

During the Round (which was completed in December 1993), three developments changed the telecommunications industry. First, the digital technology revolution began to change the market fundamentally by forcing a major reexamination of the opportunity costs of protecting traditional telecommunications equipment and service suppliers (Cowhey 1990; 1999). An inefficient market for telecommunications threatened competitiveness in the computer, software, and information industry markets. Second, after dislocations created by global stagflation through the early 1980s, reforms in the economic policies of developing countries stimulated interest in privatization of state enterprises as a tool of economic reform. State telephone companies were particularly promising targets for privatization. Once privatization became a serious option, these developing countries also began to consider the introduction of more competition. Third, even as competition began in the major industrial countries, their phone companies looked to foreign markets to create new business opportunities. Yet all phone companies faced major limits on foreign market access, and, once in a foreign market, they confronted serious regulatory uncertainties about how they would be treated. Thus, just as the Uruguay Round closed in 1993, dismantling traditional monopolies for telephone services (or “basic services” in the language of trade talks) had become a high-profile test for the world trade system.

The major industrial countries were impatient to secure their mutual rights to market access in telecommunications services, and the WTO was a convenient forum for achieving this goal. However, the multilateral features of the WTO (particularly the Most-Favored-Nation [MFN] and National Treatment obligations) meant that mutual opening among countries of the Organization for Economic Cooperation and Development (OECD) automatically conferred the same benefits on developing countries. The industrial countries realized that the issue of securing competition and open markets in basic telecommunications services in developing countries had to be faced immediately. Otherwise, these countries would lose a trade deal among themselves. Thus, the fate of the WTO telecom talks became joined to the spread of competition in basic telecommunications services to developing countries (Cowhey and Richards 1999).

The trade talks could not have forced the developing countries to adopt unacceptable reforms. But the political effort generated by the negotiations induced leaders among the newly industrializing countries to make deeper and faster market changes. The timing was right, because national governments in trade-oriented economies were already putting the introduction of competition in the telecommunications sector higher on their policy agendas in order to stimulate economic growth. And the WTO negotiations on basic telecommunications offered an instrument for consolidating or speeding up the liberalization of competition and trade in telecom services by making legally binding commitments on future liberalization plans. These WTO commitments could enhance the ability of national regulators to convince markets that reforms in their countries were un-

likely to be reversed.¹ The three Central and Eastern European countries (CEECs) reviewed in this paper made commitments binding the governments to the status quo or promising future liberalization in certain areas—promises that had not been planned prior to negotiations.

The WTO Reference Paper: A Major Achievement

A major achievement of the negotiation was the creation of the “Reference Paper” on pro-competitive regulatory principles, which was accepted by sixty-seven countries making binding offers on market access (Arena 1997). Two factors were behind the Reference Paper. The first was a sense that the negotiations were an opportunity to create a firm set of common understandings of how competition, or a transition to competition, must be governed. The principles are sufficiently broad to allow for diverse rules and practices but sufficiently specific to hold governments accountable for the fundamentals of market-oriented regulation. The second, and more immediate, factor was a distrust of any market access commitment that was not backed up by enforceable rights in regard to the “invisible” barriers to competition and market access. In the telecommunications sector, a government’s commitments to free trade may not be strong enough to guarantee real market access for foreign suppliers of services because of the very high levels of concentration. Monopolistic suppliers could frustrate competition from new foreign entrants despite trade liberalization commitments.

Differences in the ways countries choose to regulate their monopolies may also inhibit free trade. Universal service obligations, terms of interconnection, licensing criteria, and regulators’ procedures can create important indirect barriers to trade. Regulatory reform is thus a more significant component in liberalizing trade in services than trade in goods. For this reason, the agreement includes explicit regulatory principles.² Most remarkably, the parties agreed on what constituted the heart of pro-competitive regulation in the market. The obligations of governments to create effective interconnection rules, separate the regulator from the operator, and create a transparent decision process are at the core of the principles.

The WTO agreement has a significance that goes beyond the specific commitments and the impressive number of signatories: sixty-seven of sixty-nine governments made significant liberalization commitments.³ One way to capture the extent of the agreement’s impact is to look at its effect on markets. The U.S. government has calculated that approximately 85 percent of the world market, measured by revenues, is covered by strong market access commitments in the negotiations. With a few specific exceptions on particular issues or market segments, all the OECD nations essentially were bound to unconditional market access on January 1, 1998. A review of the major industrializing countries shows very significant commitments on market access that increased very rapidly over a period of a few years (typically after transition periods ranging from two to five years).

The New Agreement has Fundamentally Changed the Market

The WTO agreement is a fundamental change in the international regime. The concept of a “regime” delineates the principles, norms, and rules expected of participants in major fields of governance in the world economy. In other words, it captures expectations about how the market and governments will interact that go beyond strict legal agreements.⁴ The change in the international telecommunications regime has three major implications. First, for countries that are not yet members of the WTO, the WTO telecommunications agreement sets the terms of their accession; their minimum commitments on telecommunications will have to be significant. Second, the agreement has changed the expectations of all economic agents, including governments. Countries with less regulatory transparency and little competition will be considered riskier, because markets do not believe that traditional telecommunications practices are sustainable. Third, the WTO agreement has accelerated the reduction of prices for cross-border network services while accelerating the introduction of new technology and products in these services.

The new ways of providing global telecommunication services are reshaping the economics of the market for services within and among countries. For example, the old international telecom regime favored the “joint supply” of international phone services using settlement rates.⁵ Under this system, each carrier theoretically contributes half the international phone or fax service—for example, taking the international call from a hypothetical midpoint in the ocean and terminating the call to a local household in its country. Presumably, the supply of an international call depends on each national carrier providing half of the facilities for the call. Thus, the settlement rate is simply a form of interconnection charge for terminating incoming calls. And the developing country or the country with a transitional economy terminating a call from an industrial nation has both the market power and incentive to charge substantial rates for this interconnection service.⁶ Given the problems with pricing in most developing countries, pressure to cover shortfalls on local services by inflating rates for international services has been enormous. Finance ministries also used the profits from settlements to subsidize other budget items.

The WTO agreement permitted carriers to enter markets freely across national borders and to own and lease facilities for international services on nondiscriminatory terms.⁷ This ability to self-provision global networks meant that settlement rates had to fall steeply or carriers would bypass their use entirely. The quick descent of settlement rates among OECD countries then opened up numerous opportunities for arbitrage in the delivery of traffic to countries with developing or transitional economies.⁸ In 1997, the Federal Communications Commission (FCC) further accelerated these changes when it introduced the equivalent of price caps on the settlement rates that American carriers may pay to foreign carriers. These benchmarks meant that developing countries had to lower their settlement rates significantly on a predetermined schedule.

In short, the world trade agreement accelerated radical changes in pricing and supply options for the world market. Even countries with developing or transitional economies that made no commitments on telecommunications services at the WTO faced significantly different market economics and politics as a result of this change in the global regime. The rapid decline of settlement rates means that retail prices for international calls have dropped rapidly. Lower prices will stimulate additional international telecommunications traffic because the demand for international service is very price elastic.⁹ Wallsten (2001) used a panel data set of 179 countries from 1985–98 to show a statistically significant, negative relationship between international settlement rates and calls from developing countries to the United States, even controlling for country and year fixed effects, population, per capita income, and country's gross national product (GNP). Moreover, the negative relationship between the settlement rates and the telecom traffic appears to be strongest in the low-income countries.¹⁰ Of equal importance, Wallsten's work shows no statistical support for the hypothesis that a reduction of the settlement payments deprives the developing and transitional countries of badly needed funds for developing their telecommunications infrastructure. Although settlement payments are significantly correlated with revenues of telecom operators in developing and transitional countries, they have no effect on growth of the number of mainlines or imports of telecommunications equipment because the profits largely went to purposes other than investment.

Management of Economic Fundamentals of the Market Transition

The Economics of the Transition to Competition and the Creation of Effective Regulation

Changes in the global market for cross-border communications services will further speed changes in the communications market domestically. Rate rebalancing will have to occur. Rebalancing often leads to short-term discomfort because of such effects as increases in the cost of local phone services. But rebalancing also makes it easier to manage the other economic fundamentals of this market transition, such as building out local networks that adopt new technologies more quickly (and thus enabling better and less expensive services). Six basic economic principles explain much of the debate over the future of telecommunications market policies.

Telecommunications networks have special cost characteristics. A correct analysis of telecommunications networks has to begin by recognizing that, in theory, there is a potential for natural monopoly. Network operators may incur large sunk costs that cannot be redeployed, suggesting that these firms may have declining long-run average cost schedules.¹¹ These cost schedules can result in natural monopoly in those segments of the industries where the minimum optimal scale of production is large relative to the market demand.

The spatial distribution of potential subscribers is an important factor of telecommunications infrastructure deployment. High spatial concentration is particularly favorable because it allows the utilization of the economies of density and scope, resulting in lower operating costs for telecommunications networks in concentrated urban areas. Telecommunications services in low-density areas have also traditionally been cross-subsidized by more profitable telecommunications services in concentrated urban areas. Therefore, a relatively uneven demographic landscape with large population concentration in a few select areas could also facilitate the penetration of telecommunications networks in sparsely populated rural areas.

