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# Evaluation of Telecommunication Policy and Industry Growth in Latin American Countries

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## ABSTRACT

This paper studies the telecommunication policies of four Latin American countries (Brazil, Chile, Costa Rica, and Mexico) to evaluate the impact of these policies on telecommunications industry growth. Each country's telecommunications industry is characterized by consumer welfare (teledensity and the waiting list for a new telephone line), industry outputs (fixed lines, cellular subscribers), and capital expenditure. The main findings are that privatization is not the only approach to increase teledensity; the annual investment in the industry is proportional to annual telecommunications revenue when the industry is a state-owned monopoly; telecommunication policy makers take different approaches for each market segment; and that privatization and liberalization do not necessarily reduce service tariffs. These findings are important to industry stakeholders in making decisions that shape the future behavior of the industry.

## Keywords

Telecommunications, Policy, teledensity, Industry, growth, evaluation, Brazil, Chile, Costa Rica, Mexico.

## INTRODUCTION

Telecommunications policy is the regulatory framework that controls and promotes the industry development while securing the interest of all industry stakeholders. In some countries such as the U. S., the telecommunications industry has been steadily evolving for decades. The Telecommunications Act of 1934 established a private monopoly to develop the industry and to promote the country's economic growth. Then the Telecommunications Act of 1984 broke up AT&T's monopoly and introduced competition in the long distance services (Brock, 1994). Last, the telecommunications Act of 1996 set the conditions to increase competition in local services. Countries have followed different strategies to develop their telecommunications industries. Following the UK's experience with privatization of state-owned monopolies, several countries either privatized the state-owned monopolies or liberalized the industry to promote competition, reduce cost, and improve service quality. The purpose of this paper is to explore the impact of state-owned monopoly, privatization, and industry liberalization policies on the growth, cost, and service quality of the telecommunication industry of Latin American countries.

This study followed four stages: First, four countries (Brazil, Chile, Costa Rica, and Mexico) with very different policies were selected. Second, a research framework was designed to represent the industry behavior in response to different policies. For example, if the policy was to maintain state-owned monopolies, then revenues were linked to tariffs, innovation was limited by the lack of incentives, and service availability was limited by the lack of capital. Third, information regarding each country's telecommunications industry was collected and complemented with a data set from the ITU World Telecommunication Indicators 2002. The data set includes information for twenty-two years for the following parameters: industry investments, total revenue of telecommunications services, teledensity, cellular density, and the waiting list for a new lines. Fourth, a case analysis and statistical tests were conducted to determine significance of the impact of different policies on the industry of each country.

The main findings show that governments treat fixed telephony, long-distance, cellular telephony, and value-added services differently. Some countries opened the value-added services to competition, but kept the local and/or long-distance services closed. For example, Costa Rica's government kept control of all industry segments. Brazil liberalized the industry and one year later privatized it; however, the long distance service remained under government monopoly. Chile liberalized the industry first and then privatized it.

With state-owned monopolies in Brazil and Mexico, the industry behaved as expected by this study's research framework. Annual investment decreased, teledensity increased very slowly, waiting lists for fixed-lines grew rapidly. This behavior was also present in Costa Rica from the year 1987 to the year 1993. However, without changing its telecommunications policy after the year 1993, Costa Rica's annual investment increased, teledensity increased, and the waiting list for new lines decreased.

Privatization and liberalization had a positive impact in Brazil, Chile, and Mexico. Teledensity increased and the waiting list for new lines decreased in these countries after privatization or liberalization reforms. Annual investment also increased in Brazil and Chile, but not in Mexico. As for tariffs in Brazil and Mexico, business and residential connection charges decreased. However, business monthly subscription declined, but not significantly, and residential monthly subscription significantly increased.

## LITERATURE REVIEW

The regulatory frameworks of the telecommunication industry for developing and developed countries were mainly government administered until the early 1980. Policy changes promoted transitions from natural to private monopolies, or to deregulated environments. Before the UK sold its natural monopolies, most countries assumed that their telecommunication industries had to be kept as natural monopolies for reasons of national security and public good. The UK experience showed that other arrangements could modify the industry structure to achieve more and better services. Seeking efficient allocations of resources for industry growth, the telecommunications industry has adopted different market structures such as state-owned monopoly, corporatization, privatization, liberalization, and deregulation (Carr and Snyder, 1997).

Under the state-owned monopoly, the government controls all telecommunications services and products in the country. According to Carr and Snyder (1997), the conditions leading to natural monopolies are: 1) large capital expenditure to provide services, 2) one player to avoid waste of resources and high risk, and 3) service availability to many firms and individuals across the country. A monopoly uses certain tariffs to charge users for its services. In the case of the telecommunication monopoly, the tariff is set as a monthly fee per-line connection, and as a fee per-time usage and distance in the case of long distance services. Monopolies trigger unfair practices, prevent competition, and limit innovations and industry growth. For example, Falatoon and Navarrete (2004) report that in India, Turkey, and Pakistan, the size of investment in the telecommunications industry is a percentage of GDP or telecommunications revenues. According to these authors, the teledensity of these nations remained almost constant or presented a very slow growth during the period of the state-owned monopolies.

State-owned monopolies present two modalities. In the first one, an entity of the government, i.e. the postal service office or the ministries of transportation or energy, controls the telecommunications services. In the second one, a corporatization process transforms the government unit into an independent organization still owned by the government. For example, Chile created *Compañía de Telecomunicaciones de Chile S.A.* (ITA, Chile 2003) and Turkey, *Turk Telecom* (Falatoon and Navarrete, 2004). Corporatization is the first step followed by several countries, i.e. Mexico privatized the telecommunications industry in 1990 (Spiller and Cardilli, 1997).

Through a privatization process, the government transfers the control and ownership of the state-owned telecommunications enterprise (SOTE) to private investors. According to Pont (1997), debt crisis in the early 1980s triggered privatization processes. Even though the private monopoly inherits monopoly's disadvantages (i.e. strong union, self government regulated, regulated tariffs), the privatization seeks to improve the financial performance of the company, solve infrastructure bottlenecks (Cabanda and Ariff, 2002), increase the level of investment (Blasko 1998), and increase the number of lines and cellular subscribers (Cabanda and Ariff, 2002). Pont (1997) reports how Mexico, Malaysia, Chile, and Argentina successfully privatized their SOTEs, while Thailand, Colombia, and South Africa did not succeed.

