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Hong Kong's Business Regulation in Transition

Changqi Wu and Leonard K. Cheng

5.1 Introduction

With minimum direct government intervention in private business, Hong Kong is widely regarded as the land of *laissez faire*. Compared with most economies in the world, the degree of direct government involvement in private business in the territory is indeed rather moderate. Nevertheless, Hong Kong does have a history of government regulation of monopolies, an aspect of economic reality that has often been overshadowed by its high degree of economic freedom.

In this paper we briefly review the history of regulation of monopolies in Hong Kong and examine the current situation. The regulated industries include electricity, telecommunications services, public transport, and airport services. These industries are not exactly alike in their economic characteristics, but they are all subject to legal or technical barriers to entry. Since the provision of these services is not under sufficiently competitive conditions, public policy toward these industries has been devised with the purpose of limiting the monopolies' exercise of market power. As in many other economies, regulation of monopoly in Hong Kong has evolved over time to cope with changes in the economic environment and structure of the industries.

In section 5.2 we provide an overview of the evolution of Hong Kong's regulation of monopolies and oligopolies. Section 5.3 analyzes the salient

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features of the scheme of control, the primary regulatory tool used in Hong Kong. The impact on firm behavior and the effectiveness of schemes of control in achieving their goals are critically appraised in section 5.4 by focusing on the electricity industry. In section 5.5 we describe the transition from regulation to market liberalization in the telecommunications service industry. Finally, the implications of the regulatory changes in Hong Kong and directions for further changes are discussed.

5.2 Evolution of the Regulation of Monopolies

The history of regulation of monopolies in Hong Kong is relatively short. It can be divided into three distinct phases: (1) before 1963, (2) 1963–95, and (3) after 1995. In the period before 1963, the regulation of monopolies was not a major issue in the government's economic policy. From 1963 to 1995, the government regulated the public utility monopolies with a series of schemes of control. Since 1995, technological changes and economic development have led the government to consider ways to bring competition to the regulated industries.

Prior to the 1960s, clearly defined and well-deliberated government policy on monopolies or near monopolies virtually did not exist. Following the economic philosophy of *laissez faire*, the Hong Kong government adopted a minimum interventionist approach to industries characterized as monopolies and was reluctant to play an active role in regulating them. This attitude was reflected clearly in a statement made by the government in 1921 in response to a request by the public to provide means of public transport between Victoria Harbor and Repulse Bay: "So long as the Government continues its present policy of giving reasonable facilities for private enterprise to get under way it will have done all that can be expected of it."¹ As a result, public utility services were supplied largely by private firms under government franchises.

However, that is not to say that the government never intervened in private business. As early as 1863, the then acting governor and commander-in-chief, W. T. Mercer, set rules "for the regulation of Public Vehicles and Chairs and their Drivers and Bearers, and to license the Hire of Horses, within the Colony of Hong Kong."² When public buses were introduced into Hong Kong in 1921, the government responded swiftly by amending the Vehicles and Traffic Regulation Ordinance. The amended ordinance gave the government new power to specify bus routes with details of the fares to be charged, the stopping places, and basic specifications of the vehicles.

1. Reported in *Hong Kong Telegraph*, 2 April 1921, and cited by Leeds (1984, 29).

2. Ordinance No. 6 of 1863, cited in Hall (1996, 2).

These and other regulations set license fees, fares, standards, and penalties for malpractice. In the process, the government benefited from royalty fees paid by franchisees. An illuminating example is the early development of public bus services in Hong Kong. When public buses first appeared in Hong Kong in 1921, a number of bus companies entered and competed for business. The government decided in 1933 to grant the exclusive right to offer public bus service in Kowloon and the New Territories to Kowloon Motor Bus (KMB). To maintain its exclusive right, KMB had to pay an amount as high as 20 percent of its gross revenue to the government as royalty during a certain period of its franchise (Leeds 1984).

The first scheme of control was introduced in 1964, about one hundred years after the first traffic regulations came into existence. It symbolized the start of the second phase of Hong Kong's regulatory history. In that year, the government decided to impose a scheme of control to regulate China Light and Power (CLP), the company that supplied electricity to Kowloon and the New Territories. Rapid expansion of industrial activities and the resulting surge in demand for electricity in Kowloon led to frequent blackouts and tariff increases. The public uproar against high tariffs and low service quality generated calls for a government takeover of CLP. Under threat of government expropriation, CLP proposed to limit its own rate of return and to set up a development fund to finance its future expansion.³ The scheme of control was the government's response to the situation.

The scheme-of-control agreement was reached between CLP and the government in November 1964, but with retroactive effect to October 1963. The agreement, which spanned a period of fifteen years, set the maximum permitted rate of return on the average net fixed assets devoted to electricity operations at 13.5 percent. After the first scheme of control on CLP was introduced, similar schemes of control spread to other industries where suppliers of services enjoyed significant market power. The end of the 1980s was the heyday of the schemes of control, when the industries covered by the schemes included electricity supply, local telephone services, public bus services, and airport services.

As the schemes of control multiplied over the years, their drawbacks gradually became apparent. Since they did not limit price increases and returns were calculated on the basis of fixed assets, some companies took advantage of this loophole to increase tariffs and to expand their capacity, leading to high tariffs as well as excess capacity.

As Hong Kong's economy grew and technology advanced in some of the regulated industries, such as telecommunications, the government began to consider alternative regulatory mechanisms to improve the regu-

3. See Cameron (1982) for a detailed description of the company history of CLP.

lated industries' economic performance. Price-cap regulation, an alternative to scheme-of-control regulation, was introduced first into the local telephone network service market in 1993 in the hope that it would reward the efforts of the regulated firm to lower its costs.

Since the early 1990s, the government has taken steps to introduce competition into markets that were previously supplied by regulated monopolies. By now the competitive situation in a number of regulated industries has improved substantially. Instead of a monopoly, there are now four operators competing in the market for local fixed telecommunications services. A new bus company (Citibus) has entered the public bus market to compete against two incumbents. When the new airport at Chek Lap Kok begins operation in 1998, two firms will compete for airport cargo services compared with a monopoly at present, and three firms for ramp-handling services compared with a monopoly now. All of the schemes of control have been lifted by August 1997 except those for the electricity industry.

Given the significant role played by the schemes of control, we shall analyze this mode of regulation in greater detail in the next section. We shall examine the mechanism behind the schemes of control, identify the features that distinguish them from regulations in other economies, and evaluate their effectiveness.

5.3 Salient Features of Schemes of Control

5.3.1 Objectives of Regulation

As is well known in the economic literature, most public utilities are natural monopolies due to the economies of scale or network economies they enjoy. In other words, a sole supplier can provide the services demanded by society at the lowest possible unit cost. While efficient allocation of resources requires an output level at which consumers pay a price equal to the firm's marginal cost of production, an unregulated monopoly would maximize its profits by restricting output, thus causing the price to exceed the firm's marginal cost.

"First best" regulation implies setting price equal to marginal cost (i.e., marginal cost pricing). But given economies of scale, such a linear pricing rule will result in the firm's making a loss. If subsidies to cover losses are considered impractical due to the usual principal-agent problem, then "second best" regulation would require the firm's price to at least be equal to its average cost (i.e., average cost pricing),⁴ so that the firm can break even.

If two-part tariffs are used (as they are in public utilities such as tele-

4. More precisely, the second-best outcome is given by the largest output level at which price is equal to average cost.

phone services and electricity), then the breakeven point will be closer to the first-best outcome than that under linear pricing.⁵ In this case too, however, the calculation of marginal cost is plagued by asymmetric information that is typical of the principal-agent problem.

Schemes of control have been the Hong Kong government's main policy instruments in regulating monopolies and near monopolies in public utilities. As stated by the government, "Schemes of control exist because certain companies provide services to the public in a monopoly or semi-monopoly situation. This makes it necessary, in the public interest, for the Government to establish certain guidelines (known as schemes of control) under which these companies will operate" (see Hong Kong Government 1988, 2). This statement highlights the main motive behind schemes of control.

At the very beginning of every scheme-of-control agreement reached between a regulated firm and the government is a clause stating that the scheme of control should be devised (1) to allow the regulated company a permitted maximum return, and (2) to provide a framework under which the company's financial affairs can be monitored and tariff applications can be made. Clearly, schemes of control are a kind of rate-of-return regulation. If such regulation is effective, then a regulated firm would not be able to earn monopoly profits by charging monopoly prices, but only a return that equals to its cost of capital.

5.3.2 Basic Features

As a kind rate-of-return regulation, Hong Kong's scheme-of-control regulation has unique characteristics: (1) It specifies the permitted rate of return of the regulated firms and defines the rate base on which total returns are calculated. (2) It requires each regulated company to establish a development fund (DF) to finance future expansion and to maintain the rate of return without frequent tariff changes. (3) It sets a fixed rate of return for the entire period of the agreement, which is typically quite long.

Figure 5.1 summarizes the common features of schemes of control. A regulated firm must first submit its forecast of future demand, its investment plan, and justifications for the investment plan to the regulatory agency. After obtaining approval from the Economic Services Bureau (formerly the Economic Services Branch) of the Government Secretariat, the regulated firm can carry out its investment and production plans. Total revenue from sales, less total operating cost and taxes, will first go to investors. Debt holders receive their interest payments and equity holders re-

5. If the monopoly can use two-part tariffs, economic inefficiency as measured by the gap between the unit price and marginal cost would be lessened compared with that under linear pricing. However, the problem of monopoly profits will be further aggravated.

