



**Telecom Egypt: Status and Prospects**

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## Abstract

This paper explores whether developing countries are better off relying on competition, incentive regulation and private ownership rather than state ownership, exclusive state monopoly and administered regulation of utilities. It evaluates the welfare implications of these two scenarios by estimating implications of reforming Telecom Egypt on the welfare of consumers, workers, government and buyers. It concludes that a well-designed reform program can create a positive sum game in which all these actors can benefit.

## خلاصة

تتصدى هذه الورقة لدراسة ما إذا كان من الأفضل للدول النامية أن تطبق مزيداً من المنافسة، ونظاماً جديداً للحوافز والملكية الخاصة في مجال الخدمات العامة، بدلاً من اعتمادها على ملكية واحتكار الدولة لتقديم هذه الخدمات. وتحقيقاً للهدف من الدراسة يتم تقييم الآثار المتوقعة لإصلاح قطاع الاتصالات في مصر على رفاة كل من المستهلكين والعمال والحكومة والمستثمرين. وتنتهي الورقة إلى أن مراعاة التصميم الدقيق والمتكامل لبرامج إصلاح قطاع الاتصالات في مصر – والذي يشمل مزيداً من المنافسة والحوافز والملكية الخاصة – من المتوقع أن يؤدي إلى نتائج إيجابية لكافة الأطراف المعنية.

## 1. Introduction

There is a general consensus that the provision of efficient and universal telecommunication services is critical for growing economies.<sup>1</sup> Yet there is no consensus among policy makers about how to achieve this objective. Since the mid-1980s, only a handful of developing countries (e.g., Chile, Mexico, Argentina and Venezuela) have chosen to rely fully on private ownership, competition and incentive regulation of the monopolistic segment of their telecom markets. Despite the evidence showing the positive effects of these liberal policies, the majority of developing countries still prefer state ownership of basic telephone services, combined with exclusive licensing and bureaucratic, and overlapping ownership and regulatory functions.

The preference for favor of state ownership and its associated policies can be traced to a number of factors. One of these factors is insufficient knowledge about the future impact of reform on different economic actors, especially with respect to workers and consumers. Another factor is the fear among producers that their assets could be expropriated through underpricing of output, taxation of profit or outright nationalization. This fear is particularly prevalent in countries where government has a history of failing to develop, commit to and enforce appropriate regulatory regimes (Levy and Spiller 1993). Finally, the lack of experience regulating private monopolies and the reliance on bureaucratic solutions may be an additional factor reinforcing this preference for state ownership.

This paper explores these issues to determine whether developing countries benefit most pursuing state ownership of telecommunications or competition, incentive regulation and private ownership in telecom. Section 2 examines the performance of Telecom Egypt, a state-owned company exclusively responsible for providing all telecom services in Egypt. In Section 3 an attempt is then made to explain observed performance, focusing on the market and the institutional structure of the sector rather than the internal workings of the company. Section 4 looks ahead by estimating the welfare implications of reforming the environment in which Telecom Egypt operates. In conclusion, the paper outlines key reforms for maximizing the gains.

The paper complements the literature concerned with the ex post effects of reforming telecom.<sup>2</sup> But this analysis differs, in two main respects. First, it deals with the effects of reforms

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<sup>1</sup> See Wellenius and Stern 1994; World Bank 1994.

<sup>2</sup> See Vickers and Yarow 1988; Galal, et al. 1994.

ex ante, rather than ex post. Second, it deals with the impact of a comprehensive reform package, including competition, incentive regulation and privatization, on all important economic actors, rather than the impact of privatization alone on these actors.

## **2. Performance of Telecom Egypt**

The American saying: “If it ain’t broke, don’t fix it” is not an appropriate yardstick to judge the performance of a company or a sector. From society’s standpoint, it is important to explore whether performance is satisfactory compared with best practice elsewhere. In other words, an improvement in performance over time is certainly good news, but measuring performance against an appropriate benchmark is also important. From this perspective we assess the performance of telecom Egypt, after providing a brief background of the sector.

### ***Background***

Telephone services were first introduced in Egypt in the late-19<sup>th</sup> century. Since then, several institutional landmarks have taken place. In 1918 the Egyptian Telephone and Telegraph Administration was established and operated until the founding of the Egyptian Telecommunications Organization in 1957. The Arab Republic of Egypt National Telecommunications Organization (ARENTO) was created in 1980 as an autonomous public utility and was recently renamed Telecom Egypt. According to Law 153, Telecom Egypt operates under the supervision of the Minister of Transport & Communications as the sole provider of telecommunication services in Egypt.

Until the early 1980s, telecom services in Egypt were scarce, inefficient and costly. The installed capacity was approximately half a million lines, and telephone density was less than one per hundred inhabitants. The waiting time for a phone line approached 10 years, and the rate of completed calls was low. It was not unusual for businesspeople in Cairo to send messengers rather than make telephone calls. Customers were offered a narrow range of services at a time when the sector was witnessing a technological revolution abroad.

Great strides have been made in Egypt since then. Telecom Egypt invested heavily and made a noticeable difference in the quantity and quality of telecommunication services. As shown in Table 1, the number of installed lines is now more than 4 million, and there are five phones per 100 inhabitants. The waiting period for a phone line is declining, and telephone

services to rural areas, reclaimed land, and industrial developments have been expanded. The quality of service has also improved through replacing semiautomatic with automatic exchanges and adding digital exchanges and automatic exchange connections to the national long-distance network. In 1996 of GSM and VSAT networks were introduced.