Privatization and liberalization sometimes are promoted simultaneously. However, they are two different processes. Through liberalization, new competitors are allowed in the industry as a whole or in one or several industry segments, i.e. long distance service. The result of competition is the transfer of the control of the industry to market forces. International lending institutions and large corporate users of telecommunications promote liberalization processes (Pont 1997). Liberalization promotes investment as a function of market demand, price competition, service innovation (Gilhooly 1987), and unions with lower bargaining power. The liberalization process is supported by a deregulation of telecommunications tariffs. Several approaches to liberalization are reported in the literature. For example, Mexico first privatized and then liberalized the long distance service, while New Zeland passed from a regulated to liberalized environment (Spiller and Cardelli, 1997).

## RESEARCH QUESTIONS AND METHODOLOGY

In order to understand the impact of telecommunications policies in the development of national telecommunication industries, this study poses the following research questions and corresponding hypotheses:

*Q1. What is the behavior of annual investment in telecommunications, teledensity, waiting list for new lines, and tariffs under a state-owned monopoly?*

- H1.1: Telecommunications annual investment is related to GDP and telecommunications revenues under state-owned monopoly.*
- H1.2: The rate of teledensity growth is low under state-owned monopoly.*
- H1.3: Waiting list for new lines increases under the state-owned monopoly.*
- H1.4: Tariffs are very high under state-owned monopoly.*

*Q2. What is the behavior of annual investment in telecommunications, teledensity, waiting list for new lines, and tariffs after privatization / liberalization?*

- H2.1: Telecommunications annual investment increases after privatization/liberalization*
- H2.2: The rate of teledensity growth will increase after privatization/liberalization.*
- H2.3: Waiting list for new lines will decrease after privatization/liberalization.*
- H2.4: Tariffs will decrease after privatization/liberalization.*

The methodology of this study consists of three stages: 1) definition of a privatization-liberalization framework, 2) data collection, and 3) case and statistical test analysis. In the first stage, based on a literature review, a research framework (Table 1) was designed to represent the industry behavior as a result of different telecommunication policies and economic behavior. In the second stage, using the ITU World Telecommunication Indicators from 1979 to 20001, data related to the behavior of identified parameters were collected. The parameters include industry annual investments, teledensity (number of fixed lines for 100 habitants), waiting list for new lines, total revenues for telecommunication services, gross domestic products, and population. The monetary values in the data set were adjusted for inflation based on 1995. Lastly, in order to evaluate the impact of changes in telecommunication policies, statistical t-test was used for mean differences before and after the adoption of privatization or corporatization policies.

Policy	Economic Behavior	Industry Behavior
State-owned	Monopoly	Investment as a proportion of GDP, and as a proportion of revenue Revenues link to tariffs Inefficient allocation of resources Innovation is limited by the lack of incentives Strong union Self-regulated environment Services limited by scarcity of capital
Private ownership	Monopoly	Investment as a function of the privatization arrangement (with the government) Revenues link to tariffs Inefficient allocation of resources Innovation lacks incentives Strong union Self or government regulated Services limited for profits incentives
Liberalized markets	Competition by markets	Investment as a function of market demand (profits) Revenues link to market share Efficient allocation of resources to maximize profits Innovation incentives Unions with lower bargaining power Limited government regulation Services promoted by competition and market share

**Table 1. Research Framework**

**CASE ANALYSIS**

**Case I: Brazil**

Telebras, Brazil’s government-owned monopoly with one long distance provider and 23 local telephone companies, served the largest economy in Latin America. During the state-owned monopoly period, telecommunications services were very expensive or non-existent. For example the cost of a fixed-line connection charge was 5000 USD. Despite this high cost, the waiting list for new lines was enormous (Linhares Pires, 2000).

The telecommunications policy in Brazil has been changing since 1990; in this year, the policy allowed private companies to participate in the market for paging and value-added services. Then, in 1996, local telephone services were opened to competition; one year later, Telebras, the government-owned monopoly, was privatized.

The liberalization of the industry took the following stages. First, the government created a regulatory entity, ANATEL. Then, the country was divided into four regions and two competitors were allowed in each region for fixed-line telephony. As for cellular services, the country was divided into ten regions. Similar to the fixed-line policy, two competitors were allowed in each region. The liberalization and privatization processes have had a positive impact on the country’s teledensity, which increased from 12 percent in 1996 to 21 percent in 2000 (ITA, Brazil 2003).

**Case II: Chile**

Chile adopted the most aggressive liberalization process of the telecommunications industry in Latin America. According to several researchers, this liberalization process triggered the development of the most modern telecommunications infrastructure in the Latin America. For example, all the public service network is digital since 1993, and the teledensity of the country reached 23 percent for fixed lines and 34 percent for cellular service in 2003 (ITA, Chile 2003).

By 1960, ENTEL was created exclusively to develop long-distance and international telecommunications services. ENTEL complemented Compañía de Telecomunicaciones de Chile (CTC) S. A, the state-owned monopoly that operated since 1880. By 1971, SEGTEL, superintendents for electrical services, natural gas, and telecommunications, became the regulatory agency for CTC. In 1982, the General Law on Telecommunications was approved and the process of liberalization of the

industry started. According to this law, free access and non-discriminating access were granted to private companies to provide telecommunications services in Chile. In 1987, the government started the privatization of the company by selling 30% of shares to Bond Corporation. The end of this privatization process occurred in 1990 (Stehmann, 1995).

### **Case III: Costa Rica**

In Costa Rica, the telecommunications industry operated under a government monopoly since 1963. Trying to foster the industry growth, the legislature enacted an industry liberalization law in 1997. This law required the split the Institute of Communications and Electricity (ICE), the electricity and telecommunications state-owned monopoly, into two government agencies- one for the electricity industry and the other for the telecommunications industry. Following this separation, the law ordered the liberalization of both local- and long- distance services.

Social groups, unions, and government agencies presented a strong opposition to the law up to the point that the government rejected the whole initiative by the year 2000. As a result of this decision, the Instituto Costarricense de Telecomunicaciones (ICETEL), a unit of the ICE, provides local and long-distance services, while RACSA, another state-owned organization, provides data transmission and Internet services. In the case of cellular telephony, an U.S. company offered cellular services from 1989 to 1995, when it was forced to close. ITA-Costa Rica (2003) reports Costa Rica having fixed and cellular teledensities of 23% and 7.6% respectively.