The regulation of monopoly is imperfect and costly. Even a high minimum-efficient scale of operation for major network facilities does not necessarily justify monopoly on a national scale. Potential market failures in unregulated industries, based on technologies exhibiting scale economies, have to be compared with potential regulatory failure when the government tries to regulate natural monopoly. Although regulating imperfectly competitive industries is not entirely without costs, these costs are lower when regulators can deal with several competitors in an oligopolistic market rather than with a monopolist. For one thing, oligopolistic competition yields important economic information for regulators. For another, the presence of some competitive constraints means regulators have options other than the micromanagement of carrier costs and revenues. Moreover, competition between two local network operators with declining long-run average cost curves may result in a downward shift of these curves, generating efficiency gains that outweigh the loss of scale economies caused by the moves up along the cost curves. Frequently, competition will induce major reductions in transaction costs that more than offset any losses on scale economies. Finally, in markets characterized by pricing that is only vaguely associated with efficient costing, it may not matter whether new entrants can match the lowest theoretical costs of incumbents. There may still be substantial welfare gains from pricing and service innovations by new entrants.

Network externality effects are extremely important. Networks are more valuable if there are more people utilizing them. This externality is especially important to interconnection and universal service policies. In developing and transition economies where teledensities are rather low, the network externality effect may be pronounced. In this case, the marginal social welfare benefit of adding new subscribers to the relatively small network may be large, justifying subsidies that will allow additional users to access the network.

Interconnection policy is the bedrock for regulating the transition to competition. The incumbent controlling the “essential” facility may try to deny access to customers to its rivals. The interconnection policy requires incumbents with essential facilities to share network economies with new entrants on economically efficient terms (see Noam 2001). In addition to setting pricing rules, the policy ensures that non-price discrimination does not hamper entry. For example, new entrants need reasonable flexibility in choosing among the dominant carrier’s network features. In addition, interconnection policies must address all the major

barriers to entry. For example, customers do not want to change phone numbers in order to switch carrier services. A lack of local number portability will result in customer inertia.

Rate rebalancing and openness to new technologies are critical to successful market transitions. New technological options for communications services invariably subvert existing rate structures. As a result, many governments end up, intentionally or not, slowing the rate of technological innovation in order to finance necessary changes in rates charged for telecommunications services. In general, the biggest rebalancing challenges in all countries are the need to raise the price for local phone service while lowering the rates for long-distance (including international) and data-related services. Almost as great is the need to differentiate among the rates charged for local services. As long as governments maintain the same prices for local services in urban and rural areas, the market for telecommunications services and investment will be distorted. These distortions are not only costly to economic efficiency but unnecessary to meeting the policy objective of promoting universal access to communications services.

Credibility of Regulatory Systems

Regulators in industrial countries have attempted to eliminate a dominant firm's ability to exercise undue market power and to ensure that services are supplied at minimum cost. As a result, all OECD nations have embraced general network competition. Countries with underdeveloped networks tend to give priority to creating an environment that will stimulate investment in expanding and modernizing the telecommunications industry. But even making this type of investment a priority has led to increased competition, as competition stimulates investment and induces more efficient costs.

Non-OECD economies share another concern: how to manage the transition from limited competition while assuring access to the investment and technology needed to expand service rapidly. Countries only hurt themselves if they do not create marketplace confidence in the fairness and effectiveness of the regulations guiding the change to competition. But transition to competition has created unique challenges. First, governments must create confidence in a new regulatory system's effective ability to oversee competition. Second, to build market confidence, governments ideally will lay down stable rules governing the market transition. But a combination of inexperience, rapidly changing global conditions, and the difficulties of forging a political consensus on optimal policies often result in a plan for reform that is seriously lacking in more than one respect.

Credible Commitments and Policy Discretion

Because operating a network entails large, highly specific sunk investments in assets that cannot be redeployed, these networks are vulnerable to "regulatory

taking,” or expropriation through ex post changes of regulatory policy. In the world of utilities regulation in industrialized countries, this problem is often discussed in the context of “stranded costs”; those costs utility companies cannot recover as the structure of the market changes from natural monopoly to open competition.¹² Therefore regulators’ credible ability to commit to a certain reward structure for a regulated firm is essential to creating proper investment incentives in telecommunications. Low credibility will reduce investment or require a country to pay a higher rate of return on capital to compensate for the risk.¹³

Unfortunately, the very measures designed to enhance credibility may work against an efficient policy over the medium term. For example, regulators must be accountable to democratic governments even if partly insulated from day-to-day political whims. As political leadership changes, the rules that seemed fair at one point in time may be perceived as unfair at a later point, and the regulator may be subject to strong pressure to alter the rules. Creating transparent processes with adequate checks and balances is essential to balancing the ability to change rules with the protection of regulatory credibility.

Checks and balances are more believable if there is an *independent* agency unconnected with government ministries and charged with implementing policies covering licensing, pricing, competition, and universal service. The purpose is to build confidence in the process, showing that expert discretion is being used to implement telecommunications policy and that the agency is politically accountable, but substantially insulated from everyday politics.¹⁴ A transparent administrative process further reinforces credibility in markets.¹⁵

Countries with poor institutional endowments, such as CEECs, can import regulatory credibility from overseas.¹⁶ For example, the credibility of regulatory agencies in CEECs has been greatly enhanced since the governments of these countries entered into the agreements with EU governments on harmonizing their national regulatory environments in preparation for the accession of CEECs into the European Union. International organizations, such as the International Monetary Fund (IMF) and the World Bank, may also help to enhance the credibility of regulators in less-developed countries by making financial aid to these countries conditional on adherence to the regulatory commitments.

The WTO is another mechanism through which countries can make credible commitments to change regulations over time. To illustrate, governments that are preparing to privatize public network operators may decline to subject them to foreign competition immediately for fear of reducing the proceeds from privatization. Investors will pay more for shares of the traditional network operator if some segments of its monopoly position are guaranteed for some time. However, the promise to other new entrants to expand their competition opportunities over time is correspondingly weakened because the government now has a large stake in the welfare of the incumbent. In this circumstance, the WTO can bolster the credibility of commitments to liberalize. Many countries have scheduled a gradual phase-in of stronger commitments on market access and national treat-

ment. Governments that violate their commitment schedules will have to compensate entities that suffer losses. Several Latin American and CEEC governments have used the WTO Agreement on Basic Telecommunications for this purpose. In effect, they have found a way both to shield their national operators from competition for a limited period of time and to ensure that interest groups do not prolong the situation indefinitely.

The management of the timing of competition is, in fact, one of the pivotal choices in early national reform strategies. Argentina, the Czech Republic, Mexico, and Peru, for example, chose a strategy that was based on fast-track privatization of their incumbent operators.¹⁷ These operators were guaranteed their monopolistic position in key segments of the market for a number of years while new entrants could compete in specific niches. Specific timetables for further liberalizing the market were set in advance. In exchange for the guarantees against competition, the incumbent monopolists committed themselves to specific investments in network build-out and modernization. The incumbents' shares, together with concessions for monopoly franchise in different segments of the market, were then sold through tender to private consortia that had a domestic investor and a major foreign company. In contrast, Chile, Hungary, and Poland are among the countries that delayed privatization, but chose early and complete liberalization of most of the telecommunication markets. Although the number of entrants was limited in certain segments of the telecommunications industry (such as international telephony), the monopoly markets became oligopolistically competitive markets. Intermodal competition from suppliers using alternative technologies arrived with the entry of wireless companies, cable television, and public utilities in both local and long-distance services. All countries that pursued this strategy implemented a series of price increases for basic services to rebalance tariffs, with varying degrees of success. This made the markets for basic services more attractive to potential entrants. Making additional frequency bands of radio spectrum available to mobile operators for fixed telephone services also enhanced competition. Civil contracts governed the terms of network interconnection, and competitors could negotiate any agreements. Potential disagreements and conflicts over the contracts were subject to arbitration in court.

Under both strategies there were challenges to credibility. The approach of privatization and limited competition raises the issue of whether promised future competition will occur.¹⁸ The strategy of state ownership and general competition raises the question of whether the government will enforce competition rules strongly. Neither the WTO nor an autonomous regulator can solve all the problems of consistency. Perhaps the biggest dilemma of consistency is that it can lead to bad policy. Finding the precise balance between protecting mistaken policy and maintaining credible commitments is one of the toughest challenges for a country. In telecommunications, it requires maintaining a degree of consistency and sufficient commitment to law and contracts so that no one thinks the regulator will change the rules of the game capriciously (Dokeniya 1999; Henisz and Zelner 2001).

Previous Related Studies

The purpose of telecommunications market reform is to improve the sector's performance and stimulate general economic growth. Before examining the specific challenges of reform in the transition economies, it is useful to set them in the context of more general studies of the benefits of restructuring. A study by Madden and Savage (1998) estimates the returns to telecommunication infrastructure investments on time-series data for a sample of transitional economies in Central and Eastern Europe. The study finds a very large contribution of telecommunication infrastructure to economic growth. However, this analysis also had problems involving simultaneity bias and spurious correlation. Röller and Waverman (2001) corrected these problems by endogenizing telecommunication investment through specification of a micromodel of supply and demand for telecommunication investments. They then use evidence from twenty-one OECD countries over a twenty-year period to estimate the micromodel jointly with the macro production equation. To control for spurious correlation, they allow for country-specific fixed effects.