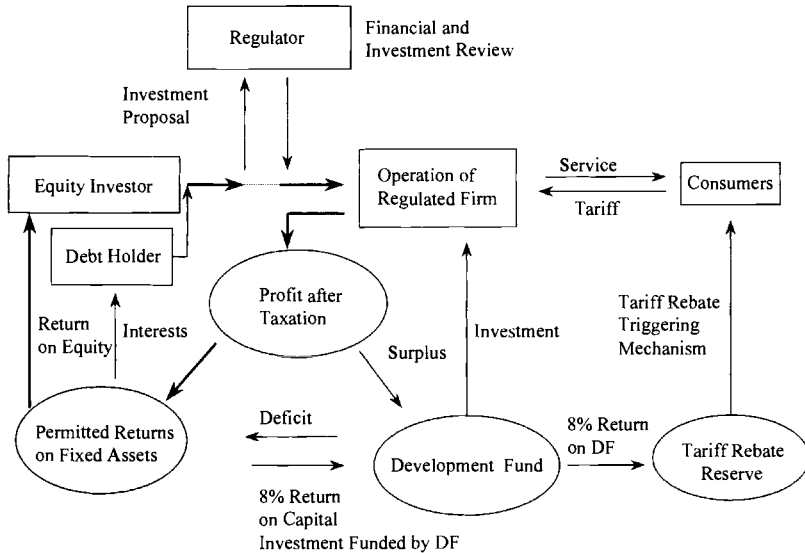


Fig. 5.1 Scheme-of-control mechanism

ceive the permitted profit as compensation for their respective supplies of capital. Any surplus (or deficit) is added to (made up by drawing down) the DF.

If the balance of the DF is insufficient to cover the shortfall in gross revenue in a particular accounting year, the government may permit the regulated firm to deduct from the DF in subsequent years any amount due to it in that year or approve an increase in tariff to cover the losses (Public Bus Services Ordinance, Cap 230, section 28). In addition, an annual charge of 8 percent on the average balance of the DF is credited to a reserve to reduce the tariff or limit tariff increases. Thus the DF serves to smooth the actual rate of return, finance capital investment, and provide rate relief.

5.3.3 Permitted Returns

By definition, permitted total returns to the regulated company depend on (1) the rate base and (2) the permitted rate of return. As stated in scheme-of-control agreements, regulated companies and their shareholders are entitled to earn returns that are reasonable in relation to the risks involved and the capital invested and retained in their businesses.

In theory, the rate of return should be based on the cost of capital, but in practice it was determined through negotiation between the government and each regulated company. This approach has led to significant variation in the permitted rates of return and in the ways in which total returns

are calculated not only across industries but also across companies in the same industry.

Rate Base

In most schemes of control, fixed assets have been adopted as the rate base for the calculation of total returns. In the cases of the electricity companies CLP and Hong Kong Electric Company, the bus companies KMB and China Motor Bus (CMB), and Hong Kong Airport Terminal Service Limited, total returns are calculated on the basis of average net fixed assets. In the case of Hong Kong Airport Cargo Terminals Limited, permitted total returns are calculated on the basis of gross fixed assets. One exception is Hong Kong Telephone Company, whose total returns were calculated on the basis of shareholder equity.

Regardless of whether gross or net fixed assets are used, the assets are measured at their historical cost. In addition to acquisition costs for machinery, land, and tangible assets, fixed assets also include capitalized refurbishment and improvements, assets under construction, prepayments, and goods in transit. The costs of construction include interest paid or payable on construction loans, but only up to a maximum of 8 percent per annum on the loan's principal.

Rate of Return

For the five companies whose permitted returns were calculated on the basis of their net fixed assets, the maximum rate of return ranged from 13.5 to 18 percent per annum. The differences in the rates of returns could be attributed partly to differences in the undiversifiable risks of the industries, but they were also a result of the case-by-case approach to regulation. For example, the two regulated bus companies KMB and CMB were permitted rates of return of 16 and 15 percent, respectively. According to the government, the difference in the permitted rate of return reflected the companies' differential profitability before the imposition of the schemes of control. If that were indeed the case, then the effectiveness of regulation would be called into question. In particular, if the maximum rate of return was set at or above that corresponding to monopoly profits, the regulation clearly would have failed to achieve the primary objective of schemes of control, that is, restraining a monopolist's market power.

A crucial question is how to determine the cost of capital of regulated firms. First, these companies were unregulated monopolies before the schemes of control were introduced. If the profitability of an unregulated monopoly was used as the benchmark to set permitted return, the "opportunity cost" of an unregulated monopoly would become its cost of capital. Second, a monopoly under prospect of regulation might inflate its profits strategically in anticipation of the upcoming regulation in order to bargain for a higher permitted rate of return.

Estimating the cost of capital for a regulated industry is challenging both theoretically and operationally. In practice, two methods are often used in estimating a regulated firm's cost of equity capital, namely, the capital asset pricing model and the dividend growth model (see Armstrong, Cowan, and Vickers 1994, 183–85). In the capital asset pricing model, the cost of equity capital is measured by the risk-free rate plus the firm's risk premium. The risk premium is measured by the covariance of the returns of the individual firm's stock with that of the market portfolio.⁶ The higher the covariance, the higher the risk level and the higher the required rate of return necessary to attract private capital.

The dividend growth model is based on the premise that the share price is determined by the initial dividend divided by the difference between the cost of equity capital and the rate of expected dividend growth. One can estimate the cost of equity capital by inverting that equation once the expected dividend growth rate is known or has been estimated.

Attempts to estimate the cost of capital of a regulated firm using either method are plagued by a number of difficulties, including some that are unique to Hong Kong. First, because the profitability of a regulated firm reflects the permitted rate of return, it is logically problematic to use the stock market return or dividend growth of the same firm to estimate its own cost of capital. Second, when the permitted rate of return on debt-financed capital is far above the market interest rate of long-term debt, which is the case in Hong Kong, shareholders will have an incentive to alter the debt-equity ratio to increase the net rate of return to equity. Therefore, by definition, the permitted rate of return would always be too low when compared with the "cost of equity capital" calculated in the above fashion.

The difficulty of determining the cost of capital for a regulated industry has implications for implementing rate-of-return regulation. Although economic efficiency is improved by narrowing the gap between price and marginal cost, it does not follow that the lower the permitted rate of return, the better off are consumers and society. In a simple analytical model without uncertainty, we can show that the lower the permitted rate of return (but still above the interest rate), the worse off society becomes. The underlying reason is that when the rate of return is set low, the regulated firm may increase its profits by expanding its capacity without necessarily expanding its supply. This results in greater excess capacity in the industry and a bigger waste to society.

6. The capital asset pricing model has been criticized recently both theoretically and empirically. See Fama and French (1992).

5.3.4 Development Funds

A development fund is an account kept by a regulated firm to enable it to maintain the permitted returns and to assist in its financing of fixed assets. So long as the fund has a positive balance, the firm is required to contribute an amount that is equivalent to 8 percent of the fund's balance to the "rate reduction reserve" to be used to reduce the tariff in the following year. Thus, when the fund grows it will lead to a reduction in prices, and when the fund shrinks it may trigger price increases in order to maintain the rate of return.

A positive balance of the fund allows the firm to draw from it to cover any shortfall in actual earnings. When the balance of the DF is too small, it may not be sufficient to serve the purpose of guaranteeing the maximum returns the regulated firm is entitled to. However, once the DF is sufficiently large, the marginal benefit of the fund as a buffer to guarantee the permitted rate of return becomes small, while the cost in terms of forced transfer to the tariff rebate reserve becomes large.

When the DF is used to expand the firm's capacity, the firm pays 8 percent interest on the amount into the rate reduction reserve, at the same rate as the DF's unused balance. Thus the additional interest cost for using the DF to finance capital investment is zero, so the real opportunity cost of using the fund for investment is the marginal benefit derived from the fund's role as a buffer to smooth actual returns. It follows that the regulated firm's dominant strategy is to expand the rate base with capital investment financed by the DF whenever the fund is sufficiently large. Furthermore, if the marginal benefits of the fund for the smoothing of returns are small because uncertainty in demand is small, then the dominant strategy would be to use the entire DF for capital expansion.

The design of the DF in schemes of control bears some resemblance to the escrow fund mechanism proposed by Vickrey (1971). When discussing the pricing of public utility services in the presence of fluctuating demand, Vickrey proposed that any actual deviation of price from marginal cost could be dealt with by establishing a dual tariff system (i.e., a "reactive" tariff and a "retention" tariff) and an escrow fund.⁷ A retention tariff determines the amount of revenue that the company is entitled to retain out of the actual revenue. Any surplus would be put into an escrow fund. The company may use the escrow fund to finance investment in capacity. Thus the escrow fund provides an incentive for the company to maintain its plant capacity at an appropriate level.

7. Vickrey's retention tariff and reactive tariff are similar to permitted returns and actual returns except that tariffs are prices charged for services provided, whereas returns are based on fixed assets.

Despite the apparent similarities between the DF and Vickrey's escrow fund, their functions are fundamentally different. The DF is used primarily to protect the interest of regulated firms, but Vickrey's escrow fund is based on marginal cost pricing and is designed to maintain economic efficiency while avoiding the need for frequent changes in the utility's tariffs.