### **Case IV: Mexico**

The telecommunications industry in Mexico dramatically changed during the 1990s. The state-owned telephone company, TELMEX, was privatized in 1990. By 1996, a new change in this country's telecommunications policy opened the industry regulated by a new independent entity –the COFETEL. Under the COFETEL supervision, the long- distance and cellular services were liberalized in 1997 and 1998 respectively (Cohen, 1997). In order to promote competition in the cellular market, the country was divided into nine regions. In each region, one company was allowed to compete with TELMEX cellular company. Even though fixed telephony has been open to competition since the early 1980s, TELMEX remains being the dominant carrier without real competition. By 2002, Mexico's teledensities reached 13.5 percent and 20.06 percent in fixed lines and cellular respectively (ITA, Mexico 2003).

## **ANALYSIS OF RESULTS**

Table 2 summarizes the telecommunications policies transitions in Brazil, Chile, Costa Rica, and Mexico. Chile and Brazil adopted almost the same strategy. First, they liberalized the industry to promote competition; then they privatized the state-owned monopoly. A significant difference, however, is that Chile waited five years before starting the privatization of the state-owned company; Brazil allowed only one year between these two stages. Following a different strategy, Mexico first privatized the state-owned monopoly, then liberalized the long-distance market six years later. As for fixed telephony, even though the local market has been open to competition since the early 1980's, investment barriers have limited competition in this industry market. Contrary to the other three cases analyzed, Costa Rica has a very homogeneous policy toward its telecommunications industry. In this country, the state-owned monopoly controls local, long-distance, cellular, and Internet services. Only temporarily did the cellular service have a provider different from the state-owned monopoly. However, the government took over this service in 1995.

### **Industry behavior under state-owned monopoly**

This section presents the analysis of the state-owned behavior for Brazil (1979-1996), Costa Rica (1979-2000), and Mexico (1985-1991). Since Chile liberalized the telecommunications industry in 1982 and data for its state-owned monopoly period was not available, the case of this country is not included in this section.

#### *Industry annual investment*

*Annual investment as a percentage of telecommunications remained on average at 50 percent in Brazil (Graph 1), 40 percent in Mexico (Graph 2), and increased from 20 percent to 60 percent in Costa Rica (Graph 3).*

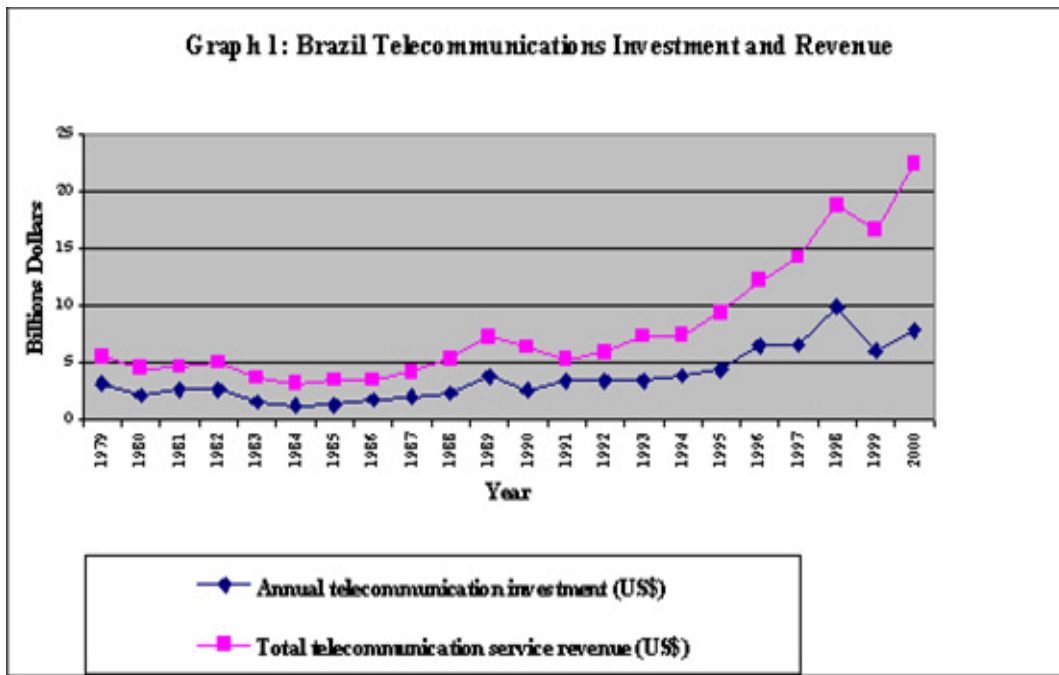
Country	Market	Stage I	Stage II	Stage III
<b>Brazil</b>	Local	State-owned Monopoly	Liberalized (1996)	Privatized (1997)
	Long distance	State-owned Monopoly	State-owned Monopoly	State-owned Monopoly
	Cellular	State-owned Monopoly	Liberalized (1997)	
	Internet	State-owned Monopoly	Liberalized (1996)	

<b>Chile</b>	Local	State-owned Monopoly	Liberalized (1982)	Privatized (1989)
	Long distance	State-owned Monopoly	Liberalized (1982)	Privatized (1989)
	Cellular	Liberalized (1989)		
	Internet	Liberalized		

