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Foreign Direct Investment in the telecommunication sectors of transition and emerging countries

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Prefazione

Il Dottorato in Diritto Internazionale dell'Economia (DIE) dell'Università Bocconi rappresenta un'esperienza di studio e ricerca unica a livello italiano e quasi unica a livello internazionale. L'originalità di questo programma non risiede tanto nell'idea di coniugare la metodologia di uno studio congiunto dell'economia e del diritto, che vanta una prestigiosa tradizione nelle scuole di Law and Economics di Chicago e di Berkeley, quanto piuttosto nell'applicazione di tale metodologia allo studio delle problematiche di diritto ed economia internazionale.
Le discipline ministeriali a cui il DIE appartiene sono infatti l'Economia Politica (SECS-P/01), la Politica Economica (SECS-P/02), il Diritto Internazionale (IUS 13) e il Diritto dell'Economia (IUS 05).
Coerentemente con tale impostazione, la mia tesi di dottorato integra questi diversi approcci e tratta un tema di rilievo nel contesto delle relazioni economiche internazionali, la liberalizzazione del settore telecomunicazioni.
Il primo capitolo, introduttivo, è legato alle problematiche più rilevanti in un contesto di liberalizzazione settoriale come quello delle telecomunicazioni.
Il secondo capitolo affronta il tema da un punto di vista giuridico, approfondendo le soluzioni offerte a tali problematiche nel contesto del sistema di accordi facenti capo all'Organizzazione Mondiale del Commercio, in particolare del GATS del 1994 e dell'Accordo sulle Telecomunicazioni del 1997.
Il terzo capitolo affronta il tema della de-monopolizzazione/liberalizzazione da un punto di vista puramente teorico, con la costruzione di un modello di ingresso nel mercato delle telecomunicazioni. Il modello attinge alla recente letteratura sulle modalità di ingresso attraverso investimenti diretti esteri, trattando un tema tipicamente di economia internazionale in un'ottica di economia industriale.
Infine, il quarto capitolo contiene un approfondimento empirico delle esperienze di riforma realizzate nel periodo 1989-2001 da un gruppo di 46 paesi definiti "economie in transizione ed emergenti", che include i Paesi dell'Europa Centro-Orientale, del Medio Oriente e del Nord Africa, del Sud e del Centro America.
I tre gruppi di paesi rispecchiano le aree di interesse dell'Istituto di Studi Latino- Americani e delle Economie in Transizione (ISLA) dell'Università Bocconi, presso il quale ho sviluppato i miei interessi di economia internazionale.

Ringrazio il Prof. Sergio Alessandrini e il Prof. Carlo Secchi dell'Università Bocconi che hanno assecondato con pazienza i miei interessi di ricerca, mi hanno sostenuto nelle mie scelte

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Silvio Contessi

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Acronyms

ARS	Accounting Rate System
ASEAN	Association of South East Asian Nations
BTA	Basic Telecommunications Agreement
CA	Central America and Caribbean
CALEA	Communications Assistance for Law Enforcement Act
CEE	12 Central and Eastern Europe Countries: Albania, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, Slovenia
CU	Customs Union
FCC	Federal Communications Commission
FDI	Foreign Direct Investment
GBT	Group on Basic Telecommunication
IM&A	International Mergers and Acquisitions
ISP	Internet Service Provider
LA	Latin America
M&A	Mergers and Acquisitions
MED	13 Mediterranean countries: Algeria, Cyprus, Egypt, Israel, Jordan, Lebanon, Libya, Malta, Morocco, PNA, Syria, Tunisia, Turkey
MIEM	Modes of International Entry Models
MNC	Multinational Corporations
NGBT	Negotiating Group on Basic Telecommunication
PTT	Post, Telecommunications and Telegraphs
Sec. 255	Section 255 of the Communications Act - Telecommunications Access for People with Disabilities
Tlc	Telecommunications
UEM	Unobserved Effects Model
USD	United States Dollar
WTO	World Trade Organization

Introduction

"In the area of telecommunications, reform of the institutional framework governing the telecommunication sector is imperative in view of the demands imposed as a result of the growing liberalization of the world economy and the rapid evolution technology.
Indeed, in order to be able to integrate Morocco into the World Economy, there is a need for access to highly advanced networks which require investment beyond the capacity of the State to provide."

His Late Majesty King Hassan II of Morocco
Speech from the Throne
March 3 1997

Telecommunication sectors have been changing hecticly at technological, economic and legal level.

In many countries, market-based approaches to deal with telecommunications (Tlc) are increasingly popular and independent regulatory authorities are more and more frequent and active to assist and discipline the challenging transformation of their national sectors, traditionally dominated by state-owned monopolies, into competitive arenas.

Multiform factors lie behind the liberalization process that is taking place at international level. The United Stated, Japan and New Zealand have been the first countries to provide the evidence: Tlc firms operating in liberalized markets are more dynamic, efficient and serve customers better. The European Union has developed a successful model to regulate interconnection in order to realize a smooth transition from monopolies to competitive markets. In fact, as the words of King Hassan II of Morocco witness, also developing countries have begun to see the liberalization of their telecommunication sectors as an opportunity to attract private capital able to expand and upgrade telecommunication networks, introduce new services, and improve the quality of the existing ones.

At the same time, telecommunication services are getting differentiated and sophisticated in order to cope with the complex needs of the information society. The rapid diffusion of the Internet has caused data traffic to overtake voice traffic, whereas the growth of wireless services has opened the road to new service providers and posed a vital alternative to the wire-line services, more than ever in developing countries.

Telecommunication liberalization is a complicate topic to tackle from a purely economic point of view. Formal economics could help only to explain single-faceted issues and rigorous analysis tends to leave important aspects out of the picture, under the *cæteris paribus*

assumption. At the same time, purely legal analyses tend to neglect important issues relating to evaluation of the *modalities* countries liberalize their telecommunication markets.
Thus, this work is interdisciplinary in nature and tries to apply that *international economic law and economics* approach that has proved successful in interpreting many complicated phenomena, generally labeled as globalization.

The motivation of the present study is to provide a framework of analysis and interpretation of the effects of FDI liberalization in the telecom sector of transition and emerging countries.

Two qualifications are necessary to understand the way this objective will be pursued.

First of all, the term **liberalization** is accepted here as an inclusive definition of three distinct sets of measures, namely liberalizing international trade, privatizing publicly owned companies and allowing entry in certain sectors, possibly de-monopolizing state-owned companies.
Naturally, since the importance of international trade in telecommunication services[1] is very limited, the General Agreement on Trade of Services signed in 1994 has been coherently negotiated to provide a framework for the "liberalization" of international activities other than trade (*cross-border* supply in the GATS parlance), namely *commercial presence*, *consumption abroad*, and *movement of natural persons*[2]. If consumption abroad, movement of natural persons, and cross-border supply are of a limited importance in the telecommunication sector, commercial presence is certainly not.

In the GATS, Commercial presence (CP) is defined as

"[...] *any type of business or professional establishment, including through (i) the constitution, acquisition or maintenance of a juridical person, or (ii) the creation or maintenance of a branch or a representative office, within the territory of a Member for the purpose of supplying a service* [3]."

[1] As opposed to tlc *goods*.
[2] Gabriella Venturini (1999), *Servizi di telecomunicazione e concorrenza nel diritto internazionale e comunitario*, G. Giappichelli Editore, Torino.
[3] GATS Art. XXVIII (d).

From a substantial point of view, CP is equivalent to what economic theory calls Foreign Direct Investment (FDI), for which the most widely accepted characterization is the OECD benchmark definition:

"Foreign direct investment reflects the objective of obtaining a lasting interest by a resident entity in one economy ("direct investor") in an entity resident in an economy other than that of the investor ("direct investment enterprise"). The lasting interest implies the existence of a long-term relationship between the direct investor and the enterprise and a significant degree of influence on the management of the enterprise. Direct investment involves both the initial transaction between the two entities and all subsequent capital transactions between them and among affiliated enterprises, both incorporated and unincorporated."

The legal and the economic definitions do not need to overlap, but this work disregards, arguably loosely, possible differences between them to treat CP and FDI as equivalent definitions.

The insertion of the CP in the GATS, as a complement to the movement of persons (*movement of natural persons*) and products (*cross-border supply*), has been widely acknowledged as a success, especially because the multilateral liberalization of investment for non-service sectors has proved to be a knotty topic to unravel within the WTO negotiations[4], and even at OECD level.

The second qualification regards the countries that are made object of this study, as "transition and emerging countries" is a somewhat imprecise definition, which has been chosen to leave out of the picture the most developed OECD countries solely. The choice is motivated by the exigence of focusing on countries where telecommunication networks, wireline and/or wireless, are "small" and inefficient as compared to developed countries. Transition and emerging countries, as defined here, are those where Tlc have been or still are publicly owned. These countries are more likely to experience capacity constraints

[4] The negotiations for a multilateral agreement on investment (MAI) were launched in 1995 among 29 member states of the OECD and stopped in 1998, without success. Since then, the task of exploring the desirability and the feasibility of a multilateral investment agreement has been deferred to a WTO working group. So far no MAI has been agreed.
For an economic interpretation of the MAI see

and/or reduced efficiency, so that consumers might be rationed and/or prices might be high with respect to international standards.

Transition countries are usually thought to include former socialist and centrally planned economies, such as Central and Eastern European Countries (CEECs), China or Vietnam, and generally all nations that are precisely re-defining fully or partially their legal and economic system towards some kind of Western capitalist model. However, only CEECs are considered here.

To put it in words used by Josef C. Brada[5] the definition of transition countries lies in the importance attributed to the ownership of capital: *"The difference between socialism and capitalism lies in the ownership of property; the former is a system where nonhuman productive resources are primarily socially or state owned, while the latter they are mainly owned by private individuals. Thus, only if transition economies are able to make large and lasting changes in the ownership of productive assets away from the state and toward individual owners will they make the transition from socialism to capitalism."*

Of course it has been argued that this definition might even apply to some European countries up until the mid-90s, so that even Brada's broad definition appears a bit too blurry.

Emerging economies include Middle East and North African (MED) countries, Latin American (LA) and Central American (CA) countries[6], at least for the purpose of this study,.

South American (SA) and Central American (CA) have a long history of tentative integration and have experienced different patterns of liberalization. SA and CA countries have also witnessed a long-lasting effort of cooperation with the European Union and are now in the spotlight because of the possibility of the extension of the North American Free Trade Agreement (NAFTA) into a continental American Free Trade Agreement (FTAA) stretching from Alaska to Patagonia.

MED countries, a heterogeneous collection of emerging and developing countries, now tend to be considered as a possible regional group.

In fact, the early 1990s have witnessed the awakening of a new interest in these countries after the call for a strengthening of the relations between Europe and the Mediterranean

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Turrini, Alessandro and Dieter Urban (2000), "For whom is the MAI?", Centro Luca D'Agliano WP.

[5] Josef C. Brada (1996), "Privatization is Transition - Or is it?", *Journal of Economic Perspectives*, 10:2:Spring, 67-86.

initiated by the European Union[7]. A number of factors heightened the awareness in Europe of the urgency of the Mediterranean issue and the need to establish a so-called Euro-Mediterranean area. The Barcelona Declaration, adopted on November 28 1995 at the Euro-Mediterranean Conference of Foreign Affairs Ministers, inaugurated the Euro-Mediterranean Partnership. This joint initiative of the 27 partners meeting in Barcelona - the 15 Member States of the European Union and 12 Mediterranean partners[8] - focused on three objectives:

- defining a common area of peace and stability by means of stronger political and security dialogue;
- building a zone of shared prosperity by means of an economic and financial partnership and gradual introduction of a free trade area, in order to integrate the Mediterranean partners into the zone's largest economic center, the European Union;
- fostering closer relations between peoples by means of a partnership in social, cultural and human affairs aimed at promoting understanding and exchanges between different cultures and societies.

In general, in most countries Tlc sectors have been long dominated by strong interventionism. The monopolistic Tlc provider typically used to be incorporated into the Government and run as a division of the ministry of Posts, Telegraph and Telecommunications (PTT), far from being considered as a normal *business enterprise*. In some cases, price regulation has been used to make up for government budget deficits, without extensive consideration of the economic or social impact of price increases.

From time to time, it has been observed that traditional discretionary price regulation has even failed to generate enough revenue to pay the operating costs on the incumbent operator or to support network upgrades and expansion[9]. In some jurisdictions, telephone revenues of state-owned operators, have historically been treated as part of general government revenues, whereas expenditures of the state-owned operators, including investment, have been included in the general government budget.

Over the years, such organizational structures of the telecommunication sectors have deprived operators of the capital required to upgrade network, and frequently annihilated

[6] The complete list of the countries included in the empirical analysis is contained in Appendix 4.1.

[7] For a comprehensive treatment of the issues related to the Euro-Mediterranean Partnership see Sandro Sideri (2002), "Euro-Mediterranean Partnership Initiative and EU Enlargement Problems, Alternatives and Policy Response", ISPI Studi & Ricerche, Milan.

[8] Algeria, Cyprus, Egypt, Gaza and the West Bank, Israel, Jordan, Lebanon, Malta, Morocco, Syria, Tunisia, Turkey.

[9] Emmanuelle Auriol and Pierre M. Picard (2002), "Privatizations in Developing Countries and the Government's Budget Constraint", WP IDEI Toulouse.

the incentive to innovate and reduce costs, leading them to have both poor performances and overstaffing.
In principle, long-term capital investment should constitute a large part of the costs of a telecommunication operator. However, cash-strapped governments tend to extract cash from state-owned operators to finance their government priorities, especially when the operator earns monopoly rents.

In order to discuss these issues, this project is sub-divided in four parts.
Chapter 1 is an introduction dealing with the major issues concerning reforms in transition and developing countries from a regulatory point view.
Chapter 2 carries out a detailed analysis of the multilateral rules concerning telecommunications in the framework of the World Trade Organization, trying to assess if and how the issues stressed in chapter 1 have been solved in the multilateral system.
Chapter 3 proposes a model of FDI entry in the Tlc sector of transition, emerging and developing countries making use of a three-stage game with capacity constraints and technology transfer.
Finally, chapter 4 proposes an econometric analysis of Tlc reforms in a panel of 46 transition and emerging countries.

References

Alessandrini, Sergio (2000), *EU foreign direct investment in Central and Eastern Europe*, Giuffrè Editore.

Alessandrini, Sergio (forthcoming),*The European FDI in the Mediterranean Region*, Bocconi Ed.

Auriol, Emmanuelle and Pierre M. Picard (2002), Privatizations in Developing Countries and the Government's Budget Constraint, WP IDEI Toulouse.

Brada, Josef C. (1996), "Privatization is Transition - Or is it?", *Journal of Economic Perspectives*, 10:2:Spring, 67-86.

Sideri, Sandro (2002), "Euro-Mediterranean Partnership Initiative and EU Enlargement Problems, Alternatives and Policy Response", ISPI Studi & Ricerche.

Turrini, Alessandro, and Dieter Urban (2000), "For whom is the MAI?", Centro Luca D'Agliano WP.

Venturini, Gabriella (1999), Servizi di telecomunicazione e concorrenza nel diritto internazionale e comunitario, G. Giappichelli Editore, Torino.

Chapter 1

Critical issues in the liberalization of telecommunication sectors: An overview

This chapter provides an overview of the relevant issues in the development of telecommunications sectors from a regulatory perspective, which encompasses both legal and economic issues. Once the key problems of liberalization processes are underlined, a juridical analysis of the WTO agreements will be carried out in chapter 2 and emphasize if and how such a system of rules solves the problems here discussed, namely regulation, licensing, monopolies and competition policies, interconnection and price regulation, and universal service.

To introduce these issues, the case of Moroccan telecommunication reforms is particularly revealing. In fact, Morocco has been addressed as a successful case of liberalization by the International Telecommunications Union (ITU), the global organization gathering 189 Member States and around 600 sector members, and dealing with Tlc related issues.

As in other countries, Moroccan Tlc have been historically run by the Government, specifically by the Ministry of Post and Telecommunications since 1956. A major breakthrough took place in 1984 when operational functions were attributed to the National Post Office and Telecommunication Agency (ONPT), whereas the Ministry retained only regulatory functions. The ONPT took responsibility for the management of both postal services and Tlc services.

In 1997, the restructuring process accelerated with the creation of Maroc Télécom, an incorporated company formally separated by any other public office, and Moroccan Post, a public entity charged with the management of postal services. The final step in the restructuring of the sector was the Establishment of the National Telecommunications Agency, the regulatory entity.

Given the existence of an incorporated public monopolist and a separate regulator, the Moroccan government speeded up the liberalization by awarding the second GSM license to Médi Télécom in 1999 for USD 1.1 billion, and selling 35% of Maroc Télécom to Vivendi Universal for MAD 2.3 billion.

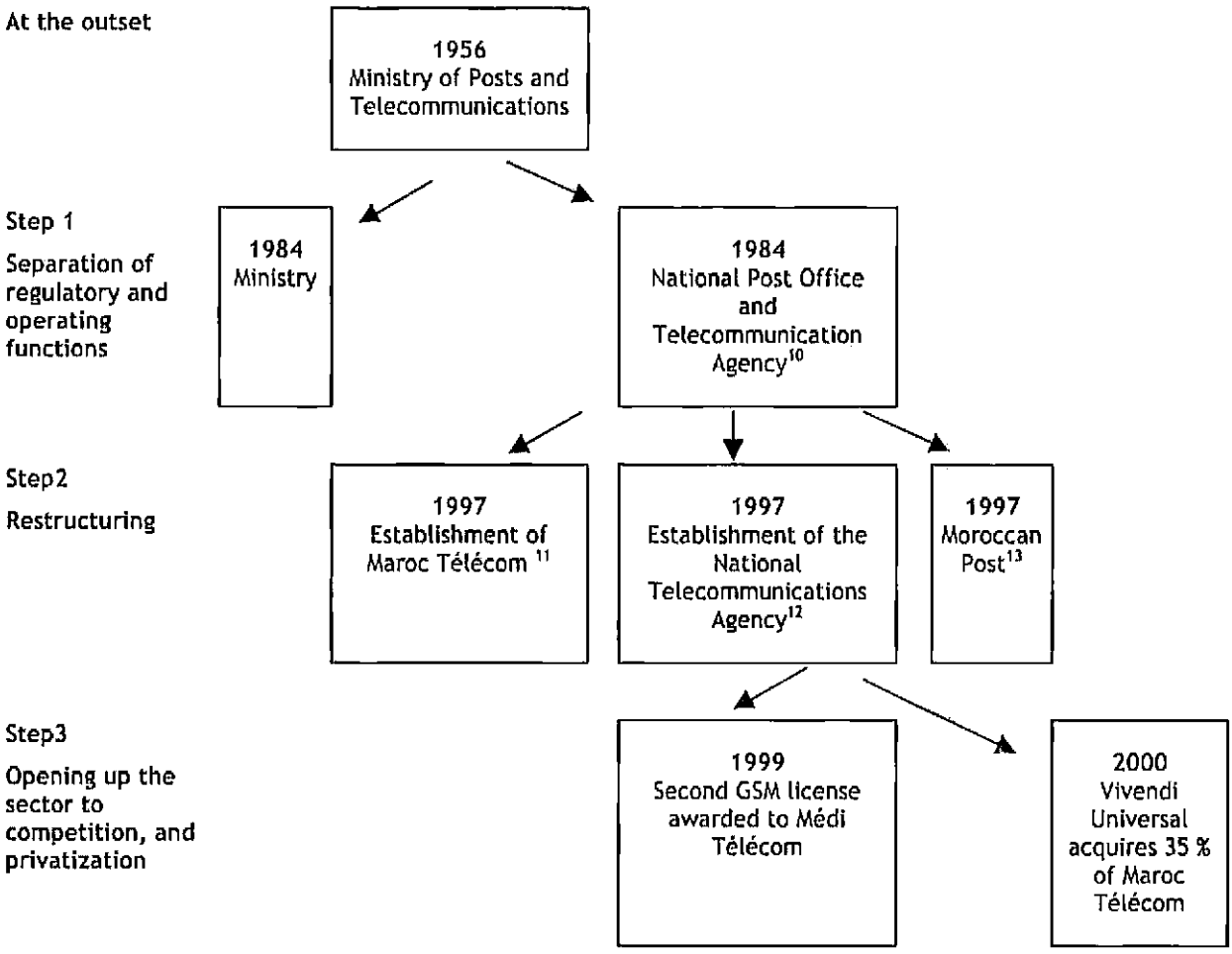

Figure 1.1 The Development of Moroccan Telecommunications

The consortium that established Médi Télécom was constituted by Telefónica de Espana (30.5%), Portugal Tlc (30.5%), and a pool of domestic investors (BMCE Bank, Groupe Afriquia, Caisse de Dépôt et de Gestion) and hosted one of the biggest FDI operations ever realized in the country.

The process just highlighted for Morocco has been typical for a number of transition and emerging countries, as next chapters will explain. The typical steps include the separation of the Tlc operator, the incorporation of the public monopolist, the establishment of a separate

[10] *Office National des Postes et des Télécommunications* (ONPT).
[11] *Itissalat Al Maghrib* (IAM S.A.).
[12] *Agence Nationale de réglementation des télécommunications*(ANRT).
[13] *Barid al Maghrib*.

regulator, the partial privatization of the monopolist to foreign operators, and the wireless competition.

Such a process requires governments to deal with the key issues that will be discussed in the next pages, namely regulation, licensing, monopolies and competition policy, interconnection and price regulation, universal service.

1.1 Regulation

The Tlc sector has traditionally been a heavily regulated industry. The market-based supply of Tlc needs regulatory authorities to attain the successful transformation of monopolistic Tlc markets into competitive ones because, without intervention, viable competition is not likely to emerge. Jean Jacques Laffont and Jean Tirole (2000) identify two complementary paradigms for regulation.

The political economy approach to regulation emphasizes the impact on policy of interest groups such as industry participants, suppliers, customers, etc.

The public interest approach looks at market failures to motivate government intervention, usually assuming that public powers are benevolent.

Both approaches, however, stress that a liberalized[14] Tlc industry has peculiarities that have to be borne in mind throughout these pages:

1. There exist multiple networks that must be interconnected because of the existence of network externalities.
2. The Tlc industry is characterized by large fixed costs. Some of its segments are natural monopolies and, to the extent that they are produced by one or few operators, these segments become bottlenecks to which other operators must able allowed access to be able to compete.
3. The evolution of the bottlenecks changes with the evolution of technology.

Regulatory intervention

ITU indicates that in 1990, 12 countries had Tlc regulatory agencies that functioned separately from Tlc operators. The term "separate regulators" generally refers to agencies that operate separately from ministries or PTTs that are also responsible for the provision of Tlc services. By 1999, that number had increased to 96.

Regulatory intervention is required for a variety of reasons. Typically, regulators must authorize or license new operators. They must often remove barriers to market entry by new operators. They must oversee interconnection of new entrants with incumbent operators. Regulatory intervention is also required to ensure that competitive markets do not fail to serve high cost areas or low income subscribers.

Widely accepted regulatory objectives include:

- the promotion of universal access to basic telecommunications services;
- the promotion of efficient supply of Tlc services, good quality of services and efficient pricing;
- where competitive prices do not exist or fail, prevent abuses of market power such as excessive pricing and anti-competitive behavior by dominant firms.

In fact, because Tlc networks have been operated by government administrations for most of the 20th centuries, operations were administered essentially in the same way as postal, rail or highway transportation services. The separation of the policy, regulatory and operational functions of Tlc has made the role of regulatory authorities much more important. Regulatory agencies were established at the same time of the privatization of Tlc administrations. The overall objective was to ensure that public policy objectives in the sector continued to be met. While government monopolies are not perceived to require regulation, private monopolies generally are. The introduction of competitors in newly privatized markets also increases the need for new regulators to act as referees between the new entrants and incumbent operators.

Thus, the typical institutional structure in developed market economies attributes a policy development function to Government ministries and executive branches, a regulatory function to separate regulatory authorities, and network operation and service provision functions to PTOs, privately or commercially operated. This structure is compatible with market-based supply of Tlc services, rather than government-based supply, and also facilitates compliance with the WTO Regulation Reference Paper that will be discussed in chapter 2.

The independence of regulators is believed to inspire market confidence and promote compliance with international trade obligations. Independence has to be guaranteed first of all with respect to governments that may intervene with political or operational pressures, especially where they retain ownership of the PTO. Tlc operators and investors have

[14] The definition of liberalization of tlc sectors accepted in this work has been highlighted in the introduction.

generally greater confidence in the possibility that an *independent* organization could regulate a market objectively and transparently. In general, such confidence will depend on the credibility of the regulator and on his demonstrated capability to regulate in a professional and impartial manner.

The funding of the regulatory process is equally important to allow hiring good caliber professional staff and consultants to implement regulatory objectives. Funding is provided through general government budget appropriations, license fees and spectrum fees paid by operators.
In fact, while regulators can be single or collegial, they necessarily require various technical, professional and support staffs, as well as outside consultants.
They usually have sector specific regulatory functions, even if the regulatory practice includes multi-sector regulators in several countries. Multi-sector regulators, also called public service commissions, have also been established in a few emerging countries, such as Bolivia, El Salvador, Jamaica and Panama, often incurring in the impractical situation of privatization and liberalization progressing at different speed in different sectors.

Regulatory instruments include regulations, decisions, orders, decrees, rules, policies, notices, resolutions that have to respond to principles of transparency, objectivity, professionalism, efficiency and, as just mentioned, independence.

1.2 Licensing

In the Tlc sector, a license authorizes an entity to provide Tlc services or operate Tlc facilities, defines the related terms and conditions, and describes the major rights and obligations of an operator.
The terms *license*, *concession*, and *franchise* may be defined differently in the law of different countries, but tend to refer to the same basic concept. In the context of Tlc regulation, a license designates a legal document granted or approved by a regulator or other government authority that defines the rights and obligations of a telecommunication service provider.
Historically, Tlc services have been provided by state-owned incumbent operators on a monopoly basis and Tlc have been treated as a branch of the public administration, together

with postal services, public transportation and other services, so that there had traditionally been no need to issue licenses.

With the liberalization process taking place in numerous countries, however, competitive licensing has been used as the basic mechanism to let new entrants into liberalized markets. In many cases, licenses for incumbent operators have been established as part of their own privatization: the specification of their rights and obligations allowed countries to reduce the uncertainty faced by investors, mostly foreign, concerning the business they were about to invest in. Also, in the context of emerging and transition economies, licenses have been used to build confidence of investors and lenders, who are required to invest millions or billions of dollars to install or upgrade telecommunication infrastructure after the initial investment.

It has to be noted that some countries have not made use of Tlc licensing, notably the US and Canada, where regulatory terms and conditions have been imposed through decisions, orders or tariff-approval processes of regulatory authorities. In other countries, mainly Latin American, privately-owned telecommunication carriers have been traditionally granted concessions or franchises.

Common licensing objectives are

- the regulation of telecommunications as one of the essential public services,
- the expansion of networks and services particularly when state-owned operators are privatized or some degree of exclusivity is granted[15],
- the regulation of market structure and competition,
- the establishment of a competition framework,
- the allocation of scarce resources such as radio spectrum, numbers and rights of way,
- the generation of government revenues,
- consumers protection[16], and
- the assurance of regulatory certainty[17].

The form of a license depends on the legal regime of a country. The cross-country regulatory experience records three types of licensing regimes:

1) *Individual licensing regimes* imply the use of detailed operator specific licenses that are granted through some form of competitive selection process, they are particularly useful

[15] E.g. a duopoly cellular license with a right to use scarce spectrum.

[16] Licenses might include price regulation, billing practices, consumer compliant mechanisms, dispute resolution, limitations of liability for service defaults and mandatory services to consumers, such as directory services, operator assistance and emergency services.

when a scarce resource or right is to be licensed, such as spectrum, and when the regulator is interested in a peculiar way of provision, e.g. when the operator has a significant market power.

2) *General authorizations* or *class licenses* allow all qualified entities to provide a service and are used when the use of individual licenses has no justification but significant regulatory objectives are preferably being achieved by means of general conditions; they tend to include various provisions relating to consumer protection.
3) *Open entry* (no licensing requirements).

The grant of a telecommunications license might be a unilateral act of the regulatory authority and in these cases the grant of license is a purely administrative act. The license is granted to one or more licensees subject to the terms and conditions specified in the license.

In other countries, the license might be a contract between the regulator and the operator, especially when it is granted by way of "concessions" and sets out rights and obligation of both parties, namely the Government and the operator, in some detail. Licensing through contract is more frequent in countries where the legal and regulatory framework is less developed, such as transition economies.
International experience shows[18] that matters of form are largely irrelevant to good licensing practice, while what really matters is that the license conditions are clear, proportionate, enforceable, and avoid unnecessary burdens.

The contents of a license document depend on the state of the regulatory regime of a country. Countries with well-developed regulation tend to have shorter documents because they do not need to specify all conditions in detail. For example, if a price regulation regime already exists in a country, it is not necessary to spell it out in a license. A fairly comprehensive license might determine the scope of license, exclusivity rights, term of license, acquisition, operating and spectrum fees, eligibility, ownership and control rules, facilities and equipment, co-operation with the regulator, access to rights of way, use of radio spectrum, numbering, directory, universal service issues, network rollout and service coverage obligations, quality-of-service requirements, terms of customer protection, price regulation, interconnection issues, anti-competitive practices and so on.

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[17] This is particularly true in the case where Foreign Direct Investment (FDI) is sought in riskier developing or transitional countries.
[18] Worldbank InfoDev (2001), Telecommunications Regulation Handbook.

Licensing process and spectrum-related issues

Since most countries begin their liberalization process departing from a situation of domestic public monopoly, the major step they initially take when reforming their Tlc sector is the issuance of a license to the incumbent operator without any competitive selection or equivalent formal public process. New Tlc laws or amendments typically authorize the licensing of the incumbent operator, while adopting rights and obligations incorporated in the new license to the new sector policy and regulatory regime. This process involves bargaining between the regulator and the public Tlc operator (PTT), with the advise of professional advisors, including investment bankers and lawyers. Ministries of Finance tend to focus on exclusivity rights and market advantages as means of increasing privatization proceeds, whereas Ministries of Communications and regulators are more focuses on the industrial logic and the objective of promoting efficiency and/or competition.

In some countries, both developed and less developed, PTT are granted licenses for new services, such as cellular, data communications or Internet Service providers, *outside* the competitive selection process by which licenses for those services are contemporaneously granted to new entrants and issues of fairness and transparency arise. The new entrant pays significant amounts for the license under a competitive process, whereas the incumbent does not. In a few cases, The latter has been required to pay a fee equal or close to the amount of the winning bid for a fixed percentage of that amount. This has been the case for the issuance of the second GSM license in Jordan, and for the second cellular operator of the three Colombian regional markets[19].

The radio spectrum is unanimously acknowledged to be a valuable, limited public resource and thus subject to government regulation. Despite technological progress expanding the usable portions of the spectrum, it is *de facto* a limited resource for which demand often exceeds availability.

Traditionally, Governments have allocated spectrum to particular applications and then assigned segments to entities on a "first come, first served" basis. The present competitive environment, however, requires more appropriate tools to tackle the availability constraints: Lotteries, comparative evaluation processes and auctions, or combinations of them, are used.

1) Lotteries are quick, cheap and transparent but bear the risk of attracting participants either with no intentions of operating Tlc services, but rather planning to re-sell the

[19] 95% of the amount of the winning bid in the applicable region.

spectrum license for a profit, or just financially unprepared to start up the service, especially if a formal qualification process is baldly carried out.

