Volume Title: Deregulation and Interdependence in the Asia-Pacific Region, NBER-EASE Volume 8

Volume Author/Editor: Takatoshi Ito and Anne O. Krueger, editors

Volume Publisher: University of Chicago Press

Volume ISBN: 0-226-38674-0

Volume URL: http://www.nber.org/books/ito_00-1

Conference Date: June 19-21, 1997

Publication Date: January 2000

Chapter Title: Telecommunications Liberalization: A Taiwanese Perspective

Chapter Author: Shin-Horng Chen

Chapter URL: http://www.nber.org/chapters/c8486

Chapter pages in book: (p. 327 - 350)

11

Telecommunications Liberalization
A Taiwanese Perspective

Shin-Horng Chen

11.1 Introduction

Gone are the days when the telecommunications sectors in most countries were governed as state monopolies. This trend toward telecommunications liberalization has become increasingly apparent since the 1980s and now is taking place in Taiwan. While global deregulation and Taiwan's accession to the World Trade Organization (WTO) carried weight in political minds, there are a few internal self-driving forces at work strengthening the will to liberalize the industry. Critical developmental policies relating to the Asia-Pacific Regional Operations Center and the National Information Infrastructure are characterized by the promotion of institutional reform and soft infrastructure as new competitive parameters. Added to this, changes in industrial parameters, such as scale economies and scope economies, call for the transformation from a state monopoly in a competitive telecommunications market. At the heart of Taiwan's deregulatory process are the organizational separation of the public telecommunications operator from the regulator and the introduction of private competition. Also the reform framework is characterized by a two-tiered regulatory regime for different segments of telecommunications services. Substantial progress has been made, but much remains to be done.

Against this background, this paper examines the policy framework and the implementation of Taiwan's telecommunications liberalization. Its aim is to distill lessons that may add to the current understanding of telecommunications liberalization that has been derived mainly from the developed world, rather than to comprehensively evaluate the whole program.

Shin-Horng Chen is deputy director of the second division of the Chung-Hua Institution for Economic Research, Taiwan.

The remainder of the paper is structured as follows: Section 11.2 reviews the historical background of Taiwan's telecommunications industry prior to liberalization. It is followed in section 11.3 by a discussion of current progress in telecommunications liberalization in Taiwan. In particular, the policy framework is outlined. Section 11.4 puts forward a few criticisms of the liberalization program. Section 11.5 highlights problems arising from market entry. The wrangling over industrial policy versus competition policy in the deregulatory process in Taiwan is taken up in section 11.6. Section 11.7 discusses the emerging issues that warrant the attention of the regulatory authority. Finally, section 11.8 draws conclusions.

11.2 Historical Background

Until recently, virtually all telecommunications services in Taiwan were provided by its public telecommunications operator, the Directorate General of Telecommunications (DGT), under the auspices of the Ministry of Transportation and Communications (MOTC). Based on the Telecommunications Act of 1958, the DGT assumed both regulatory and operational responsibilities. A wide span of business activities, ranging across voice telephonic services, data communications, satellite communications, and training and research, were all operated by the DGT. While the Telecommunications Act of 1977 technically allowed domestic private and public organizations to enter the local telephone service market, this did not really happen, due to the dominance of the DGT. At the same time, a few state enterprises were granted permission by the MOTC to install dedicated telecommunications networks limited strictly to internal communications and monitoring. Also, six international news agencies—Reuters, for example—were allowed to lease direct link circuits from the DGT to communicate with their global news networks. As a result, their subsidiaries in Taiwan acted more or less like value-added network service providers. Nonetheless, these were exceptions. The DGT was mandated to provide comprehensive telecommunications services in Taiwan.

As the administrator and public operator of telecommunications in Taiwan, the DGT was governed as an official body with limited independent authority. Its human resource management and procurement were subject to tight control and scrutiny. Its employees were qualified as civil servants and tended to be vulnerable to the criticism that they demonstrated insufficient customer orientation. Like many public utilities in Taiwan, the DGT was required to meet a return rate of investment, with a profit cap of 11.5 percent. There is a danger that monopolistic utilities such as the DGT, may, under the veil of investment return rates, unduly favor the use of capital relative to other inputs, so that output might be produced at an inefficiently high cost, a scenario known as the Averch-Johnson effect. On top of this, it cannot be taken for granted that the DGT will share its

excess profits with customers by reducing tariffs, due to the absence of competition and to delay in the process of changing tariff schemes. Furthermore, like other public telecommunications operators throughout the world, the DGT employed cross-subsidization to provide certain of its telecommunications services at "affordable" prices, as part of its universal service obligations. In this regard, tariffs were priced below cost for local calls but significantly above cost for trunk and international calls and for mobile communications. Though quite common worldwide, there has been concern that this divergence from cost, as a result of cross-subsidization, might distort price signals to the users of telecommunications networks.

Due credit should be given to the DGT for establishing and modernizing the telecommunications infrastructure in Taiwan. Table 11.1 presents a set of performance indicators for the DGT over the period 1991–95. For example, the penetration rate of telephone mainlines in Taiwan was 41.3 per 100 inhabitants in 1995, as against 0.29 in 1950 and 32.1 in 1991, which was close to the OECD average in 1990 (42.58; OECD 1993, 10). Headway has also been made by the DGT in expanding mobile communications services. As a result, 1995 witnessed a penetration rate of 90.8 per 1,000 inhabitants for radio pagers and 27.9 for cellular phones. To date, the completion rates of digitization of local telephone switching, toll trunk exchanges, and toll trunk circuits are all above 90 percent, with toll trunk exchanges having been completely digitized in 1994.

However, it has become increasingly difficult for the DGT to meet mounting demand for communications services. Recently, remarkable growth in mobile communications in Taiwan has resulted in a situation where demand outstrips supply. As a consequence, hundreds of thousands of inhabitants have been on the waiting list to subscribe to cellular phone and radio paging services, due to underestimation of consumer demand on the part of the DGT and to delay in the procurement process. Such a huge unmet demand for cellular phone and radio paging services and hence the long waiting period for connection to the services reflected the deteriorating quality of service provided by the DGT. Ironically, the regulatory authority will not start to monitor and collect data on quality of service until 1998. Having said that, it is estimated that the waiting period for mobile phone and radio paging services is not less than one year, given the long waiting list discussed above. Partly for this reason, mobile communications is the first target for market liberalization, which will be discussed later.