5.3.5 Duration of Scheme-of-Control Agreements

Schemes of control in Hong Kong take the form of long-term renewable agreements between the government and the regulated firms. The maximum permitted rates of return are fixed for the entire period of the agreements. The duration of scheme-of-control agreements, however, varies across industries. The longest period was twenty years when a scheme of control was imposed on Hong Kong Telephone Company in 1975. The effective period of the schemes of control for the two bus companies was set at ten years. The duration of the current scheme-of-control agreements for the two electricity companies is fifteen years.

Presumably, a long-term contract offers a better incentive for the regulated firm to make long-term investments than a frequently changing regulatory regime, thus providing an incentive to achieve the optimal amount of cost savings. However, such benefits associated with long-term agreements do not seem to be present in the case of Hong Kong's schemes of control. First of all, schemes of control typically contain periodic reviews and the possibility of modification of the initial agreement. The review period was set at five years for the two electricity suppliers and two years for the two public bus companies. More important, since a regulated firm can pass its costs on to the consumers, something it cannot do under price-cap regulation, the incentive to save costs is not enhanced by lengthening the agreement's duration.

Most important of all, the formulas for calculating permitted returns have given regulated firms a perverse incentive to increase capital investment beyond what is economically efficient and raised the total costs of production. As we shall see in the following section, this effect is most conspicuous in the electricity industry.

5.4 Experience with Schemes of Control: The Electricity Industry

The electricity supply industry in Hong Kong was the first industry to operate under schemes of control and will probably be the last one to leave the schemes. It provides the best illustration of the weaknesses of schemes of control. Among other questions we shall ask: (1) How did the schemes affect the firms' behavior? (2) What was the impact of the schemes on the industry's economic efficiency? (3) How effective were the schemes in

achieving their objectives? Let us first provide some background information about the electricity industry before answering these questions.

5.4.1 Industry Background

Electricity in Hong Kong is supplied by two companies. The Hong Kong Electric Company Limited (HEC) supplies electricity to Hong Kong Island and the neighboring islands, while the China Light and Power Company Limited supplies electricity to Kowloon and the New Territories. The electricity generation of CLP is carried out by its associated company, the Castle Peak Power Company Limited (CAPCO), which is 60 percent owned by Exxon Energy Limited and 40 percent owned by CLP, but the associated transmission and distribution systems are wholly owned and operated by CLP.

By the end of 1996, the total installed electricity generating capacity of HEC was 2,955 MW. The total installed capacity of CAPCO was 7,515 MW. In that year, electricity sales of HEC were 8,876 million kWh. This amount represented 28 percent of total electricity sales in Hong Kong. In the same year, CLP sold 22,839 million kWh of electricity, accounting for 72 percent of the market.

The current schemes of control on CLP and HEC came into effect on 1 October 1993 and on 1 January 1994, respectively, due to differences in the two companies' financial years. Both schemes guarantee a 15 percent permitted rate of return for fifteen years. The electricity companies make forecasts of future electricity demand and submit major investment plans for approval by the Economic Services Bureau of the Government Secretariat.

The two electricity companies do not have exclusive rights to supply electricity in their respective territories, but each is the sole supplier in its own geographical area. Despite the lack of exclusive rights, there has never been any serious attempt by local or overseas investors to enter either market, and they have not made any attempt to enter each other's territories either. Their networks are interconnected by the cross-harbor cable, which is designed mainly as an emergency backup facility, not for the purpose of transmitting a large amount of electricity under normal circumstances. Given the nature of their schemes of control, however, there is really no need to enter a rival's territory so long as one's own fixed assets are allowed to grow.

5.4.2 Effect on Firm Behavior

In a competitive industry, a firm will choose the optimal combination of capital and labor to minimize its production costs. An unregulated monopoly also has the same incentive to do so because lower costs mean higher profits. A monopoly under scheme-of-control regulation, however,

may not benefit directly from any cost reduction if its rate of return has already reached the permitted rate of return. Under these circumstances, the only way for the monopoly to increase its total profits is through expansion of its fixed assets.

The existence and magnitude of the distortion à la Averch-Johnson (1962) in Hong Kong's electricity industry can be empirically tested due to a peculiarity of the regulatory regime. In the period 1964–78, CLP was regulated by a scheme of control while HEC operated as an unregulated monopoly. Both firms have been regulated under similar schemes of control since 1979. The periods before and after the switch provide us with an opportunity to test Averch-Johnson's prediction.

Because capital investment can be used as a means to increase profits, we would predict that the regulated CLP employed more capital per labor than the unregulated HEC, provided that other things were equal. But other things might not be equal (e.g., the two firms operated at substantially different scales), so we would instead predict that the capital-labor ratio of CLP grew at a faster rate than that of HEC between 1964 and 1978 but that the opposite would be true after 1978.

We have found that the capital-labor ratio of the unregulated HEC remained higher than that of its regulated counterpart, CLP, throughout the period 1964–78. Nevertheless, during the fifteen-year period from 1964 to 1978, the average annual growth rate of the capital-labor ratio of CLP was 9.06 percent while that of HEC was only 7.94 percent. Furthermore, the growth rates of the two firms reversed after HEC voluntarily joined the scheme of control. In the period 1979–96, the capital-labor ratio of HEC grew at 8.82 percent per annum, faster than CLP's 8.13 percent. The changes in the firms' capital-labor ratio during these two periods are thus consistent with the prediction that regulated firms respond to schemes of control by speeding up their capital investment.

Relatedly, Peles and Whittred (1996) have demonstrated that the Hong Kong electricity companies, in response to the nature of their schemes of control, have used more fixed assets relative to current assets than U.S. electricity companies.

5.4.3 Effect on Economic Efficiency

In short, the data on capital expenditures and employment of the two electricity suppliers reveal a marked difference in their investment behavior before and after the schemes of control were imposed. While the intention of the schemes of control was to protect the consumers' interest by fixing the rate of return, the regulated electricity suppliers responded to the schemes by expanding their physical capital. The loss in economic efficiency due to such a distortion in input combination is a cost to society.

No less important than static allocative efficiency is dynamic efficiency, which measures the growth in total factor productivity (TFP) over time.

To assess the impact of the schemes of control on the regulated electricity companies, we have studied whether there are any observable changes in the TFP of the electricity firms before and after the schemes of control were introduced. Using historical data, we make two comparisons based on the estimation of the regulated firms' TFP changes: (1) the difference between the TFP changes of HEC and CLP from 1970 to 1978, when CLP was subject to a scheme of control but HEC was not,⁸ and (2) the difference between the TFP growth of HEC before and after it was under the scheme of control.

The statistical results do not show any statistically significant improvement in the TFP for either company in the period 1970–78, and TFP growth remained insignificant in the period 1979–96, when both firms operated under schemes of control. That is to say, the TFP growth of electricity companies in Hong Kong was insignificant in the past three decades.

In terms of TFP, Hong Kong's electricity industry seems to have underperformed when compared with the electricity industry in the United States (see Ansar 1990; Gollop and Roberts 1981). During the 1950s and early 1960s, TFP growth of the U.S. electric power industry was on average above 4 percent annually. Even though the growth slowed down significantly in the late 1970s and the 1980s, it remained between 1 and 2 percent.⁹

To put the above findings in a broader perspective, let us compare the TFP growth of the electricity industry with that of Hong Kong's unregulated gas industry. A recent study shows that the TFP of Hong Kong China Gas grew at an average rate of about 2 percent per annum during the period 1975–95, on par with the economy-wide increase in TFP in Hong Kong (see Kwan and Png 1994). This is in sharp contrast with the situation in the electricity industry in which the TFP remained stagnant for about thirty years. While the difference in performance between the two industries may be the result of many factors, scheme-of-control regulation seems like a possible cause.

The loss in static and dynamic efficiency is better appreciated by considering the excess generation capacity of the two electricity monopolies. While schemes of control require the government regulator to review and approve the major investment projects of the electricity companies, the mechanism does not seem to have succeeded in resisting the companies' incentive to expand capacity. As a matter of fact, both companies have been investing aggressively to expand their electricity generation capacity despite excess capacity. In 1996 HEC's reserve margin—that is, the difference between installed capacity and maximum demand as a percentage of

8. The choice of a shorter period instead of the entire period 1964–78 was dictated by data availability.

9. The slowdown in the productivity growth rate in the U.S. electric power industry has often been attributed to the lack of flexibility of the regulatory regimes.

maximum demand—stood at 47 percent, which was much higher than the international norm of 30 percent. Despite the already substantial excess capacity, HEC completed the installation of a new 350 MW unit in 1997 as part of the current scheme-of-control agreement (Hong Kong Electric Company 1997).

For CLP, the situation is even more serious. The growth in demand for electricity has slowed significantly in recent years partly due to the relocation of local manufacturing industries to southern China, but the expansion of capacity continues unabated. The first of four 625 MW blocks of additional generating capacity, approved by the government in 1994, was installed in a new power station in 1996, and the second was installed in 1997. The buildup in generation capacity and the slow growth in demand have pushed the reserve margin of CLP to over 60 percent. In addition, the remaining two 625 MW blocks have been scheduled to be commissioned in 1998–2001 (Hong Kong Government 1997).