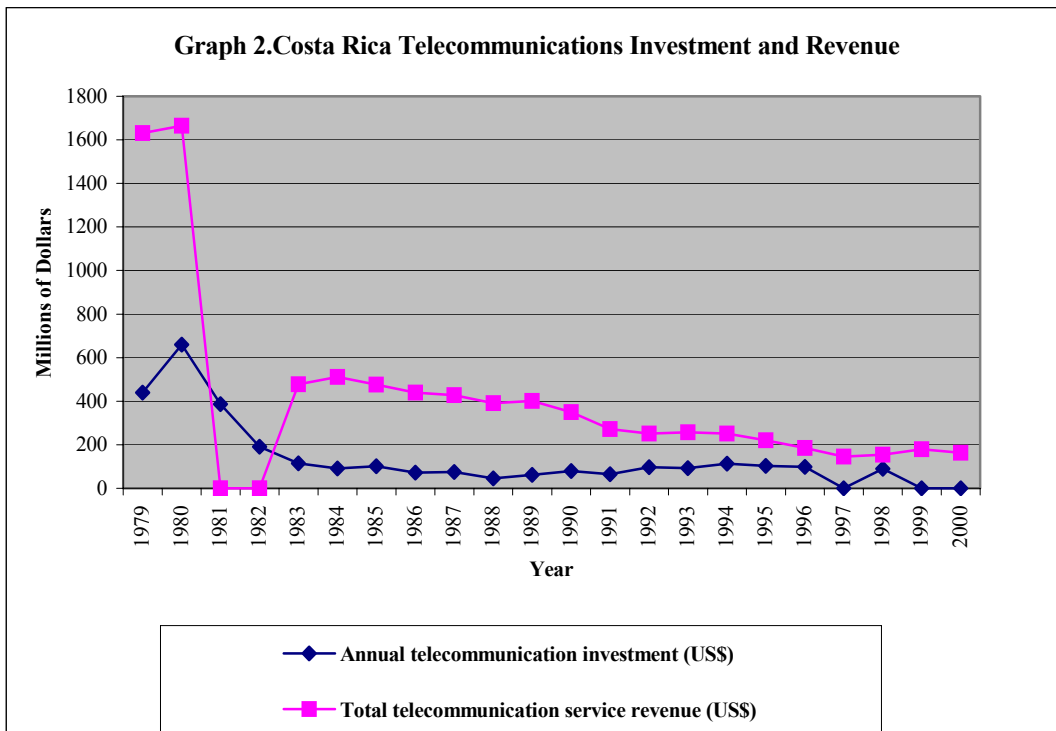
<b>Costa Rica</b>	Local	State-owned Monopoly	State-owned Monopoly	State-owned Monopoly
	Long distance	State-owned Monopoly	State-owned Monopoly	State-owned Monopoly
	Cellular	Private (1989)	State-owned Monopoly (1995)	State-owned Monopoly
	Internet	State-owned Monopoly	State-owned Monopoly	State-owned Monopoly

<b>Mexico</b>	Local	State-owned Monopoly	Privatized duopolies (1990) and	De facto private owned monopoly
	Long distance	State-owned Monopoly	Privatized (1990)	Liberalized (1997)
	Cellular	State-owned Monopoly	Privatized	Liberalized (1998)
	Internet	State-owned Monopoly	Liberalized (1994)	

**Table 2. Telecommunications Policy and Industry Growth**

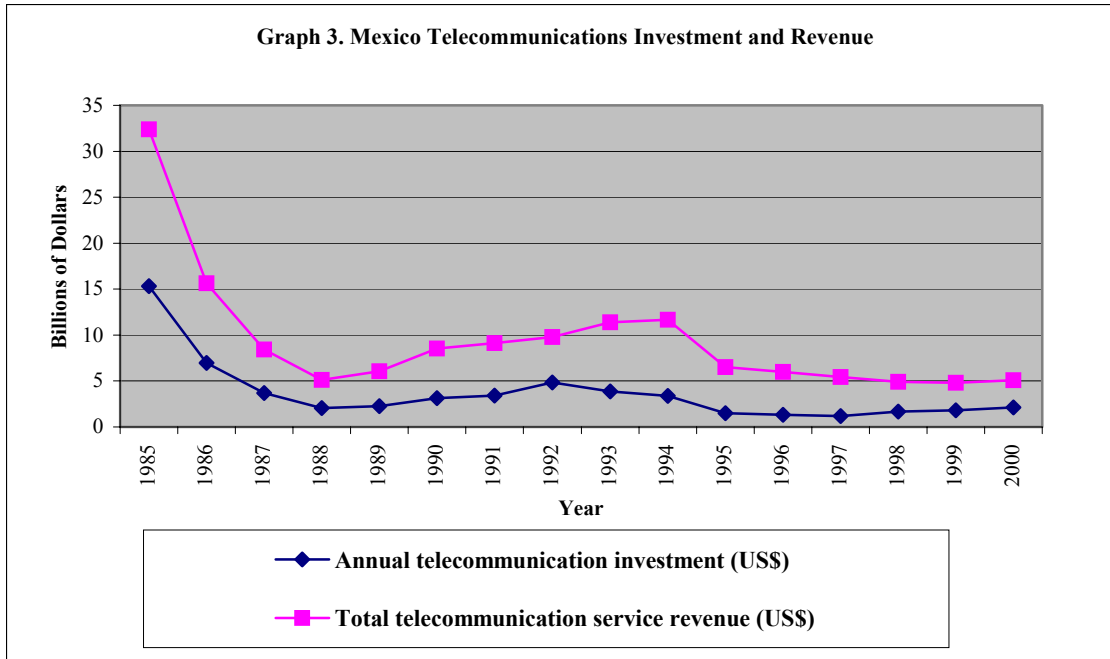


Source: ITU World Telecommunication Indicators 2002.



Source: ITU World Telecommunication Indicators 2002





Source: ITU World Telecommunication Indicators 2002

As stated in this study research framework (Table 1), we expected annual investment in telecommunications to be a proportion of telecommunications revenues during the state-owned monopoly period (Hypothesis H1.1). The cases of Brazil and Mexico support this hypothesis. However, Costa Rica’s annual investment does not behave as expected for a state-owned monopoly.

These findings are similar to the ones reported by Falatoon and Navarrete (2004). These authors report the industry behavior for state-owned monopolies in four Asian countries. In three cases-Turkey, India and Pakistan-telecommunications annual investments were directly related to the industry revenues, just like the cases of Brazil and Mexico. However, similar to the case of Costa Rica, China’s annual investment steadily increased since 1994.