The DGT, though never involved in the manufacturing of telecommunications equipment, had a stake in three local producers of public switching systems (Taiwan Alcatel International Standard Electronics, Siemens Telecommunications System, and AT&T Taiwan Telecommunications). These three firms are international joint ventures led by Alcatel, Siemens, and AT&T, respectively. Of note is the fact that they each enjoyed a de

Table 11.1 **Business Performance of Directorate General of Telecommunications, 1991–95**

Item	1995	1994	1993	1992	1991
Local telephone exchanges	11,726,572	11,306,386	10,995,646	10,417,616	9,371,406
Local telephone switching digitization (%)	91.5	83.8	70.7	58.7	41.9
Local telephone subscribers	8,773,685	8,209,557	7,662,499	7,137,265	6,583,435
Telephone density (per 100 inhabitants)	41.3	38.9	36.7	34.5	32.1
Resident subscriber density (per 100 households)	110.5	106.3	101.99	97.7	92.8
Public telephones	121,979	119,077	114,151	109,259	106,370
Public telephone density (per 1,000 inhabitants)	5.7	5.6	5.5	5.3	5.2
Radio pager subscribers	1,929,451	1,548,429	1,259,281	1,078,478	885,182
Radio pager density (per 1,000 inhabitants)	90.8	73.5	60.3	52.1	43.2
Cellular phone subscribers	593,869	561,987	472,838	299,690	137,815
Cellular phone density (per 1,000 inhabitants)	27.9	26.7	22.6	14.5	6.7
Toll truck exchanges	833,000	740,000	647,500	563,520	524,380
Toll truck exchange digitization (%)	100	100	99.15	96.8	89.4
Toll truck circuits	668,823	626,303	584,950	480,202	330,006
Toll truck circuit digitization (%)	99.1	98.9	98.8	96.9	94.1
Domestic data communications dedicated line rentals	51,274	44,232	38,401	34,449	27,776
Dial-up data communications subscribers	27,548	21,976	19,698	17,549	15,930
Packet switched data communications subscribers	5,259	4,577	3,935	3,492	2,777
Videotex subscribers	20,122	15,955	13,550	12,334	11,460
Universal database access system	334	360	327	314	252
International telephone direct link circuits	11,173	8,768	6,914	5,684	4,465
International satellite communications circuits	2,241	2,565	2,806	2,257	1,711
International submarine cable communications circuits	16,696	12,951	9,636	7,975	4,953

Source: Directorate General of Telecommunications 1996, http://www.dgt.gov.tw/.

facto spatial monopoly over the provision of public switching systems for the three broad (northern, central, and southern) regions of Taiwan, which is known as the "three systems, three suppliers" policy. This resulted from a government policy introducing digitized switching technology via foreign investment in 1985. It was hoped that the DGT's investment in the three companies might facilitate technology transfer from their overseas parents. However, the extent to which core competencies of digitized switching technology were localized within Taiwan is still open to question. In addition, the three companies were often accused of overcharging for the systems they provided.

11.3 Progress in Telecommunications Liberalization

Since the 1980s, an increasingly significant development on the global telecommunications landscape has been the move from monopolization to liberalization. This trend was pioneered by the United States, the United Kingdom, and Japan in the early 1980s and then followed by many other countries. Taiwan has also followed suit. This move, however, is not just jumping on the bandwagon but reflects a belief that telecommunications liberalization should be an integral part of Taiwan's midterm development policy. In fact, several attempts were made in the late 1970s and early 1980s to provide the statutory basis for the corporatization of the DGT and liberalization of the industry. Relevant draft bills tabled at that time, however, were not enacted, due in part to the resistance of the telecommunications trade union (Cheng et al. 1989, 38–39). These initial efforts did bear fruit, in the liberalization of the customer premises equipment (CPE) market and the regulatory relaxation of access to telecommunications networks that have taken place since 1987. Further momentum was gained as the DGT started to liberalize some segments of value-added network (VAN) services from 1989 onward.

Meanwhile, the issue of the transformation of the industrial structure surfaced when three telecommunications reform bills were drafted. This was due to external pressures and internal self-driving forces. On the one hand, the global trend of deregulation and Taiwan's accession to the WTO carried weight with politicians. On the other hand, critical development policies relating to the Asia-Pacific Regional Operations Center (APROC) and the National Information Infrastructure (NII) were the internal forces at work strengthening resolve. Both programs are at the forefront of public policy in Taiwan's midterm economic development. The APROC plan has two major aspects. First, it aims to promote Taiwan as a center of the Asia-Pacific region by developing regional manufacturing, sea transportation, air transportation, financial, telecommunications, and media centers. Second, it serves to engineer a highly liberalized and internationalized economy. The APROC program proposes to develop Taiwan into a tele-

communications center, among others, which will be able to provide reasonably priced, high-quality telecommunications services regionwide. In addition, the NII program aims to construct an information superhighway, preferably led by the private sector through unleashed competition. It embodies the goals of upgrading telecommunications infrastructure, stimulating innovation, introducing novel applications, and setting up an appropriate regulatory framework. To achieve the aims of these two programs, it is necessary for Taiwan to deregulate its telecommunications market. With the passage of the three telecommunications reform bills in January 1996, both the resolve and the means to open up Taiwan's telecommunications sector have emerged. Accordingly, a large-scale telecommunications liberalization program, albeit involving an evolutionary process, is under way in Taiwan.

In addition, evidence on the industrial parameters of the sector, gleaned from other sources, lends support for the introduction of telecommunications liberalization. The concepts of scale economies and scope economies have been used in rationalizing the monopolization of the telecommunications industry. A study supported by the Council for Economic Planning and Development (CEPD 1996) revealed that the cost function of the DGT indeed featured scale economies, but they have been declining over time due to the introduction of new technologies. Moreover, it established no evidence to support the argument that the DGT enjoyed scope economies.

Before 1995, telecommunications liberalization in Taiwan was limited in scale. Over the period 1987–94, the liberalization process focused on deregulating the CPE market, access to telecommunications networks, and VAN services (table 11.2). By the end of 1994, the DGT's monopoly on the supply of numerous items of CPE was rescinded. Subscribers were allowed to obtain their own CPE and in-house lines. As a result, the CPE market was opened to competition. Private competition was also introduced in eight kinds of VAN services. In addition, restrictions on the terms for access and lease of telecommunications networks and circuits were loosened. More recently, CT-2 (second-generation cordless telephone) service was opened to the private sector at the end of 1995. This move went beyond the liberalization of VAN services and served as a prelude to a more radical transformation of Taiwan's telecommunications industry, since, according to the Telecommunications Act of 1996, CT-2 is classified as part of so-called Type I services (common carriers).