5.4.4 Effectiveness of Schemes of Control

Profitability of Electricity Companies

The first scheme-of-control agreement between CLP and the government stipulated that the regulated firm was permitted to earn a maximum rate of return of 13.5 percent on fixed assets regardless of the way in which the capital investment was financed. Later, when the scheme of control was up for renewal in 1979, the revised agreements added a new feature, namely, fixed assets financed by shareholder equity were allowed to earn a 1.5 percent premium on top of the permitted rate of return for fixed assets financed by external borrowing and “borrowing” from the DF.¹⁰ The shareholders of the regulated companies are guaranteed not only the 15 percent rate of return but also the additional return from the difference between the permitted return on debt-financed fixed assets and the actual borrowing costs.

Using the debt and equity data reported by the two electricity companies and the assumption that the cost of borrowing was 9 percent, the net rate of return on equity would be around 20 percent, substantially higher than the 15 percent maximum permitted under the scheme.

When questioning the effectiveness of rate-of-return regulation thirty-five years ago, Stigler and Friedland (1962) suggested that one should not look only at the profit and loss accounts of the regulated firms because they would usually hide the critical information from accounting statements. Whether such a practice has actually occurred may be tested indirectly by examining the fortunes of investors in regulated firms’ stocks.

10. External borrowing includes bank loans, supplier credits, amounts payable on leasehold land purchased on installment from the government, etc.

Using stock return data for HEC and CLP and adjusting for dividend payments, we have calculated that the stock returns on equity for both firms were on average 22.35 percent, even higher than the net rates of return during the period 1980–96. In the same period, the rates of return to shareholders of both electricity companies were higher than that of the Hang Sang Index, where most of the Hang Sang Index constituent companies were not regulated firms.

Our findings suggest that schemes of control were ineffective in protecting consumer interests because returns to shareholders of the regulated electricity companies exceeded the opportunity cost of equity capital by a very substantial margin.

Tariffs

As the other side of the coin, consumers have failed to enjoy a low-cost supply of electricity. To provide an independent piece of evidence, let us compare the levels and rates of change of CLP and HEC tariffs during the period 1963–79, when the former was regulated and the latter was not. The two firms' tariffs have moved closely during this period, suggesting that the scheme of control did not effectively alter the pricing behavior of the regulated firm CLP. An international comparison shows that the level and rate of increase of electricity prices in Hong Kong are at the high end among economies with comparable conditions (table 5.1).

Table 5.1 Average Electricity Prices in Selected Economies

Country	1995			1993	
	Price (HK cent/kWH)	Index	Price Change from 1993 (%)	Price (HK cent/kWH)	Index
Australia ^a	48	66	10	44	77
United States ^a	51	70	-1	51	90
Indonesia	59	81	16	51	90
Thailand	59	81	5	56	98
Malaysia	61	84	11	55	97
Korea	61	84	-5	64	114
Taiwan	62	85	-13	71	125
Singapore	64	88	16	55	96
Hong Kong	73	100	28	57	100
United Kingdom ^a	76	104	6	72	126
Philippines	89	122	14	78	137
Japan ^a	177	193	16	153	203

Data sources: Data for OECD countries are from the International Energy Agency (1997). Remaining data are from Lam (1997) and China Light and Power Company.

Note: All prices are in nominal terms and US\$1 = HK\$7.8. Prices of OECD countries are the average prices for industry and households.

^aOECD countries.

In sum, the regulatory experience of the electricity industry suggests that schemes of control have failed to achieve their main objective of restraining regulated firms' monopoly power. Moreover, regulation has given rise to abnormally high excess capacity, which might have caused inefficiency in input combination and lack of productivity growth. The first reason behind the schemes' failure is the nature of rate-of-return regulation, as it gives weak incentive to regulated firms to lower cost. In addition, the formulas for calculating returns in the case of schemes of control have indeed provided a perverse incentive for regulated firms to expand their fixed assets beyond what is economically efficient and socially sensible. The second reason is asymmetric information, which makes it very difficult, if not impossible, for the regulator to monitor regulated firms effectively. As a result, it is not easy for the regulator to avoid being "captured" by regulated firms.

In the next section, we shall see a different path of development in the local telecommunications industry, where competition has gradually replaced regulation.

5.5 From Regulation to Competition: Telecommunications Services

The telecommunications service industry supplies a variety of services to different groups of customers. At the most general level, the industry can be divided into three segments: (1) local fixed telecommunications network services (FTNS), (2) mobile telecommunications services, and (3) international services. These three segments are characterized by different technologies and regulatory schemes.

The Economic Services Bureau of the Government Secretariat is responsible for setting an overall policy framework. Within this framework, the Telecommunications Authority is the regulatory body of the telecommunications industry and the administrator of the Telephone Ordinance (which governs the establishment and operation of basic telecommunications services) and the Telecommunication Ordinance (which regulates so-called nonbasic and competitive services).

Facing strong competition from neighboring regions that aspire to become the top financial and business center in the Asia-Pacific region, the government regards it as vital to have in place a good telecommunications infrastructure and to provide communications services to meet local and regional needs. The government set three policy objectives to guide the development of Hong Kong's telecommunications industry: (1) the widest range of high-quality telecommunications services should be available to the community at reasonable cost, (2) telecommunications services should be provided in the most economically efficient manner possible, and (3) Hong Kong should serve as the preeminent communications hub for the region now and into the next century (Hong Kong Government 1994).

Competition is viewed as a mechanism that engenders efficient supply of services and disciplines suppliers to ensure that prices are fair to consumers. As a result, the policy framework adopted by the government seeks to create an environment that makes entry by new suppliers possible, provides a fair rate of return to investors, and is proconsumer. Thus progressive liberalization and the licensing of competing suppliers are important aspects of the industry's development.

The three segments of the telecommunications service industry are characterized by different kinds of market structures. International telephone services are provided by Hong Kong Telecommunications International (HKTI), an unregulated monopoly. Mobile services are in a state of intensive competition. The market structure of local FTNS falls between the two extremes, experiencing a transition from a regulated monopoly to a regulated oligopoly.

5.5.1 Local Fixed Telecommunications Network Services

For quite a long time, telecommunications services have been regarded as an example of natural monopoly; that is, the most efficient service can be provided by only one service operator. Under this premise, Hong Kong Telephone Company (HKTC) was granted a fifty-year exclusive license in 1925 to provide the territory with a public telephone network. In return for this monopoly right, HKTC was required to pay a royalty to the government each year and gave concessions to the government by charging the government half of the regular tariff rates for its phone lines. In addition, HKTC was required to bear the universal telephone service obligation and seek government approval for any changes in rental charges.

The surge in demand for telephone services in the 1950s and the early 1960s outstripped HKTC's ability to provide phone services, leading to long waiting times for telephone installation. In reaction, HKTC proposed a substantial increase in rental charges to reduce waiting times and to finance the capacity expansion of the telephone network. The government initially refused the request for the rental increase but later approved a smaller increase in 1964. As part of the agreement, HKTC accepted a target return of 9 percent on average capital employed. The right of approval for any increases in the rental charges for telephone lines remained in the hands of the government.

HKTC's requests for substantial rental increases to cover rising costs in the early 1970s prompted the government to introduce a scheme of control on HKTC when its license was up for renewal in 1975. The scheme of control with HKTC, while resembling that reached between the government and CLP, had unique features. It allowed HKTC to retain its monopoly for another twenty years while limiting the maximum permitted rate of return on shareholder equity to 16 percent after taxes. After deducting total operating costs, permitted return, and taxes, 80 percent of the re-

Table 5.2 Residential Telephone Tariffs in Selected Economies (U.S. dollars)

Country	Connection			Monthly Subscription			Local Three-Minute Call		
	1995	1994	1993	1995	1994	1993	1995	1994	1993
Hong Kong	69	77.6	77.6	8.4	8	8	0	0	0
Korea	10	10	10	3.4	3.4	3.4	0.04	0.04	0.04
Singapore	56	52.4	50	5.9	5.5	5.2	0.01	0.03	0.02
Taiwan	113	228.7	255.2	2.3	4.6	4.6	0.04	0.04	0.04
United States	43	43.5	43.5	11.7	11.3	11.3	0.09	0.1	0.1

Sources: International Telecommunication Union, *ITU Statistical Yearbook* (Geneva, 1995); and International Telecommunication Union, *World Telecommunication Development Report* (Geneva, 1995, 1997).

maining surplus would go to a DF while 20 percent would go to shareholder equity in the form of bonus shares. That is to say, in contrast with the schemes of control for all other utility firms, the scheme of control on HKTC did not cap the accounting return to shareholder equity because any revenue above the permitted return would be shared by the company's shareholders and its DF. As a result, the real return to shareholders could be higher than the *maximum* permitted rate of return.

Although the DF could be used to expand HKTC's telephone network as well as to smooth its permitted returns, in practice it was used only for the latter purpose because the company had sufficient resources to finance its expansion of fixed assets. Like other DFs, the DF of HKTC represented a liability to the company and would accrue interest at the rate of 8 percent per annum on its average balance. This interest payment was deductible from the profits of HKTC and used for tariff relief.