2) With a Comparative Evaluation Process, also called Beauty Contest, a government agency, such as a regulator, carries out a detailed individual analysis of the applicants and assigns the relevant spectrum to the ones it believes suitable to use the spectrum. Required qualifications and criteria vary greatly, ranging from proposed tariffs, to geographical coverage, network rollout targets, quality and range of service commitments, and efficient use of frequencies. Needless to say, such an approach brings a number of risks related to the lack of transparency, the high discretionality and subjectivity.
3) Auctions are more and more popular in the Tlc sector[20]. The auctioning process might be very complex and include a pre-qualification phase using criteria similar to those in Comparative Evaluation Processes, used to restrict participation to bidders with proven financial and technical capabilities. Commonly used spectrum auctions are one-round (open or closed) or multiple-round (sequential or simultaneous)[21] auctions. Auctions are considered efficient, transparent and objective, tend to allocate the spectrum to the bidders with the highest evaluations, and can produce substantial proceeds for deficit reduction and other public priorities. Arguments against auctions include the possibility of passing high costs on to customers, the possibility that high prices for licenses or spectrum may reduce financial resources to invest in network infrastructure, and the risk of strategic co-operative bidding among companies.

Spectrum licenses are used to allow operators to use radio frequencies, which are required to provide a service that is typically, but not necessarily, granted as part of an individual licensing process. For example, cellular operators have to be authorized to use required spectrum as well as to operate cellular networks.

Two distinct licenses might be used for administrative convenience in management of the spectrum, especially in countries where it is delegated to administrative authorities different from those regulating other aspects of Tlc operations, such as price regulation or anti-competitive conduct. If two distinct licenses are used they should be issued simultaneously to avoid discriminatory or unfair treatment of the beneficiary.

[20] For an excellent survey see Paul Klemperer (2001), "Why every economist should learn some auction theory", Cambridge University WP.
[21] A detailed description of various types of auctions is beyond the scope of these pages.

Licensing Practices

Good licensing practices are discussed in Infodev (2000) and include procedural transparency, the use of public consultations, distinguishing licensing from procurement, clear definition of license fees, balancing certainty and flexibility, distinguishing licensing from procurement, concession, Build-Operate-Transfer from similar arrangements, the definition of geographic service areas, of qualification criteria and of selection criteria.

1.3 Monopolies and Competition Policy

From the simplest economic point of view, the rationale for competition policy is present in markets that depart from perfect competition.

In competitive markets, individual suppliers lack the power of dictating market terms and have to face the rivalry of their competitors, if they want to survive. Market power is generally defined as the power to unilaterally set and maintain prices or other key conditions of sale. In those (ideal) markets, there exist a large number of suppliers and a large number of consumers who have perfect information and freedom to deal with any chosen supplier. Economic theory indicates that in a perfectly competitive market, government intervention to implement competition policy has no reason to take place.

In reality, of course, there exist almost no perfectly competitive market, and a few quasi-competitive sectors. Rather, in most market competition is not perfect and tends to lead to some form of market failure that, in extreme cases, might result in a monopoly. Again, simple economic theory suggests that a monopolistic market is associated with excessively high prices, reduced supply levels, or other non-competitive behaviors that reduce consumer welfare. Monopoly could be the result of structural conditions of a particular market, or come from collusion among suppliers.

Accordingly, the objectives of governmental intervention in the operation of competition in market-based economies are to respond to market failures, to limit abuses of market power, and to improve economic efficiency.

These objectives are pursued by means of both behavioral and structural competition policy. Behavioral intervention attempts to modify the conduct of a firm, or of a group of firms, as in the case of price regulation, of prohibition of competitive practices or agreements, and interconnection related orders. Structural regulation, instead, affects the market structure of the industry, as in the case of merger prohibitions of major Tlc operators, or in the case of

orders to separate operations under distinct corporate entities, or to divest entire lines of business[22].

Many countries have separate authorities exerting competition and regulatory powers in the Tlc sector, having both a competitive authority and sector-specific Tlc authority. When two or more authorities co-exist, the limit of their powers has to be carefully defined in order to avoid overlapping or gray areas that may come to the detriment of the objectives of the regulatory and pro-competitive intervention.

Not all countries, however, have established sector-specific regulators. New Zealand, for example, has been one of the front-runners in worldwide Tlc liberalization, but has long had solely a general competition law and no sector-specific regulator. At the other edge, there exist countries having Tlc regulators but no economy-wide competition law. And, of course, some countries have neither.

While economy-wide competition authorities typically apply remedies retrospectively in response to specific complaints, habitually carrying out formal investigation procedures, sector-specific regulators act both forward- and backward-looking, taking decisions that can have a general or a peculiar scope, and can make use of less formal procedure, more often than not.

In fact, while the policy focus of the former is to reduce the conduct that impedes competition, to promote allocative efficiency and to prevent market misconduct, the focus of the latter is wider. Tlc regulators typically apply multiple policy objectives, including social objectives other than allocative efficiency, such as the attainment of universal service, and play an important pro-competitive role during the transition from monopolies to oligopolies.

In fact, the focus on Tlc usually calls for wider sector-specific powers of intervention in the case of Tlc regulators, allowing the authorities to make more abundant use of technical sectoral expertise.

Thus, good regulatory design calls for the establishment of Tlc regulator rather than on the reliance on competition authorities. Of course it happens that Tlc regulators often apply competition law or policy in carrying out their mandates.

Overall, there exist a wide consensus on the fact that effective regulatory activity is fundamental to implement a successful transition from monopoly to competitive markets. The need arise from the particular position of incumbent network operators who could be

[22] The divestiture of AT&T is a handbook case of structural regulation decision.

able to dominate their markets even after the introduction of competition. This explains also why for Tlc competition policy and regulatory intervention are very much inter-wined, especially during liberalization initiatives.
A definition of product and geographic market and of product market are required, the former in order to provide a spatial context in which to evaluate the level of competition and the impact of anti-competitive conduct, the latter to understand what kind of services are subject to regulatory intervention.

The most evident and common advantages incumbent operators customarily exploit are the control of essential facilities, economies of established national network, vertical economies, control over network standards and development, cross-subsidies, and customer inertia.

At the outset of liberalization programs, incumbent operators often own **essential facilities** that have built and paid for under a regime of government ownership or guaranteed rate-of-refund regulation. Those include public rights of ways and support structures, namely poles and conduits, local loops telephone numbers and frequency spectrum. New entrants require access to those facilities to compete with the incumbent while they establish or complete their own facilities, if regulation or their business plans require so. Duplication of these facilities may be either technically difficult, or even economically inefficient.
Control of essential facilities in absence of a strong pro-competitive regulation determines unfair competition: The incumbent can use its control over them to increase the competitors costs or make its service less attractive to customers, can refuse to supply essential facilities to competitors, or discriminate by providing low quality facilities to competitors. Clearly, anti-competitive behaviors over essential facilities might be extremely difficult to detect especially when they touch peculiar technicalities.

Economies of scale and scope of established network might be difficult to match for competitors in short periods of time. For some elements of the network, such as national local access loop network, the cost of duplicating the incumbent's facilities may be prohibitively high, while at the same time, the capacity of the facility may accommodate two or more competitors without additional congestion costs. Moreover, from a historical point of view, many established telcos have provided access service at subsidized rates, so to enjoy presently economies of density, scale and scope giving them an advantage in terms of lower long-run "total service" incremental costs than the new entrant, who can rely on a smaller initial customer base.

Vertical economies due to integration of upstream and downstream production facilities and to the joint planning, construction and operation of networks give the incumbent additional advantages. For example, the active operation of local access, national long-distance and international networks make the coordination of different segments of business much easier than for the entrant who typically expand gradually from one or few services to a wider broad of activities.
Moreover, for established technology the incumbent enjoys the advantage of having set the technical standards and the technologies to which the competitors must adapt if they enter the market.

The wide range of services provided by the incumbent allows him to make use of cross-subsidies among segments of business. For example, in most countries, local access has been traditionally cross-subsidized by international traffic, meaning that profits from the latter were used to sustain below-costs tariffs in the former.
The anti-competitive behavior of incumbents, in this cases, consists of pricing *competitive* service below costs using rents extracted from sub-sectors run in a monopolistic position.

Finally, customer inertia and switching costs are another possible friction affecting negatively the competitive impetus that a new entrant might bring into the market. This holds especially true for low-volume consumers (such as residential consumers) when marketing costs and customer-switching costs, or simple inconveniences[23] can be potentially high, even when competitors do not take any specific action to lock in their customers.

All these elements call for the need for an efficient regulatory authority to favor competition and to deal with specific anti-competitive conducts.

A key element of success to guarantee an effective competition policy in the Tlc sector is the clear definition of markets, of barriers to entry, of market power and dominance, and of essential facilities.

Markets can be defined along a geographic and a product dimension.
The importance of the geographic definition of a market is sector specific, varying with the type of services under examination. For example, the market for local phone access in an

[23] Think about the need to dial extra digits to reach a new entrant's network, to deal with two different bills, or to change telephone numbers.

area is typically unaffected by the degree of competition in a neighboring local market, whereas the markets for internet-related services might be.
The definition of product is conducted on the demand side through the definition of substitutes for the service and the study of price elasticities between services, in order to establish how much an operator can increase prices without losing customers and determine some kind of measure of monopoly power over a business segment.

Barriers to entry include government restrictions such as monopoly franchises or restricting licensing practices, economies of scale, high fixed or capital costs, intellectual property rights such as copyright and patent protection. For example, a Tlc network typically requires large investment in fixed costs, licenses, or permits to use spectrum.

As it should be clear by now, the concept of **Essential Facilities** is fundamental for the application of competition policy in the Tlc sector. An essential facility is general defined[24] as a structure that

1) is supplied on a monopoly basis or is subject to some degree of monopoly control
2) is required by competitors (e.g. interconnecting operators) in order to compete, and
3) it cannot be practically duplicated by competitors for technical or economic reasons.

Definitions of essential facilities vary quite much among national regulations and agencies. Nonetheless, all regulators in the US, Canada, Europe have felt the need to define essential facility in order to be able to evaluate incumbent's market power and market dominance.
From a regulatory point of view, **market power** is defined[25] as the ability of a firm to independently raise prices above market levels for non-transitory periods without losing sales to such a degree as to make this behavior unprofitable. Factors influencing a firm's market power include her market share, barriers to entry, pricing behavior, profitability and vertical integration. The European Commission, for example, has employed the concept of "Significant Market Power", in a number of Open Network Provision Directives to apply additional obligations on operators to which such a measure of market power applies.
Market dominance is a more extreme form of market power whose definition can be found in the law and jurisprudence on some countries, based on the doctrine of essential facilities.
In antitrust, the *doctrine of essential facilities* (or bottlenecks) states that the owner of an essential facility may have an incentive to monopolize complementary or downstream segments as well. This is commonly considered as a peculiar case of a dominant or monopoly

[24] Worldbank InfoDev (2001), Telecommunications Regulation Handbook, page 5-13.
[25] Worldbank InfoDev (2001), Telecommunications Regulation Handbook, page 5-11.

position[26]: As just explained, since most goods and services are purchased in bundles of different elements, economies of scale or of scope, network externalities, innovation or patent ownership might entail monopolization in one of the segments and consequently affect complementary segments.

The European Court of Justice referred to the doctrine in the *United Brands* [1978] decision (Case 27/76), maintaining that the United Brands Corporation had engaged in exclusionary practices - discriminatory pricing - in related markets (distribution and ripening), thanks to the substantial market power it enjoyed in the European market for bananas.

A remarkable case of application of the doctrine of essential facilities to Tlc has been the Clear case in New Zealand, where the dominant operator's network was viewed as an essential facility[27] in a dispute over interconnection issues that would become quite typical in other countries experiencing liberalization, as well.

Together with ex-ante provisions for effective regulation, optimal regulatory practice would require countries to determine and enforce credibly a set of remedies for anticompetitive conduct.

The most common anti-competitive circumstances are briefly discussed hereinafter.

1) Abuse of dominant position. Although it is hard to give a clear-cut definition valid worldwide, most countries base such misconduct on the existence of a firm having a dominant market position in the relevant market, and using such a position to engage in abusive conduct that is harmful to competition. In Tlc, abuse of dominant position can take the following forms:
   - Refusal or delay in providing essential facilities to competitors;
   - Overpricing of services or essential facilities or discriminatory supply to competitors;
   - Predatory pricing and/or cross-subsidization of competitive services with revenues obtained from services which are subject to less competition;

[26] The first discussion of the doctrine relates to *Terminal Railroad v. U.S.* [1912], where a group of railroads created a joint venture to run a key bridge across the Mississippi River, together with the approaches and terminal in Saint Louis, and excluded competitors that did not belong to the company. According to the decision of the Supreme Court, the practice constituted a violation of the Sherman Act.

[27] The dispute between Telecom and Clear centered on the terms under which Clear was to interconnect to Telecom's local telephone network in order to offer a competing local telephone service. The Privy Council held that Telecom was entitled to charge a price derived from the "Baumol-Willig" or *efficient component pricing* rule (ECPR). The ECPR is a partial regulatory rule that links retail and wholesale prices. ECPR forces the incumbent to charge an access price below or equal to the opportunity cost on the competitive segment.

- Bungling of services designed to provide the incumbent with exclusive advantages or to charge on the competitor services that he does not really need.

Remedies to such a behavior range from the issuance of enforceable orders against the dominant entity to cease or modify the conduct, to revoking the license of the incumbent, fine the dominant entity, to order compensation to the injured parties, restructure the incumbent with the divestiture or the structural separation of some lines of business.

2) The **refusal to supply essential facilities** relates essentially to interconnection facilities and, for the provision of Tlc services, refers to the interconnection to the incumbent's network and related switching, signaling, Operational Support Systems and database systems.

3) The regulatory treatment of anti-competitive **cross-subsidization** in Tlc markets is thorny, due to the patterns of "social" cross-subsidies to local, residential and rural services from international, long-distance and business services, which characterized the monopoly years in most jurisdictions. These cross-subsidies are progressively being eliminated by the implementation of rate of rebalancing policies, aimed at aligning prices of services to their costs. Tlc policy-makers and regulators try to replace implicit cross-subsidies with explicit subsidies aimed at meeting social objectives[28].

   Cross-subsidies are generally prohibited, sometimes even directly through license conditions. However, common remedies include accounting separations, especially in services in which the incumbent is dominant, structural separation, and divestiture. The goal of accounting separations is to divide the costs of an operator between the different services it offers in order to determine the cost of providing a particular service. Costs are then compared to revenues to determine whether operators recover their costs or lose money. Services that do no recover costs, are considered to be subsidized by other services.

   A typical example of separation and divestiture are the EU's 1999 Cable Ownership Directive, requiring dominant Tlc operators to place their cable televisions in structurally separated companies, and the 1984 divestiture of AT&T into the Regional Bell Operating Companies in the US.

4) Vertical Price Squeezing occurs if the incumbent operator provides services in two or more vertical markets, either upstream (wholesale) or downstream (retail) as a

monopolist or a monopsonist. For example, incumbents often control local access and switching processes from which other services depend, such as the provision of dedicated local circuits from customers premises to local exchanges. Dedicate local circuits can be seen as upstream services used as an input also by the incumbent in providing downstream services, such as dedicated Internet access services. So, both the incumbent and the competitors use the same input but the former has the control over such a service. If he decides to engage in vertical price squeezing, he can easily overprice the competitors for the input and force them to increase their final prices, without changing his own prices.

5) Predatory Pricing consists of undercutting competitors' prices to drive them out of the market, so as to monopolize the business. Even if there exist no rife agreement about what constitutes predatory prices, common elements are

- the existence of incumbent's market power;
- the predator must be charging prices below a nationally set standard[29];
- there must be evidence of systematic selling at predatory prices, not just sporadic or reactive price cutting.

Remedies vary, but are sometimes anticipated by means of price regulation to deter predatory behavior.

6) The misuse of information, such identification of the customers, derives, once again, from the control over essential facilities and technical standards.
7) "Locking-in" of customers makes it impossible or expensive for a customer to move to another operator or service provider, as in the cases of long term contracts and discounts for exclusive dealing, or agreements binding customers to a particular technology or hardware problem. Not all agreements locking-in customers are anti-competitive, but there are certainly cases that need regulatory intervention. For example, when a dominant operator locks-in customers into exclusive arrangements, before of the introduction of competition. "Locking-in" s typically accomplished using tied sales, bundling and restrictive agreements

Finally, just a word about barriers to entry that limit competitive response. Among the most commonly barriers, there are government restrictions (such as monopoly franchises or restricting licensing practices), economies of scale (unitary production costs fall as output increase) - that allow large incumbent suppliers to produce at lower unit costs than new

[28] See Paragraph 1.6 on this point.
[29] For example, below the Long-Run Incremental Cost.

entrants -, high fixed/capital costs and intellectual property rights (such as copyright and patent protection) - that affect the availability to competitors of key inputs or outputs - .

1.4 Interconnection and price regulation

The issue of interconnection arises at the outset of liberalization processes when incumbent operators own or have control of the Tlc network and entrants need to rely on the existing network to operate and bring competition to the market. In these situations, incumbents have a number of incentives to exploit advantages of dominant position. For example, they can charge excessive rates for interconnection, refuse to build or make available adequate interconnection capacity, or refuse to un-bundle network elements or services necessary for efficient interconnection.

Generally accepted interconnection principles today refer to the need of providing ex-ante interconnection guidelines rather than ex-post regulation, to focus on interconnection obligations on the incumbent operator, to guarantee transparency of interconnection agreements and non-discrimination, to set interconnection prices based on costs.
The relationship between the incumbent and his new competitors is regulated by interconnection agreements, whose content varies considerably depending on the existing regulatory framework, and could be quite technical. Interconnection agreements are reached via ex-ante regulatory prescription, negotiations between operators, establishment of general regulatory guidelines for operators, regulatory mediation, regulatory prescription of default arrangements, and even regulatory decisions or arbitration to solve disputes.

Evidence from ITU's surveys makes clear that interconnection-related issues are ranked as the single most important problem in the development of a competitive marketplace for Tlc services by many countries. Almost half of the countries in the Asia-Pacific region indicate that interconnection issues are a top regulatory priority, whereas fewer countries in the Arab states (20%) and the Americas (30%) point to the issue as a regulatory priority.

The role of the regulator in the process is fundamental and international experience has shown that without regulatory intervention and direction, interconnection negotiations can be dramatically unsuccessful.

The universal imposition of interconnection obligations on all operators, however, is perceived as over-regulation, whereas, in principle, only firms with a dominant market position have the ability to establish interconnection terms independently of competition.
The role of the regulator can be briefly summarized in

- establishing guidelines to provide ex-ante guidance,
- setting ex-ante default arrangements to apply in case of failure of negotiations,
- establishing deadlines for various stages of the negotiations,
- establishing industry technical committees and standards, and
- appointing mediators and arbitrators.

Moreover, in most countries, regulators play an important role in resolving interconnection disputes, which can be extremely complicated because of the inferior information on the details of interconnection regulators hold with respect to operators. Interconnection issues arise chiefly about the cost of interconnection.
Table 1.1 reports a set of widely accepted interconnection principles discussed in the World Bank/InfoDev's Telecommunications Regulatory Handbook.

Price regulation is the typical way regulators use to overcome the failure of Telecommunication markets to produce competitive prices, trying to mimic the outcome of efficient competition.
First of all, it is used to ensure that operators collect sufficient revenues to finance current operations and perspective investment. Thus, regulators often define a "revenue requirement", the minimum amount of revenue associated with the financial objective, big enough to match what an efficient operator would require to finance its activity.[30]

Secondly, price regulation is aimed at reaching efficiency in the supply of Telecommunication services, allocative, productive[31], and dynamic[32].
Thirdly, equity objectives aim at the redistribution of welfare benefits along the lines of operator-consumer[33] and consumer-consumer[34] relationships.

[30] Competitors tend to enter the supply of services priced above costs.
[31] Allocative efficiency is achieved when the prices of services reflect their relative scarcity or their marginal costs. In the Tlc sector, instead, prices of international and long-distance services have traditionally been set significantly above their costs while local calls are priced below. Productive efficiency relates to the most effective mix of production factors for a given level of output.
[32] Efficient use of resources over time.
[33] For example, it would not be equitable to let a monopolist reap large monopoly profits without improving or extending the service for a ling time.
[34] Between different classes of consumers.

Optimal price regulation involves the design and implementation of low-cost and effective regulatory approaches, apt to induce the operator to achieve these goals that are in principle conflicting with each other.

- Terms of interconnection should not discriminate unduly between operators or between a dominant firm's operations and those of interconnecting competitors;
- Interconnection should be permitted at any technically feasible point, but the requesting operator should pay any additional costs of non-standard interconnection;
- Interconnection charges should generally be cost-based;
- Cost inefficiencies of incumbent operators should not be passed on through charges to interconnection operators;
- Where reciprocal interconnection and costs can be expected to be reasonably balanced, bill and keep arrangements are an efficient alternative to cost-based interconnection;
- Regulatory guidelines and procedures should be prescribed in advance, to facilitate interconnection negotiations between operators;
- Interconnection procedures and arrangements should be transparent and encourage efficient and sustainable competition;
- Networked elements should be unbundled and charged separately;
- charges related to universal service obligations should be identified separately, and not bundled with interconnection charges;
- Any independent regulator (or other third party) should resolve interconnection disputes quickly and fairly.
-

Table 1.1 Widely accepted Interconnection principles

It is typical to observe unbalanced telecommunications price structures in many countries, where there exist some services priced well above costs (long distance and international calling) and other services priced below costs (monthly subscriptions and local calls). *Rebalancing* is used to move the prices of Tlc services and put them in line with the costs of providing the relevant service, because unbalanced price structures cannot be sustained in competitive environments. Technological innovation has reduced Tlc services costs at

different rates worsening the unbalancement of prices. In general, competitive markets tend to drive prices towards their costs, but in monopoly or non-competitive markets the regulator may be required to take steps to ensure that prices are more closely aligned with costs.

During the 1990s, re-balancing has taken place quite rapidly, and OECD estimates for his members that the average price of local calls has risen by 30%, while that of long distance calls has decreased by the same percentage. Over 1990-1998, fixed charges (connection and subscription) increased by over 20% and usage charges decreased by 20%, with an overall weighted reduction of about 12%. Moreover, teledensity of OECD countries has been growing steadily, despite rebalancing.

1.5 Universal service

The overall objective of universality policies (UP) is to expand and maintain availability of affordable Tlc services to the public.

More specifically, **Universal Service** policies focus on the promotion or maintenance of universal availability of connections to public Tlc networks by individual households. Instead, the objective of connecting all households to public Tlc networks is referred to as **Universal Service Obligation.**

Finally, **Universal Access** refers to the situation where every person has a reasonable means of access to a publicly available telephone.

Undoubtedly, while Universal service is a practical policy objective in most developed countries, it is not equally feasible in less developed countries where Universal Access assumes greater political and economic relevance.

Universality policies refer to a wide set of objectives ranging from the promotion of national social, economic and cultural cohesion to the promotion of economic development, the encouragement of a more balanced spatial distribution of the population, the reduction of rural/urban disparities. Moreover, besides being considered a basic right of all citizens, essential to full membership of a community, however defined, access to communications is strongly related to the level of development. Figure 2.2 plots teledensity against GDP per capita for 178 countries as of year 2000 and shows the strength of this relationship.

It has to be pointed out however that in many transition and developing countries the lack of supply, rather than the lack of demand, is the principal reason for low levels of teledensity, as data on waiting lists witness. Low teledensities in these countries have two distinct causes, the undersupply of Tlc services due to inadequate sector policies and the low demand due to low incomes.

To address the first cause, a number of measures have been suggested, all of them including the reform of the telecommunication sector by introducing competition, privatization and pricing reform. The evidence reviewed in chapter 4 confirms that such efforts tend to remove the supply constraints on the sector.

Ça va sans dire, sector reform cannot address the second cause of universality problems, insufficient income to support the roll out of Tlc networks.

Definitions of Universal Access and Universal Service vary greatly among countries. Focusing on developing and transition countries, some definitions are reported in Table 1.2.

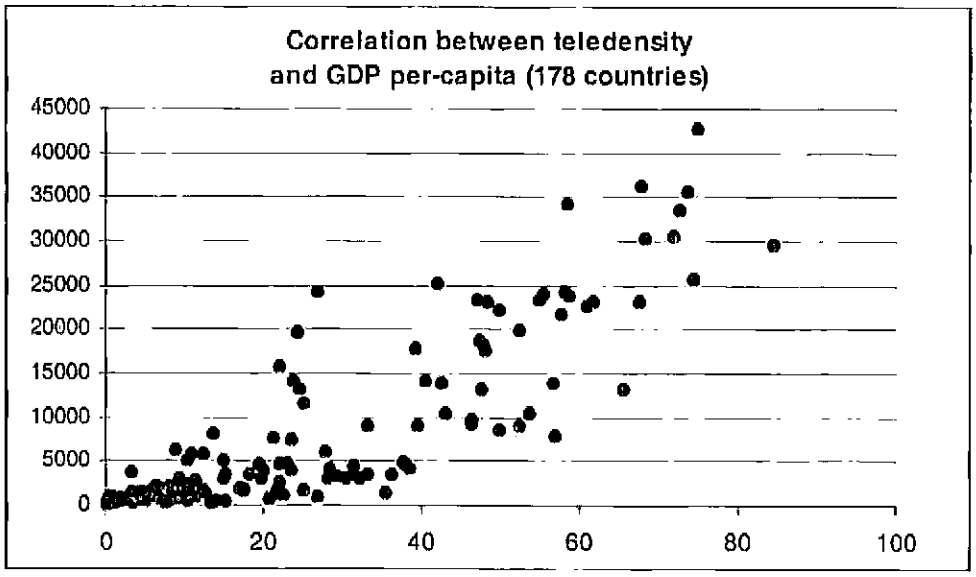

Figure 2.2

For such countries, it is simply unrealistic to set a universal service objective of providing fixed Tlc service to each household. Accordingly, the regulatory focus tends to be put on the expansion of

- access, particularly of *new* (rather than existing) services,
- services to remote or high cost areas and low income subscriber groups, and
- public (rather than private) access services.

The five mechanisms commonly used to implemented universality policies are

1) market-based reforms
2) mandatory service obligations
3) cross-subsidies
4) across-deficit charges
5) Universality funds

These policies are now discussed in some detail.

Market-based reforms

It is widely recognized[35] that in a number of developing and transition countries, outdated sector policies are a principal cause of the lack of universality policies. Many of these countries have low income levels and large un-served populations that would be willing and partially able to pay for personal and community Tlc access. These waiting lists include businesses that might increase economic activity or improve efficiency if they had Tlc to do so. However, Tlc reforms are called for to increase the supply of Tlc services. Three key reforms are privatization, competition and cost-based pricing.

COUNTRY	UNIVERSAL ACCESS POLICY	OPERATOR OBLIGATIONS
Costa Rica	Within 1 Km of both public and private access	No obligations
Cuba	Access to all villages and to communities of more than 500 inhabitants	License conditions stipulate by the end of the first 8-year program all villages of more than 500 inhabitants must have access
Kenya	A phone within a walking distance	A performance contract entails obligations on service quality and expansion
Maldives	At least one telephone booth per 500 inhabitants, a phone on every island	Operator's license condition is to provide access to basic telecommunications services to other whole country by the year 2000
Togo	A telephone within a 5 km radius by 2010; a telephone in every administrative and economic center of importance	Contract with the state to determine the objectives for development and plurality of service

Table 1.2 Universal Access Policies and Obligations in selected transition and less developed countries (Source: InfoDev, 2000 and ISLA-Tlc database)

Privatization and competition have been proven to increase the supply of Tlc services[36] by increasing teledensity and public telephone penetration in a number of countries through some typical channels. Firstly, network expansion targets are often included in contracts or

[35] Wallsten (2002).
[36] For a review of such evidence refer to chapter 4.

licenses that form part of the privatization procedure; in fact, privatized operators have demonstrated their willingness to meet or exceed rollout targets, not simply to comply with legal obligations, but as profit maximizing strategies, so that they are often reported to have surpassed mandatory network expansion targets. Secondly, privatization allows private capital to fund network expansion, to promote commercial initiatives to supply services to meet demand, to improve management, and to reduce political and bureaucratic constraints on extending services.

Cost-based pricing and rate rebalancing have been discussed already. The evidence indicates that penetration levels increased after rate rebalancing, at least in OECD countries[37], on which most research has been carried out, so far. In OECD countries rate rebalancing has resulted in lower overall prices of Tlc services for most consumers.

The positive relationship between rate rebalancing and teledensity seems to apply to developing countries, as well. Ros and Banejeree (2000) have shown that higher subscription prices result in higher telephone penetration rates and in reduced waiting lists. The result is explained by the fact that residential subscription tends to be set below economic costs. As operators are permitted to raise these rates, they also reduce their access deficits and it becomes profitable for them to construct more network access lines.

Mandatory service obligations

Mandatory service obligations are possibly the most common mechanism used to expand Tlc networks in developing countries.

The operator with a general obligation to serve all customers is typically referred to as the universal service provider and it is usually the incumbent operator.

In some countries, government and regulators have imposed mandatory service obligations to newly licensed operators, including obligations to provide service throughout certain areas, especially for wireless operators, or to install a specific number of lines within a certain period (coverage or rollout obligations).

Cross-subsidies

Cross-subsidization can be inter-service (long distance vs. connection services) or intra-services (geographic tariff averaging).

Cross-subsidies have been historically very important as a policy to promote universalism in Tlc services, particularly to maintain low access rates in high cost areas but are now gradually being phased out, for a number of reasons including their competitive

unsustainability, the reform of the international accounting rate reform, inefficiency of untargeted subsidies, inefficient consumption, anti-competitive use of subsidies.

Access Deficit Charges

Systems using Access Deficit Charges, or supplementary charges, require all providers of subsidizing services, e.g. long distance services, to contribute to subsidize access services. Supplementary charges can be used to subsidize either broad service categories (for instance all access services) or narrower categories (such as residential access services) and are collected on a per-minute or a per-trunk basis. Access Deficit Charges were traditionally collected and administered by the universal service provider in many countries. Regulatory reform and, to some extent, the WTO Agreement on Basic telecommunications, has made most regulators establish an independent administrator to collect and disburse them. However, most industrialized countries are trying to eliminate or replace Access Deficit Charges due to the perception that they are problematic and inefficient in promoting universality[38].

Country	Company	Obligation
Mexico	Telmex	During 1990-1994, average annual line growth of 12%. Public payphone density of 2‰ by 1994 and 5‰ by 1998.
Panama	Cable and Wireless	From 1997, increase teledensity by 2002. Install 600 rural payphones within 2 years
Peru	CPT and Entel	From 1994, add 978,000 telephone lines by 1998. Install 600 rural payphones within 2 years.
Venezuela	CANTV	Increase telephone lines by 355,000 from 1992 to 2000.

Table 1.3. Examples of license obligations on selected operators

Universality Funds

Universality Funds (or US funds) collect revenues from various sources and distribute them in fairly targeted manner to achieve *specific* universality objectives. The source of the revenues might be the government budget (as in Chile), revenues from Tlc privatization, spectrum

[37] Boylaud and Nicoletti (1999).
[38] For a detailed discussion see InfoDev (2000).

auctions and/or license payments, funding from international development agencies such as the World Bank, charges on interconnection services, levies on subscribers (for example on access lines) or levies on all Tlc service operators in proportion to their revenues from specified services. In contrast to Access Deficit Charges, US funds are used to finance *specific* universality objectives, typically targeted by specific programs, involving network expansion project, and the installation of public payphones or calling centers, among others.

Once again, good regulatory practice would require US funds to have administrators independent from the incumbent operator, to have transparent financing, to be market neutral, to target specific beneficiaries, to be relatively small in absolute terms and as a share of the effort required for the specific initiative.

* * *

With the discussion of Universal Policy issues, the first introductory chapter is concluded. In chapter 2, most of the issues brought to light insofar, will be tackled from a juridical point of view. The analysis of the WTO provisions related to telecommunications will highlight if and how these issues have been resolved in the multilateral framework offered at the end of the Uruguay Round.

References

Boylaud, Olivier, and Giuseppe Nicoletti (2000), "Regulation, Market Structure and Performance in Telecommunications", OECD Economic Department WP No. 237.

Harrington, Joe, John M. Vernon and Kip Viscusi (2000), *Economics of Regulation and Antitrust*, MIT Press.

Klemperer, Paul (2001), "Why every economist should learn some auction theory", invited lecture to 8th World Congress of the Econometric Society, 2000.

