Privatization and Regulation in Turkish Telecommunications

A Preliminary Assessment

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ABSTRACT:

The importance of efficient workings of network industries and the markets in which they operate has long been recognized in the literature. In a parallel fashion, policy makers around the world initiated various restructuring efforts focusing on these sectors. However, the issues of privatization and much needed subsequent regulatory framework face considerable challenges in developing countries. Both political opposition and difficulties encountered in the process of privatization caused major delays in overall privatization and restructuring efforts of these countries.

This paper focuses on the telecommunications sector and the Turk Telekom case, in particular, assessing the prospects for its much-debated divestiture, evaluating the company specifics and subsequent regulatory agenda. In doing that, it emphasizes the current "telecom meltdown" in international markets, and compares telecommunications privatizations of various nations. Additionally, the study reviews major regulatory methods and draws on some recommendations for policy makers in the light of the U.S experience in this sector.

JEL Classification: L51, L96, L98

1-Introduction: Case for Telecommunications Privatization and Global Experience

Historically, telecommunications services were considered to be a natural monopoly. This widely shared characteristic of the industry can be traced back to economics of the industry. Economic theory defines natural monopoly as a single firm that can serve the entire market at a lower average cost than two or more firms. For a natural monopoly, the long run average cost (LRAC) curve slopes downward due to economies of scale. Thus, the firm is capable of achieving the lowest point of LRAC curve if the market is served by a single firm. Considering the scale and cost of telecommunications networks, it was believed that competition would duplicate investment, raise costs, inflate rates and make services unavailable to the public. Therefore, telecommunication services were best to be provided by one firm. However, this is not the case anymore. The explosive introduction of new technologies and their applications such as digital, mobile/personal communications systems (PCS), broadband transmission, internet and e-commerce etc. and parallel developments in the theory of Industrial Organization has dramatically changed the economics of the industry and the traditional treatment of telecommunications as a natural monopoly. Technological progress reduced the extent of economies of scale in network construction and utilization, which allowed multiple players in the market. This subsequently shrank the core of the natural monopoly. Therefore, duplicative investment argument in favor of natural monopoly has lost its validity in large parts of the sector. Once telecommunications markets are opened to competition both *productive* and *allocative* efficiency improvements are achieved. In other words, production costs are lowered and consumer preferences are served better. Innovations such as microwave and satellite technologies made competition possible in service segments such as long-distance communication. Many developed economies capitalizing on technological progress have been serving their consumers competitively in the long-distance telecommunications markets for almost two decades by separating local exchange from the long-distance market.

Telecommunications industries are becoming increasingly capital intensive and require a substantial amount of fixed investments. In the rapidly evolving global economy, telecommunications operators have to keep up with the needs of increasingly sophisticated users who demand low-cost, reliable and high-speed networks for transmitting data, voice, text and images. State of the art telecommunication infrastructure is a prerequisite for economic growth. This imperative puts further pressure on the governments to expand and upgrade their existing networks to attract and retain companies within their borders.

The experience in telecommunications regulation and competition, primarily in the U.S and U.K., indicated that private capital could be used to develop this sector. Recognizing the potential for the evolution of a competitive industry, governments under severe budget constraints turned to private participation for investment. Multilateral efforts, such as the Group of Basic Telecommunications (GBT) initiated by the World Trade Organization (WTO), further accelerated the momentum for reform and liberalization in telecommunications. 72 countries, including 42 developing economies, made serious commitments for privatization and liberalization of their telecommunication industries with solid deadlines (see Table 1).

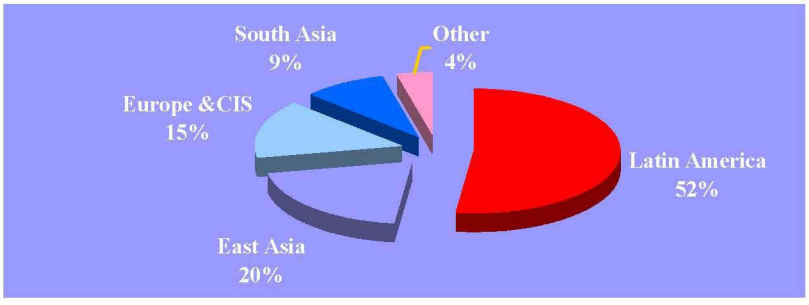
Table-1: Largest Telecommunications Privatizations

Company	Country	Date	Size ($millions)
NTT-2	Japan	1987	39,780
NTT-3	Japan	1988	22,800
NTT-1	Japan	1986	18,670
Telecom Italia	Italy	1997	14,900
Deutsche Telecom-3	Germany	2000	13,800
Deutsche Telecom-1	Germany	1996	13,300
Telstra	Australia	1997	11,240
Deutsche Telecom-2	Germany	1999	9,900
BT-2	UK	1986	9,990
BT-3	UK	1993	8,060
France Telecom	France	1997	7,100

Source: Compiled from Privatization International (PI) Yearbook 1997,1998,1999 and 2000.

While developed countries with the most advanced telecommunication infrastructure and with high tele-densities[1] were feeling the urge to privatize and liberalize their telecommunications industries, developing countries faced tougher challenges. According to International Telecommunication Union (ITU), more than 75% of the 132 member countries have only one telephone line per ten people[2]. More than half of the world population lives in countries with less than 1 telephone to a hundred citizens. In many developing and emerging markets, large unmet demand, long waiting times, call traffic congestion, poor service quality, out-dated technology, limited territorial coverage and the absence of modern business services were manifestations of the failure of the state owned telecommunications monopolies. Developing Country governments, like their counterparts in developed economies, were unable to keep up with the investment requirements to expand and upgrade telecommunications infrastructure due to severe budget constraints. Figure-1 below, shows recent trends of private participation in telecommunications investments by region. According to Beardsley and Patsalos-Fox (1995) [3], the average cost of adding one line to the local telephony loop is about $1000. For instance, Czech republic, Poland and Hungary had to spend $70bn to reach a density of 30 lines per 100 people, well below the EU average[4].

Figure-1: Private Investments in Telecommunications 1990-1998: Emerging Markets



[1] Teledensity is the number of active fixed landlines per 100 people in a region.
[2] *ITU Yearbook 1999*.
[3] Scott Beardsley and Michael Patsalos-Fox (1995) "Getting Telecom Privatization Right," *The McKinsey Quarterly*, No:1.
[4] Ibid.

Privatization in the telecommunications sector liberates a massive amount of scarce public resources that can be diverted to health, education and social programs. More significantly, it can increase the efficiency and results in better resource allocation. Since the international telecommunications market place is becoming increasingly competitive it will prove harder for a government monopoly to stay competitive in the absence of necessary incentives provided by the free markets and private ownership. Under the appropriate governance configuration, transfer of ownership is expected to lead to more effective monitoring of management by shareholders and creditors. Efficiency improvements and lower production costs will increase market value of the shareholders' investment. Since the market value of managers is likely to depend on the value of the firm as reflected in its share price, maintaining the value of the firm's shares by managers will minimize the cost of capital to the firm. Also, private firms can tie managerial compensation to corporate performance through bonuses and stock options[5]. Another significant implication of privatization and the accompanying liberalization in telecommunications markets is improvements in allocative efficiency. Under private ownership, cross-subsidies between different rate classes will cease to exist and realistic rate setting will send correct signals to market for resource allocation.[6] However, privatization of a telecommunications monopoly will result in efficiency gains only if the subsequent regulatory environment and market structure allow fair competition. The regulator's aim must be to create such conditions and protect consumers. The ultimate target in this process is to offer more choice and lower customer bills.

In certain industries markets cannot be relied on for self-correction. Most network industries are such an example, at least for now. Market imperfections (or market failures) need to be dealt with a reasonable intervention. That intervention must be in the form of customized regulation. The specific institutional and legal environment of a country must be taken into account when developing appropriate regulatory policies.

Finally, privatization in telecommunications can lead a privatization program and help development of the stock market. Because of its size, telecommunication privatizations have a great potential for raising substantial capital (see Table-2). Being an indispensable network industry for the information age it not only attracts a large number of domestic investors, but it also attracts international capital.

[5]See Ioannis Kessides (1998) " Privatising and Regulating Telecommunications," in Ira Lieberman and Christopher Kirknessed eds., *Privatisation and Emerging Markets*, The World Bank for a discussion.

[6] One exception to this rule is the provision of universal service where regulated entity is obligated to serve remote high cost areas.

Table-2: Largest Telecommunications Public Offerings in Emerging Markets 1990-1999

Company	Country	Value (m$)	Company	Country	Value (m$)
China Unicom	China	$4,920	PT Telekomunikasi	Indonesia	$1,590
China	China	$3,933	OTE	Greece	$1,280
Singapore Telecom	Singapore	$3,826	Telefonica Peru	Peru	$1,240
Korea Telecom	Korea	$2,486	Telecom Argentina	Argentina	$1,227
Telmex 1	Mexico	$2,170	Matav	Hungary	$1,200
Portugal Telecom 3	Portugal	$2,050	OTE	Greece	$1,083
Portugal Telecom 4	Portugal	$1,700	Indosat	Indonesia	$1,060
Chungwa Telecom	Taiwan	$1,600	CANTV	Venezuela	$1,026

Source: PI

Perotti and van Oijen (1999) noted that privatization sales in network industries and public infrastructures, which are traditionally inaccessible to private and international investment, may signal a change in the investment climate in the country and attract foreign direct investment.[7] The involvement of more sophisticated foreign investors with long-term orientation contribute to a better price for the stock.[8] However, the long-term potential of the sale is also vitally dependent on bringing domestic investors to the market. The size of the privatization offering will deepen and broaden the domestic stock market. Due to its size and earnings potential, telecommunication privatizations can diffuse asset ownership in an emerging economy. The likely success of such a sale has a potential of creating a snowball effect in terms of attracting more domestic and international investors for future privatization initiatives.

Between 1990 and 1998, more than 90 developing economies opened their telecommunications sectors to privatization[9]. Forty-two countries made commitments to reform the sector in the context of WTO's Basic Telecommunications Agreement signed in February 1997. These countries either transferred the operating and construction risk to the private sector or are prepared to do so in the near future. The World Bank's Private Participation in Infrastructure database reports $214bn of investment commitments between 1990-1998[10]. Two-thirds of this amount has been invested in expanding and modernizing networks. The most dramatic increase in private participation has been observed in new services, such as mobile communication. By the end of 1998, 311 private mobile operators offered services on a stand-alone basis or along with basic services in 94 developing economies. Most of these countries introduced some type of competition in these new services. While twenty-eight countries had between three and six operators, thirty-eight had duopolies.

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[7] Enrico C. Perotti and Pieter van Oijen, (1999) "Privatization, Political Risk and Stock Market Development in emerging economies," Mimeo. Perotti and van Oijen also cites F. Sader (1993), "Privatization and Foreign Investment in the Developing World 1988-92,"'World Bank Policy Research Working Paper, Washington D.C. for this agument.

[8] Phumchai Kambhato (1998), "The Flagship Role of Telecom Privatizations," in Ira Lieberman and Christopher Kirkness, eds., *Privatisation and Emerging Markets,* The World Bank, p. 92.

[9] Ada Karina Izaguirre (1999), "Private Participation in Telecommunications: Recent Trends," *Public Policy for the Private Sector*, Note No: 204, The World Bank.

[10] Ibid.

Table-3: Major Emerging Market Telecommunications Privatization

Country	Date	Government Stake	Long Distance Competition	Local Competition
Argentina	1991	No	Yes/Duopoly	Yes/Duopoly
Brazil	1998	No	Yes/Duopoly	Yes/Duopoly
Mexico	1991	No	No	No
Peru	1996	No	No	No
Venezuela	1991	No	No	No
Chile	1989	No	Yes/Free Entry	Yes/Free Entry
Indonesia	1994	Yes	No	No
Malaysia	1992	Yes	No	No
Korea	1993	Yes	No	No
Taiwan	2000	Yes	No	No
Greece	1996	Yes	Yes	Yes
Portugal	1995	Yes	Yes	Yes
Cz. Republic	1994	No	No	No
Hungary	1993	No	No	No
Poland	2000	Yes	No	No

Source: PI various issues, ITU Yearbook various issues.

However, in the more traditional segments like long-distance and local services competition started to emerge very slowly (see Table-3). Out of forty-two developing countries with private involvement in the sector, only twelve allowed some type of competition in the long distance segment of the market. In other countries incumbent operators hold exclusive licenses. In fifty-five out of 90 developing countries, private operators are involved in local services. However, in forty countries either monopoly rights awarded to privatized incumbents or private investments such as build-operate-transfer (BOT) projects were used to complement the state owned incumbents' infrastructure.

Privatization and liberalization in developing economies is expected to gain further pace to meet the WTO-GBT agreement deadline of 2005. A breakdown of activities reveals that Latin America is the leading region in telecommunications reform. Most Latin American countries started to privatize and liberalize telecommunications sectors during the 1990s. While East Asia, Eastern Europe and Central Asia lag behind Latin America, private investments are still significant.

2- Telecommunications Privatization in Turkey

2.1. An Overview of Privatization Trends in Turkey

Although an early reformer, Turkey has had a disappointing performance in privatization. The 1986 Privatization Master Plan developed by Morgan Guaranty Trust laid out the objectives of the program as to increase industrial efficiency and growth in the economy, to develop capital markets, to reduce financial support for the state economic enterprises by the Treasury, and to facilitate a wider distribution of share ownership.[11] However, a combination of factors including macroeconomic disequilibrium in the Turkish economy, political instability and the absence of a legal framework for privatization led to a policy incoherence, that characterized the post 1986 period. In addition to the lack of enabling conditions of macroeconomic stability, political commitment and appropriate legal framework, the inability of governments to gather public support and address concerns of special interest groups have dramatically slowed down the pace of privatization. Between 1986 and 1998, only $4.6bn of an estimated $70bn worth of state owned assets were divested.

Despite this grim picture and poor image of Turkish privatization in the last two decades, a number of recent developments appeared promising:

- Following many amendments in the laws governing privatization of state owned enterprises, and a mind-boggling number of decree laws that were frequently invalidated by the Constitutional Court, the first stand-alone Privatization Law was ratified by parliament in November 1994. At last, Privatization Law took its final form in April 1997, after a round of revisions. A landmark legislation allowing international arbitration in disputes over contracts involving provision of public services was passed in August 1999. This legislation complimented the legal framework and opened the door for active foreign participation particularly in infrastructure and utility privatizations.

- Stand By Agreement with IMF in December 1999 and the ensuing stabilization program to establish macroeconomic stability, placed a particular emphasis on privatization. The program included a very ambitious privatization schedule that remained on target for a while. Divestments in the first half of 2000 almost exceeded privatization revenues of the past two decades and were expected to reach $5 bn by the end of 2000.

- An unusual coalition government of diverse political aspirations had been signaling serious commitment to the stabilization program and to privatization as a main component of the program.

With the above factors combined, Turkey finally seemed to come close to the three enabling conditions for a successful privatization program: a convincing path towards macroeconomic stability, political commitment by the government and a sound legal

[11] Cevat Karatas (1994), "Has Privatisation Improved Profitability and Performance of the Public Enterprises in Turkey?" in Paul Cook and Colin Kirkpatrick eds., *Privatisation Policy and Performance: International Perspectives*, Prentice Hall.

framework built on the culminating experience of past controversies. In addition to these macro factors, Turkey had managed to build a well-positioned implementation body (Privatization Administration) with substantial experience and considerable technical competence over the last decade.