Starting in 1993, rate-of-return regulation in the local FTNS segment was replaced by new, price-cap regulation. Under the new regulation, HKTC could revise the charges for its services on an annual basis but no more than the general inflation rate, based on the consumer price index (CPI) minus 4 percent (known as CPI-4). Rental charges for residential lines may not be increased by more than the general inflation rate less 3 percent per annum (known as CPI-3). Residential telephone tariffs from 1993 to 1995 (the year HKTC's exclusive franchise expired) are given in table 5.2. When the tariffs are compared with those of other Asian newly industrializing economies (NIEs) and the United States, we see that Hong Kong had the highest connection charges except Taiwan and the highest monthly rental fees except the United States. Despite the fact that local calls were free of charge in Hong Kong but not in the other included economies, total monthly charges were higher in Hong Kong than in the other three Asian NIEs if each household made fewer than 100 to 150 three-minute local calls per month.

From Regulation to Competition

Technological changes have made the natural monopoly argument in granting exclusive franchising increasingly irrelevant. Digital transmission and fiberoptic cable technologies have drastically reduced the cost to develop networks, thus bringing down the barriers to entry.

The expiration of the exclusive franchise of HKTC at the end of June 1995 provided an opportunity for the government to open the local telecommunications market to competition. In that year, three additional FTNS licenses were granted to Hutchison Communications Limited, New T&T Hong Kong Limited, and New World Telephone Limited for the provision of telecommunications services between fixed points in Hong Kong on a competitive basis. This move ended HKTC's seventy years of monopoly in the local fixed-line telecommunications market.

Hong Kong's approach to liberalization of the telecommunications market is different from that of other economies in two respects. First, because the exclusive franchise for international telephone services granted to HKTI will not expire until 2006, in 1995 competition was introduced only into local FTNS. Second, consistent with Hong Kong's free market philosophy, a *market-driven* open licensing approach was adopted over an alternative approach of creating a duopoly by tendering for a second network. The open licensing approach seems preferable both in promoting efficiency within the industry and ensuring that consumers enjoy the full benefits of competition.

Under the new regulatory provisions, the Telecommunications Authority has adopted a number of measures aiming to limit the market power of the dominant operator HKTC and to foster competition in the FTNS market. These measures include (1) introducing number portability to reduce customers' switching costs, (2) maintaining the universal service obligation on the dominant firm, (3) formulating tariff-setting provisions to prevent anticompetitive pricing behavior by the dominant firm, and (4) assisting new service providers in negotiation of interconnections with the dominant firm.

Number Portability. To facilitate a smooth entry by the three new FTNS operators and to create a level playing field, the Telecommunications Authority has introduced a number portability plan that allows residential and business users to keep their existing telephone numbers when they switch service providers. This measure has reduced the costs to HKTC's existing customers when they switch to a new service provider, making the services offered by the new entrants more attractive to consumers.

Universal Service Obligation. As specified in the government's position paper of 1994, *Hong Kong's Telecommunications Policy*, HKTC must carry

the universal service obligation (USO) in circumstances where HKTC remains the dominant carrier, but the three new local service providers are required to pay HKTC an amount known as the "access deficit contribution" calculated on the basis of international calls to cover part of the costs of the USO (because currently local services are still cross-subsidized by international services).

In a recent report on market liberalization of local FTNS, the Consumer Council recommends that an independent universal service fund be established to subsidize the USO. This is clearly an improvement on the current system in which HKTC meets the USO while others contribute. A more important issue is to find a way to terminate the cross-subsidization of local services by international services.

Pricing Strategy. The tariffing rules set by the Telecommunications Authority state that the dominant firm HKTC is prohibited from offering to customers discriminatory tariff discounts from their published tariffs. In contrast, the three new entrants are not subject to the same constraint as long as their individual market share does not exceed 20 percent of the local telephone market.

Interconnection. Interconnection is a critical issue in the process of market liberalization because new operators can only provide their services through the incumbent firm's established network at the initial stage of entry. Current government policy is to allow the terms and conditions of the interconnection between the new entrants' networks and the fixed-link telecommunications infrastructure of HKTC to be determined through commercial negotiation on the principle that the connection charges should be based on long-run incremental costs. However, if an agreement cannot be reached, or the Telecommunications Authority considers the terms and conditions reached to be anticompetitive and against the public interest, the Telecommunications Authority has the power to determine the terms and conditions itself (Section 36A of the Telecommunication Ordinance).

HKTC and the other three FTNS suppliers reached a provisional agreement on connection charges in July 1995, and the charges were set at 9¢ per minute.¹¹ They have not yet reached any agreement, however, about the charges in accordance with the principles set out by the Telecommunications Authority. HKTC and NTT have sought the authority's help in determining the charges, but the determination has yet to be made.

11. The connection charges for mobile phones are 6.7¢ per minute, and those for value-added services are 4.2¢ per minute.

Effect of Market Liberalization

As an indirect indication of the effect of market liberalization on cost savings by the existing monopoly, let us see how HKTC responded to the opening of the local FTNS market. Hong Kong Telecom, the sole parent of both HKTC and HKTI, announced a three-year plan in March 1995 to reduce the number of its employees by 2,500, which represented 16 percent of its total workforce and the largest reduction in the company's history. Such streamlining did not seem to have adversely affected the performance of the company or services it provided. On the contrary, the growth rates of Hong Kong Telecom's revenues from local telephone services have continued to be in double digits. The 12.3 percent growth rate in revenues in the financial year ending March 1997 is even higher than in previous years (Hong Kong Telecom 1997).

As Hong Kong's experience in opening up local FTNS has demonstrated, the regulator can play an important role in the process of liberalization. Promotion of competition does not call for premature deregulation, which may set back progress toward market liberalization. Moreover, the regulator may have to be proactive and take measures to ensure that adequate competition is developing and consumers' interests are protected.

5.5.2 Mobile Telecommunications Services

Mobile telecommunications services are at present the most competitive segment of Hong Kong's telecommunications market. This segment differs from local FTNS in at least two aspects: First, there are minimum regulatory barriers to entry. The government has issued as many licenses as needed to maintain competition. Second, technologies in mobile telecommunications evolve rapidly. New entrants with better technology can penetrate the market relatively easily, thus putting competitive pressure on incumbent operators.

In 1994, the Telecommunications Authority conducted a review on the way forward with regard to the licensing and regulation of mobile telecommunications services. On the basis of the review, the authority decided to invite applications for up to four licenses for the provision of cordless access services and up to six licenses for the provision of personal communications services (PCS). This decision had a significant impact on the mobile phone business. In late 1995—almost a year before the issue of PCS licenses—the existing cellular operators responded to the threat of imminent entry by PCS (which are expected to enjoy a cost advantage) with deep cuts in tariffs and prices for handsets and with aggressive advertising campaigns to increase their customer base.

Paging services have minimal regulatory barriers to entry. There is prac-

tically no limit on the number of licenses because the Telecommunications Authority adopts a class licensing approach for mobile communications services where frequency constraints do not limit the number of potential operators. A license will be issued within days of application. Therefore, competition among paging service providers is most intense.

Mobile telecommunications services are characterized by rapid technological advances. The rapid changes in mobile communications technology illustrate the powerful force of creative destruction. A good example is the development of the CT2 Telepoint (i.e., the second-generation international standard for cordless handsets that uses digital radio technology) market in Hong Kong. Introduced into Hong Kong in 1992, CT2 generated a very positive response from consumers. Within two years of service launch, CT2 subscribership reached 170,000, representing close to 3 percent of the total population of Hong Kong. However, the CT2 system's advantages of low cost and light handsets in comparison with cellular phones quickly evaporated after cellular communications technology improved substantially. In 1996, all providers of CT2 services were out of business.

5.5.3 International Services

With an exclusive franchise that ends in 2006, HKTI enjoys a monopoly on international telecommunications circuits, telephonic services, and video-telephone services connected to the public switched telephone network.

Under both local and international pressure, in recent years the government has been pursuing opportunities to liberalize the international telecommunications segment subject to HKTI's exclusive franchise. The basic approach of the government is to define the areas to which the exclusive license applies as narrowly as possible.

In March 1995, the Telecommunications Authority announced that callback services did not constitute an infringement on HKTI's exclusive franchise. Also, as nontelephonic international services such as fax and data communications, video-conferencing, and other value-added services became increasingly popular in the business community, the authority stated in May 1996 that the simple resale of HKTI's international private lease circuits for fax and data services, private internal communications networks within companies and organizations, video-conferencing, and customer mobile terminals for mobile satellite services did not breach the terms of HKTI's monopoly on international services. As a result, these new international services have since been open to competition.

To limit the monopoly power of HKTI, the government has also allowed companies and organizations to "self-provide" their own external circuits for intracorporation traffic. In addition, companies and organiza-

tions may also provide their own international private circuits by, for example, directly leasing satellites for private use. The first self-provided external telecommunications service (SPETS) license was issued in 1995. Since then, a total of seventy-three SPETS licenses have been issued. The government has also kept future technical innovations such as international satellite cellular phone services outside of HKTI's exclusive franchise.

Given the above development, the competitive condition of the market for international services is now vastly different from what it was in 1981 when the twenty-five-year exclusive license was granted. This is an example of technological advances circumventing regulatory barriers. However, the government has been slow in responding to calls to liberalize international services and restrict the monopoly power of HKTI. The government either should find a way to end HKTI's exclusive franchise before 2006 or should seriously consider imposing price caps on the unregulated monopoly.

