

CHAPTER 2 : LITERATURE REVIEW

The literature on regulatory reforms can be divided into three parts. First, we discuss the theoretical literature on regulation in the telecommunications sector. Second, we examine a few existing studies on regulatory reforms in the Malaysian telecommunications sector. Finally, we take stock of the literature on regulatory reforms in other countries (such as the US, UK, New Zealand, Australia, Chile and Mexico).

2.1 Theoretical literature on regulation and competition in telecommunications sector

2.1.1 Why Regulate?

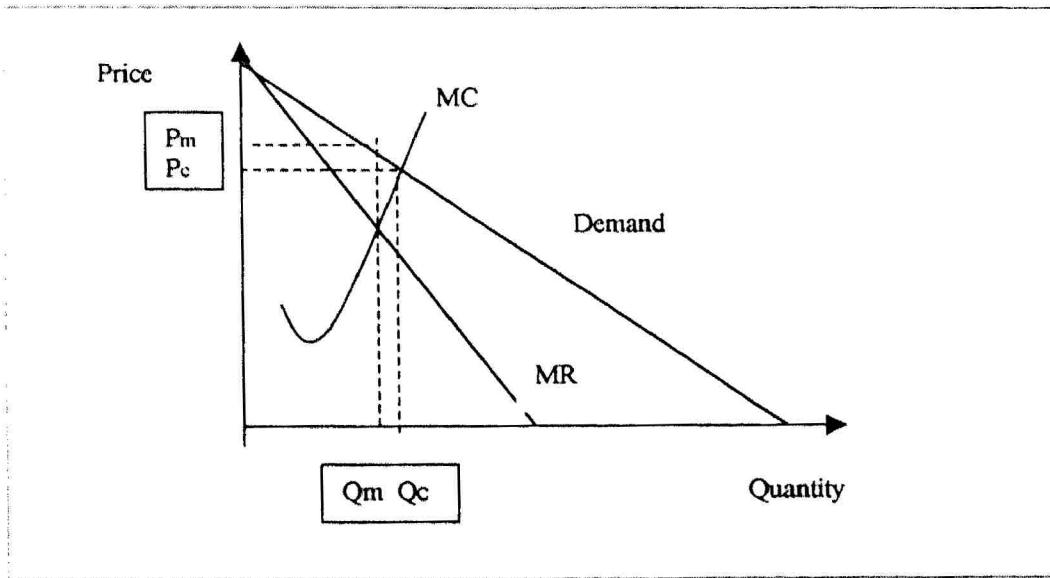
The prime motivation for regulation is to correct market inefficiencies¹ and promote economic efficiency (Carlton and Perloff, 2000). It has been argued that the chief objective of government regulations is income redistribution i.e. governments try to reduce firms' rent with the purpose of maximizing consumer surplus. The monopoly is an often-used example to motivate regulation. There is little evidence that an unregulated monopoly will behave optimally or set prices to maximize welfare.

In the absence of regulation, the profit-maximizing monopolist would set price above marginal cost (MC), which is determined by price-production point at marginal revenue (MR) equals MC, resulting lower output level. The consumer is paying more than it costs to produce the last unit of output, resulting in allocation inefficiencies. In this case

¹ Market inefficiencies include monopoly power, externalities such as pollution, uncertainty and various forms of opportunistic behavior.

the dead weight loss (DWL) reflects welfare loss due to the relatively lower unit of output sold. If the price is set between P_m and P_c , output lies between Q_m and Q_c , DWL could be reduced but not eliminated (Figure 2.1).

Figure 2.1: Monopoly Pricing



2.1.2 How to Regulate?

Several approaches could regulate such monopoly. One approach is direct government ownership. Government may privatize monopoly by selling them to the highest bidder, using franchise bidding. In a more sophisticated scheme, the government/regulator can design a menu of franchise contract as an optimal scheme whereby the net transfer payment is equal to an ex-post production subsidy less the franchise fees. This has been discussed by Riordan and Sappington (1987). They recommend that the franchise should be awarded to the firm with the lowest expected costs, but allowing prices to exceed realized marginal cost to encourage more competitive

bidding. Generally, the higher winning bid elicits prices closer to marginal cost and the firm is required to pay a larger franchise fee.