Further momentum was gained after the three telecommunications reform acts were promulgated in January 1996 and became law the following month. They are the Telecommunications Act of 1996, the Organizational Statute of the DGT, and the Statute of Chunghwa Telecom Co. Ltd. (table 11.3). The Telecommunications Act of 1996 sets out the framework within which Taiwan's telecommunications industry is to be reformed. The act creates a dichotomy of telecommunications services. Type I services refer

Table 11.2 Telecommunications Liberalization in Taiwan before 1995

	Date
Customer premises equipment	
Telephone sets	August 1987
Modems (2,400 bps)	November 1987
Telex terminals	May 1988
Modems (9,600 bps)	June 1988
Modems (9,600 bps)	June 1989
Cellular telephones	July 1989
Radio pagers	February 1990
Access to networks	
Domestic leased circuits shared by value-added network (VAN) service operators and their customers allowed	June 1989
International leased circuits shared allowed	October 1989
In-house lines	July 1990
Connection of domestic leased circuits with local phone systems allowed	March 1994
Restrictions eased on leasing domestic and international leased lines by VAN service providers	December 1994
Telecommunications services	
Domestic VAN services (information storage and retrieval, information processing, remote transaction, word processing, voice mail, e-mail)	June 1989
International VAN services (as indicated above)	October 1989
VAN services (bulletin board system, electronic data interchange)	June 1992
Home/office-based second-generation cordless telephone (CT-2)	August 1994
Public CT-2	November 1994
VAN services (packet switched data services, store and forward facsimile services)	December 1994

Source: Directorate General of Telecommunications, *White paper on telecommunications* (in Chinese; Taipei, 1995), 329–30.

to the installation of telecommunications machinery and line facilities and to services provided through owned circuits and facilities. Those services other than Type I are referred to as Type II. While private firms will be allowed to enter virtually all segments of the telecommunications market, the extent of regulatory control differs between Type I and Type II carriers. Type II carriers need only approval from the DGT to start business, while special approval and a license issued by the MOTC are required for private firms to provide Type I services that are subject to phased liberalization. Under the two-tiered regulatory regime, the planned scenario is that Type II services will be characterized by open competition, but Type I services will involve regulated competition among a limited number of providers. The latter is deemed appropriate on the grounds that the DGT enjoyed scale economies, though they are declining over time (Jang 1993). In addition, this act legalizes the principle of equal access to telecommuni-

Table 11.3 Outline of Three Telecommunications Reform Acts in Taiwan, 1996

Telecommunications Act of 1996
1. Delineation of Type I and Type II telecommunications enterprises.
2. Regulations on the extent of liberalization and foreign participation in the two types of telecommunications enterprises.
3. Prohibition on cross-subsidies between the two types of telecommunications enterprises.
4. Establishment and collection of funds for the provision of universal services.
5. Equal access to telecommunications networks.
6. Establishment of a pricing system to allocate radio frequencies.
7. Enhancement of the telecommunications inspection system.

Organizational Statute of the Directorate General of Telecommunications (DGT)
1. Release of the DGT from operational responsibility.
2. Clarification of the roles of the DGT in
   drafting and implementing telecommunications policies,
   approving and reviewing telecommunications tariffs,
   drafting and examining telecommunications technical specifications, and
   inspecting and supervising telecommunications carriers and their activities.
3. Restructuring of the DGT and its subordinate institutions.
4. Establishment of regional telecommunications regulatory stations.
5. Establishment of a telecommunications conciliation committee to settle telecommunications disputes.

Statute of Chunghwa Telecom Co. Ltd. (CHT)
1. Establishment of CHT as a state-owned telecommunications operator.
2. Assignment to CHT of considerable operational discretionary authority, especially concerning organizational structure and regulations, in order to enhance operating efficiency.
3. Application of ex post auditing to CHT's procurements.
4. Preservation of favorable welfare conditions for CHT's employees transferred from the former DGT.

Source: Adapted from Chen (1997).

cations networks and prohibition of cross-subsidies between the two types of services, where applicable. Also provided is a legal basis to develop a pricing system to allocate radio frequencies, given the fact that they have become economic goods (Kelly 1992). On top of these, the act stipulates the extent of foreign participation in Taiwan's telecommunications market. There is no restriction on foreign ownership for Type II carriers, but a 20 percent limit on investment by foreigners is imposed for individual Type I operators (table 11.4). The regulatory framework adopted in Taiwan is similar to that in Japan a decade ago (Sato and Stevenson 1989). While a more liberalized framework has currently been adopted in Japan and such countries as Denmark, Finland, Sweden, and the United States, it is not uncommon in OECD countries for local, national, and international calls and mobile communications, which fall within Type I services in Taiwan, to be handled by firms that have limited competition, and even monopoly status (OECD 1997). Given the proposed liberalization schedule for the

Table 11.4 Types of Telecommunications Carriers

Industry Framework	Type I Carriers	Type II Carriers
Business activities	Installation of telecommunications machinery and line facilities and provision of telecommunications services through owned telecommunications circuits and facilities[a]	Telecommunications services apart from Type I
Government regulation		
Start-up of services	Special approval and issue of a license by the MOTC required	Approval by the DGT required
Tariff schedules	Approval of primary tariff schedules by the MOTC required Approval of secondary tariff schedules by the DGT required	Notification to the DGT required
Foreign capital principle	Proportion of total shares held by foreigners limited to 20 percent	Unregulated

Source: Adapted from Chen (1997).

[a]The main items of Type I currently include local calls, toll calls, international calls, mobile communications, satellite communications, broadband switching communications, and high-speed data communications.

next five years, which will be discussed later, it is likely that the two-tiered regulatory framework in Taiwan will remain intact in the near future. Having said that, MOTC, the competent ministry, is inclined to exempt satellite communications from foreign ownership limits.

The other two acts, also outlined in table 11.3, form the statutory basis for restructuring the DGT and establishing a state-owned corporatized telecommunications operator, namely, Chunghwa Telecom (CHT). The Organizational Statute of the DGT demands the DGT be released from its operational responsibility to act merely as a regulatory authority. Among other responsibilities, the DGT is required under this law to establish a telecommunications conciliation committee to settle telecommunications disputes. The Statute of CHT authorizes a spinoff from the DGT to be incorporated as a state-owned telecommunications carrier. It also outlines the corporation's main business activities and basic organizational structure. In particular, the statute gives CHT considerable discretionary authority over its internal management and regulations in order to enhance operational efficiency. It is designed to free CHT from many

limitations normally imposed on state enterprises that may not be compatible with commercial best practices.

Following the passage of the three telecommunications reform acts, the restructuring of the DGT took place on 1 July 1996. The business arms of the DGT were spun off to form CHT and incorporated as a state enterprise. The rest of the DGT, staffed by 500 employees or so, has since acted merely as a regulatory authority.