Röller and Waverman (2001) find that the impact of telecommunication infrastructure on growth is nonlinear. The positive effect on economic growth is especially strong when a *critical mass* of telecommunications infrastructure is present. The existence of network externalities probably explains this nonlinear relationship. Röller and Waverman (2001) also find that the growth effects achieved at low and medium penetration rates (i.e., below 40 percent of households) are moderate. However, the impact is twice as large once the penetration rates reaches 40 percent. Because a 40-percent penetration rate approaches universal service (assuming 2–2.5 people per household), this finding suggests that growth effects are significantly higher for countries whose telecommunication infrastructure has approached universal service.¹⁹

The evidence of the existence of a *critical mass*, leading to increasing returns on growth at levels approaching universal service, is consistent with the presence of network externalities. Since most of the transition economies have penetration rates far below the critical level of 40 percent, the results obtained by Röller and Waverman (2001) imply that *marginal* improvements in the telecommunication infrastructure in these countries might not generate significant growth effects. In order to realize the growth effects through telecommunication investments like their industrialized counterparts, the transition economies must achieve radical improvements in their telecommunications infrastructures and accelerate the build-out of their networks in order to approach the universal service level.

The empirical findings of the positive effects of telecommunications infrastructure build-out on economic growth suggest that, in order to accelerate economic development, countries need to create policy environments conducive to a high level of investment in the telecommunications sector. Therefore, countries in dire need of investment want assurances that operating surpluses from profitable segments of the telecommunications industry will be used for network upgrades and

expansions. Fortunately, competition tends to modify the trend (followed by traditional monopolies) of spending the surplus on vested interests without significant modernization.

There are only a few studies of the economic and welfare impact of the WTO telecommunications agreement, partly because of the highly opaque nature of the nontariff barriers (NTBs) impeding trade. Moreover, NTBs in telecommunications have a wide-ranging nature that includes barriers to foreign direct investment, the movement of labor, or cross-border trade. As a consequence, it is difficult to translate NTBs in services into tariff equivalents. Nevertheless, studies attempting to quantify the economic importance and impact of barriers to trade that exist in telecommunications services sectors are beginning to emerge.

For example, based on a 1997 survey by the International Telecommunications Union (ITU), Warren (2000) constructed a set of telecommunication policy restrictiveness indices for 136 countries, taking into account actual telecommunications market structure. The indices have been constructed to incorporate the distinctions drawn in the GATS context between limitations on market access (MA) and national treatment (NT), as well as the distinction between two modes of supply, cross-border trade and foreign direct investment. The indices for the top twenty services trading countries show a great deal of variation in the degree of restrictiveness of their regulatory environments toward trade in telecommunications services, ranging from very low for the United Kingdom to very high for Turkey and China.

In order to assess the economic impact of his results, Warren (2000) uses the indices for market access policy restrictions and national treatment policy restrictions on investment in the penetration models to quantify the impact of limits on competition upon fixed and mobile network services consumption. He shows that liberal policies, particularly investment policies, increase both fixed and mobile network penetration.²⁰ The major beneficiaries of reform are the more closed economies, particularly the developing economies. Warren (2000) also found that the price effect of national treatment restrictions on foreign telecommunication providers was less than 20 percent for the majority of economies studied. But the most restrictive (e.g., Indonesia, South Africa, Thailand, and Turkey) had price effects ranging from 20 percent to more than 100 percent. Market access barriers—which apply equally to domestic and foreign suppliers—can raise the price by up to 70 percent.

The Telecommunications Industry in Central and Eastern Europe: Three Case Studies

The service sector was a relatively low priority in terms of investment in CEEC economies.²¹ The telecommunications sector was affected by the prevailing bias toward manufacturing and the lack of potential for generating foreign exchange revenues, as well as by the communist governments' desire to control information

flows. The result was dramatic underinvestment in infrastructure. Reformist CEEC governments inherited very outdated equipment, including manual switches and analog technology. Teledensity was not only far lower than the European average but well below the levels typical of newly industrialized countries in East Asia. Networks were heavily concentrated in urban areas, leaving teledensities in rural areas appallingly low.

In the early stages of reform, telecommunications tariffs favored residential and local calls and did not give a reasonable rate of return (even on average) on investments. Underinvestment and low tariff levels resulted in severe excess demand, which effectively invalidated the existence of cheap uniform domestic call rates.

Heavy investment in network technologies became an imperative for CEEC governments in the beginning of the 1990s. Most of the CEEC governments have aimed for a 30 percent penetration rate by the year 2000, and as the data in Table 1 suggests, many of them succeeded in achieving this goal.²² However, the growth rate significantly slowed down in most of the countries in the region after 1998.

Telecommunications Policy in Poland

Poland is the largest of the CEECs, with a population of 40 million. Its dramatic story of transformation and transition shows how the details of interconnection and regulatory processes are vital to creating an efficient market. Despite the fact that Poland has the largest telephone network among CEECs (10,252 million main lines), it also has one of the lowest teledensities in Europe: 26.5 lines per 100 people.²³

During more than four decades of mismanagement by the communist government, telecommunication infrastructure had been built up extremely slowly. The COCOM (Coordinating Committee for Multilateral Export Controls) embargo was a major impediment for Poland in gaining access to the modern technology. As a result, the industry's technical base is very backward, and a significant number of manual exchanges are still in use. The incumbent operator, TPSA (Telekomunikacja Polska Spolka Akcyjna), needs 15 percent of its workforce just to operate and maintain the manual exchanges. Only about 70 percent of lines are digitalized, and fixed-line penetration in some rural areas is as low as 4 percent.²⁴

The Polish Telecommunications Act—adopted in 1990 and amended in 1991 and again in 1995—was the first post-communist telecommunications act among CEECs. The act formally liberalized local networks: a license from the Ministry of Posts and Telecommunication (MPT) was the only restriction on the entry of new local operators, which could be domestic or foreign companies.

The Polish laws did not clearly separate the industry regulator and the owner of the incumbent operator. Both functions remained the prerogative of the Ministry of Communications. The Ministry is also in charge of issuing the licenses to TPSA's competitors. Concentration of these functions in the hands of the same Ministry

Table 1
Telephone Mainlines for Selected Countries (per 1,000 people)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Croatia	186	202	220	262	283	309	332	348	365	365
Czech Republic	166	176	191	211	236	273	318	364	371	378
Estonia	212	220	231	252	277	299	321	344	357	363
Hungary	109	125	145	173	211	260	304	336	371	371
Latvia	244	249	266	260	279	295	298	302	300	312
Lithuania	220	224	231	241	254	268	285	300	312	321
Poland	93	103	115	130	148	169	194	228	263	282
Bulgaria	246	274	285	295	305	317	323	329	354	354
Romania	105	113	114	123	131	140	151	160	167	175
Slovak Republic	144	155	167	187	208	232	259	286	307	314
Slovenia	229	248	265	290	309	334	358	364	378	378
Bosnia and Herzegovina	—	140	144	61	60	70	80	91	96	103
Macedonia, FYR	149	161	166	173	179	185	205	219	234	255

Sources: World Bank, ITU.

created a conflict of interests, which is inconsistent with the EU rules. The latter explicitly require that operating and regulating functions be separated. In March 1997, in accordance with its Association Agreement with the European Union, Poland took a step in the direction of harmonizing its telecommunications regulation with that of the European Union by transferring state ownership interests in TPSA to the Treasury. Taking the telecommunications operator out of the structure of the Ministry of Communications and transforming it into a joint stock company controlled by the Treasury were certainly steps in the right direction. However, much remains to be done to eliminate the conflicts of interest arising out of historical links between the Ministry of Communications and the structures that eventually have taken the form of TPSA.

In 1998, the Polish Securities and Exchange Commission admitted the first block of TPSA shares to public trading. The TPSA shares were offered on the primary markets in the WSE (Warsaw Stock Exchange) and in the form of global depositary receipts on the London stock exchange. In spite of the turmoil on the global emerging markets following the 1997 financial crisis, the initial public offering (IPO) was very successful. The sale of 15 percent of the company raised some \$840 million for the Polish government.²⁵

In March 1999, the Polish government approved an amendment to the Communications Act enabling the sale of an additional 25 percent of the TPSA stock to the strategic investor. One of the government's major concerns was that full liberalization of all telephone services might have a detrimental effect on the TPSA's share price at the time of the initial stock offering. This concern explains the government's policy of balancing the need to comply with EU competition requirements with the slow pace of liberalization. Given the recent history of telecommunications reforms in other countries, Poland probably could not support a market with multiple operators without damaging the TPSA's valuation.²⁶

Poland's privatization story shows why it is hard to instill true market confidence in the authorities supporting competition. The problem has no perfect solution, but creating an independent regulatory authority was one way to help the liberalization of the Polish telecommunications industry succeed.

The new Telecommunications Act passed in 2000, which replaced the Telecommunications Act of 1990, marked a radical step toward full liberalization and incorporated many EU regulations on telecommunications, in particular those relating to network access, licensing, interconnection, universal service, and mobile services. The Act established an independent regulatory body, the Office for Regulation of Telecommunications and Post (URT), which is responsible for the development of policy and legislation, creation of favorable conditions for network construction and the extension of service provision, supervision of technical issues, and supervision of state bodies.