2.1.3 Regulation Under Imperfect Information

A core problem in regulation is that the firm is typically better informed than the regulator about its production processes, namely demand, cost, technology, efficiency and profitability of the firm and its cost reduction efforts.² For example, the regulator's pricing policy relies heavily on the firm's cost observation. The problem is how to regulate using cost observation to maximize the expected social welfare. The firm is able to reduce the cost of production in a way that is not observed by the regulator. Under moral hazard, the firm's price is too high compared with perfect information.

When the firm's effort level is unobservable by the regulator, there is no way to set $P=MC$ (first-best regulation) because this earns zero profit, unless society willing to subsidize its lost profit. This subsidy is a transfer of wealth from the monopoly and non-users to consumers of the products. Unfortunately, it has no efficiency implication. Therefore, one possible solution is using a two-part tariff which consist of fixed charge plus a usage charge. This two-part tariff enables price to be brought closer to MC. However, there remains inefficiency because some low demand customers are excluded from the market. Another solution is use the optimal linear tariff, second-best regulations that charge $P=AC$ (average cost) to breakeven. Again, this type of regulation resulting some degree of allocation inefficient because AC is above MC and there is a DWL due to the gap between P and MC.

² As elaborated, for example, by Galal and Nauriyal (1995), Riordan and Sappington (1987), Armstrong, Cowan and Vickers (1994) and Laffont and Tirole (1986 & 2000). Laffont and Tirole survey the theory of regulation under incomplete information.

However, Lewis and Sappington (1988) show that whenever marginal cost is increasing with the output, the first-best ($P=MC$) can be imposed despite the regulator has imperfect demand information. Therefore, efficient pricing is always implemented. However, when the firm has increasing returns, the informational asymmetry does have an impact and can not attain first-best. The best that the regulator can do is to set a fixed transfer to the firm.

The issues of uncertainty and incomplete information are also discussed by Riordan and Sappington (1987), Armstrong, Cowan and Vickers (1994) and Laffont and Tirole (1986). The regulator's problem is to maximize the social welfare under the constraint of information. They agreed that it is optimal for the regulator to use auction as a menu of contract for the firm to self-select and thus reveal information. With optimal auction, the firm would compete for one franchise and thus reduce rent in order to win the auction. Laffont and Tirole (1986), McAfee and McMillan (1987) and Riordan and Sappington (1987) argue that if the government shares the additional cost realization with the winning bidder, this would promote greater bidding.

2.1.4 Regulatory Mechanism

There are several types of information extracting mechanisms. Firstly, due to liberalization and technological progress, competition could promote efficiency. Secondly, yardstick competition mechanism (competition by comparison) is a useful way for the regulator to improve the precision of information about the firm's incentive for cost reduction and to compare the relative performance across the firms. Thus, it reduces competition between regional monopolies. This is seen in the basic telephone services.

Last but not least is auction. A low winning bid is generally one incurs high production costs.

On the other hand, Loeb and Magat (1979) propose a regulatory mechanism whereby the regulator gives the firm a lump-sum of transfer equal to the entire consumer surplus. Therefore, firm would minimize cost by choosing price equals to MC. This fulfills allocative and productive efficiency. However, in practice, this regulatory mechanism poses some problems because the firm possesses more information than the regulator. Nevertheless, Laffont and Tirole (1993) explain why the regulators are not permitted to make lump-sum transfers to the regulated firm. This is because high transfers are taken out from tax revenues via consumers having to pay it. If prices are used as policy tools, then consumers are able to monitor the regulator's behavior. Therefore, it could reduce the chance of regulatory capture and thus improve allocative efficiency and overall welfare.

2.1.5 Competition, Bypass and Cream Skimming

Competition may block regulatory mechanism in other aspects such as bypass and cream skimming. The bypass problem has been examined by Armstrong, Cowan and Vickers (1994). Users may be able to bypass the local network altogether and connect directly to a long distance network that is more cost effective privately. Local bypass has been widespread in US for years. There, large telecommunication customers bypass the US major common carrier, AT&T, and deal directly with the satellite company. However, an efficient regulated firm may benefit from the threat of bypass because it can use it to vindicate high level of production.