Although it was contingent on the successful implementation of the stabilization program and political stability, the Turkish privatization record began giving signals to break away from the stalemate of the past towards the end of 1999. The first encouraging signs emerged in the third quarter of 1999 after eight months of inertia. The successful auctioning of POAS, the country's biggest petroleum retailer, led to the block sale of 51% of the shares to a local consortium. This was followed by the initial public offering of 31% of TUPRAS (petroluem refinery) shares in April 2000, which attracted $265m of foreign institutional investment. Turkish Airlines was another company included in the ambitious 2000 program, with a projected block sale of more than 51%. The 2000 Privatization Program targeted $5.3 bn in implementation with about $3.1bn cash flows within the year the 2000 excluding two GSM licenses.[12] If the implementation target were reached at the end of the year, year 2000 implementations alone would have exceeded the total privatization revenues generated between 1986 and 1998. Telecommunications privatization was central to maintaining this new momentum and could have further energized the privatization program. It would also be an important turning point since it would constitute the first significant natural monopoly privatization in the Turkish economic history with a demanding institutional infrastructure.

First signs of reform fatigue were felt when disagreements on the Turkish Airlines and Turk Telekom privatization surfaced in the coalition government in mid 2000. By the time internal differences ironed out and the legal hurdles addressed, Telecommunications meltdown had already started in the international markets. This had turned the tide against a successful privatization. Next, arrived the November mini crisis, which was followed by a major financial turmoil in February. The following section focuses on the path to February 2001.

2.2. Path to Telecommunications Privatization and Sector Reform

The privatization of Turk Telekom was initiated in 1994, only months after the September 1993 communiqué establishing Turk Telekom as a separate entity from PTT. In May 1995, law 4107 authorized the sale of 49% of the company and opened the door for telecommunications license agreements. However, since then, privatization of telecommunication services has been subject to political and legal squabbling. In February 1996, the Constitutional Court overturned critical parts of the law. After several rounds of cancellations, the Law 4161 was enacted. Subsequently, the Constitutional Court rejected an effort led by 161 parliamentarians to rule the privatization of Turk Telekom illegal.

[12] Emerging Turkey 2000, p. 206.

The telecommunications privatization law was partly amended in mid 1996 to strengthen the legal basis for valuation and bidding methods.[13] In the context of Law 4161, Turk Telekom privatization was linked to sector reform and company valuation, which would be followed by actual execution of the sale of the company. A Value Assessment Committee (VAC) was formed to perform the valuation exercises and a consortium led by Goldman Sachs was appointed to provide advisory services. The VAC committee and its advisors set general guidelines for sector reform and a draft amending law was prepared to restructure the telecommunications sector and Turk Telekom. The draft amending telecommunications law envisioned the following:

- Establishing an independent telecommunications regulator
- Bringing full liberalization for the value added services
- Giving commercial independence to Turk Telekom (i.e., corporatization) to minimize government intervention
- Specifying the exclusivity period and service scope for Turk Telekom under a concession agreement
- Addressing changes in the status of Turk Telekom employees

VAC and its advisors also proposed a privatization strategy, which was later approved by the Council of Ministers in February 1998. The sale strategy adopted by the Council suggested a block sale of 20%, to a strategic partner followed by a 19% initial public offering of Turk Telekom shares. The block sale to a strategic investor or consortia requires participation of an international telecommunications operator that will bring expertise and know-how and accelerate the commercialization of Turk Telekom. Specifics of the management rights in the scope of the block sale were left to negotiations in the auction process[14].

The new Telecommunications Law was passed on January 29th, 2000. According to this version of the law, Turk Telekom would retain monopoly rights on voice transmission and infrastructure until December 31st, 2003. Turk Telekom would be the primary provider of infrastructure to other operators and individual owners of telecommunication facilities until its monopoly rights were terminated. Other entities would be allowed to provide telecommunications services under concession agreements with the Ministry of Transportation. Finally, local operators were permitted to negotiate contracts with international companies for a range of activities including international telecommunications services within the limits of relevant legislation.

Within the scope of Law No. 4161, a Tender Committee (TC) was formed to undertake the execution of the Turk Telekom sale. On behalf of the TC, the Privatization Administration invited bids for a 20% block sale as of June 13th. The closing date for bids was September 15th, at which time the two highest bidders would compete in an auction to determine the winner. However, a lack of interest due to obscure management rights, led to the postponement of the auction. The percentage of

[13] Merih Celasun and Ismail Arslan, (2000), "State Owned Enterprises in Turkey: Policy Performance and Reform Experience, 1985-1995, in Merih Celasun ed., *State owned Enterprises in the Middle East and North Africa: Privatization, Performance and Reform*.

[14] This provision turned out to be an important impediment to the privatization of Turk Telekom. It stirred much debate among the coalition partners and delayed the privatization of the company.

ownership stake to be offered to the strategic partner(s) and the controversial management rights were reconsidered by the government. Subsequently, a decree signed by the president authorized the block sale of 33.5% of the company in December 2000. The decree also included an article prescribing a public offering of 0.5% of the Turk Telekom shares. The tender for 33.5% of Turk Telekom was announced on December 14th, and bidders were invited to register and sign confidentiality agreement. Data room for the prospective bidders were opened on February 12th, 2001 and the tender committee was expected to accept offers until May 14th, 2001. However, the financial crisis, triggered by a confrontation between Prime Minister and the President led to a collapse of the December 1999 Stand-by agreement with the IMF and the tender was practically cancelled. The realization that the uncertainty about the management rights would hinder a successful privatization in a depressed global telecom market, led to a new proposal to privatize 51% of the company.

Another amendment in the Telecom Law was passed on May 14th, 2001, primarily due to an implicit conditionality imposed by the IMF, which linked Turk Telekom privatization and the IMF led financial bail-out. The new law allows privatization of the 100% of Turk Telekom, and allocates a golden share to the government with veto power in major strategic decisions. The law limits foreign ownership at 45%, and waives the requirement of participation of a multinational operator in the bidding consortia. It also links the monopoly power to the public ownership, and stipulates that monopoly status be abolished before December 31,2003, if by then Turk Telekom is majority owned by private entities. A notable and very significant change in the law is the transfer of the authority to sign concession agreements with private operators and service providers, from the Ministry of Transportation to the Telecom Regulator. The new law also included amendments that aimed to insulate the company from political interference and the implementation of professional management practices. Although the amendment of the law creates great deal of flexibility for the government to pursue its privatization strategy, legal experts maintain that without an amendment in the constitution, privatization of more than 51% of Turk Telekom is likely to face legal challenges. As of May 17th, 2001, the government did not address a constitutional change. If it becomes an issue, it is not clear whether this legal hurdle can be overcome in a starkly split parliament , where two-thirds majority is needed for constitutional amendments.

A further assessment of the privatization strategy and the regulatory framework envisioned in the law 4161 will be developed in sections 4 and 5 following highlights of the Turk Telekom in section 3.

3- An Overview of Turkish Telecommunications Sector

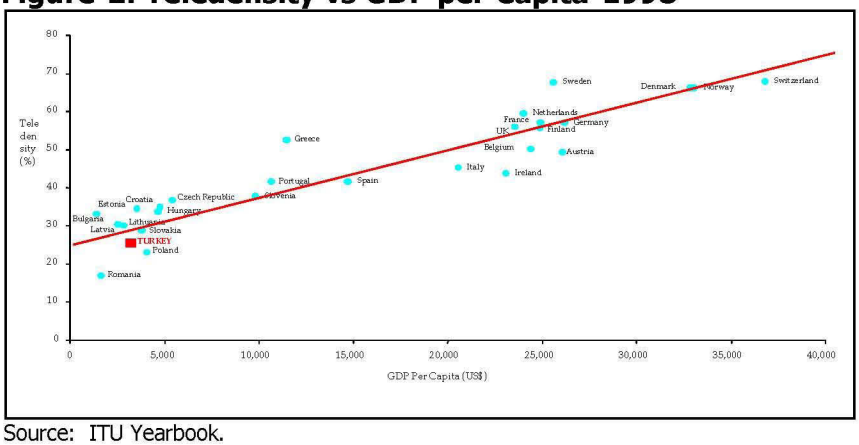
3.1. Infrastructure Development

The PTT was established in 1924, under Law No. 406, and it received a monopoly over telecommunications, post, and telegraph. However, development of the sector remained slow until 1983-1984, when the PTT was incorporated as a State Economic Enterprise within the Ministry of Transportation and sectoral policy began to emphasize network expansion and modernization. The dynamic expansion of the 1980s was invigorated during 1994-1996 by the enactment of a number of laws that amended Law No. 406. Law No. 4000 separated telecommunication and postal services and created the company *Türk Telekomünikasyon A.Ş.* In combination with subsequent Laws - 4107 and 4161 - Law No. 4000 laid the legal foundation for the privatization of 49% of Turk Telekom[15]. Provision was also made for the licensing of private companies to provide value-added services.

The results of the changes since 1983 have been twofold: (1) a rapidly growing telecommunications sector, and (2) the evolution of a sectoral structure that is appropriate for privatization.

In 1983, wireline teledensity stood at 3.5%. Waiting lists exceeded both the existing number of subscribers and the capacity of the network. At that time, the country embarked on a ten-year $6 bn investment program via an increase in its investments of its fixed line telecommunications network by 17% per annum, resulting in a rapid transition to digital exchanges and transmission, as well as a seven-fold increase in number of subscribers. As a result of this investment program, Turkey's teledensity has been brought into line with its level of GDP per capita as shown in Figure-2.

Figure-2: Teledensity vs GDP per Capita-1998



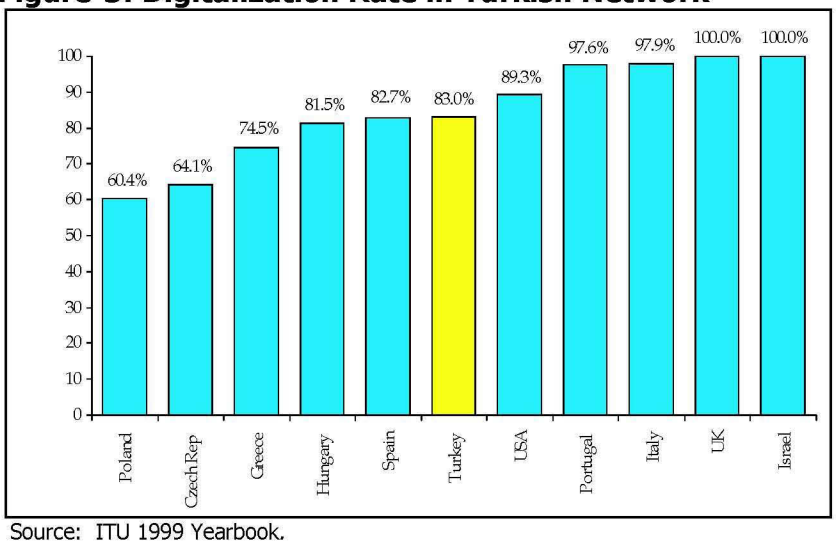
Source: ITU Yearbook.

Following a period of significant investments, Turkey has dramatically expanded the network and modernized the infrastructure. The chart below illustrates the level of digitalization of the Turkish network relative to other operators based on 1998 data.

[15] This law is expected to be amended to allow for the divestment of 51% of the company.

Current levels of exchange and transmission digitalization are at 84% and 96% respectively.

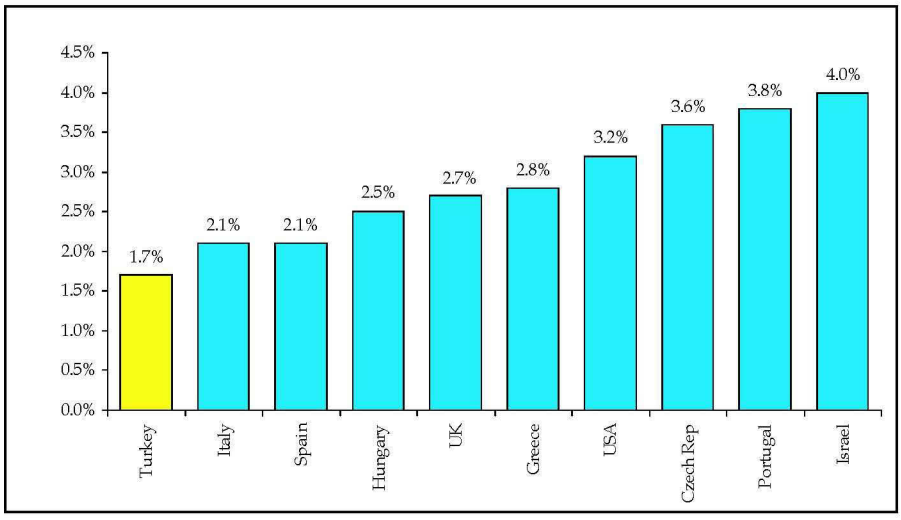
Figure-3: Digitalization Rate in Turkish Network



Source: ITU 1999 Yearbook.

In spite of the modernized network and the increased level of penetration, spending on telecommunications was estimated to be only 1.7% of GDP in 1998, highlighting the potential for market growth. Figure-4 compares Turkey with other markets based on 1998 data.

Figure-4: Telecommunications spending as a percentage of GDP



Source: ITU 1999 Yearbook and World Bank.

3.2 Telecommunications Services: PSTN, Business Network Services, Mobile Communications, Cable and Satellite

3.2.1. Public Switch Telecommunications Network

Turk Telekom is the sole provider of public switched voice telephony and fixed telecommunications networks in Turkey. Revenues from PSTN services reached to $3,074 m at the end of 1999 and accounted for 87% of Turk Telekom's total revenues. Network development investments initiated in 1983 created the fourteenth largest PSTN network in the world. Teledensity has grown by approximately 10.6% per year during 1990-1996, and average teledensity had reached 28% in December 1999.

Table-4: Development of Installed Capacity, 1995-1999

ITEM	1995	1996	1997	1998	1999
PSTN capacity (# lines)	14,522,391	15,812,138	17,584,265	18,558,707	19,679,009
Capacity added	-	1,289,747	1,772,127	974,442	1,120,302
Installed capacity provided on a revenue-payback basis	149,950	401,970	601,845	824,076	1,315,424
Digital access lines (%)	77%	78%	82%	83%	84%
Analogue access lines (%)	23%	22%	18%	17%	16%
Manual access lines (%)	0.20%	-	-	-	-
Lines in urban areas (%)	74%	75%	76%	76%	77%
Lines in rural areas (%)	26%	25%	24%	24%	23%
Business Lines	24%	24%	24%	25%	24%
Residential Lines	74%	74%	74%	74%	75%
Discounted Lines	1.86%	1.61%	1.53%	0.62%	0.60%
Payphone Lines	0.44%	0.44%	0.45%	0.47%	0.44%
Free Lines	0.35%	0.30%	0.29%	0.28%	0.28%

A total of 1,120,302 lines of new capacity were installed during 1999, including 491,348 lines set up on a revenue-payback basis. Projected installation of new lines envisaged in the investment programs for 2000 and 2001 are expected to increase the penetration rate to 29.7% and 30.7%, respectively.

As of December 1999, the total number of access lines installed in the country had reached 19.7 million. The network continues to grow in rural areas. The number of rural villages and settlements having access to automatic telephone services has increased dramatically since 1994 to reach 45,172 by the end of 1999. However, in spite of the efforts to reduce geographic imbalances in infrastructure, 35.8% of the all lines are still concentrated in three main cities with highest teledensities.

