1998), «Telecommunications in Mexico», *Telecommunications Policy*, Vol. 22 (4/5), pp. 341 – 357 (Elsevier Science)
- Gutierrez Luis and Berg Sanford (2000), «Telecommunications liberalization and regulatory governance: lessons from Latin America», *Telecommunications Policy*, Vol. 24 (10-11), pp 865 – 884 (Elsevier Science)
- Haggarty Luke, Shirley Mary and Wallsten Scott (2003), «Telecommunications Reform in Ghana», *World Bank*
- Heracleous Loizos (2001), «State Ownership, Privatization and Performance in Singapore: An Exploratory Study from a Strategic Management Perspective», *Asia Pacific Journal of Management*, 18 (1), pp. 69 – 81 (Kluwer Academic Publishers)
- Holder Stuart (1998), «Regulation and Competition and Privatization – Privatization and Competition: the Evidence from Utility and Infrastructure Privatization in the UK», *Twelfth Plenary of the OECD Advisory Group on privatization (AGP), Helsinki (Finland)*
- Howell Bronwyn, Richard Meade and Seini O'Connor (2010), «Structural separation versus vertical integration: Lessons for telecommunications from electricity reforms», *Telecommunications Policy*, Vol. 34(7), pp. 392–403 (Elsevier Science)
- Hughes Patrick and Bernard Phillips (1999), «Regulatory Reform in the Telecommunications Industry in the United States», *OECD*
- Jha Raghendra and Majumdar Sumit (1999), «A matter of connections: OECD telecommunications sector productivity and the role of cellular technology diffusion», *Information Economics and Policy*, Vol. 11(3), pp. 243 – 269 (Elsevier Science)
- Karamanis Kostas and Antonios Georgopoulos, «Market's Liberalization and Consequent Changes in the Telecommunication Sector», *International Conference "Management of International Business and Economics Systems (MIBES) 2006"*, Larissa Greece, ISBN: 978-960-87764-3-2, pp. 1-10, 4-5 November, 2006 (pub. Technological Educational Institute of Larissa, Greece).
- Laffont Jean – Jacques and N' Guessan Tchetché (2003), «Telecommunications Reform in Cote d' Ivoire», *World Bank*
- Leong Lai-Ying, Teck-Soon Hew, Keng-Boon Ooi and Binshan Lin (2012), «The determinants of customer loyalty in Malaysian mobile telecommunication services: a structural analysis», *International Journal of Services*,

- Economics and Management* , Vol. 4(3), pp. 209 - 235 (Inderscience Publishers)
- Lee C. (2002), «Telecommunications Reform in Malaysia», *Annals of Public & Cooperative Economics*, Vol. 73(4), pp. 521 (Blackwell Publishing)
- Lee Sangjin and Ypsilantis Dimitris (2002), «Regulatory Reform in the Telecommunications Industry in Poland», *OECD*
- Lestage Romain, David Flacher, Yeonbae Kim, Jihwan Kim and Yunhee Kim (2013), «Competition and investment in telecommunications: Does competition have the same impact on investment by private and state-owned firms?», *Information Economics and Policy*, Vol. 25(1), pp. 41–50 (Elsevier Science)
- Grace Li (2012), «The return of public investment in telecommunications: Assessing the early challenges of the national broadband network policy in Australia», *Computer Law & Security Review*, Vol. 28(2), pp. 220–230 (Elsevier Science)
- Lam Pun-Lee and Alice Shiu (2010), «Economic growth, telecommunications development and productivity growth of the telecommunications sector: Evidence around the world», *Telecommunications Policy*, Vol. 34(4), pp. 185-199 (Elsevier Science)
- Li Wei and Xu Lixin Colin (2002), «The Impact of Privatization and Competition in the Telecommunications Sector around the World», *University of Virginia*
- Lumanto Rudi and Toshio Kosuge (2005), «Telecommunications Reforms: Resolving performance problems in Indonesia», *Technology in Society*, Vol. 27(4), pp. 517–529 (Elsevier Science)
- Madden Gary and Savage Scott (2001), «Productivity growth and market structure in telecommunications», *Economics of Innovation and New Technology*, Vol. 10, pp. 493–512 (Overseas Publishers Association)
- Min Wonki (1999), «Regulatory Reform in the Telecommunications Industry in Japan», *OECD*
- Min Wonki and Ypsilantis Dimitris (1999), «Regulatory Reform in the Telecommunications Industry in the Netherlands», *OECD*
- Montoya Miguel Á. and Francesc Trillas (2007), «The measurement of the independence of telecommunications regulatory agencies in Latin America and the Caribbean», *Utilities Policy*, Vol. 15(3), pp. 182–190 (Elsevier Science)
- Mueller Milton and Lovelock Peter (2000), «The WTO and China's ban on foreign investment in telecommunication services: a game – theoretic analysis», *Telecommunications Policy*, Vol. 24 (8-9), pp. 731–759 (Elsevier Science)