On 20 January 1998, however, the government announced that it had reached an agreement with Hong Kong Telecom, the parent company of HKTI, for the early surrender of HKTI's exclusive license. The liberalization measures include the following: (1) External service-based competition (such as international simple resale of voice services) will begin 1 January 1999. (2) External facility-based competition (such as IDD services over cable and satellite facilities owned by service providers other than HKTI) will begin 1 January 2000. To compensate for the early termination of HKTI's exclusive license, the government would provide cash compensation of HK\$6.7 billion and terminate the royalty payment of HKTI as early as 20 January 1998. The changes in the government's position and market liberalization measures will prevent future losses in static efficiency and social waste arising from HKTI's efforts to defend its monopoly. More important, the forces of competition released by the agreement will improve dynamic efficiency by generating more and quicker innovations in international telephone services.

5.6 Conclusions

Business regulation defines the relationship between the government and business. It often alters the incentives and thus the conduct of the regulated firms. Hong Kong's business regulation is in a state of transition. Government regulation of monopolies by schemes of control in Hong Kong reached its peak in 1980s, when schemes were imposed on many public utilities, but most have now been dropped as the government has recognized their drawbacks and started to introduce competition into these industries. In sections 5.4 and 5.5, we used the electricity industry to illustrate the drawbacks of schemes of control and the telecommunications

industry to illustrate the benefits of introducing competition into a regulated industry.¹²

Schemes of control in Hong Kong differ from rate-of-return regulation adopted in other economies in terms of the determination of returns, the presence of a development fund, the duration of agreements, and the price adjustment mechanism. They have failed to achieve their objectives for two reasons. First, like any rate-of-return regulation, the schemes provide a weak incentive for regulated firms to lower their costs and a perverse incentive for the firms to expand their fixed assets due to their peculiar way of determining returns (i.e., returns depending primarily on capital investment). Second, asymmetric information makes it very difficult, if not impossible, for the regulator to monitor regulated firms effectively and avoid being captured by them.

To introduce competition into the electricity industry, a necessary step would be the separation of electricity generation from its transmission and distribution. The newest technology for electricity generation and the scale of demand in Hong Kong can accommodate many small electricity firms that are able to operate at the minimum efficient scale, provided the transmission and distribution network is open to them. To achieve an open market for electricity, the government not only has to find a way to link up the transmission networks of the two geographical monopolies and have it managed by a separate company (i.e., a regulated monopoly) but also must find a way to introduce new entrants into a market that already suffers from huge excess capacity.

Failure by the government to forestall the perverse developments in this industry years ago has resulted in a messy situation from which there is no easy way out. To avoid aggravating the problem of excess capacity further, some arrangement would have to be sought to sell incumbent firms' existing capacity to new entrants. However, at present no competition and antitrust laws yet exist in Hong Kong to provide a legal basis for the government to impose such a solution.

The most competitive segment of the telecommunications industry is that for mobile communications services because the government has imposed minimal regulatory barriers to entry and because rapid technological innovations allow new entrants to put severe competitive pressure on incumbents. The local fixed telecommunications network service segment of the market comprises a dominant incumbent and three new entrants. The Hong Kong experience with this segment of the industry is that the regulator can play an important role in market liberalization by ensuring that adequate competition is developing and consumers' interests are protected.

12. Some studies show that direct competition between electric power companies causes firms to operate at lower average cost, sell electricity at lower prices, and avoid excess capacity. See, e.g., Primeaux (1986).

The least competitive segment is that for international telephone services. Under an agreement with the Hong Kong government in January 1998, HKTI's exclusive license on international telephone services was terminated. International services provided via HKTI will be open to competition in 1999 and international services provided via facilities of any party will be open to competition in 2000.

Looking beyond electricity and telecommunications, we can see changes in other public utility industries as well (see Cheng and Wu 1998 for details). As indicated in section 5.2 above, a new bus company has entered the public bus industry to join two incumbents, whose schemes of control were not renewed when they expired in August 1997. In addition, an open tendering system has replaced private negotiation as a mechanism for awarding bus routes. When the new Chek Lap Kok International Airport begins operation in 1998, two firms will compete for airport cargo services compared with a monopoly at present, and three firms for ramp-handling services compared with a monopoly now.

The progress in the past few years has encouraged policymakers to move ahead in the direction of regulatory reform and market liberalization. There is definitely room for both. Although the effort has already started to pay off, the pace of progress is uneven. The government has announced that it intends to open more markets to competition that until recently have been governed by exclusive franchises and will encourage further competition in markets that have already been opened.

These moves are expected to have a positive impact on productivity growth in these industries. However, the territorial monopolies in the electricity industry remain intact while they are still under schemes of control.

Even though competition in airport services will increase after the new airport is open in 1998, the nature of regulation will undergo a very fundamental, and perhaps bizarre, change. Air cargo service and ramp-handling service providers will no longer be subject to government regulation but will instead be "regulated" by the Airport Authority, a government-owned corporation that has a statutory obligation to conduct its business according to "prudential commercial principles." So far no details have been revealed about the way in which air cargo service and ramp-handling service providers will be regulated. However, if prudential commercial principles are to be the principal guidelines for the Airport Authority's business dealings with its franchisees, then the outcome would be achieved through negotiation between an upstream monopoly and a downstream duopoly or triopoly. In that case, it is not clear how well public interests will be served.

Less bizarre but equally problematic is the role of government-owned corporations in the public transport industry, namely, the Mass Transit Railway Corporation and the Kowloon Canton Railway Corporation. If

these corporations continue to be primarily profit oriented, as they are now, then the government should introduce regulation to restrain their monopoly power and to protect consumers' interests.

In conclusion, to improve its regulatory regime or to bring about greater competition to industries that are traditionally regulated monopolies for the purpose of promoting economic efficiency, the government will have to formulate a comprehensive and sound public policy for each industry to guide its future initiatives.

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Comment Thomas Gale Moore

I learned a lot from Changqi Wu and Leonard Cheng's paper on Hong Kong's business regulation. What I found most remarkable was that Hong Kong introduced competition into the local phone market but has maintained a monopoly in the potentially more competitive international market. The authors report that HKTC was given monopoly rights for twenty years from 1975 and that 80 percent of any return over 16 percent was to go to a development fund. They also report that the development fund was exhausted in 1991. It would have been very instructive had the authors spelled out how the development fund approach actually worked. As I understand the development fund approach, the accumulated funds can be used either for investment or to lower rates to consumers. Was the HKTC development fund exhausted because it was used for investment, which incidentally would go into the rate base, justifying greater profits, or was it used to reduce rates? Since four companies have rushed in to offer competition with the phone company, the latter seems unlikely.

This brings me to a fundamental problem with regulation that is too often overlooked. The regulator gets most of its information from the regulatee. The regulated company has incentives to hire the best accountants and lawyers to make its case. The data can be presented selectively, fudged, or even made up. How much will demand grow? If it grows rapidly, more investment is needed than if it is only slowly expanding. Do the workers need ten urinals for every twenty workers or would five be enough? Does the firm need copper piping, stainless steel boilers, gold wiring, more space to park vehicles, better vehicles that break down less often, or bigger offices? Must the firm have the latest computers, connections to the Internet, its own power source in case the purchased electricity fails? I could go on, but the idea is clear.

The real question is, Can regulation be made to work? Or will it always

be a tool of the regulated to protect their franchises? George Stigler and Claire Friedland (1962) in a famous paper on electric utility regulation failed to find that regulation lowered rates. I did a study of electric power rates (Moore 1970) using data from the 1960s and came to the same conclusion: that is, regulation had little effect in reducing rates below what they would have been had the firm simply priced monopolistically without any controls and without fear of competition.

Primeaux has shown from examples and statistical evidence that competition in electric power can work and has worked. He has spelled this out in various studies (see Primeaux 1986). Direct competition existed between two or more electric power companies in forty-nine cities over 2,500 population in the United States in 1966. He reports that competition causes firms to operate at lower average cost. Distribution firms that have monopolies fail to exhibit lower costs than those under competition. Florida has a system of wholesale electricity competition that improves efficiency and reduces wholesale electric costs. Primeaux concludes that "direct competition is feasible between utility firms." He also reports that "competition causes firms to operate at lower costs, sell electricity at lower prices, operate without engaging in price wars, and avoid excess capacity" (Primeaux 1986, 422).

Although Hong Kong's readiness to endorse and encourage competition in local phone service is admirable, its failure to do so in the bus area is unfortunate. It has franchised four companies, each of which has a territorial monopoly. The government apparently argues that complete deregulation of public bus service is not practical because, without a monopoly franchise, "loss-incurring services cannot be provided." Before airlines were deregulated in the United States the same argument was made. The airlines "proved" that without regulation they would only serve the biggest hubs and most cities would lose service. We know that did not happen.

Trucking companies maintained that they needed regulation to continue to offer service in small communities. Actually, they failed to offer service in places where it was not profitable, and service has improved since deregulation.

Meyer and Gomez-Ibanez have shown that "the benefits of privatization and deregulation depend critically on whether effective competition can be established and maintained. . . . When competition exists, deregulation and privatization have great potential to reduce costs and improve the quality of urban bus services" (1993, 28). They go on to suggest that mini-bus services, shared-ride taxis, jitneys, or motorized tricycles often provide good competition. Not only does competition cut rates but it often "improves productivity and encourages more market-oriented services."