Traditionally, discounted and free lines have been given to particular types of customers, such as government agencies, Turk Telekom employees, VIPs, and journalists. The number of discounted and free lines has been relatively small at around 0.6% of the total number of subscriber lines, and this represents a significant decline from the level in 1997 when the percentage was around 1.6%. After the enactment of the Amending Law, Turk Telekom ceased to provide any free business or residential free lines.

Turkey is not an exception to long waiting lists experienced prior to telecommunications privatization in emerging markets. The following table clearly reveals unevenness in access network roll-out, and the existence of significant excess demand for fixed line services.

Table-5: The Waiting List by Region (Number of Requests)

City/Region	**1995**	**1996**	**1997**	**1998**	**1999**
Istanbul	160,952	171,680	157,113	179,677	191,391
Ankara	28,144	21,013	15,081	24,425	20,488
Izmir	49,133	36,208	26,766	30,409	24,238
Marmara (excluding Istanbul)	133.716	143.625	104.276	69,692	88,134
Aegean (excluding Izmir)	90,266	97,651	64,537	85,935	70,053
Mediterranean	89.219	91.386	68.258	65,862	80,452
Black Sea	102,197	95,155	69,591	83,241	74,520
Central-Anatolia (excluding Ankara)	42.128	37.869	23.97	21,113	22,723
East Anatolia	28,275	25,780	22,236	27,512	35,705
South East Anatolia	25.572	24.869	26.005	28,382	34,427
Totals	749,602	745,236	577,833	616,248	642,131

3.2.2. Use of Revenue Payback Agreements with Suppliers for Network Expansion

In order to facilitate the realization of the roll-out objectives, Turk Telekom has entered into revenue-payback agreements with Turkish telephone equipment manufacturers (for switches, transmission equipment and cabling) since 1995. These agreements have been a practical means of financing equipment purchases, given the constraints on capital expenditures imposed by the Treasury. The revenue-payback provisions and the duration of these agreements vary since they are negotiated between the company and the manufacturers participating in the tender. Under typical revenue-payback agreements of this type, suppliers receive between 15% and 25% of line connection fees and the pulse value of usage. Revenue-payback periods vary with the scope of the investment carried out by the manufacturing partner (typically 8 months for exchanges only, 12 to 18 months for exchanges and external plant, and 18 to 24 months for exchanges, external plant, and customer premises installation). Turk Telekom collects revenues procured under revenue-payback agreements, and payments are subsequently made to the supplier.

3.2.3. PSTN Revenues

Turk Telekom has historically not charged a line rental fee. The company has been using a "bundled" tariff scheme since 1998. Charges are paid in advance monthly, and include 100 free pulses for calls. Unused pulses at the end of the month can be transferred until the end of the year, but unused pulses expire at the end of year. We should note that until recently the company lacked freedom to implement alternative tariff schemes and charge line rentals. This has changed with the ratification of the Amending Law, which has introduced additional freedom for Turk Telekom to charge line rentals and similar rental payments.

Prepayment charges amounted to $ 542m in 1999, representing 17.6% of PSTN revenues or 15.3% of gross telecommunications revenue.

Table-6: Pulse Duration and Average Prices per Minute (as of 10/09/99)

	Local / Metropolitan	Intra-City	Up to 100 km	Over 100km	To GSMM	To NMT	Internet	900 Line
Peak								
Seconds per pulse	90	24	15	12	6	12	360	0.8 – 2.4
Tariff (c/min)	2.13	8.01	12.82	16.02	32.05	16.02	0.53	240 to 800
Off-peak								
Seconds per pulse	128 to 150	34 to 40	21 to 25	17 to 20	6	17 to 20	514 to 600	0.8 to 2.4
Tariff (c/min)	1.49 to 1.27	5.6 to 4.8	8.97 to 7.69	11.21 to 9.61	32.05	11.21 to 9.61	0.37 to 0.31	240 to 800

Figures based on a pulse price of TL 15,000 as of 20 October 1999, including VAT (15%). Conversion to US$ at an exchange rate of US$1 = TL 468,000, as of 20 October 1999.

Additional call revenues for local and domestic long-distance calls over and above the pulses provided free as part of prepayment amounted to $ 2,109m in 1999, representing 68.6% of PSTN revenues or 59.4% of gross telecommunications revenue.

All tariffs are applicable on a per pulse basis, although subscribers have been used to converting international call tariffs into the corresponding time-related tariffs. The tariff per pulse is unitary and has regularly been adjusted for inflation.

An analysis of tariffs for local calls suggests modest increases since 1996. However similarly, local call charges remain modest by international standards. For instance, peak time costs per minute increased from $0.0147 in 1996 to $0.0213 in 1999. On the other hand, peak time national long-distance charges over 100 km declined from $0.1955 to $0.1602 and are also modest by international standards.

Table-7: National Call Tariffs (per minute equivalent)[1]

	1996		1997		1998		1999	
(in cents per minute)	**Peak**	**Off-peak**	**Peak**	**Off-peak**	**Peak**	**Off-peak**	**Peak**	**Off-peak**
Local	1.47	0.88	2.12	1.27	1.95	1.17	2.13	1.27
Metropolitan	1.95	1.17	2.75	1.65	2.52	1.51	2.13	1.27
Intra-city	7.33	4.4	9.73	5.84	8.91	5.35	8.01	4.8
Up to 100 km	11.73	7.04	15.56	9.34	14.26	8.56	12.82	7.69
Over 100 km	19.55	11.73	23.35	14.06	21.4	12.89	16.02	9.61
To GSM	29.9	29.9	38.91	38.91	35.66	35.66	32.05	32.05
To NMT	19.93	11.96	23.35	14.06	21.4	12.89	16.02	9.61

(1) Figures based on year end exchange rates, pulse charges and pulse lengths, including VAT (15%).

International call charges at peak time range between $0.30 and $1.18 depending on the destination. While about 54% of the outgoing traffic is destined to EU, 64% of the incoming traffic originates from EU. The peak time per minute charges for the outgoing traffic is $0.46 for EU and Western European countries.

Table-8: Historical International Call Charges (tariffs per minute)

	1997					1998				1999			
Charge Band	**Peak**		**Off-peak**			**Peak**		**Off-peak**		**Peak**		**Off-peak**	
	TL	**US Cents**	**TL**	**US Cents**	**TL**	**US Cents**	**TL**	**US Cents**		**TL**	**US Cents**	**TL**	**US Cents**
Category 1	80,500	40	64,500	32	107,250	37	85,750	30		160,750	30	128,600	23
Category 2	125,000	62	80,500	40	166,750	58	107,250	37		250,000	46	160,750	30
Category 3	187,500	94	150,000	75	250,000	87	200,000	70		375,000	70	300,000	55
Category 4	321,500	161	250,000	125	428,750	149	333,500	116		642,850	118	500,000	92

Category-1:Bosnia & Herzegovina, Bulgaria, Greece, Hungary, Macedonia, Moldova
Category-2:Albania, Algeria, Azerbaijan, Czech Republic, Estonia, Georgia, Gibraltar, Kyrgyzstan, Iran, Latvia, Libya,Malta, Morocco, Romania, Syria, Tajikistan, Turkmenistan, Slovak Republic, Tunisia, Ukraine, Uzbekistan, and WE
Category-3:Canada, Israel, Russia, Kazakhstan, Tataristan, USA, and other countries with country code "1"
Category-4:Iceland, Lithuania, and all other countries (unless indicated above).

3.2.4. Mobile Services

Mobile telephony services in Turkey are currently provided by Turk Telekom (NMT), Turkcell (GSM), and Telsim (GSM). Turk Telekom's mobile services comprise three main service areas: cellular telephony, paging, and marine communications.

Turk Telekom's analogue cellular service, operated under the NMT 450 Standard, commenced operations in 1986. The service was initially promoted primarily as a car telephone product. At the end of 1999, the system had a capacity of 150,000 lines and had 121,517 subscribers. Tariffs applicable to the NMT 450 services have steadily been

adjusted to keep pace with inflation. As of December 1999, there was no connection charge and the monthly charge was TL 2,000,000. During peak hours (08:00 - 18:00 Monday - Friday) the charge for a one-minute call to and from an analogue mobile phone is TL 62,500. Off-peak (all other times), the customer is billed TL 37,500 per minute. Calls made within the NMT 450 network are charged at the same rates. Off-peak charge is not applied since January 2000.

Turkcell is the leading GSM cellular provider in Turkey and ranks as one of the largest GSM operators in Europe, with approximately 6.2 million reported subscribers as of March 2000, and an approximate 68% share of the total Turkish cellular market. Telsim had approximately 2.9 million reported subscribers and a 31% market share as of March 2000. Turkcell and Telsim both began service in 1994 under revenue-sharing agreements. In April 1998, both signed license agreements with the Ministry of Transportation. The GSM licenses were granted for 25 years for a license fee of US$ 500 million. Under the licenses, both operators are entitled to collect the revenue generated from the operation of the GSM systems and are obligated to pay the Treasury a monthly license fee equal to 15% of gross revenue as defined in the license agreement. Under the interconnection agreement between the two operators and Turk Telekom, Turkcell and Telsim pay Turk Telekom an interconnection fee per call based on the type and length of call, and they also pay fees for other services.

After the conversion of revenue sharing agreements into licenses, number of mobile subscribers boomed. This huge growth in the market stressed out the need for additional licenses and in 1998 the Ministry of Transportation decided to issue three additional licenses in 1800 MHz. frequency, one to be awarded directly to Turk Telekom. The Value Assessment Committee (VAC) consisting of representatives from the Ministry of Transportation, the Undersecretariat of Treasury, the Capital Markets Board, the Privatization Administration and Turk Telekom established a minimum of $650 Million license value. In April 2000, two 1800 MHz licenses were offered in two subsequent auctions. Is Bankasi-Telecom Italia consortium was awarded the first license for $2.525bn, which set the floor price for the subsequent auction. However, high floor price set in the first auction led to withdrawal of all the competitors and the fourth license was removed from the auction block. Turk Telekom was awarded the fourth license in November 2000 by paying the floor price set in the first auction held in April 2000.

These recent developments in the mobile communication market suggests that penetration rate is likely to move up from current 13% rate which is well below the European average.

Table-9: Mobile Service Revenues 1996-1999 (Constant December 1999 Billion TL)

	1996	1997	1998	1999	1999 (US$m)[2]
GSM services revenues	122,252	253,058	189,287	64,798	119
Growth (%)	-	107.00%	-25.20%	-65.80%	-
Retained income (after sharing)	88,525	170,052	136,304	64,257	118
Subscribers					
Analogue NMT 450 service revenues	8,647	10,680	11,322	9,154	17
Growth (%)	-	23.50%	6.00%	-19.20%	-
Subscribers					
Paging revenues	828	1,454	1,858	1,092	2
Growth (%)	-	75.50%	27.70%	-41.20%	-
Subscribers					
Marine communications revenues	2,530	2,966	2,453	1,823	3
Growth (%)	-	17.20%	-17.30%	-25.70%	-
Total mobile services	134,258	268,159	204,920	76,866	141
Growth (%)	-	99.70%	-23.60%	-62.50%	-
% of gross telecom revenue	10.30%	15.10%	10.20%	4.00%	-

(1) Expressed in terms of the purchasing power of the Turkish Lira in billions at 31 December 1999.
(2) 1US$ = 544,300, as of 31 December 1999.

Table-10: Mobile (Car) Radio Telephone Systems (NMT 450)

	1994	1995	1996	1997	1998	1999
Base stations	364	414	430	496	606	632
Subscribers	93,503	103,833	113,560	126,659	124,448	121,517
	GSM Systems					
Base stations	192	742	1,107	1,894	2,694	[ ]
Subscribers	81,968	332,716	692,779	1,483,149	3,250,000	8,424,000

3.2.5. Business Network Services

Turk Telekom offers its customers both analogue and digital private leased circuits that vary in speed from 2400 bps to 140 Mbs and are available on a 2 wire or 4 wire basis. At the end of 1999, there were 10,448 data and 1,441 voice-band leased data circuits between cities within the country. The GSM mobile operators, Telsim and Turkcell, are by far the largest users of leased line services. Other important customers are banks, internet service providers, newspapers, and Ulakbim, the inter-university communication network. A 70% tariff discount on the lease charges applies to customers with more than 500 leased lines, such as Telsim and Turkcell.

The revenue from national and international leased lines, excluding microwave circuits for television and radio distribution but including the circuits used by the GSM operators, amounted to TL 938 bn ($ 2.0 m) in 1999.

3.2.6. Data Network Services

In light of the changing demands on the data market and with a view to adopt the latest technologies, Turk Telekom has been redesigning its data networks and service offerings around recently introduced ATM platforms. The core of its data service offering is based on TTnet. TTNet is Turk Telekom's national fiber-optic backbone, which, once completed, will provide high bandwidth IP services within and between all major urban centers in Turkey. TTNet commenced operations at the beginning of 1999 and the first of four stages was fully completed in December 1999. It represents a major step in the company's plans to offer high bandwidth Internet and data services in Turkey. Due to the importance of data communications within Turk Telekom's development strategy, the company has chosen to rollout TTNet as a wholly owned entity, without recourse to the revenue sharing agreements. The backbone is currently fully redundant and is based on 155 Mbps ATM rings with other cities connected using 34 or 2 Mbps ATM links. In all, TTNet has 140 POPs. Prior to development of TTNet, internet backbone was operated by Global One.

At the end of 1997, Turk Telekom began operating a frame relay network that provides cheaper data communication at a higher speed. Frame relay services are being offered using the X.25 network backbone and the TTnet network. Coverage is currently limited to 10 main cities (capacities of up to 34 Mbs on the backbone) although countrywide access is available via PSTN access lines (capacities limited to 64 kbs). The company has installed 19 passport modules for high-speed connectivity ensuring a base with five modules (with a capacity of 34 Mbs) and 14 modules with a capacity of 2 Mbs. It also offers France Relay Services over its TTnet network, and it is on this network that its expansion plans are focused.

Turkish Packet Switching Data Network (TURPAK) was put into service at the end of 1989. Subscribers connect to Turpak via a dial-up modem or a leased line. The network covers all of Turkey and offers direct connections to Italy, Belgium, Azerbaijan, United Kingdom, United States, Germany, Macedonia, and Uzbekistan. Via these direct connections, Turpak is linked to a total of 68 countries and 72 networks. As of March 2000, Turpak has 159 access modules, four switching modules, and capacity of 16,592 ports. Turk Telekom is planning to increase this capacity to 30,000 ports by the end of the year 2000. At the end of 1999, the estimated number of dial-up modems available for packet switched data applications in the country was 20,647. Turpak had 14,530 subscribers and 1,428 dial-up subscribers at the end of 1999. Turpak's connection, rental, and usage tariffs vary with the duration of the connection time and with the amount of transferred data. Revenues from Turpak amounted to TL 55,992 bn ($ 102.8 m) in 1999.

The commercial implementation of Integrated Services Digital Network (ISDN) Services in Turkey depends on the progressive upgrade of the Turk Telekom network to CCITT's Number 7 Signalling system. At the end of 1999, 357 exchanges had been upgraded to

the Number 7 Signalling system, and by the end of 2000 the Company expects the Number 7 roll-out to be almost complete throughout the network. In December 1999, approximately 2,295 Primary (PRI) ISDN access lines and 120 Basic (BRI) ISDN lines were in service. Additional 6,000 PRI ports and 5,000 BA ports are planned to be installed in 2000. As of December 1999, the charges for primary (PRI) to the ISDN network were an initial connection fee of $ 1,386.8 and a monthly rental fee of $ 166.4 and the charges for basic access (BRI) to the ISDN network were an initial connection fee of $ 92.45 and a monthly rental fee of $ 11.09, respectively. Normal PSTN charges apply for usage. Estimated number of ISDN subscribers in Turkey is 67,510.