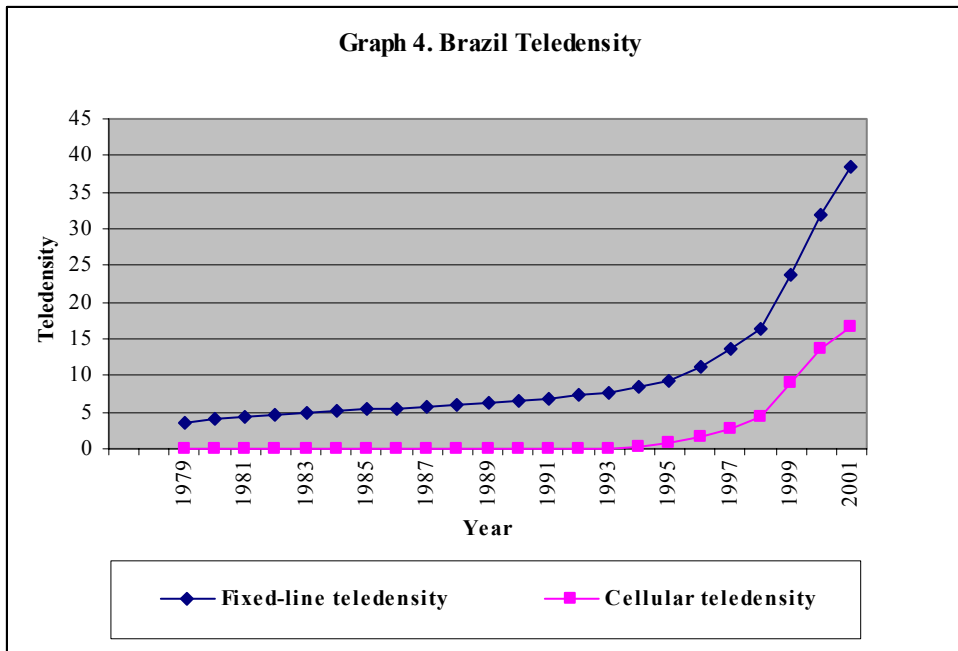
**Teledensity**

Teledensity growth was slow for Brazil and Mexico under the state-owned monopoly. In the case of Brazil, teledensity reached less than 10% and 2% for fixed and cellular telephony respectively (Graph 4). Similarly, Mexico’s teledensity of fixed lines grew less than 5% between 1979 and 1990 (Graph 5). Teledensity in Costa Rica shows mixed behaviors: cellular teledensity follow the same slow growth as Brazil and Mexico (Graph 6); however, fixed-line teledensity presented a steady growth reaching 23% in 2001.

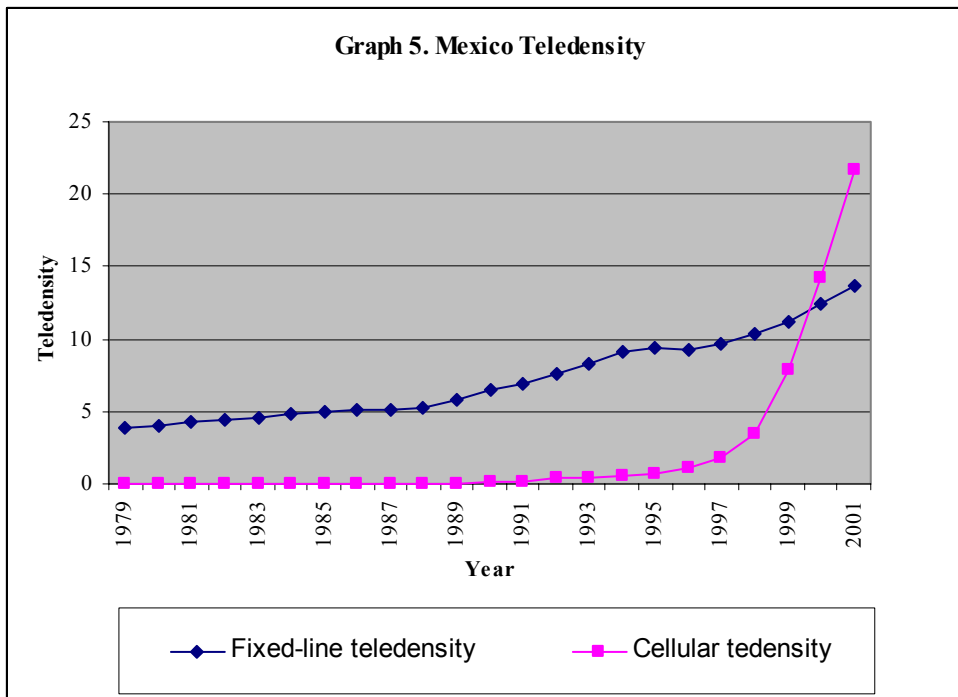
These teledensities’ behavior support hypothesis H1.2, which states that teledensity growth will be slow under state-owned monopoly. Only fixed-line teledensity in Costa Rica does not support this hypothesis. According to Falatoon and Navarrete (2004), India and Pakistan teledensities also grew slowly under stat-owned monopolies. But just like Costa Rica’s, Turkey’s and China’s teledensities grew faster than expected during the state-owned monopoly.

**Waiting List for New Lines**

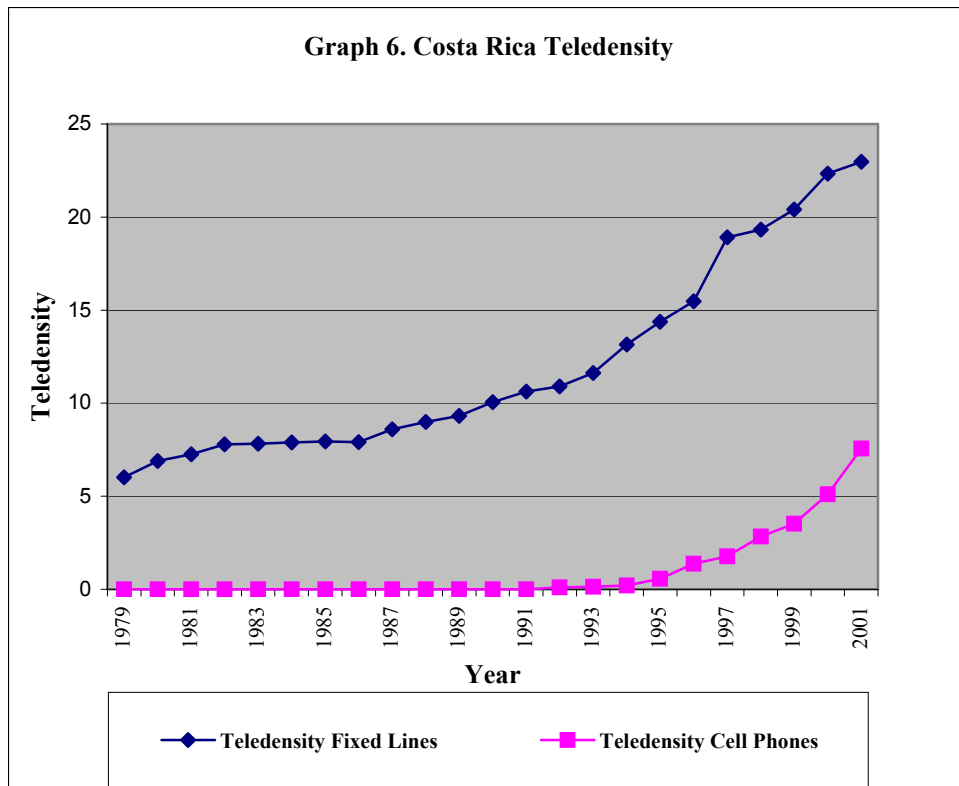
Brazil presented a huge demand for phone services during the state-owned period. Even though the cost for a new line almost reached 5000 US Dollars, the waiting list increased from 500,000 US Dollars to almost 2 million lines (Graph 7). Similarly, in the case of Mexico, the demand for new lines increased from 300,000 lines in 1985 to 1.1 million in 1990 (Graph 8). In Costa Rica, this list presented an increase of 800% from 1979 to 1993. In 1993, year the waiting list started to decrease; by 1999, the waiting list dropped to 35,000 lines (Graph 9).