In view of these favorable developments, one might question the need for reform. Answering this question requires further analysis of Telecom Egypt's performance, its potential, and its policy and institutional environment. These issues are taken up in the remainder of the paper.

**Table 1. Telecom Egypt: Selected Growth Indicators**(In thousands, unless specified otherwise)

	1987/88	1991/92	1992/93	1993/94	1994/95	1995/96
Installed Lines	1,562	2,530	2,738	3,151	3,526	4,104
Lines in Service	1,200	2,022	2,234	2,456	2,716	3,024
Tel. per 100 inhabitants (TD)	2.27	3.48	3.77	4.06	4.60	5.02
Pay phones/1,000 inhabitants	0.03	0.055	0.062	0.068	0.070	0.075
Waiting period (years)	NA	NA	6.1	NA	5.8	5.7

*Source:* All indicators except waiting period: Telecom Egypt; Waiting period: ITU, *World Telecommunication Development Report*, various issues.

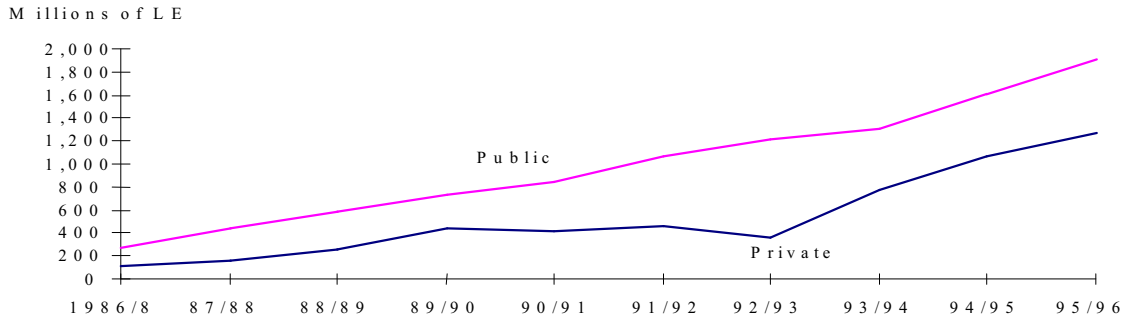
### ***Performance of Telecom Egypt over the Past Decade***

By all indicators, the performance of Telecom Egypt improved significantly over the period 1986-1996. As Figure 1 indicates, the company's public profits increased seven times and private profits increased 17 times over the period analyzed.<sup>3</sup> Over the last four years, profits increased at an unprecedented rate.

<sup>3</sup> Public profit is the same as quasi-rent, or the return to all investors, owners and lenders. It is defined as:

$$\text{public profit} = X - II - W - R - rK^W,$$

where X is the value of output, II is the value of intermediate inputs, W is employment compensation, R is factor rentals, and  $rK^W$  is the opportunity cost of working capital. Private profit is the return to equity holders alone. It can be defined as profit before or after taxes, or retained earnings plus dividends.

**Figure 1. Public and Private Profits of Telecom Egypt at Current Market Prices, 1986/87-1995/96**

Source: Calculated from Telecom Egypt data.

In principle, the surge in private and public profits in absolute terms could be attributed to an increase in prices or improvement in productivity. To distinguish one factor from the other, a number of additional performance indicators are calculated. One such indicator is public profit in constant prices, according to which Telecom Egypt has improved its performance steadily throughout the period analyzed (Figure 2).<sup>4</sup> In other words, while the company did benefit from favorable price changes, it was able to increase the quantity of output more than the corresponding increase in the quantity of inputs, including wages, factor rentals, and intermediate inputs.

The disproportionate increase in output was also due to a significant increase in fixed-capital formation. While this expansion was financed largely by internal funds (Figure 3), it raises the question: is Telecom Egypt's performance as good if we use relative indicators of performance, such as public and private profitability.<sup>5</sup> This is because profits in absolute terms may go up, but not necessarily in relation to fixed assets or net worth.

<sup>4</sup> Constant prices are derived from detailed information from Telecom Egypt, in which major outputs and inputs are decomposed into their price and quantity components.

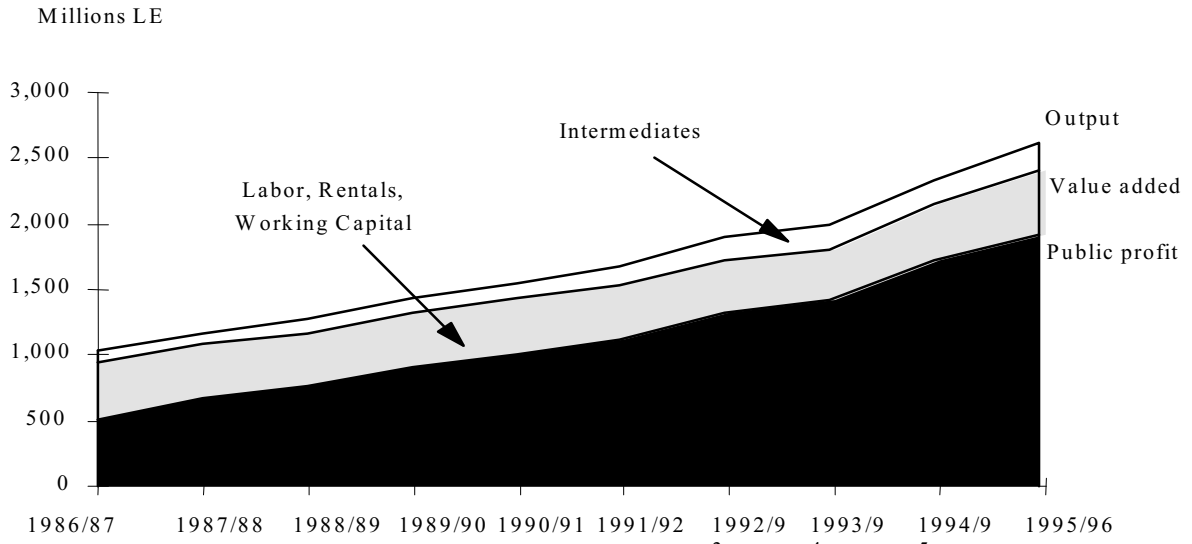
<sup>5</sup> Public profitability is public profit divided by revalued capital. Revalued capital is estimated using the perpetual inventory methodology, or:

$$K_t = K_{t-1} * (1 + \text{inflation rate}_t) * (1 - \text{depreciation rate}) + I_t$$

where  $K_t$  is capital stock in year  $t$ ,  $K_{t-1}$  is capital stock in the previous year, and  $I_t$  is investment this year.

Private profitability is profit after tax divided by net worth.

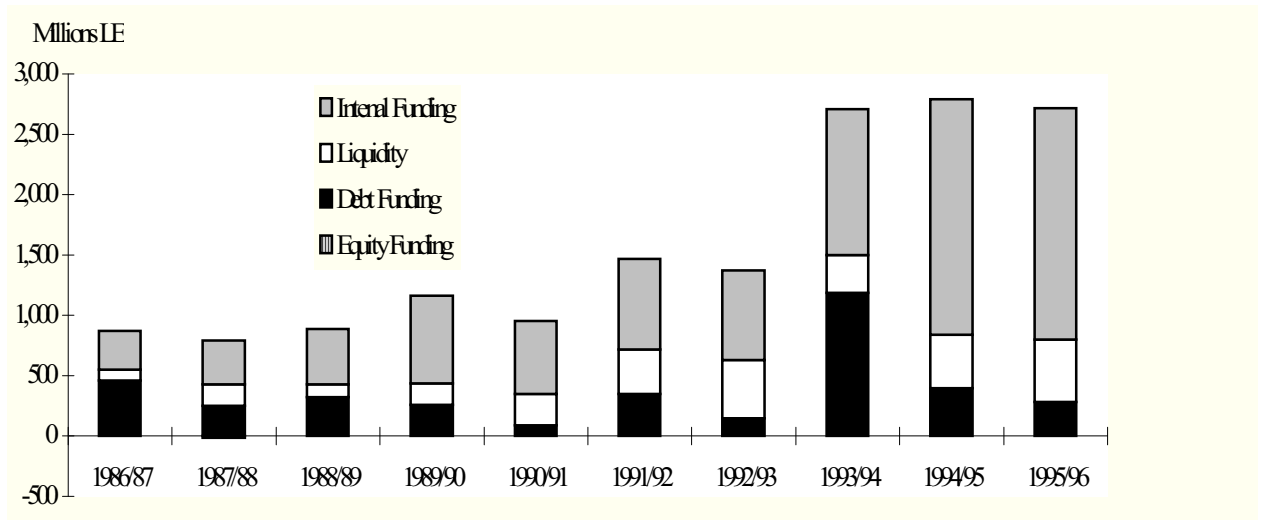
**Figure 2. Public Profit at Constant Market Prices, Telecom Egypt, 1986/87-1995/96**



Source: Calculated from Telecom Egypt data.

**Figure 3. Sources of Funds, Telecom Egypt, 1986/87- 1995/96**

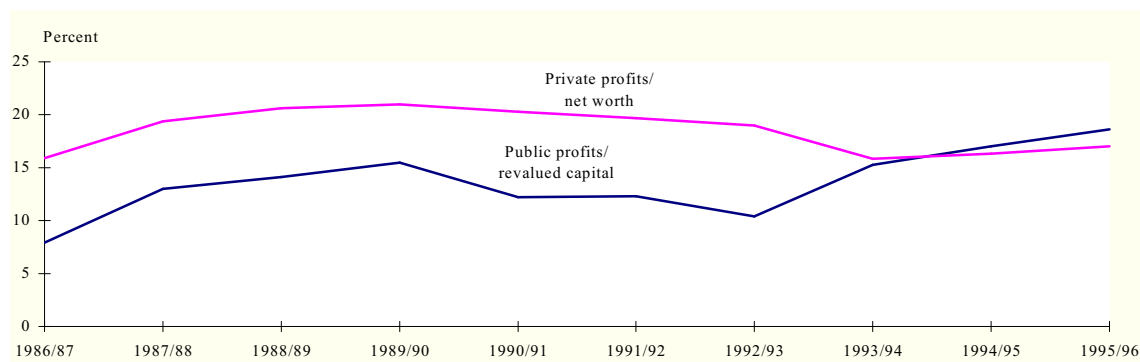
Source: Telecom Egypt.



According to these indicators, Telecom Egypt did well. Figure 4 shows that private profitability in relation to net worth averaged 13.7 percent per annum during the period 1986/87-1995/96, which is higher than the prevailing 10.4 percent interest on a 3-6 month deposit in 1996. In addition, public profitability in current prices in relation to revalued capital averaged 8.5 percent. Turning to productivity, the results still show that Telecom Egypt improved over time (Figure 5).<sup>6</sup> Labor productivity rose over the period 1986-96, and total factor productivity (TFP) improved at a compound annual growth rate (CAGR) of 1.94 percent over the same period. In large measure, this improvement can be traced to the expansion of capital without a significant increase in labor.