Universal service need not be mandated. It is noteworthy that Federal Express provides service to every community in the United States at a

fixed rate. Clearly, the costs of serving small rural areas are much higher than those of serving big cities. Why does FedEx do this? Because it makes economic sense to market universal service.

If there are areas in Hong Kong to which bus service would not be offered because demand is too low or costs are too high, then the government could offer subsidies. It could ask for bids from bus companies to provide the service. Are jitneys permitted in Hong Kong?

I was also struck with the limited competition in the ferry market. Why not competition? The ferry market is much like the bus market or the airline market, one that could easily be competitive.

Hong Kong, which relies on trading and is one of the great ports of the world, has granted an exclusive license to one firm to provide air cargo services. This sector is much too important to be monopolized. Rate-of-return regulation will not work for the reasons that I have already outlined. This system will change to a duopoly. In addition, the government proposes that a state-owned firm do the regulating. Although I am a great supporter of privatization, I find this bizarre. This new entity will "have no obligation to reveal the methods and terms of regulation" according to the authors. Who is kidding whom? Who is paying whom? A duopoly is an improvement over a monopoly, but more competition would be better yet.

In summary, I learned a lot, especially about the problems Hong Kong is experiencing with making regulation work. The authors admit that the evidence suggests the Hong Kong program for regulation fosters more fixed assets than in the United States. They report that the electric utility companies have great excess capacity. Regulation has fostered and in fact maintained regional monopolies in buses, ferries, and electric power plants. Faith in regulation is like Samuel Johnson's remark on someone marrying for the second time, "It was the triumph of hope over experience."

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Comment Roger G. Noll

Wu and Cheng provide some fascinating information about the history of electricity and telecommunications in Hong Kong. Their paper provides an important piece of the larger puzzle concerning the effects of neoliberal reform of infrastructural industries throughout the world. Surely the 1990s has proved to be the decade of grand experimentation in industrial policy in developed and developing countries alike. The theme of reform is broadly similar across numerous countries: to replace ubiquitous monopoly providers (usually public enterprise) with competition where possible, and to use regulatory instruments with much sharper incentives for cost minimization and technological innovation where monopoly seems durable. Nevertheless, each country has developed some unique elements of its reform policy, and variation among these countries provides interesting and useful information about how best to organize the reform.

My purpose in this comment is to place the Hong Kong case in a broader context of reform in electricity and telecommunications throughout the world. The Hong Kong case provides insights about several policy choices that reformers face in all nations. The first choice pertains to the regulatory institutions and methods for protecting consumers against monopoly abuses either permanently if monopoly is expected to endure or temporarily during the transition to a market competitive enough that regulation is no longer needed or desirable. The second decision is about the scope of permitted competition: in which markets will competitors be allowed and where will monopoly be protected? The third decision concerns the degree to which the government will be proactive in facilitating competition: will it intervene to establish regulatory rules on such matters as vertical integration and interconnection that anticipate and prevent anticompetitive actions by the incumbent monopolist, or will it rely on market opportunities, private litigation, and competition policy to sort out the ultimate industry structure and relations among horizontal competitors?

Although I cannot offer a definitive assessment of the situation in Hong Kong based solely on the essay by Wu and Cheng, my overall impression is that Hong Kong has been excessively solicitous in protecting the interests of the old monopoly enterprises. The regulatory system and background competition policy appear to be relatively timid in imposing risks on incumbent firms, with the main consequence being not only less competition than might otherwise be possible but also relatively inefficient provision of services to customers. Indeed, I interpret the performance information that the authors provide about electricity and telecommunica-

tions in Hong Kong as confirming theoretical predictions from economics concerning the costly effects of regulatory rules that create perverse financial incentives and that limit the incursion of competition into the marketplace.

Regulatory System

The Hong Kong system of regulating profits and prices in these sectors is, to the best of my knowledge, unique in the world. The authors describe the system as a modified "rate-of-return" regulatory system, but this terminology surely is an injustice to the remarkable perversity of the Hong Kong approach. With all its flaws, rate-of-return regulation actually is not all that horrific a means for controlling monopoly prices. Economists rightly emphasize the superiority of price-cap regulation, but prior to the introduction of incentive regulation schemes in the 1980s, countries that practiced rate-of-return regulation enjoyed clearly superior performance in infrastructural industries, especially in telecommunications. The key weaknesses of rate-of-return regulation were that it imposed impossible information requirements on regulators and that it had the perverse effect that as regulators did a better job of solving their information problems—for example, measuring costs and demand elasticities—the distorting incentives of regulation on factor proportions (the Averch-Johnson bias in favor of capital-intensive technology) became worse. Regulators responded to this problem by imposing "used and useful" tests on capital investments, which created a burden of proof on firms to show that an investment was necessary and cost-effective before it could be added to the cost basis for setting prices. Whereas this test itself imposed impossible information requirements on regulators, at least it was likely to prevent unlimited substitution of capital for other inputs and excessive investments in quality that were predicted by the theoretical models.

The regulatory system in Hong Kong is at best a distant cousin of this system. The only connection between Hong Kong's scheme and rate-of-return regulation is that the latter is used to set a baseline revenue requirement in the short run. In reality, all forms of economic regulation must have this feature. The fundamental fact of price regulation is that unless it falls into the extreme cases of expropriation or government-protected monopoly (pure "capture" by the regulated firm), in the long run it must satisfy two criteria: nonbankruptcy of the incumbent firm and something less than monopoly pricing. Even price-cap regulation is initialized and then updated by traditional cost-based regulation. The theoretically pure price-cap system, in which prices are perpetually adjusted annually according to some arbitrary but permanent formula (such as the CPI- X), has never been implemented because no value of X has a zero probability of both bankruptcy and monopoly pricing. In fact, even a small error in

X will cumulate over even a few years to either subcompetitive or near-monopoly profits and so will require adjustment. In every case in which a price-cap formula has been adopted, within a few years it has proved to be politically unacceptable for one or another reason and has been altered. Usually, the mistake has been to make the formula too generous, arising from a persistent tendency for political authorities to underestimate the efficiency benefits of sharp incentives. Hence, over a decade or two, X generally grows as regulated firms find unpredicted ways to reduce costs when they can keep all or most of the cost reductions.

The crucial feature of the Hong Kong price regulation system is the peculiar role of the “development fund.” Firms are allowed a fixed profit, determined by the product of their capital investments and an allowed rate of return. But unlike in traditional rate-of-return regulation, the profit constraint does not cap either prices or revenues. Instead, the excess of revenues over costs plus allowed profit is placed in a fund.¹ The firm can borrow from this fund at 8 percent or can save the fund. In the latter case, 8 percent of the fund is returned to ratepayers through rate reductions. Thus, if the firm invests the fund, next year it earns its allowed return on the original capital stock plus the allowed return minus 8 percent on the investment. If the firm does not invest the fund, in the next period it will earn its allowed profit on the original investment. Hence, as the authors correctly reason, investing the fund, even in useless investments (“gold plating”), always dominates saving the fund as long as the allowed rate of return is less than monopoly profits. One would predict, then, that both electricity and telecommunications firms would embark on a mad dash to invest as much as possible. In fact, this is the case. Telecommunications has invested its fund to zero, and electricity is madly adding generation facilities despite widespread excess capacity. Meanwhile, customers pay unusually high prices for both services.

The Hong Kong system is even worse than this, however. First, it lacks the feature of a standard used and useful test of rate-of-return regulation. Hence, the regulators apparently do not inquire whether an investment is worth making. As a result, overinvestment can be expected to be worse under the Hong Kong scheme than under the standard rate-of-return system. Second, once a firm invests so much that the rate-of-return constraint is no longer binding, there is an incentive for still more investment. The reason is that if any fund remains, and the firm is not reaching its rate-of-return target, it can pay itself from the fund to reach its profit target. Hence, the Hong Kong system creates an even greater incentive for excessive capital intensity, excessive quality, and gold plating than does a rate-of-return scheme that lacks a used and useful test. One wonders what in

1. In telecommunications, the firm keeps 20 percent of the fund as profit sharing and places 80 percent of excess profits in the fund.

the world political officials were thinking when they adopted such a ridiculously perverse system!

Competition versus Monopoly

Another important feature of the Hong Kong system is that it does not really take seriously the possibility of introducing competition. The basis for this conclusion varies somewhat in the two industries, so each needs to be discussed separately.

Electricity

In electricity, the first step in moving toward competition is to allow entry into generation. In Hong Kong, apparently entry in generation—indeed, in every aspect of the industry, including retail distribution—is technically permitted; however, the circumstances created by the perversities of the price regulation scheme make entry completely implausible. In generation, as the authors note, the two monopolies that share Hong Kong have so overinvested in capacity that no sensible company would enter, even if the government prohibited the entrants from building any more generation facilities. The reason, of course, is that the existing capacity is more than adequate to satisfy all demand for the indefinite future. Without a requirement to buy power from others, the incumbents have neither a need nor a financial incentive to buy anything from an entrant. And a requirement to buy externally would just add to the excess capacity of the system.

Thus the only viable means for introducing competition into this sector is divestiture: to split generation from transmission and distribution, and to create a market in which distribution companies buy power competitively. To accomplish this task would require two additional policies. First, because electricity distribution in Hong Kong would be a duopoly, without adding more buyers the result of a wholesale electricity market would be monopsony prices that prevent generation firms from recovering the cost of capital. Second, because generation capacity substantially exceeds demand in Hong Kong, for a long while the competitive equilibrium price also would be too low to allow the recovery of all capital costs.