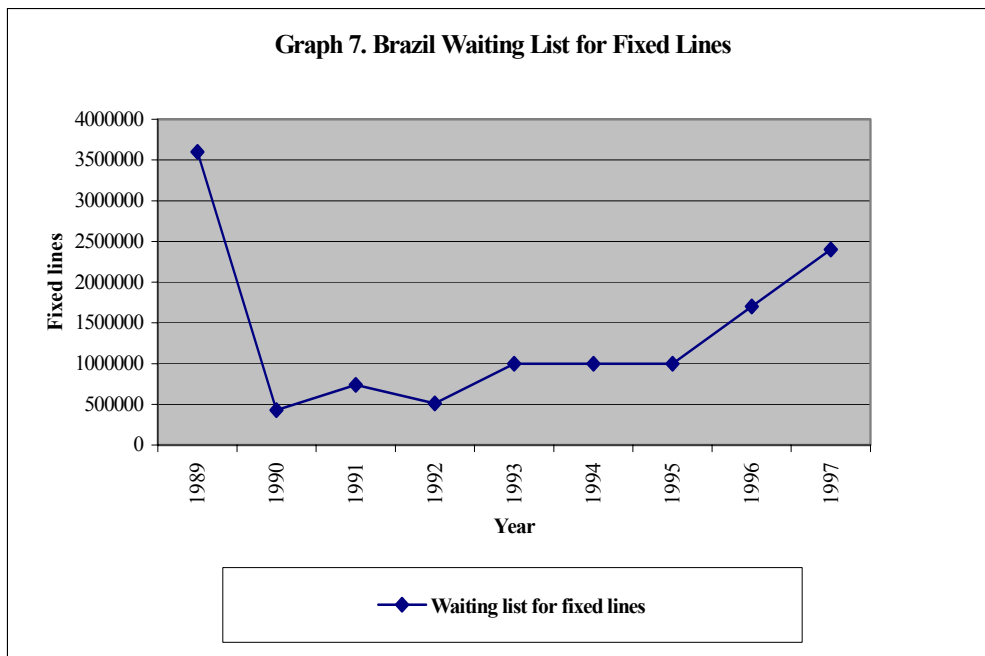
Source: ITU World Telecommunication Indicators 2002



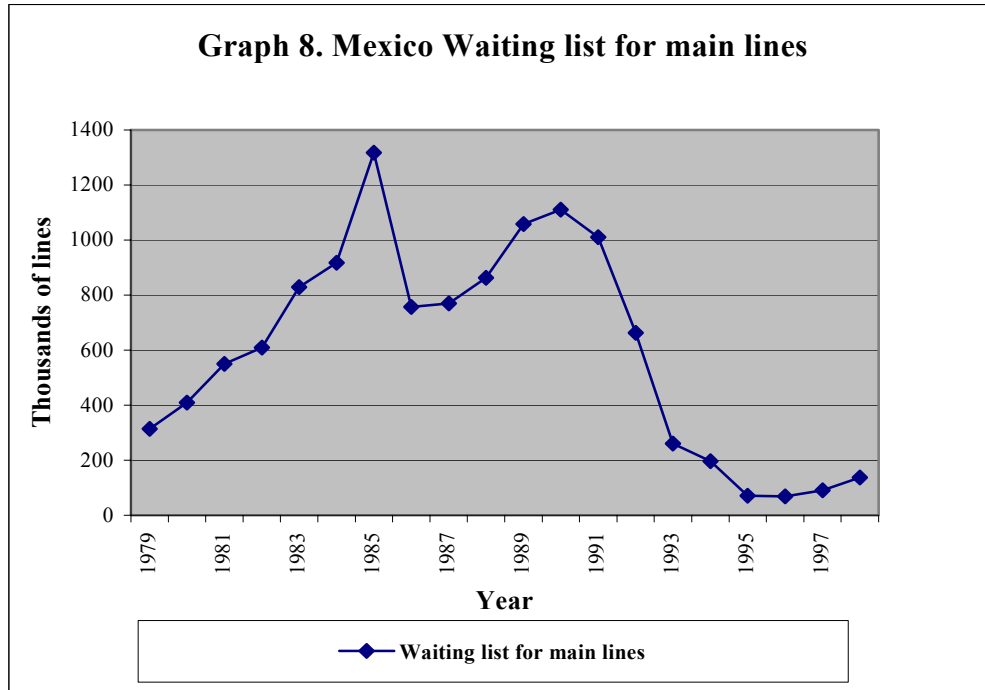
Source: ITU World Telecommunication Indicators 2002