Moreover, this expansion brought the latest technology and enabled the company to realize substantial economies of scope and scale. To appreciate how the acquired technology impacted productivity, consider the scope of new technology provided by such well-known companies as AT&T, Siemens, CIT Alcatel, Ericsson, and NEC. Many of the trunk-cables are now made with fiber-optic technology, which offers an almost unlimited bandwidth; manual exchanges have largely been replaced by semiautomatic and automatic switches; several international links have also been installed, most of fiber-optic cable; coaxial submarine cables connect Egypt with Italy, Greece, Southeast Asia and Western Europe, providing greater capacity, reliability and speed.

Figure 4. Profitability, Telecom Egypt, 1986/87 - 1995/96



Source: Calculated from Telecom Egypt data.

<sup>6</sup> Total factor productivity is obtained by dividing the value of total output by the value of total costs, both expressed in constant prices. That is,

$$TFP = \text{benefits/costs} = X / (II + W + R + rK^W + rK^F),$$

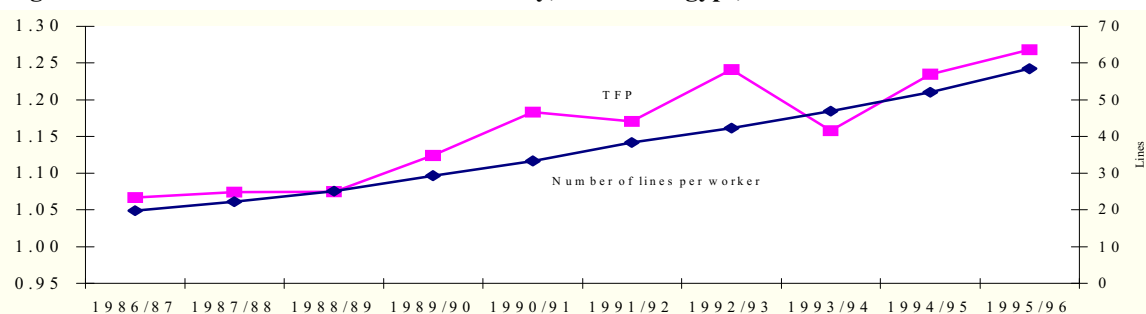
where all variables are as defined before, and  $rK^F$  is the opportunity cost of fixed capital.



*Performance of Telecom Egypt Compared to Other Countries*

While Telecom Egypt has improved over time, it has yet to catch up with most countries of the region. As Table 2 indicates, telecom services in Egypt lag behind oil- and non-oil producing countries on most counts, including teledensity, demand satisfaction and waiting period for a phone. Egypt also scores low on two efficiency indicators: the number of lines per worker and revenue per line. If Egypt is to compete with these countries in the world market, Telecom Egypt has a long way to go.

**Figure 5. Labor and Total Factor Productivity, Telecom Egypt, 1986/87- 1995/96**



Source: Calculated from Telecom Egypt data.

**Table 2. Telecommunications in Egypt Compared with Selected Arab Countries, 1994**

	Egypt	Lebanon	Tunisia	Algeria	Morocco	Syria	Jordan	Saudi Arabia	Libya	Oman	Kuwait	Qatar	UAE
	Lower Middle-Income Arab Countries							Upper Middle-Income Arab Countries			High-Income Arab Countries		
<b>Service Availability</b>													
Overall country TD	3.92	9.26	5.38	4.11	3.07	4.85	7.24	9.58	4.84	7.61	22.57	21.74	32.11
TD outside largest cities	2.95	4.71	4.96	3.62	2.39	4.12	3.18	8.54	6.23	5.32	59.02	34.27	24.3
Pay phones/1,000 inhabitants	0.06	0.03	0.64	0.25	0.23	0.13	0.05	0.43	NA	1.54	0.28	0.83	4.28
Waiting period (years)	5.8	>10	2.8	8.1	0.7	>10	8.9	>10	>10	0.2	0.2	0.1	0
Satisfied demand (%)	65	59.3	79	63.4	90.2	19.3	71.8	58.5	50.9	98.4	99.3	99.4	99.8
<b>Efficiency Indicators</b>													
Lines per worker	45	78	62	61	74	41	79	84	27	65	51	69	121
Revenue per line (\$)	322	133	460	206	643	293	718	1,056	1,188	1,261	716	1,327	1,282

Note: TD= teledensity

Source: ITU, *World Telecommunication Development Report*, 1995.

A similar conclusion is reached when Egypt is compared with seven developing countries that followed a different mode of organizing their telecom sectors (Table 3). Telecom sectors in these countries offer competition in the markets for value added services, cellular and other telecom services, incentive regulation for the market of basic telephony, and private rather than public ownership of all telecommunication services. The performance of telecom in these countries is clearly superior to that of Telecom Egypt by most measures. With the exception of the Philippines, the remaining countries did better in terms of the number of telephone lines per 100 inhabitants, demand satisfaction and pending applications for a phone. Of course, these countries have higher per capita incomes than Egypt, thus they are capable of providing more telephone services per person. However, there is no reason why these countries should have greater labor productivity or revenue per line than Egypt.

In summary, Telecom Egypt has shown significant progress in the quality and efficiency of services offered. Expansion and new technology were the main forces behind this improvement in performance. However, Egypt's telecom sector does not compare favorably with other developing countries, especially those that reformed their telecom sectors. This suggests that Telecom Egypt could do much better. The next section addresses why Egypt's telecommunications are lagging behind other developing countries.