Laffont, Jean Jacques, and Jacques Tirole (2000), *Competition in Telecommunications*, Munich Lectures in Economics, MIT Press.

Ros, Agustin, and Aniruddha Banejeree (2000), "Telecommunications Privatization and Tariff Rebalancing: Evidence from Latin America", *Telecommunications Policy*, 24:3.

Venturini, Gabriella (1999), *Servizi di telecomunicazione e concorrenza nel diritto internazionale e comunitario*, G. Giappichelli Editore, Torino.

Wallsten, Scott (2002), "Does sequencing Matter? Regulationand Privatization in Telecommunications Reforms", Worlbank WPS 2817.

Worldbank InfoDev (2001), *Telecommunications Regulation Handbook*, Worldbank, Washington D.C.

Chapter 2

Telecommunication services in the WTO system

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1. Services in the WTO system
2. The distinction between basic and value-added telecommunication services
3. Telecommunications in the WTO: an overview of the negotiating process
4. The Annex on Telecommunications
5. The Basic Telecommunications Agreement (Fourth Protocol)
6. The Reference Paper
7. The classification of WTO provisions on Telecommunications
8. Foreign Direct Investment

Annex 1.1 Annex on Telecommunications of the GATS (1994)
Annex 1.2 GATS (1994): Annex on negotiations on basic Tlc
Annex 1.3 Decision on negotiations on basic Tlc (1994)
Annex 1.4 Fourth Protocol and Reference Paper (1996-1997)
Annex 1.5 Summary of Tlc obligations
Annex 1.6 Schedule of specific Commitments of Poland

Within the framework of liberalization of international trade in services, the telecommunication (Tlc) sector is regulated by the General Agreement on Trade in Services (GATS), and, more specifically, by the Annex on Telecommunications (AT) of 1994 and by the Fourth Protocol of the GATS of 1997, also called Basic Telecommunication Agreement (BTA). Since the process of negotiations of these parts of the GATS treaty has been a challenging one, the purpose of this chapter is to clarify the structure and the implications of multilateral rules on telecommunications in order complement and to pave the way to the economic analysis of the following chapters. A special attention will be dedicated to the understanding of the WTO rules as the outcome of a negotiating process where the issues discussed in chapter 1 have been fiercely debated.

As mentioned in the previous pages, the sector is characterized by a recent dynamism caused by rapid technological innovation and by the de-regulation choices made by governments in the last 15 years. The approach developed for services during negotiations within the WTO framework has focused on the necessity to ease Foreign Direct Investment (FDI) restrictions, besides liberalizing trade in services.
In the Tlc sector, FDI are of the utmost importance because Tlc services are for the most part non-tradable (meaning that they are not imported or exported between countries) and supplied at domestic level. Thus, besides the traditional GATT issues of Most Favored Nation (MFN) treatment and National Treatment (NT), commitments on Market Access (MA) have been attributed extreme importance and particular efforts have been put on securing fair and non-discriminatory access to opening markets. In the Tlc sector, the issue is definitely delicate because of the longstanding position of natural monopolies that possibly confer telecommunication companies (telcos) a considerable market power.

This chapter begins by framing Tlc services within the structure of the complex system the WTO treaties. It explains the distinction between basic and value-added Tlc services that has been maintained throughout the Agreements, and depicts the process of negotiations that took place during and after the Uruguay Round in paragraphs 2.2, 2.3 and 2.4.
Paragraphs 2.5, 2.6 and 2.7 focus on the specific provisions of the AT, of the BTA and of the Reference Paper (RP), a short document containing regulatory principles for the Tlc sector, that constitutes an absolute novelty in the multilateral set of rules on the WTO.

Finally, after a global re-consideration of WTO provisions of Tlc, paragraph 2.8 emphasizes problems and open issues concerning the treatment of Tlc FDI in the Agreements.

2.1 Services in the WTO system

The General Agreement on Trade in Services (GATS) has been adopted on December 15 1993 as part of the Final Act of the Uruguay Round under the denomination "Annex 1B". The GATS is one of the results of such round of negotiations and represents the first conventional multilateral agreement aimed at the global regulation of international trade in services. It entered into force on January 1 1995.
The objective of the GATS is not the immediate regulation of international trade in services, but the commitment of the signatory countries towards a progressive liberalization of the whole sector, as stated in part IV on progressive liberalization, and, more specifically, in GATS Art. XIX on negotiation of specific commitments. Since the Agreement does not contain any coercive and indictable provision, the realization of the liberalizing efforts depends crucially on the willingness of Member countries to enforce the provisions of the treaty.

As for trade in telecommunication services, the first elements of the normative liberalization in the WTO framework can be found in the GATS Agreement of 1994 and in the attached documents, the so-called Annexes. Hierarchically above other provisions, it is first of all the general principles of GATS that apply to telecommunications as services, while the peculiarities of the telecommunication sector have been tackled with the Annex on Telecommunications[1] and later on with the Fourth Protocol.
The GATS is based on three basic pillars. While the framework agreement contains fundamental obligations by which signatory countries have accepted to be bound, the core outcome of the negotiating process is contained in the specific lists that countries are bound to respect in order to get concrete service liberalization. Finally, further negotiations scheduled at the time of the signature of the GATS have been completed later to take into account the peculiarities of these sectors within the liberalization framework of the WTO system.

[1] Annex 2.1 to this chapter.

The Annexes focus on specific groups of services that have been deemed to deserve particular attention, namely financial services (Second protocol, adopted July 21, 1995 entered into force on September 1 1996), movement of natural persons (Third Protocol, adopted on July 21, 1995 entered into force on January 30, 1996), and financial services (Fifth Protocol, adopted on November 14, 1997 entered into force on March 1, 1999).

Part I of the GATS is made of a single article aimed at defining the scope of the agreement. According to GATS Art. I,

"This Agreement applies to measures by Members affecting trade in services."

Measures are intended to be laws, regulations, provisions and any disposition related to the service sector taken by *"(i) central, regional or local governments and authorities; and (ii) non-governmental bodies in the exercise of powers delegated by central, regional or local governments or authorities*[2]*."*

As claimed, for example by Comba (1995), GATS Art. I applies neither to the concept of "Services", nor to the one of "trade of services", but uniquely to the "international trade of services". However, that the exact definition of services is not given, and definitely not clarified by the tautological expression of Art. I (3)(b): *"For the purposes of this Agreement:* [...]*"services" includes any service in any sector except services supplied in the exercise of governmental authority*". As we shall see, the same definitional choice, rather vague indeed, has been made for Tlc.

[2] GATS Art. 1(3).

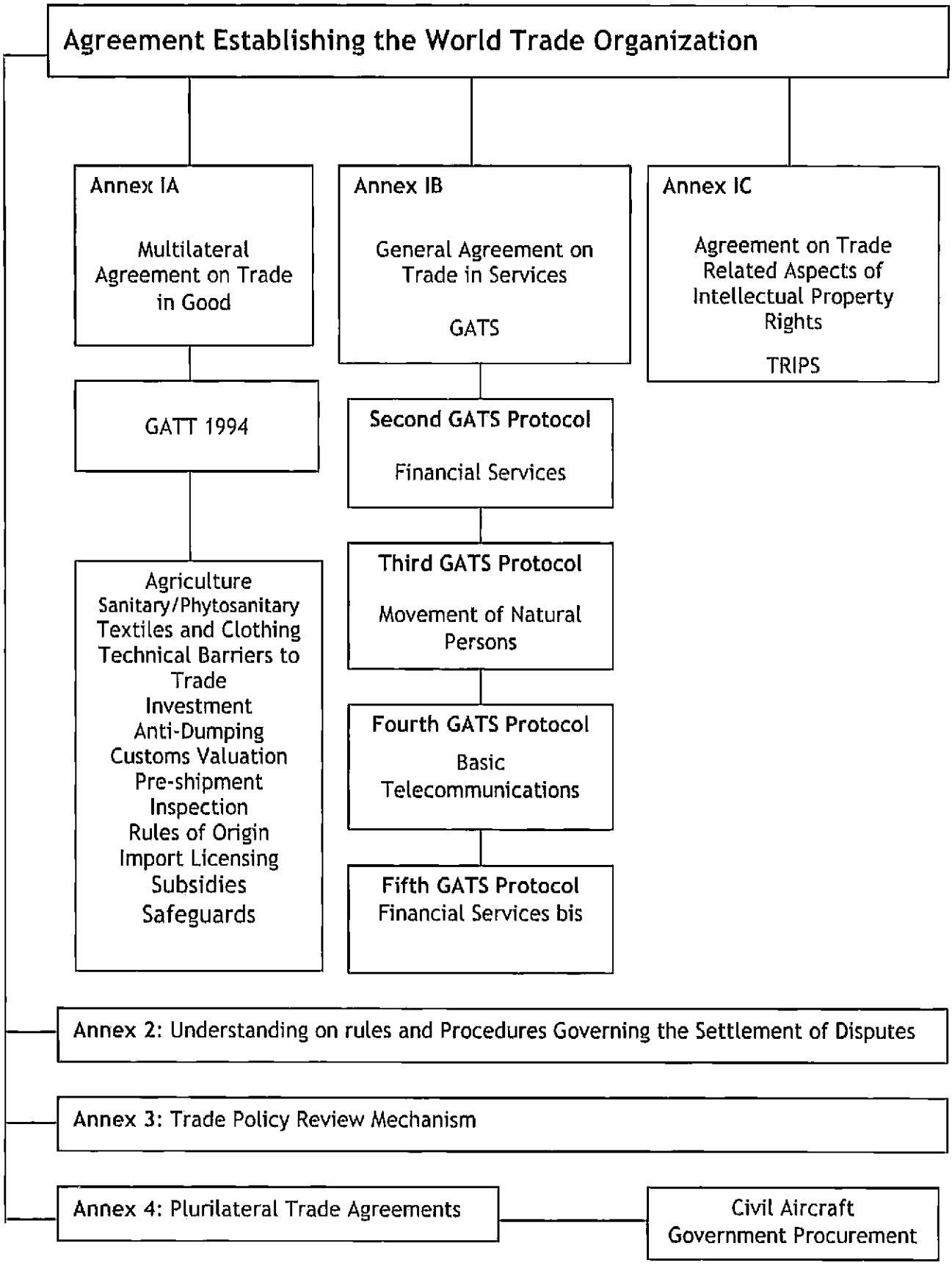
Agreement Establishing the World Trade Organization
Annex IA
Multilateral Agreement on Trade in Good
Annex IB
General Agreement on Trade in Services
GATS
Annex IC
Agreement on Trade Related Aspects of Intellectual Property Rights
TRIPS
GATT 1994
Second GATS Protocol
Financial Services
Third GATS Protocol
Movement of Natural Persons
Fourth GATS Protocol
Basic Telecommunications
Fifth GATS Protocol
Financial Services bis
Agriculture
Sanitary/Phytosanitary
Textiles and Clothing
Technical Barriers to Trade
Investment
Anti-Dumping
Customs Valuation
Pre-shipment Inspection
Rules of Origin
Import Licensing
Subsidies
Safeguards
Annex 2: Understanding on rules and Procedures Governing the Settlement of Disputes
Annex 3: Trade Policy Review Mechanism
Annex 4: Plurilateral Trade Agreements
Civil Aircraft
Government Procurement

Figure 2.1

Part II runs from Art. II to Art. XV and contains general obligations and disciplines with many basic rules substantially cloned from GATT 1947, such as MFN treatment and transparency.
The other GATS obligations become operational once a Member has actually negotiated concession called "Specific Commitments". Specific commitments usually contain legal details that are subject to and might be even modified by the general commitments. For example, licensing conditions incorporated by way of a specific commitment must be applied on a non-discretionary basis, in accordance with the MFN principle and may ultimately have to be relaxed by virtue of the GATS proportionality principle.
In fact, Part III (Arts. XVI-XVIII) includes the specific commitments and contains provisions concerning mostly market access and national treatment, two topics of particular relevance for the Tlc market.
Part IV (Arts. XIX-XXI) focuses on progressive liberalization calling to successive rounds of negotiation to be undertaken by the signatory countries, while part V (Arts. XXII-XXVI) deals with institutional provisions, dispute settlement procedures and organs and the establishment of a negotiating group for the trade of services.
Finally Part VI (Arts. XXVII-XXXV), contains final dispositions and the Annexes concerning particular services, among which the Annex on Tlc.

Members' specific commitments are recorded according to a rather elaborate system of country schedules attached to the GATS. The structure is similar to the GATT, wherein bound tariffs are recorded in country schedules attached to the GATT. However, GATS commitments are more complex. A distinction is made between *horizontal commitments*, those that cut across all service sectors, and *particular commitments*, those that have been made in a particular service sector like telecommunications. Commitments in both categories are then subdivided according to four different modes of supply: cross-border supply, consumption abroad, commercial presence and temporary entry of natural persons. In fact, according to GATS Art. I (2), "[...] *trade in services is defined as the supply of a service:*

(a) from the territory of one Member into the territory of any other Member;

(b) in the territory of one Member to the service consumer of any other Member;

(c) by a service supplier of one Member, through commercial presence in the territory of any other Member;

(d) by a service supplier of one Member, through presence of natural persons of a Member in the territory of any other Member."

The first and the third mode of supply, namely cross-border supply and commercial presence, are primarily relevant for the Tlc sector, whereby the latter includes Foreign Direct Investment.

According to GATS Art. XXVIII, *"**commercial presence**" means any type of business or professional establishment, including through (i) the constitution, acquisition or maintenance of a juridical person, or (ii) the creation or maintenance of a branch or a representative office, within the territory of a Member for the purpose of supplying a service*[3]."

Dordi (2000) emphasizes the importance of the broad definition of commercial presence in the context of the GATS. When such definition is read jointly to Art. XXVIII (g), according to which ***service supplier*** means *"any person that supplies a service"*, the novelty of the GATS approach is immediately clear, even with respect to the right of establishment and the freedom to provide services in the European Law[4]. In the EC law, an extra-European legal person wishing to benefit of the EC provisions on the free circulation of services has to establish herself on the territory of one of the EU Member States and cannot simply open a foreign branch or a representative office.

In the GATS system, instead, a subject can be defined as a supplier of services and appeal to the treaty provisions, even if the commercial presence is not realized through the creation of a legally autonomous legal person. Consequently, a foreign branch or a representative office of a company incorporated in a country that is not a WTO Member is a supplier of services in the sense of the GATS and, therefore, is entitled to set up a commercial presence in another WTO Country and possibly appeal to GATS provisions[5].

As just discussed, the Agreement is articulated in three parts. The framework of articles presents the general obligations and disciplines; the annexes elaborate further on a selection of sectors or obligations; and the schedules contain commitments submitted by each country. The general rules of the GATS constitute the fundamental nucleus of the telecommunications discipline, as well. In particular, Most Favored Nation treatment (Art. II), transparency (Art. III), domestic regulation (Art. VI), non discriminatory regulation of monopolies (Art. VIII), additional commitments (Art. XVIII), safeguard clauses (Art. X), specific lists and their

[3] GATS Art. XXVIII (d).
[4] Treaty Establishing the European Community Art. 43.
[5] Claudio Dordi (2000) "Gli accordi sul commercio dei servizi", in Gabriella Venturini (2000), *L'ordinamento dell'OMC*, Giuffré Ed. and Werner Zdouc (1999) "WTO Dispute Settlement Practice Relating to the GATS", *Journal of International Economic Law*, 1999.

modification (Art. X and XXI), dispute settlement (Art. XXIII), apply automatically to the telecom sector.

In GATS Art. II, **Most-Favored Nation Treatment** (MFN) states that *"With respect to any measure covered by this Agreement, each Member shall accord immediately and unconditionally to services and service suppliers of any other Member treatment no less favorable than that it accords to like services and service suppliers of any other country."*
However, the span of this principle is counterbalanced by the provision of Art. II (2) according to which *"A Member may maintain a measure inconsistent with paragraph 1 provided that such a measure is listed in, and meets the conditions of, the Annex on Article II Exemptions."* Thus, exemptions are accepted as far as they are included in the specific Annex, and should not last more than ten years with a five-years revision[6].

GATS Art. III on **transparency** applies to any law, regulation, administrative directive and decision, pronouncement or relevant measure of general application that might be issued by national or sub-national governmental bodies and pertain to or affect the operation of the Agreement. It requires each WTO member to provide quick publication and precise information about these measures and their modification to the General Service Council *"at the latest by the time of their entry into force[7]". "International agreements pertaining to or affecting trade in services to which a Member is a signatory shall also be published."*
According to GATS Art. VI (1) disciplining **domestic regulation**, *"in sectors where specific commitments are undertaken, each Member shall ensure that all measures of general application affecting trade in services are administered in a reasonable, objective and impartial manner."* For Tlc, reasonableness, objectivity, and impartiality are fundamental as far as issues such as licensing schemes, universal service obligations, frequency allocation, numbering, open network provision type regulation, and the like are touched.
In part III of the GATS on specific commitments, MFN is deep-rooted also in the fundamental provision of Art. XVI concerning **market access**, which is particularly important in the case of Tlc. In the sector, indeed, *entry of new operators* means mostly *foreign entry* especially in Less Developed Countries (LDC) or transition countries where the capital necessary to start up a new Tlc business is normally unavailable at domestic level. Provisions that guarantee

[6] The list of exemptions in Italian is spelled out in Suppl. Ord. No. 1 to G.U. No. 7 of January 10 1995.
[7] *"except in emergency situations."* In fact, there exist exemptions listed at Art. III-bis in the case of *"confidential information, the disclosure of which would impede law enforcement, or otherwise be contrary to the public interest, or which would prejudice legitimate commercial interests of particular enterprises, public or private."*

market access requires each Member State to "*accord services and service suppliers of any other Member treatment no less favorable than that provided for under the terms, limitations and conditions agreed and specified in its Schedule*[8]." In the Tlc sector, market access requires Members to guarantee a set of fundamental services such as public network interconnection, the possibility of leasing dedicated lines, of resaling excess capacity, among others[9].

In addition, paragraph 2 of GATS Art. XVI reports a black list of six types of limitations to market access. Most of all, (a) and (f) are crucial to allow the opening up of Tlc markets, where access limitations are posed essentially through exclusivity rights or concession-limiting policies, and not least through FDI restrictions. Measures that shall not be taken "*are defined as:*

(a) *limitations on the number of service suppliers whether in the form of numerical quotas, monopolies, exclusive service suppliers or the requirements of an economic needs test;*

[...]

(b) *limitations on the participation of foreign capital in terms of maximum percentage limit on foreign share-holding or the total value of individual or aggregate foreign investment*[10]."

The same normative technique adopted for Art. XVI has been chosen for National Treatment (NT) at Art. XVII. Indeed, NT has not been made a general obligation but it is defined for every single sector through the specific lists attached to the GATS by each country[11]. In the Tlc sector, however, the foreign competitor is normally worse off than the provider of domestic Tlc services, the latter being already settled to exploit an established network of infrastructure and usually stable market shares. A typical example of implicit discrimination

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[8] The provision is modeled on GATT Art. II on concession lists.

[9] Dimitri Ypsilanti (1990), "A framework for trade in telecommunications services", *The OECD observer*.

[10] Other exemplified measures being: "*(b) limitations on the total value of service transactions or assets in the form of numerical quotas or the requirement of an economic needs test; (c) limitations on the total number of service operations or on the total quantity of service output expressed in terms of designated numerical units in the form of quotas or the requirement of an economic needs test; (d) limitations on the total number of natural persons that may be employed in a particular service sector or that a service supplier may employ and who are necessary for, and directly related to, the supply of a specific service in the form of numerical quotas or the requirement of an economic needs test; (e) measures which restrict or require specific types of legal entity or joint venture through which a service supplier may supply a service.*"

[11] According to GATS Art. XVII (1): "*In the sectors inscribed in its Schedule, and subject to any conditions and qualifications set out therein, each Member shall accord to services and service suppliers of any other Member, in respect of all measures affecting the supply of services, treatment no less favorable than that it accords to its own like services and service suppliers.*"

is the imposition of some form of universal service or minimum coverage requirements to a foreign entrant that substantially discriminates against the new comer whose own network is not in function, yet. And GATS Art. XVII (3) refines the NT principle to exclude *de jure* identical treatment, which *de facto* favors local providers[12].

According to Art. XVIII on Additional Commitments, Members can negotiate additional measures not included in market access or NT lists, including those related to requisites, norms or license granting, and those obligations are to be included in the Member's schedule. The structure of the lists and the procedures to follow to modify them are regulated by Part IV of the Agreement that somehow mimics the corresponding GATT provisions of Arts. XIX to XXI.

According to Art. XX on Schedules of specific commitments each Member reports specific obligations taken within the scope of GATS Part III in a list specifically set up to "*specify*:

(a) terms, limitations and conditions on market access;

(b) conditions and qualifications on national treatment;

(c) undertakings relating to additional commitments;

(d) where appropriate the time-frame for implementation of such commitments; and

(e) the date of entry into force of such commitments."

The Schedules of specific commitments are voluminous and complex documents where each Member identifies the service sector to which NT and MA commitments apply, any additional commitment and any exemption it maintains with respects to this sector. The Schedules are organized as a matrix, wherein each sector's lines are ordered according to the four modes of supply and columns report service subsectors, market access limitations, national treatments limitations, and finally additional commitments whose limitations are not included in MA and NT columns. The second sector is defined as "c: Telecommunications Services" and includes all subsectors analyzed here.

Measures being an exemption to both Art. XVI and XVII are included in the columns relating to Art. XVI and extend also to NT even if not made explicit in the column relating to Art. XVII. In fact, MA and NT obligations are complementary, because MA aims to secure entry of foreign service suppliers into the Market of a given WTO Member irrespective of the position of national suppliers, whereas NT ensures that once in the market of a given WTO Member, a foreign service supplier is treated like local supplier. Yet, the MA and NT obligations also

[12] "*Formally identical or formally different treatment shall be considered to be less favorable if it modifies the conditions of competition in favor of services or service suppliers of the Member compared to like services or service suppliers of any other Member.*" GATS Art. XVII (3).

frequently overlap. The GATS establishes that limitations listed with respect to market access apply to national treatment, as well[13].

The relationship between Tlc services liberalization and competition discipline attributes a particular interest to the GATS provision referred to monopolies and exclusive service suppliers (Art. VIII), business practices (Art. IX), and government procurements (Art. XIII).
As for monopolies and exclusive service suppliers, Art. VIII (1) and (2) state that Member States must guarantee that suppliers operating in monopoly regime do not act inconsistently with MFN treatment of Art. II (1), in the supply of the monopoly service in the relevant market. Moreover, those entities must not abuse their monopoly position whenever they compete, either directly or through an affiliated company, in sectors where their countries have taken specific commitments[14]. In case of violations, the WTO dispute settlement mechanism is available to Member States.
The provisions on (restrictive) business practice of Art. IX are quite inoffensive as they simply impose countries to enter into consultations, upon request of any Member,. with a view to eliminating those practices that may restrain competition and consequently restrict trade in services. Moreover, Members must co-operate *"through the supply of publicly available non-confidential information of relevance to the matter in question"*[15].
Finally, GATS Art. XIII simply excludes Government procurement from the GATS and requires Members to begin negotiations on the topic within two years from the date of entry into force of the WTO Agreement.
Given this synthetic overview of the GATS, the next paragraphs will focus on specific provisions concerning Tlc that have been inserted in the WTO over the years, after different rounds of negotiations. In order to define the kind of services hereby considered, paragraph 2.2 will explain the difference between basic and value-added Tlc services within the WTO agreements.

[13] GATS Art. XX (2): *"Measures inconsistent with both Articles XVI and XVII shall be inscribed in the column relating to Article XVI. In this case the inscription will be considered to provide a condition or qualification to Article XVII as well."*
[14] GATS Art. VIII (2). The provision requires WTO Members to guarantee an outcome, but it could be also be used to censor anticompetitive behaviors of public monopolists.
[15] And "[...] *also provide other information available to the requesting Member, subject to its domestic law and to the conclusion of satisfactory agreement concerning the safeguarding of its confidentiality by the requesting Member.*" Art. IX (2).

2.2 The distinction between basic telecommunication and value-added services

In the GATS framework, the definition of the telecommunications sector is made clear for the first time in the GATS Services Sectoral Classification List[16]. Accordingly, there exist 14 detailed sub-headings (a. to n.) and a residual category (o. others), all reported in table 2. This specification is also reflected in the schedules.
The distinction between basic and value-added services has proved important with the separation of the sub-sectors in two groups for the purposes of the negotiations, the latter being treated in the GATS, the former being left out for later negotiations.

In the WTO system, **basic telecommunications** include *all telecommunication services, both public and private that involve end-to-end transmission of customer supplier information.* They correspond to sub-sectors for which the Fourth Protocol - also called Basic telecommunications Agreement (BTA) - has been negotiated and concluded in 1997, namely services listed a. through g. and those providing real-time transmission of customer supplied information (o.), like mobile telecommunications. Thus, the categories covered by the BTA commitments include local, long distance, international, wire-based (including different types of cables and, usually, radio portions of fixed infrastructure), radio-based (all forms of wireless, including satellite), on a resale basis (non-facility based supply), facility-based supply, for public use (i.e., services that must be made available to the general public) and for non-public use (services provided for sale to closed user groups)[17].

Telecommunications services labeled as **value-added services** are listed h. through n. and also include those other services in o. that either transform the form or content of customer's services, or do not to provide real-time transmission[18]. The WTO discipline relating to these sub-sectors is contained mainly in the GATS of 1994.
The distinction between Basic Telecommunications and Value-Added Tlc made in the GATS/WTO system has been acknowledged to be inappropriate from a technical point of view[19].
The distinction is based on the analogous US categories, originally introduced by the Computer Inquiries, the investigations aimed at delineating the jurisdiction of the Federal

[16] MTN.GNS/W/120.
[17] WTO (1997), "Coverage of basic Tlc and value-added services", WTO website.
[18] This distinction will be maintained from here on.

Communications Commission (FCC) begun in 1966. In the Second Computer Inquiry, in particular, the FCC concluded that **basic telecommunications** simply consist of "*the* [...] *offering of transmission capacity for the movement of information*". Anything more than that, "*any offering over the telecommunications network which is more than a basic transmission service*" (a change in format, a change in message, data processing, or protocol conversion) is an enhanced service[20].

American *Basic* Telecommunications are regulated under Title II of the Communications Act as common carriers. *Enhanced* Services, instead, are unregulated, meaning that Enhanced Service Providers are not regulated like telephone companies and do not pay universal service fees, do not fall under Communication Assistance for Law Enforcement Act (CALEA), are not under Section 255 of Communications Act concerning access for people with disabilities (Sec. 255). Internet Service Providers (ISPs) fall within the Enhanced Services category.
The FCC distinction was basically based on the need to draw a line between two groups of sub-sectors perceived as inherently different from the point of view of their market structure, the former being supposed to be a competitive sector, the latter still needing regulation.

The European regulatory distinction following the liberalization measures of the 1990s, is more skewed towards a sort of authorization-based distinction between services that require an individual license and services that can be provided with either no authorization or pursuant to a general authorization21. The former is generally subject to heavier regulatory framework and comprises the provision of public voice telephony and public Tlc networks. In EC Directive 90/388/ECC, together with some US style provisions concerning the definition of public voice telephony, other considerations came into play, the most important of which

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[19] Bronckers and Larouche (1998).
[20] The FCC viewed the Enhanced Services market as highly competitive and innovative. The FCC was also aware that Enhanced Services were dependent upon telecommunications and that telephone monopolies presented potential bottlenecks to advancement of the computer and data processing market. In order to ensure that the telecommunication system was an open platform promoting advancement of enhanced services, and in order to protect against potential anticompetitive behavior by telephone companies against enhanced service, the FCC developed a series of separation rules. These separation rules sought to protect against such things as improper cross subsidization (using funds from regulated services to support unregulated services), improper discrimination in favor of affiliated services as opposed to unaffiliated companies, and other anticompetitive behavior.
[21] No general investigation similar to the American Computer Inquiries has been carried out in the EU, so far; it is also true, however, that the attention has been moving towards the shape of the regulation only recently, after the big push to de-monopolize and liberalize national markets experienced in the 1990s.

was whether the service was offered to the public or not. Similarly, in the EC framework the fundamental nature of public

a.	Voice Telephone Services/lk
b.	Packet-switched data transmission services
c.	Circuit- switched data transmission services
d.	Telex services
e.	Telegraph services
f.	Facsimile Services
g.	Private leased circuit services
h.	Electronic Mail
i.	Voice mail
j.	On-line Information and Data Base Retrieval
k.	Electronic Data Interchange (EDI)
l.	Enhanced/Value-Added Facsimile Services
m.	Code and Protocol Conversion
n.	On-line Information and/or data processing
o.	Other (Terrestrial-based mobile, Satellite-based mobile)

Table 2.1 Telecommunications sub-sectors in the WTO/GATS

Tlc networks is that they are used for the provision of Tlc services to the public.
Directive 2002/21/EC on a **common regulatory framework for electronic communications, networks and services** of March 7, 2002, the so-called *Framework Directive*, re-organizes the EC regulatory framework taking into account the convergence of the Tlc, media, and information technology sectors, and covering *all* transmission networks and services, accordingly. In particular, the *"Directive establishes a harmonised framework for the regulation of electronic communications services, electronic communications networks, associated facilities and associated services. It lays down tasks of national regulatory authorities and establishes a set of procedures to ensure the harmonised application of the regulatory framework throughout the Community*[22]*."*

The newly established regulatory framework of the EU consists of the Framework Directive itself and four specific Directives: Directive 2002/20/EC on the authorization of electronic

[22] Directive 2002/21/EC, Chapter 1, Art. 1.

communications networks and services (Authorisation Directive)[23], Directive 2002/19/EC on access to, and interconnection of, electronic communications networks and associated facilities (Access Directive)[24]; Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services (Universal Service Directive)[25]; Directive 97/66/EC concerning the processing of personal data and the protection of privacy in the telecommunications sector[26].

The regulatory framework recognizes the necessity of separating the regulation of *transmission* from the regulation of *content*, and excludes, accordingly, broadcasting content, financial services and certain information society services from its application.

According to the definitions contained in the Framework Directive, "**electronic communications network**" means *"transmission systems and, where applicable, switching or routing equipment and other resources which permit the conveyance of signals by wire, by radio, by optical or by other electromagnetic means, including satellite networks, fixed (circuit- and packet-switched, including Internet) and mobile terrestrial networks, electricity cable systems, to the extent that they are used for the purpose of transmitting signals, networks used for radio and television broadcasting, and cable TV networks, irrespective of the type of information conveyed.*[27]"

"**Electronic communications service**" means *"a service normally provided for remuneration which consists wholly or mainly in the conveyance of signals on electronic communications networks, including telecommunications services and transmission services in networks used for broadcasting, but exclude services providing, or exercising editorial control over, content transmitted using electronic communications networks and services; it does not include Information Society services, as defined in Article 1 of Directive 98/34/EC, which do*

[23] "Directive 2002/20/EC of the European Parliament and of the Council of 7 March 2002 on the authorisation of electronic communications networks and services".
[24] Directive 2002/19/EC of the European Parliament and of the Council of 7 March 2002 on access to, and interconnection of, electronic communications networks and associated facilities.
[25] Directive 2002/22/EC of the European Parliament and of the Council of ..... on universal service and users' rights relating to electronic communications networks and services (Universal Service Directive)
[26] Directive 97/66/EC of the European Parliament and of the Council of 15 December 1997 concerning the processing of personal data and the protection of privacy in the telecommunications sector 4, (hereinafter referred to as "the Specific Directives").

[27] Directive 2002/21/EC, Chapter 1, Art. 2, .

not consist wholly or mainly in the conveyance of signals on electronic communications networks[28]."