The new Act also established that public telecommunications or broadcasting network operators are required to have official authorizations, which can be issued for periods of ten to twenty-five years depending on the type of network to be

operated. However, companies wishing to provide value-added telecommunications services, including Internet, are simply required to register with the URT.²⁷

Facilities-based competition and interconnection policy. Until the TPSA loses its position as monopoly carrier, all local operators must use its trunk network for interconnection. Under the new Telecommunications Act passed in 2000, authorized operators are required to offer interconnection to other operators on terms, which are nondiscriminatory, fair, and transparent. They are also required to provide co-location for other operators' equipment, subject to an agreement. The existing law states that the terms of the interconnection agreements should be stipulated in a civil contract between operators of interconnecting networks. But it does not explain what happens when the parties are unable to reach an agreement. If the TPSA wants to prevent the entry of a competing network operator, it can simply delay negotiations on the terms of interconnection. The three companies that received long-distance licenses in early 2000 reported difficulties in negotiating interconnection agreements with TPSA.²⁸

Ambiguous and inadequate regulatory legislation, together with the lack of a truly independent regulatory body, has allowed the TPSA many opportunities to take unfair advantage of its position. Delaying interconnection agreements was not the only method the TPSA had used to deter the entry of independent local network operators. According to Kubasik (1997), the TPSA has sometimes deployed small exchange offices that connect only the largest business customers in the given localities. This strategy crippled the business plans of many independent local entrants that needed revenues from business customers to recover costs. Once the new operators have given up, the TPSA usually stopped building up its capacity in the area, leaving the region significantly underdeveloped. The TPSA's tactics have prevented new entrants from gaining a bigger share of the Polish market.²⁹

Despite market reforms aimed at liberalization of long-distance and international telecommunications services, TPSA still has a dominant position in these segments of the market. Although the 2000 Telecommunications Act stipulates that any company with a home majority stake in its capital can become a long-distance network operator, no Polish company has enough capital to build out a new network without a major contribution by a foreign partner. Since foreign participation is not allowed in international networks, the Act essentially preserves the incumbent operator's monopoly on international networks. The Act also gave the TPSA a significant competitive advantage over new local and domestic long-distance operators. In applying for licenses, new operators must present a formal strategic development plan to the Ministry of Communications and pay certain fees. The TPSA does not have to declare its strategic plans and gets licenses free of charge.

The draft law aiming at breaking TPSA into several entities was recently submitted to the Polish parliament, Sejm, however, there is uncertainty as to whether it will be adopted in the near future. Under the proposal, TPSA was to be split into local, long-distance domestic and international operators, mobile telephone op-

erators, as well as into regional entities. The initiative is aimed at removing a legal loophole in the Telecom and Antimonopoly Acts that limits the scope of Poland's main antitrust regulations. Currently, regulators can only prevent planned mergers that would create anticompetitive market positions. However, the existing law does not include mechanisms preventing anticompetitive practices by entities that have a dominant position when the Acts went into effect. The proposed move would block TPSA from financing its local connections from profits made on the long-distance market, something that TPSA's competitors are unable to do.³⁰

Despite the TPSA's clear advantage, however, competition does exist in important segments of the Polish telecommunications market. There are about 200 new data/value-added service operators, 400 new cable TV operators, and various new VSAT and private corporate networks. By May 2001, fifty-two operators had received authorizations for the provision of local services, many of which hold licenses for multiple regions.³¹ More than 100 interconnection agreements among local operators have been signed to date, although few are up and running. A major breakthrough for competition in Poland's domestic long-distance services came in 2001 when three independent operators—Netia (controlled by the Swedish telecom operator Telia), Niezalezny Operator Miedzystrefowys (NOM), and Energis Polska—started offering calls. The entry of these companies put a dent on the TPSA's monopoly.

Although TPSA is expected to retain its lucrative monopoly on international calls at least until the end of 2002, its dominance in this area is being eroded by Internet service providers (ISPs), offering voice-over Internet protocol (VoIP) services. By 2001, there were 163 registered companies offering leased-line data or communications services, in addition to 414 registered ISPs.³²

Competitive entry (or the mere threat of it) forced TPSA to undertake rate rebalancing strategy to meet the challenges introduced by new operators. In 2001, TPSA lowered its charges for domestic long-distance calls by 10 percent, adjusting the prices to those of the independent operator NOM. The new operator, however, also cut its rates by 10 percent. By the end of 2001, TPSA responded with another 10 percent reduction and further discounts for the "active" callers.³³

The mobile telephone services market has been competitive since 1996 when two GSM operators³⁴ began to offer their services in addition to the services of the incumbent operator. The latter provided the NMT-based analogue service and offered a digital service under the first GSM 1800 license granted in Poland.³⁵ By the end of 2001, there were more than 9 million active mobile service subscribers (almost 40 percent of them were prepaid users), as compared to 6.8 million recorded at the end of 2000. Such an increase means a 47 percent annual growth.³⁶

Poland's mobile phone subscriber base is the largest among the East European countries. But the country's 23.4 percent mobile penetration rate is still among the lowest in the region, and much lower than the European Union's average of about 62 percent. However, Poland is considered to have a huge growth potential. It is expected that by 2003 the country's mobile phone penetration rate will reach 47 percent.

Although Internet usage in Poland is relatively high for the region (2.8 percent of the population versus 2.5 percent for the Czech Republic and 0.4 percent for Hungary),³⁷ the country's information technology market is still far behind the rest of Europe (1 percent of gross domestic product [GDP] compared to 5 percent in the EU countries). As the rest of the economy continues to grow, there should be enormous demand for data transmission and related consulting services. Although until recently TPSA has enjoyed a de facto monopoly in this segment of the market, cable and radio-based providers are now offering Internet connections.

Universal service and national network build-out. Sheltering the TPSA has not produced a miracle in network modernization, but rates of network expansion and indicators of efficiency have improved. The Polish telephone network is one of the fastest growing in the world, averaging 12 percent growth per year over the past ten years.

The most striking aspect of the Polish story in regard to universal service is rural service. Most recent improvements in the telecommunications network have benefited urban rather than rural areas. Although 36 percent of the population lives in the countryside, rural inhabitants have access to just 13 percent of exchange lines. Teledensity in rural Poland is only 4.6 percent, whereas in urban areas it is close to 30 percent. The fixed-line telephone network deployed in rural areas is very outdated: 23 percent of the telephone throughput of rural areas is handled by manual exchanges, most of which operate for fewer than 24 hours a day.

The TPSA expanded its network primarily in urban areas because the economies of density and scope are more pronounced and lead to higher return on investments. The inhabitants of many residential and rural areas organized themselves into telephone cooperative groups consisting of several dozen to several hundred members. Members of such cooperatives typically acquired the rights-of-way on the local land and prepared it for the ducting with their own resources. The newly built local networks were then transferred to the TPSA, which compensated the cooperatives' members by granting them free units on their long-distance bill.

Given the scarcity of capital for developing telecommunications infrastructure in the rural areas, cooperatives represented a quick and unorthodox way of raising funds for building out rural networks. They mobilized the capital reserves of local communities in unserved areas. The Polish government considers the development of local telephone cooperatives the least costly means of deploying rural telecommunications networks. Over the past few years, nearly 60 percent of the new main lines in rural areas have been developed in this framework.³⁸

Telecommunications Reforms in the Czech Republic

In the mid-1990s, as a result of the talks on accession to the European Union, the Czech government has come under pressure to liberalize the telecommunications market in line with EU norms. As a result, the government recently introduced significant changes. Although the attempts to liberalize fixed-line telephone have

been underway since 1996, the reforms in this sector received additional impetus with the introduction in July 2000 of the Act on Telecommunications.

The Act of Telecommunications put an end to the exclusive rights to the Czech Telecom (formerly SPT), which was a de facto monopoly operator. The Act also transformed the Czech Telecommunications Office (CTO) into a truly independent telecommunication authority and clarified regulatory responsibilities between the CTO, the Ministry of Transport and Communication, and the Finance Ministry.³⁹

Privatizing and restructuring the Czech Telecom. As a result of the voucher privatization program, the Czech government maintained a 74 percent stake in the incumbent telecommunications operator SPT, which is presently known as Czech Telecom. At that point, the government decided to sell 27 percent of its share to a strategic foreign partner for \$1 billion. The partner was required to implement a network modernization program worth \$3.5 billion and to ensure a 100 percent increase in the number of main lines by 2000. The tender was organized in 1995, and five international companies submitted their bids.⁴⁰ The most attractive bid was offered by the TelSource consortium (\$1.45 billion). Among the factors that determined the success of the tender were the Czech Republic's successful economic reforms, its political stability, and a strategic location in the middle of Central Europe.

As of December 2000, Czech Telecom had a market capitalization of CZK 163.4 billion, making it the largest capitalized and most liquid stock on the Prague Stock Exchange. The majority shareholder is the National Property Fund of the Czech Republic (51.1 percent) with the second and the third largest blocks of shares belonging to TelSource (27 percent) and KPN Royal Dutch Telecom (6.5 percent).

Czech Telecom is also one of the largest publicly traded corporations in Central and Eastern Europe. Since its privatization, the company has outperformed the Czech stock market, and in 1997 Standard & Poor's gave it an "A" rating. The degree of monopoly that Czech Telecom was promised after privatization and the future tariff policy played a central role in determining the value of its equity. The high proceeds from privatization have been attributed to the relatively monopolistic market structure and the comprehensive regulatory framework, among other things.