3.2.7 Satellite Services

Turk Telekom owns and operates two satellites, Turksat 1B and Turksat 1C. Through Eurasiasat, a joint venture with Aérospatiale, Turk Telekom is planning to launch a third satellite (Turksat 2A).

Historically, the development and performance of the company's satellite services have been constrained by the centralized process of approving capital expenditure decisions of State Enterprises and by Turk Telekom's obligation to provide services to Turkish Radio Television (TRT) on significantly disadvantageous terms. However, recently approved Law 4397 has transferred the responsibility of the transmission of transmitters from Turk Telekom to TRT. Therefore, Turk Telekom expects to be able to charge TRT on non-exclusive terms for this service.

In an effort to establish greater financial and operational autonomy in its satellite business, Turk Telekom entered into a joint venture with Alcatel SpaceCom for the development, launch, and operation of Eurasiasat in 1996. At the time of the kick-off of the joint venture, Turk Telekom owned 51% of Eurasiasat with the balance owned by Alcatel SpaceCom. Since then, Alcatel has reduced its stake to 25% and Turk Telekom increased to 75%. Turk Telekom expects that the autonomous status of Eurasiasat will provide it with the marketing and tariffing flexibility that are needed for the successful operation of a commercial satellite service. While the initial privatization strategy bundled TURKSAT in Turk Telekom, national security concerns voiced by the army led to the decision to divest the division as a separate entity. The decision was incorporated into the amended law in May 2001.

3.2.8 Internet Services

According to data provided by Turk Telekom, Turkey had over 100 internet service providers (ISPs) as of end of 1999 with approximately over 400,000 customers. ISPs use leased lines to access the TTnet network. Certain ISPs have established their own international connections through international carriers licensed to operate in Turkey (through the company's international gateways) such as Sprint, GlobalOne, UUnet, etc.

Turkey demonstrates that relatively high main-line connectivity levels do not ensure internet growth. A lack of government initiative in promoting internet awareness, low PC penetration and computer literacy and inadequate competition have been main inhibitors. Turkey's internet penetration rate is below 1% and well behind developed economies. However, subscriber growth rates have been high and as measured by total

accounts, internet service markets are expected to expand substantially within next five years[16].

Since May 1998, Turk Telekom started leaving international connectivity to ISPs, allowing for an expansion of the international IP traffic and preventing further bottlenecks on the PSTN. Revenue from internet access amounted to TL 2,687 bn ($ 4.9 m) in 1999.

Broadband infrastructure remains extremely underdeveloped in Turkey. Efforts to develop DSL markets were initiated in 2000. The business sector is expected to be the main source of demand for broadband technologies. Since there is very little CATV infrastructure, cable modems will not offer competition to ISDN or DSL any time soon. Direct international IP access via satellite links is illegal when not established through Turk Telekom SCPC connections. There are a few ISPs offering satellite broadband technologies, but high costs and technological limitations suggest that a widespread use is unlikely.

[16] Turkey: Telecommunications, *Economist Intelligence Unit*, May 5th 2000.

4- Prospects for Sector Reform and Privatization Strategy

An efficient and innovative telecommunications industry is crucial in attaining higher levels of economic development. Economic impact of telecommunications privatization goes beyond improving contiguous industries, however; it contributes to the entire processes of economic development, for it is instrumental to competitive evolution of other peripheral industries.

Privatization in telecommunications is only an initial step towards the goal of evolution of an efficient industry. It is no coincidence then that almost invariably, telecommunications privatizations are accompanied by sweeping restructuring of the industry to achieve highly competitive markets. It is crucial that privatization plans in telecommunications sector should embrace a vision beyond the mere transfer of ownership and establish a quick path to a highly competitive market structure. Policy makers who can successfully use this opportune tool will attain full benefits of an economic driver from achieving highly competitive markets, others will fail as for them, privatization remains as a simple transfer of ownership. Furthermore, even the flawless reform plans and rigorous implementation schedules create results with significant lags. So the risk remains, and Turkish telecommunications privatization is not immune to these concerns.

The onset of Turkish telecommunications sector reform with the introduction of telecommunications law and ensuing privatization of Turk Telekom will shape the industry in the years to come and arguably will play a significant role in the Turkish economic development. In this section, potential implications of the privatization strategy and companion legal framework that set the path for sector reform will be addressed. Also, the difficulties and problems lie ahead in this path will be articulated bearing on the culminating evidence elsewhere.

A brief review of trends in telecommunications privatizations around the globe suggests that governments adopt two common strategies**:** The first strategy entails incremental public offerings over a few years that reduce the government stake step by step to negligible levels with a final goal of full divestment. In this option, there is no immediate change in the management of the firm, and presumably shareholders are confident that the existing management is professional and the company can operate free from political interference. Telecommunications monopolies in most developed countries such as Deutsche Telecom, Telefonica of Spain, France Telecom, NTT of Japan, British Telecom etc. were privatized step by step without significant management shakeouts.

The second option, block-sale strategy, requires block sale of shares to a strategic partner that is followed by a sequence of public offerings. Public offerings ensuing the block sale are intended to reduce the government share gradually while capitalizing on enhanced efficiency and reputation building in the post privatization period. They also give the strategic partner an opportunity to increase its investment in the company through preferential allocations during the offerings. We identified 75 block sales in

telecommunications privatizations in 48 countries[17]. Strategic partners were offered ownership rights ranging from 20% to 100% of the company. While 30 of the 75 block sales involved less than 50% of the share transfers to strategic investors, in 45 cases strategic investors were offered more than 50% of the shares.

In strategic sales, privatizing governments seek transfer of managerial know-how, technological infusion and capital injection by the strategic partner. Often, governments strive to attract experienced multinational operators in joint ventures or consortiums with local participation. In general, strategic partners are given substantial managerial control in order to be able to implement sound commercial strategies free from political interference. Telecommunications privatizations in South Africa, Peru, Mexico, Venezuela, Belgium, Hungary, Slovakia resulted with transfer of full managerial control to the strategic partner despite minority ownership of the strategic partner (less than 50%). In some other cases, such as Ireland, Latvia and Cuba strategic partners were rendered limited managerial control.

Initially, Turkish government adopted a two-stage privatization strategy. First stage would start with a 20% block sale to a strategic partner along with 5% and 10% allocations to employees and the general directorate of postal office funds, respectively. A 14% public offering would complete the divestment of 49% of the Turk Telekom. Government would retain 51% ownership. However, lack of interest from qualified consortia including foreign multinational operators forced the government to reconsider the size of the share to be offered to the strategic partner and council of ministers increased it to 33.5% in December 2000[18]. Proposed allocations to employees and the general directorate of postal system funds were not revised.

As it was indicated earlier, it is not uncommon for governments to maintain a residual minority or majority stake in telecommunications privatizations. A number of factors explain why governments retain shares. Included in these are national security concerns, alleviating political opposition, significant valuations, and most importantly, expectations to sell remaining government shares in subsequent share offerings. If the expected benefits from privatization are realised, governments can generate substantial revenues by cashing their shares through public offerings or private sales to the consortia.

However, until the government shares are liquidated and divestment is completed, government will have a role in the post-privatization governance. The nature of this role has implications. The first issue is the possibility of power imbalance. Suppose that the strategic partner and the government become major shareholders in the privatized monopoly. The emerging governance structure that can be described by this co-habitance is not free of tensions. Disputes arise often in rights to strategic and day-to-day management of the firm. Naturally, strategic partner who comes to the partnership with a substantial equity investment and potentially a hefty commitment to expand the infrastructure insists on managerial control of the operations. On the other hand, the government presses for clout to appoint directors and officers consistent with its

[17] PI Database.

[18] This reconfiguration implied that the proposed IPO of 14% of shares were added to the original stake reserved for strategic partner. Instead the IPO scaled back to 0.5% of the shares.

shareholding. The resolution of this potential tension is paramount to a successful privatization. The government is naturally concerned about the post privatization political implications of the strategic sale. Therefore, it is motivated to assert control to avoid politically costly outcomes. This motivation is more pronounced under the xenophobic pressures and concerns about national security. The absence of a credible and established regulator further contributes to the problem and government control in critical decision-making is perceived to be the only solution to alleviate the concerns listed above. From the perspective of the strategic partner, this possibility of political interference represents a significant risk that would be factored into valuation of the stake it purchases. This risk becomes even more debilitating when there is no clear calendar for the divestment of the government stake, which in some cases is envisioned to remain at 51%. Further reduction in government share often requires amendments in the law and parliamentary approval.

Proposed privatization strategies of Turk Telekom suffered from this governance risk. Multinational operators, who would otherwise be interested in, were reluctant to take this risk, particularly since they were under severe investor scrutiny due to depressed international telecommunications market. An announcement made from the prime minister's office on December 11th, 2000, indicated that the prospective partner of Turk Telekom would have the majority vote in a committee which would decide on issues such as personnel, financial matters, investments and appointment of senior managers. However, disagreements among coalition parties regarding how much control the foreign partners would exert persisted. When the governance problem coupled with the February 19th financial crisis, Turk Telekom privatization strategy practically became an impossible proposition.

It became increasingly clear that under the current market conditions, a controversial divestment design with significant governance risk could not possibly facilitate privatization of Turk Telekom[19]. Recognizing the difficulty of privatizing Turk Telekom under current market conditions, the government started to consider divesting 51% of the company. A consensus on the amendment to the existing law was reached. The amended law which was passed on May 14th, has created significant flexibility in the privatization design and strategy by allowing 100% divestment provided that the government is granted a golden share with veto power. On the other hand, it imposed restrictions on foreign control by limiting foreign ownership at 45%. Although this strategy may attract multinational investors, it faces a serious legal challenge, which can only be overcome by amendments in telecommunications law and related articles of constitution. If the Turkish government can prevail over these legal hurdles is yet to be seen.

The alternative divestment strategies discussed above is only one of many important attributes of telecommunication privatizations. Another vital dimension of the privatization strategy is related to the design of post-privatization market structure. As we emphasized above, privatization is only a step towards achieving a competitive industry structure that should be followed by a custom-made regulatory framework in

[19] We are still not sure if the government, policy makers, and legislators fully comprehend the issues surrounding the privatization of Turk Telekom.

the light of international experience. A successful privatization strategy should establish the shortest path to the competition. Recent technological developments have dramatically increased the options available to governments. The global experience in competitive national long-distance and international services suggests that these segments are immediate candidates for competition with few complications. Even the prospects for successful competition in the local loop are promising.[20]

Telecommunications privatization in early 1990s focused on introducing competition in primarily long-distance and international services while maintaining local loop monopolies. In some cases like Argentina, incumbent operator was divided along the geographic lines and duopolies were created in the local loop. The duopolies shared ownership in long- distance and international services were delivered through a joint venture. In others like Chile, division came along the service lines, and each service segment was opened to competition. On the other hand, some large operators such as Telmex were sold in a bundle to make the firm more attractive to foreign investors and to avoid legal, administrative and accounting problems that would have delayed the privatization. In this sense, decision to privatize Turk Telekom in a bundle resembles to Telmex privatization, where the company was divided neither along geographic nor service lines. The motivation for this strategy is clear: A division along the geographic lines or service lines could render some parts of the company unattractive to investors. This is particularly true for geographic division since most of the Turk Telekom revenues are generated in a few concentrated metropolitan areas. We believe the decision to keep the services together was also motivated by the traditional nesting of all these services in the Turk Telekom organizational structure, where a break-up would create substantial accounting and administrative complications and further delay the privatization of the company.

Although a bundled sale strategy is more attractive to investors and eases the sale process by increasing the marketability of the firm, it is inherently more prohibitive for introduction of competition in the sector. While the dateline set by the telecommunications law for the sector reform suggests that the Turkish telecommunications market would be open to competition in all segments of voice and data transmission by December 2003, global experience indicates that incumbents try hard to maintain or create new entry barriers. Incumbent Public Telephone Operators (PTOs) exploit their competitive advantages sometimes by violating the competition laws. This is more likely to be the case, if the incumbent controls the entire network. In a recent OECD research paper, Boylaud and Nicoletti[21] argue that incumbents continue to dominate the market years after the market opening, particularly in the local loop where the entry barriers are strongest. They claim that despite extensive liberalization, the PTOs retain an average market share of over 90 per cent in trunk services, 86 per cent in international services, 93 per cent in mobile analogue services and 66 per cent in mobile digital services.

The OECD experience summarized in Boylaud and Nicoletti study suggests that product market competition and credible threat of liberalization have significant impact on

[20] Competitive service provision in local loop has already begun in various locations in the U.S.
[21] Boyleud, Oliver and Guiseppe Nicoletti (2000), "Regulation, Market Structure and Performance inTelecommunications", *OECD Economics Department Working Paper Series* No: 237, 2000.

productivity increases and quality enhancement. The deadline for free entry in all segments of the Turkish telecommunications market was set as December 31, 2003 in telecommunications law. However, the amended law stipulates that the monopoly rights of Turk Telekom can be maintained until this date only if it is still majority owned by the government. According to the amended law, privatization of more than 51% of the company before December 2003, will trigger the free entry into all voice and data segments in addition to already deregulated value added services.

The strict imposition of the deadlines by the government is crucial to discipline the incumbent monopoly and to introduce competition in the market. The responsibility of the new telecommunications regulator will be paramount to enforce competitive practices during the incumbent's efforts to defend its markets. As it was mentioned earlier, anti-competitive practices by the incumbents should be expected once the market is opened to competition. The amended law shifted the power balance in sector regulation dramatically by transferring the authority to sign concession agreements from Ministry of Transportation to the regulator and strengthened the regulator's position.

Telecommunications privatization experience in Turkish setting should capitalize on the OECD experience and avoid replication of erroneous sector reforms such as the Mexican experience, which essentially stemmed from regulatory capture. Almost a decade after privatization of Telmex, competition of Mexican telecommunications market is still stifled and government regulators have only recently announced rules which will reduce the near-monopoly position of Telmex as the main provider of local, long- distance, cellular and internet services. [22]

Another important attribute of the telecommunications privatization design is the participation of an experienced foreign telecommunications operator in the bidding consortia. This has been a standard strategy in emerging market telecommunication privatizations to facilitate technology and capital injections to the privatized company. Although the Turkish government seems to value efficiency enhancing capital and technology infusions expected from multinational operators, it is also concerned about the foreign control of the incumbent operator. This tension was reflected in the revision of the law, which aimed to reconcile these tensions by limiting the foreign participation by 45%.

A brief review of comparative operational efficiency indicators suggests that Turk Telekom has substantial room for efficiency enhancements (see Table-11) that can be unleashed by a well-designed privatization benefiting from the experience of a world class operator. Turkish telecommunications market is clearly an attractive market for multinational telecommunications operators because of its current size and growth opportunities (see Figure-5). Its fixed line penetration rate at 28% is still well below the EU average and the demand for services is growing rapidly.[23] The market also offers significant opportunities in relatively underdeveloped data communications and mobile segment. Internet usage at 1% and mobile penetration rate at 23% are far below the OECD or EU averages[24].

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[22] Andrea Mandel-Campbell, "Telmex Seeking Injunction Over State Curbs", Financial Times, October,6th 2000.
[23] ITU Yearbook, 2000.
[24] Doing Business in Turkey: E-Commerce, EIU E-Business Forum, May 5th 2000.