**Table 3. Telecom Egypt Compared with a Sample of Reforming Economies 1994**

	<b>Egypt</b>	<b>Argentina</b>	<b>Chile</b>	<b>Jamaica</b>	<b>Malaysia</b>	<b>Mexico</b>	<b>Philippines</b>	<b>Venezuela</b>
<b>Service Availability</b>								
Overall country TD	3.92	14.14	11.01	8.63	14.69	7.95	1.68	10.92
TD outside largest cities	2.95	10.31	8.01	5.75	14.73	6.74	0.57	8.29
Pay phones/1,000 inhabitants	0.06	1.66	1.32	0.69	3.28	2.36	0.09	2.57
Waiting period (years)	5.8	0.9	1.2	4.3	0.3	0.2	5.5	3.7
Satisfied demand (%)	65	90.7	88.6	59.6	95.9	97.7	56.7	71.8
<b>Efficiency Indicators</b>								
Lines per worker	45	155	153	59	97	174	55	119
Revenue per line (\$)	322	1023	775	1067	598	1019	759	445

Note: TD= teledensity

Source: ITU, *World Telecommunication Development Report*, 1995.

### 3. Explaining the Performance of Telecom Egypt

The primary obstacle to improved telecom services in Egypt seems to be the nature of the implicit contract governing the operation, entry and management of the sector. The most critical deficiency is that Telecom Egypt does not face competition or even the threat of competition. In the monopolistic segment of the market, the regulatory contract is also not designed to provide incentives for efficient operation or consumption. Finally, the operation, ownership and regulatory functions are not well defined, and several elements of commitment are not in place (e.g. conflict resolution mechanisms and insulation of regulatory reform from politics). These features of the implicit contract are elaborated below.

#### ***Lack of competition or threat of competition***

Telecom Egypt monopolizes the market for local, national and international long-distance service. It also monopolizes the market for complementary services, including cellular telephones, facsimile, telex, telegraph and data transmission. The market domination of Telecom Egypt, its sheer size and sunk cost give the company a favorable position against potential competitors.

Recently, there have been cases of private sector participation in Internet and VSAT service and private sector is licensed to sell subscriber terminal equipment for GSM and paging services. But Telecom Egypt independently owns the Egyptian Telephone Company (ETC), which manufactures under license telephone sets, boxes and small switches. It also works with Siemens in a joint-venture called EGTI to provide manufacturing facilities. Clearly, private participation, free entry and competition are completely lacking in Egypt's telecommunications sector.

In contrast, Argentina, Chile and Mexico liberalized their telecom sectors by allowing competition in the value added, and in some cases in the market, for long-distance services. Competition in these markets is forcing firms to operate efficiently without costly regulation. These countries also auctioned off new franchises, inducing competition for the markets themselves and the selection of more qualified and efficient suppliers. Finally, when these countries privatized their basic networks, they introduced regulation first, which in Chile preceded privatization by some five years. To ensure that the private operator meets pending and

growing demand, they committed the buyers to specific quantity and quality targets, retaining the right to revoke the concession in case of failure to meet these targets. These reforms collectively imposed pressure on firms to be efficient, kept them from taking full advantage of their information privilege and reduced the burden of regulation.

***Lack of incentives for efficient operation and consumption***

The prevailing tariff structure in Egypt involves cross-subsidization of local users at the expense of national and international users. Telecom Egypt also charges new subscribers a significant allocation fee. The company does not pay taxes, and, ironically, funds the expansion of the Cairo Metro. While the funds earmarked for the metro almost match the taxes Telecom Egypt would have had to pay on profit, this practice has the effect of reducing transparency. Finally, tariffs are cost-plus based, and are revised on an ad hoc basis. These features of the incentive regime are not conducive to efficiency in consumption or in production. Users of telecom services tend to consume more local services and less national and international services than desired by society. At the same time, Telecom Egypt does not have the motivation to improve efficiency, given that higher costs can be passed on to consumers.

Contrast this system with the price cap regulation (or RPI-X) adopted, for example, by Argentina, Mexico, Venezuela and Malaysia. According to this scheme, a ceiling is imposed on the average tariff increase for a pre-specified basket of services in which the firm has a monopoly. The average price increases do not exceed the Retail Price Index minus X factor, which is predetermined for a given period of time. A positive X factor at the time of revising tariffs simply means that some of the benefits of technological progress and improved productivity are transferred to the consumer. Because prices are set independent of costs, the firm is not motivated to distort its cost data or shift the costs of competitive services onto their monopoly activities. Instead, it is motivated to minimize costs because it can retain any savings until tariffs are revised next.

In further contrast, Chile follows *benchmark regulation*, according to which tariffs are calculated to allow the firm a fair rate of return based on the cost of an 'efficient' firm.<sup>7</sup>

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<sup>7</sup> More specifically, tariffs are set for each regulated service on the basis of the incremental costs of an "efficient" firm. The resulting prices are adjusted to ensure that the firms can earn a fair rate of return on revalued assets, using the capital asset pricing model. That is:

$$R_i = R_{rf} + \beta_i (R_p - R_{rf}),$$

This method of calculating tariffs ensures that the firm has no incentive to inflate its costs. Meanwhile, because tariffs are revised only periodically (every five years), benchmark regulation has cost-saving properties similar to price cap regulation.