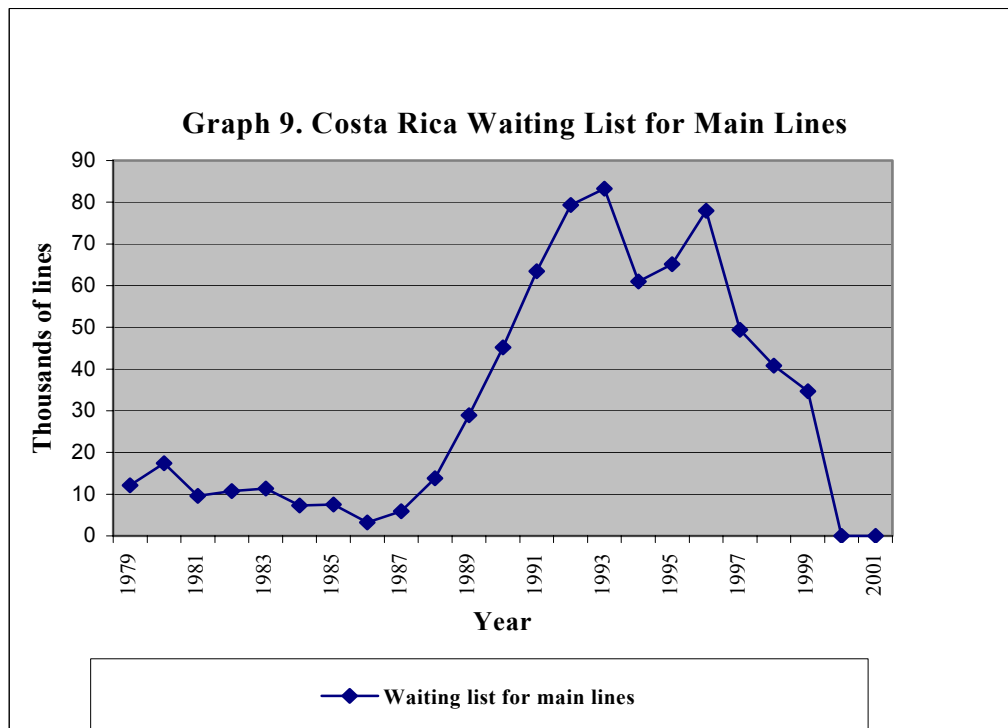
Source: ITU World Telecommunication Indicators 2002



Source: ITU World Telecommunication Indicators 2002



Source: ITU World Telecommunication Indicators 2002



Source: ITU World Telecommunication Indicators 2002

The waiting list behavior for Brazil, Mexico, and partially for Costa Rica supports hypothesis H1.3, which points out that the waiting list for new fixed lines will increase with state-owned monopolies. From 1993 to 1999, the waiting list for new lines in Costa Rica did not support H1.3. Falatoon and Navarrete (2004) report that India's state-owned monopoly presents a similar pattern to Brazil and Mexico. However, China and Turkey present a similar pattern to Costa Rica with a first period of a fast growing waiting list, followed by a decreasing period. These results might be a reflection of economic growth in these countries.

**Tariffs**

During the state-owned monopoly, the average of the business and residential connection charge were 1689.87 US Dollars in Brazil, while businesses and homeowners in Mexico paid an average 1604.36 US Dollars and 896.00 US Dollars for these services respectively. From 1990 to 1995, connection charges decreased from 513.00 US Dollars to 350.00 in Costa Rica; after 1995, this charge dropped rapidly to 29.00 US Dollars in 2000. Brazil and Mexico charges support hypothesis H1.4 -- tariffs are very high with state-owned monopoly. The results for tariffs in Costa Rica are mixed. Although the tariffs charges supported hypothesis H1.4 until 1995, this hypothesis is not supported from 1995 through the year 2000.

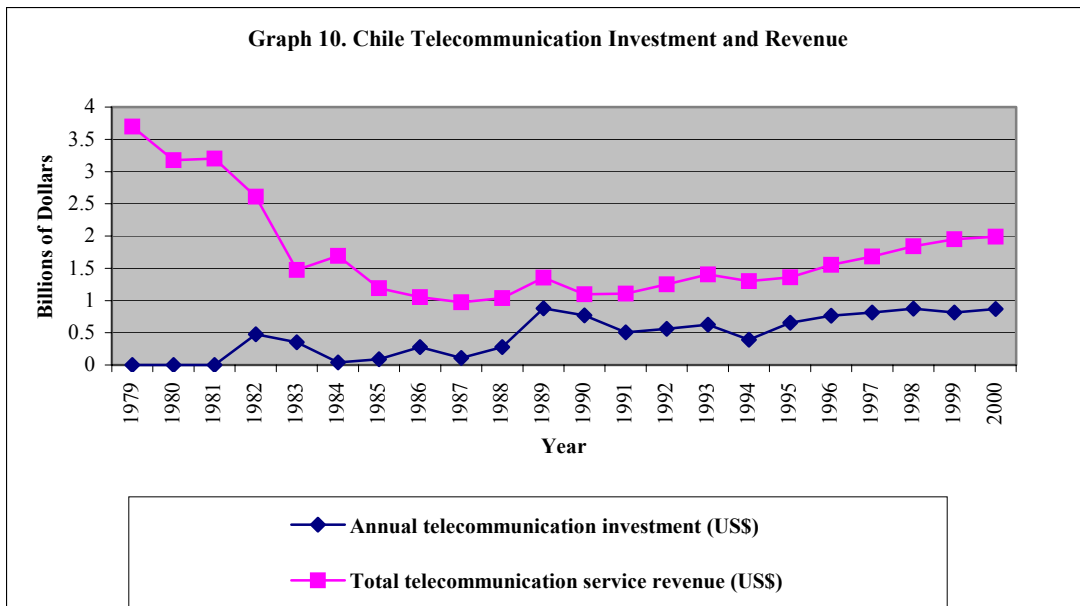
According to Falatoon and Navarrete (2004), connection tariffs in India and Pakistan changed similarly to Costa Rica's tariffs. For example, India's connection charges passed from 136 US Dollars in 1988 to 11 US Dollars in the year 2000.

**Industry behavior under Privatization and Liberalization.**

In this section we analyze the impact of privatization and/or liberalization of the telecommunication industry on the industry growth in Chile, Brazil, and Mexico. Since Costa Rica's industry remains as a state-owned monopoly, this country's industry is not included in the analysis of this section.