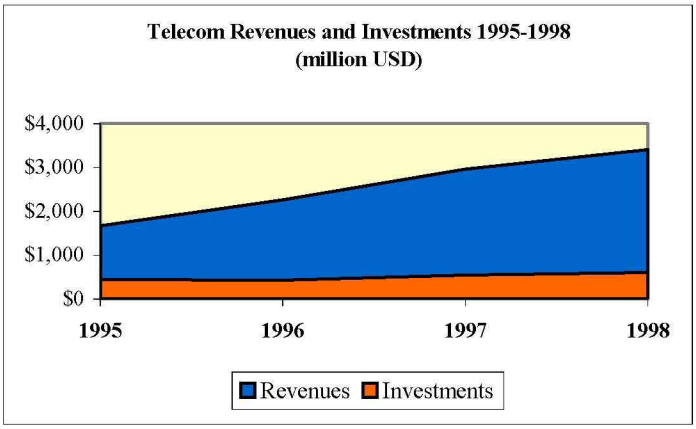
Table-11: Comparative Efficiency in Telecommunications Operations

Country	Teledensity	Revenue/Employee	Line/Employee
Argentina	20.00	$311,199	336
Brazil	12.05	$177,071	236
Chile	16.57	$250,781	806
CR	36.39	$82,290	153
Egypt	6.02	$19,528	74
Greece	52.22	$157,460	252
Korea	43.27	$176,703	331
Mexico	10.30	$162,594	179
Poland	22.76	$40,192	121
Portugal	41.35	$167,363	192
Turkey	25.41	$46,849	233

Source: ITU Yearbook 2000.

On the other hand, as it was indicated above, multinational operators may hesitate to enter the market due to uncertainties associated with future regulatory environment and continued government involvement in the management of Turk Telekom. A second important deterrent is the mounting debt levels of multinational telecommunications operators and sudden reversal of appetite to finance telecommunications deals in the financial markets.

Figure-5: Turkish Telecommunications Revenues and Investments



Source: ITU Yearbook 2000.

The accumulated debt in the sector is projected to be in the neighborhood of $250bn.[25] Highly indebted large operators such as AT&T, France Telecom, Deutsche Telecom and British Telecom have little room to expand into new operations because of limitations of financing (see Table-12).

[25] "A $250bn Gamble," Survey of Corporate Finance, *The Economist*, January 27th 2001, pp 10-11.

Table-12: Meltdown in Market Value of Major Multinationals Operators

Company	Country	Market Value*	Market Value**
Vodafone Air-touch	UK	$291,934.90	$166,897
NTT	Japan	$207,261.50	$98,773
Deutsche Telekom	Germany	$199,716.40	$75,800
France Telecom	France	$158,967.30	$60,700
AT&T	US	$156,742.60	$88,700
SBC Communications	US	$143,624.10	$152,300
British Telecom	UK	$114,210.10	$56,800
MCI WorldCom	US	$113,519.60	$49,200
Bellsouth	US	$97,503.00	$77,700
Bell Atlantic	US	$96,043.90	$128,900
Telefonica	Spain	$76,128.30	$73,300
Telecom Italia	Italia	$74,045.80	$67,600
BCE	Canada	$64,392.00	$21,200
Telstra	Australia	$57,613.50	$43,100
KPN	Netherlands	$52,368.30	$12,400
Sprint Fon Group	US	$45,810.10	$19,500

Source: Financial Times and Yahoo Finance; * as of 24 April 2000, ** as of 23-March, 2001

In addition to these, Turk Telekom privatization overlaps with a period of congested pipeline where other governments attempt to privatize incumbent operators. Only in Europe and Commonwealth of Independent States (CIS) there are 45 transactions in the pipeline including public offerings, private sales and 3G licenses[26]. More than half of these represent block sales to strategic partners. However, Turk Telekom is one of the largest and most valuable companies in the block, along with Cablecom of Switzerland and Sonera of Finland (see Table-13).

Table-13: Selected Pending Block Sales in Europe and CIS

Company	Country	Region	% Offered	Value ($bn)
Sonera	Finland	W. Europe	53	15,000
Cablecom	Switzerland	W.Europe	100	3,700
Turk Telekom	Turkey	W.Europe	20	2,000
BulgarianTelecom	Bulgaria	E.Europe	51	600
Ceske Radiokomunikace	Czech Republic	E.Europe	51	600
EBC	Estonia	E.Europe	49	5.2
Antenna Hungaria	Hungary	E.Europe	36	n/a
Makedonski Telekom	Macedonia	E.Europe	51	n/a
Montenegro Telecom	Montenegro	E.Europe	n/a	n/a
RCS	Romania	E.Europe	20	30
Sakekectrivacshiri	Georgia	CIS	75	n/a
Saktelecom	Georgia	CIS	51	n/a
Kazaktelecom	Kazakhstan	CIS	30	100
Kyrgyztelecom	Kyrgyztan	CIS	40	n/a
Moldova Telecom	Moldova	CIS	51	n/a
Urktelekom	Ukraine	CIS	25	548

Source: Privatisation International Electronic.

[26] PI various issues in 2000 and PI Electronic Telecom Pipeline.

It is no coincidence that Turk Telekom privatization still did not materialize as of first half of 2001 despite the fact that initial steps were taken as early as in 1994. First, an inadequate legal framework hampered privatization efforts, which finally was resolved in January 2000 with the introduction of new Telecommunications Law 4161. However, this legal framework could only respond to objectives set in reference to market conditions of 1994-1995. Second, governance risk stemming from minority ownership stake allowed for strategic partner proved to be particularly unattractive under the market conditions in the last quarter of 2000 and first quarter of 2001. A severe financial market downturn in global telecommunications, and large number of privatization pipeline created a very selective investor posture, and reduced the willingness of multinational telecommunications operator's appetite for participation in joint ventures and consortia for Turk Telekom offering. A third and equally important factor is the uncertainty associated with regulatory policy in the Turkish setting. Although, privatization efforts never advanced so far to bring up regulatory risk to the forefront of discussions, in our opinion this is likely to be an issue once other legal and strategic design hurdles sorted out. Announcement of a clear timetable for competitive service provision would be an important initial step towards addressing future regulatory issues.

Our concerns and suggestions regarding regulatory framework were addressed in section five of the paper. The section five provides a general background in telecommunications regulation and addresses issues pertinent to the Turkish case.

5 . The New Regulatory Framework

5.1 Why Regulation? Arguments for Regulation of the Turkish Telecommunications Market

A brief and straightforward answer to the question of "Why regulation?" is the existence of market failures in a privatized public utility sector[27]. Privatization of a state monopoly does not automatically lead to a competitive market structure. It needs to be an integral part of an overall privatization plan for public utilities.

In the absence of a subsequent regulation, a privatized monopoly will be as detrimental as its predecessor. The major goal of a privatization strategy for utilities is to establish a functioning competitive market not to transform a state monopoly into a private one. An effective regulatory regime is essential and instrumental in achieving a competitive environment in the industry. There will be numerous issues to address by a regulatory regime, at least until competition in those markets is established, and no need for regulation is realized. What are those issues in a regulated telecommunications market?

Even after a wave of restructuring and divestitures, most network industries still carry some natural monopoly characteristics, and these conditions need to be addressed to protect consumers. The vertical break up of telecommunications giants does not constitute the final stage in establishing competitive markets. In telecommunications services, even after separating local exchange network operations from its long-distance service component, interconnection of long-distance carriers to a monopolistic local exchange needs to be regulated to secure a fair and equal access. The long-distance affiliate (or subsidiary) of a local exchange operator might still get preferential treatment and access may be restricted to others. These potential constraints would not be compatible with competitive industry performance.

The issue of interconnections will be at the heart of telecommunications regulation if the reform continues in the aftermath of privatization. Absent a precedent for "rules of the game," establishing a competitive environment with transparent rules will be a major task for Turkish telecommunications regulators. Without these rules, even under private ownership, the telecommunications market may turn into a "jungle" with substantial rents.[28]

Also, service quality must be monitored to protect captive customers in local exchange territories. Protection of consumers in a post privatization environment is one of the major duties of the regulator.

This being said, regulation can potentially be used to create protected market segments. Regulatory capture is still a threat even in advanced markets and the autonomy of the regulator is a must. Regulatory tilting toward certain providers will not only harm market

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[27] For that matter similar market failures also exist in a state run public utility market. Since these markets are not subject to public regulation, the distortionary effects of those market failures will still be widespread.

[28] Currently there are around five hundred long-distance companies (of which four of them major carriers) in the U.S. operating in different states and the success of this market outcome is overwhelmingly due to well-established fair and transparent rules regarding interconnections.

efficiency, but it will also create future credibility problems for the regulator itself. The autonomy of the regulator will also serve in shielding the agency from government pressure.

Of course, regulation comes with its cost. There is a whole literature on welfare costs of regulation either through creation of implementation lags or direct costs imposed on the industry. However, we should keep in mind that since full competition in these industries is not feasible yet we ought to be contending with a second-best solution. This of course does not mean that regulator must not be held accountable. Transparency and efficient regulation can minimize the cost of regulation. Performance based (incentive) mechanisms are effective tools in progressing toward a fully competitive market structure and gradually minimizing the role of regulation. We will explore the concept of optimal regulation in section 5.2.

While asserting the importance of it, regulation of a telecommunications market should not be thought as the ultimate target. It is only a means to achieve the efficient workings of a network industry, where market failures exist due to the very nature of the industry. Until markets can work in a self-sustained competitive fashion, a functional public regulation can protect consumer interests and promote efficiency in the industry.

The Turkish telecommunications market can benefit from the regulatory experience of various western economies. Until a decade ago, the U.S. telecommunications market was subjected to heavy public regulation. At the present time, advances both in theory and practice of network service provision have allowed industries to be regulated in a much more minimal manner. Minimum regulation without causing extraordinary regulatory lags results in efficiency gains. This experience of the western markets can help the Turkish telecommunications industry and its regulator to start at a higher point on its learning curve.

There is no single homogenous regulatory manual that is applicable across all borders. Regulation needs to be custom made for each market and its institutional endowment. Kessides (1998) notes that "…if the regulatory system is incompatible with the country's institutional endowment, privatization may lead to disappointing results, recrimination, and calls for renationalization." [29] The success of a privatization plan is intimately related to the regulatory design following sale. However, if policy makers see regulation as another tool for imposing central control over the industry, the cure might well be worse than the disease.

Regulation, in some instances, causes inefficiencies in the markets by giving unintended incentives to the firm. For decades, rate of return regulation (ROR) has been implemented in the U.S telecommunications market. Well researched Averch-Johnson (A-J) effect of ROR regulation which indicated that, when the rate base is capital and firms earn return as a percentage of their capital investment, overcapitalization (i.e., excess capital investment) can result. Lacking an incentive mechanism for efficiency improvements for the firm, ROR regulation is being abandoned in many jurisdictions in the U.S.A. at an increasing speed. Subsequent price-cap regulation is a pricing scheme

[29] Kessides, ibid., p. 104.

to remedy side effects of ROR regulation. We will review major regulatory methods and make policy recommendations in subsequent sections.

5.2. Arguments for Optimal Regulation

The major goal of regulation is to establish incentives for firms in a noncompetitive market to achieve efficient and socially desirable outcomes. [30] However, these outcomes are generally expected of competitive markets. How can the regulator induce the sole supplier in a market to produce efficient and socially desirable outcomes that can only be associated with competitive markets? Specifically, what is the optimal outcome in a regulated monopoly market?

A perfectly competitive solution mandates marginal cost (MC) pricing so that total surplus is maximized. In fact, this as good as it gets. Efficient and socially desirable (i.e., optimal) outcome is realized when P=MC. Can this same principle characterize a regulated monopoly? The regulator cannot set P=MC where the monopolist in network industries incurs heavy upfront fixed costs. Ignoring these costs and setting P=MC will not let the firm break even. Declining LRAC over the relevant market demand segment points to the existence of economies of scale and/or economies of scope. In fact, this is the "réason d'etre" of natural monopoly. Declining LRAC indicates that the MC will lie below the AC. Setting monopolist's price at MC will result in losses. So, the first-best solution is out in this case.

Providing monopolist only with normal profit and letting firm to break even is possible under AC pricing. At AC, price will be higher and output will be lower compared to the first-best solution. Total surplus is maximized under the constraint of zero economic profit. The concept of second-best solution is due to this constrained maximization.

Economic theory indicates that the monopolist also minimizes its costs while maximizing its profits (i.e., MR=MC). But when it is left unregulated, price exceeds MC. Thus, the optimal outcome in a regulated market depends on the pricing mechanism. In a single output case, the solution is straightforward for an unsubsidized monopolist. The regulator can require monopolist to set P=AC.

In multi-output cases, where economies of scale and scope dictate monopolist to produce more than one good, the pricing scheme could be complicated. Various combinations of MC and AC pricing for different products and/or services can enable firm to break even. A host of studies suggest that, welfare maximizing (optimal) pricing in this context is equivalent of Ramsey Pricing, which is also known as inverse elasticity rule.[31]

Ramsey Pricing maximizes total surplus (or minimizes loss compared to first-best outcome) by charging higher prices where demand is less elastic. This may bring some

[30] Efficiency (i.e., productive efficiency) occurs when a perfectly competitive firm produces at the minimum point of its long-run average cost (LRAC) curve. Socially desirable outcome is achieved when allocative efficiency is obtained by producing at MC so that total (social) surplus is maximized.

[31] Inverse elasticity rule can also be applied in single-output case where multipart tariffs are designed to charge lower prices as consumption goes up.

equity and fairness questions. Should a necessity be charged higher prices where consumers lack options? The concept of optimality must be reassessed here where optimal pricing in technical sense appears to be in conflict with socially equitable policies. In other words, as K. Train asserts, "[T]he regulator must address these equity issues in deciding whether to implement (or, more precisely, induce the firm to implement) Ramsey prices." [32]

A major obstacle in obtaining optimal outcome is the informational asymmetry between the firm (agent) and the regulator (principle). The regulated firm possesses the information about its true cost and demand parameters but the regulator doesn't. The firm has an incentive to hide or misreport (i.e., inflate) its costs to increase profits. Some models aim to overcome this obstacle by developing regulatory mechanisms that induce firms to move to optimal prices.[33] Other models aim at designing more specific tariff mechanisms such as multipart tariffs or time of use pricing schemes. They all target maximizing surplus by applying sector specific pricing algorithms. Multipart tariffs include fixed access charges and usage charges that are proportional to consumption.[34] Under certain mechanisms usage charges can be designed in form of block rates where charges may increase/decrease as consumption varies. Declining or inverted block rate design has substantial welfare enhancing implications and has broad based implementation in utilities. Again, the search for optimal number of blocks and the form of block rates will reflect equity issues. The application of the "right" tariff format rests with the regulator.

Time of use pricing, on the other hand, aims to create optimal pricing mechanism where capacity is fixed and network congestions occur. Under this scheme, utilities aim to ration their available capacity in response to fluctuating demand and prevent blackouts or shutdowns. Designing such a rate mechanism prevents utilities from investing in excess capacity, minimize cost and holding capacity closer to optimal.

Although the regulatory design models we have reviewed were (being) applied across industries to certain extent, real world regulatory *incentive* mechanisms are confined to the following two major models of regulation: rate of return regulation and price cap regulation (or a hybrid of the two).

In the U.S. and U.K. these methods are used extensively for electric, natural gas, water and telecommunications sectors. Each method provided vast resources for academic work over the last four decades and related research produced results pointing to costs and benefits of these methods.