To solve these problems requires some combination of the following proactive government structural policies. To reduce concentration on the demand side of the market, two possibilities could be pursued. One is further to divest the distribution companies, creating a half-dozen instead of two. Another is to use some of the development fund to connect Hong Kong generation facilities to power systems in neighboring areas of China, and to introduce competition in generation in these regions as well. The latter move might solve some of the excess capacity problem, but if it does not solve it all (or if this reform is politically infeasible), something else

must be done to produce a realistic initial capitalization for generation facilities. The most efficient solution would be simply to spin off generation facilities into a number of competitive suppliers, and to subtract the depreciated book value of the generators from the rate base of the incumbents. Unfortunately, most nations have found this approach to be either illegal (an uncompensated expropriation) or politically infeasible. Assuming that this approach cannot be implemented, another possibility is a simplified version of the “efficient components pricing rule”—to auction off generation units (with limits on the number of units that could be owned by a single buyer to ensure that generation becomes structurally competitive) and then to subtract only the auction proceeds from the rate base of the incumbent companies. Generation facilities would then sell for prices based on their expected operating margins, not their book value or replacement cost (both of which are likely to be higher than their economic value). In this case, retail prices would still reflect the inefficiencies of the excessive investments of the incumbents, but at least the generation sector would face incentives for more efficient operation.

The point behind identifying the rough dimensions of a procompetitive policy in electricity is to contrast the circumstances in Hong Kong with those that one might find in a nation that was serious about improving the performance of the electricity sector through the introduction of competition. The scheme described above captures some benefits of competition immediately, and growing benefits over time as demand grows, generation equipment is retired, and new capacity begins to be added because it makes sense to do so, rather than because the peculiar incentives of the price regulation system encourage it. At the same time, it protects the investment of the incumbents, however foolish they might have been. The failure to introduce these reforms, then, has to be for reasons that go beyond the desire to assure incumbents a nice return on their existing investments. The behavior of the Hong Kong government is consistent with only two explanations: the government either is irrational or is motivated to perpetuate the inefficiency and high profitability of the status quo.

Telecommunications

Telecommunications policy in Hong Kong is not nearly as anticompetitive as electricity policy. Hong Kong has allowed competition in all elements of the industry except international calling.

The international calling system is worth a paragraph, even though Hong Kong is hardly alone in this area. Like nearly all countries, Hong Kong still succumbs to the allure of the perverse incentives of the international system for regulating prices. In brief, nearly all nations cannot resist vigorously playing the negative sum game of bloated terminating international access charges. In essence, the standard bilateral arrangement in telecommunications is that the calling party must pay half of the “official

calling rate" (a bloated, monopoly price) to the local access carrier that terminates the call. Thus receiving calls is outrageously profitable, and almost everywhere these excess profits are then used to subsidize basic local access. But because both nations practice this pricing policy, each is in the position of paying roughly the same amount of subsidy for local access to the other, with one receiving some trivial net benefit if it terminates more calls than it originates. Meanwhile, both are substantially harmed by international prices that vastly exceed costs, in some cases by a factor of one hundred to one. This pricing policy not only causes a substantial deadweight loss to international callers but creates a very large incentive to spend money to evade the system on such things as "callback" and private systems.

In other aspects of telecommunications, Hong Kong has adopted most of the policies necessary to promote effective competition. First, it has adopted number portability, which reduces the switching costs of customers who change carriers. Second, it has sought to prevent anticompetitive pricing by incumbent monopolists, although the method is the crude one of demanding uniform pricing. Nevertheless, because Hong Kong is so urbanized, this policy is certainly less distorting than it would be in a nation with a large rural sector, so perhaps the simplicity of the approach is worth the relatively small distortions it will create. Third, Hong Kong has allocated spectrum in a manner that allows competition in wireless telephony. Unfortunately, the paper gives us few details here, such as how the spectrum is allocated and what technical conditions are placed on the licensees that might inhibit direct competition between wireline and wireless service. In the United States, for example, only in the 1990s were radio telephone companies permitted to use technologies that provided less mobility but had low costs, which is the necessary step if wireless and wireline services are to be close substitutes.

Unfortunately, Hong Kong has sacrificed a great deal of the potential benefits of competition by its regulations regarding universal service and interconnection pricing. The paper does not present the details of the universal service policy, so a thorough evaluation is not possible. Some key missing ingredients are as follows. First, what is the penetration of the phone system, which is relevant to assessing whether the universal service subsidy is necessary to achieve penetration among households who cannot afford it or whether it is primarily an unnecessary tax subsidy system aimed at middle-class households and businesses. Second, the paper implies, but does not actually state, that Hong Kong practices what might be called gross universal service subsidies—that is, it underprices basic access to everyone, not just to those who need it. If so, even if penetration among lower income households is nontrivial, it is achieved at a huge cost in terms of subsidies to those who do not need it, financed by excess prices on other services (like calling charges) charged to exactly the same people.

In any case, all we know from the paper is that the incumbents carry the universal service obligation and in return collect huge subsidies.

One source of this subsidy is the interconnection charge. Briefly, the interconnection charge is the price one company pays to terminate a call to a customer who is served by another company. In Hong Kong, the price that has been set by the incumbent wireline carriers is 9¢ per minute. (The authors report that the regulators have not ruled on this fee.) This price is outrageously high in comparison to costs. In most countries, the price per minute for local calls, originating and terminating in the same company, is less than this. Prices for mobile phone carriers are 6.7¢ and for value-added carriers (those who lease facilities from the incumbent carriers) are 4.2¢. These, too, are ridiculously high and are clearly designed to inhibit competition. In Hong Kong, the authors tell us that residential customers have free local calling. But a competing local access provider must pay the interconnection charge if its customer calls a customer of the incumbent.

In the pricing domain, the paper provides data from the International Telecommunication Union (ITU) about residential telephone pricing. These data are very inaccurate for the United States and so distort the comparisons. The ITU data for the United States are wrong on three counts. First, the monthly service charge is understated because it does not include the “customer access charge” for long-distance service (which is mandatory). Second, the price reported in the table is the “lifeline” price, available to households that have low incomes. The actual average monthly access price in the United States is about \$18 for ordinary households and \$11 for low-income households, including both local and long-distance access charges.² Third, the usage charge is wrong because it is actually the long-distance usage rate charged by one carrier (New York Telephone) for calls outside of a customer’s local calling area (but not so far as to be picked up by a long-distance carrier). In reality, the vast majority of local customers have free local calling, and very few calls are actually charged the rate reported by the ITU. Finally, price comparisons are meaningless without including all calling prices, not just the price of a local call. The main reason for high access prices in the United States is that interconnection fees and hence prices for long-distance calls are far lower than elsewhere. Indeed, 9¢ a minute is closer to the price of a 2,500-mile long-distance call in the United States than to a local call, even for business customers who buy local measured service.

The important fact about the table of telephone prices is how low residential access charges are. One cannot imagine a circumstance in which the average cost of providing service is anywhere near this low, even if the

2. For comparisons of the entire pricing structure in Japan and the United States, see Noll and Rosenbluth (1995).

incumbent carrier is highly efficient. Hence, the Hong Kong system must feature other prices that are far above cost and that generate access subsidies. Because access demand is very price inelastic, a nation with low access prices inevitably will have a very inefficient telephone system—and an incumbent telephone company that is reluctant to make investments to provide access service to customers who do not buy the highly profitable services.

The solution to this problem is realistic pricing. One benefit of competitive entry is that it attacks massive cross-subsidy systems by attracting entrants to services that are heavily taxed. The only effective ways to stop this entry are either to prohibit it or to tax it. Apparently Hong Kong has tried the latter by imposing very high interconnection fees in order to protect an inefficient price structure.

Comparing Electricity and Telephones: A Paradox

The electricity and telephone policies seem to have quite different motives and consequences. In electricity, the policy seems consistent with a capture story: incumbent firms make supracompetitive profits, and prices seem to be very high across the board. In telecommunications, the policy is protective of incumbent wireline carriers, but not to the degree that appears to have arisen in electricity. Instead, the policy seems to be to engage in a great deal of cross-subsidization of access by international calling, radio telephony, and other things unspecified in the paper. The paradox is why these policies are so different.

The authors offer two characterizations of policy that inferentially might provide an explanation. First, the authors state early on that some aspects of these industries might be natural monopolies. The subsequent analysis of the two industries, however, is not consistent with this explanation, for generation remains monopolized even though experience elsewhere has demonstrated that it need not be. Second, the authors state that the government regards advanced telecommunications services as essential to continued economic progress in the modern world economy. But this belief, even if true, is not consistent with policy, for the effect of policy is to tax usage, which taxes advanced services, in order to subsidize ordinary telephone access.

The puzzle, then, is what in the political economy of Hong Kong has caused the divergence in policy between the two sectors? The basis for the decision to let telecommunications carriers have profit sharing, but not the electric utility, is far from obvious: why do these policies differ? Hong Kong has chosen two quite different ways to encourage inefficiency in electricity and telecommunications, with apparently different lineups of beneficiaries for these distorting policies. An interesting question is why these differences were adopted.

Reference

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