***Overlapping functions and lack of commitment***

Telecom Egypt plays a dual role operating and regulating the sector. By law, Telecom Egypt has the exclusive right to provide telecom services, subcontract services, provide concessions, manage the spectrum and establish joint ventures. The company proposes tariff revisions, which are approved initially by the Minister of Transport and Communications and finally by an inter-ministerial committee. In other words, tariffs are not decided by an independent regulatory agency. Under the current regulatory regime, disputes are resolved administratively. Complicating matters is the fact that the ownership rights are exercised by the Ministry of Finance and the Ministry of Transport and Telecommunications.

In 1994, the government began a process of separating the regulatory and operating functions of Telecom Egypt by creating a five-member independent regulatory commission. But this was only a partial reform. It was not accompanied by regulatory reforms, leaving the commission with no clear mandate; nor was it accompanied by allowing entry into different telecom markets. As a result, the implicit contract governing the sector has remained effectively unchanged.

The contrast between Egypt's approach and reformers of telecom is again apparent. Countries such as Chile and Argentina created independent regulatory bodies, and liberalized and privatized their telecom sectors. These reforms led to the separation of different functions and established opposing interests that stimulated competition in the market and benefit the

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where  $R_i$  is the rate of return on revalued capital of firm  $i$ ,  $R_{rf}$  is the rate of return on risk free assets,  $\beta_i$  is firm  $i$ 's systematic risk, and  $R_p$  is the rate of return on a diversified investment portfolio (which can be drawn from international data).

public at large. The independence and neutrality of the regulatory agencies were enhanced by separating them from the bureaucracy, giving them the power to request information from firms and endowing them with the financial resources to retain or hire needed skills. In most cases new regulations were introduced a few years prior to privatization.

To strengthen the credibility of government commitment, reformers of telecom also defined conflict-resolution mechanisms and selected the most appropriate institutions to settle these disputes efficiently and fairly. In Chile, for example, disputes over pricing are resolved by a three-member arbitration committee, with one member selected by each party and the third by mutual agreement. Disputes over entry are resolved by the anti-trust commissions, with possible appeal to Supreme Court. Disputes over interconnection are subject to binding arbitration. Finally, they protected their regulation from arbitrary changes following political turnovers. For example, Chile enacted its regulation in a detailed law which is difficult to change given the country's long history of split legislature. Jamaica, on the other hand, incorporated its regulatory regime in an explicit license that stipulates a specific rate of return and other terms of operations, as well as the conditions under which the parties can change the license. To make reneging costly for the government, any rulings by the Supreme Court in Jamaica are subject to review by the Commonwealth Privy Council in London (Spiller and Sampson 1993).

In summary, Telecom Egypt operates in an institutional and policy environment which does not promote efficiency in production or consumption. International experience suggests that reforming the policy and institutional environment is beneficial to society, although such reforms are often resisted by those whose interests are threatened. To make reforms politically acceptable, it is therefore important to identify who is likely to win and lose in the process. This question is taken up next.

#### 4. Potential Winners and Losers from Reforming Telecom Egypt

The potential gains and losses from reforming Telecom Egypt depend on the changes following reform and how the adopted policies affect the distribution of these gains. This section first highlights the likely changes if Egypt moves towards enhanced competition, incentive regulation and private sector participation. It then summarizes how these changes are modeled to estimate

the welfare gains or losses. Finally, it presents an estimate of the impact of reforms on the main economic actors (consumers, workers, government and buyers).

### ***Likely changes following reform***

The experience of countries that followed a telecom reform strategy relying on competition, incentive regulation and private ownership suggests that three changes are likely to follow:

- First, with respect to tariff rebalancing, prices of local services often go up, while those of national and international services go down. This is because the initial tariff structure typically favors consumers of local services at the expense of consumers of national and international services. Reforming countries correct this imbalance in relative prices to ensure that they reflect the economic scarcity of resources. This phenomenon has been observed in almost all countries which introduced telecom reforms, ranging from the UK to Mexico. Egypt be no exception.
- Second, increased investment is likely to follow reform. Typically, developing countries undergoing fiscal reform find it necessary to reduce public expenditure on telecom services in favor of social services such as health and education. To maintain sufficient telecom services for investment requirements, governments seek private sector participation, either through outright privatization or BOTs. When privatization is pursued, governments typically commit new buyers to meet pending demand within a few years, and demand growth thereafter. This commitment has been required of the private sector by Mexico, Chile, and other countries. If Egypt were to privatize Telecom Egypt, this commitment should be expected as well.
- Third, reform is often associated with improved productivity. This is due in part to faster growth in investment than in employment. It is also due to the fact that the private sector tends to introduce internal incentive regimes that link labor productivity with effort. The two factors reinforce each other, creating a surge in labor productivity, sometimes in excess of 3 percent per annum (as in Mexico and Chile). In the Egyptian case, similar results can be anticipated as well.

### ***Modeling the impact of reform***

Assuming that reform brings these changes, how can their impact on welfare be assessed? The methodology applied below follows Galal and others (1994) closely. It is a partial equilibrium methodology, but takes into account the impact on the welfare of all important economic actors: buyers, sellers, workers and consumers. Welfare effects are derived by subtracting the net

present value (NPV) of the firm under two scenarios: the factual scenario (or the no-reform scenario) and the counterfactual scenario (or the reform scenario). In each case, the NPV of the firm is the sum of expected benefits to consumers, workers, government and the private sector.<sup>8</sup>

In applying this methodology to Telecom Egypt, the performance of the company, and thus the sector, is projected with and without reform. The key differences between the two scenarios relate to the tariff structure, investment level and productivity. Under the counterfactual scenario, it is assumed that incentive regulation will result in higher prices of local services and lower prices of national and international services. Second, investment is assumed to increase to meet pending demand over a period of 10 years. Finally, it is assumed that the number of lines in service per workers will increase progressively to match the average for other countries that reformed their telecom sectors. More specifically, it is assumed that labor productivity would increase at a compound annual growth rate (CAGR) of 0.8 percent under the factual scenario and at 4.5 percent under the counterfactual scenario. With the exception of these three differences, all other variables, regarding demand and cost, are the same in both scenarios.