ROR regulation, especially after Averch-Johnson's seminal work in the early 1960s, attracted more attention and provided the background for subsequent research. Most of the work pointed to the inefficiencies associated by this method after years of

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[32] K. E. Train (1991), *Optimal Regulation*, MIT Press, pp. 116-117.
[33] "Vogelsang-Finsenger" mechanism (in Ingo Vogelsang and Jorg Finsinger (1979), "Regulatory Adjustment Process for Optimal Pricing by Multiproduct Monopoly Firms," *Bell Journal of Economics*, presents such a scheme where even though such asymmetries exist, regulated firm moves over time to Ramsey Prices.
[34] Optimally set fixed access charges allow utilities to implement MC pricing for usage.

application and regulators all over the spectrum now, are moving away from ROR to performance based regulation (PBR) or price caps.

Price cap regulation gained momentum over time mainly because of its efficiency implications. In the following two sections, we will go into details of these two methods and state their basic implications. Finally, we will conclude that the price cap method is a better candidate for efficiency purposes and Turkish telecommunications regulators are advised to consider prior experience of their western counterparts.

5.3. Major Regulatory Mechanisms for Utilities: A Survey

5.3.1 Rate of Return Regulation

From its early years on, the regulators of public utilities in the U.S. and U.K. used ROR regulation.[35] Following Averch-Johnson's work in 1962,[36] which modeled this method, the issue attracted considerable theoretical as well as empirical attention. The model abstracts from many real world aspects of ROR regulation however, its results help assess important issues. The model concludes that ROR regulation, by giving perverse incentives, has lead to inefficient (sub optimal) capital-labor(K/L) ratios in public utilities in favor of capital. This has resulted in higher costs and lower output levels than regulation intended.[37]

Let us briefly explore the model and sate its implications:

In public utilities regulation, rate cases are pursued on the basis of a concept called Revenue Requirement (RR). RR can be written as:

$$RR = \Sigma P Q = OC + Kf$$

Where,

OC= Allowable operating costs for noncapital inputs[38]
K= Capital
f= Allowable (fair) rate of return

Here we call K as a (rate) base input and ROR will be calculated on the basis of K. The regulator sets the rule that the firm can earn a ROR no larger than f. That is,

$$\frac{\Sigma P Q - OC}{K} = \text{earned rate of return, } e \quad \text{(i.e., net revenues per base unit)}$$

[35] This is also called "cost-based" regulation since, under this method the regulated firm is allowed to recover all "reasonable" costs it incurs.
[36] H. Averch and L. Johnson (1962), "Behavior of the Firm Under Regulatory Constraint," *American Economic Review*, Vol. 52.
[37] Another deficiency of this method is the lack of an incentive mechanism, which encourages firm to be more efficient.
[38] In real world situation regulator has some oversight control over the firm's choices of inputs. However, the A-J model assumes that the firm is free to choose its levels of inputs, its output level, and its price level as long as the firm earns no more than the allowed rate of return. Train asserts that the results of this model can be expected to hold to a degree when the regulator has less than perfectly effective oversight ability (Train, ibid., p. 33).

and $e \leq f$

Assuming only one noncapital (non rate base) input, the firm aims to maximize profits;

Max π= RR(L,K) – wL – rK subject to the RR constraint

$$\frac{RR(L,K) - wL}{K} = f$$

where
L= noncapital input
r= cost of capital
w= cost of noncapital input

The resulting first-order conditions of this maximization yield[39]

$$\frac{MP_K}{MP_L} < \frac{r}{w}$$

Thus, the firm acts as if the cost of capital is cheaper than it actually is. This results in the regulated firm using too much capital compared to the least cost combination. In other words, the K/L ratio of the regulated firm is inefficiently high for a given level of output. This bias is actually called the "A-J effect" of ROR regulation. It indicates that the regulated firm can increase its profits, in absolute terms, by expanding its capital base. Thus, it overuses capital. [40]

A firm under ROR regulation builds extra capacity under the pretext of peak shaving facility, providing relief in peak time use or reliability.

Although theoretical results indicate this way empirical results are mixed. One argument in favor of ROR regulation is that capital deepening is synonymous with technological innovation and observed advances in telecommunications is a result of this policy.

5.3.2. Price Caps

Price caps (PC), one of the performance based regulatory tools, were first implemented in the U.S. long-distance telephone market and the privatized U.K. telephone, natural gas, electric and water industries. In the U.K., price caps have been used primarily in efforts designed to secure efficiency improvements in the privatized public utility companies.

Price caps are designed, or targeted, to provide firms an incentive to improve their productive efficiency while capping price increases at a predetermined level for a period of time. In this situation, the regulatory pricing scheme limits the firm to charge a price at or below the cap for the review period, and the firm can keep surpluses that may accrue due to potential efficiency improvements. The fundamental formula for a PC is:

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[39] See Appendix A for derivation of this result.
[40] Change in profit, $\Delta\pi = \pi_{UNREG} - \pi_{REG}$ = RR(L,K) – wL – rK – (RR(L,K) – wL – fK)= (f-r) K (i.e., incentive to use more K).

RPI – X

where RPI indicates the rate of the firm's assumed price increase (often expressed in either consumer price index, CPI or producer price index, PPI terms) and X is the expected increase in the level of productivity (or reduction in costs).

If, for example, the regulatory agency sets RPI = PPI to reflect input price increases, an increase of 10% in the index minus a 3 % expected productivity increase will mean that the price change will be capped at 7 % per year, throughout the review period. This mechanism provides an incentive for the seller to adopt efficiency improvements so that the company can retain the value of any productivity rise until the company's next rate review. In this example, when actual productivity increase changes from 3 % to 5 %, the company's price cap provides an additional 2% profit to the firm instead of lower authorized profit that was implicit in the calculated 7% price cap. Now, the price increase is capped effectively at 9% instead of 7%.

A refined PC formula can be expressed as follows:

$P_{(t)} < P_{(t-1)} * (1 + RPI_{(t)} - X \pm Z_{(t)} + Q_{(t)})$, where

$P_{(t)}$ is the company's weighted average price (cap) in year (t)
$P_{(t-1)}$ is the company's weighted average price in year (t-1)
$RPI_{(t)}$ is a price inflation index for year (t)
X is a productivity offset that would remain constant throughout the review period
$Z_{(t)}$ is an adjustment for exogenous costs that might occur in year (t) and
$Q_{(t)}$ is an indicator of quality of service in year (t), taking a value of zero or less than zero, based on whether the company meets minimum quality of service standards

Unintended regulatory lags for rate cases under ROR regulation are knowingly built into PC system so that these lags create opportunity for firms to improve their productive efficiency and reduce costs.

When a regulator fixes the cap for the review period, the firm will seek to produce at cost minimizing input levels and retain all profits due to enhanced efficiency. Thus, PC regulation yields improved efficiency and surplus gains compared to ROR regulation.[41]

However, unless the previous pricing scheme resulted in higher prices than the one without regulation, the increased (monetary) surplus accrues entirely to the firm, leaving consumers not benefiting from increased productive efficiency.[42]

So, how are consumers going to benefit from PC regulation? The answer to this question can be found in a dynamic context. Under changing demand and cost conditions, price caps must change too. Periodic reviews of the caps will ensure that the firm will neither keep losing money nor make large profits. At the end of each review period regulator is

[41] Note that variable Q in the formula is an added incentive mechanism for what can be called as "qualitative" efficiency.
[42] Train, ibid., p. 318.

able to lower the cap given higher than expected productivity in the formula. This would provide downward trend in utility prices. Also, initial setting of X-factor level may imply additional benefits for consumers.

There could be two reasons for a cap review by the regulator:[43] Changes in input costs exogenous to the firm and an increase in firm's positive profits, which is endogenous to the firm. In the former case, the regulator may tie the cap to an input price index; and subsequent increases in this index may prompt the review of the cap. This case is simple to analyze since the firm will not change its behavior and continue to minimize its costs.

However, when the price cap is going to be changed on the basis of firm earning excess positive profits, then the issue of cap review must take into consideration the strategic behavior of the firm. Strategic behavior of the firm will be formed on the basis of the firm's expectations about the regulator's actions. If the regulator announces that it will switch from ROR regulation to PC regulation, then the firm may engage in wasting more prior to switching in order to keep the effective cap higher. Its profits in the following period under PC regulation will be higher.

If review is planned while PC regulation is in place, then the following strategic behavior of the firm can be observed: The regulator may follow a rule that profits are assessed based on the firm's profits during the most recent year. Then, the firm minimizes cost in other periods but inflate costs in the last year to receive a higher cap. A higher cap would mean higher profits in the following years.[44]

This behavior leads to the following conclusion: As long as the regulator sets more frequent reviews, the wasteful behavior of the firm under ROR will be mimicked under PC regulation. The less frequent reviews will create room for the firm to create surplus through increased efficiency. Even in this situation, the firm might engage in strategic behavior. Then, the regulator must come up with a method of these reviews so as to minimize sub-optimal behavior.

5.4. U.S. Experience in Telecommunications Regulation: An Assessment of Outcomes

5.4.1. Historical Background

Historical development of U.S. telecommunications markets offers valuable lessons not only for Turkish markets but also for the rest of the world. Within this line of development one observes transformation of a regulated natural monopoly market into almost completely deregulated long-distance telephone markets.

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[43] Ibid., pp. 325-328.

[44] Train states that " [u]nless the firm's discount rate is very high, the present value of current and future profits will be higher if the firm wastes in the year before a review" (Ibid., pp. 327-328).

As early as late 1940s, the U.S. telecommunications industry started to face challenges with respect to its natural monopoly status.[45] Prior to World War II, both open wire and American Telephone and Telegraph Company's (AT&T) subsequent invention of coaxial cable (higher capacity transmission) technologies required physical connection of wires, which asserted the scale economies aspect of a natural monopoly. Higher fixed costs of installation of transmission lines ensured a natural monopoly status even for the largest long-distance routes. Following the end of World War II, a commercially feasible use of microwave transmission through a series of microwave relay stations greatly reduced the size of the necessary fixed costs and minimum efficient firm size in the industry. Together with increasing demand for telecommunications services, various firms and government organizations began petitioning the Federal Communications Commission (FCC) in the early 1950s to enter the point-to-point communications market.

Microwave Communications Inc.'s (MCI) 1963 petitioning of the FCC to allow them to enter the St. Louis-Chicago private line system (PLS)[46] for the long-distance market resulted in approval in 1969. Following this decision, the FCC allowed free entry to the PLS market in 1971.

In 1975, the FCC allowed MCI to serve in the intercity (long-distance) markets. However, competition in long-distance markets effectively started in 1978 following a court overruling of an earlier FCC decision.

Until 1978, AT&T was the sole provider of local exchange and long-distance telephone services and the FCC regulated its rates. Following the introduction of competition into the long-distance markets, the FCC continued to regulate long-distance providers, AT&T in particular, to prevent it from exercising market power. A major potential threat seen by the FCC was the cross-subsidization of competitive services by AT&T at the expense of monopoly (i.e., local telephone) services.

A landmark seven-year antitrust case against AT&T by the Justice Department was concluded in January 1982, divesting AT&T into seven so-called "baby bells" (Regional Bell Operating Companies, or RBOCs). By this decision, AT&T agreed to separate itself from its twenty-two telephone operating companies. Local operations were subdivided into 161 "local exchange and transport areas" (LATAs) with each LATA being assigned to one of the RBOCs. A major restriction for the new RBOCs was that they were not allowed to provide interLATA services. As a result of final break up in 1984, AT&T was allowed to keep Western Electric (telecommunications equipment manufacturing division), Bell Labs (its research and development division) and Long Lines (which served in long-distance markets).

Since then, AT&T has been operating in long-distance markets together with two major carriers (MCI and Sprint) and many other smaller companies.[47]

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[45] The following historical background mainly follows W. Kip Viscusi, John M. Vernon and Joseph E. Harrington, Jr. (1997), *Economics of Regulation and Antitrust*, The MIT Press, (ch. 15).

[46] The PLS system connects two or more points to meet the communication needs of a specific large sized customers being either a firm or a government agency.

[47] Hundreds of telecom companies are currently providing long-distance services in the U.S. mainly by leasing excess lines from major long-distance carriers. Following competitive trends in local exchange service provision, AT&T has recently started to provide local loop services throughout the U.S.

5.4.2. Regulatory Experience

5.4.2.1 Long-Distance Markets

Although, current telecommunications regulation in North America is at its minimum level, state Public Utility Commissions are still regulating intrastate interLATA services. At the federal level, only AT&T has been subject to price regulation by the FCC until 1995, mainly because of precautionary motives against its potential market power. AT&T's large market share has been a powerful factor in this treatment. Since 1995, no long-distance operator has been subject to price regulation at the national level. Tables-14 and 15 show high market share of AT&T in the market.

Table-14:Market Share of Presubscribed[48] Lines in Long-Distance Telephone Markets (%)

	AT&T	MCI	Sprint	Worldcom	Other
1987	83.7	8.2	4.8		3.3
1988	80.6	9.8	5.8		3.9
1989	77.4	11.7	6.4	0.1	4.5
1990	75.6	13.2	6.6	0.1	4.6
1991	75	13.5	6.2	0.2	5
1992	73	14.5	6.4	0.3	5.8
1993	71.2	15.3	6.5	1.2	5.8
1994	70	14.8	6.4	1.3	7.4
1995	66.4	15.7	6.4	2.7	8.8
1996	63.3	14.5	7.4	2.7	12.1

Source: Long Distance Market Shares Fourth Quarter 1998, Industry Analysis Division, Common Carrier Bureau, FCC March 1999.

[48] Note: A telephone line is said to be presubscribed to the long-distance carrier that receives the ordinary long-distance calls placed on that line. In areas where equal access is available (areas now covering more than 99% of the U.S. lines), customers may choose a long-distance carrier. In areas where equal access is not yet available, all lines are considered presubscribed to AT&T. As of December 1996, 158.7 million presubscribed lines exist in the United States.

Table-15: Market Share Based on Operating Revenues of Long Distance Carriers (%)

	AT&T	MCI	Sprint	Wordcom	Other	HH-Index*
1984	90.1	4.5	2.7		2.6	8155
1985	86.3	5.5	2.6		5.6	7479
1986	81.9	7.6	4.3		6.3	6783
1987	78.6	8.8	5.8		6.8	6298
1988	74.6	10.3	7.2		8.0	5720
1989	67.5	12.1	8.4	0.2	11.8	4778
1990	65.0	14.2	9.7	0.3	10.8	4527
1991	63.2	15.2	9.9	0.5	11.3	4321
1992	60.8	16.7	9.7	1.4	11.5	4074
1993	58.1	17.8	10.0	1.9	12.3	3795
1994	55.2	17.4	10.1	3.3	14.0	3466
1995	51.8	19.7	9.8	4.9	13.8	3197
1996	47.9	20.0	9.7	5.5	17.0	2823
1997	44.5	19.4	9.7	6.7	19.8	2508

Source: FCC (March 1999). * Herfindahl-Hirshman Index

Table 16: Market Shares in International Service (%)

	AT&T	MCI	Sprint	Wordcom	Other
1984	100				
1985	97.3	2.2	0.5		
1986	93.3	4.9	1.7		
1987	90.7	6.4	2.7		0.2
1988	87.1	8.9	3.8		0.2
1989	82.5	11.5	5.6		0.4
1990	79.1	14.6	5.8		0.5
1991	73	16.3	7.3	0.1	3.4
1992	68.4	19.8	7.9	0.4	3.5
1993	62.6	23.6	9	0.8	4
1994	59.7	22.5	9.6	1.9	6.3
1995	53.5	25.5	8.6	3	9.3
1996	48.3	20.3	8.9	4.4	18.1
1997	43.5	22.2	8.1	4.1	22.1

Source: FCC (March 1999).