Thus, the EC framework also relies on the distinction between means of conveyance of signals and content delivered through *electronic communications networks*, as defined above. The new Directives are broader in scope than previous EC legislation in that they apply to "electronic communications" as opposed to 'telecommunications'. The obligations contained in the new Directives are intended to apply to the provision of an electronic communications network, or an electronic communications service, or an associated facility[29]. This broader approach means that traditional distinctions between, for example, licensed network operators and unlicensed resellers (or system-less service providers") no longer apply. Resellers will, in general, be providing electronic communication services, and therefore will be subject to the same regulatory regime as those existing network operators who are also providing electronic communication services. Further, providers of electronic communication networks and services which go beyond voice telephony (e.g. internet service providers) will all be subject to the same framework.

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Now that the distinction has been clarified, the following paragraph will pin down the negotiating process that led to the current multilateral set of rules regulating the Tlc sector at international level. Those rules will be analyzed in detail in Paragraph 4, 5 and 6 and their relation to Foreign Direct Investment explored in Paragraph 8.

2.3 Telecommunications in the WTO: An overview of the negotiation process

At the beginning of the Uruguay Round in 1986, there had been few experiences and little debate about the opportunity of liberalizing telecommunications both at national and international level. Nevertheless, developed countries were observing with interest the experiments taking place in the United States, United Kingdom and Japan. The partial

[28] Directive 2002/21/EC, 2(b).

[29] In the language of Directive 2002/"Associated facilities" are defined as "*those facilities associated with an electronic communications network and/or an electronic communications service which enable and/or support the provision of services via that network and/or service. It includes conditional access systems and electronic programme guides*".

privatization of the state-owned monopolist Nippon Telegraph and Telephone Corporation (NTT) in Japan[30], the privatization of British Telecom the UK and the liberalization of the telecommunications market in the United Kingdom, together with the break-up of AT&T in the United States were beginning to change radically the perception of the role of telecom operators in developed economies.

The decision to negotiate on services within a specific negotiating group different from the one concerned with the trade in goods, taken at Punta del Este in 1986 by the contracting parties of the GATT, followed a wide diplomatic and scientific debate about the opportunity of including services in the new round of talks.

The United States had been pushing towards the inclusion of services in the new talks since the conclusion of the Tokyo Round and other industrialized countries seemed to agree. Developing countries, however, soon began to express the apprehension that the export of services by industrialized countries would crowd out their own service producers and exporters and eventually reduce their gains from trade[31].

At the same time, economists and experts were discussing the legal treatment of trade in services focusing in particular on the applicability of traditional instruments used to liberalize international trade in the GATT, namely the MFN clause and NT, to the service sector and on the opportunity of opening a negotiate formally separated from the one on goods[32].

Developing countries progressively moved towards an attitude of constructive cooperation, and eventually proposed to maintain unconditional MFN, while allowing exceptions to NT. On the other side, the position of developed nations was to favor the maintenance of unconditional NT and a general formulation on MFN.

As regards Tlc specifically, four main reasons can be identified to explain why the sector was included in the trade policy framework discussion at the outset[33].

Firstly, in the mid-1980s a number of developed countries perceived the inadequateness of the International Telecommunications Union as a forum to discuss any initiative of liberalization, due to the vested interested that the organization traditionally represented,

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[30] According to the NTT website (May 2002) approximately 45% of the company was still in the hands of the Ministry of Finance, as of December 2001.

[31] Sapir, André (1985), "North-South Issues in Trade in Services", *The World Economy*, March 1985, 27-42. Reprinted in H.W. Singer, N. Hatti and R. Tandon (eds.), New World Order Series, Volume IV: New Protectionism and Restructuring, Ashish Publishing, New Delhi, 1987.

[32] Sapir, André (1982), "Trade in services: policy issues for the eighties", *Columbia Journal of World Business*, Fall.

[33] See Bronckers and Larouche (1998).

i.e. governments still in control of national telecom operators, and the over-representation of developing countries that was a direct consequence of the North-South dialogue within the new international economic order in the 1970s.

Secondly, the negotiating structure of the GATT was seen as an appropriate arena for the objectives that developed countries were trying to pursue, mainly because of the opportunity to arrange cross-sectoral deals.

Thirdly, the experience of the negotiate on trade of goods in the GATT framework was seen as a tested asset, able to provide a set of fundamental principles of liberalization (MFN, NT, tariff bindings, etc.) to orientate the in-coming negotiations on services.

Fourthly, even though sharply criticized, the dispute settlement procedures then available in the GATT looked attractive to perspective telecom negotiators because they were concretely used, while the corresponding settlement provisions of the ITU available since 1947 had never been used.

Having accepted to include service in the new round of negotiations, however, developing countries managed to put them on a separate track to avoid "give and take" linkages between services and traditional GATT topics, basically reducing the number of trade-offs to be used in the negotiation process. This separation has been eventually blamed for the long duration of the negotiations on Tlc[34].

Early WTO discussions took place between 1986 and 1989 and obviously focused on the outlines of a general agreement on services leaving little room for discussion on Tlc specifically. Sectoral negotiations were initiated in 1989. Value-added and enhanced services negotiation went relatively smoothly and the main troubles arose once basic Tlc services liberalization began to be discussed.

The US initially dominated the talks because of the advanced status of their national liberalization[35]. The position of the US was naturally justified by the advanced state of their liberalization program and focused on the asymmetries generated by a would-be agreement on basic services. On the one hand, US operators were fervent to enter foreign markets and invest abroad, being comparatively more efficient and competitive. On the other hand, the US were loath to let foreign competitor into their own market, as long as foreign competition

[34] Since the agreement on basic Tlc was not reached within the deadline set for the signature of the WTO Agreement in 1994, room was left for a new round of talks within a negotiating group expressly created for Tlc.

[35] Consider, for example, the role of the US in defining the distinction between basic Tlc and value-added services.

was represented by legal public monopolies that could easily rely on anti-competitive practices and public financial support, consequently hurting the liberalization effort[36].

Moreover, as early as in 1989, U.S. representatives tried to throw light on the need of being granted reciprocal access to markets of similar size requiring a sufficiently large number of market access commitments from trading partners in order to accept an international agreement on Tlc in the WTO framework, a problem soon referred to as *the critical mass issue*.

In any case, at the conclusion of the Uruguay Round, after all negotiations no agreement on *basic* Tlc had been reached. The Members, however, agreed to sign three documents concerning Tlc services that became integrating part of the GATS after being adopted at Marrakesh on April 15, 1994: the *Annex on Telecommunications* (AT), the *Decision on Negotiations on Basic Telecommunications* and the *Annex on Negotiations on Basic Telecommunications*.

The former contains additional notes and commitments with respect to the basic text of the GATS and is aimed at providing basic guarantees associated to Tlc, given that fact that these services are instrumental to the supply of other services and a discriminatory behavior of government on Tlc might easily affect the liberalization efforts in other sectors. The AT is discussed in detail in paragraph 1.5.

With the *Decision on Negotiations on Basic Telecommunications*, instead, WTO members committed to begin a new round of negotiation to complete the liberalization effort that was perceived to be still open after the Uruguay Round. The Decision established a specific Negotiating Group on Basic Telecommunications (NGBT, henceforth) with the objective of concluding the new negotiations and make a final report by April 30, 1996. In the meanwhile, Members accepted to maintain a standstill until the end of the NGBT activity, whereby they committed not to try to improve their negotiating position by introducing new measures.

Finally, Members used the *Annex on Negotiations on Basic Telecommunications* to extend the time limit to file exemptions to GATS Art. II MFN in the Tlc sector up to the deadline given to the NGBT to conclude its work[37].

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[36] The danger perceived in the late 1980s actually solidified in 1999 when Deutsche Telekom (DT) tried to acquire the American operator Voicestream. In 2000, Senator Ernest Hollings (D-SC) and other 29 US Senate co-sponsors introduced a bill (S. 2793) that would have blocked Deutsche Telecom, or any other telecom owned more than 25 percent by a foreign government, from acquiring a US telecom firm. Eventually, S. 2793 did not pass and DT acquired Voicestream. See Gary. C. Hufbauer and Edward. M. Graham (2000), " "No" to Foreign Telecoms Equals "No" to the New Economy", *Institute for International Economics Policy Brief* No. 7, Washington D.C.

[37] *"Article II and the Annex on Article II Exemptions, including the requirement to list in the Annex any measure inconsistent with most-favored-nation treatment that a Member will maintain, shall enter into force for basic telecommunications only on: (a) the implementation date to be determined*

The strong pro-liberalization effort of the US Government became even more apparent right after the conclusion of the Uruguay Round when negotiations about basic Tlc began. Negotiations within the NGBT took place by means of lists of offers and requests of commitments concerning liberalization measures. At the end of April 1996, 34 countries had presented conditional offers concerning a wide range of basic Tlc services.

The position of the European Union mirrored the common regime of liberalization of basic Tlc liberalization that was scheduled to enter into force on January 1, 1998. Her proposal included local, national and international services, including satellite and cellular services supplied by means of both proprietary facilities and traffic re-sale. Restrictions were limited to foreign ownership limits and regarded only France (20% in radio services), Spain (25%), Portugal (25%) and Belgium (49%). Liberalization was to be phased in for Spain, Portugal and Greece (2003) and Ireland (2000)[38].

The counter-proposal of the US also reflected the new domestic law, namely the Telecommunications Act of 1996. Liberalization extended to local, national and international services, in addition to the access to radio licenses for operators indirectly owned by foreign telcos, wireless and satellite services and related terrestrial basis.

Market access limitations included a 20% restriction to direct foreign ownership for radio licenses owners, exclusivity rights for COMSAT for connections to INTELSAT and INMARSAT and restrictions concerning submarine cables pose.

In mid-1996, negotiations were thought to have been a success thanks to the number of offers submitted and the wide acceptance of the regulatory commitments contained in the *Reference Paper*, an absolute novelty in the WTO framework where countries liberalization effort had been traditionally limited to market access and national treatment.

However, during 1996, the US withdrew form the NGBT blaming particularly on developing countries: They motivated their decision by claiming that the Group was not contributing to the definition of a sufficient critical mass of MA commitments. The US argued that the opening up of the American Tlc market, a business of approximately 215 billion USD[39], would

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under paragraph 5 of the Ministerial Decision on Negotiations on Basic Telecommunications; or, (b) should the negotiations not succeed, the date of the final report of the Negotiating Group on Basic Telecommunications provided for in that Decision." Annex on Negotiations on Basic Telecommunications, Paragraph 1.

[38] Italy did not list any restriction concerning specific sectors but a general restriction about the voting right of newly privatized companies alternative to the Treasury right of limiting for maximum 5 years and beginning in 2000, the acquisition of large equity shares in companies active in strategic sectors (so called *golden share*).

[39] Holmes, Kempton, McGowan (1996), "International competition policy and telecommunications", *Telecommunications Policy*.

be acceptable only if a critical mass of commitments by other countries were offered in exchange in particular by ASEAN countries, LA countries and India. Indeed, the position of the US was legitimate because many countries were about to face an open US market without granting reciprocal access to their own markets. Moreover, the persistence of legal monopolies would actually put a ceiling on the international activity of US firms and allow non-US operators to engage in anti-competitive practices that would affect the American market, for example, in the international communications segment.

The break point in the negotiations was the US request to introduce an ex-ante control about the possibility of denying a license on the basis of *potential* abuses operated by both legal monopolists and operators enjoying some kind of a dominant market position. Moreover, the US position was influenced by the pressure of the American satellite industry and led to consider too weak the commitments on satellite services and subsequently proposed an exclusion of the issue from the basic Tlc negotiations.

The EU and other WTO Members deemed the US position unacceptable and defended the principle of ex-post control limited to situations of *de jure* monopoly.

The complete failure of the negotiations was avoided in extreme with the signature of the *Decision on Commitments in Basic Telecommunications* based on a proposal of the WTO General Director, Renato Ruggiero. The Decision, adopted by the Council on Trade in Services on April 30, 1996, extended the negotiations on basic Tlc to February 15, 1997 and established a new negotiating group called Group on Basic Telecommunications (GBT, henceforward). In contrast to the NGBT, where some countries were participants and other countries were observers, the GBT was open to all WTO Members as participants.

The four main key topics that got particularly delicate during the discussions within the NGBT and the GBT were international trade, anti-competitive behavior of monopolists, infrastructure-based competition, broadcasting. These topics are quickly discussed in the following pages in order to understand how the pro-competitive pressure and regulatory principles have been tackled during negotiations and have eventually been coagulated in the Fourth Protocol and in the Reference Paper.

As for international trade in Tlc services, the main problem was that the reform of the Accounting Rate System (ARS)[40] has ceased to be perceived as an effective mode to regulate

[40] The idea behind the ARS is that every international call is supplied jointly by two national monopolists that charge their customers approximately the same price in both traffic directions. The revenue collected by the telephone company in the country where the call is originated (*collected*

international traffic between operators in an international environment where markets are possibly liberalized asymmetrically. Since the opening up to competition, many countries experienced an increase in the number of operators and, in particular, a downward movement in the cost structure of the international calls segments[41].

In fact, as a first effect, price reduction in one country tends to inflate his firms' outward volume of traffic and to create a bias in the bilateral balances of traffic between operators, as far as users exploit services such as call-back or country-direct in order to benefit from lower collection rates. Consequently, telcos of liberalized countries have to arrange large compensating payments to telcos on non-liberalized countries to comply with the ARS.

Moreover, settlement rates in liberalized countries tend to be higher than costs faced by telcos, so that the incentives to attain further cost reduction is annihilated and part of the settlement payments to a national monopolist made by operators of a liberalized environment are in effect indirect subsidies.

During the negotiations, the US were particularly adverse to the depicted situation and even the FCC promoted a tough discussion about the problems arising from the working mechanism of the ARS, that creates obstacles to competition.

In fact, in the NGBT and in the GBT the US proposed initially to bind the award of licenses to foreign telcos to the level of accounting rates between the US and the correspondent foreign country. Later on, they suggested the introduction of a benchmark rate for accounting rate for carriers wishing to entry the US market in order to avoid the conflict with the MFN principle intrinsic to the first proposal.

The ARS could arguably leave room to **anti-competitive behavior** against US carriers at least in the case of discrimination by foreign operators (*whipsawing*, that is according preferential

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rate) is generally different from the *settlement rate* paid by the calling country's telcos, that is a fraction of the negotiated fixed rate per minute paid (*accounting rate*), thought to compensate the receiving telco for the completion of the international call and negotiated by telco at international level within the negotiating arena of the ITU.

The system has been sustained by the fact that, for a long time, outward and inward traffic have been balanced for both operators involved in the international transaction and inflation and exchange rates have been relatively constant. In the last years, many conditions that permitted to sustain the system stopped to hold.

[41] Cricelli et. Al. (1999) report that after considering depreciation of optical fiber submarine cables, transmission costs are less that 0,00001 U$ per minute. For satellite technology, the minute cost for the use of a satellite, including operating costs, is about 0,00003 U$ whereby the average use of capacity is about ¼; see Cricelli, Livio, Massimo Gastaldi and Nathan Levialdi (1999) "Strutture di mercato nelle telecomunicazioni internazionali: un'analisi econometrica", *Economia e politica industriale*, 104: 57-83.

treatment for return traffic to one US telco rather than another[42]), cross-subsidization (the use of monopoly in the home market to undercut prices of US carriers in the US market) and bypass (of the ASR by foreign operators or foreign affiliate of US operators).

Cross-subsidization and bypass have been regulated by the FCC by allowing foreign carriers into the US market for international services, only conditional on the proof that the foreign country offers to US companies operating conditions similar to those offered in the US, the so-called Effective Competitive Opportunities.

Discrimination had been tackled by the FCC with the introduction of the International Settlements Policy that required the equal division of the accounting rate between the US and foreign carriers, nondiscriminatory treatment of US carriers (all US carriers must receive the same accounting rate, with the same effective date), and proportionate return of inbound traffic[43]. On April 15, 1999, however, the FCC adopted a Report and Order (FCC 99-73) reforming the International Settlements Policy [44] in order to overcome the rigidity of the system that characterized bilateral relations of liberalized market, whereby the emergence of innovative alternative arrangements for international traffic between the two countries was blocked.

Within the NGBT and the GBT, the US regulation has been widely criticized with the argument that in the GATS framework both the International Settlements Policy and the Effective Competitive Opportunities test conflict with the MFN obligation in the way it discriminates between countries according to their perceived level of liberalization.

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[42] According to the FCC, *whipsawing* can occur when a dominant foreign carrier exercises its market power to play competing U.S. carriers off one another in order to force U.S. carriers to accept accounting rate agreements with unfavorable terms and conditions. The Commission has consistently found whipsawing to be contrary to the public interest because it prevents U.S. carriers from negotiating lower accounting rates, to the ultimate detriment of U.S. consumers.

[43] In a series of decisions starting in 1936, the Commission developed its International Settlements Policy (ISP), a policy that, among other things, requires U.S. telecommunications carriers to pay nondiscriminatory rates for the termination of international traffic in foreign countries. Although the ISP initially applied only to international telegraph and telex service, the Commission extended it to voice traffic in 1986 in the ISP Order; FCC 99-73 - Revised ISP Rules, IB Docket No. 98, 148, et al., 5/6/99.

[44] The FCC removed the international settlements policy and contract filing requirements for arrangements with foreign carriers that lack market power; removed the international settlements policy for arrangements with all carriers on routes where rates to terminate U.S. calls are at least 25 percent lower than the relevant settlement rate benchmark previously adopted by the FCC in its Settlement Rate Benchmark Order; adopted changes to contract filing requirements to permit U.S. carriers to file arrangements on a confidential basis with foreign carriers with market power on routes where the international settlements policy is removed; adopted procedural changes to simplify accounting rate filing requirements; and eliminated the flexibility policy in recognition that the reforms to the international settlements policy render the flexibility policy largely superfluous. (IB Docket No. 98-148).

The *resale* vs. *facility-based* **competition** issue is based on a longstanding discussion in economics concerning the opportunity of fostering competition by regulating access to existing infrastructure as sustained by most developed countries, rather than building new parallel networks[45], as traditionally claimed by LDC. The point will be discussed further in chapter 3.

Telecommunications and Broadcasting has been a hot topic especially because of the rigid position of the European negotiators: The EC claimed that the liberalization of the Tlc sector might have possibly enfeebled its cultural reservations in the audiovisual sector.
Accordingly, the EC specified that broadcasting, *"the uninterrupted chain of transmission required for distribution of TV and radio program signals to the general public"* - is excluded from the topics covered by its schedule of commitments, as well as *"content provisions which requires telecommunications services for its transport"*. Naturally, today some Internet services such as the distribution of audio or video files through the Internet, turn out to be difficult to be framed within the agreement bearing this exemption in mind.
Frequency availability was excluded by the discussion during the negotiation process with the motivation that it was regulated under GATS Art. VI on domestic regulation[46]. In effect, many countries initially tried to condition their MA commitments to the availability of frequencies but it was soon pointed out that accepting such offers would contrast with obligations stemming from MA commitments.

After finding partial agreement on these topics, the activity of the GBT concluded in the beginning of 1997 with the signature of the so called *Agreement on Basic Telecommunication,* the Fourth Protocol of the GATS, that completed the picture of the treatment of Tlc in the system of agreements of the WTO.
The following pages will carry out a detailed analysis of the relevant WTO provisions on Tlc focusing on four main elements: General provisions contained in the GATS that apply to the Tlc sector, The Annex on Telecommunications, The Fourth Protocol and the Reference Paper. The Reference Paper is formally part of the Fourth Protocol but it will be discussed separately due to its importance in the WTO framework for Tlc.

[45] For an economic discussion of the issue, two good references are Oz Shy (2000) and Jean Jacques Laffont and Jean Tirole (2000).
[46] WTO (1997), Note on Market Access Limitations on Spectrum Availability, WTO/S/GBT/W/3.

2.4 The Annex on Telecommunications

Generally speaking, principles of trade in telecommunications services are contained in the GATS like for other services. Moreover, included in the GATS is the *Annex on Telecommunications* (AT) on access to public networks. The Annex was designed to supplement and strengthen disciplines such as those found in GATS Art. VI on domestic regulation, Art. VIII on monopoly and exclusive suppliers, and Art. IX on business practices so as to deal more adequately with the sector. Negotiators did not consider Art. VIII and IX of the GATS to be strong enough to address a sector with a long history of monopolies that were still the rule rather than the exemption, such as Tlc. Consistently, the AT was thought to ensure that domestic regulators would guard against monopoly abuses and other anti-competitive business practices in order to achieve a level playing field[47] for service suppliers who depend on access to Tlc.

The Annex is structured in six parts with the first three being a kind of introduction aimed at making objectives, scope and object of the document clear in paragraph 1, 2 and 3, respectively. "WTO style" provisions concerning transparency, technical cooperation and relation to international organization and agreements are contained in paragraph 4, 6 and 7 respectively, whilst the core of the Annex can be traced down to paragraph 5 under the heading *"Access and Use of Public Tlc transport Networks and Services"*.
The following pages respect this order and present objective and scope, core provisions and other sections in a sequence, with a marked focus on core obligations.

Objective and Scope

As mentioned above, the decision to single out the telecommunications sector as an independent topic in the GATS has been based on the recognition of its specificity in the economic system. As expressly explained in the first Paragraph of the AT, the sector is peculiar because of "[...] *its dual role as a distinct sector of economic activity and as the underlying transport means for other economic activities*[48]." While for some service

[47] Tuthill (1996).
[48] AT, Paragraph 1.

companies information or its transmission is the *product* they offer to their customers, for other sectors Tlc are a *channel* or a means of transport they need to serve their customers[49].

The declared objective of the AT is to elaborate *"upon the provisions of the Agreement with respect to measures affecting access to and use of public telecommunications transport networks and services*[50]".

In view of that, the scope of the AT is stated in paragraph 2(a): The Annex applies *"to all measures of a Member that affect access to and use of public telecommunications transport networks and services"*, while *"measures affecting the cable or broadcast distribution of radio or television programming"* are explicitly excluded.

This acknowledgment is important because it makes clear that the AT is drafted with Tlc users as its main beneficiary and its provisions are dedicated to ensuring that users do not face unfair obstacles related to telecommunications as an essential means of transport for trade in services.

The Annex notes and provisions are to be considered additional to the GATS and subsidiary to the supply of other services[51]. In the words of Bronckers and Larouche[52]: *"The AT does not contain or lead to any market access or NT obligation: It is not to be interpreted to require WTO Members to allow the provision of Tlc services beyond the commitments they have already made in their respective schedules*[53]*. The AT only kicks in once a Member has offered specific commitments in a given service sectors*[54]*. It could be therefore compared to general GATS obligation which apply in addition to the specific commitments made in the schedules*[55]".

Hence, rules contained in the AT have the character of general obligations at the same level of MFN treatment, a feature that has been acknowledged to be a point of strength of the document[56].

In GATS parlance, a *general obligation* is a discipline that applies over and above what may be committed in schedules[57]. While MFN treatment or certain aspects of transparency apply

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[49] The top five Tlc-intensive service sectors are usually thought to be banking and insurance, wholesale and retail trade, business services and transport warehousing , see Croni, F.J., E.K. Colleran, p. l. Herbert and S. Lewitzky (1993), "Telecommunications and growth", *Telecommunications Policy*.

[50] AT, Paragraph 1.

[51] Tuthill, Lee (1996), "Users' rights? The multilateral rules on access to telecommunications", *Telecommunications Policy*, 20: 89-99.

[52] Bronckers and Larouche (1998).

[53] Referred to AT, Paragraph 2(c).

[54] Referred to AT, Paragraph 5(a).

[55] Referred to AT, Paragraph 5(a).

[56] Among others, Tuthill (1996).

[57] The nature of obligations in the WTO framework is extendedly discussed in paragraph 7.

with reference to all services, other general obligations such as the AT provisions kick in only when commitments on particular services have been scheduled.

The scope of the AT is spelled out in Art. 2. While GATS applies to all *"measures by Members affecting trade in services"*, the AT applies to all *"measures of a Member that affects the access and use of public telecommunications networks and services"*.

In order to qualify the ground of application of the AT, paragraph 3 of the AT provides the four definitions reported in Table 3.

The phrasing *"Public telecommunications transport networks and services"* is a term of art developed for the AT that has been interpreted to have a dual nature. According to Tuthill (1996), the qualification *"transport"* is meant to refer the whole Annex to *basic* Tlc, while the reference to *"public"* draws the attention to Tlc services that have a public service assignation or are related to universal services requirement, rather than ownership. Moreover, the specification of both "networks" and "services" is aimed at including basic Tlc network infrastructures as well as basic services, not necessarily provided over those facilities. It follows that the AT does not apply to non-public basic Tlc, such as voice telephony or data transmission provided within closed user groups. Again, the mode of supply of Tlc, on a competitive basis or monopoly is not relevant.
Thus, excluded services include non-public basic telecommunications, e.g. data transmission or voice telephony provided within closed user groups, and access and use of value added Tlc services, provided either by a public operator or on a monopoly basis.

It has to be noted that the AT specifies the type of Tlc *services* it covers, rather than the type of *operators* on behalf of which government undertakes the obligations. This specification is a deliberate compromise taken during the negotiation process. In fact, most governments that had not liberalized their Tlc monopolies were unsure whether or not to take on obligations to guarantee fair access and use, if participants that had introduced competition in the sector would incur no such obligation at all.
Accordingly, the Annex does not limit its scope to monopolies or dominant operators but applies to *any* provider of public basic Tlc, being it publicly or privately owned, being a monopolist or competing with other service providers, operating or not Tlc infrastructure or facilities.

Core Provisions

The core provisions of the AT are included in paragraph 5 under the heading "Access and use of Public telecommunications transport networks and services". The lead paragraph goes straight to the heart of the problem with the following statement:

"Each Member shall ensure that any service supplier of any other Member is accorded access to and use of public telecommunications transport networks and services on reasonable and non-discriminatory terms and conditions, for the supply of a service included in its Schedule. This obligation shall be applied, inter alia, through paragraphs (b) through (f)."

As specified in a footnote to the paragraph, the term *"non-discriminatory"* is understood to refer to MFN and NT as defined in the Agreement, as well as to reflect sector-specific usage of the term to mean *"terms and conditions no less favorable than those accorded to any other user of like public telecommunications transport networks or services under like circumstances*[58]".

Part I of the GATS is made of a single article aimed at defining the scope of the agreement. According to GATS Art. I,

"This Agreement applies to measures by Members affecting trade in services."

Measures are intended to be laws, regulations, provisions and any disposition related to the service sector taken by *"(i) central, regional or local governments and authorities; and (ii) non-governmental bodies in the exercise of powers delegated by central, regional or local governments or authorities*[59]."

As claimed, for example by Comba (1995), GATS Art. I applies neither to the concept of "Services", nor to the one of "trade of services", but uniquely to the "international trade of services". However, that the exact definition of services is not given, and definitely not clarified by the tautological expression of Art. I (3)(b): *"For the purposes of this Agreement:* [...]*"services" includes any service in any sector except services supplied in the exercise of*

[58] AT, note 2 to paragraph 5 (a).
[59] GATS Art. 1(3).

governmental authority". As we shall see, the same definitional choice, rather vague indeed, has been made for Tlc.

Telecommunications Paragraph 3 (a)	the transmission and reception of signals by any electromagnetic means
Public telecommunications transport service Paragraph 3 (b)	any telecommunications transport service required, explicitly or in effect, by a Member to be offered to the public generally. Such services may include, *inter alia*, telegraph, telephone, telex, and data transmission typically involving the real-time transmission of customer-supplied information between two or more points without any end-to-end change in the form or content of the customer's information.
Public telecommunications transport network Paragraph 3 (c)	the public telecommunications infrastructure which permits telecommunications between and among defined network termination points
Intra-corporate communications Paragraph 3 (d)	telecommunications through which a company communicates within the company or with or among its subsidiaries, branches and, subject to a Member's domestic laws and regulations, affiliates. For these purposes, "subsidiaries", "branches" and, where applicable, "affiliates" shall be as defined by each Member. "Intra-corporate communications" in this Annex excludes commercial or non-commercial services that are supplied to companies that are not related subsidiaries, branches or affiliates, or that are offered to customers or potential customers

Table 2.2 Basic definitions in the context of the AT

The significant scope of the provision with respect to MFN and NT has to be considered in the light of this footnote. So, GATS Art. II requires *governments* to respect MFN treatment, but at the same time the AT extends MFN to the behavior of *operators*.
Moreover, if NT[60] is related to the *supply* of a service, it is certainly constrained by the limitations entered in schedules.

[60] Which, unlike MFN, is not a general obligation but is a commitment contained in Members' schedules with the limits thereby specified.

On the contrary, if NT relates to *access and use*, the Annex implies that it must be granted in full for a scheduled service. This is a major addition to the scope of the GATS framework.
In addition, the reference to *sector-specific usage* concerning non-discrimination entails that discrimination on access and use cannot occur within a given class of users.

Paragraph 5 (b) guarantees the *"access to and use of any public telecommunications transport network or service offered within or across the border of that Member"* to service suppliers of any other Member. Exemplified cases include the entitlement of users to purchase or lease and attach terminals or other equipment that interfaces with the network and is necessary to provide a supplier's service; the right to interconnect private leased or owned circuits with Tlc networks and services including private leased circuits of other service suppliers; the right to use operating protocols of the service supplier's choice in the supply of any service, except where mandatory protocols are necessary to ensure the availability of basic Tlc to the public generally[61]. Moreover users are entitled to use public Tlc for the movement of information within and across borders, including intra-corporate communications and access to information contained in data bases or otherwise stored in machine-readable forms in the territory of any Member[62].
It is clear that the cases listed in paragraph 5 provide a guidance on the interpretation of the wording "access and use", which is not defined elsewhere in the AT, so that they must be interpreted as illustrative. In fact, the guarantee extends to any public basic network and cannot be thought to mean an exclusion of other forms of interconnection or usage. This interpretation is utterly important in the light of the subsequent negotiations that paved the way to the provisions on competition in the supply of basic Tlc contained in the BTA.
Opposed to the Users' Rights above discussed, the AT highlights also Regulators Rights in the subsequent provisions. The AT provides regulators with a set of parameters to clarify the reference to reasonable terms spelled out in paragraph 5 (a), In particular, regulators may permit conditions to be imposed on access and use, which are designed

(i) to safeguard the public service responsibilities such as universal service;

(ii) to protect the technical integrity of public Tlc systems; or

(iii) to ensure that only services listed in schedules of commitments are supplied[63].

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[61] AT paragraph 5 (b).
[62] AT paragraph 5 (c). Paragraph (d) introduces an exception to paragraph (c) by stating that a Member may take such measures as are necessary to ensure the security and confidentiality of messages, subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on trade in services.

Public operators, however, must not impose restrictions on access and use that fall outside the scope of the objectives or more onerous than necessary to comply with paragraph 5 (e)[64]. Again, a few examples of acceptable practices are cited in the AT paragraph 5 (f) and include

(i) restrictions on resale or shared use of such services;

(ii) a requirement to use specified technical interfaces, including interface protocols, for inter-connection;

(iii) requirements, where necessary, for the inter-operability;

(iv) type approval of equipment which interfaces with the network and technical requirements relating to its attachments;

(v) restrictions on inter-connection of private leased with public networks or services or with circuits or with private leased circuits; or

(vi) requirements for notification, registration and licensing[65].

However, it has to be kept in mind that any conditions on access and use, whether or not falling within these examples, can only be used to satisfy the three permissible regulatory objectives stated at paragraph 5 (e).

The last paragraph of the article deals with the particular situation of developing countries who may, consistent with their level of development, place reasonable conditions on access to and use of networks and services necessary to strengthen their domestic telecommunications infrastructure and service capacity and to increase its participation in international trade in telecommunications services. As usual, however, additional conditions shall be specified in the Member's Schedule.

Transparency and technical cooperation

As usual in the WTO framework, the AT regulates transparency[66] measures and puts forward technical cooperation and assistance to LDC[67].