In addition, from 1996 onward, several significant milestones in market liberalization have been planned or realized in the telecommunications sector in Taiwan. First, four mobile communications services, including radio paging, cellular phones, trunked radio, and mobile data communications, have been liberalized. In these segments, a total of fifty-three operating licenses were issued to private operators, in addition to CHT, at the beginning of 1997 (eight licenses each for radio paging and cellular phones, twenty for trunked radio, and seventeen for mobile data communications; Chen 1997). Other segments of Type I services are also scheduled to be liberalized in the next five years (fig. 11.1). The next target for market liberalization is satellite communications, which will take place by the end of 1999. Before July 2001, the rest of Type I services, including local calls, long-distance calls, international calls, broadband switching communications, and high-speed data communications, will be opened to the private sector. More important, CHT will be privatized at that time.

Taiwan is in the middle of liberalizing its telecommunications market. The time is perhaps not ripe for a comprehensive evaluation of the impact of the liberalization program as a whole, but there are signs that market liberalization has started to generate some positive results (Chen 1997). Prominent among them is the reduction of telecommunications tariffs. On the brink of the entry of private mobile communications operators, CHT gained approval from the regulator to rebalance its tariffs (table 11.5). Despite a substantial increase (70 percent) in local call tariffs to eliminate cross-subsidization, tariffs for mobile phones, radio paging, and international calls have fallen. Important reductions of 45 and 25 percent for nationwide and regionwide services, respectively, have occurred. Tariffs for international calls have also decreased, by 3 to 27 percent. However, it is believed that CHT's new tariffs still diverge from costs and hence that room remains for further tariff rebalancing. On top of that, the liberalization is beset by several problems, to which I now turn.

11.4 Criticisms of the Liberalization Program

Criticisms have been leveled against the government's telecommunications liberalization program. First, the breakdown of Type I and Type II services gave rise to controversy. As described above, Type I services refer to the installation of telecommunications machinery and line facilities and

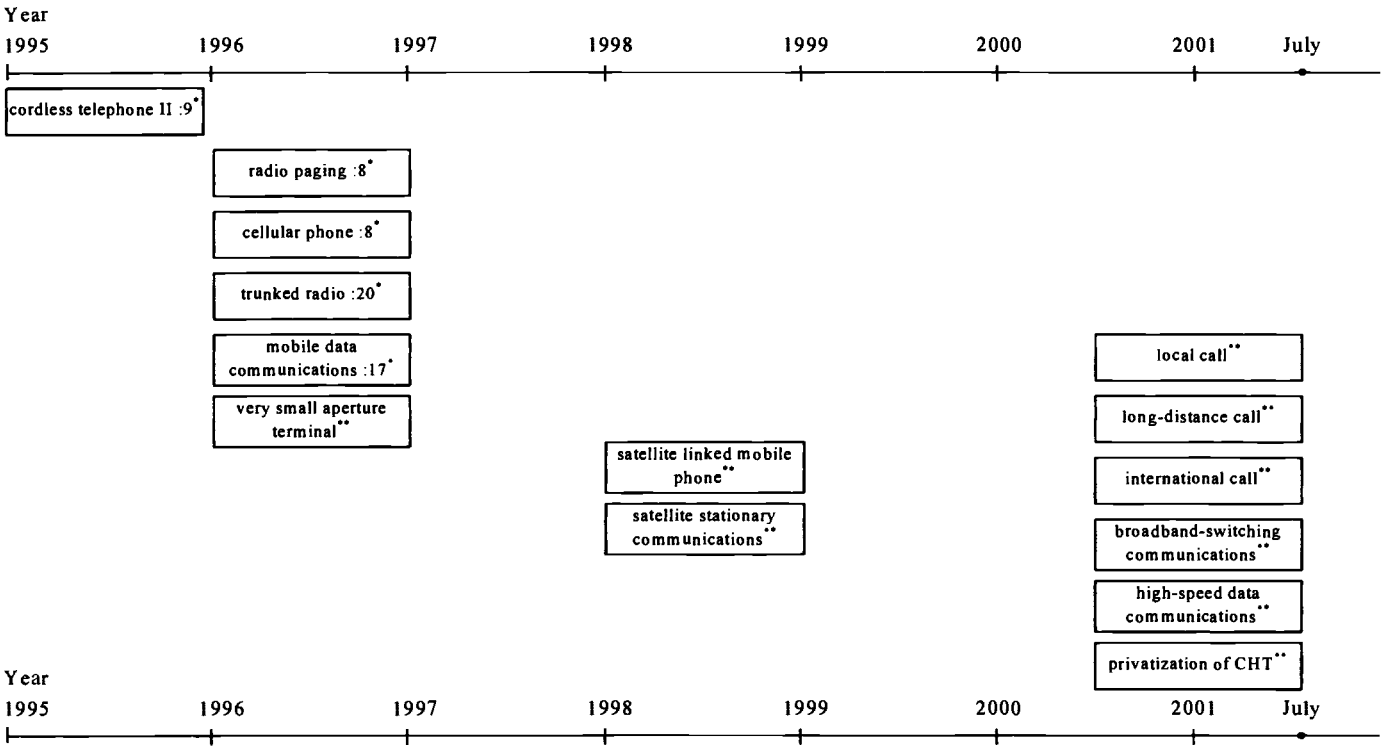

Fig. 11.1 Schedule of telecommunications liberalization in Taiwan, 1995 onward

Source: Adapted from Chen (1997).

*Number of private operators, in addition to Chunghwa Telecom (CHT).

**Scheduled to be liberalized.

Table 11.5 **Changes in Chunghwa Telecom's Tariffs, Effective 1 July 1997**

Category	Old Tariff	New Tariff	Difference (%)
Local calls	NT$1 per 5 minutes	NT$1.7 per 5 minutes (peak time)	+70
		NT$1 per 10 minutes (off-peak time)	−50
Public phone calls	NT$1 per 3 minutes	NT$1 per 2 minutes	+50
Mobile phone calls (nationwide)	NT$6.5 per minute (peak time)	NT$5.6 per minute	−14
	NT$3.3 per minute (off-peak time)	NT$3 per minute	−9
Mobile phone calls (within single region)	NT$5 per minute (peak time)	NT$4.5 per minute	−10
	NT$2.5 per minute (off-peak time)	NT$2 per minute	−20
Radio paging monthly rent (nationwide)	NT$550	NT$300	−45
Radio paging monthly rent (within single region)	NT$200	NT$150	−25
International calls			−3 to −27

Source: Compiled from Chunghwa Telecom press releases.