**Annual Investment**

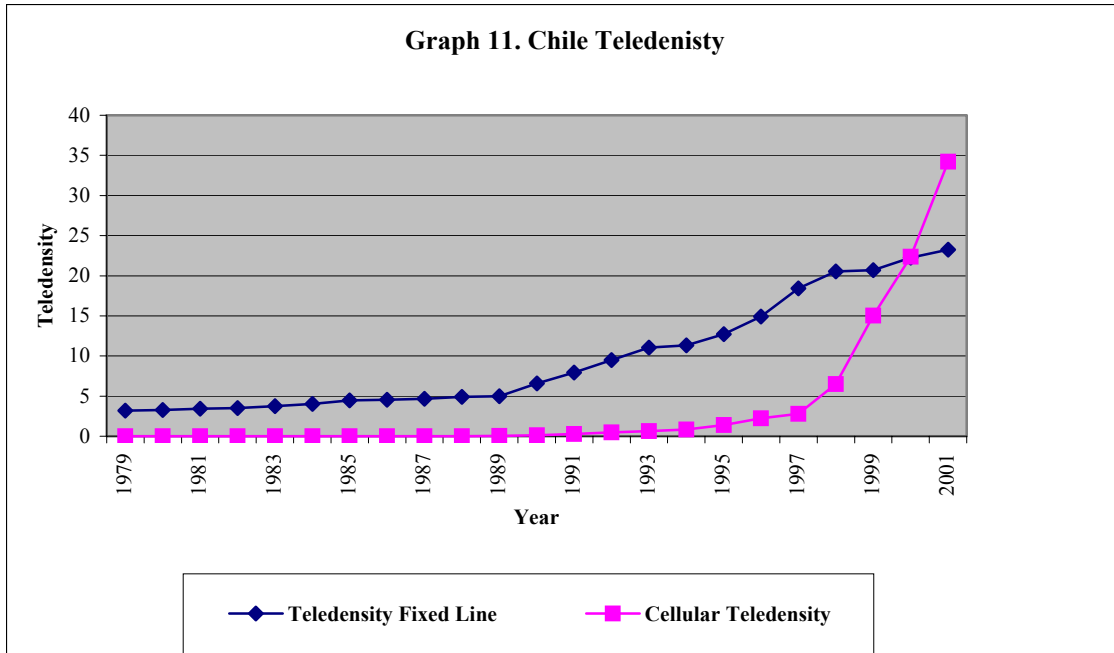
After its liberalization-privatization process (1996-1997), Brazil's annual investment increased from 12% to 25% (Graph 1). Similarly, industry privatization promoted an increase of 100% in investment from 1983 to 1989 in Chile. After the full privatization of the industry in 1989, investments decreased slightly until 1994, when it steadily increased reaching an annual investment of almost one billion US Dollars (Graph 10) in the year 2000. However, the state-owned monopoly privatization did not increase annual investment in Mexico (Graph 3). Only annual investment of Brazil and Chile supports hypothesis H2.1 -annual investment will increase after privatization/liberalization policies.



Source: ITU World Telecommunication Indicators 2002

**Teledensity and Waiting List for New Lines**

Teledensity for both fixed and cellular services rapidly increased after liberalization/privatization in 1997 in Brazil (Graph 4); after privatization in 1990 in Mexico (Graph 5); and in 1989 in Chile (Graph 11). Cellular teledensity exploded in these three countries after 1997. For Mexico and Chile, cellular teledensity surpassed fixed-line teledensity in the year 2000. The three cases support hypothesis H.2.2: The rate of teledensity growth will increase after privatization/liberalization.



Source: ITU World Telecommunication Indicators 2002

Privatization/liberalization had a very positive impact on the waiting list for new lines in Chile and Mexico. In the case of Chile, this list decreased from 300 thousand lines in 1989 to less than 50 thousand in 1998. Lack of information limited the analysis of the waiting list behavior after privatization in Brazil. The cases of Chile and Mexico strongly supports hypothesis H.2.3 which hypothesis states that the waiting list for new lines will decline after liberalization.

**Tariffs**

Table 3 shows the impact of liberalization and privatization in Brazil. Business and residential connection charges significantly declined. Business monthly subscriptions also declined, but not significantly. The most important finding, in the case of Brazil, is the fact that residential monthly subscription significantly increased after privatization.

As for Mexico, Table 4 shows the impact of privatization on business and residential tariffs. Business and residential connection charges decreased significantly after the privatization. However, the monthly subscription rate decreased slightly (only 5%), while the residential monthly subscription rate increased 6%.

Variable	Mean Before	Mean After	P-value (t-test)	% Change
Business monthly subscription (USD)	10.61	8.84	.1646	-17
Business connection charges (USD)	1689.87	38.4	.0115*	-98
Residential connection charge (USD)	1689.87	38.4	.0115*	-98
Residential monthly subscription (USD)	2.13	5.61	.0022* (-4.92)	163

**Table 3. Impact of telecommunications policy before and after liberalization and privatization in Brazil**

Variable	Mean Before	Mean After	P-value (t-test)	% Change
Business monthly subscription (USD)	20.92	19.86	.4358	-5
Business connection charges (USD)	1604.36	669.52	.0028*	-58
Residential connection charge (USD)	896.10	364.30	.0055*	-59
Residential monthly subscription (USD)	9.93	10.50	.4057	6

**Table 4. Impact of telecommunications policy before and after privatization in Mexico**

Changes in business and residential connection charges in Brazil and Mexico support hypothesis 2.4 – tariffs for telecommunication services will decrease after privatization/ liberalization. However, business monthly subscription decreased but not significantly. Residential monthly subscription in Brazil and monthly subscription for both residential and business in Mexico increased.

## CONCLUSIONS

The telecommunications industry in each country evolves and is shaped by a complex structure with social, political, economic, and legal ramifications. Studying such complex issues requires extensive data and information about the political and legal environment of each country. Unfortunately, such information is not readily available. Consequently, this study is an exploratory evaluation of each country's telecommunications policies and the impact of these policies on the industry growth.

State-owned monopolies in Mexico and Brazil corroborate the industry behavior presented in the research framework of this study. During the state-owned monopolies, these countries' annual investment was a proportion of telecommunications industry revenues (H1.1), teledensity growth was slow (H1.2), the waiting list for new lines increased (H1.3), and tariffs were very high (H1.4). However, Costa Rica's telecommunication industry did not follow this behavior.

Privatization and liberalization processes in Brazil, Chile, and Mexico had positive impact on teledensity and waiting lists for new lines. Annual investment increased in Brazil and Chile, but decreased in Mexico. A further analysis of the industry in Mexico shows that the new privately owned monopoly fulfilled the country's targets for teledensity and service quality, without investing more by year than the state-owned monopoly. This study's most contrasting findings are that in Brazil and Mexico, the tariffs did not decrease as expected after the privatization and liberalization of the industry.

Access to a more complete data set will allow future research regarding the behavior of tariffs and quality of services (i.e., number of fails by 100 lines), and the impact of national economic crisis on annual investment and services cost. For example, in Mexico annual investments fluctuated in different years perhaps due to several economic crises that have affected this country. Future research should analyze Costa Rica telecommunications policy to answer its telecommunications industry paradox—a significant increase on teledensity and decrease in the waiting list for new lines without privatizing and liberalizing its telecommunication industry.

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