### *Potential winners and losers*

On the basis of these assumptions, reforming Telecom Egypt is expected to bring about net gains in national welfare of 96 percent of the company's sales in 1995/96. This net gain is the difference between the social value of Telecom Egypt with reform ( $V_{sp}$ ) and its social value without reform ( $V_{sg}$ ). Given the magnitude of the potential gains in welfare, Egypt will be better off reforming its telecom sector to one of competitive markets, efficiency-inducing incentives and private sector participation in the telecom sector.

There is a chance that the country will benefit, while consumers and workers do not; that is, the gains may accrue to the private sector and possibly the government, leaving consumers and workers worse off than before. This, however, is not the distribution pattern likely to emerge

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<sup>8</sup> More formally, the change in welfare is estimated using the following formula:

$$\Delta W = \Delta S + \Delta \Pi + \Delta L,$$

where  $\Delta W$  is the change in welfare, or the difference between the social value of the firm with and without reform,  $\Delta S$  is the change in consumer surplus,  $\Delta \Pi$  is the change in profit, which is shared by the buyer and seller through the payment of a price for the firm, and  $\Delta L$  is the change in the welfare of workers.



on the basis of the stated assumptions (shown in Table 4). Rather consumers are expected to benefit most, realizing 70 percent of the improvement in domestic welfare.<sup>9</sup>

**Table 4. Telecom Egypt: Potential Winners and Losers**  
(1995/96 present values; millions of pounds)

	Private (Vsp)	Public (Vsg)	Gains from reform (Vsp - Vsg)	Perpetual annuity/ 1995/96 sales (%)
<b>Government</b>				
Taxes	19,952	15,844	4,108	
Net Quasi-rents	870	23,559	(22,689)	
Net Sale Proceeds	18,581		18,581	
<b>Total Government</b>	<b>39,403</b>	<b>39,403</b>	<b>0</b>	<b>0</b>
<b>Private Shareholders</b>				
Employees	967		967	4
Private domestic shareholders	5,585		5,585	21
Foreign shareholder	2,977		2,977	11
<b>Total Private Shareholders</b>	<b>9,529</b>		<b>9,529</b>	
<b>Consumers</b>	141,699	126,072	15,627	60
<b>GRAND TOTAL</b>	<b>190,632</b>	<b>165,475</b>	<b>25,156</b>	<b>96</b>

Source: Author's estimates.

Consumers gains will come from reduced prices and more services. While users of local telephony will lose, users of international services will win. But both will benefit from expansion and provision of a variety of value-added services.<sup>10</sup> Similarly, workers as a group will also gain approximately 4 percent of the annual sales of Telecom Egypt, assuming that they will buy 10 percent of the shares. One reason workers are expected to benefit is the assumption that laid-off workers will be compensated adequately. As for workers that will stay with the firm, experience elsewhere suggests that they typically gain from receiving a percent of the shares at a discount. Beside consumers and workers, reform is expected to benefit the buyers of Telecom Egypt, at an estimated gain of 32 percent of the company's annual sales for purchasing 90 percent

<sup>9</sup> Consumer surplus is estimated by calculating the area under the demand curve for each product under the two scenarios, from which we subtracted the fixed charges, i.e., connection and installation fees and the fixed component of the two part tariff. Further, a shadow multiplier of 1.5 is used to account for externalities in consumption, emerging from the ability not only to call, but to be called as well.

of the company. These gains will be split between foreign and domestic buyers in proportion to their share in equity, which is assumed to be 51 percent foreign and 39 percent domestic.

As for government, it is assumed that it will just break even by accepting a price equal to what the Treasury would have received (in dividends, retained earnings and taxes) if it were to retain Telecom Egypt and what it is expected to receive if it sells the company (in the form of taxes). This floor price is estimated at LE18.6 billion, but this result does not need to hold. The private sector's maximum willingness to pay for the company is estimated at LE 28.1 billion. As such, it is possible that in the bidding process could generate a price between LE 18.6 and LE 28.1. In that event, the fiscal impact of selling Telecom Egypt will be positive. Additional gains to the government will reduce the private sector's gains, leaving the estimated welfare effect of reform unchanged.

But where will the improvement in welfare come from? Table 5 shows that the expansion of the basic network and price rebalancing will contribute almost equally to the improvement in welfare. Labor productivity contributes modestly, because the process of providing telecom services is relatively capital intensive.

Both the estimated changes in welfare and their distribution clearly depend on the assumptions made. For this reason, it is useful to think of these estimates as orders of magnitude. Moreover, the results can be seen as a point of departure for policy makers in their attempt to design reforms that are politically acceptable, while ensuring that the country is better off. The endogenous quality of reforms raises a question about the policy and institutional reforms most likely to maximize gains. This question is taken up next.

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<sup>10</sup> Expansion to value added services is particularly important because the telecommunications business is increasingly marked by contraction in 'POTS', or the Plain Old Telephone Service, and expansion into 'VANS', or value-added network services (see *The Economist*, "A Survey of Telecommunications," October 5, 1991 for details).