to services provided through owned circuits and facilities. Services other than Type I are referred to as Type II operations. In other words, the definition of Type II services is characterized by a negative list that allegedly allows for the introduction of new services in line with technological advancement without being unduly hampered by existing regulations. In practice, Type I services—though by law apparently facility based rather than service based—are itemized to include local calls, toll calls, international calls, mobile communications, satellite communications, broadband switching communications, and high-speed data communications. This gives rise to controversy over whether callback and Internet phone services should be legally permissible. Admittedly, these two services have a substantial impact on wireline voice communications, thus public telecommunications operators and even telecommunications authorities throughout the world tend to look on them with hostility. CHT also insists that callback and Internet phone services be banned. However, legally speaking, the prohibition is open to question. While they perform the function of voice communications, callback and Internet phone services by nature appear to be value-added services and hence are, from a legal perspective, closer to Type II than to Type I operations and thus should be opened to private competition. On top of that, CHT's wrangling over the private provision of callback and Internet phone services is at odds with the trend

in the telecommunications industry, according to which new technologies often result in productive economic efficiency in the form of lower costs and superior services (Hausman 1996). To capitalize on new technologies available in the marketplace or looming on the horizon, regulations must be continuously upgraded to allow for the reality of complementary and competing services.

Also under attack is the DGT's proposal to regulate Type I carriers with rate-of-return regulation, as opposed to price-cap regulation. Rate-of-return regulation, with a profit cap of 11.5 percent, has been used in Taiwan to regulate public utilities, including telecommunications. By linking allowed revenues to realized or estimated production costs, rate-of-return regulation may weaken incentives on the part of the regulated firm to reduce operating costs and to develop and introduce new and innovative services (Sappington and Weisman 1996, 5). In contrast, in OECD countries rate-of-return regulation is being replaced by price-cap regulation (OECD 1995, 18). At the time of writing, the DGT is indeed in the process of formulating a price-cap regulation. It is generally agreed that price-cap regulation, by controlling the prices charged by regulated firms, provides enhanced incentive for cost reduction relative to rate-of-return regulation. Having said that, the move to price-cap regulation will make the scope of bargaining more explicit (over the productivity offsets, e.g.) between the two sides of the regulatory relationship (Braeutigam and Panzar 1993). Care, therefore, should be taken to enhance the regulatory function and oversight.

More controversial is the 20 percent foreign capital limit imposed on Type I enterprises. Elsewhere I have demonstrated that foreign participation, in terms of business opportunities, in Taiwan's telecommunications market is much wider than implied by the foreign equity cap (Chen 1997), but such tight control on foreign ownership is hard to justify. The main reason for imposing the foreign capital limit appears to rest mainly on the fear that experienced foreign telecommunications carriers may leverage incumbency advantages to dominate the local market; thus economic rents arising from liberalization would be captured mainly by foreign investors at the expense of domestic firms. Such an argument has little merit because economic rents can be preserved for the host economy in a more efficient way by policies other than foreign ownership restrictions (Globerman 1995). Above all, it is preferable to "tax away" economic rents, as far as possible, from private firms, regardless of nationality, by fine-tuning the regulatory regime rather than to take the existence of economic rents for granted. Added to this, the foreign capital limit is at odds with the vision of the APROC plan, which champions the principles of liberalization and internationalization in developing Taiwan into a telecommunications center in the Asia-Pacific region. Since Taiwan is a laggard in global telecommunications, foreign carriers can help Taiwan to fulfill the goals

of the APROC plan, particularly the telecommunications center. Tighter control of foreign ownership, however, leaves less room for domestic carriers to forge strategic alliances with foreign firms because such alliances frequently involve equity participation. It is encouraging to learn, at the time of writing, that the authority is reconsidering its position on the foreign investment cap.

11.5 Problems Arising from Market Entry

The initial impact of telecommunications liberalization is open market access, but successful market entry depends on the incumbent's offering interconnection, due to the prevalence of interconnected networks in the industry. In this regard, the literature on telecommunications liberalization is replete with discussions of access pricing regulations (e.g., Doyle 1997). In Taiwan, the issue of interconnection rates has indeed been central to mobile communications liberalization, and opinions are divided between CHT and mobile communications carriers. At the time of writing, CHT and mobile communications operators are still struggling to reach agreement on interconnection rates. While CHT proposes to charge NT$1.86 per minute for interconnection, mobile communications operators are willing to pay only NT$1.01 per minute. This huge gap has something to do with the differences in the two sides' views on which cost items should be included and the accuracy of CHT's cost data.

This is, however, part of the interconnection issue. For mobile communications carriers, interconnection involves a physical link, via E1 leased lines, between their own networks and CHT's public switched telephone network. The demand for installation of the requisite E1 lines, however, outstrips supply due to CHT's poor planning and delay in the procurement process. New entrants in mobile communications may therefore be behind schedule in launching their operations. For this reason, CHT is vulnerable to the criticism that it tactically forecloses entry. Alternatively, mobile communications carriers may opt to bypass to some extent CHT's networks by means of microwave or very small aperture terminal (VSAT) links, which nonetheless remain handicapped by current regulations. The spectrum required for interconnection through microwave has not yet been made available by the DGT and is vulnerable to interference. Neither is the VSAT solution feasible currently because voice communications through VSAT have not yet been liberalized. These interconnection problems raise the fear that mobile communications liberalization may be undermined by incumbent manipulation and out-of-date regulations.

The prospects for new mobile communications carriers are also complicated by other issues such as numbering and portability of numbers. Numbering in the telecommunications industry refers to the arrangement for allocating telephone numbers among carriers to be used by their subscrib-

ers. Though seen primarily as a technical issue, it has had economic and regulatory implications (ICCP 1995). Where the incumbent has control over number allocation functions or enjoys proprietary rights over numbers, new entrants may face additional barriers to entry, and thus competition is restrained. The portability of numbers enables consumers to shift completely to other carriers without changing their numbers so that negligible switching costs will be incurred. Lessons distilled from OECD countries show that lack of number portability between carriers has acted as deterrent to competition because it restrains consumers from migrating to a new entrant even if it offers a lower tariff (ICCP 1995). Despite the significant implications for fair competition, these two issues have been low on the DGT's agenda and will not be dealt with technically for two years. New entrants to the mobile communications market will therefore be threatened by a high magnitude of such incumbency advantages at first.