Laffont and Tirole (1990) discuss the problem of cream skimming. The regulated firm faces competitive pressure and focuses on the high-demand customers (the cream)

and not services that are high-cost with low-returns. From the economic point of view, cream-skimming has its advantages and disadvantages. New entrants will seek the most profitable market segment. These segments are profitable (e.g. tariffs for business and long distance services are set markedly above cost). Under these circumstances, it may spur the existing operator to adopt more efficient pricing. On the other hand, cream skimming has significant costs where it leads to duplication of expensive facilities.

2.1.6 Commitment Problem

In the literature of regulatory economics, the commitment problem refers to a regulator establishing a pricing rule to convince investors that they can earn a reasonable return on investment. Levy & Spiller (1993) argue that there is positive relationship between the government commitment and private sector incentive to invest in a country. In addition, Galal and Nauriyal (1995) evaluate the effect of different regulatory schemes on private sector behavior in the telecommunications sector in seven countries³. They find that firms depend on the government's commitment to the terms of regulatory contract. Failure on the part of the regulator to resolve information, incentive and commitment problems would induce low levels of private investment and productivity.

2.1.7 Price Regulation and Incentives

Price regulation is necessary to allow firms to make a fair rate-of-return and to protect the consumers. There are two regulated pricing schemes, namely price caps regulation and rate-of-return regulation. Each scheme has its own incentive properties⁴.

³ The seven countries are Argentina, Chile, Jamaica, Malaysia, Mexico, Philippines and Venezuela.

⁴ These properties have been discussed lengthily in Laffont and Tirole (2000).

Laffont and Tirole (1988) explain that there is a trade off between the revelation of information through the selection of an incentive contract and efficient ex-post production. A firm would reveal true information about its productivity only if it chooses a cost-plus contract whereas it would opt for fixed-price contract if a firm put effort on cost reduction ex-post production. Agents should be given low powered incentive schemes (cost-plus contracts) if high rents are incurred. When price reflects actual observed costs, allocative efficiency is nearly attained, but there are no excessive profits. Therefore, the firm has weak incentive to reduce cost under rate-of-return regulation. When price is fixed at some predetermined level, price-cap regulation is adopted. Moreover, the regulator expects the regulated firm to perform better than the previous year in terms of cost reduction, thus resulting in a ratchet effect.

2.1.8 Regulatory Capture

An accurate sign, Noll, Roger,G (1999) sayings about privatization with weak regulation creates another problem, regulatory capture. Capture means the regulator reports that the firm has higher costs than its actual does. The problem here is that the government would regulate in a discretionary manner. The regulator allows regulated firms to charge higher prices, earn higher profit and provide lower quality services. Therefore there is a danger that regulator acts outside the public interest. The capture theory indicates that firms want to be regulated because they can bribe or persuade the regulator to regulate in favor of the industry. Hence, regulation here is to protect firms from competition. If there is a risk of capture, it is better to limit the discretion of the regulator by offering lump sum transfer to the firm to reduce the firm's incentive to expand resources wastefully on rent seeking. Therefore, incentive regulation such as conflict

2.2 Literature on regulatory reforms in the Malaysian telecommunications sector

There are very few studies on regulatory reforms in the Malaysian telecommunications sector. The range of issues that have been examined in these studies are limited. Daud (1989) examines the background and objectives of privatization. The government used privatization as a major policy tool to achieve fiscal, sociopolitical and economic objectives. Daud (1989), Kennedy (1995) and Syed Hussein Mohamed (1994) discuss the changes that have taken place during the 1970s up to the implementation of corporatization policy, partial privatization and liberalization of the Malaysian telecommunications sector in the 1980s. In addition, both Syed Hussein Mohd and Kennedy traced the ultimate outcome and performances due to these policies implementation.

The Legal Research Board (1999) examines two legislations that address industry convergence, namely the Communications and Multimedia Act (CMA) 1998 and the Malaysian Communications and Multimedia Act (MCMA) 1998. These new acts were based on the principles of transparency rather than self-regulation. The transition of the CMA Act 1998 repeals both the Telecommunication Act 1950 and the Broadcasting Act 1988. In addition to this, the role of Malaysian Communication and Multimedia Commission and the government national policy objectives were also been stated.

Last but not least is the issue of major regulatory problems were addressed by Lee (1995). Nevertheless, the discussion of regulatory reform covered the Malaysian infrastructure sector, and not just the telecommunications sector.