As for the **transparency**, in the application of Article III of the GATS, each Member shall ensure that relevant information on conditions affecting access to and use of public telecommunications transport networks and services is publicly available, *"including: tariffs and other terms and conditions of service; specifications of technical interfaces with such*

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[63] AT paragraph 5 (e).
[64] By which "[ ] *no condition is imposed* [ ] *other than as necessary*".
[65] AT paragraph 5 (f).
[66] AT section 4.
[67] AT section 6.

networks and services; information on bodies responsible for the preparation and adoption of standards affecting such access and use; conditions applying to attachment of terminal or other equipment; and notifications, registration or licensing requirements, if any."
Moreover, the AT includes the explicit recognition that an efficient and advanced Tlc infrastructure in developing countries is essential to the expansion of their trade in services. In fact, the participation of developed and developing countries and their suppliers of Tlc in the development programs of international and regional organizations[68] and the cooperation among developing countries at the international, regional and sub-regional levels are explicitly encouraged.

Members are required to make available to developing countries information with respect to Tlc services and developments in Tlc and information technology to assist in strengthening their domestic Tlc services sector. Moreover, the AT requires Members to give special consideration to opportunities for the least-developed countries to encourage foreign suppliers of telecommunications services to assist in the transfer of technology, training and other activities that support the development of their infrastructure and expansion of their Tlc services trade.

2.5. The Basic Telecommunications Agreement (Fourth Protocol)

As recalled in paragraph 3, at the end of the Uruguay Round in 1993, 67 WTO members, including the United States and the EU[69], signed specific commitments on telecommunications in the 56 original GATS schedules. The vast majority of commitments were related to value-added and enhanced Tlc services[70] (44 schedules accounting for 55 members). At the time, value-added services made only a minor share of the whole Tlc market, whilst the market was still dominated by public voice telephony. At a certain point, reaching an agreement on basic Tlc became actually unfeasible, and particularly on segments where the big business was concentrated at the time.

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[68] *"Including the International Telecommunication Union, the United Nations Development Program, and the International Bank for Reconstruction and Development"*. AT Paragraph 6 (a).
[69] In 1993, the EU was still formed by 12 countries and submitted a single schedule according to Art. 133 of the Consolidated version of the Treaty establishing the European Community.
[70] The European Community and her Member States, for example, fully committed to NT and free market access for services liberalized through the Directive 90/388: e-mail, voice mail, online information and data base retrieval, code and protocol conversion, electronic data interchange.

The negotiation on basic Tlc continued and finally ended on February 15, 1997 when 55 negotiating members of the WTO, representing 69 countries, accepted the Fourth Protocol (together with the specific commitments and exemptions of Art. II "TNPF"). The 55 schedules were annexed to the Fourth Protocol to the GATS that subsequently entered into force on January 1 1998. According to Fredebeul-Krein and Freytag (1997) and ITU (1997) the signatory countries represented more that 91% of the revenues of the world market for telecommunications[71].

The Agreement focuses on three fundamental issues:

1) Market access and market liberalization;
2) Regulation of foreign participation into domestic telecom operators;
3) Regulatory principles.

At the beginning of the talking, negotiators agreed to set aside national differences regarding the definition of basic telecommunications and began to discuss on all services that involve end-to-end transmission of customer supplied information[72]. The 55 lists of specific commitments attached to the Fourth Protocol cover all basic services, independently of the content (voice, data, images), of the transmission mode (cable, radio, satellite) or distance (local, national, international). They add to the 44 lists concerning value-added services attached to the GATS in 1994 completing the range of sectors covered within the WTO system.

Naturally, MFN clause implies that the commitments accepted in the Protocol, including additional regulatory principles contained in the *Reference Paper*, automatically extend to all WTO members, unless specific exemptions[73] to MFN have been invoked at the conclusion of the negotiations[74].

The vast majority of participating countries, 63 out of 69 countries taking specific commitments, has presented additional regulatory commitments and 57 have accepted the Reference Paper[75]. Only 9 countries presented exemptions concerning MFN[76].

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[71] ITU (1997), World telecommunications Report 1996/1997.
[72] E.g. simply the relay of voice or data from sender to receiver.
[73] Exemptions are attached to the IV Protocol together with specific commitments.
[74] WTO (1997a), The WTO Negotiations on Basic Telecommunications and WTO (1997b), The WTO Negotiations on Basic Telecommunications: Informal Summary of Commitments and M.F.F. exemptions.
[75] In whole or with a few modifications.

Market Access and Market Liberalization

As mentioned, the first part of the BTA deals with market entry. The BTA does not only allow for cross-border supply of telecommunications, but also enables foreign companies to provide local, long-distance and international service, including all voice and data service, through any means of network technology[77]. In effect, the provisions allow foreign supplier to build their own facilities to compete with incumbents and to re-sell existing network capacity over private leased circuits.

30 countries committed to guarantee market access by January 1998 while another 15 committed to follow within the next seven years, and 6 countries opened their markets only for selected services[78].

Moreover, 56 commitments were related to foreign ownership or control of *all* Tlc services. According to the US Trade Representative, those 56 countries represented 97% of total Tlc revenues of WTO members.

FDI

Together with the liberalization of international trade in telecommunications services, the second key objective of the negotiations was to reach a number of commitments concerning Foreign Direct Investment in the sector. GATS Art. I (1)(c), defines the establishment of new firms or commercial presence, including the ability to acquire shares in domestic Tlc operators, as one of the modes of supply to which provisions of the agreement on service apply.

In effect, 56 of the 69 countries covered by the origianl 55 schedules annexed to the Fourth Protocol committed to permit foreign ownership or control of all Tlc services and facilities. In 18 countries, including the US, the UK and Germany, foreign-owned companies were permitted a 100% stake in domestic telecom operators since 1998.

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[76] GATS ART. II (1): *"With respect to any measure covered by this Agreement, each Member shall accord immediately and unconditionally to services and service suppliers of any other Member treatment no less favorable than that it accords to like services and service suppliers of any other country."*

[77] 53 countries guaranteed market access to international Tlc services and facilities and 42 countries conceded market access for satellite services and facilities.

[78] For example, Spain delayed the deadline to November 30, 1998, granting the second national license on January 1, 1998; Luxembourg negotiated a phase in to January 1, 2000 to let the Agreement enter into force (as well as Singapore and Argentina); Greece will liberalize phone and network services on January 1, 2003 and in any case access will be granted only to companies that are quoted on the Greek stock exchange. Portugal liberalized international and national value-added services on January 1, 1999 and phone, telex and telegraph on January 1 2000; Ireland opened interconnection between fixed and mobile networks on January 1, 1999.

The remaining countries decided not to fully liberalize FDI. In particular, some significant WTO member like India, South Africa, Turkey, and Indonesia did not take any commitment at all, or put quite substantial limits on the FDI liberalization effort. Brazil, Canada, Mexico[79], France, Israel, and Portugal kept foreign investment limits on selected services.
Finally, a group of notable Members, including Australia, Japan[80] and New Zealand retained limits on foreign participation in the domestic incumbent. Commitments on FDI will be fully discussed in paragraph 1.8. In Table 2.4, a short list of specific commitments concerning NT[81] is reported.

Regulatory Principles

The third building block of the Fourth Protocol is constituted by the so called Reference Paper (hereinafter RP), a short document attached to the Protocol that is widely acknowledged to be the most interesting and innovative part of the Basic Telecommunications Agreement. The regulatory provisions of the RP are discussed in detail in the next few pages.

	No. of signatory members	No. Countries
Commitments to liberalize		
Voice telephony	47	61
International	42	56
Long-distance	38	52
Local	41	55
On a resale basis	28	42
Other services	49	63
Data transmission	49	63
Cellular/Mobile services	46	60
Private leased circuits	41	55

Table 2.3 Commitment related to NT contained in the original Schedules

[79] Canada and Mexico do not allow majority shareholding by foreign companies.
[80] Japan limits foreign ownership of the two main operators, NTT and KDD, to a 20% share.
[81] WTO (1997), *Results of Negotiations on Basic Telecommunications. Guide to reading the GATS schedules of specific commitments and the list of article II (MFN) exemptions.*

2.6 The Reference Paper

Because of the oligopolistic nature of the market for telecommunications services, the coexistence of entry barriers and strong national operators tends to keep would-be competitors out of domestic markets and to make them forge powerful international strategic alliances. Thus, the right to access national markets stated by the Basic Telecommunications Agreement is simply not enough to guarantee competition in the sector.
In the WTO system, the issue has been dealt with through the *Reference Paper* (RP).
The RP contains six regulatory principles to complement the principles of liberalization and free competition among suppliers of Tlc services.
According to the general structure of the WTO agreements, the regulatory principles bind a WTO Member only when the Reference Paper has been added to his specific commitments attached to the Fourth Protocol. Thus, the document is classified as one of the Additional Commitments that Members can agree under Art. XVIII of the GATS and, as such, incurs in the limits determined by Part III of the GATS[82].
Concretely, out of 69 signatory countries of the Basic Telecommunications Agreement, 63 also undertook additional commitments on regulatory principles to guide the design and management of their regulatory structure and 57 specifically accepted the Reference Paper[83]. Bolivia, India, Malaysia, Morocco, Pakistan, the Philippines and Turkey did not adopt the whole of the Reference Paper, while Bangladesh, Brazil, Mauritius and Thailand claimed that they would adopt it at a later point in time.

The RP has two chief objectives:

1) to establish minimal safeguards guarantees that domestic law must provide in order to make market access and FDI commitments truly effective, and
2) to make the access to the WTO Dispute Settlement System available to countries that detect inadequate implementation of the BTA.

Scope and structure

The very first heading of the RP states that the regulatory principles therein contained apply to *basic* telecommunications services. However, it has been pointed out that the distinction

[82] Arts. XVI, XVII and XVIII.
[83] In whole or with a few modifications.

between basic and enhanced or value-added services is quite artificial in the GATS context[84]. In fact, regulatory concerns that worried both the NGBT and the GBT during negotiations do not usually arise for suppliers of value-added or enhanced services, being the market for those services normally more competitive. Thus, the application of the RP benefits downstream companies indirectly, notwithstanding.

The RP is structured in six headings: *competitive safeguards* and *interconnection*, aimed at regulating major suppliers; *universal service, licensing, independence of the regulator*, and *allocation of resources*, as more general regulatory issues.

Major suppliers

In the BTA, a major supplier is is defined[85] as a subject that

1) *"has the ability to materially affect the terms of participation (having regard to price and supply)"*;
2) deriving form "(a) *control over essential facilities; or* (b) *use of its position in the market*";
3) *"in the relevant market for basic telecommunications services"*.

Essential facilities means[86] *"facilities*

1) *of a public telecommunications transport network or service, that*
2) *are exclusively or predominantly provided by a single or limited number of suppliers; and*
3) *cannot feasibly be economically or technically substituted in order to provide a service"*.

The RP is rather vague about the meaning of *"power to affect the terms of participation"*. To have a term of comparison, the European discipline is based on *Michelin v. Commission*[87], where the European Court of Justice defined a dominant position as the possibility *"to prevent effective competition from being maintained and behave to an appreciable extent independently" of a firm's "competitors and customers and consumers"*.

The RP does not refer explicitly to market power or dominant position, though. Bronckers and Larouche (1998) interpret the phrasing *"affecting the terms of participation"* to mean

[84] The point has been discussed deeply in paragraph 2.
[85] RP, Definitions.
[86] RP, Definitions.

quite radical influence on the market, with the power to exclude or control the participation of market actors. A situation where this power can be thought to operate is a firm cutting off the supply of "building blocks" needed to make up the relevant product, or squeezing off other operators by offering them at prices where market operators cannot realize a sustainable margin on their own market prices. At a practical level, a typical situation involves a national operator that controls the public telecommunications network, and therefore the main source of leased line capacity, and can easily discipline players on the data communications market. Market power would be abused, for example, whenever the national operator refuses to supply leased lines or prices them so high that it becomes impossible for downstream operators to operate at positive profit levels.
However, a supplier qualifies as a major supplier only if the power to discipline above discussed derives either from the *control over essential facilities* or from his *position on the market* [88].
The introduction of essential facilities as an alternative criterion is central because it allows to identify a supplier as a *major* supplier on the basis of its control over such structures.

The RP, in fact, defines essential facilities through two conditions. Condition (b) emphasizes non-substitutability as a criterion for defining them and is quite clear. On the contrary, condition (a) appears rather vague. The loose wording would allow a facility to be maintained essential even if provided on a competitive basis by few suppliers.
Nonetheless, the risk of abusing the definition is remote because it still has to take into account the interpretation of a major supplier as an entity characterized by the considerable power of discipline discussed above.

The definition of major supplier does not strictly require the firm to operate in the relevant market, and the power might actually be exerted in upstream, a downstream or neighboring markets[89]. Naturally, major suppliers happen to have incentives to use their discipline power to affect related market, where they are not necessarily active, and where apparently there should be no competition concern. In general, the solution of the RP allows the avoidance of a formal definition of Tlc sector common for all the signatory countries.

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[87] Case 322/81 [1983].
[88] The topic has been introduced in paragraph 1.4.
[89] Here, the reference in the European context is *Tetra Pak SA v. Commission*, case C-333/94. Tetra Pak was found to have engaged in predatory pricing in relation to the sale on non-aseptic cartoons and the dominant position did not lay in that market, but in the market for aseptic cartoons.

Rather, the weakness of the wording relates to the restriction to relevant market for basic Tlc services. According to the RP, a Tlc operator that controls the public infrastructure and, consequently, leased lines is a major supplier in the market for data communications, for instance, but not in the market for on-line and Internet services provided to the public, although it equally affects the terms of market participation in the latter. In a way, the restriction to basic Tlc that pervades the whole agreement exclude a number of Tlc services from the pro-competitive shield of the RP.

In addition, the definition of major supplier is quite indeterminate and it is not clear whether such notion is really enforceable in the framework of the WTO dispute settlement. In comparison, both the United States and the European Union disciplines, opt for more refined criteria. The Telecommunications Act of 1996 classifies US service providers as local exchange carriers, incumbent local exchange carriers, and Bell operating companies in order to impose peculiar obligations adding to those faced by Tlc carriers in general. The European discipline has less clear-cut notions but is definitely less vague than the RP: In the New Open Network Provision regulatory framework, obligations similar to those contained in the RP apply to operators *"having significant market power"*, that are identified by a share of at least 25% in a given market[90].

Competitive safeguards

The first point of the RP contain a general principle binding countries to act out regulatory measures aimed at guaranteeing a competitive environment; and provides a list of three examples of typical anti-competitive business practices.

According to the RP text:

"Appropriate measures shall be maintained for the purpose of preventing suppliers who, alone or together, are a major supplier from engaging in or continuing anti-competitive practices."

"The anti-competitive practices [...] *shall include in particular:*

a) engaging in anti-competitive cross-subsidization;

b) using information obtained from competitors with anti-competitive results; and

c) *not making available to other service suppliers on a timely basis technical information about essential facilities and commercially relevant information which are necessary for them to provide services."*

[90] Other factors that the market share test are also examined ranging from the ability to influence market conditions, to experience in the market, control of access to customers, financial resources and turnover relative to the market size.

If the service provider holds a monopoly or is an exclusive service supplier, Art. VIII of GATS applies: In these specific cases the RP discipline can be thought to complement the provision of GATS.

On the other hand, there exist anti-competitive situations that are not defined in national legal systems but are covered by the three exemplified cases. In these cases, Bronckers and Larouche (1998) suggest that the use of general competition law or, whenever this is missing, the creation of specific regulatory provisions for the telecommunications sector might satisfy the regulatory requirements of the RP, while a set of defined practices would not.

The three exemplified and non-exhaustive cases regard cross-subsidization, use of information and withholding of information.

Cross-subsidization. Again, an express definition of cross-subsidization is missing, whereby it is specified that it falls within the regulatory scope of the RP when it is anti-competitive. The silence of the RP opens a number of problems concerning the effectiveness of the agreement in preventing such practice and a number of authors have correctly criticized this vagueness. Cross-subsidization is common in many markets and even necessary in the telecommunications sector. At practical level, it is a tight spot to distinguish among different services of large size telcos and to pinpoint actual cases of anti-competitive cross-subsidization, not to mention the difficulties of proving that such a practice has occurred in reality.

To avoid anti-competitive cross-subsidization, thus, the optimal arrangement is to design and implement an appropriate regulatory framework. In particular, the would-be major supplier should be required to operate an adequate accounting system, where reporting and disclosure of information could allow regulatory authority and competitors to investigate and possibly question the pricing mechanism.

Use of information. The second exemplified case is particularly important in the light of the liberalizing tension of the agreement. When a Tlc market opens up to competition, the newcomers typically negotiate interconnection agreements with the incumbent in order to gain access to the infrastructure network or to lease lines for data communications. In many instances, the incumbent collects information from its competitors and is often put in a condition to identify their customers and possibly part of their business strategies. Clearly, the availability of reserved information might easily leave room to anti-competitive

behaviors. And again the RP does not define the possible meaning of *anti-competitive* results, as well as it does not offer possible solutions to the problem[91].

Withholding of information. The practice of keeping secret technical information on essential facilities is condemned in absolute terms, and not only when it is associated to anti-competitive purposes. In compliance with the RP, competitors might force a major supplier to disclose technical and commercial information even when the latter is not active in the sector the former intends to enter or operate.

Interconnection

Tlc negotiators felt that effective interconnection discipline was crucial to maximize the benefits of competition in a liberalized environment and consistently strengthen the requirements of the Annex by adding noteworthy specificity with this regard in the RP.

The definition agreed in the RP is rather precise and closely resembles the US[92] and EU[93] characterization: Interconnection is defined as the *"linking with suppliers providing public telecommunications transport networks or services in order to allow the users of one supplier to communicate with users of another supplier and to access services provided by another supplier."*

Clearly, interconnection provisions focus on the business relationship between suppliers rather than customers access to telecommunications facilities, and involves intermediate connection nodes of the networks rather than terminal nodes.

Paragraph 2(1) of the RP covers a number of situations that might affect the transparency of interconnection negotiations.

"Interconnection with a major supplier will be ensured at any technically feasible point in the network. Such interconnection is supplied:

(a) under non-discriminatory terms, conditions (including technical standards and specifications) and rates and of a quality no less favorable than that provided for its

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[91] Such as the legal separation of different lines of business related to different telecommunications subsectors.

[92] *"Physical linking of two networks for the mutual exchange of traffic"* under section 251(c)(2) of the New Telecommunications Act of 1996, as from the FCC interpretation to the interconnection obligation of the local exchange carriers in "In the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996", CC Docket No. 96-98, First Report and Order, FCC 96-325, 61 Fed Reg. 4547, August 8 1996.

[93] *"Physical and logical linking of telecommunications networks used by the same or a different organization in order to allow the users of one organization to communicate with users of the same or another organization, or to access services provided by another organization"*, Article 2(1)(a) of Common Position 34/96 of June 18 1996 with a view to adopting Directive 96/.../EC on interconnection in telecommunications, with regard to ensuring universal services and interoperability through application of the principles of open network provision (ONP), O.J., C 220/13.

own like services or for like services of non-affiliated service suppliers or for its subsidiaries or other affiliates;

(b) *in a timely fashion, on terms, conditions (including technical standards and specifications) and cost-oriented rates*[94] *that are transparent, reasonable, having regard to economic feasibility, and sufficiently unbundled, so that the supplier need not pay for network components or facilities that it does not require for the service to be provided; and*

(c) *upon request, at points in addition to the network termination points offered to the majority of users, subject to charges that reflect the cost of construction of necessary additional facilities."*

The emphasis has been put on non-discrimination concerning terms, conditions and rates, while quality is to be *no less favorable* that the one guaranteed to subsidiaries, affiliates or third parties. It has been pointed out[95] that this wording would allow telcos to let affiliates or subsidiaries get interconnected in line with proprietary protocols, once it grants equivalent interconnection to other companies according to an established standard[96].

Provisions similar to the obligation to guarantee "sufficient unbundling" can be found in the US[97] and EU[98] discipline; in the RP framework, the provision is equally difficult to apply because of the need of an opportune classification of network component to be operated by regulatory authorities in order to guarantee the implementation of the obligation.

Paragraphs 2(3) and 2(4) are concerned with transparency.

"The procedures applicable for interconnection to a major supplier will be made publicly available. [ ] It is ensured that a major supplier will make publicly available either its interconnection agreements or a reference interconnection offer."

RP provisions on transparency do not rule out the possibility that some kind of negotiation needs to take place between the incumbent and the newcomers to arrange interconnection. The U.S. Telecommunications Act of 1996 solved the problem quite dramatically with a local version of the WTO MFN clause, i.e. by forcing local exchange carriers to offer to other

[94] Rather than cost-based rates.
[95] Bronkers and Larouche (1998).
[96] The economic rationale behind proprietary protocols would be fostering innovation.
[97] Telecommunications Act of 1996, 47 U.S.C. § 251 (c)(3).
[98] Article 7(4) of Common Position 34/96 of June 18 1996 with a view to adopting Directive 96/.../EC on interconnection in telecommunications, with regard to ensuring universal services and interoperability through application of the principles of open network provision (ONP), O.J., C 220/13.

carriers the same terms and conditions as those offered under existing interconnection agreements[99].

Finally, the RP regulates dispute settlements in case of disagreements in case of disagreements between the parties involving terms, conditions and rates for interconnection.
"A service supplier requesting interconnection with a major supplier will have recourse, either:

(a) at any time or

(b) after a reasonable period of time which has been made publicly known.

to an independent domestic body, which may be a regulatory body [ ] to resolve disputes regarding appropriate terms, conditions and rates for interconnection within a reasonable period of time, to the extent that these have not been established previously."
The recourse is to be guaranteed in front of an independent domestic body, possibly, but not necessarily, the regulatory authority. In a compromise that reflects different regulatory approaches in use in different countries, the dispute resolution mechanism is to be made available either at any time in the course of interconnection negotiations among operators or once a reasonable period of time to be made public has elapsed since the initiation of the negotiations.

Universal service

Any member has the right to define the kind of universal service obligation it wishes to maintain. Such obligations will not be regarded as anti-competitive per se, provided they are administered in a transparent, non-discriminatory and competitive neutral manner and are not more burdensome that necessary for the kind of universal service defined by the Member.
Again, universal service is not defined and full freedom is left to let countries fix specific domestic rules that have to be respectful of general principles of non-discrimination and transparency.

Licensing

The public availability of licensing criteria is stated by paragraph 3, which indicates the elements that must be made public:

a) all the licensing criteria and the period of time normally required to reach a decision concerning an application for a license, and

[99] 45 U.S.C. § 252(1).

b) the terms and conditions of individual licenses.

Furthermore, explications are to be given if a license is denied:

"The reasons for the denial of a license will be made known to the applicant upon request."

It is clear how licensing and interconnection issues lye at the basis of a successful regulatory framework and the content of the RP is rather limited in providing (enforceable) guidelines to orient it.

In particular, the RP indicates neither the situations that would conceivably require licensing, nor terms and/or conditions that should be necessarily included in a license. Licensing procedures, in fact, assume quite different structures and contents in different countries and a fair level of standardization on the part of the RP would help the internationalization of the sector. However, it is widely recognized that reaching coordination at international level in this respect is difficult. In the EU, for example, one of the key elements on the new regulatory framework is the Directive on a common framework for licensing[100]. In the absence of specific provisions of the RP, the disproportionate licensing requirements might be curbed by the GATS general proportionality rule[101]. Complementarily, the Annex on Telecommunications contains a few provisions about permissible conditions on access and use, that would not be specific for licensing but might broadly encompass it.

A second problematic issue in the RP treatment of licensing is the absence of provisions about the mutual recognition of licenses, especially considering that even the GATS contains a meager encouragement to mutual recognition of licenses and non-discrimination obligation[102]. The mutual recognition of licensing would constitute a big step ahead in the international liberalization of the sector especially considering the possibility of making regional operators operative[103]. At the same time, however, such a discipline would make countries give away substantial control over their domestic market for telecommunications by loosing the possibility of deciding the number of companies operating on their territory. Even at EU level, the harmonization of licensing procedures has been achieved only after the difficult path that eventually led to the Directive 97/13/EC of April 10 1997 on a common framework for general authorizations and individual licenses in the field of

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[100] EC Licensing Directive (97/13/EC) is deregulatory and provides a common framework for authorizations and licenses. The central requirements are that differences between individual licenses should be eliminated except where objectively justified; and that all conditions in licenses should be non-discriminatory, proportionate and transparent.

[101] GATS Art. VI(1): *"In sectors where specific commitments are undertaken, each Member shall ensure that all measures of general application affecting trade in services are administered in a reasonable, objective and impartial manner"*.

[102] GATS Art. VII.

[103] Suppose a would-be regional operator is interested in serving all MERCOSUR countries. It still needs to obtain license in each and every country.

telecommunications services[104]. This Directive limits the type of conditions that can be imposed on licenses, provides for a general one-stop-shopping procedure and among other provisions contains a policy on the limitation of the number of licenses.

Independence of the regulatory authority

According to the RP, "*the regulatory body is separate from, and not accountable to, any supplier of basic telecommunications services. The decision of and the procedures used by regulators shall be impartial with respect to all market participants.*"

The key elements that regulate the independence of regulatory authorities are thus their separation from the telecom operator and its impartiality. Many countries[105], however, require a formal separation also between the regulatory authority and the government departments in charge of exercising the ownership and control activities over national telecommunications operators. Conceivably, even if the incumbent is State-owned but autonomous, the regulatory authority might be subject to pressures from two sides: On the one hand, the national operator will try to protect its interests as a business entity; on the other hand, the government will make pressures as the owner of the national operator[106]. Only the complete independence from both the government and the incumbent helps provide a clearer and safer regulatory framework; but the RP neglects this issue.

Moreover, the RP does not provide any example of a situation where the recourse to the regulatory authority will be open, but in the case of interconnection disputes of paragraph 2.5, neither it specifies the standing requirements for foreign entities before the independent authority.

Allocation and use of scarce resources

Finally, provisions on scarce resources are definitely general and emphasizes the role of transparency in information availability:

"*Any procedures for the allocation and use of scarce resources, including frequencies, numbers and rights of way, will be carried out in an objective, timely, transparent and non-discriminatory manner. The current state of allocated frequency bands will be made*

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[104] Directive 97/13/EC of the European Parliament and of the Council of 10 April 1997 on a common framework for general authorizations and individual licenses in the field of telecommunications services, OJ L117, 7.5.97.

[104] For instance, when a privatization procedure is open.

[105] EU countries.

[106] For instance, when a privatization procedure is open.

publicly available, but detailed identification of frequencies allocated for specific government uses is not required.[107]"

2.7 The classification of WTO provisions on Tlc

By now, it should be clear that WTO provisions are dispersed within different agreements and it is opportune to summarize them briefly and analyze their hierarchy.

The WTO discipline on Tlc stems from two sets of fundamental normative acts. On the one side, the GATS and the Annex on Telecommunications, together with the lists of specific commitments and exemptions attached to the GATS; on the other side, the Fourth Protocol with the related lists of specific commitments and exemptions attached to the GATS, together with the additional commitments contained in the Reference Paper. The first set of rules entered into force on January 1, 1995 and the second on January 1, 1998.

Naturally, the successful conclusion of the GBT negotiations made the AT lose some importance. While the RP has more substance that the AT, however, it must be recalled that the former has a narrower scope, being it addressed to suppliers of basic Tlc only.

Thus, the AT is still the relevant reference when a given WTO Member has not made any commitments under the BTA and when it has made commitments under the BTA but has not fully committed to the principles contained in the RP. In the latter case, the AT could still provide some protection to suppliers of basic Tlc services.

Again, the AT comes into play for all Members that have signed commitments in a service sector different from Tlc, at least for service suppliers in that sector whenever they deal with the incumbent Tlc operator in foreign countries, and naturally for WTO Members that have taken commitments on value-added Tlc services for suppliers of these services[108].

The provisions contained in the above mentioned sources can be subdivided on the basis of their reach of effectiveness, being it possibly objective or subjective.

Objective (or material) effectiveness points first of all to general rules that apply inclusively to *all* services, hence to Tlc; in second instance, it touches special provisions, those that are addressed to the Tlc sector exclusively.

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[107] The specification is intended to protect national security interests in the secrecy of certain frequency spectrum allocation.

[108] While the RP only applies to *basic* Tlc services.

Rules with objective effectiveness are essentially GATS general principles because they apply indistinctly to all services and represent, also for Tlc, the fundamental nucleus of the enforceable discipline. The category includes MFN treatment (GATS Art. II), transparency (Art. III), domestic regulation (Art. VI), monopolies and exclusive service suppliers (Art. VIII), business practices (Art. IX), emergency safeguard measures and restrictions to safeguard the balance of payments (Art. X and XII), market access (Art. XVI), national treatment (Art. XVII), and dispute settlement (Art. XXIII).

Other rules that have an objective effectiveness are special provisions that are limited to the Tlc sector distinctly and are aimed at integrating and detailing general provisions of the GATS establishing an *ad hoc* discipline for the Tlc sector. Such provisions include, for example, the provision on access to and use of public Tlc transport networks and services of section 5 of the AT as well as basic principles contained in the RP regarding competitive safeguards, interconnection, universal service, licensing criteria, regulatory authorities, allocation and use of scarce resources. Special provisions can be found in the AT attached to the GATS, in the lists of specific commitments and exemptions attached to the Fourth Protocol and in the additional commitments of the RP.

Turning to subjective effectiveness, it must be noted that it can be general or special itself. General subjective effectiveness is referred to all the provisions that are directly and unconditionally binding for *all* Members, for the pure fact that they signed the Agreement establishing the WTO.

Special subjective effectiveness, on the contrary, touches those provisions that are binding only when accepted explicitly by Member States *in addition* to their participation to the WTO.

Provisions with general subjective effectiveness include GATS' transparency, monopolies and exclusive service suppliers, emergency safeguard measures and dispute settlement, in addition to the provision on access to and use of public Tlc transport networks and services of the AT.

There are two kinds of provisions with special subjective effectiveness:

- Those giving WTO Members the power of derogating, that are usually binding for all but countries having presented exemptions (*opting out* clause); and
- those that bind exclusively countries that specifically declare their acceptance and accordingly give power of adhesion or acceptance (*opting in* clause) rather than a power of derogation or exclusion.

Under the former sub-category it is listed the typical rule of GATS Art. II by which countries can derogate MFN treatment whenever they declare their willing to do so in the apposite Annex on Exemptions. The latter sub-category, instead, includes market access provisions of GATS Art. XVI, NT and the additional regulatory principles of the Reference Paper; the related obligations, in fact, are binding only for those countries that accepted them and listed them in their lists of specific commitments within the limits established by GATS part III.

It should be clear that there is no coincidence between the extensions of the two kinds of effectiveness: Not all provisions having general objective effectiveness are obligatory as in the case of MA and NT and, viceversa, not all special provisions are optional, as in the case of the AT.

Naturally, the existence of facultative rules allows opens the way to confused situations where different Members have different positions concerning the legal discipline they refer to. At practical level, non-overlapping effectiveness spheres might entail huge difficulties in the way WTO provisions are implemented. In general, to determinate whether specific provisions bind a particular WTO member it is necessary to verify the Annexes to the GATS and to the Fourth Protocol with the specific obligations taken by the Member.

2.8 Foreign Direct Investment

This paragraph is intended to review the impact of international agreements on Foreign Direct Investment in the Tlc sector, specifically, in order to collect ideas and considerations touched along the development of chapter 2, and subsequently carry out the economic analysis of chapter 3. Generally speaking, international agreements touching the Tlc sector can include services, goods or both depending on the reference to the supply of Tlc services or the production and distribution of telecommunications equipment. In these pages, only agreements or provisions in agreements concerning services are considered.
FDI in Tlc services can be subject to three types of international agreements: Multilateral agreements, regional agreements and bilateral agreements.

Multilateral treaties dealing with Tlc FDI include WTO agreements, namely the GATS and the BTA, both containing a number of guiding principles for negotiating market access for foreign

investors and a few minor technical treaties, namely the Agreement on the settlement of international traffic and payments and government regulations on technical standards of the ITU and the Government Procurement Code for practices on government purchases.

As for regional treaties, FDI treatment is dealt with in the European treaties (within the scope of the *right of establishment*), the Andean Pact[109], the Mercosur[110], the Fourth Lomé Convention of 1979[111], and in the Energy Charter Treaty[112] of 1994.