The fortune of some, if not many, of the new mobile communications carriers is also at risk because of "service convergence" among different segments of mobile communications. By service convergence, we refer to the extent to which services provided by different types of communications resemble one another. Thanks to technological progress, cellular phones nowadays can provide short message services that were only available through radio paging before. Two-way communications services developed by CT-2 and radio paging operators duplicate part of cellular phone service. New trunked radios are also able to provide communications services like cellular phones. Looming on the horizon is "personal communications services" (PCS), which is basically a cellular phone including such features as electronic messaging and paging on the same handset. Such examples imply that the functional boundaries between various segments of mobile communications are becoming blurred; thus their markets have overlapped. Two points are particularly noteworthy here. First, to the extent that new services are technologically feasible, their introduction into the marketplace rests on the relaxation of relevant regulations. A manifestation of this point is that the unavailability of spectrum has slowed the introduction of two-way paging in Taiwan. In other words, outworn regulations can be a bottleneck that paralyzes new technologies and services. On the other hand, should those new services become marketable, various kinds of mobile communications would encroach on each other's markets; thus some operators may find their markets being taken away. As a matter of fact, CT-2 operators reportedly have had doubts from the very beginning, due to the functional limitation of CT-2 services and potential market encroachment made by cellular phone and digital enhanced cordless telephone carriers. A few of the nine CT-2 license winners have just started commercial operations but are having difficulty attracting subscribers. A private telecommunications firm, which was the major shareholder in two CT-2 operators, ran into trouble when CT-2 services were available for

less than a year. Some may be inclined to position CT-2 services as a "transitional" product. If this is the case, "regulation regimes designed to permit and/or promote entry may well end up achieving little more than a noisy market periphery around a fundamentally uncompetitive core" (Cave 1996, 105). A danger, therefore, is that market entry may fail to deliver economic efficiency in terms of making the best use of resources. Furthermore, Amendola and Ferraiuolo (1995) note that cellular telephony is characterized by technological incrementalism and considerable economies of scope in building and operating different mobile services in the same area. Taking into account these features, they then call for a comprehensive regulatory framework, encompassing the entire field of mobile telephony, rather than regulating each new mobile service as if it were a new separate market. In light of the service convergence discussed above and the fact that the time span of Taiwan's mobile communications licenses is either ten or fifteen years, which is long enough for advanced mobile services, such as PCS, to take root in Taiwan, I echo Amendola and Ferraiuolo's proposal.

11.6 Industrial Policy versus Competition Policy

Telecommunications policy in Taiwan has retained a flavor of industrial policy. A typical case in point is the practice of only procuring systems from local subsidiaries of AT&T, Alcatel, and Siemens in exchange for technology transfer—known as the "three systems, three suppliers" policy. This policy has been criticized for restraining competition in the telecommunications system market without generating much success in technological localization. In addition, most domestic communications firms have been kept from entering the core of the telecommunications equipment industry. Owing partly to this, the lion's share of the business opportunities arising from the liberalization of mobile communications have been out of the reach of local communications firms (Chen 1997).

The implementation of telecommunications liberalization has brought the "three systems, three suppliers" policy under scrutiny. On the one hand, the proliferation of private operators resulting from opening the mobile communications market has made it impossible to sustain the policy. To the extent that private operators are able to compete efficiently in the marketplace, they have to adopt best-practice technology wherever available, rather than merely limit themselves to indigenous supply, if any. On the other hand, binding CHT to the "three systems, three suppliers" policy may sacrifice its competitiveness and the technological performance of the backbone networks in Taiwan. At the time of writing, the "three systems, three suppliers" policy has been exposed to critical review by the Taiwan Fair Trade Commission. The policy might be abandoned. This, however, will not eliminate the possibility that industrial policy con-

siderations will continue to outweigh competition policy in Taiwan's deregulation process. Another case in point is a paging operator's call for government action to fight for medium-speed paging technology, which is currently the dominant standard in Taiwan but is in the process of being replaced by high-speed paging technology. Admittedly, telecommunications liberalization will create enormous business opportunities for service providers and equipment producers. It is difficult to accept the scenario that the lion's share of those business opportunities will be captured by foreign firms. One must bear in mind, however, that service and technological innovations in telecommunications are characterized by continuous flux. Protecting domestic firms by blocking new innovations or technologies runs the risk of decreasing telecommunications competitiveness. Needless to say, the liberalization policy itself could dilute the influence of government mandates because both private and public operators have to fight for their fortunes in a more market-oriented way.

11.7 Emerging Issues

A couple of emerging issues also warrant the attention of the regulatory authority. The first concerns whether or not CHT needs to be divested, by structurally separating the operations of the incumbent. The cost of this separation is to forgo scope economies, but evidence gleaned from a study of the former DGT's cost structure does not support the existence of such economies (CEPD 1996). A more sentimental appeal against the proposed divestiture of CHT seems to rest on the fear that since CHT has just spun off from the former DGT, the more radical reform of separation may cause additional chaos. Therefore, the authority appears to be reluctant to tackle the issue and has decided to leave it to the board of CHT. It should be noted, however, that the structure of the incumbent can have an impact on access pricing and hence on the extent of fair competition between the incumbent and new entrants (Doyle 1997, 86). In Taiwan, competition has not yet encroached on the local and long-distance service markets. The vertical structure of CHT enables it to control the local and long-distance networks while competing with private operators in the mobile communications market, which can lead to foreclosure and predatory action. New entrants in mobile communications are concerned about discrimination in the provision of access to essential facilities and access prices. Indeed, the possibility of predatory action is not remote because information on CHT's operating costs has not been made transparent enough to distinguish its tariff rebalancing policy from a predatory pricing strategy, and regulatory oversight by the DGT remains inadequate (Chou 1996). Of course, this problem may be overcome by other regulatory tools, for example, requiring separate accounting for CHT's operations. Nonetheless, the position taken here is that the issue of decomposing CHT should be

addressed by the regulatory authority rather than left in the hands of CHT itself.

The second issue that deserves the attention of the regulatory authority relates to the cross-entry of telecommunications and cable television (CATV). The convergence between telecommunications and broadcasting has been documented, and the two are now segregated mainly by regulation rather than by technology itself (Kelly 1989). A decision to be made by the regulatory authority is whether telecommunications and CATV operators should be allowed to penetrate each other's markets. Likewise in Taiwan, the boundaries between telecommunications and CATV are largely artificial, since these two services are currently governed as separate sectors. Such regulation has little merit in terms of promoting telecommunications competition and developing the NII. CATV provides much wider band transmission services than do traditional telecommunications networks, which presents substantial underexplored potential for providing telecommunications services. To the extent that they are connected by fiberoptic backbones, CATV networks are able to provide broadband services to the home, which is in line with one of the aims of the NII program. In addition, they will form the capacity for promoting network competition in local call services. It is estimated that the penetration rate for CATV in Taiwan is above 60 per 100 households. Removing the artificial boundaries between telecommunications and CATV can facilitate fulfilling the aims of telecommunications liberalization and the NII. It is noted that some may not be so optimistic about the convergence of CATV and telecommunications, but the cross-entry of these two services has been realized in some OECD countries (OECD 1997, 77–79). In Taiwan, a decision has been made to allow CATV operators to explore broadband Internet opportunities over coaxial cable. CATV and telecommunications operators have also developed strong interest in penetrating each other's markets. The possibility of removing market boundaries is therefore not remote. The problem, for one thing, is that CATV operators have a size disadvantage due mainly to a governmental policy to divide the national CATV market into fifty-one sections. This size disparity may shift the balance toward telecommunications operators once cross-entry is permitted.