On the other hand, same data indicate declining market share of AT&T over the years following the introduction of competition in the long-distance market. While AT&T's market share of 83.7% in 1987 declined to 63.3% in 1996 all other remaining carriers increased their share in the market from 16.3% to 36.7% during the same period (see Table–14). In the international long-distance market, this development is even more dramatic (see Table-16).

Also, competitive trends in the industry can be seen from the decline in Hirshman-Herfindahl Indices (HHI) estimated by the FCC based on long-distance carrier revenue.

HH index numbers, which measures industry concentration resulting from horizontal mergers in the market, has fallen to 2508 in 1997 from 8155 in 1984.[49]

Throughout the last decade, another major development was the entry of many incumbent local exchange carriers (ILECs) in the market as competitors. The FCC reports that the number of lines presubscribed for long-distance service to ILECs in their own service areas has increased approximately 400 percent between 1989 and 1996, and the number of service areas in which ILECs provide interLATA long-distance service has increased over 1,000 percent, for the same time period.[50]

In terms of regulatory method, AT&T was subject to ROR regulation until 1989 and thereby earned allowed return on its invested capital. ROR regulation controls prices indirectly via the "allowed rate of return" applied to the capital base of the company (see section 5.3.1 for this method). Long-distance rates are determined in conjunction with this allowed rate. Being a cost based regulatory method, ROR regulation provided a downward trend in AT&T's rates due to falling access (interconnection) charges paid to local exchange system.[51]

In March 1989, the FCC began to use price cap regulation where long-distance rates are set directly by the regulator based on an incentive mechanism, explained in section 5.3.2. The price cap formula for AT&T allows the company to change its prices within a 5 percent ± band annually adjusted for inflation.[52] The formula also requires the company to reduce its rates by the predetermined productivity (increase) factor of 2.5 percent and a "consumer dividend" of 0.5 percent.[53]

This overview has some important implications for U.S. telecommunications market. First, although there is an asymmetric regulatory policy toward AT&T, underlying regulatory concerns about its dominant role in the market urges regulators to be cautioned. Second, gradual deregulation caused main competitors of AT&T to gain increasing market shares. Viscusi et al. argues that even a full deregulation of the U.S. market is unlikely to end up with AT&T gaining dominance in the market.[54] Their analysis is based on the two likely scenarios that are of concern. The first one predicts an unregulated AT&T substantially raises its rates and the second scenario sees an unregulated AT&T pursuing a predatory policy of pricing very low to force its competitors out of the market, and once gone, raising its rates.

The first scenario seems to be unlikely given the ease of customers switching to another provider proved by the approximately 37 percent market share of the remaining service providers in 1996.[55] The use of fiber optics in recent years provided a considerable

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[49] The FCC (1999) also reports the HHI for the total toll market, which includes toll revenues for both long-distance carriers and local exchange companies, has fallen from 4,734 to 2,048 over the same period of time.
[50] FCC (1999), p.4.
[51] Viscusi et al., ibid., p. 494.
[52] Bridger M. Mitchell and Ingo Vogelsang (1991), *Telecommunications Pricing: Theory and Practice*, Cambridge University Press, p.16.
[53] Viscusi et al.,ibid., p. 494.
[54] Ibid., p. 495.
[55] This share is 56.5% in international long-distance market in 1997 (see Table-15).

excess capacity for telecommunications companies so that other companies can easily bear the potential switching load from AT&T.

The second scenario is also unlikely such that the major competitors, MCI and Sprint are financially strong companies and it would take a long price war to chase them out of the market. Another factor in support of discounting this scenario is that the most of the cost of service of MCI and Sprint is due to sunk network costs leaving a relatively low marginal cost for them. In sum, they can bear a possible price war.

In conclusion, the break up of AT&T and the introduction of gradual competition in long-distance markets in the U.S. have resulted in increasing price and non-price competition (see Table-17 for long-distance rates of three major carriers).

Table 17: Basic Schedule Rates of AT&T, MCI and Sprint for Residential Customers (10 min. Day Call, as of December 31)[56]

	5 Mile Call			90 Mile Call			678 Mile Call		
	AT&T	MCI	Sprint	AT&T	MCI	Sprint	AT&T	MCI	Sprint
1980	1.01			3.15	2.37	2.30	3.77	3.22	2.90
1981	1.13			0.67	3.07	2.67	4.39	3.66	3.36
1982	1.76	1.53	1.53	0.90	3.28	3.27	4.49	3.74	3.74
1983	1.76	1.54	1.54	0.90	3.28	3.29	4.49	3.74	3.74
1984	1.65	1.48	1.62	0.69	3.33	3.49	4.18	3.84	3.98
1985	1.98	1.80	1.70	3.48	3.29	3.34	3.97	3.84	3.70
1986	1.75	1.67	1.61	2.95	2.85	2.84	3.44	3.35	3.34
1987	1.48	1.45	1.46	2.38	2.32	2.34	2.95	2.90	2.92
1988	1.47	1.44	1.44	2.16	2.12	2.13	2.64	2.69	2.71
1989	1.71	1.70	1.70	2.21	2.15	2.20	2.40	2.35	2.35
1990	1.71	1.70	1.71	2.15	2.10	2.10	2.39	2.30	2.30
1991	1.70	1.70	1.71	2.10	2.10	2.10	2.30	2.30	2.30
1992	2.00	1.99	2.00	2.20	2.20	2.20	2.30	2.30	2.30
1993	2.20	2.20	2.20	2.30	2.30	2.30	2.40	2.40	2.40
1994	2.40	2.40	2.40	2.60	2.60	2.60	2.70	2.70	2.70
1995	2.40	2.40	2.40	2.60	2.60	2.60	2.70	2.70	2.70
1996	2.60	2.60	2.60	2.80	2.80	2.80	3.00	2.90	3.00
1997	2.80	2.60	2.60	2.80	2.60	2.80	2.80	2.90	3.00
1998	2.80	2.60	2.50	2.80	2.60	2.50	2.80	2.90	2.50
		Percent Change 1988 to 1998							
	90%	80%	73%	30%	23%	17%	6%	8%	-8%

Source: Reference Book of Rates, Price Indices and Expenditures for Telephone Service, Industry Analysis Division, Common Carrier Bureau, FCC June 1999.
Note: Change in CPI during 1988-1998 period is 36 %.

5.4.2.2. Local Exchange Services Market

Local exchange services, which complete the delivery of an end service, have long been viewed as having natural monopoly characteristics. Both the connection of an end user

[56] Basic schedule rates are those charged to consumers who do not make arrangements to be included in a particular calling plan.

to the system by a wire and subsequent switching services have been handled by a single local exchange operator due to large economies of scale. Because of a necessary duplication of investment for wire connection to each site and the economical necessity of large number of switches to be handled by a single exchange system was almost prohibitive for competition.

The development of wireless options such as the (analog and digital) cellular technology, digital cordless telephony, proprietary (non cellular) wireless local loop and mobile satellite systems[57] have practically ended the monopoly characteristics of wire-based technology for service connection. Now, a subscriber can be added to the system through radio waves without laying wire to the end user's site. Thus, establishing a competitive market in the transmission part of the service has become feasible. Not only for technological feasibility but also for cost effectiveness wireless option becomes more preferable. In the areas of low subscriber density (fewer than 250 to 300 subscribers per square kilometer), wireless systems have lower costs.[58] Additionally, the development of digital switching technology currently allows for each carrier to have its own switching facility. Although these trends are overwhelmingly pro-competitive, a question still remains: Can cellular telephones effectively replace wire-based telephones? Currently, cellular systems need wire-based local exchange systems to complete the delivery of their service (i.e., to complete a call). In fact, 98 percent of the cellular calls are completed through local exchange.[59] Currently, local telephone companies are facing competition from cellular service providers, cable TV companies and long-distance companies. Thus, a fully competitive solution to local exchange markets remains to be seen pending further technological advances.

A major potential obstacle before a competitive market in local loop is the establishment and enforcement of fair rules in interconnection (or access) issues. An incumbent local exchange operator may set various barriers to entry by way of pricing, discriminatory (or preferential) access, technical obstacles and (interconnection) delays. Even at this stage of the market development, interconnection issues are still the most challenging aspect of telecommunications regulation in the U.S market.

In the U.S, regulation of local exchange and intraLATA services are regulated by state PUCs. Up until early 1990s, these services generally were under ROR regulation.[60] Beginning in mid 1990s, the general trend is a move towards a form of regulation where price caps or hybrid of the two is applied. The FCC, on the other hand, has been auctioning off the spectrum for PCS since 1994.[61]

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[57] Descriptions are based on Peter Smith (1995), "End of the Line for the Local Loop Monopoly?," *Public Policy for the Private Sector*, Note No. 63, The World Bank.
[58] Ibid.
[59] Viscusi et al., ibid., p. 500.
[60] Mitchell and Vogelsang, ibid., p. 17.
[61] Viscusi et al., ibid., p. 499.

5.5. Lessons for the Turkish Telecommunication Market: An Assessment

5.5.1 Regulatory Policy

U.S. regulatory experience in telecommunications presents itself as a valuable lesson and a source of positive externality for Turkey's restructuring efforts. Starting from early 1900s, the U.S. telecommunications industry has evolved from regulated monopoly (with various forms of regulation) to almost totally competitive industry structure with minimum regulation. Compared to most European and developing world telecommunications markets where only *unregulated government monopolies* rule, U.S. markets have indisputably been in the forefronts of the industry. For that reason only, policy makers interested in reforming their telecommunications markets are obliged to listen to what the U.S. market have to say regarding their experience.

The most vital points of public utility regulation are intimately related to the details of the regulatory method that is to be implemented. A regulatory system cannot rely only in vague policy statements such as efficiency, consumer benefits etc. A system of specific rules and methods must be established for an effective implementation. A regulatory system must be open about its methods of operation. This has been the case in regulated U.S. public utilities markets for the past century. With the help of academia and industry, regulatory rules and methods have evolved as the cost and benefits of these methods went under public scrutiny. There were no hidden or secret formulas but rather publicly open debates on the effectiveness of these methods. With that in mind let us make some findings regarding the right way of regulating the Turkish telecommunications industry in the twenty first century.

Up until 1989 when the FCC began to implement price cap regulation for AT&T, the dominant mode of telecommunications regulation in the U.S. was that of rate-of-return (ROR) regulation. All local and long-distance telecommunications carriers were subject to heavy public oversight with detailed cost accounting procedures, lengthy rate cases and prolonged litigations. Under ROR regulation, the regulated firm had to receive regulatory approval for almost every move it may make including some operational aspects of the service it provided. This approval process caused substantial "regulatory lags" resulting in inefficiencies in policy implementation and inability of firms to act instantaneously to exogenous demand or cost changes in the economy.

However, ROR regulation also brought about some major benefits. The most notables are creating stable investment environment through its revenue requirements rule and lower prices (or price increases). As noted in section 5.3.1, ROR method, being a cost plus method of regulation, allows recovery of any "reasonable" cost incurred by a regulated firm. Through a form of somewhat "guaranteed" rate of return, this method created a fertile ground for raising sufficient funds for investment. In fact, during the tenure of this method most of the public utilities expanded their capital base even in some cases more than necessary. Additionally, through strict cost control procedures, price increases of services subject to public regulation were kept lower relative to other sectors (see Table-18).

Table-18 CPI vs. Price Changes in Telephone Services

(% change from December of the previous year through December of the year shown)

		Telephone Services		Local Services		Interstate Toll Service		Intrastate Toll Service	
Period	All Goods and Services		Inflation Adjusted		Inflation Adjusted		Inflation Adjusted		Inflation Adjusted
1980	12.5	4.6	-7.1	7	-4.9	3.4	-8.1	-0.6	-11.6
1981	8.9	11.7	2.5	12.6	3.3	14.6	5.2	6.2	-2.5
1982	3.8	7.2	3.3	10.8	6.7	2.6	-1.2	4.2	0.3
1983	3.8	3.6	-0.2	3.1	-0.6	1.5	-2.2	7.4	3.4
1984	3.9	9.2	5.1	17.2	12.7	-4.3	-8	3.6	-0.3
1985	3.8	4.7	0.8	8.9	5	-3.7	-7.2	0.6	-3.1
1986	1.1	2.7	1.6	7.1	5.9	-9.4	-10.4	0.3	-0.8
1987	4.4	-1.3	-5.5	3.3	-1	-12.4	-16.1	-3	-7.1
1988	4.4	1.3	-3	4.5	0.1	-4.2	-8.2	-4.2	-8.3
1989	4.6	-0.3	-4.7	0.6	-3.9	-1.3	-5.7	-2.6	-6.9
1990	6.1	-0.4	-6.2	1	-4.8	-3.7	-9.3	-2.2	-7.8
1991	3.1	3.5	0.4	5.1	2	1.3	-1.7	-1.5	-4.4
1992	2.9	-0.3	-3.1	0.5	-2.4	-1.3	-4.1	-2.4	-5.1
1993	2.7	1.8	-0.9	1	-1.7	6.5	3.7	0.2	-2.5
1994	2.7	0.7	-2	-0.3	-2.9	5.4	2.7	-1	-3.6
1995	2.5	1.2	-1.3	2.6	0	0.1	-2.3	-3.8	-6.2
1996	3.3	2.1	-1.2	0.9	-2.4	3.7	0.4	6.1	2.7
1997	1.7	0.2	-1.4	1	-0.6	-4.3	-5.9	2.8	1.1
1998	1.6	0.3	-1.9	1.3	-0.3	-0.8	-2.4	1.5	-0.1

Source: FCC (June 1999).

Meanwhile, the cost side of this analysis also attracted widespread attention. By passing through most costs it incurred the regulated firm under ROR regulation did not have much incentive to cut costs or become more efficient. The lack of a built-in "efficiency incentive" mechanism in this method led both regulators and the academics to investigate other methods, which favor more efficient outcomes. Price caps, as performance based regulatory pricing mechanisms, have proved to be the most prominent method in telecommunications sector.[62] Price cap method, by using a formula, provides an incentive for the regulated firm to be more efficient and allows the firm to keep a potential productivity gain for a predefined period of time. Benefits also accrue to consumers since a) price increases are capped at the inflation level (less a productivity offset) and b) regulator may lower the price cap at the end of the review period considering efficiency improvements of the firm.[63]

[62] Price caps are also widely used in other network industries such as electric power and natural gas sectors with notable success.

[63] A U.S. FCC performance review indicates that price caps yielded $1.8 billion of gains to consumers over the 1990-93 period and a study by R. Schmalensee and J. H. Rohlfs shows that 90 percent of the gains from price cap regulation went to consumers and the remaining to AT&T stockholders (R. Schmalensee and J. H. Rohlfs (1992), "Productivity Gains Resulting from Interstate Price Caps for AT&T," filed for FCC, Docket 92-134, cited in Jeffrey H. Rohlfs (1996), "Regulating Telecommunications," *Public Policy for the Private Sector*, The World Bank.