Besides the European treaties, however, the most important regional agreements dealing with FDI are no doubt the regional agreements of the European Union and NAFTA.

NAFTA treats Tlc as a separate industry in Chapter 13. Accordingly, FDI and trade are regulated first of all by commitments under the "investment" and "cross-border supply" chapters and additionally by specific provisions on Tlc. Chapter 13 requires countries to make efforts to implements free flow of information, non-discrimination, and transparency. To some extent, NAFTA goes beyond GATS on issues related to pricing mechanisms, transparency[113], security and confidentiality, value-added services[114], standards[115], and monopolies. Monopolies, as non-competitive business practices are fully recognized by the Treaty, both in Art. 1305 and in Chapter 15 on Competition Policies: NAFTA goes beyond the GATS by including specific provisions to remove distortions such as timely disclosure of technical changes to networks and their interface.

As for regional agreements signed by the EU, nowadays there exist a wide variety of treaties ranging from agreements on free trade areas to co-operation agreements and Association Agreements[116], aimed at deepening integration in the light of a potential enlargement of the EU. Interestingly, while standard free trade agreements and custom unions are limited to trade and exclude investment issues, the Association Agreements include both investment and telecommunications as two important chapters. Since Association Agreements are negotiated bilaterally, specific provision usually change from one to another, but they all cover issues of exchange of information, transfer of technology and promotion of new

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[109] See, in particular, decision 291/1991 of the Cartagena Agreement.

[110] Protocol of Koln of 1994 for the reciprocal promotion and protection of investment in Mercosur and the Protocol of Buenos Aires of 1994 on the promotion and protection of investment of non-members countries.

[111] Specific sections on investment can be found at Arts. 258-274 and Annex LIII.

[112] Part II on investment promotion and protection.

[113] NAFTA Art. 1302.

[114] NAFTA Art. 1302.

[115] NAFTA Art. 1304.

[116] Also called Europe Agreements. See Mariagiovanna Bosco (2002), I diritti di proprietà intellettuale e gli investimenti esteri nel quadro degli accodi euro-mediterranei in Ganino, Mario and Gabriella Venturini (2002), *Europe tomorrow: towards the enlargement of the Union*, Giuffrè Ed.

communications, while being on the whole less comprehensive that NAFTA. Co-operation Agreements have an even narrower coverage than Association Agreements.

Quite the reverse, in bilateral investment treaties, rather than appearing outstandingly, Tlc FDI tend to be treated as any other sectors[117] with no perceived need of peculiar discipline, or excluded.

A deep analysis of international agreements other than those within the WTO system is beyond the scope of these pages, so the remaining of the chapter will focus on the widest multilateral agreements concerning Tlc FDI, namely GATS and the BTA. Market size, sectoral coverage and cross-modal variations, and competition are the main issues that qualify the importance of the WTO agreements.

Market Size

Historically, there has been nothing like a world Tlc market. Rather, national markets for Tlc services have been strongly protected and neatly separated one from another. The WTO agreements[118] have added to the technological acceleration and contributed to a more integrated global market. Naturally, it is not completely clear what should be the definition of a global market for Tlc, given the fact that most Tlc services are non-tradable at international level. For sure, the way and the timing many countries opened up to competition have created a global competitive arena for companies, where market fragmentation has diluted and telcos have began to see each other like potential competitors, especially in their internationalization strategies and specifically in matters of foreign acquisition and entry, that is in matters of FDI.

GATS and BTA have made a major difference in this respect, in the way they have globalized national commitments on MA as well as on the resolution of disputes.

A vague measure of the "global market" created by WTO agreements is given by the country coverage of GATS. The following discussion is based on data referring to February 1998, when the total number of countries having signed commitments was 89[119]. A summary of commitments on CP is reported in Table 4.

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[117] See UNCTAD (2000), Bilateral Investment Treaties 1959-1999.

[118] In this context, Commercial Presence (CP) and Foreign Direct Investment (FDI) are synonyms.

[119] New commitments were added by WTO Members making late commitments, as well as by new Members. The former included Barbados, Cyprus, Kenya, Suriname and Uganda. The latter includes Estonia, Georgia, Jordan, Latvia, Kyrgyz Republic. In addition, three countries have revised their original commitments: Guatemala, Pakistan and Switzerland.

The schedules on CP include a remarkable number of countries especially with respect to other modes of supply. For example, regarding an important sectors like voice telephony, there exist 99 partial or full commitments, 11 countries provided a complete free access to their markets, 17 countries provided NT to foreign investors.

Even if it has been developed countries to make the most far-reaching commitments, emerging economies have definitely undertaken serious obligations, for the most part Asian, Latin American countries and above all transition economies, maybe with the objective of the EU accession in mind. Their pro-competitive effort can be explained by the desire to obtain both the Tlc services possibly provided by foreign investors as well as the necessary financing, new technology and technical expertise, and know-how, as the discussion in chapter 3 will point out.

In general, the level or value of MA agreed by countries in the WTO agreements can be quite different from the one applied in practice. The liberalization process has begun before WTO negotiations in many countries and consequently MA commitments are not necessarily the results of multilateral negotiations. In effect, many countries did not make significant commitments that would go beyond the liberalizing policies they were implementing or were willing to implement at the time of the negotiations.

A few countries made commitments above the existing situation in their domestic markets and several African and Caribbean countries were actually allowed to make commitments based on their future liberalizations.

Another group of countries undertook independent liberalization processes after the signature of the WTO agreements, and clearly these measures were never embodied into their original schedules. Central and Eastern European countries, for example, have harmonized their laws and regulations with the *acquis communautaire* in order to speed up the negotiations for their accession to the EU.

Thus, one cannot easily attribute to the WTO agreement the liberalizing impetus that is often attributed to multilateral treaties.

Sectoral coverage and Cross-modal variations

An acceptable number of countries have offered unconditional MFN or NT in many different sectors, so that market opening with no limitations has been offered basically across the whole spectrum of Tlc sectors. However, most countries have put some restrictions to the presence of foreign investors as indicated by the large number in the column "partial" CP of table 4.

More countries have opened up the markets for value added Tlc services than for basic. This is the case for both MFN and NT principles. Perhaps somewhat surprisingly, fewer countries have imposed limitations to the NT principle, than they have done in the case of MFN treatment. The finding is unexpected since countries normally try to protect their nationals before they protect the competitors to foreign companies investing or doing business in their countries. Possible explanations take account of the effect of regional agreements on commitments and of a would-be wider and wiser handling of horizontal schedules.

As for Cross-modal variations, it has been noted that the variation of restrictions varies among different modes of supply might produce cross-modal technological biases. Hoekman (1996)[120] reports that schedules differ significantly among different modes of supply. It might be claimed that countries have tried to orientate their opening up in the service sector via the manipulation of incentives and disincentives implied by commitments and limitations attached to the GATS. Whether the cross-modal variations affects the liberalization process or not will be verifiable only ex-post, though. In any case, it should be noted that during the Tlc negotiations countries explicitly agreed to maintain technological neutrality among modes of delivery as a matter of principle.

[120] Hoekman, Bernard (1996), Assessing the General Agreement in Services, in Will Martin and L. Alan Winters Eds, *The Uruguay Round and Developing Countries*, Cambridge University Press.

MARKET ACCESS					NATIONALTREATMENT			
2.C Telecommunication Services	No. Listed	Full	Partial	None	2.C Telecommunication Services	No. Listed	Full	Partial
a Voice Telephone Services	65	11	88	2	a. Voice Telephone Services	65	17	77
b. Packet-Switched Data Transmission Services	59	10	90	0	b Packet-Switched Data Transmission Services	59	34	63
c. Circuit-Switched Data Transmission Services	60	10	88	2	c. Circuit-Switched Data Transmission Services	60	30	65
d. Telex Services	59	11	89	0	d. Telex Services	59	31	65
e. Telegraph Services	43	9	91	0	e. Telegraph Services	43	33	65
f. Facsimile Services	55	11	87	2	f. Facsimile Services	55	31	64
g. Private Leased Circuit Services	55	11	89	0	g. Private Leased Circuit Services	55	27	65
h. Electronic Mail	52	17	79	4	h. Electronic Mail	52	48	46
i. Voice Mail	48	17	81	2	i Voice Mail	48	42	54
j. On-line Information and Data Base Retrieval	54	17	78	6	j. On-line Information and Data Base Retrieval	54	48	44
k. Electronic Data Interchange (EDI)	45	20	76	4	k. Electronic Data Interchange (EDI)	45	49	42
l. Enhanced/Value-Added Facsimile Services	43	21	74	5	l. Enhanced/Value-Added Facsimile Services	43	51	42
m. Code and Protocol Conversion	42	19	79	2	m. Code and Protocol Conversion	42	48	45
n. On-line Information and/or data processing	40	18	80	3	n. On-line Information and/or data processing	40	55	38
o. Other, Terrestrial-based Mobile	61	13	87	0	o. Other, Terrestrial-based Mobile	61	20	74
o. Other, Satellite-based Mobile	23	8	92	0	o. Other, Satellite-based Mobile	23	15	79
o. Other, other	42	2	93	5	o. Other, other	42	7	88

Legend: FULL = No limitations listed, Partial = Limitations listed None = No commitments taken on this mode. (Source: WTO website)

Table 2.4 WTO AGREEMENTS: Level of commitments for "commercial presence" by sector

Effects on competition

Undoubtedly, MA commitments are not enough to ensure real competition in the Tlc market. There are a number of ways and instruments that countries can easily bring into play in order to restrict MA to foreign competitors.

In principle, the GATS encloses six types of restrictions ("black list") which countries were not allowed to impose provided they were not specifically scheduled in their list of commitments. Hence, in practice, the effectiveness of the "black list" only refers to *new* measures[121].

In the GATS, restrictions on entry appear in the Schedule of Limitations and tend to be quite recurrent among countries through three main channels:

1) restrictions on the number of suppliers in the industry;
2) restriction on the type of legal entity;
3) limits on the participation of foreign capital.

The rational behind restrictions on the number of suppliers in the industry descends from the status quo of domestic Tlc markets where telcos were supposed to operate as natural monopolies, as well as from the belief that there might be prudential reasons to restrict and control entry. Restrictions on legal entity are very common and normally require foreign investors to set up joint ventures in which foreign subjects are obliged to participate in equity partnership with the host country's subjects. Finally, restrictions on foreign ownership typically place minority bounds on foreign ownership of telco.

Table 5 reports restrictions based on Tlc sectors.

Besides these limitations, countries can also depart from MFN principle in two main ways. Firstly, there exist explicit deviation from MFN such as exemptions for regional integration at GATS Art. V and general exemptions at Art. XIV. Secondly, there exist measure such as domestic regulations, quantitative restrictions arising from reciprocity conditions accepted by the GATS, and, most of all, competition provisions.

Table 5 confirms that schedules on Tlc FDI are constrained mainly on the basis of nationality, residency and authorization requirements.

The nationality restriction is particularly prevalent in CP, much more than for cross border supply or consumption abroad and are more frequently imposed in developing countries. WTO (1998) reports that *"emerging markets are about five times more likely than industrialized countries to have maintained limitations on the number of suppliers and*

[121] The six types in the list are: (1) the number of service suppliers allowed, (2) the total values of transactions and assets, (3) the total output of services, (4) the total number of natural persons

almost four times more likely to require that a particular type of legal entity be established to provide service. They were also more than three times more likely to have listed limitations under the heading "other requirements[122]*."*

The competition provision is particularly important because, during the Tlc negotiations, many countries were seriously worried by the possibility that the MFN obligation was not giving room enough to actions against foreign anti-competitive practices[123].
Table 4 highlights the pattern in MA limitations that emerges from a synthesis of the Agreement. Restrictions regard mostly the number of supplier, (38 countries for voice telephone services), the types of legal entities (22) and participation limits (23). In value-added services, the pattern is similar even though limitations are less frequent.
It should be noted that all these limitations refer to those aspects of business management that are critical for companies deciding to undertake FDI and that they do not inevitably discriminate against foreigners, in theory, even if their implementation could be biased in practice.

The problem of ensuring competition in the sector continues to be a fundamental issue within any framework of liberalization. In most countries, Tlc have been traditionally characterized by state ownership. The recent trend has seen a reduction in the role that government play as a supplier of services as evident from data on Tlc divestitures. According to Drabek (2001), in Europe 37% of PTO have not been privatized as at the end of 2000, with much higher percentage in other regions, from 47% in Asia-Pacific, to 65% in African countries and 71% in Arab States. As a matter of fact the WTO agreements have coagulated no consensus on the role of the state as an owner of productive assets.
Strictly related to the issue of state ownership is the problem of restrictions of MA for new entrants and the discipline of infusion of foreign equity into existing companies. Thus, a further restriction concerns the restriction on the choice of investment involvement into domestic legal entities. Carsten Fink, Aaditya Mattoo and Randeep Rathindran (2001)[124] considered the case of the Asian countries and found no evidence of simple correspondence between market openness and the degree to which FDI took place and attribute the finding to the strong *dirigiste* attitude of governments along the divestiture process. They conclude

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employed, (5) the type of legal entity (e.g. branch rather than subsidiary), and (6) foreign equity participation on investment.
[122] WTO (1998), *Telecommunication Services*, World Trade Organization, Geneva, S/C/W/74.
[123] See Paragraph 1.3.

that there is room for further opening up and negotiations. The point will be widely treated in chapter 3.

MARKET ACCCESS	No. of Suppliers	No. of operations	Types of lega entities	Participatio of foreign capital	Other measures
a. Voice Telephone Services	38	1	22	23	38
b. Packet-Switched Data Transmission Services	24	1	22	17	32
c. Circuit-Switched Data Transmission Services	23	1	19	18	31
d. Telex Services	22	1	20	17	27
e. Telegraph Services	18	1	18	13	24
f. Facsimile Services	16	1	17	15	28
g. Private Leased Circuit Services	20	1	18	16	31
h. Electronic Mail	14	1	8	7	19
i. Voice Mail	13	1	7	8	16
j. Online information and Sata Base retrieval	12	1	8	9	18
k. Electronic Data Interchange (EDI)	9	1	4	5	14
l. Enhanced/Value-Added Facsimile Services	10	1	5	6	16
m. Code and Protocol Conversion	9	1	3	5	13
n. Online Information and/or data processing	10	1	6	4	13
o. Other (Terrestrial-based Mobile)	30	1	20	21	33
o. Other (Satellite-based Mobile)	24	1	20	18	31

Table 2.5 WTO AGREEMENTS: MA, types of limitations for Commercial Presence by sector

[124] Carsten Fink, Aaditya Mattoo and Randeeo Rathindran (2001), Liberalizing Basic telecommunications: The Asian Experience, Worldbank WP.

	Tax measures	Nationality requir.	Residency requir.	Licensing, standards, qualifications	Registration require.	Authorization require.	Ownership of property/ land
a. Voice Telephone Service	1	12	5	3	1	5	5
b. Packet-Switched Data Transmission Services	1	10	5	2	1	5	5
c. Circuit-Switched Data Transmission Services	1	11	5	2	1	5	5
d. Telex Services	1	13	4	1	1	5	5
e. Telegraph Services	1	11	4	1	1	5	5
f. Facsimile Services	1	12	4	1	1	4	5
g. Private Leased Circuit Services	1	10	4	1	1	4	5
h. Electronic Mail		4		1			1
i. Voice Mail		5		1			1
j. Online information and Data Base Retrieval		5		1			
k. Electronic Data Interchange (EDI)		4		1			
l. Enhanced/Value-Added Facsimile Services		4		1			1
m. Code and Protocol Conversion		3		1			
n. Online Information and/or data processing		2		1			
o. Other (Terrestrial-based Mobile)	1	12	5	3	1	6	4
o. Other (Satellite-based Mobile)	1	9	4	1	1	5	4

Table 2.6 WTO AGREEMENTS: NT, types of limitations for Commercial Presence by sector

References

Bronckers, Marco, and Pierre Larrouche (1997), "Telecommunication Services and the World trade Organization", *Journal of World Trade*, 31:3:5-47.

Bosco, Mariagiovanna (2002), "I diritti di proprietà intellettuale e gli investimenti esteri nel quadro degli accordi euro-mediterranei" in Mario Ganino and Gabriella Venturini (2002), *Europe tomorrow: towards the enlargement of the Union*, Giuffrè Ed.

Carsten Fink, Aaditya Mattoo and Randeep Rathindran (2001), "Liberalizing Basic telecommunications: The Asian Experience", Worldbank Working Paper.

Comba, A. (1995), *Il neo liberismo internazionale. Strutture giuridiche a dimensione mondiale: dagli accordi di Bretton Woods all'Organizzazione mondiale del commercio*, Giuffrè, Milano.

Cricelli, Livio, Massimo Gastaldi, and Nathan Levialdi (1999), "Strutture di mercato nelle telecomunicazioni internazionali: un'analisi econometrica", *Economia e politica industriale*, 104: 57-83.

Croni, F.J., E.K. Colleran, P. L. Herbert and S. Lewitzky (1993), "Telecommunications and growth", *Telecommunications Policy*.

Dordi, Claudio (2000), "Gli accordi sul commercio dei servizi", in Gabriella Venturini (2000), *L'ordinamento dell'OMC*, Giuffré Ed.

Drabek, Zdenek (2001), "Investment Policies and Telecommunications regimes", WTO WP No. ERAD 2001-01.

FCC (1996), "In the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996", CC Docket No. 96-98, First Report and Order, FCC 96-325, 61 Fed Reg. 4547, August 8 1996.

Fredebeul-Krein, Markus, and Andreas Freytag (1997), "Telecommunications and WTO disciplines. An assessment of the WTO agreement on telecommunications services", *Telecommunications Policy*, 21:6:477-191.

Ganino, Mario and Gabriella Venturini (2002), *Europe tomorrow: towards the enlargement of the Union*, Giuffré Editore.

Hoekman, Bernard (1996), "Assessing the General Agreement in Services", in Will Martin and L. Alan Winters Eds, *The Uruguay Round and Developing Countries*, Cambridge University Press.

Holmes, Kempton, McGowan (1996), "International competition policy and telecommunications", *Telecommunications Policy*.

Hufbauer, Gary. C., and Edward. M. Graham (2000), " "No" to Foreign Telecoms Equals "No" to the New Economy", *Institute for International Economics Policy Brief* No. 7, Washington D.C.

ITU (1997), World telecommunications Report 1996/1997.

Laffont, Jean Jacques, and Jean Tirole (2000), *Competition in Telecommunications*, Munich Lectures in Economics, MIT Press.

Martin, Will and L. Alan Winters (1996), *The Uruguay Round and Developing Countries*, Cambridge University Press.

Shy, Oz (2000), *The Economics of Network Industries*, Cambridge University Press.

Sapir, André (1982), "Trade in services: policy issues for the eighties", *Columbia Journal of World Business*, Fall.

Sapir, André (1985), "North-South Issues in Trade in Services", *The World Economy*, March 1985, 27-42. Reprinted in H.W. Singer, N. Hatti and R. Tandon (eds.), *New World Order* Series, Volume IV: New Protectionism and Restructuring, Ashish Publishing, New Delhi, 1987.

Tosato (1997), "La liberalizzazione delle telecomunicazioni", in *Diritto e organizzazione del commercio internazionale dopo la creazione dell'Organizzazione Mondiale del Commercio*, 2° Convegno della Società Italiana di Diritto Internazionale (SIDI), Università Bocconi, Milano, 5-7 giugno 1997.

Tuthill, Lee (1996), "Users' rights? The multilateral rules on access to telecommunications",

UNCTAD (2000), *Bilateral Investment Treaties 1959-1999*.

Venturini, Gabriella (2000), *L'ordinamento dell'OMC*, Giuffré Ed.

WTO (1997a), *The WTO Negotiations on Basic Telecommunications*.

WTO (1997b), *The WTO Negotiations on Basic Telecommunications: Informal Summary of Commitments and M.F.F. exemptions*.

WTO (1997c), *"Coverage of basic Tlc and value-added services"*, WTO website.

WTO (1997d), *Note on Market Access Limitations on Spectrum Availability*, WTO/S/GBT/W/3.

WTO (1997e), Results of Negotiations on Basic Telecommunications. Guide to reading the GATS schedules of specific commitments and the list of article II (MFN) exemptions, WTO website.

WTO (1998), *Telecommunication Services*, World Trade Organization, Geneva, S/C/W/74.

Ypsilanti, Dimitri (1990), "A framework for trade in telecommunications services", *The OECD observer*.

Zdouc, Werner (1999), "WTO Dispute Settlement Practice Relating to the GATS", *Journal of International Economic Law*, 1999.

Annex 2.1 Annex on Telecommunications of the GATS (1994)

ANNEX 1B. GENERAL AGREEMENT ON TRADE IN SERVICES

[...]

ANNEX ON TELECOMMUNICATIONS

1. *Objectives*

Recognizing the specificities of the telecommunications services sector and, in particular, its dual role as a distinct sector of economic activity and as the underlying transport means for other economic activities, the Members have agreed to the following Annex with the objective of elaborating upon the provisions of the Agreement with respect to measures affecting access to and use of public telecommunications transport networks and services. Accordingly, this Annex provides notes and supplementary provisions to the Agreement.

2. *Scope*

(a) This Annex shall apply to all measures of a Member that affect access to and use of public telecommunications transport networks and services[125].

(b) This Annex shall not apply to measures affecting the cable or broadcast distribution of radio or television programming.

(c) Nothing in this Annex shall be construed:

(i) to require a Member to authorize a service supplier of any other Member to establish, construct, acquire, lease, operate, or supply telecommunications transport networks or services, other than as provided for in its Schedule;

or

(ii) to require a Member (or to require a Member to oblige service suppliers under its jurisdiction) to establish, construct, acquire, lease, operate or supply telecommunications transport networks or services not offered to the public generally.

3. *Definitions*

For the purposes of this Annex:

(a) "Telecommunications" means the transmission and reception of signals by any electromagnetic means.

(b) "Public telecommunications transport service" means any telecommunications transport service required, explicitly or in effect, by a Member to be offered to the public generally. Such services may include, *inter alia*, telegraph, telephone, telex, and data transmission typically involving the real-time transmission of customer-supplied information between two or more points without any end-to-end change in the form or content of the customer's information.

(c) "Public telecommunications transport network" means the public telecommunications infrastructure which permits telecommunications between and among defined network termination points.

(d) "Intra-corporate communications" means telecommunications through which a company communicates within the company or with or among its subsidiaries, branches and, subject to a Member's domestic laws and regulations, affiliates. For these purposes, "subsidiaries", "branches" and, where applicable, "affiliates" shall be as defined by each Member. "Intra-corporate communications" in this Annex excludes commercial or non-commercial services that are supplied to companies that are not related subsidiaries, branches or affiliates, or that are offered to customers or potential customers.

(e) Any reference to a paragraph or subparagraph of this Annex includes all subdivisions thereof.

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[125] This paragraph is understood to mean that each Member shall ensure that the obligations of this Annex are applied with respect to suppliers of public telecommunications transport networks and services by whatever measures are necessary.

4. *Transparency*

In the application of Article III of the Agreement, each Member shall ensure that relevant information on conditions affecting access to and use of public telecommunications transport networks and services is publicly available, including: tariffs and other terms and conditions of service; specifications of technical interfaces with such networks and services; information on bodies responsible for the preparation and adoption of standards affecting such access and use; conditions applying to attachment of terminal or other equipment; and notifications, registration or licensing requirements, if any.

5. *Access to and use of Public Telecommunications Transport Networks and Services*

(a) Each Member shall ensure that any service supplier of any other Member is accorded access to and use of public telecommunications transport networks and services on reasonable and nondiscriminatory terms and conditions, for the supply of a service included in its Schedule. This obligation shall be applied, *inter alia*, through paragraphs (b) through (f)[126].

(b) Each Member shall ensure that service suppliers of any other Member have access to and use of any public telecommunications transport network or service offered within or across the border of that Member, including private leased circuits, and to this end shall ensure, subject to paragraphs (e) and (f), that such suppliers are permitted:

(i) to purchase or lease and attach terminal or other equipment which interfaces with the network and which is necessary to supply a supplier's services;

(ii) to interconnect private leased or owned circuits with public telecommunications transport networks and services or with circuits leased or owned by another service supplier; and

(iii) to use operating protocols of the service supplier's choice in the supply of any service, other than as necessary to ensure the availability of telecommunications transport networks and services to the public generally.

(c) Each Member shall ensure that service suppliers of any other Member may use public telecommunications transport networks and services for the movement of information within and across borders, including for intra-corporate communications of such service suppliers, and for access to information contained in data bases or otherwise stored in machine-readable form in the territory of any Member. Any new or amended measures of a Member significantly affecting such use shall be notified and shall be subject to consultation, in accordance with relevant provisions of the Agreement.

(d) Notwithstanding the preceding paragraph, a Member may take such measures as are necessary to ensure the security and confidentiality of messages, subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on trade in services.

(e) Each Member shall ensure that no condition is imposed on access to and use of public telecommunications transport networks and services other than as necessary:

(i) to safeguard the public service responsibilities of suppliers of public telecommunications transport networks and services, in particular their ability to make their networks or services available to the public generally;

(ii) to protect the technical integrity of public telecommunications transport networks or services; or

(iii) to ensure that service suppliers of any other Member do not supply services unless permitted pursuant to commitments in the Member's Schedule.

(f) Provided that they satisfy the criteria set out in paragraph (e), conditions for access to and use of public telecommunications transport networks and services may include:

(i) restrictions on resale or shared use of such services;

(ii) a requirement to use specified technical interfaces, including interface protocols, for inter-connection with such networks and services;

(iii) requirements, where necessary, for the inter-operability of such services and

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[126] The term "non-discriminatory" is understood to refer to most-favoured-nation and national treatment as defined in the Agreement, as well as to reflect sector-specific usage of the term to mean "terms and conditions no less favourable than those accorded to any other user of like public telecommunications transport networks or services under like circumstances".

to encourage the achievement of the goals set out in paragraph 7(a);
(iv) type approval of terminal or other equipment which interfaces with the network and technical requirements relating to the attachment of such equipment to such networks;
(v) restrictions on inter-connection of private leased or owned circuits with such networks or services or with circuits leased or owned by another service supplier; or
(vi) notification, registration and licensing.

(g) Notwithstanding the preceding paragraphs of this section, a developing country Member may, consistent with its level of development, place reasonable conditions on access to and use of public telecommunications transport networks and services necessary to strengthen its domestic telecommunications infrastructure and service capacity and to increase its participation in international trade in telecommunications services. Such conditions shall be specified in the Member's Schedule.

6. *Technical Cooperation*

(a) Members recognize that an efficient, advanced telecommunications infrastructure in countries, particularly developing countries, is essential to the expansion of their trade in services. To this end, Members endorse and encourage the participation, to the fullest extent practicable, of developed and developing countries and their suppliers of public telecommunications transport networks and services and other entities in the development programmes of international and regional organizations, including the International Telecommunication Union, the United Nations Development Programme, and the International Bank for Reconstruction and Development.

(b) Members shall encourage and support telecommunications cooperation among developing countries at the international, regional and sub-regional levels.

(c) In cooperation with relevant international organizations, Members shall make available, where practicable, to developing countries information with respect to telecommunications services and developments in telecommunications and information technology to assist in strengthening their domestic telecommunications services sector.

(d) Members shall give special consideration to opportunities for the least-developed countries to encourage foreign suppliers of telecommunications services to assist in the transfer of technology, training and other activities that support the development of their telecommunications infrastructure and expansion of their telecommunications services trade.

7. *Relation to International Organizations and Agreements*

(a) Members recognize the importance of international standards for global compatibility and inter-operability of telecommunication networks and services and undertake to promote such standards through the work of relevant international bodies, including the International Telecommunication Union and the International Organization for Standardization.

(b) Members recognize the role played by intergovernmental and non-governmental organizations and agreements in ensuring the efficient operation of domestic and global telecommunications services, in particular the International Telecommunication Union. Members shall make appropriate arrangements, where relevant, for consultation with such organizations on matters arising from the implementation of this Annex.

ANNEX 1B. GENERAL AGREEMENT ON TRADE IN SERVICES
[...]

ANNEX ON NEGOTIATIONS ON BASIC TELECOMMUNICATIONS

1. Article II and the Annex on Article II Exemptions, including the requirement to list in the Annex any measure inconsistent with most-favoured-nation treatment that a Member will maintain, shall enter into force for basic telecommunications only on:

(a) the implementation date to be determined under paragraph 5 of the Ministerial Decision on Negotiations on Basic Telecommunications; or,

(b) should the negotiations not succeed, the date of the final report of the Negotiating Group on Basic Telecommunications provided for in that Decision.

2. Paragraph 1 shall not apply to any specific commitment on basic telecommunications which is inscribed in a Member's Schedule.

Annex 2.3 Decision on negotiations on basic Tlc of 1994

DECISION ON NEGOTIATIONS ON BASIC TELECOMMUNICATIONS

Ministers decide as follows:

1. Negotiations shall be entered into on a voluntary basis with a view to the progressive liberalization of trade in telecommunications transport networks and services (hereinafter referred to as "basic telecommunications") within the framework of the General Agreement on Trade in Services.
2. Without prejudice to their outcome, the negotiations shall be comprehensive in scope, with no basic telecommunications excluded a priori.
3. A Negotiating Group on Basic Telecommunications (hereinafter referred to as the "NGBT") is established to carry out this mandate. The NGBT shall report periodically on the progress of these negotiations.
4. The negotiations in the NGBT shall be open to all governments and the European Communities which announce their intention to participate. To date, the following have announced their intention to take part in the negotiations: Australia, Austria, Canada, Chile, Cyprus, European Communities and their member States, Finland, Hong Kong, Hungary, Japan, Korea, Mexico, New Zealand, Norway, Slovak Republic, Sweden, Switzerland, Turkey, United States.
   Further notifications of intention to participate shall be addressed to the depositary of the Agreement Establishing the World Trade Organization.
5. The NGBT shall hold its first negotiating session no later than 16 May 1994. It shall conclude these negotiations and make a final report no later than 30 April 1996. The final report of the NGBT shall include a date for the implementation of results of these negotiations.
6. Any commitments resulting from the negotiations, including the date of their entry into force, shall be inscribed in the Schedules annexed to the General Agreement on Trade in Services and shall be subject to all the provisions of the Agreement.
7. Commencing immediately and continuing until the implementation date to be determined under paragraph 5, it is understood that no participant shall apply any measure affecting trade in basic telecommunications in such a manner as would improve its negotiating position and leverage. It is understood that this provision shall not prevent the pursuit of commercial and governmental arrangements regarding the provision of basic telecommunications services.
8. The implementation of paragraph 7 shall be subject to surveillance in the NGBT. Any participant may bring to the attention of the NGBT any action or omission which it believes to be relevant to the fulfillment of paragraph 7. Such notifications shall be deemed to have been submitted to the NGBT upon their receipt by the Secretariat.

FOURTH PROTOCOL TO THE GENERAL AGREEMENT ON TRADE IN SERVICES

S/L/20 - 30 April 1996

Members of the World Trade Organization (hereinafter referred to as the"WTO") whose Schedules of Specific Commitments and Lists of Exemptions from Article II of the General Agreement on trade in Services concerning basic telecommunications are annexed to this Protocol (hereinafter referred to as "Members concerned"),
Having carried out negotiations under the terms of the Ministerial Decision on Negotiations on Basic Telecommunications adopted at Marrakesh on 15 April 1994,
Having regard to the Annex on Negotiations on Basic Telecommunications,
Agree as follows:

Upon the entry into force of this Protocol, a Schedule of Specific Commitments and a List of Exemptions from Article II concerning basic telecommunications annexed to this Protocol relating to a Member shall, in accordance with the terms specified therein, supplement or modify the Schedule of Specific Commitments and the List of Article II Exemptions of that Member.

This Protocol shall be open for acceptance, by signature or otherwise, by the Members concerned until 30 November 1997.

The Protocol shall enter into force on 1 January 1998 provided it has been accepted by all Members concerned. If by 1 December 1997 the Protocol has not been accepted by all Members concerned, those Members which have accepted it by that date may decide, prior to 1 January 1998, on its entry into force.