2.3 Literature on regulatory reforms in other countries (United State of America (US), United Kingdom (UK), New Zealand, Australia, Chile and Mexico)

Privatization and regulatory reforms have been extensively carried in many countries. We briefly review the literature on regulatory reform in six countries that are considered leading nations in regulatory reforms in telecommunications. They are the United States (US), United Kingdom (UK), New Zealand, Australia, and two Latin America countries, namely Chile and Mexico.

2.3.1 United States

Katz (1997) and Cole (1999) discuss the experience of deregulation in the American telecommunications sector (see *Appendix 1* for the summary of U.S Telecommunications Events and Legislation). For decades, American Telephone and Telegraph (AT&T) was monopoly over local and long distance network operation in US. The equipment used was manufactured by AT&T's own manufacturing arm, Western Electric. Later in 1956, government decided to separate telecommunication and data processing policy. In 1940s, the Rural Electrification Administration (REA) began to offer low-cost loans to extend telephone service in areas that were still lack of telephone services. The Communication Act of 1934 established the Federal Communications Commission (FCC), which took over the regulatory responsibility for interstate and international telecommunications. It was superseded by the Telecommunications Act of 1996. FCC initially restrained entry towards its rivals in long distance market. It declared anti-competitive because it feared to loss its business to cover losses on its local network, particularly in rural areas. This induced the Department of Justice (DOJ) to bring an antitrust suit against it in 1974. In the *Modification of Final Judgement* (MFJ), AT&T was

required to break up on 1 Jan 1984. Geographic coverage was used as a guide and AT&T was broken up into seven regional service areas⁶. In the process, AT&T was split into two: 'New' AT&T and 22 operating groups under seven regional holding companies. The 'new' AT&T retained Bell's long distance network. Each local carrier is required to accept all long distance carriers' calls on an equal basis. With deregulation, businesses have a wider array of service providers to choose from and no longer relied on the local exchange carrier (LEC)⁷ to solve their problems.

Telecommunication reform arrived in 1996 after years of intensive lobbying. The Telecommunications Act of 1996 was a clear step toward deregulation of wired and wireless communications. The policy environment became favorable for competition. US is now in the process of introducing competition into all telecom markets via imposition of equal access for all national carriers. However, local telephony is still a monopoly. Therefore, entry into local exchange markets has to be promoted through the forced resale of incumbent local network. Local telephone companies can offer cable, wireless and long distance services. On the other hand, long distance companies can enter the cable, wireless and local access telephone services. However, long distance carriers have not entered the local telephone market. The Regional Bell Operating Companies (RBOCs) have been prevented from entering the long distance markets.

2.3.2 United Kingdom

Armstrong, Cowan and Vickers (1994), Armstrong and Vickers (1992), Hudson (1997), Kagami and Tsuji (1999) and Laidlaw (1994) have reviewed telecommunications

⁶ For the historical background, see Brock (1981) and Cole (1999) and Crandall (1999).

industry in Britain. In the United Kingdom, before the British Telecommunications Act of 1981, all aspects of network operations were provided by a public monopoly. Telecommunication services were provided by the post office under a department known as Post, Telephone and Telegraph (PTT). Since PTT is a public entity, it served public interest. Profit maximization was not an important objective. Indeed, what profits that were generated were used to subsidize the postal service.

Until 1981, British Telecom (BT) enjoyed a statutory monopoly on all aspects of network operations such as fixed-link network operation and basic voice telephony. The 1981 Act took the first step towards partial liberalization of the industry. BT was split from the Post Office which is under PTT. Major policy decisions were taken concerning structure, entry conditions, pricing, quality and investment. The structural decision taken was to privatize BT (instead of splitting it vertically and regionally as in the AT&T case). This restructuring took place before privatization. With the Telecommunications Act 1984, BT's privileges in telecommunication sector were abolished and property rights were transferred to a company nominated by the state. At the same time, Office of Telecommunications (OFTEL) was set up as the regulatory body to enforce operators' license conditions and act as an advisor to the government on licensing matters and regulatory environment⁸.