- Nadiri M. Ishaq, Banani Nandi and Chandana Chakraborty (2009), «Telecommunications infrastructure, telecommunications intensity and productivity growth in US industries: a disaggregated approach», (Inderscience Publishers)
- Nicoletti Giuseppe (2001), «Regulation in services: OECD patterns and economic implications», *OECD*
- Palcic Dónal and Eoin Reeves (2010), «Organisational status change and performance: The case of Ireland's national telecommunications operator», *Telecommunications Policy*, Vol. 34(5-6), pp. 299–308 (Elsevier Science)
- Paleologos John M. and Michael L. Polemis (2013), «What drives investment in the telecommunications sector? Some lessons from the OECD countries», *Economic Modelling*, Vol. 31, pp. 49-57 (Elsevier Science)
- Parker David (1999), «Regulation of privatized public utilities in the UK: performance and governance», *International Journal of Public Sector Management*, Vol. 12(3), pp. 213 – 236 (Emerald Group Publishing Limited)
- Ros Agustin (1999), «Does Ownership or Competition Matter? The Effects of Telecommunications Reform on Network Expansion and Efficiency», *Journal of Regulatory Economics* Vol. 15(1), pp. 65-92 (Kluwer Academic Publishers)
- Ros Agustin and Banerjee Aniruddha (2000), «Telecommunications privatization and tariff rebalancing: evidence from Latin America», *Telecommunications Policy*, Vol. 24(3), pp. 233 – 252 (Elsevier Science)
- Sacripanti Andrea Michele (1999), «Liberalizing telecommunications in Italy: the role of the regulator», *Info – The Journal of policy, regulation and strategy for telecommunications*, Vol. 1(5), pp. 449 – 453 (Emerald)
- Samarajiva Rohan (2000), «The role of competition in institutional reform of telecommunications: lessons from Sri Lanka», *Telecommunications Policy*, Vol. 24 (8-9), pp. 699 – 717 (Elsevier Science)
- Sato Kyoko and Dimitris Ypsilantis (2000), «Regulatory Reform in the Telecommunications Industry in Denmark», *OECD*
- Serra Pablo (1998), «Regulation, Competition and Privatization Evidence from Utility and Infrastructure Privatization in Chile», *Twelfth Plenary Session of the OECD Advisory Group on Privatization (AGP)*
- Sinha Nikhil (1996), «The political economy of India's telecommunications reforms», *Telecommunications Policy*, Vol. 20 (1), pp. 23 – 38 (Elsevier Science)
- Spiller Pablo and Cardilli Carlo (1997), «The Frontier of Telecommunications Deregulation: Small Countries Leading the Pack», *The Journal of Economic Perspectives*, Vol. 11 (4), pp. 127 – 138 (JSTOR)

- Thamae Leboli Zachia (2015), «Lesotho telecommunications sector reform: an assessment of regulatory governance and substance», *International Journal of Technology Policy and Law*, Vol. 2(1), pp. 71-89 (Inderscience Publishers)
- Tusubira F.F, Gebreab Frew Haggarty, Luke και Shirley Mary (2002), «Telecommunications Reform in Uganda», *World Bank*
- Vanyai Judit (1998), «A new era: the development of telecommunications in Hungary», *Technology in Society*, Vol. 20(1), pp. 25 – 44 (Elsevier Science)
- Wallsten Scott (2000), «Telecommunications Privatization in Developing Countries: The Real Effects of Exclusivity Periods», *Stanford University*
- Wallsten Scott (2001), «An Econometric Analysis of Telecom Competition, Privatization and Regulation in Africa and Latin America», *Journal of Industrial Economics*, Vol. 49(1), p. 1 (Blackwell Publishing)
- Wallsten Scott (2002), «Does Sequencing Matter? Regulation and privatization in Telecommunications Reforms», *World Bank*
- Wen Wang Yan, Li Baozhen, Ge Jing and Guo Guihua, (2012), «The Current Situation and Regulations of Telecommunications», *Physics Procedia*, Vol. 33, pp. 1360-1365 (Elsevier Science)
- Xavier Patrick (1996), «Monitoring telecommunications deregulation through international benchmarking», *Telecommunications Policy*, Vol. 20(8), pp. 585 – 606 (Elsevier Science)
- Xavier Patrick and Ypsilantis Dimitris (2000), «Regulatory Reform in the Telecommunications Industry in Spain», *OECD*
- Xavier Patrick και Ypsilantis Dimitris (2001), «Regulatory Reform in the Telecommunications Industry in Czech Republic», *OECD*
- Yamada Takashi and Ypsilantis Dimitris (2001), «Regulatory Reform in the Telecommunications Industry in Ireland», *OECD*
- Ypsilantis Dimitris (2002a), «Regulatory Reform in the Telecommunications Industry - Canada», *OECD*
- Ypsilantis Dimitris (2002b), «Regulatory Reform in the Telecommunications Industry – United Kingdom», *OECD*
- Ypsilantis Dimitris and Min Wonki (2000), «Regulatory Reform in the Telecommunications Industry in Korea», *OECD*
- Ypsilantis Dimitris and Min Wonki (2001), «Regulatory Reform in the Telecommunications Industry in Italy», *OECD*