This Protocol shall be deposited with the Director-General of the WTO. The Director-General of the WTO shall promptly furnish to each Member of the WTO a certified copy of this Protocol and notifications of acceptances thereof.

This Protocol shall be registered in accordance with the provisions of Article 102 of the Charter of the United Nations.

Done at Geneva on 15 April One thousand nine hundred and ninety-seven, in a single copy in the English, French and Spanish languages, each text being authentic, except as otherwise provided for in respect of the Schedules annexed hereto.

REFERENCE PAPER

24 April 1996
Negotiating group on basic telecommunications

The following are definitions and principles on the regulatory framework for the basic telecommunications services.

Definitions

Users mean service consumers and service suppliers.

Essential facilities mean facilities of a public telecommunications transport network or service that
(a) are exclusively or predominantly provided by a single or limited number of suppliers; and
(b) cannot feasibly be economically or technically substituted in order to provide a service.

A *major supplier* is a supplier which has the ability to materially affect the terms of participation (having regard to price and supply) in the relevant market for basic telecommunications services as a result of:
(a) control over essential facilities; or
(b) use of its position in the market.

1. Competitive safeguards

1.1 Prevention of anti-competitive practices in telecommunications

Appropriate measures shall be maintained for the purpose of preventing suppliers who, alone or together, are a major supplier from engaging in or continuing anti-competitive practices.

1.2 Safeguards

The anti-competitive practices referred to above shall include in particular:
(a) engaging in anti-competitive cross-subsidization;
(b) using information obtained from competitors with anti-competitive results; and
(c) not making available to other services suppliers on a timely basis technical information about essential facilities and commercially relevant information which are necessary for them to provide services.

2. Interconnection

2.1 This section applies to linking with suppliers providing public telecommunications transport networks or services in order to allow the users of one supplier to communicate with users of another supplier and to access services provided by another supplier, where specific commitments are undertaken.

2.2 Interconnection to be ensured

Interconnection with a major supplier will be ensured at any technically feasible point in the network. Such interconnection is provided
(a) under non-discriminatory terms, conditions (including technical standards and specifications) and rates and of a quality no less favourable than that provided for its own like services or for like services of non-affiliated service suppliers or for its subsidiaries or other affiliates;
(b) in a timely fashion, on terms, conditions (including technical standards and specifications) and cost-oriented rates that are transparent, reasonable, having regard to economic feasibility, and sufficiently unbundled so that the supplier need not pay for network components or facilities that it does not require for the service to be provided; and

(c) upon request, at points in addition to the network termination points offered to the majority of users, subject to charges that reflect the cost of construction of necessary additional facilities.

2.3 Public availability of the procedures for interconnection negotiations

The procedures applicable for interconnection to a major supplier will be made publicly available.

2.4 Transparency of interconnection arrangements

It is ensured that a major supplier will make publicly available either its interconnection agreements or a reference interconnection offer.

2.5 Interconnection: dispute settlement

A service supplier requesting interconnection with a major supplier will have recourse, either:

(a) at any time or

(b) after a reasonable period of time which has been made publicly known to an independent domestic body, which may be a regulatory body as referred to in paragraph 5 below, to resolve disputes regarding appropriate terms, conditions and rates for interconnection within a reasonable period of time, to the extent that these have not been established previously.

3. Universal service

Any Member has the right to define the kind of universal service obligation it wishes to maintain. Such obligations will not be regarded as anti-competitive per se, provided they are administered in a transparent, non-discriminatory and competitively neutral manner and are not more burdensome than necessary for the kind of universal service defined by the Member.

4. Public availability of licensing criteria

Where a licence is required, the following will be made publicly available:

(a) all the licensing criteria and the period of time normally required to reach a decision concerning an application for a licence and

(b) the terms and conditions of individual licences.

The reasons for the denial of a licence will be made known to the applicant upon request.

5. Independent regulators

The regulatory body is separate from, and not accountable to, any supplier of basic telecommunications services. The decisions of and the procedures used by regulators shall be impartial with respect to all market participants.

6. Allocation and use of scarce resources

Any procedures for the allocation and use of scarce resources, including frequencies, numbers and rights of way, will be carried out in an objective, timely, transparent and non-discriminatory manner. The current state of allocated frequency bands will be made publicly available, but detailed identification of frequencies allocated for specific government uses is not required.

Annex 2.5 Summary of Tlc obligations

GATS/TELECOM AGREEMENTS: Level of commitments by sector and mode of supply (Source: WTO)

2.C Telecommunication Services	No. Listed	Cross border			Consumption abroad			Commercial presence		
		In per cent of listed sub-sectors								
MARKET ACCESS		Full	Partial	None	Full	Partial	None	Full	Partial	None
a Voice Telephone Services	65	12	78	9	31	58	11	11	88	2
b. Packet-Switched Data Transmission Services	59	19	75	7	42	51	7	10	90	0
c. Circuit-Switched Data Transmission Services	60	18	73	8	42	50	8	10	88	2
d. Telex Services	59	20	75	5	47	45	7	11	89	0
e. Telegraph Services	43	19	72	9	49	42	9	9	91	0
f. Facsimile Services	55	18	75	7	44	49	7	11	87	2
g. Private Leased Circuit Services	55	16	80	4	42	55	4	11	89	0
h. Electronic Mail	52	35	60	6	46	42	12	17	79	4
i. Voice Mail	48	35	58	6	44	48	8	17	81	2
j. On-line Information and Data Base Retrieval	54	31	61	7	44	43	13	17	78	6
k. Electronic Data Interchange (EDI)	45	36	58	7	51	42	7	20	76	4
l. Enhanced/Value-Added Facsimile Services	43	37	56	7	49	40	12	21	74	5
m. Code and Protocol Conversion	42	31	60	10	48	48	5	19	79	2
n. On-line Information and/or data processing	40	33	55	13	50	35	15	18	80	3
o. Other, Terrestrial-based Mobile	61	8	79	13	30	61	10	13	87	0
o. Other, Satellite-based Mobile	23	9	87	4	28	68	4	8	92	0
o. Other, other	42	5	86	10	10	81	10	2	93	5

Legend: FULL = No limitations listed, Partial = Limitations listed None = No commitments taken on this mode.

GATS/TELECOM AGREEMENTS: Level of commitments by sector and mode of supply (Source: WTO)

2.C Telecommunication Services	No. Listed	Cross border			Consumption abroad			Commercial presence		
NATIONAL TREATMENT		Full	Partial	None	Full	Partial	None	Full	Partial	None
a. Voice Telephone Services	65	23	65	12	26	63	11	17	77	6
b Packet-Switched Data Transmission Services	59	37	53	10	39	54	7	34	63	3
c. Circuit-Switched Data Transmission Services	60	37	52	12	40	50	10	30	65	5
d. Telex Services	59	40	55	5	44	47	9	31	65	4
e. Telegraph Services	43	40	51	9	42	47	12	33	65	2
f. Facsimile Services	55	40	55	5	44	49	7	31	64	5
g. Private Leased Circuit Services	55	36	56	7	40	55	5	27	65	7
h. Electronic Mail	52	50	44	6	44	40	15	48	46	6
i Voice Mail	48	46	48	6	46	42	13	42	54	4
j. On-line Information and Data Base Retrieval	54	52	41	7	48	35	17	48	44	7
k. Electronic Data Interchange (EDI)	45	56	38	7	53	36	11	49	42	9
l. Enhanced/Value-Added Facsimile Services	43	56	37	7	51	33	16	51	42	7
m. Code and Protocol Conversion	42	50	40	10	50	40	10	48	45	7
n. On-line Information and/or data processing	40	55	33	13	53	28	20	55	38	8
o. Other, Terrestrial-based Mobile	61	21	66	13	25	64	11	20	74	7
o. Other, Satellite-based Mobile	23	19	74	8	21	74	6	15	79	6
o. Other, other	42	7	83	10	10	80	10	7	88	5

GATS/TELECOM AGREEMENTS: Market access, types of limitations by sector and mode of supply listed[1]

Source: WTO

2.C Telecommunication services	Mode	Market access limitations					
		a	c	d	e	f	g
a. Voice Telephone Services	CB	5			4	1	11
	CA	1			4	1	8
	CP	38	1		22	23	38
b. Packet-Switched Data Transmission Services	CB	5			4	1	8
	CA	2			4	1	6
	CP	24	1		22	17	32
c. Circuit-Switched Data Transmission Services	CB	3			4	2	8
	CA	2			4	1	6
	CP	23	1		19	18	31
d. Telex Services	CB	2			3	2	7
	CA	1			3	1	5
	CP	22	1		20	17	27
e. Telegraph Services	CB	2			3	1	6
	CA	1			3	1	5
	CP	18	1		18	13	24
f. Facsimile Services	CB	2			2	2	7
	CA	1			2	1	4
	CP	16	1		17	15	28
g. Private Leased Circuit Services	CB	2			4	2	8
	CA	1			4	1	6
	CP	20	1		18	16	31
h. Electronic Mail	CB	3					7
	CA	1					1
	CP	14	1		8	7	19
i. Voice Mail	CB	3					4
	CA	1					1
	CP	13	1		7	8	16
j. On-line Information and Data Base Retrieval	CB	3					5
	CA	1					2
	CP	12	1		8	9	18
k. Electronic Data Interchange (EDI)	CB	2					4
	CA	1					1
	CP	9	1		4	5	14
l. Enhanced/Value-Added Facsimile Services	CB	2					4
	CA						1
	CP	10	1		5	6	16
m. Code and Protocol Conversion	CB	2					3
	CA	1					1
	CP	9	1		3	5	13
n. On-line Information and/or data processing	CB	3					5
	CA	1					1
	CP	10	1		6	4	13
o. Other - Terrestrial-based Mobile	CB	4			4	2	11
	CA	1			4	1	8
	CP	30	1		20	21	33
- Satellite-based Mobile	CB	2			4	2	9
	CA	1			4	1	6
	CP	24	1		20	18	31

Legend: CB - Cross border supply
CA - Consumption abroad
CP - Commercial presence

a) Number of suppliers
c) Number of operations
d) Number of natural persons
e) Types of legal entity
f) Participation of foreign capital
g) Other measures

GATS/TELECOM AGREEMENTS: National treatment, types of measures by sector and mode of supply[1]

Source: WTO

2.C. Telecommunication Services	Mode	National treatment limitations						
		a	d	e	f	g	h	l
a. Voice Telephone Services	CB	1	6	4			4	4
	CA		6	4			4	4
	CP	1	12	5	3	1	5	5
b. Packet-Switched Data Transmission Services	CB	1	6	4			4	4
	CA		6	4			4	4
	CP	1	10	5	2	1	5	5
c. Circuit-Switched Data Transmission Services	CB	1	7	4			4	4
	CA		6	4			4	4
	CP	1	11	5	2	1	5	5
d. Telex Services	CB	1	7	4			4	4
	CA		6	4			4	4
	CP	1	13	4	1	1	5	5
e. Telegraph Services	CB	1	6	4			4	4
	CA		6	4			4	4
	CP	1	11	4	1	1	5	5
f. Facsimile Services	CB	1	7	4			4	4
	CA		6	4			4	4
	CP	1	12	4	1	1	4	5
g. Private Leased Circuit Services	CB	1	7	4			4	4
	CA		6	4			4	4
	CP	1	10	4	1	1	4	5
h. Electronic Mail	CB		1		1			
	CA		1		1			
	CP		4		1			1
i. Voice Mail	CB		1		1			
	CA		1		1			
	CP		5		1			1
j. On-line Information and Data Base Retrieval	CB		1		1			
	CA		1		1			
	CP		5		1			
k. Electronic Data Interchange (EDI)	CB		1		1			
	CA		1		1			
	CP		4		1			
l. Enhanced/Value-Added Facsimile Services	CB		1		1			
	CA		1		1			
	CP		4		1			1
m. Code and Protocol Conversion	CB				1			
	CA				1			
	CP		3		1			
n. On-line Information and/or data processing	CB				1			
	CA				1			
	CP		2		1			
o. Other - Terrestrial-based Mobile	CB	1	7	4			4	4
	CA		6	4			4	4
	CP	1	12	5	3	1	6	4
- Satellite-based Mobile	CB	1	7	4			4	4
	CA		6	4			4	4
	CP	1	9	4	1	1	5	4

Legend:

CB - Cross border supply
CA - Consumption abroad
CP - Commercial presence

a) Tax measures
d) Nationality requirements
e) Residency requirements
f) Licensing, standards, qualifications
g) Registration requirements
h) Authorization requirements
l) Ownership of property/land

Annex 2.6 Schedule of specific Commitments of Poland

Sector or Sub-sector	Limitations on Market Access	Limitations on NT
2.C. TELECOMMUNICATIONS SERVICES (excluding broadcasting) All sub-sectors	Modes 1),2),3),4) The installation and usage of telecommunications equipment and networks and the provision of telecommunication services requires a license or permission, with the exception of cases specified by the Minister of Communications in his ordinance. The licenses and permissions are available only for the entities registered in Poland. The requirement to obtain licenses and permission does not concern the national operator: Telekomunikacja Polska SA (TP SA). The entities with foreign participation in Poland must take the form of limited liability companies and joint stock companies established in Poland. Entities with foreign participation are not allowed to own international networks or to render international facilities based services until 31 Dec. 2002. With reference to international and domestic long-distance services and networks the limitation of foreign capital and voting rights is 49%. Number of licenses and permissions can be subject to the publicly available licensing criteria.	Modes 1),2),3),4) When the limitations of foreign participation are applied, Polish citizens domiciliated in Poland must have majority in the board of directors and supervising body.
2.C: (a) Voice-telephone services; (b) Packet-switched data transmission services; (c) Circuit-switched data transmission services; (d) Telex services; (e) Telegraph services; (f) Facsimile services; (g) Private leased circuit services; International, long distance, local, - public and non-public, - facilities-based and on resale-base, - wire-based and radio-based.	(1) None (2) None (3) None except: (a) excluded from all commitments: - international public voice telephone, telex and telegraph services until 31 Dec. 2002, - long-distance domestic public voice telephone services and networks until 31 Dec. 2002, - domestic telex and telegraph services and networks until 31 Dec. 1999, (b) territorial area of the licenses and permissions for the local public voice telephone services and networks can be subject to the publicly available licensing criteria.	(1) None (2) None (3) None (4) Unbound except for horizontal measures

Sector or Sub-sector	Limitations on Market Access	Limitations on NT
	(4) Unbound except for horizontal measures	
o. others - cable television and radio networks Services;	(1) Unbound (2) Unbound (3) The limitation of foreign capital and voting rights is 49% (4) Unbound except for horizontal measures.	(1) None (2) None (3) None (4) Unbound except for horizontal measures.
- public cellular mobile telephone services and networks,	(1) None except: - only through use of the international network of TP S.A. until 31 Dec. 2002 (2) None except: - only through use of the international network of TP SA until 31 Dec. 2002 and according to the international agreements. (3) None except: - the limitation of foreign capital and voting rights is 49%. - only through the use of TP S.A. infrastructure, except microwave connections in the Case if TP S.A. is not able to establish such connections in the limited period of time until 31 Dec. 2002. (4) Unbound except for horizontal measures.	(1) None (2) None (3) None (4) Unbound except for horizontal measures.
- mobile satellite services and networks	(1),2),3) None as of 1 January 2003. (4) Unbound except for horizontal measures	(1),2),3) None
- paging	1), 2) Unbound except pan-European paging systems (3) None (4) Unbound except for horizontal measures.	(4) Unbound except for horizontal measures (1) None (2) None (3) None (4) Unbound except for horizontal measures.

Modes of supply: 1) Cross-border supply 2) Consumption abroad 3) Commercial presence 4) Presence of natural persons

Chapter 3
A theory of FDI entry
in the telecommunication sector

There has been mounting optimism at international level as regards the importance of information technology *revolution* to help LDC to "leapfrog" development[1], thanks to its ability to accelerate the rate of development and transition. In the words of J.P. Singh[2]:

"The telecommunications literature uses the word "leapfrogging" in three ways.
First, it is meant to imply that telecommunications can help developing countries skip over stages of development and become members of postindustrial society.
Second, leapfrogging is used in a "engine of growth" sense to mean that telecommunications can help developing countries accelerate their pace of development.
Finally, leapfrogging is used in a technical sense to signify skipping over the technological frontier or product cycle."

As Singh himself points out, however, reality has to be taken into account at political and international level and policy makers face the truth of the underdeveloped status of infrastructure networks in most developing countries and transition economies. As for telecommunications, it is well documented[3] that many countries are still endowed with tiny networks, while, at the same time, network developments take place rapidly.

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[1] As a general reference, see
- World Bank (1998), *World Bank Report: Knowledge for Development*, Washington D.C., Worldbank;
- Nulens, Gert, Nancy Hafki, Leo Van Audenhove and Bar Cammaerts Eds. (2001), The digital divide in developing countries: towards an information society in Africa, UNO-ECA and VUB Brussels University Press;
- or the website of the InfoDev initiative of the Worldbank, www.infodev.org/about/prospectur.html

[2] J. P. Singh (1999), *Leapfrogging Development?: The Political Economy of Telecommunications Restructuring*, Suny Series in Global Politics, State University of New York Press.
[3] ITU(2001).

Obstacles of various type have been identified that hold back Tlc development at economic and legal level. While legal and regulatory obstacles have been extensively dealt with in the first chapters, this chapter focuses on the economic issues surrounding the liberalization of telecommunications in transition countries from theoretical point of view. In particular, it aims at evaluating the potential impact of the WTO liberalization measures in the Tlc sector of transition and developing countries, through the study of a simplified model of FDI in an oligopoly setting.

From a purely economic point of view, while Tlc networks are no longer or not entirely perceived as natural monopolies, empirical evidence suggests that there exist little but growing international trade in Tlc hardware and slow formation of fixed capital in the domestic Tlc sector of a number of countries[4].

Moreover, three empirical regularities characterize Tlc sectors of transition and less developed countries:

- The existence of public monopolies, and a process of de-monopolization and privatization;
- Extended waiting lists reaching 4 years, and consumers willing to put down deposits for the privilege of *waiting* for a phone line.
- The intensified activity of multinational corporations (MNC) as actors in the telecommunications sectors.

Ravi Ravamurti (2000), among others, reports that in many Latin American countries, deposits are frequently set even beyond U$ 1000.
Given these regularities, I infer that some transition and less developed countries experience capacity constraints due to past under-investment in Tlc infrastructure. Under-investment is frequent in transition countries because of the contingent need of securing financial resources to guarantee macro-stability, after the beginning of the transition process.

Thus, entry of foreign investors through Foreign Direct Investment might be a good policy instrument in the hands of governments who want to remove the under-investment constraints and improve the supply of Tlc services, whereas different modes of entry might naturally have different impacts on domestic Tlc development, ranging from differences in

the extent of technology transfer and/or capacity expansion and/or competition implications.

This chapter is structured as follows. Paragraph 1 is motivational and explains the importance of infrastructure investment to economics growth as emphasized by a restricted number of recent theoretical and empirical works.
Paragraph 2 reviews the most recent and innovative literature on FDI and modes of entry. This literature, broadly defined as *Mode of International Entry Models* (MIEM), includes a small number of papers that investigate incentives and effects related to international investment decision, when the alternative between different modes of entry is faced by the investor. Silvio Contessi and Claudia Guagliano (2003) survey this literature in profundity and claim that it might constitute a valid response to the call for research in the field invoked by the 2000 World Investment Report (WIR) of UNCTAD.

After constructing a demand curve for Tlc connection in paragraph 3.3, the subsequent paragraphs develop a full model of FDI in partial equilibrium, detailing the structure of the game in Mattoo, Olarreaga and Saggi (2002) to take into account the existence of network externalities in consumption that characterize the demand function for Tlc connection and the possible existence of capacity constraints in the supply of connections.
Finally, paragraph 3.8 draws on the results of the model to discuss policy options of interest to governments of transition and developing countries and on the verge of liberalizing their Tlc sectors.

3.1 Priors: Investment in infrastructure, market enhancement and economic growth

The theoretical prior upon which the model is developed is that investment in infrastructure is market-enhancing.
Admittedly, the idea is not new and underlies many experiences of policy interventions in both developed and developing countries. It has been Philip Aghion and Mark Schankerman (2000, 2001), however, that have provided a formalized model of market-enhancing infrastructure in a recent paper from the European Bank for Reconstruction and

[4] Röller and Waverman (2001) and Madden and Savage (1999).

Development[5], whose interest in the issue is obviously motivated by the strong involvement in infrastructure financing, particularly in Central and Eastern Europe.

The main idea Aghion and Schankerman (2000) develop in their paper is that infrastructure investment foster market interaction and competition through three different channels they examine in depth. They sustain their argument using a circular model with asymmetric production costs for incumbent firms and potential entrants, where units of transport cost are a proxy for the intensity of competition and reflect the quality of infrastructure.
From a theoretical point of view, the contribution is important in the way it emphasizes the market enhancing role of infrastructure, both physical (that reduces search and transportation costs and consequently limits the scope for local monopoly power) and institutional (that enhances competition in transition economies: competition agencies, regulatory frameworks, contract enforcing mechanisms). In contrast, earlier theoretical work on infrastructure and development has emphasized the indivisibility and public good aspects of infrastructure and the coordination failures involved in building infrastructure ahead of demand[6].

Aghion and Schankerman (2000) isolate three key mechanisms that sustain market enhancement:

- **Direct Market Selection.** By lowering transportation costs, infrastructure investment reduces the equilibrium market share for higher-cost firms, which in turn reduce average production costs; this means that infrastructure investment favors product market competition and, in turn, improves the selection mechanism among heterogeneous firms naturally operated by the market.
- **Restructuring.** Competition-enhancing infrastructure implies lower transportation costs. Since there exist both high and low-cost firms, if there is sufficient cost asymmetry, firms are induced to engage in cost-cutting or efficiency-improving activities.
- **Entry.** Increased product market competition changes incentives of firms to enter the market. In particular, new high-cost firms are discouraged to enter the market, whereas when firms are identical, lower transportation costs tend dilutes the

[5] Aghion and Schankerman (2000).
[6] Hirschman (1958), Murphy, Shleifer and Vishny (1989).

incentives to enter for all of them. Here, low-costs firms find attractive to enter because they are favored by post-entry enhanced competition.

Restructuring and Entry can also be seen as the dynamic by-products of the direct market selection mechanism in a two-stage game where first firms decide whether to reduce costs and/or enter the market, and subsequently compete on prices.

Aghion and Schankerman claim that market development, which is measured by the fraction of a high-cost firms among incumbent firms, affects the magnitude of each of these effects.

Even if this theory has not been tested empirically, yet, it has recently received strong indirect support in an empirical article by Lars Röller and Leonard Waverman (2001)[7] who find evidence for the claim that investment in Tlc fosters growth.

Previous studies on the topic address the returns to public infrastructure investment more generally. Aschauer (1989) estimates a production function on time series data and emphasizes the strong impact of the structure of public infrastructure capital on total factor productivity growth, but his results are biased because they do not control for causality, correlations and aggregation bias[8]. In subsequent studies, the introduction of fixed effects at state level attenuates the result, as in T. Garcia-Mila and T.J. McGuire (1992) or Douglas Holtz-Eakin (1993, 1994), Harry H.Kelejian and Dennis P. Robinson (1994) and Alfredo M. Pereira and Rafael Flores de Frutos (1995), and Hulten (1994). The result of these studies is that the strong impact found by Aschauer (1989) is not maintained once more precise or sophisticated econometric techniques are brought into play.

As far as the author is informed, the only studies relating to telecommunication infrastructure specifically are Hardy (1980), S.W. Norton (1992), Röller and Waverman (1996, 2001). Hardy (1980) makes use of single equation regression on data from 1960 to 1973 for 15 developed nations and 45 LDC. He finds that telephones per capita significantly impacts on GDP but the diffusion of radio does not.

Norton (1992) estimates a cross-section on data for 47 countries for 1957-1987 and finds that the average stock of telephones impacts positively and significantly on the mean annual growth rate.

Shane Greenstein and Pablo T. Spiller (1996) investigate the impact of the amount of fiber-optic cable and ISDN lines on the economic performance of US states finding that

[7] Lars Röller and Leonard Waverman (2001), "Telecommunications Infrastructure and Economic Development: A Simultaneous Approach", *American Economic Review*, 91:4.

[8] See Manuel Balsameda (1996).

infrastructure investment is responsible for a significant share of consumer surplus growth and business revenue in local Tlc services.

Altogether, these empirical studies on the relation between public infrastructure investment and growth are limited because they mostly make use of single equation models that do not usually take into consideration causality problems. The results are likely to underestimate the role of country specific fixed effects that are explicitly analyzed by Röller and Waverman (2001).

In fact, they propose a structural model made of a system of equations that endogenizes Tlc investment, and use evidence from 21 OECD countries over 20-year period to examine the impact that Tlc development may have had. By jointly estimating a micro-model for Tlc investment and a macro production function, they find evidence of a significant positive casual link, especially when a critical mass of Tlc infrastructure is present, and the critical mass appears to be at a level of Tlc infrastructure that is near universal service. Moreover, their approach and their results are important because they emphasizes the potential impact of non-linearities, related to the presence of network externalities, in empirical studies concerning Tlc, a feature that will be considered explicitly in this work, as well.

Accordingly, along this chapter a model of entry in telecommunication sector will be built to examine the effects of telecom investment liberalization in transition and developing countries. The model classifies naturally within a new strand of literature in international economics that will be discussed in the next paragraph and referred to as *Mode of International Entry Models* (MIEM).

3.2 Modes of International Entry: An overview of the recent literature

Despite the fact that Foreign Direct Investment in the Tlc sector has gained importance in the last ten years and the transactions related to operations of telecommunication MNC typical register huge amounts of financial resources being transferred internationally, surprisingly little research has been carried out at both theoretical and empirical level.

The only theoretical piece of research the author is aware of is Edward Graham (2001)[9]. The paper originates from the concerns about potential unfair competition exerted on US telcos by the acquisition of Voice Stream by Deutsche Telekom, discussed in chapter 2, and will be commented at the end of the paragraph.

Because of the lack of contributions on the topic to back any theoretical analysis, I will refer to a brand-new strand of literature in international trade has developed in the last four years, to explain international entry with a marked industrial organization flavor. Here and in Silvio Contessi and Claudia Guagliano (2003)[10], these models are labeled as *Mode of International Entry Models* (MIEM), a definition used to gather partial equilibrium models on international entry with a game theoretic structure. The model developed later in the chapter should be included within this category.

To understand better how this model fit in the literature of reference, this paragraph presents a brief introduction of the theory of Multinational Corporation, then focuses on recent international modes of entry models relevant to the set up of the model and finally comments Graham's paper on Tlc FDI.

The theory of Multinational Corporations is often blamed for being at least partial and incomplete. In effect, the study the complex behavior of MNC, heterogeneous agents themselves, requires the joint consideration of different fields of economics, ranging from the theory of the firm and contract theory, the theory of international trade and international factor movements, to development economics.

The first comprehensive seminal contribution to the theory has been provided by Dunning with its eclectic paradigm or O.L.I theory.

Dunning (1977)'s eclectic paradigm

Dunning (1977, 1997) explains the existence of MNC with the existence of advantages of Ownership (O.), Localization (L.) and Internalization (I.) jointly exploited by companies that decide to go multinational.

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[9] Edward Graham (2001), "Subsidies, Market Closure, Cross-Border Investment, and Effects on Competition: The Case of FDI in the Telecommunications Sector", *Institute for International Economics Working Paper 2001-2.*

[10] Silvio Contessi and Claudia Guagliano (2002), Modes of International Entry in theory and practice: A survey, *ISLA Bocconi University*, mimeo.

According to his analysis, on the one hand, knowledge-intensive companies can take advantage of the replication of their human capital, patents, technologies, intellectual property rights or reputation, in different countries and exploit scale economies at firm level, on the *number* if plants, by internationalizing their activity[11].
On the other hand, MNC want to localize close to final consumers or downstream customers in order to save on transport costs, find cheap inputs (such as labor in developing countries), and jump tariffs. For example, in the case of Tlc services, localizing in the market that has to be served is simply necessary, because the service cannot be materially exported or imported, being its production and consumption necessarily contemporaneous.
Once there exist O. and L. advantages, a company still has the option of contracting out her knowledge capital, in the typical form of patents or brands, to a local agent and avoid to incur in the cost of setting up a new plant. However, since knowledge capital is usually easily replicable and international contracts are difficult to enforce as well as their breach is hard to punish, the contracting out option is not risk-less. Thus, the existence of Internalization (I.) advantages makes the choice of going multinational more likely.

The eclectic paradigm is certainly an important step in the development of the theory of MNC and is still widely addressed to explain a number of aspects of MNC behaviors. However, departing from the criticism for the O.L.I. theory being completely qualitative, a number of formal contributions have developed since the 1980s in mainstream economics.

Mainstream Models of MNC

Within the theoretical work of the 1980s and 1990s, three main strands of literature can be identified: Trade-related models, strategic models and internalization models[12].

Trade-related models are general equilibrium models that rely upon the methodological tools developed within the context of the new trade theories (Dixit/Sitglitz monopolistic competition, iceberg costs à la Samuelson and positive transport costs).
A first wave of models, including Elhanan Helpman (1984) and James Markusen (1984), *assume* that there exist companies having O. and L. advantages, and explain how the

[11] Knowledge capital, in effect, shares one of the features of public goods, replicability, but not the other, being it exclusive.
[12] James Markusen (1995), "The Boundaries of Multinational Enterprises and the Theory of International Trade", *Journal of Economic Perspectives*, 9:2:Spring, 169-190.

production can be disentangled internationally to exploit them, giving rise to flows of FDI from developed to developing countries.

Established empirical evidence, however, shows that FDI flows are more frequent between *similar* countries and are strongly correlated to flows intra-industry trade.

Thus, more elaborated models, including Ignatius Horstman and James Markusen (1992), Lael Brainard (1993), James Markusen and Tony Venables (1996) endogenize the presence of MNC, and model explicitly the so-called proximity-concentration trade-off, so to explain two-ways horizontal trade and FDI flows between similar countries. The most promising direction trade related models have taken so far, is the introduction of heterogeneity of MNC into general equilibrium models, together with the reinforcement of the connections to the industrial organization (IO) literature, as Helpman, Melitz and Yeaple (2002) [13] that construct a model of heterogeneous MNCs.

Alasdair Smith (1987), Ignatius Horstman and James Markusen (1987) and Massimo Motta (1992, 1994), are all ***Strategic Models*** of oligopolistic firms in an international setting. According to this branch of literature, entering a market with investment in new plants is a strategic choice by which companies commit themselves to produce in the host market. Thus, companies belonging to oligopolistic industries use this strategy to encourage or reduce rivals' competition on foreign markets.

Internalization Models, finally, formalize the trade-off between contracting out and internalization originally brought to light by Dunning (1977). The most important contributions here are James Markusen (1995) and Ignatius Horstman and James Markusen (1987, 1996).

More recent work is developing rapidly in a line of research on FDI with incomplete contracts, that draws heavily on contract theory. Elhanan Helpman and Gene Grossman (2002), develop a model in which the heterogeneous firms in an industry choose their modes of organization and the location of their subsidiaries or suppliers. They assume that the principals of a firm are constrained in the nature of the contracts they can write with suppliers or employees and sort firms with different productivity levels into different organizational forms.

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[13] Helpman,Elhan Mark N. Melitz and Steven Yeaple (2002), "Trade versus FDI", Harvard University, mimeo.

Dalia Marin and Terry Verdier (2001, 2002), introduce the Aghion and Tirole (1997) theory of firm into the Helpman and Krugman (1985) theory of international trade to examine the interaction between the firm's mode of organization and international.
Finally, Dalia Marin and Terry Verdier (2003) survey recent work on the impact of integration between similar and dissimilar countries on changes in the way corporate entities organize their activity. They show that international competition and trade both increase the stakes of the firm which affects the behavior of agents inside the corporation. This way, trade integration leads to new waves of outsourcing and to convergence in corporate cultures across countries.