11.8 Conclusion

The global telecommunications landscape has been shaped by technological, economic, and regulatory forces. Despite having advanced halfway, telecommunications liberalization in Taiwan has already reached the stage where attention should be paid to the essential issue of how to foster fair competition. Above all, market liberalization should go hand in hand

with overhauling the regulatory regime. If the regulatory authority in Taiwan is reluctant to adopt the policy of asymmetric regulation in favor of new entrants, it at least has to make sure that they can compete on an equal footing with the incumbent. The opposite, however, appears to be the case. Apart from asymmetric market positions vis-à-vis CHT, the new entrants are beset by problems concerning interconnection, numbering, and so on, due to regulatory slack or ignorance. Such problems have something to do with the dominance of CHT and the extent to which the DGT is willing to break with its past and CHT and reposition itself as a genuine regulator. In essence, central to the telecommunications liberalization policy is the introduction of efficient and effective competition in the market under an appropriate regulatory regime, which is much more than opening the market.

Moreover, the pace of technological and service innovations in the telecommunications industry can quickly outdate policies. This is particularly true for developing countries like Taiwan because they are presented with advanced technologies and services developed elsewhere. This raises the question of what policy changes need to be made to ensure that the benefits of technological change can be fully realized. This question not only is important in its own right but also concerns telecommunications competition. A significant trend in the telecommunications industry is for new technologies to result in lower costs and superior services. The regulatory authority in Taiwan is not unaware of this trend but tends to manage it in a manner that favors CHT, without giving due consideration to its competitive impact and to the needs of the industry and the country. Competition in mobile communications has been restrained because the DGT fails to meet new entrants' needs to bypass CHT's networks via microwave or VSAT links. Service convergence among different segments of mobile communications also challenges the traditional practice of regulating them as separate markets. In addition, the current prohibitions on the provision of callback and Internet phone services and the cross-entry of CATV and telecommunications stifle competition from new complementary and competing networks. The proliferation of new technologies and services will unleash the force of competition in telecommunications but not unless the regulatory regime is continuously upgraded.

References

Amendola, G., and A. Ferraiuolo. 1995. Regulating mobile communications. *Communications Policy* 19 (1): 29–42.

Braeutigam, R. R., and J. C. Panzar. 1993. Effects of the change from rate-of-return to price-cap regulation. *American Economic Review* 83 (2): 191–98.

Cave, M. 1996. Entry, competition, and regulation in U.K. telecommunications. *Oxford Review of Economic Policy* 12 (4): 100–121.

CEPD (Council for Economic Planning and Development). 1996. Report on telecommunications (in Chinese). In *Report on promoting the liberalization of services,* by Council for Economic Planning and Development. Taipei: Council for Economic Planning and Development.

Chen, S. H. 1997. The telecommunications industry. In *The impact of investment rule-making and liberalization,* ed. Chung-Hua Institution for Economic Research. Taipei: Chung-Hua Institution for Economic Research.

Cheng, J., et al. 1989. *A study on the policy and institutional reform for establishing a sound information society* (in Chinese). Taipei: Council for Economic Planning and Development.

Chou, J. 1996. The prospects of Taiwan's telecommunications service industry: Challenges and strategies. In *Proceedings of the Trend and Strategies for Taiwan's Communications Industry Conference,* ed. Industrial Technology Research Institute. Hsinchu: Industrial Technology Research Institute.

Doyle, C. 1997. Promoting efficient competition in telecommunications. *National Institute Economic Review,* no. 159 (January): 82–91.

Globerman, S. 1995. Foreign ownership in telecommunications. *Telecommunications Policy* 19 (1): 21–28.

Hausman, J. A. 1996. Proliferation of networks in telecommunications: Technological and economic considerations. In *Networks, infrastructure, and the new task for regulation,* ed. W. Sichel and D. L. Alexander. Ann Arbor: University of Michigan Press.

ICCP (Information, Computer and Communications Policy Committee). 1995. *The economic and regulatory aspects of telecommunication numbering.* Paris: Organization for Economic Cooperation and Development.

Jang, H. 1993. *Technological change and growth in productivity in Taiwan's electronics industry: Empirical evidence from the telecommunications industry* (in Chinese). Taipei: National Taiwan University, Department of Economics.

Kelly, T. 1989. The marriage of broadcasting and telecommunications. *OECD Observer,* no. 160: 16–18.

———. 1992. What price the airwaves? *OECD Observer,* no. 173: 31–34

OECD (Organization for Economic Cooperation and Development). 1993. *Communications outlook.* Paris: Organization for Economic Cooperation and Development.

———. 1995. *Communications outlook.* Paris: Organization for Economic Cooperation and Development.

———. 1997. *Communications outlook.* Paris: Organization for Economic Cooperation and Development.

Sappington, D. E., and D. L. Weisman. 1996. *Designing incentive regulation for the telecommunications industry.* Cambridge, Mass.: MIT Press; Washington, D.C.: AEI Press.

Sato, H., and R. Stevenson. 1989. Telecommunications in Japan: After privatization and liberalization. *Columbia Journal of World Business* 24 (1): 31–41.

Comment

Ramonette B. Serafica

Shin-Horng Chen provides a good discussion of the reforms undertaken in the telecommunications industry in Taiwan. Figure 11.1, which shows the schedule of telecommunications liberalization in Taiwan from 1995 onward, is particularly interesting because it captures the Taiwanese perspective on telecommunications liberalization. The story behind the sequence and timing of reforms would be a good addition so that readers can gain a deeper sense of the Taiwanese perspective. Another aspect of the paper that I find quite informative is the discussion of the underlying national objectives motivating further liberalization. Indeed, telecommunications is becoming so critical an industry for every nation that it is important for us who are involved in policy research to share the lessons learned and strategies adopted so that our respective economies can be active players in the coming information century.