As of the end 2001, Czech Telecom maintained nearly 4 million telephone lines in operation, which implied the teledensity of 37.51. Installation of new trunking and switching capacity dramatically reduced the waiting time for establishment of residential telephone lines from nearly seventeen months to less than one month. But the main achievement was a substantial reduction of call rates and improvement of the main quality characteristics of basic services.⁴¹

Between 1998 and 2001, the company invested almost \$1 billion annually in constructing the core of the new digital overlay network, of which SDH technology makes up about one-sixth. By 2001, Czech Telecom had virtually completed digitizing its network. Increased digitalization has boosted value-added services,

such as voice mail, call waiting, and conference calls. The company has been steadily expanding its Internet and data division, Imaginet.⁴²

Since the beginning of natural monopoly transformation into a competitive telecommunications market, Czech Telecom cut costs and substantially increased productivity by reducing its workforce by 11,000. Productivity growth and network expansion increased the number of lines per employee to 290 by the year 2000, up from 1998 level of 134, and well above the European average of 205.

The transition to competition. The Act on Telecommunications fully opened the telecom market to competition since early 2001. Specifically, the Act allowed private operators (other than Czech Telecom) to run local networks through regional concessions. As of the end of 2001, some sixteen such areas are licensed to eight private competitors.

Prior to the introduction of the new Czech telecommunications law in 2000, the government had made several attempts to tackle the problem of rate rebalancing. But the division of regulatory authority has hampered the ability to implement cost-based principles in line with the European Union by raising line rental and local call charges. The Ministry of Finance, which was responsible for formulating tariff policy, has resisted Czech Telecom's proposals to increase local call charges as a way to help generate revenue for the company's modernization plans. Czech Telecom's international tariffs were regulated by the CTO, and the company has been successful in reducing international (and long-distance) tariffs in line with EU norms. Nevertheless, the tariff structure was far from cost-oriented.

The new telecommunications law harmonizes the Czech laws with the EU legislation and provides for tariff rebalancing, which should bring Czech Telecom's local, long-distance, and international tariffs roughly in line with other European incumbents. However, since Czech Telecom's monthly subscription fees are still two times lower than Western European levels, they will have to be substantially increased in order to offset the expected decline in all call rates brought about by competition. This could be politically difficult for the government experiencing serious budgetary pressure. Tariffs for mobile, data, and some value-added services remain unregulated and are relatively higher than OECD averages.

Public utilities, in particular the electricity distribution network and the railway system, have exclusive rights to build and operate their own communications infrastructure, and have considered entering the telecommunications market. The Czech railway company, together with several private investors, has started to deploy a \$120 million digital network. In the end of the 1990s, the eight regional power-supply utility companies formed a joint venture, Aliatel, which controls modern, fiber-optic networks with sufficient capacity to carry public traffic. By 1999, this network was expected to be accessible to 60 percent of businesses and 50 percent of households. The company also planned to provide Internet and related services; virtual private network services with data, voice, and picture signal transmission capabilities; and ATM and public telephone service. However, many

Table 2

Selected Indicators of Telecommunication Services, 1994–2001

	1994	1995	1996	1997	1998	1999	2000	2001
Number of subscribers in fixed public telephone network per 100 inhabitants	20.89	23.24	27.34	31.78	36.29	36.96	37.67	37.51
Average waiting time for MTS establishment (months)	47.59	71.55	17.23	7.15	1.89	1.23	0.95	0.83
Share of fixed network subscribers connected to digital exchanges (%)	15.06	17.89	31.70	48.49	64.02	74.43	85.72	93.85
Number of public pay telephones per 100 inhabitants	0.18	0.20	0.26	0.28	0.29	0.29	0.29	0.28
Total number of ISDN subscribers	—	—	—	196	2,753	11,394	26,194	27,6010
Number of subscribers in public mobile networks per 100 inhabitants	0.26	0.44	1.94	5.05	9.36	18.88	42.28	68.20
Number of registered Internet domains hosts	10,397	21,856	40,846	56,869	86,482	122,253	160,000	215,525

Source: Ministry of Transport and Communication of the Czech Republic.

of these plans were postponed as a result of the economic recession, which began at the end of 2000.

The Czech government opened the mobile telephone market to competition in 1996. Since that time, the two licensed providers have been competing for market shares through aggressive pricing. Czech Telecom is the major player in the market through its mobile subsidiary Eurotel. The second GSM license belongs to Radiomobil. In 1998, the CTO awarded the third 1.8 GHz license to Czech Mobil. In 2001, the Eurotel had the largest market share (46 percent), followed by Radiomobil (41 percent) and Czech Mobil (13 percent).⁴³

An increasing popularity of mobile telephones resulted in slower growth of fixed-line users. The number of mobile network subscribers exceeded 4 million, and, at the end of 2000, surpassed the number of fixed-network subscribers. According to the Ministry of Transport and Communication, the density of sixty-eight mobile terminals per 100 inhabitants had been achieved by end of 2001. In 2001, the CTO granted the first UMTS licenses, which enable wireless operators to provide new multimedia services. However, the market is beginning to approach its saturation. The penetration of mobile phones is expected to reach 100 percent in 2003–4.⁴⁴ And, although some doubts exist over the potential of data and multimedia services carried by the new 3G licenses, by the end of 2002, the Czech operators were able to offer some 3G mobile services.

Internet usage in the Czech Republic has risen significantly between 1995 and 2000, especially with increasing usage in small and medium enterprises and lowering tariffs. At the end of 2000, more than a quarter of all households had a computer and more than 10 percent of households were using the Internet. The total number of Internet users reached approximately 2 million. However, the Internet usage is constrained by relatively high prices for personal computers and high charges for Internet access.

Overall, new operators trying to enter the Czech telecommunications market can count on a transparent regulatory framework and strong support from regulators. However, despite the positive developments during the past ten years, a few important tasks still lie ahead. Full privatization of Czech Telecom still has to be completed. And the government still has to accomplish liberalization of the fixed-line segment of the market.⁴⁵ Until the monopoly rights of the incumbent operators expire, new entrants must develop as niche players, concentrating on corporate clients. It will take time and considerable effort from government regulators before emerging companies can compete with the incumbent monopolist on a level playing field.

Telecommunications Reforms in Hungary

Hungary's telecommunications sector, as with those in other CEECs, was not a public investment priority, and the impossibility of raising substantial funds in other ways led to a low rate of network growth. From 1991 on, however, the rate

of network expansion had accelerated to above 10 percent and, by the end of 2000, fixed-line penetration reached about 38 percent.⁴⁶

Nevertheless, fixed-line penetration apparently reached the saturation point, as it started to decline from its original level and settled at around 36.6 percent in the beginning of 2002. In the meanwhile, the number of wireless phone users has surpassed the number of fixed lines. In December 2001, wireless telephone penetration reached 48.3 percent.⁴⁷ Despite some slowdown in its expansion in 2002, it is clearly the mobile segment that drives the telecom sector's growth in Hungary.

Regulation and market structure. Hungary was the most successful of all the CEECs in liberalizing the telecommunications market and building regulatory institutions. In 1992, the country adopted a set of laws that introduced competition in some value-added services and reshaped the telecommunications sector in preparation for full liberalization. In the meanwhile, the incumbent monopoly operator Matav was granted a concession contract giving it an exclusive right to provide international, domestic long-distance, and some local public telephone services up to the year 2002.

The Communications Act passed by the Hungarian Parliament in 2001 further advanced regulatory reform and the process of telecommunications market liberalization. The new act clarified the division of regulatory authority and introduced more transparent procedures in registration of communications services providers and allocation of frequencies. It also introduced pro-competitive provisions regarding interconnection and cooperation between service providers, including number portability, construction of networks, and universal services.

Regulation of the telecommunications industry in Hungary is the responsibility of the Communication Authority (HIF). The Communication Authority reports to the Hungarian Government via the Ministry of Transport, Communications, and Water Management. The Communication Authority's responsibilities include registration of communication services and regulatory functions and arbitration of disputes in the telecommunications markets. The Ministry of Transport, Communications, and Water Management oversees broader policy issues, including regulation of prices and management of radio spectrum.

Hungary separates the administration of the regulatory process from the operation of telecommunications networks, and particularly from the main operator, Matav. Regulatory and ownership functions are formally separated as well. In December 1995, the Hungarian State Property and Holding Agency, which had been acting as majority shareholder in Matav, divested itself of the controlling stake, retaining responsibility for the 25 percent plus one golden share. As a strategic owner, the agency is not subordinate to the ministry and represents the shareholders' point of view in issues of Matav management (see Szanyi 1997).

However, the process of separating the regulatory authority both administratively and legally from owners and operators of telecommunications networks was not supplemented with measures adequate to insulate the regulator from political pressure. Although the Communication Authority has considerable freedom

in implementing regulatory arrangements, its independence appears to stop well short of designing new policies. This arrangement may not be sufficient in the future. The overwhelming market dominance of the incumbent network operator and the comparatively high cost of market entry, particularly into network operation, create major difficulties. As a multi-operator environment develops, the need for strong independent regulation is acute.

Privatization, competition, and the emerging market structure. Hungary's pivotal choice was to allow a transitional monopoly mixed with competition. Early in 1993, the Ministry of Transport, Communications, and Water Management issued a tender for 30 percent of Matav's shares and the concession to provide long-distance calls over Matav's digital overlay network. The concession provided six years' protection from competition on public long-distance and local calls, beginning January 1, 1994. Opponents of the privatization plan argued that it was out of step with the EU's telecommunications rules, which provided protection for monopoly suppliers only until January 1998. Moreover, imposing the same protection period for long-distance and local calls put local suppliers at a disadvantage. Local networks were still under development, whereas the overlay network had practically been completed.