In November 1983, a year before privatization, the government announced a duopoly policy for the telecommunications sector for the next seven years. The only competitor to BT in the fixed-link market would be Mercury. Within this time frame, entry

⁷ LEC is the provider of local telephone services. Prior to 1996 Telecommunication Act, the LEC was local telephone company. With the act, the local telephone company is now called the incumbent local exchange carrier (ILEC) and its competitors are called competitive local exchange carrier (CLECs)

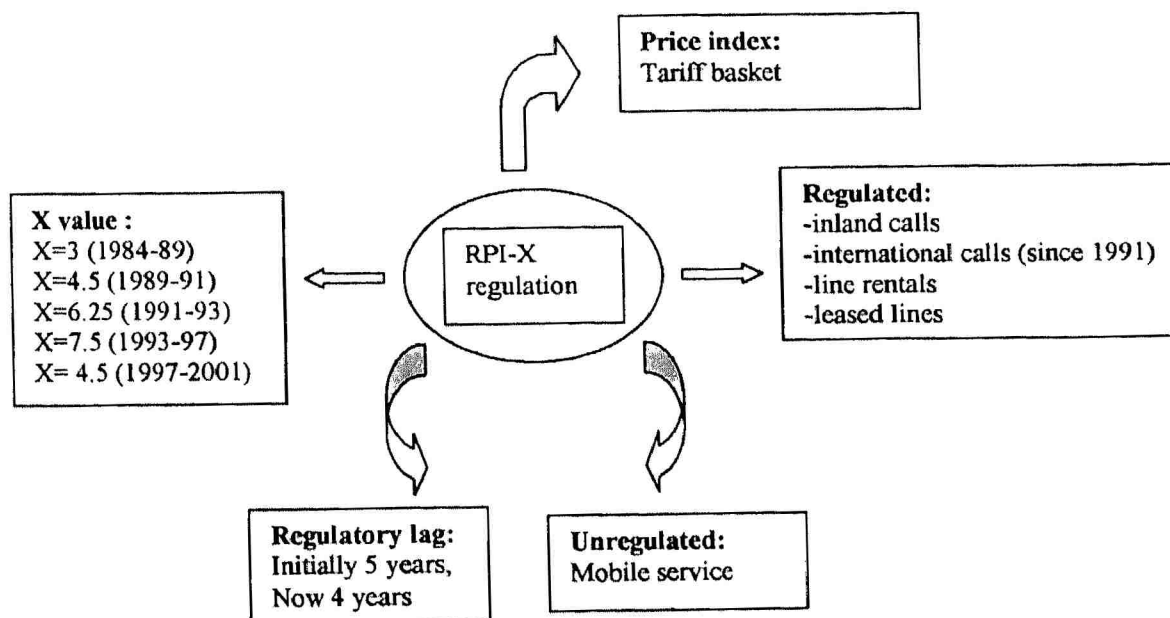
⁸ For more details, see Armstrong and Vickers (1992) and Armstrong, Cowan and Vickers (1994).

into fixed-link public network operation was restricted. This condition severely limited competition and the rationales given were to nurture Mercury as viable competitor to BT as well to allow BT some time to adjust to a more competitive environment.

Mercury was licensed to provide domestic service and international services, but it did not penetrate into the local loop network market extensively (except within the City of London). In other words, nobody could access Mercury's long distance links without using BT's local links. As a result, OFTEL made an interconnection ruling in 1985. It was hoped that this would remove any competitive advantage enjoyed by BT as a result of being a monopoly in the local loop network. No major review of entry conditions was made until the duopoly policy expired at the end of 1990.

In the UK, price regulation of local and long distance call charges were deemed necessary because of substantial cross-subsidization between long distance calls (high tariff) and local calls and rentals (low tariff). The type of pricing regulation used is the RPI-X price cap regulation. Almost 70% of BT's business is subject to price control. Below shows an illustration about RPI-X regulation.

Figure 2.2 : RPI-X regulation in British Telecom



Source: Adopted from Armstrong, Cowan and Vickers (1994).

Broader aspects of network operation are regulated since the duopoly review. A more liberal and pro-competitive regulatory policy in telecommunication is now in place. For the list of some of the important changes in UK Telecommunications policy, see *Appendix 2*.