The objective of the paper is "to distill lessons that may add to the current understanding of telecommunications liberalization outside the developed world." However, given that the reform program in Taiwan is relatively young, I think that what the paper can realistically achieve is to raise the level of awareness of outsiders about the issues confronting Taiwan so that parallelisms can be drawn that will lead to a richer understanding of telecommunications reform worldwide. Since Chen touches on potential problems that may arise from the current policies, he may also want to look at the experiences of other countries that have adopted similar paths and from there distill lessons that may be applicable to Taiwan.

After reading Chen's paper, I realized that despite the differences between Taiwan and the Philippines, particularly in terms of telecommunications network development, we nonetheless share similar concerns with respect to competition in the telecommunications industry. Three issues in particular I think parallel the concerns that have emerged in the Philippines.

Is Divestiture a Prerequisite for Competition?

One of the issues identified in the paper concerns the structure of CHT. Chen notes that CHT's vertical structure allows it to control the local and long-distance markets while competing with private operators in the mobile communications market. Thus he asks whether CHT needs to be divested by structurally separating its operations.

Based on the Philippine experience I can say that the fear of undesirable competitive behavior such as foreclosure and predatory pricing by a vertically integrated incumbent is not entirely unfounded. In 1993, the Philip-

Ramonette B. Serafica is associate professor of economics at De La Salle University, Manila.

pine government decided to open the international long-distance and cellular markets to competition. As a condition for entry in these lucrative lines of business, international gateway facility operators and cellular mobile telecommunications service operators were also required to install fixed lines in both profitable and unprofitable areas, thereby opening the local exchange market to a duopoly. These reforms were introduced to address the huge unmet demand existing at that time. With an asymmetrically competitive industry structure, however, a seamless telecommunications network has so far been unattainable.[1] The Philippine Long Distance Company (PLDT), a private firm that has enjoyed virtual monopoly of long-distance and local exchange service for more that sixty years in the country, has made interconnection difficult for the new local players. Firms have expressed frustration over the delay in getting interconnection lines with PLDT, which owns the most extensive nationwide backbone and network. As the dominant firm, it is able to control the setting of access charges and the pace with which interconnection takes place, to the detriment of competing firms. The regulator generally takes a hands-off stance and lets the individual firms negotiate through bilateral contracts. In a few years, this problem is expected to be less contentious as the networks of the new firms grow. In the meantime, subscriber dissatisfaction brews.

Another topic of hot debate at the moment concerns PLDT's application for rate rebalancing. With the impending reduction of accounting rates from U.S. telecommunications firms, PLDT has petitioned for a restructuring of existing domestic toll service rates (increase in long-haul rates and decrease in short-haul rates) and an increase in existing local exchange service rates. In addition, the company is also planning to adopt metered service rates. Competing firms have argued that the rates proposed by PLDT will allow it to undercut prices in high-revenue and competitive areas, which these firms cannot match because of their government-mandated service obligations in unprofitable areas. With imperfect knowledge of the true cost of service and lack of expertise within the regulatory agency it is difficult to distinguish between tariff rebalancing and predatory pricing.

These two situations illustrate the possibility of exclusionary actions. As Chen has pointed out, divestiture may not be necessary if alternative technologies exist that can bypass bottleneck facilities. It may also be the case that regulatory power is sufficient to discipline the behavior of the dominant firm. In the absence of such conditions, divestiture may be the next best solution. In addition to discussing the cost and benefits of

1. According to Sharkey, "Competition is 'asymmetric' if one firm is overwhelmingly larger than each of its potential competitors and if the rules of competitive conduct differ between the large and small firms. . . . The largest firm must also have a dominant market share" (1982, 206).

divestiture in the Taiwanese case, the author may want to consider its implications in light of the final stretch of the reform program scheduled in 2001, which includes the privatization of CHT and the liberalization of the remaining segments of telecommunications. Divestiture may make CHT less attractive to private investors but may draw more players into the liberalization program. The experience of other countries that have successfully introduced reforms in the sector should be examined (see Petrazzini 1995, e.g.).

Regulation of Converging Technologies

The paper cites the convergence of broadcasting and telecommunications. Another convergence would be information technology and telecommunications. And with the creation of the national, regional, and global information infrastructures, all three will converge, at least from the regulatory point of view, because the economics of multimedia will have implications for competition policy. Already the convergence of information technology and telecommunications presents gray areas in terms of ownership and the scope of competition.

To illustrate, value-added services such as the Internet are completely deregulated in the Philippines. Testimony to the fierce competition in the industry is the existence of close to a hundred Internet service providers (ISPs). This situation of unbridled competition is threatened by the potential foreclosure by telecommunications firms who have commercial interests in the Internet business as well. Again, a case in point is PLDT. In 1996, it acquired majority control of INFOCOM Technologies, Inc., the largest ISP in the country. With the impending metering of local telephone rates as spearheaded by PLDT, independent ISPs fear that control of telecommunications facilities by competing ISP firms will unfairly jeopardize their operations. Thus the question arises of whether there is a need to limit ownership and control of complementary goods and services.

Telecommunications Policy in Support of National Goals

Finally, I would like to point out that the Asia-Pacific Regional Operations Center and the NII in Taiwan have equivalent initiatives in the Philippines. The current government would also like to position the Philippines as a center for knowledge-based industries, and the establishment of the NII is likewise part of the national agenda. These two initiatives require advanced telecommunications networks and, therefore, the competition that fosters the innovation needed to deliver the communications requirements of advanced users.

Another national objective in the Philippines, however, merits equal attention. Unlike Taiwan, the telecommunications network in the Philippines is relatively small, as evidenced by the current telephone density rate of about 5 lines per 100 Filipinos. Thus the attainment of universal service is still of paramount concern. Under such conditions, the introduction

of competitive forces that tend to concentrate on serving high-revenue customers becomes problematic.

The current strategy by the government is to impose service obligations on new firms in order to increase telephone penetration, particularly in the countryside. By next year, it is hoped that the density rate will double from the current figure as a result of this scheme. As I have argued elsewhere this is not a sustainable solution, and in fact it is contrary to the promotion of competition since, among other things, the dominant firm is not covered by this rule so that new firms operate at a disadvantage vis-à-vis PLDT. The task, therefore, is to think of a better alternative to the current situation. It would be useful for us to learn how universal service can be achieved in the era of competition.

Conclusion

These are just some of the issues that need to be resolved if we are to create a credible competitive environment. I thank the author for providing useful insights from the Taiwanese experience that have enabled me to think of similarities with the Philippine case. Indeed, the technology involved has universal application, so it is easy to understand why similar concerns emerge. The differences lie in the unique social, political, and economic conditions of each country.

References

Petrazzini, Ben A. 1995. *The political economy of telecommunications reform in developing countries.* New York: Praeger.

Sharkey, William W. 1982. *The theory of natural monopoly.* New York: Cambridge University Press.