To be eligible to take part in the tender, applicants had to satisfy minimum financial requirements. The winner in the tender was supposed to pay a concession fee to the Hungarian government for the use of the digital overlay network. In addition, the winner had to pay 0.1 percent of the future gross revenues into the budget. The winner also had an obligation to guarantee at least a 15.5 percent annual increase in main lines for six years; satisfy 90 percent of the applications for main lines by July 1997; and satisfy 98 percent of the outstanding waiting list before the end of 1997 (OECD 1997).

Four groups took part in the final bidding round: France Telecom/U.S. West, STET/Bell Atlantic, Deutsche Telecom/Ameritech/Cable & Wireless, and Telefonica/Dutch PTT/GTE. Based on the bids, the State Property Agency awarded the concession to the Deutsche Telecom-led consortium MagyarCom. In the end, MagyarCom paid \$875 million for 30.2 percent of Matav's shares. By November 1997, MagyarCom's ownership in Matav increased to 59.6 percent stake, while the government controlled 6.5 percent. The remaining stakeholders were multilateral financial institutions and public investors, such as the EBRD and the IFC. In June 1999, the government's privatization and holding company sold its remaining interest in Matav on domestic and international stock markets, although it retained a "golden share."⁴⁸ In 1997, Matav was listed on the Budapest Stock Exchange, where it still has the largest market capitalization. The shares of Matav are also listed on the New York Stock Exchange (NYSE), where they trade in ADR format.

For the period leading up to liberalization, Hungarian regulators adopted the approach that was previously tested by Argentine regulators. Specifically, Hungary has established a number of independent regional monopolies in local ser-

vice rather than one national monopoly. Of the fifty-four primary regional networks, Matav controlled thirty-six. New independent companies acquired the other eighteen networks in an open concession tender. The performance of one local monopoly serves as yardstick for measuring the performance of the others.

Following a period of consolidation, the fixed-line market is today controlled by four groups, of which Matav is clearly the dominant player controlling about 80 percent of the fixed-line market. Deutsche Telekom controls 60 percent of Matav,⁴⁹ through which it indirectly controls the mobile market leader Westel as well. The local subsidiary of France's Vivendi is the second largest fixed-line provider. It controls nine concession areas and has a 13 percent market share. Hungarotel (formerly Hungarian Telephone and Cable Corporation/HTCC) is the third-largest player servicing five primary areas (about 5 percent of all fixed-line subscribers). The smallest operator, Monortel, is controlled by cable provider UPC and services only one primary area, which gives it an estimated 2 percent market share.

Full-scale market liberalization in local telephony started with the official expiration of Matav's concession rights in major primary areas at the end of 2002. Since the beginning of 2003, the Hungarian subscribers are able to select a single provider for all their international or domestic calls, or even select a different provider for each call made. Selection of providers will be made by dialing a four-digit prefix before the number to be called.

The most intense competition is expected in the international and domestic long-distance markets. However, prices are only projected to fall by a modest 10 percent during the first year after liberalization. By the end of 2001, seven companies (Vivendi Telecom Hungary, PanTel Rt, KabelNet Kft, Matav Rt, eTel Magyarorszag Kft, MatavCom, and Global) registered with the Communication Authority to provide telecom services in the liberalized market.⁵⁰

Hungary was the first among the CEECs to introduce public mobile cellular services. In 2000, the country had the broadest cellular coverage in Central and Eastern Europe. Analog and digital services were available to virtually the entire population of the country at comparatively low tariffs.

At present, there are four players in the mobile market, but only three digital providers: Matav's subsidiary Westel Mobile, Telenor's Pannon GSM, and VRAM Rt/Vodafone, with respective market shares of 53.30 percent, 40.56 percent, and 6.14 percent at the end of 2000. The fourth analog provider is another Matav subsidiary, Westel Radiotelefon, with a dwindling subscriber base numbered in the tens of thousands.⁵¹ Wireless cellular networks expanded dramatically after three competing GSM operators won licenses. The recent statistics on the wireless telephony subscriber bases is presented in Table 3.

The Hungarian authorities planned to auction Hungary's first Universal Mobile Telecommunications (3G) licenses in 2001, but had to postpone the auction due to pessimistic investor sentiment in the telecommunications sector. It is widely expected that, when the auctions are finally conducted, the three existing cellular

Table 3

Mobile Subscribers in Hungary (December 2000)

Operator	Subscribers	Market share (percent)
Weston 900	1,600,000	53.30
Pannon GSM	1,200,000	40.56
Vodafone Hungary	200,000	6.14
Total	3,000,000	100.00

Source: Espicom Business Intelligence (2000).

operators—Westel 900, Pannon GSM, and Vodafone Hungary—will acquire most of the licenses.⁵²

Network build-out and performance. In the early 1990s, local governments received the right to sell their public networks in tenders for monopoly concessions. This mechanism allowed local areas to attract additional capital and technical expertise. Until then, Budapest had received preferential treatment (its teledensity was four times as high as in rural areas). However, between 1991 and 1999, Budapest's share of total access dropped from 45 percent to 31 percent. Although the average number of main lines per 100 inhabitants rose from 6.6 in 1984 to 38.1 in 2000, rural areas enjoyed a fourfold increase in teledensity.⁵³

Most aspects of service have steadily improved since regulatory reforms began in 1992. Although the actual levels of telecommunications indicators in Hungary are still lower than the corresponding OECD averages, certain indicators, such as call completion rates and the number of fault incidences per main line, are steadily improving.

The incumbent monopoly operator Matav has shown consistent improvements in the most important productivity parameters during the 1997 to 2001 period. For example, during this period, the ratio of main lines per employee grew from about 163 to almost 316, or about 100 percent. Strict cost control measures to counteract slowing revenue growth allowed the company to reduce the workforce by 17 percent. Table 4 summarizes the dynamics in Matav's operating statistics between 1997 and 2000.

The MatavNet Internet access service was introduced by Matav in early 1996, and launched on a commercial basis in May 1997. Matav aimed to become the service provider of existing and future ISPs in Hungary, as well as providing the service directly to its residential and business telephone customers. Access to the ISPs is given on a revenue-sharing basis provided they do the billing (30 percent peak, 10 percent off-peak). In 1996, Matav introduced ISDN access to MatavNet.

Table 4

Matav Operating Statistics, 1997–2000

	1997	1998	1999	2000
Lines in service	2,365,391	2,601,148	2,785,389	2,733,076
Residential	1,982,186	2,201,366	2,370,579	2,335,103
Business	347,737	362,828	378,605	361,492
Public pay phones	35,468	36,954	36,205	36,481
ISDN channels	38,520	70,642	114,466	181,416
Waiting list	23,000	30,000	38,000	n.a.
Digitalization (%)	70.2	75.7	79.0	81.2

Source: Espicom Business Intelligence (2000, p. 19).

By the end of 2000, the MatavNet's subscriber base had increased to 70,904, representing a market share of 47 percent.⁵⁴

Overall investment level in the telecommunications sector has grown dramatically. By the end of 2000, annual investment in the public network had reached \$600 million, with overall investment in telecommunications exceeding \$770 million. Annual investment in the industry is close to 0.8 percent of the GDP, significantly higher than in any other CEEC. Investment per main line is \$520, about twice the OECD average. Since 1994, per capita investment in public telecommunications service, including both fixed and wireless networks, has risen from \$73 (1994) to \$114 (2000). This amount is still lower than the OECD average, but rivals the levels of such EU members as Belgium, Greece, Ireland, and the United Kingdom.

Steady investment flow and upgrading of the telephone network translates into increasing revenues of the communication service providers. The combined revenues of Hungary's telecom providers reached \$3.2 billion in 2001. This is 8 percent higher than in 2000. Fixed-line revenues of the leading providers Matav, Vivendi, HTCC, MonorTel, and Emitel accounted for 57 percent of the total.

Challenges for Regulation After the WTO Agreement

Our review of experiences with the transition to competition leads us to focus on three policy challenges. The first is the critical role of rate rebalancing, because rebalancing is essential to combining efficient competition with network build-out and universal service. If rate rebalancing succeeds, it is easier to get interconnection policy right, and interconnection policy (the second policy challenge) is indispensable to getting competition right. Finally, the lack of a credible regulatory

process makes succeeding that much harder during the transition to a market economy.

Rebalancing Rates to Improve Market Efficiency, Network Build-Out, and Universal Service

It is almost impossible to exaggerate the demand for more network capacity in transitional and developing economies. Certainly the traditional indicators of unfilled demand, which we discussed above in our case studies (e.g., waiting lists for phone service), vastly underestimate the actual pent-up demand. These indicators do not capture the large numbers of people who do not bother registering for telephone service and the even larger numbers who do not utilize capacity fully because of counterproductive pricing. When demand is unfilled, consumers lose.

A particularly keen irony of prevailing practices is that universal service policies tend to affect network build-out, irrespective of the degree of competition. The usual mechanisms for providing universal service can become the enemy of greater economic efficiency and faster build-out. For example, the common practice of keeping local rates below costs to encourage universal service simply discourages investment in building out the local network.⁵⁵ This type of protection for consumers treats the wrong problem and also discourages investment in adequate network infrastructure. There is little evidence that bringing rates for local service into line with costs causes any significant dropping off from the network in any income group. And, to the extent that a problem exists, there are far more efficient ways of handling it.