2.3.3 New Zealand

Ahdar (1995) and Hudson (1997) and Donaldson (1994) have discussed the New Zealand deregulated experience. New Zealand is the earliest country to deregulate its

telecommunications industry. It undertook this by removing all legal entry barriers into telecommunications market. Restructuring of the sector was done in three phases. In the first phase (1985-87), the government decided to improve public sector performance by corporatizing the telecommunication business of the Post Office to become Telecom New Zealand (TCNZ) in 1987. The *Telecommunications Act 1987* ordered a partial liberalization of telecommunications services, including value added services and customer premises equipment. In the second phase, the *Telecommunications Amendment Act of 1988* authorized the removal of barriers of entry in the telecommunications market in 1989. In the third phase, TCNZ was privatized in 1990. It was sold in September 1990 for US\$2.6 billion to a consortium comprising Bell Atlantic, Ameritech (two giant America companies), and Freightways Holding Limited (a New Zealand transport firm). Foreign ownership was limited to 49.9 percent. Provision was made for a single 'Kiwi' share with certain significant rights and held by the Ministry of Finance on behalf of the government.

New Zealand is unique in its approach to regulatory reforms as the government did not establish any specific regulatory authority. It adopted a so-called 'light-handed' regulation i.e. it relies on antitrust law, the *Commerce Act 1986*, to prevent antitrust acts in the deregulated environment. The Commerce Commission enforces this through the courts. Consumer rights are protected under the *Fair Trading Act of 1986*. Meanwhile, the *Telecommunications (Disclosure) Regulation Act 1990* requires TCNZ to publish quarterly information relating to interconnection services and prices to enable customers, competitors and new entrants to make informed decisions. Tariffs were also restructured to reduce cross subsidies and to move towards cost-based pricing. On the other hand, the *Radio Communications Act of 1989* was created to open up the spectrum market via an

auction. A two-tiered system of spectrum property rights - management rights (to own a band of frequencies for 20 years) and license rights - was created.

Prior to 1998, only two companies competed in the fixed and cellular markets. However, when the government intent to open up its telecommunications market, the new entrant, Clear Communications Ltd, began to offer long distance services in 1991. Clear has lodged two legal cases in New Zealand High Court, claiming that TCNZ has abused its dominant position. In another case pertaining to issues of interconnection in local and toll market, users filed a complaint with Commerce Commission on leased circuit prices.

2.3.4 Australia

Grant (1998), Horton (1998), Hutchinson (1994), and Hudson (1997) for instant have examined the progress of telecommunications sector in Australia. Until 1991, telecommunications services in Australia were provided by a public monopoly. The Australian Telecommunications Commission (Telecom) was created in 1975 under the *Telecommunications Act of 1975* which separated postal and telecommunication functions. *Telecom* became a statutory authority and became known as the Australian Telecommunications Corporation in 1989. Telecommunications, previously under the purview of the Department of Transportation and Communications (DOTAC), came under the supervision of Department of Communications.

The Australia Telecommunications Authority (Austel) was established under the *Telecommunications Act of 1989* as an independent regulatory authority in Australia. Austel's mandate is to supervise the transition to full competition between the carriers. In September 1990, the Australian government decided to restructure the telecommunications sector. This reform involved the merging of international carriers, Oversea

Telecommunications Commission (OTC) with domestic carrier Telecom Australia, and sell off Aussat.⁹ This merger resulted in the formation of the Australian and Overseas Telecommunications Corporation (AOTC), now known as Telstra.

Following that, the Telecommunication Act 1991 came into force. The Act supported duopoly competition in the sector. The previous monopoly (Telstra) in network became a duopoly (Telstra and Optus) and the resale of domestic and international services were permitted. No restrictions on the provision of mobile services were imposed on Telstra and Optus¹⁰. A third mobile operator was later licensed to Vandafone. Telecommunications services were further opened to full competition from July 1997 onwards.

2.3.5 Mexico

Casasus (1994) has discussed the history of Mexico telecommunication sector and its post privatization period. He examined how the earlier Mexican government had managed the reforms in the telecommunications sector successfully, from expansion of state monopoly in service delivery to comprehensive structural changes. For the issues and options for telecommunication policy and regulatory reform in Mexico, see Wellenius and Staple (1996).