Price caps have other efficiency improvement implications too.[64] They discourage firms from cross-subsidizing their competitive services. Cross-subsidization is another sub optimal outcome of ROR method where regulated entity can shift cost of its competitive services to regulated services and create unfair competition in competitive markets. Under price caps method, this strategy does not pay off since the firm has no opportunity to recoup those lost profits. The only cross-subsidy which may take place (and usually imposed on the firm) is through the provision of "universal service" where high cost (rural) customers are subsidized at the expense of others. Finally, price caps provide flexibility for the firm to adjust its rates within the boundary of the cap formula without causing major regulatory lags, as they were the case in ROR regulation.[65]

Beside above said benefits, a regulator is faced with a strategic decision-making regarding the duration of review periods for price caps. While longer review periods are designed to create opportunity for a firm to leap productivity gains an inappropriately longer review period may be far from reflecting recent price, cost and demand conditions. On the other hand, shortening the term of the plan will induce inefficient behavior or eliminate efficiency incentives of this method.[66] This apparent trade off is extremely important in a highly volatile inflationary environment like Turkey since frequent cap adjustments will end up reducing gains of the firm from productivity increases thus eliminating originally intended incentives.

Finally, although price caps are efficient way of controlling prices they provide little help when it comes to non-price aspects of service provision. The firm can substitute lower prices in return for lower quality and the regulator needs to develop "quality of service" indices and performance reviews. Such quality indices are in place in the U.S. and regulators impose monetary penalties in case of performing below certain benchmark.[67]

However, beyond such mechanical aspects of regulation a "culture of regulation" needs to be established. This culture is dramatically different than a pricing system where unregulated government monopolies impose arbitrary pricing schemes upon the consumer. Regulation requires a transparent cost accounting with all procedures being made public and debated in a public proceeding. In such an institutional environment, while an economically and politically independent regulator makes decisions, consumers' voice is heard before the end result. The decision-making is executed in such an environment that all stakeholders are allowed to intervene at their will and be a part of the final ruling. Thus, this "culture" renders itself as a democratic one. Public utility pricing must not be seen as a means of taxation and its accounting should be completely independent of other (public) budgetary concerns. Its pricing can not be allowed to be determined in a sub optimal manner which will create additional distortions in other sectors of the economy.

A policy of privatization, in the absence of a well thought regulatory framework, would likely to end up in a chaotic market situation, at least from consumers' perspectives. At

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[64] Rohlfs, ibid.

[65] Currently, telecom companies subject to price cap regulation (either at the federal or local level) are required to file their tariffs with regulator but are not required to receive regulatory approval as long as provisions of the price cap formula are maintained.

[66] Rohlfs, ibid. and Train, ibid.

[67] Benchmarks such as answering directory assistance or operator calls under certain time limit.

present time, delayed sale of Turk Telekom can be considered as an opportunity for establishment of such a regulatory structure in advance of privatization to minimize the risk of a chaotic transition.

Meanwhile, implementing regulation in a least complicated and a more streamlined fashion will enhance its efficiency. In fact, as the current pace of fast technological developments in the industry open more room for competition the telecommunications regulation is seen as a short-term transitory process which must be at minimum possible scale. With all this in mind, the basic premise of public regulation is to protect consumer interests. While price caps provide efficiency incentives, the regulator must keep a watchful eye to increase consumer surplus.

Thus, even with a subsequent public regulation the final game would be far from over. The final target is to provide services in a fully competitive manner. Public regulation is just an intermediate step in establishing competitive markets. As the U.S. experience shows us clearly, this is easier said than done. Competition in those markets is generally achieved in a gradual manner, one step at a time.

5.5.2 Regulatory Institutions

In the last decade or so, there has been a significant trend toward convergence among network industries. While the structure of demand in the telecommunications sector changes from a demand for fixed voice telephony service to a demand for multiproduct services (such as cellular as well as fixed telephony, and internet services), a convergence is observed within the telecommunications and among different sectors of the network industries. On the one hand, mobile telephone services are increasingly becoming a substitute for fixed telephony services and local and long-distance calling services are being offered in a bundled fashion. On the other hand, there is a visible trend toward multioperator service provision such that telephone services, broadcasting, cable television and the Internet operators become one single provider. Thus, the telecommunications service is forming, as a composite product with changing characteristics and the role of the regulator needs to be redefined in the light of procompetitive developments in the market. In fact, now, one can talk about "convergence of regulation."

Multisector public utility commissions have been the norm since their inception in the U.S. Regulation of these utilities under one roof was not only a matter of choice but also as a result of efficiency concerns. In fact, regulating these network industries which have similar characteristics proved to be resource saving and more prohibitive in terms of "regulatory capture." Now, it seems that this approach to utility regulation is promising to be even more functional given those new trends in the industry.

Smith (1997) argues the reasons for regulatory convergence in a more systematic way:[68] The first reason is the obvious one which is related to the increasing overlap

[68] Peter Smith (1997), "What the Transformation of Telecom Markets Means for Regulation" *Public Policy for the Private Sector*, Note No: 121, The World Bank.

between regulation of carriage (telecommunications) and regulation of content (broadcasting) as the multiproduct utility operators provide services in a bundled fashion. The second is somewhat related to the first one: the substitutability of services across subsectors or market segments creates pressures for harmonizing regulation across communications subsectors.

However, the remaining two reasons are less apparent. The most fundamental issue in the new era of telecommunications regulation is to create competition in these markets. Although there are issues specific to telecommunications sector or network industries in general, the policy itself is basically competition policy. In this context, the pressure for regulatory convergence is originating not only from changing technology and market structures, but also from increasing role of international agreements on telecommunications regulation. Once the internationally imposed rules of competition are in effect, the regulatory rules regarding network industries need to be implemented in a coordinated way. Lastly, in conjunction with this last point, recently accorded WTO agreements are likely to end compartmentalization of regulatory policies both at the national and international level and will provide international harmonization of regulation. European competition policy is one step in this direction.[69]

These developments urge Turkish telecommunications regulators to be confirming to recent trends in the public utility sectors worldwide. The optimal model in public utility regulation, especially at this juncture, is a multisector regulatory agency which functions in close coordination with all public utility sectors and implements its regulatory rules and methods with this transforming sector in mind. Regulatory capture is also less probable with multisector agencies since more cross scrutiny will be feasible by the all participants in the industry. As is the case in current Turkish legislative initiative, establishment of separate regulatory agencies for each respective utility sector will prove to be less than optimal in terms of efficiency and transparency and international harmonization.[70]

5.6 Final Thoughts on Regulation

Recent wave of restructuring of network industries in the Western Hemisphere and much of the emerging markets usually took an integrated approach and combined privatization with restructuring. Restructuring of a telecommunications industry requires separating local exchange from its long-distance component while maintaining local exchange under regulated monopoly structure. Long-distance services can easily be provided in a competitive manner with minimum regulatory oversight. The basic target in restructuring is to provide the end service as competitively as possible. Restructuring

[69] Smith (ibid.,) also underlines one major prediction that as a result of transformation in telecommunications market and telecommunications regulatory agencies will eventually disappear, absorbed into multisector antitrust agencies.

[70] However, establishing such a regulatory agency alone is in no way sufficient for a successful regulation. In countries with weak governance and government intervention a regulatory system will likely to result in failure. Peter Smith and Bjorn Wellenius (1999)," Mitigating Regulatory Risk in Telecommunications," *Public Policy for the Private Sector*, The World Bank cites such an example. In Philippines where such a multisector regulator existed, Philippines Long Distance Telephone Company's (PLDT) friendly ties with the government in 1978-83 allowed the company to raise prices, borrow heavily, limit investment in local facilities, take over other companies, and channel high profits to the accounts of controlling shareholders. Coupled with regulatory failures, the result were exclusive rights for a service provided not at all in some areas and inadequately in most others.

prepares the industry to a potentially fully competitive market. There are no technical, economic or otherwise reasons not to provide long-distance services competitively. Thus, restructuring includes creating a legal base for establishment of long-distance carriers. Their access to local exchange must be subject to fair rules of regulation so that no discriminatory practices can take place.

Until the sector is matured sufficiently, long-distance rates can be subjected to price caps. When the market shares of various firms reach certain levels such that a threat of dominant firm or predatory pricing is unlikely, price regulation can be removed, leaving the regulator functioning largely for consumer protection.

The success of regulation is heavily depended on establishing a competent regulatory body. Hence, regulatory institution must be staffed with qualified attorneys, economists and engineers. Top-level administrators must have substantial knowledge and experience related to the industry with no organic links to the regulated entities. They will be responsible for policy decisions and must be accountable to the fullest extent. There should always be an appeal process open to regulated firms in case of potential grievances following the rulings of the regulator, as this would be consistent for a democratic "regulatory culture."

6. Concluding Remarks

In this paper we presented the case for telecommunications privatization and summarized the global trends both in global telecommunications industry and privatization. The evidence presented in this paper suggests that telecommunications industry is clearly shifting to a competitive market structure, albeit at varying pace and degree in both developed and emerging markets. Changes in ownership in particularly incumbent operators are an important component of this shift. The intertwined nature of these two parallel changes is paramount in evolution of an efficient and competitive industry. Therefore, invariably, privatization efforts are coupled with emergence of a new market configuration and important new regulatory arrangements. Even if we presume that privatizing governments have already built a sound privatization infrastructure and political consensus to handle large privatizations, telecommunications privatizations prove to be sophisticated transactions. However, a mature privatization infrastructure and particularly political consensus hardly describe the privatization context for many emerging economies including Turkey. From this vantage point, we identify several problem areas in the Turkish telecommunications reform and particularly in the Turk Telekom privatization, which resulted in several failed attempts with substantial opportunity costs to the Turkish economy.

First, Turkey failed to establish a sound legal infrastructure that would provide the flexibility for alternative privatization strategies particularly under varying ownership configurations. The straight legal jacket derailed the privatization efforts more than once, and continues to be the most important impediment to privatization under current market conditions. Therefore a robust legal framework consistent with the envisioned evolution of the telecommunication sector is needed to legalize Turk Telekom privatization and to liberate the process from debilitating constraints. Although resolution of this issue goes far beyond technical requirements of privatization, and challenges archaic approaches to private-public ownership dichotomy ingrained in the restrictive constitution of Turkey, it has to be addressed head on for any prospect of a successful privatization of Turk Telekom and restructuring in telecommunications industry. Although the amended telecom law is a very positive step in this direction, constitutional limitation remains to be addressed.

The second important issue is the resolution of the *political* opposition to privatization of Turk Telekom. This requires a dramatic shift in the privatization debate, which has been overwhelmingly superficial and dominated by either distrust to private enterprise with no reference to economic merits or merely promoting private ownership without regard to any subsequent precautionary measures to protect consumers. Any observer of the Turk Telekom privatization process will be astonished by the "lack of substance" and extremely politicized nature of the arguments either in favor of privatization or against it. The authors of this paper followed the Turkish media on a daily basis in the last couple of years and they are yet to see an economic argument for or against the privatization of Turk Telekom. This topic, on the other hand, surprisingly has received little attention in the Turkish academia in spite of its popularity and significance. On the other hand, it is fair to argue that building public opinion is a primary responsibility of the governments contemplating large-scale privatizations. Shifting the discussion to an

economic domain and energize the local experts and academics towards a publicized transparent debate are likely to help in building a support base for telecommunications privatization and reduce the political opposition.

The third important issue is the scope of privatization of Turk Telekom. It is unfortunate that the current approach to Turk Telekom privatization reduced it to a cash generating transaction for the embattled state treasury. While we see privatization as an opportunity to transform the industry to an efficient and competitive one, we do not think that the current design is aggressively taking advantage of this opportunity. We are concerned that the extension of monopoly rights to Turk Telekom until 2004 is likely to create impediments for the evolution of a competitive industry for the reasons extensively discussed in the paper. The amended law conditionally removes monopoly powers of Turk Telekom, linking monopoly right to the remaining government ownership. In any case, competitive evolution of the industry should be the primary policy target, and privatization should only be seen as an instrument in this development.

Fourthly, Turk Telekom's privatization strategy needs to include a comprehensive perspective plan for restructuring the Turkish telecommunications industry as a whole. Because of telecommunication industry's importance (as most other network industries are) in overall economic activity, an industry structure with inefficient operation will create distortions elsewhere and reduce competitiveness of various sectors open to international markets. This perspective plan should include creating a credible and well-defined regulatory environment that will reduce uncertainty, which is currently perceived by foreign investors. In a sense, lagging process of Turk Telekom's sale can be taken as an opportunity for creating such a regulatory infrastructure that entails detailed rules and road map. Such a strategic move will signal commitment on government's behalf and preempt hesitations of investors. Sophisticated foreign and domestic institutional investors are likely to be interested in the rules regarding for example, interconnection charges to local networks, specific regulatory method(s) for rate setting or the appeal process following a regulatory ruling. When such a commitment toward an open and enforceable regulatory system is signaled prior to the sale, it will help to reduce risk premium leading to higher privatization proceeds.

Lastly, the goal of restructuring telecommunications industry should not be merely transfer of ownership but rather providing consumers low-cost and better service. One should keep in mind that restructuring efforts are originated in the U.S. market where all operators are privately owned. These efforts are in their advance stages and being followed by European markets where the public ownership is common. Rapid pace of change in the industry points to wave of mergers of companies operating in different segments of the industry. The major impetus behind the break up of AT&T in 1982 was the intention of creating competition in the market at large by separating long-distance services from its local exchange component. At this juncture, in many developed markets while the long-distance carriers are going into local telephone service business, incumbent local exchange operators are gaining increasing market shares in long-distance segment. Further, a convergence in network industries is becoming a fact such that, most (telephone, cable, internet etc.) services are increasingly being offered by a single provider. Technological innovations reduce the scope for the scale economies in

network industries, particularly in telecommunications. This (desired) end-result of restructuring is likely to convert regulatory bodies into somewhat antitrust agencies in the future. However, until then, these markets must be regulated.

The current market conditions in global telecommunications industry and a very congested privatization pipeline suggest that even if the political and legal hurdles are overcome, privatization of Turk Telekom will be a challenge. The depressed global telecom valuations imply that Turkish Telekom can hardly attain valuations attached to it in 1999 and early 2000. This will further weaken the privatization prospects due its political implications. Although the amended law created the opportunity to reduce governance risk and therefore potentially enhanced value to prospective buyers, it is hardly sufficient to make up the conjectural discount that the company faces. Finally, current economic and political instability in Turkey do not offer the most attractive conditions to accommodate a large-scale privatization.

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APPENDIX A

Max π= RR(L,K) – wL – rK subject to the RR constraint

$\frac{RR(L,K) - wL}{K} = f$

where
L= noncapital input
r= cost of capital
w= cost of noncapital input

Thus,

Max $\mathcal{L}$= RR(L,K) – wL – rK - λ [RR(L,K) – wL – fK]

FO.C. i) $(1-\lambda)(R_L - w) = 0 \Rightarrow R_L = w$

ii) $R_K(1-\lambda) = r - \lambda f \Rightarrow R_K = \frac{r - \lambda f}{1 - \lambda}$

$= r - \frac{\lambda (f - r)}{(1-\lambda)}$

In an unregulated monopoly case, F.O.C. would yield as:

i) $R_L = w$ and ii) $R_K = r$

The condition for efficient allocation of resources would be:

$\frac{R_K}{R_L} = \frac{R' MP_K}{R' MP_L} \Rightarrow \frac{MP_K}{MP_L} = \frac{r}{w}$

However, given the assumptions of a) $r \leq f$ (i.e., the firm is allowed to earn a higher ROR then the true cost of capital) and
b) $0 < \lambda < 1$

$\frac{MP_K}{MP_L} = r - \frac{\lambda(f - r)}{\frac{(1-\lambda)}{w}} = \frac{r}{w} - \frac{\lambda(f - r)}{(1-\lambda)w}$ where $\frac{\lambda(f - r)}{(1-\lambda)} > 0$

Thus,

$\frac{MP_K}{MP_L} < \frac{r}{w}$