Other rate distortions created in the name of equity significantly hinder the efficient provision of communications services and create political disincentives for competition. For example, relying on subsidies from urban to rural areas (a by-product of geographic price averaging) can mean that poor urban workers subsidize phone services for the country estates of business leaders. Meanwhile, incumbent operators have a powerful political weapon to use against introducing competition: the argument that new entrants are likely to serve only urban areas (thus “skimming the cream” from the market).⁵⁶ Keeping local rates artificially low also creates incentives to inflate the prices of domestic and international long-distance services (including data services). Inflated prices for these services constitute a significant tax on business. The extremely high cost of international calling is a barrier to small firms interested in export-oriented growth.

All countries suffer from inflated rates for international services, including the United States. But the situation in virtually every country undergoing transition to a market economy is far worse than it is in industrial countries. Rates for international services to and from most of these countries are so high that they are equivalent to a tariff of 100 to 500 percent on communications and data services. These escalated prices act as strong disincentives in the creation of an information-based economy.

What can be done? The most important step is to move to cost-based rates for all services. Making this change requires significant rate rebalancing across classes of services and much less rate averaging. To facilitate cost-based rates, public policy can duplicate the logic of other digital information markets. These markets cover costs in their pricing, but typically feature steadily declining prices to encourage high utilization. As a result, prices are driven down, and suppliers are able to maintain adequate margins even at lower prices. Rebalancing means that the cost of local service prices may rise (at least in some regions of a country), but many other prices will decline and tap significant demand elasticity.

The good news about rebalancing is that, although certainly it is subject to political controversy, even dramatic needs for rebalancing can be managed without any loss of universal service. Hungary was especially dependent on revenues from international services from the United States and the European Union. As those rates declined, the Hungarian government undertook significant rate rebalancing. Lower prices for long-distance services, along with the belated rapid expansion of cellular services, have also generated more domestic long-distance traffic and income. More generally, modern financial techniques allow for effective commercial financing to handle many cash flow issues during rebalancing. When these techniques are not enough, international financial institutions, such as the World Bank, are willing to assist (Braga et al. 1999).

Another policy choice involves controversies over the pricing of new services made possible by technological innovation. Regulators can find themselves mired in arguments about the cost of special services, such as Internet videoconferencing. There is no perfect solution to such issues, but we think the notion of creating a “safe harbor” for the prices of new services has much to recommend. As long as existing communications markets are imperfectly competitive and have badly flawed pricing, exempting new services and technologies from the regulatory errors of the past may be the best policies. These services have great potential for inducing dynamic corrections of past errors by forcing cost improvements and pricing reforms in traditional services. If the new services someday grow to become a major part of the national market—say, 5 percent of the total market—the regulator can reconsider the policy and align it with policies for traditional services.

Getting Interconnection Policy Right

Interconnection policy is extremely difficult to implement because it produces high levels of uncertainty and strife. Given the economic significance of the issue, this outcome should surprise no one. But there is, in fact, a policy consensus based on hard-won lessons from introducing competition.

Requirements for interconnection go to the heart of competition, so vigorous disputes over its precise terms are to be expected. These regulatory and judicial disputes (especially in the United States) have created the impression in developing countries that there is no consensus on the correct principles and terms for the

policy. But, in fact, a fundamental consensus exists in industrial countries. Interconnection policy sets pricing for interconnection based on some version of long-run incremental costs. It requires the timely provision of leased circuit capacity, significant unbundling of the network elements available for interconnection, non-discriminatory access to rights-of-way, and portability for telephone numbers when subscribers decide to switch carriers. International benchmarking is the best way to determine interconnection costs. A big enough pool of countries now exists to provide an appropriate reference group. Even allowing for some upward adjustments based on uncertainties about local conditions, a country would get a more realistic calculus for costs in a much faster period with benchmarking than with other methods.

Above all, interconnection policies are a transitional measure to deal with the market power of the traditional incumbent. As a complex form of regulatory micromanagement of the market, this policy inevitably has costs. Some commentators believe that it induces “too much” market entry (i.e., by setting the price of interconnection too low that it induces entry in the market, which is not economically efficient). Yet it is equally clear that dominant carriers do have significant market power and an incentive to employ that power to discourage new entrants. Their position as a significant factor in the national stock market of transitional economies and as large national employers further bolsters their political influence. So, regulators in CEECs benefit from adopting the competition policies of the European Union as a way of justifying politically difficult choices. They also gain the benefit of the collective learning about the policy’s intricacies from the rest of the European market.

Creating a Credible Regulatory Process

No discussion of the credibility of regulation can ignore the legacy of government ownership of the dominant carrier that once prevailed in most countries. When the government holds a significant financial stake in the phone company, it creates mixed incentives. The government has often been found to interfere in corporate decisions to advance political goals (such as retention of employees) and the ownership stake also gives parts of the government an incentive to favor the company in regulatory policy (Cowhey and Klimenko 2001). Nonetheless, many countries phase out government ownership over time. So, it is important to do the best to manage the transition in a way that helps the market.⁵⁷

Managing the relationship between former government operators and regulators is a major challenge, because privatization rarely takes place immediately. An even bigger task is finding the right formula for ending a monopoly—particularly when the initial policy choice proves inadequate. The pace for moving to general competition is speeding up considerably. Decisions on extending monopoly franchises made earlier this decade now look dubious. But reversing these decisions raises the credibility problems we discussed early in the paper.

The Czech Republic addressed precisely this kind of “regulatory regret” by using a buy-out to end a monopoly early. Singapore and Hong Kong also chose this approach when monopolies on the international voice services of Singapore Telecom and Hong Kong Telecom became serious sticking points in the WTO negotiations. At the same time that they negotiated the buyout, however, these governments also took a combination of other policy measures to alter the financial prospects of the carriers. For example, Hong Kong took pro-competition measures that would predictably lower the level of monopoly profits from international services while rebalancing rates so that local services would earn larger margins. This policy package became part of the negotiation over the buy-out price.

The question facing many countries is what to do in similar circumstances. These examples are certainly instructive. A change in the concession cannot be arbitrary and capricious. The buyout is an attractive solution, but governments also have other ways of altering the costs and benefits of the concession holder.

One of the hardest tasks of the transition to a competitive market is creating an effective independent regulator with adequate expertise, information, authority, and accountability. The problem grows worse as technology creates a greater convergence of services and erodes the logic of traditional regulatory distinctions. The crucial first step is simply to separate the regulator from the operator and provide the regulator with adequate resources. A top priority is to “work smart,” not just hard, by using tactics that simplify the task of regulation. Two tactics are especially appealing.

First, the regulator should select its market policy to provide incentives for the timely disclosure of critical information. Competition and privatization are, in a very profound way, measures to induce better disclosure of information, because now the financial markets and other suppliers are monitoring the claims of the dominant supplier. Although competition is no bar to self-serving complaints by new entrants, it does create a marketplace of information about the telecommunications market. For example, one reason for introducing more competition in wireless services and allowing greater bandwidth for many licenses is to let market competition sort out the complex issue of what constitutes the best use of the spectrum.

Monopoly is the enemy of good information. If a country opts for a transitional monopoly, it would do well to borrow from the example of Hungary. It resisted granting a single national monopoly. Creating regional monopolies allowed government officials to benchmark the performance of the monopolists against one another. This device is highly imperfect, as the limits on monitoring state telephone monopolies in the United States demonstrated. But it is better than dealing with a monolith.

Second, regulators can use international arrangements (such as the WTO’s regulatory principles) to simplify national policy. Regular consultations among national telecommunications regulators, much like those among central bankers, will allow regulators to share best practices and experiences.

The WTO Agreement on Basic Telecommunications Services created a new regime for the world market. The basics of the regime require that reformist governments in CEECs undergoing transition to market economy pay close attention to regulatory fundamentals. These include low barriers to entry in the market for communications services, effective rebalancing of rates for services during the market transition, strong interconnection policies, and the creation of independent regulatory authorities with the resources and power necessary to foster competition and safeguard consumer welfare. Achieving these regulatory goals will ensure efficient embedding of the domestic communication markets of CEECs in the global communications marketplace.

Notes

1. Even when governments bound only the existing policy regimes (or even made market access commitments more limited than existing practice) the commitments were still valuable because WTO principles inherently convert piecemeal market opening into more general ones. For example, commitments binding at less than the current limit on equity to any foreign investor will be “ratcheted up” after they enter into force because of the MFN principle. Using the MFN clause, any new entrant from one country can demand the same level of equity participation granted to a supplier from another country (Low and Mattoo 1997).

2. Some observers question whether harmonization and multilateral disciplines on regulatory principles in member states should be negotiated alongside trade liberalization. See, for example, Bhagwati (1994). The argument is that free trade is most efficient when differences among nations can be exploited by the industry seeking to specialize.

3. The number of signatories is especially significant, because most WTO agreements emerge from multi-sector and multi-issue negotiations where trade-offs can occur over many industries and items. The telecommunications agreement broke this pattern (Hoekman 1996).

4. In terms of economic theory, a close analogy would be a “focal point” in a bargaining game—a point in the continuum of options that comes to dominate expectations and thus shapes the initial strategies of actors (Keohane 1984).