Table 5. Telecom Egypt: Origin of the Change in Welfare

Behavioral Difference	Contribution (LE billion)	Relative Contribution (Percent)
Investment	11.6	46
Price rebalancing	10.6	42
Labor productivity	1.9	7
Interaction effect	1.1	4
<i>TOTAL</i>	25.2	100

*Source:* Author's estimates.

## 5. Toward Maximizing the Benefits of Reform

The key to maximizing the benefits of reform in Egypt is to forge a new contract. Three key reforms are necessary in this contract: liberalization, incentive regulation and introduction of new safeguards against opportunistic government behavior. In each of these reform areas, the devil is in the details. It does matter whether liberalization involves competition in the product markets, as well as competition for the markets themselves. It also matters whether pricing is based on rate of return or RPI-X regulation, and whether the regulation is embodied in a license or in a law. Finally, it matters whether institutional reforms involve safeguarding mechanisms against arbitrary behavior on the part of the government/regulator. These issues are elaborated below.

### ***Liberalization***

The first step toward reforming the telecom sector is liberalization, with emphasis on free entry, competition by comparison and auction of the new franchises. Competition and free entry are the least costly solutions to resolve the problem of information asymmetry and put pressure on firms to be more efficient. Recent technological progress in telecommunications has increased the possibility for competition more than ever before, permitting, for example, multiple carriers for long-distance phone calls, cellular phones and a variety of other value-added services such as data transmission and facsimile.

In markets where technology does not permit competition due to economies of scale, competition by comparison may be the next best option. Accordingly, it may be desirable in the market for basic telephone services to have multiple suppliers in the same country, even if each supplier is a regional monopoly. This scenario, as adopted in Argentina, can help the regulators verify the accuracy of information provided by firms, thereby setting tariffs on better grounds.

Third, awarding the new franchises through auctions will essentially permit competition for the markets themselves and can help identify the most efficient supplier. Even if the potential

producers have private knowledge of their likely production costs, and the regulator wishes to select a single firm to serve as the sole producer of a commodity (e.g., basic telephony), the government can link the compensation rules under the franchise to the winning bid. One way of doing so is to protect the winning bidder against the prospect of high cost realizations by announcing that the government will share the additional costs in such cases.<sup>11</sup>

### ***Incentive regulation***

Some segments of the telecom market will remain monopolies. To ensure that consumers are protected and investment is encouraged, price regulation is necessary. Prices can be regulated using rate of return regulation, price cap regulation or benchmark regulation. Each of these pricing schemes has its own incentive properties.<sup>12</sup> However, a few key features distinguish sound and unsound pricing regimes. The first is that tariffs should be as independent of the actual costs of the firm as possible, which is feasible under price cap or benchmark regulation. Setting tariffs on the basis of actual costs to assure the producers a fair rate of return simply induces firms to inflate costs and pass on inefficiency to consumers. Second, tariffs should be revised only periodically (every 3-5 years), allowing for inflation adjustment in the interim period. This practice will save the cost of revising tariffs frequently and, more importantly, it gives the firm an incentive to be more efficient, as it can retain the benefits of cost cutting until they are passed on to the consumer. Finally, the rules of setting tariffs and settling disputes should be explicitly stated so that all parties can realistically expect the future benefits, and thus make investment and other decisions.

### ***Functions and Commitment***

Competition and incentive regulation will not produce their maximum benefits without reforms to separate the ownership, regulatory and operation functions, and reforms safeguarding against opportunistic government behavior. The first step toward separating these functions is to create

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<sup>11</sup> Laffont and Tirole (1986), McAfee and McMillan (1987), and Riordan and Sappington (1987) argue that this linkage will promote more aggressive bidding.

<sup>12</sup> These properties have been discussed at length elsewhere. See, for example, Brown, Einhorn and Vogelsang (1991), and Schmalensee (1989).

an independent regulatory body, along with a new regulatory regime. Free entry into all markets, where technology permits, is essential. In addition, privatization may be unavoidable to solve the problem of divided ownership among different ministries. These reforms inject checks and balances into the system, and ensure more efficient outcomes.

With respect to safeguards against government influence, two issues are critical: conflict resolution mechanisms and insulation of the regulatory regime from political influence. Conflicts are bound to surface because of the inherent imperfections of contracts (Williamson 1989). To assure the private sector that conflicts will be resolved efficiently and fairly, regulation should specify the rules and institutions responsible for dispute settlement. Conflict resolution mechanisms could include arbitration (for disputes over pricing), antitrust commissions (for anticompetitive behavior issues) or the court system (for disputes over property rights). The choice depends on the institutional endowment of each country.

In trying to insulate the regulatory regime from political influence, a balance must be struck between flexibility in meeting changes in technology or taste and stability of the rules necessary for long-term investment. This is an important issue, because successive administrations could change the regulatory rules for purposes of distribution rather than efficiency (Baron 1988). One way of safeguarding against this possibility is to embody the regulation in a law (if laws are difficult to change), grant the concession in the form of a specific license which can be arbitrated in court or resort to external guarantees.

In conclusion, policy makers in Egypt have an opportunity to create a positive sum game in which both domestic and foreign actors can benefit from reforming Egypt's telecom sector. With the appropriate reforms, they can relax the resource constraint facing Telecom Egypt and mobilize foreign capital. They can restore balance to the pricing regime, with built-in incentives for firms to operate efficiently. And they can provide consumers—residential and business—with a variety of services that will enable Egypt to be more competitive in an increasingly globalized world.

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