In the pre-privatization era, telecommunications in Mexico was characterized by large unmet demand for basic services, limited response to adapt to growth needs and new services, and deteriorating of quality service. The privatization of national carrier *Telefonos de Mexico* (TELMEX) was divided into two clearly defined stages. In the initial

⁹ Aussat is Australia's satellite system.

phase of reform from 1989 to 1994, the government of Mexico carried out restructuring of telecommunication sector by privatizing TELMEX and liberalizing the cellular, value-added services, and private networks. In 1990, TELMEX was sold to a consortium comprising the financial Carso Group (Mexico) and two foreign common carriers, Southwestern Bell (US) and France Cable et Radio (a subsidiary of France Telecom). Mexico's foreign investment law at that time restricted an individual foreign entity's ownership share to not more than ten per cent and total foreign ownership to not more than 30%.

The second phase of privatization, which began in 1994, was initiated by the placement of TELMEX shares in the international stock market. It also further opened up the markets for local, long distance, international network, satellites business, as well as auctioning the radio spectrum. The regulatory body, SCT (Secretaria de Comunicaciones y Transportes) was established, with the aimed to liberalize the market structure. It ensures that the participants adhere to the requirements of their concession and that the dominant carrier, TELMEX, does not behave in an anti-competitive manner towards new competitors.

2.3.6 Chile

The privatization of the largest Chilean telephone company, Compania de Telefonos de Chile (CTC) began in December of 1987 and was completed in 1990. This was implemented via an open international auction where foreign investors were invited to acquire shares of the privatized firm. In 1991, CTC was sold to Telefonica de Espana and

¹⁰ Optus is a second carrier license, where BellSouth and Cable & Wireless each hold 24.5 percent and Mayne Nickless, an Australian transport group, hold 20 percent. It provide long distance, international access and digital cellular services.

made a profit in this operation. Chile is a country that is committed to private property rights and is very market orientated. It has fully implemented competition in all segments of the industry in the 1980s. It also believes that private competition can greatly accelerate rural telecommunications development by using market mechanisms (rather than by distinguishing which projects require subsidies).

According to Galal and Nauriyal (1995), Chile was the most successful country in solving the commitment problem because Chile incorporated regulation in the form of laws. However, there are problems despite CTC's success (in terms of higher rates of return, improvements in service quality and a decrease in subsidy). For example, the rules regarding entry condition are not clearly defined. This became a problem in the long-distance market when the incumbent carrier, CTC (which supplies about 95% of the local phone services), decided to enter international long-distance market. Originally, the Chilean government established another firm (ENTEL) to provide long-distance service. CTC's rival feared that the firm would use its dominance position in local telephony to discriminate in favor of its own long-distance service. Finally, in 1994, the Chilean Supreme Court ruled that CTC could compete in the long-distance market along with ENTEL and four other long-distance operators, including Bellsouth, Chilesat, VTR and Lusatel due to the liberalization. Unfortunately, such regulatory failure may have induced discriminatory behavior and delay in efficiency. For example, Kagami and Tsuji (1999) argues that uncertainty have a significant negative effect upon investment.

The above review suggests that there are several ways to reform a telecommunications sector. Among these six countries, only US opted for a regional approach. AT&T's local network services, long distance services and apparatus supply business were broken up to reduce the potential for anti-competitive behavior. Having

separate local network operators under different regional could enhance the effectiveness of regulation, by facilitating cost comparisons and yardstick competition. Furthermore, the US regulates by law, whereas in the UK, some bargaining between OFTEL and BT occurs.

Australia has shown that it is possible to introduce some competition without privatizing the government monopoly. It established a regulator and encouraged a duopoly without privatizing Telstra. Meanwhile, New Zealand approach was to open the whole sector to competition, auctioned off its spectrum. It has no regulator but relies on antitrust laws and consumer protection legislation to regulate the telecommunications industry. This is different from the UK and Australia, where new telecommunications regulatory bodies were set-up. The argument used in these cases was that in any dispute that requires resolution by courts and judges, such institutions would lack of the necessary expertise and technical knowledge.

The link between market structure (e.g. duopoly vs. open competition) and investment is another key issue. A telecommunications market may be legally open but its small population may make it less attractive for the existence multiple operators. But duopoly firms may invest in duplicating facilities if both carriers fail to match demand with the capacity as appears in part of Australia. This has prompted countries to weigh the benefits of fully open competition against the risk of over-investment. There are other dimensions (such as quality) to consider. For example, carriers in the US went on building redundant capacity to ensure reliability after the divestiture of AT&T as most long distance carriers invested in nationwide fiber network.