5. Accounting rates are the negotiated prices for end-to-end international services created jointly by two national carriers. Carriers conduct the negotiations and conclude a commercial contract to establish the accounting rate. We use only the settlement rate, which is the cost of terminating a service in another country, because it is the economically relevant concept.

6. The settlement rate is not the end price to consumers. National carriers can mark up the price still further for originating an international call. But the costs created by settlement rates influence the minimum price for the service.

7. Countries had to make a market access commitment to permit such cross-border networks, but all of the OECD nations and a few key traffic centers in the developing world (such as Hong Kong) did so.

8. Settlement rates are very inconsistent. Rerouting traffic through a third country may be cheaper for a carrier than sending it directly to a country.

9. See Braga et al. (1999), Cave and Waverman (1998), Cowhey (1999), Wallsten (2001), and Wright (1999).

10. For the low-income countries, Wallsten (2001) reports the negative elasticity of 0.9. This means that a 1 percent decrease in settlement rates leads to a 0.9 percent increase in traffic from these countries to the United States.

11. More technically, the possibility of natural monopoly usually rests on the possibility of a sub-additive cost structure. For a discussion of network economics, see Laffont and Tirole (2000).

12. For a discussion of the stranded costs problem in the deregulation of utilities in industrial countries, see Brennan and Boyd (1997).

13. Cowhey and Klimenko (2001) discuss this point in detail in regard to telecommunications reform.

14. Hoski (1998) found that the type of regulatory agency has an important effect on prices for telecommunications on the development of the telecommunications sector in twenty-two European countries (fifteen EU countries and seven East European countries) between 1990 and 1995. The presence of an independent national regulatory authority (as opposed to regulation by a governmental ministry) in European telecommunications markets seems to create a market environment that facilitates greater diffusion of mobile telephones and provides higher penetration rates of pay phones. Furthermore, it was conducive to greater tariff restructuring in the telecommunication sector.

15. This transparency of the process provides two kinds of assurances. First, any effort to influence the opinion of the regulator is a matter of public record. This disclosure limits the possibility of improprieties. Just as important, even with perfectly proper campaigns to persuade regulators, all market participants are able to judge whether they have a stake in lodging counterclaims. Second, regulators are accountable for the record on which they base decisions.

16. According to Levy and Spiller (1994), countries with poor institutional endowments have “unpropitious” regulatory environments.

17. Similar strategic alternatives are outlined by Davies et al. (1995) and Hruby (1997).

18. Analyses of privatization in industrial countries suggest that, in terms of efficiency, the advantages of private ownership over public ownership are considerably weaker in monopolistic markets (see, for example, Vickers and Yarrow 1988).

19. Traditional measures focus on wired network connections. However, wireless connections often match or exceed those numbers in developing economies. Measures of national connectivity have not yet fully accommodated this change.

20. Other policies, such as restrictions on callback, leased lines, and resale, decrease fixed-network penetration, although the relationships are not significant. Non-policy factors, such as significant unmet demand, household density, and network quality (for fixed networks) and average income and population levels (for mobile networks) are also shown to affect network penetration, however, the relationships are also nonsignificant. The data reveal a differing impact on network penetration of barriers to investment among the developed and developing countries economies. Countries such as Australia and Japan, which maintain very minor barriers to investment, are predicted to see only small percentage increases in network penetration as a consequence of complete liberalization.

21. Although this paper focuses on three CEECs—the Czech Republic, Hungary, and Poland—six countries from the region (Bulgaria, the Czech Republic, Hungary, Poland, Romania, and the Slovak Republic) have signed the WTO agreement and are actively seeking membership in the European Union. To qualify, the CEECs must harmonize their laws with the laws of the European Union. In many ways, the EU’s requirements for its current and prospective members go far beyond multilateral disciplines of the WTO when it comes to telecommunications. This harmonization is governed by the far-reaching Association Agreements with the European Union (the Europe Agreements). These agreements took effect in 1994 and have brought about considerable liberalization of trade between CEECs and the European Union. The agreements also include commitments by CEECs to adopt many of the disciplines of the Treaty of Rome. The Czech Republic, Hungary, and Poland have filed formal applications for full membership.

22. The ITU estimated that to meet these goals CEEC governments needed to maintain an annual rate of line growth of 11 percent and to attract more than \$100 billion in investments during the period 1993 to 2000, while achieving a 40 percent penetration in this same period, required \$173 billion in investment.

23. Espicom Business Intelligence (2001).

24. Espicom Business Intelligence (2001).

25. A 10 percent stake was sold to international investors, while 5 percent was sold to domestic investors. Among the international investors was the European Bank for Reconstruction and Development (EBRD), which paid approximately \$75.5 million for 8.1 percent of the total global depositary receipts sold to international investors in the IPO. The EBRD has been a principal supporter of TPSA's modernization and development programs. See Espicom Business Intelligence (2001).

26. World Bank research indicates that uncertain and weak regulatory and legal frameworks sometimes can be stronger predictors of the poor privatization proceeds than the existence of competition. Foreign investors are willing to pay premiums for shares in high-potential companies in growing markets even under competitive pressure (see World Bank 1999). We thank Anna Bjerde from the World Bank for pointing out the results of this research to us.

27. Espicom Business Intelligence (2001).

28. Espicom Business Intelligence (2001).

29. The prices of interconnections tariffs might fall in the future, following the 2001 ruling issued by the Office for the Regulation of Telecommunication and Post (URT) that puts caps on the peak hour interconnections tariffs paid to TPSA. The ruling ordered TPSA to reduce the access fees charged for peak-hour connections, from the current average of PLN 0.068 to PLN 0.032 per minute. The URT's ruling might turn out to be a significant step leading to lower rates and liberalization of the market in general. See IntelliNews (2001).

30. Interfax News Agency (2001).

31. Espicom Business Intelligence (2001).

32. IntelliNews (2001, p. 2).

33. IntelliNews (2001). It should be noted that by the time NOM entered the market, peak-time long-distance rates offered by TPSA had been already 40 percent lower than in 1998. See Gerin (2001).

34. Polska Telefonía Cyfrowa (PTC) operates under the brand name of Era GSM. It is controlled by U.S. West and Deutsche Telekom, each of which holds 22.5 percent, as its main foreign investors. Its network covers around 80 percent of the country and 90 percent of the population. Its main rival Polkomtel, which operates the Plus GSM network, is close behind. Its main investors are the U.S. group AirTouch and TeleDanmark.

35. Centertel, 66 percent of which is owned by TPSA and 34 percent by France Telecom, holds the license.

36. IntelliNews (2001).

37. Brno Broker Group, A.S. (2001).

38. See Petrazinni (1995) and Espicom Business Intelligence (2001b).

39. Ministry of Transport and Communication of the Czech Republic, Telecommunications in Czech Republic, March 22, 2002, www.mdcz.cz/english/index37.htm.

40. The bids were submitted by the following consortia: TelDanmark in partnership with BT, Ameritech with Deutsche Telekom, a Swiss–Dutch–American consortium TelSource, the Italian operator STET, and an alliance between France Telecom and Bell Atlantic.

41. Ministry of Transport and Communication of the Czech Republic, Telecommunications in Czech Republic, March 22, 2002, www.mdcz.cz/english/index37.htm.

42. *Financial Times* (2001).

43. Ministry of Transport and Communication of the Czech Republic, Telecommunications in Czech Republic, March 22, 2002, www.mdcz.cz/english/index37.htm.

44. *Financial Times* (2001).

45. This problem was recently again postponed until the next parliamentary elections. See Machacek (2002).

46. Hungarian fixed network consists of fifty-four primary networks, which comprise 1,500 local exchanges. Trunk facilities connect these primary networks to nine interconnected secondary exchanges. The only international gateway is located in Budapest. Telephone densities in Hungary decline in proportion to the distance from the capital, and peripheral regions in the eastern part of the country have the lowest.

47. Interfax News Agency (2002).

48. Espicom Business Intelligence (2000, p. 7).

49. In early July 2000, Deutsche Telecom acquired the 50 percent stake held in MagyarCom from SBC, which increased Deutsche Telecom's holding in MagyarCom to 100 percent, whereas its ownership in Matav stood at 59.53 percent. The remaining 40.47 percent of the company's stock continues to be publicly traded. MagyarCom therefore remains Matav's main shareholder. See Espicom Business Intelligence (2000).

50. Interfax News Agency (2002).

51. Interfax News Agency (2002).

52. "Hungarian government puts off 3G licence auction," Europemedia (2001).

53. See the Web site of the Hungarian Ministry of Transport, Communication, and Water Management, 2002 (www.mav.hu/khvm/docs/postae/text.htm#a3).

54. Espicom Business Intelligence (2000).

55. Using revenues from long-distance services to subsidize universal service (as is done in the United States) is also a bad idea because it distorts pricing and economic incentives for network development. See Erikssen et al. (1998).

56. A geographically averaged rate, which inflates prices for urban areas, makes entry into urban areas quite profitable.

57. Ordovery et al. (1994) have demonstrated, for example, that regulatory credibility can be significantly enhanced if privatization is phased in. This requires arrangements whereby regulatory takings at the early stages of privatization can significantly reduce revenues at the later stages. The risk of losing future privatization revenues then serves as a credible restraint on regulatory arbitrariness.

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