Overall, theories of MNC are now evolving rapidly and expanding to other branches of literature to overcome the limitations that still characterize the comprehension of the FDI phenomenon. One major snag of the literature on MNC until recently has been pointed out by James Markusen in his influential article of 1995 in the Journal of Economic Perspective:

"Future Research. [...] *joint ventures need attention. What market alternatives are being rejected in favor of joint ventures? What problems are being internalized? Do technological and information advantages outweigh possible anti-competitive consequences?*[14]"

International joint ventures are typically included in the wider definition of International Mergers and Acquisitions (IM&A) that have been indicated to dominate the international movement of firms by a number of empirical studies, whereas the literature on MNCs just discussed typically models entry only as greenfield entry. Besides being quantitatively important, IM&A are a delicate topic for the policy makers of many developed and developing countries, where governments are often accused to sell out domestic assets to foreign companies
In addition, the literature on FDI has traditionally neglected the role of privatizations in promoting MNC entry and the important competitive effects of entry on market structures.

In the last few years, thus, a broadening research effort has been poured in to clarify the determinants and the consequences of different modes of entry. Recent papers and articles investigate partial equilibrium models mostly with a game theoretic structure and might be

[14] James Markusen (1995), "The Boundaries of Multinational Enterprises and the Theory of International Trade", *Journal of Economic Perspectives*, 9:2:Spring, 169-190.

thought as an expansion of the *strategic models*, wherein the international business perspective is, once again, incorporated formally. Early models focus on the recent upsurge of international M&A[15], while recent working papers highlight the alternative between Greenfield and acquisition within the setting of multi-stage games.

Mode of International Entry Models (MIEM)

Buckley and Casson (1998)

From the international business perspective, one important contribution is Peter Buckley and Mark Casson (1998)[16], that study the case of a firm localized in a home countries that decides to sell for the first time in a foreign market where a vertically integrated monopolist operates. The production process of the MNC is broken down in vertically disintegrated phases including production, distribution, research and development and, marketing. The model is complex and provides an "eclectic framework" itself, due to the variety of variables taken into account.

Buckley and Casson (1998) define a set of twelve possible market entry strategies with a number of variants, then measure the profit associated to each strategy and finally rank the alternatives according to their profitability, via elimination of dominated strategies. These strategies include FDI in production or distribution, subcontracting, franchising/exporting, licensing, Joint Ventures integrated in production, in distribution, in export, and various combinations of FDI/JV in the home/host country.

After the elimination of dominated strategies, three options are considered: Greenfield production combined with acquired distribution, Greenfield production combined with franchised distribution, and licensing. The choice among these strategies ends up to depend crucially on six variables, namely the adaptation costs of production plants, the cost of building trusts to access marketing expertise through newly acquired distribution facilities, the value of profit-sharing collusion, transaction costs incurred when licensing technology, transaction costs incurred in using an external market for the wholesale product and the rate of interest.

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[15] UNCTAD (2000).

[16] Peter J. Buckley ad Mark C. Casson (1998), "Analyzing Foreign Market Entry Strategies: Extending the Internalization Approach", *Journal of International Business Studies*, 29:3, 539-562.

Thanks to the simpler analytical structure and the finer coverage of possible means of entry, the model's results encompass a number of conclusions of more mainstream articles.
Higher tariffs, transport costs or a loss of economies of scale in domestic production encourages production abroad, as in Brainard (1993); stronger technological advantages encourages greenfield production, as in Markusen (1995), and discourages acquisition or licensing, while higher costs of building trusts tend to favor greenfield investment. Higher transaction costs for intermediate output trigger vertical integration of production and distribution, as in all Dunning (1977), Brainard (1993) and Markusen (1995). In general, subcontracting is not a first best mode of entry into the foreign market, especially because it does not give access to the domestic rival's marketing expertise.
Finally, the model predicts that high costs of competition associated to the existence of domestic monopolies favor strategies giving long term control over production or distribution facilities and favors acquisition over greenfield FDI in either production or distribution. Moreover, the model confirms that market structure is crucial when the choice between Greenfield, and acquisition is made: Entry through Greenfield increases local competition whilst entry through acquisition does not change the domestic competitive structure[17].

Görg (2000)

Holger Görg (2000) formalizes the approach of Buckley and Casson (1998) with a static Cournot game, by modeling the choice of a firm that has decided to enter a new market via FDI and faces the simpler alternative between setting up a new plant (Greenfield) or acquiring an existing company (Acquisition) in the market. As in Buckley and Casson (1998) goods are non-traded so that the price is determined endogenously in every market, but there exist two firms established in the host economy, that are possibly endowed with different levels of technology. Here, moreover, the take-over of a domestic firm is costly for the MNC.
Given a cost function of the form:

$$c_i = c_i q \qquad i = 1, 2 \qquad \text{and} \qquad c_1 < c_2 \qquad [1],$$

and a linear inverse demand function of the form

$$p = a - b(q_1 + q_2) . \qquad [2],$$

[17] This explains why government tend to compete to attract greenfield FD, and contemporaneously maintain a negative attitude towards acquisitions.

the entering company has three possible choices:

1) Scenario A: Acquiring the existing low-cost (high-tech) firm,
2) Scenario B: Acquiring the existing high-cost (low-tech) firm, or
3) Scenario C: Establish a brand new plant with a Greenfield FDI.

Moreover, the foreign firm

1) lacks marketing ability on the new market, and establishing marketing skills implies higher costs (m) under the greenfield scenario, so that

$$m_C > m_A = m_B = 0 \qquad [3]$$

2) faces product and process adaptation costs (d) to the requirements of the indigenous market, such that:

$$d_A > d_B > 0 \qquad [4],$$

$$d_C = 0 \qquad [5].$$

3) has to pay a premium u for taking-over any existing firm, that depends upon the net present value of future profitability, so that

$$u_B > u_A > 0 \qquad [6].$$

All m, d and u are sunk costs[18].

The result indicates that under most conditions on the structure of the costs mentioned above, take-over of existing low-cost (high-tech) firms could be the preferred form of entry. Greenfield investment is preferred only under scenario A, when marketing costs are very low relative to the costs of adaptation d_A. Moreover, Görg sketches a strategic dimension of the model by extending it informally to a two-period setting, introducing the possibility of crowding out strategies operated through the undercutting of prices below c_1 and c_1, and the subsequent establishment of a monopoly.

The model has four main limits. First of all, it assumes a simple linear demand function; another functional form might imply different effects of varying modes of entries on prices and quantities. Secondly, setting the slope of the demand function to 1 forces to neglect the effect of changes in the elasticity of demand on the outcomes. Thirdly, both Cournot and Bertrand competition might yield different results with differentiated, rather than

[18] They are faced once and for all occurring when the firm sets up in the market.

homogeneous, products. Finally, the model is static, whereas a dynamic entry process is expected to imply a higher propensity of high-tech companies to enter the new market.

Partially following Görg (2000)'s approach, the most recent formal models of entry through FDI focus on different alternatives as regard the *mode* of entry and preserve a multi-stage game theoretic structure in a partial equilibrium framework. The line of research includes Pehr-Johan Norbäck and Lars Persson (2000, 2001a, 2001b, 2002), Kjetil Bjorvatn (2001), Toby Kendall and Cillia Ryan (2002), and Aadityia Mattoo, Marcelo Olarreaga and Kamal Saggi (2001).

Norbäck and Persson (2001)

Pehr-Johan Norbäck and Lars Persson (2001)[19] introduce explicitly the possibility of entry through privatization as an alternative to direct entry through Greenfield FDI. Their analysis is particularly relevant for the understanding FDI in transition economies. Privatization-related FDI flows have been shown to be empirically relevant[20], but most evidence on FDI at microeconomic (firm) level does not deal with the privatization issue, not accounting at all for the effect of privatization programs on FDI flows. And this is true even if micro-databases[21] are often built upon privatization records of national governments, themselves.

Norbäck and Persson (2001) elaborate upon a two-country (H and F) partial equilibrium model to study the interaction between privatization procedures and incentives for FDI and exports.

In their model, there exist three companies producing a homogeneous product: An existing domestic monopolist operating in the country that is opening up to competition, a foreign (private) firm and a third firm that can possibly be domestic or foreign. The possibility of a merger between private firms is explicitly ruled out. Each firm has an endowment of K_i units of capital that give rise to a market configuration $M(K_1,K_2)$. K_i is made either by the pure assets of the former monopolist (K_S), by new assets created with the greenfield initiative (K_N) or by the sum of the two (K_S+K_N).

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[19] Norbäck, Pehr-Johan and Lars Persson (2001), "Privatization and Foreign Competition", IUI Stockholm WP No. 545-2001.

[20] UNCTAD (1999), World Investment Report;

[21] For a survey of existing FDI databases see Anna Falzoni (2000), *"Statistics on Foreign Direct Investment and Multinational Corporations: A Survey"*, CEPR data survey.

The companies face a liberalization program made by a package of three distinct measures: privatization of the state enterprise, FDI liberalization (removal or ease of FDI restrictions), and trade liberalization. The privatization procedure is realized as a simultaneous bid auction, where the two private firms are the potential buyers of the state assets.

The model is set up as a three-stage game where the privatization takes place in the first stage, giving rise to the possibility of a Greenfield investment in the form of investment expansion[22]. In the second and in the third stage firms install new capacity and compete on the product market à la Cournot, respectively.

If a foreign firm has not invested in the domestic market, it can be an exporter and accept to bear a trade cost in addition to the normal production costs; if both firm 1 and 2 are exporters their trade costs might be different[23].

In the equilibrium market structure it is shown that low greenfield costs and low trade costs induce foreign acquisition, which is certainly a counterintuitive result from the point of view of the mainstream theory of international economics, where FDI are treated only as new start-ups, thus Greenfield, and the high tariff/trade costs jumping argument is seen as one of the main determinants of MNC activity.

As for trade costs, for example, Richard Baldwin and Gianmarco Ottaviano (2001)[24] present a realistic model of simultaneous FDI and trade, where obstacles to trade generate a natural incentive for multi-product firms to engage in intra-industry FDI and trade at the same time, and the economic forces driving this process are analogous to the ones present in the Brander and Krugman (1983) 's model of reciprocal-dumping[25].

As for Greenfield costs, instead the natural reference is Lael Brainard (1993) which bases the proximity-concentration trade-off on three trigger variables including precisely greenfield costs.

But while both Brainard (1993) and Baldwin and Ottaviano (2001) consider multi-product firms supplying a range of imperfectly substitutable products, Persson and Norbäck (2001) model mono-product firms supplying a single homogeneous good, in partial equilibrium.

The reason why low Greenfield costs induce acquisitions of state assets is that the domestic firms cannot prevent foreign firms from becoming locally strong competitors and thus, their

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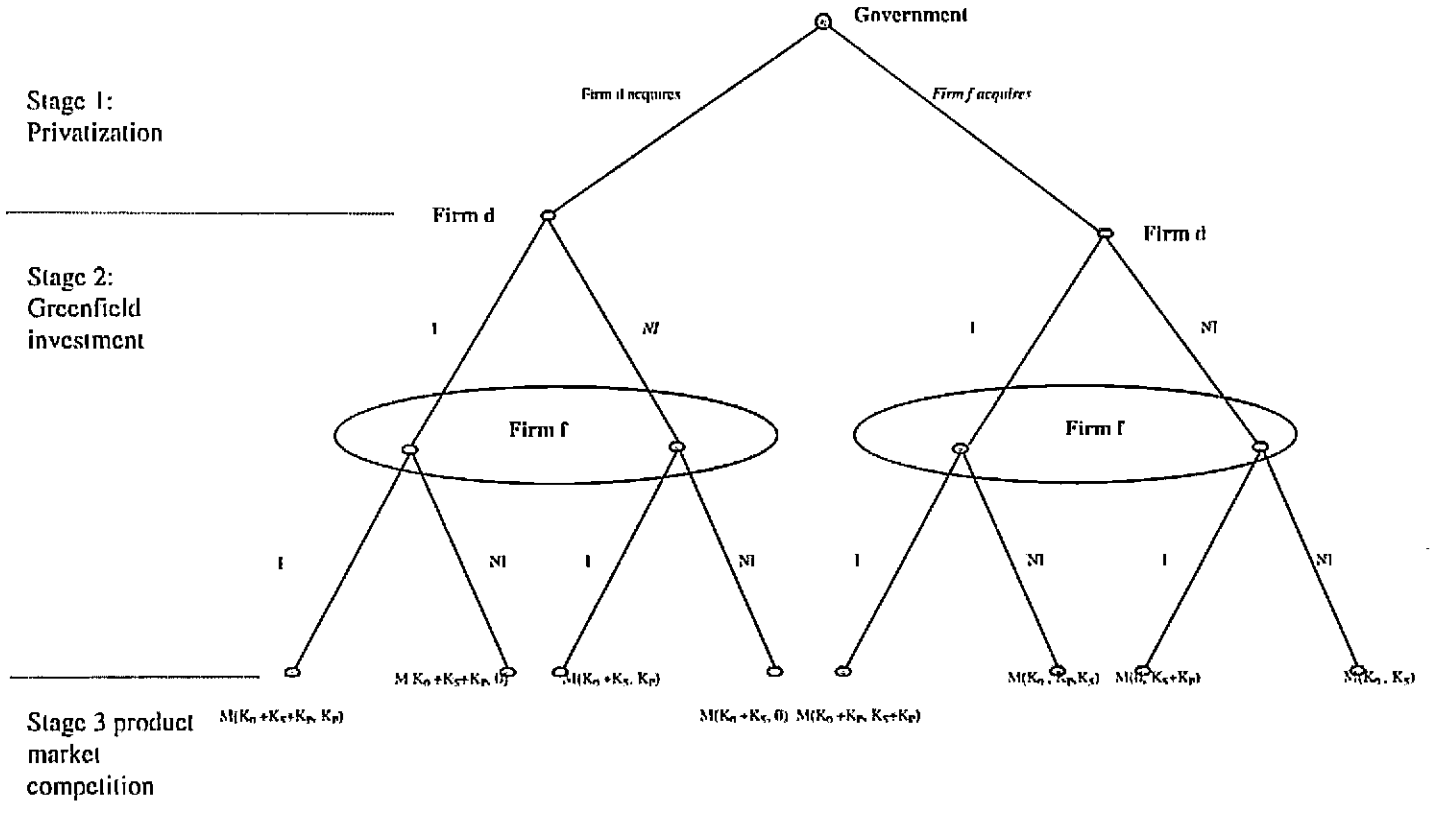
[22] Acquisition and subsequent capacity investment is a form of FDI often termed *brownfield* investment.

[23] Due to distance, tariffs, and the like.

[24] Richard Baldwin and Gianmarco Ottaviano (2001), "Multi-product Multinationals and reciprocal FDI dumping", *Journal of International Economics*, 54:429-448.

[25] J. Brander and Paul Krugman (1983), "A 'reciprocal dumping' model of international trade", *Journal of International Economics*, 15:313-323.

willingness to pay for the state assets are low. Even if domestic firms bought the state assets, they might have to face foreign firms local competition, so they simply have no incentive to buy. If Greenfield costs are high, instead, the likelihood of foreign entry decreases and the domestic firms tend to buy the state company to reduce competition on the domestic market and increase their monopoly (or oligopoly) profits.



I = Invest
NI = not invest
K_0 = Private Domestic Firm's initial capital stock
K_S = State assets
K_N = New assets (Private Investment)
M(. , .) = Market structure depending on installed capacities

Figure 3.1. Game tree of Persson and Norbäck (2001)

According to the conclusions, the paper points to the fact that the potential negative effect of national treatment[26] clause through crowding out is partly mitigated in privatizations because the negative impact on domestic firms created by the acquisition is partly paid for by the foreign investor in the bidding competition over the state assets.

Norbäck and Persson (2002)

The topic is explored in depth in Pehr-Johan Norbäck and Lars Persson (2002)[27], that distinguish between domestic assets, in scarce supply and whose price is determined in an auction type acquisition game, and greenfield assets, not scarce and sold at a fixed price. Domestic assets are associated to privilege access to distribution system, ownership of land or permits, knowledge of the specific characteristics of the local market, locally well-known brand names .

They consider a model where a domestic firm is initially located in the market of the host country H, which is going to be exposed to international competition. The game has three stages: In the first stage the MNs might acquire the domestic firm's assets under non-discriminatory policy, while no cross-border acquisition is allowed under the discriminatory policy. In the second stage, MNC have the option of investing Greenfield in new assets. In the third stage, firms compete in country H as oligopolists.

They show that the acquisition price might be higher than the seller's reservation price when there are many possible MNC/acquirers. This is because there might be an asset *complementarity effect and a preemption effect;* the former arises when domestic assets might more efficiently used if transferred from domestic to foreign owners because the MNC might exploit superior technology. The preemption effect has been identified in Fridolfsson and Stennek (1999)[28] and in Horn and Persson (2001)[29], and consists in the possibility of preventing other MNCs from acquiring the asset. Horn and Persson (2001) highlight how the preemption mechanism might carry easily to the counterintuitive result of low trade costs

[26] Recall that the basic idea behind NT clauses is the commitment of countries to treat foreign controlled firms operating in their territories no less favorably than domestic enterprises in similar situations. In the policy debate, not least in the Tlc sector, it has been a concern that FDI might "crowd out" domestic investments and shift profits from domestic to foreign firms. See World Investment report (1999).

[27] Pehr-Johan Norbäck and Lars Persson (2001), Investment liberalization -Who benefits from Cross-border Mergers & Acquisitions?, IUI Stockholm WP No. 569-2001.

[28] S.-O. Fridolfsson and J. Stennek (1999), "Why Mergers reduce Profits, and Raise Share Prices", IUI Stockholm WP No. 511-1999.

being conducive to foreign ownership of assets, contrary to the what the "tariff jumping" argument would suggest.

After studying different equilibrium ownership structures under discriminatory governmental policy, which does not allow for cross-border M&A, and a non-discriminatory policy, which does, Norbäck and Persson (2002) show that investment liberalizing countries might forego the possibility of *welfare enhancing* M&A when having restrictions on *cross-bordes* M&As. The reason is that combining assets in these situations means a great possibility of creating a surplus for the firms involved, since MNC are typically firms with strong firm specific assets and local firms have access to country-specific assets. If the domestic assets provide the acquirer with a strong position in the host market relative to other MNC, MNC gain from preventing other MNC from obtaining the assets, thereby further increasing the surplus. Moreover, if domestic assets are sufficiently scarce, the domestic firm will capture the created surplus and if the MNC's use of the domestic asset is sufficiently more efficient than that of the domestic firm, consumers will be better off under the non-discriminatory policy.

Björvatn (2001)

Kjetil Björvatn (2001)[30], finally, studies the profitability of mergers in an open economy, moving from the well-known result of the literature in mergers by which is generally more profitable to be outside a merger that to participate in it (Stiegler, 1950). In fact, while Horn and Persson (2001) show that when trade costs are high, a domestic merger results in domestic monopolies which may be well more profitable than an international duopoly, and Norbäck and Persson (2001) show that low trade costs keep away domestic firms from the acquisition of privatized companies, none analyzes the possibility of mergers *not* being profitable to the parties involved.
Björvatn does, and sets up a two-stage game where firms simultaneously decide whether or not to invest in the first stage and, in the case of investment, whether to invest Greenfield or Acquire. At stage two, production and sales are decided on the basis of Cournot competition between the firms.

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[29] Horn, Hendrink and Lars Svensson (2001), "The equilibrium ownership of an International Oligopoly", *Journal of International Economics*, 53: 2.
[30] Bjorvatn, Kjetil (2001), "On the profitability of cross-border mergers", NHH Discussion Paper No.14-2001.

By showing that the relationship between entry costs and the profitability of cross-border mergers is not monotone because a change in entry costs may induce a change in the entry mode of the rival firm, Björvatn (2001) demonstrates that mergers are more likely to take place between firms located in different markets rather than between firms located in the same market. Cross-Border mergers, in fact, bring with themselves the additional gain of market access to the foreign firm. Hence, the willingness to pay for a firm specific location is generally higher for a foreign than a local firm, but sufficiently high entry costs may make a merger profitable only between two local firms.

Kendall and Ryan (2002)

The last MIE model I consider here is Toby Kendall and Cillian Ryan (2002), that studies the effect of regional integration agreements, in the form of customs union with common external tariff and internal liberalization of trade, on M&A and Greenfield FDI.

From a formal point of view, they model an international oligopoly in partial equilibrium as a three-stage game solved by backward induction. There exist two countries, which decide to form a customs union (CU), and a third foreign country. Each country is assumed to be endowed with a small number of firms n>3 that produce a homogeneous tradable good. Markets are segmented with each firm selling in all markets. Production is characterized by constant marginal costs, different among firms, and no fixed cost.

In the first stage, the foreign firm decides how to serve the CU market, through exports, Greenfield FDI, or Acquisition FDI.

In the second stage, it decides whether to maximize the (joint-plants) profits of the group, or run separately every company, given the fact that the acquired firm uses a superior technology.

In the third stage, all firms (domestic, union-partner and foreign) compete à la Cournot. The number of agents at this stage depends on decisions taken at previous stages.

The paper comes to the conclusion that the strategy of taking-over an existing firm and shutting it down (a business strategy defines as *asset stripping*[31]) is dominated by licensing or taking over a competitor and operating it as a separate division.

[31] By UNCTAD (2000), *World Investment Report: Cross-border Mergers and Acquisitions and Development*, Chapter IV.6, among others.

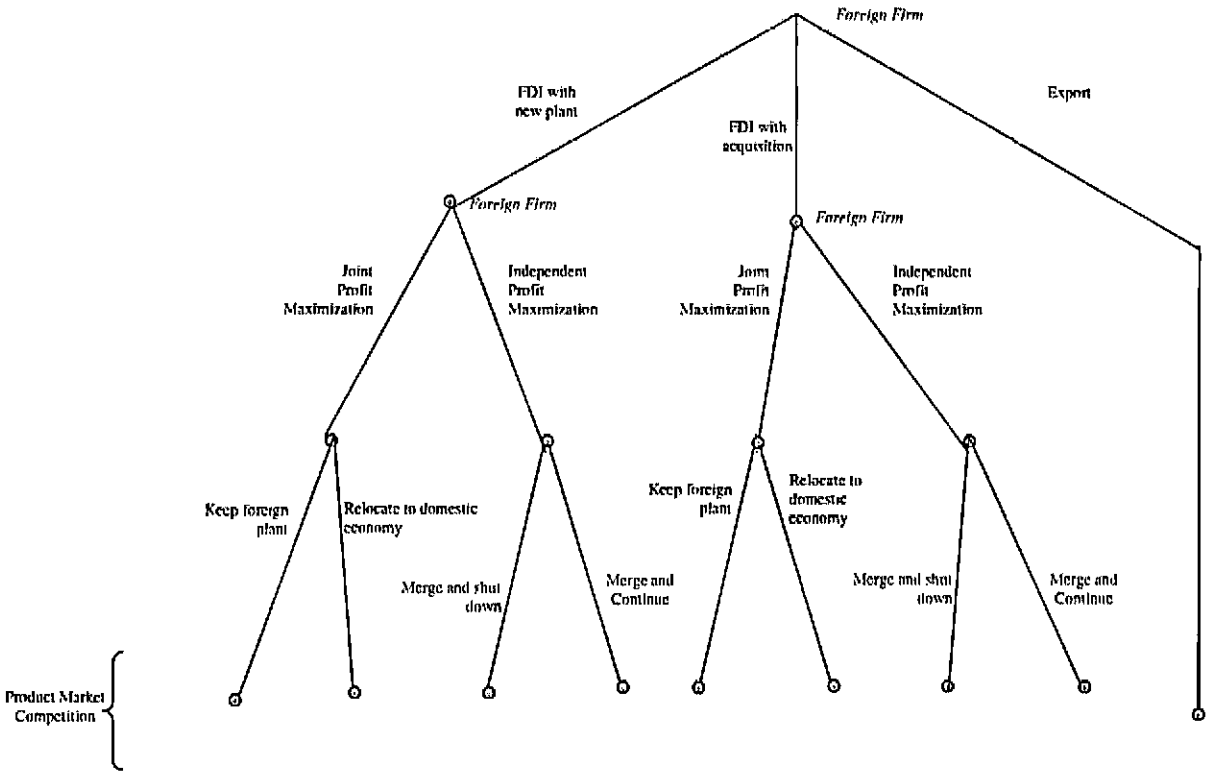


Figure 3.2: Game tree of Kendall and Ryan (2002)

M&A FDI are more likely to be preferred to Greenfield FDI when there is a large cost difference between the predator and the target and when the fixed cost of engaging in FDI is high relative to the cost of merging.

In this setting, the tariff jumping argument is related to the modification of the intra-union tariffs in the Regional Integration Agreement, and favors foreign predators over possibly more efficient domestic market leaders. The regional integration process makes both M&A FDI and Greenfield FDI more profitable, relative to exporting, for the foreign firm and customs union formation is likely to result in more foreign-owned plants within the union.

The results would seem to suggest that the firms that are most likely to benefit form the CU formation are those from its outside and would seem to explain why the number of transatlantic M&A operations has increased so rapidly with the completion of the single market in the EU and the advancements in the regional integration process initiated by NAFTA in 1992/1994.

Graham (2001)

As mentioned in the beginning of the paragraph Edward M. Graham (2001) is the only paper to develop a model of FDI in the Tlc sector, as an attempt to address some of the issues raised in the context of the Hollings bill and discussed in chapters 1 and 2. Specifically, the paper consider two separate markets for identical goods, separate in the sense that, initially, firms in one market may not sell in the other market because there exist barriers to entry that deter them from doing so. Firms operate with a cost structure typical of Tlc, where much of the cost of providing the relevant service is fixed in nature. Graham (2001) investigates the effects of opening up one market asymmetrically and letting into this market the firm that was previously selling only in the non-liberalized market.

The model builds upon Kreps and Scheinkman (1983) with a two-stage game where firms decide their productive capacity in the first stage and then compete *á la Bertand* in the second stage. Two alternative scenarios are analyzed to understand the possible behavior of cross-border investors: In the first scenario, symmetrical, both countries de-monopolize and allow entry, while in the second, a-symmetrical, one firm can use subsidies provided by her domestic government (costly because the subsidize is meant to augment domestic capacity) to finance aggressive entry into the liberalized market and ease the burden of building new capacity there.

In the first case, a punishment strategy "if you enter my market, I enter yours" is sub-game perfect and Pareto-dominates other alternatives. The best option for a government wishing to achieve more competition is to unilaterally open her own market, without insistence for reciprocity, whereas reciprocal opening would retard entry. Under the second scenario, the advantage of recurring to the rents gardened in the home market to subsidize foreign operations depends on the net gain from using the subsidy which is not necessarily positive due to high cost of expanding capacity.

The simple model is extremely useful to understand interaction between ex-monopolists of developed, say OECD, countries but might fail to capture the asymmetry of FDI investment in transition countries so that a more elaborated framework of analysis needs to be created.

Referring to the literature just discussed, in the next pages I shall set up a partial equilibrium model for FDI in the Tlc sector of transition economies.

The structure of the model is based on Aaditya Mattoo, Marcelo Olarreaga and Kamal Saggi (2001), a MIEM that focuses of technology transfer and privatization.

Mattoo, Olarreaga and Saggi (2001)

The original model is once again a three-stage game in partial equilibrium. In the first stage a Government and a MNC bargain to determine the mode of entry of the foreign company into the market; in the second stage, the MNC decides how much technology to transfer and in the third stage companies Cournot-compete facing an inverse demand function q= 1-p for a homogeneous non-tradable good. The model is set up originally for two company, then extended to n companies and it applies to any sector.

Mattoo, Olarreaga and Saggi (2001) show that when a foreign firm faces high costs of technology transfer, it generally prefers direct entry through Greenfield to Acquisition, because such high costs are associated to smaller cost advantage over domestic firms and a high acquisition price. Governments, on the other hand, prefer acquisitions because they lead to a larger extent of technology transfer by the foreign firm and a relatively high acquisition price for the domestic firm. Higher technology transfer under acquisition partly offsets its anti-competitive effect which, when combines with the larger producer surplus under acquisition makes it more attractive relative to direct entry. Thus, when the amount of technology transferred is high, it makes sense for government to restrict direct entry in order to induce acquisition, even in highly concentrated markets, improving welfare in the host country.

If the cost of technology transfer is low, instead, governments tend to prefer Greenfields to Acquisitions. Under this scenario, direct entry is not only associated to a more competitive domestic market, but also brings more technology transfer. Acquisitions, instead, lead to higher concentration and low acquisition prices so that Governments might restrict Acquisitions (equity participation) in domestic firms to induce direct entry, even if markets are relatively competitive.

The model I develop in the following pages, adapt Mattoo, Olarreaga and Saggi (2001) to the Tlc sector by introducing two fundamental modifications.

First of all, it considers explicitly a bell-shaped demand function for Tlc connections that captures network externalities following Rohlfs (1974). By doing this, I remove the

simplifying assumption of a linear inverse demand function, introducing the non-linearities, whose importance has been emphasized by Röller and Waverman (2001).
Secondly, I introduce capacity constraints in the supply of Tlc connection, which have been shown to characterize transition countries, bringing the model close to the Kreps and Scheinkman capacity-quantity game.
I maintain, however, the possibility for the MNC to transfer technology and I study the interaction of these three elements, network externalities, capacity constraints and technology transfer, to determine the equilibrium market outcome of liberalization process of Tlc sector.

Consistently, I begin to construct the network-enriched demand function for Tlc connections in the next paragraph.

3.3 The peculiarities of the Demand for Tlc connections

In order to model entry in the sector a detailed analysis of the atypical features of the demand for Tlc connections is needed to understand what kind of demand function companies providing Tlc connections face.
It is fundamental to point out that the non-tradable good studied hereby is "one connection to a Tlc service" and is thus discrete in nature. The focus is not on modeling the good "use of the Tlc connection" that can be and obviously is normally priced in reality.
In the above mentioned study, for example, Mattoo, Orellaga and Saggi (2001), assume a linear inverse demand function of the form q=1-p and claim that the model of international entry they develop is suitable for the study of FDI entry in service sectors such as Tlc. Their statement is completely correct if the Tlc of *developed* countries are under consideration, but has to be better specified for less developed countries.
In effect, the demand for Tlc connections does not need to be downward sloped over its range of definition as Rohlfs (1974) initially pointed out in his seminal paper[32]. In fact, Tlc access as a good is said to exhibit *network externalities* because the utility that a consumer derives from a communication service increases as others connect to the same service.

[32] Rohlfs, J. (1974), "A Theory of Interdependent demand for Communication Service", *Bell Journal of Economics*, 5:16-37.

This section will explain how the presence of network externalities affects the shape of the demand function for Tlc connections and will put up the demand curve for Tlc used in the following pages, as Oz Shy (2000)[33] does.

In order to define a demand function for Tlc connections, consider a set of potential Tlc customers uniformly indexed by the variable q on the unit interval [0,1] with density $\eta > 0$. Individuals 1, 2, 3, ..., η are assigned an index number $q_1, q_2, q_3, \ldots, q_\eta$ with $q_1=0$, $q_\eta=1$.
A low (high) value of q reflects a high (low) willingness to pay for the connection, meaning that customers with low (high) q place a high (low) evaluation on the good "being able to communicate".

A density function (d.f.) and a cumulative distribution function (c.d.f.) are defined as follows:

d.f. : $\Re \supset [0,1] \rightarrow \Re^+$

c.d.f. : $\Re \supset [0,1] \rightarrow \Re^+$

The density function simply captures the size of the population, namely there exist η consumers. The cumulative distribution function says, for each type q, how many customers exist having index types between 0 and q.
To give an example, there are $\eta/2$ customers (half of the total population) that are indexed on [0, 1/2]. The assumption of uniform distribution of preferences is convenient to keep calculations simple.

Consider the following variables:

$Q \in [0,1]$ total number of customer that actually subscribe to the service,

p connection fee (price) of subscribing to the service,

$Q^e \in [0,1]$ expected number of customers subscribing to the network.

[33] Shy, Oz (2000), *The Economics of Network Industries*, MIT Press.

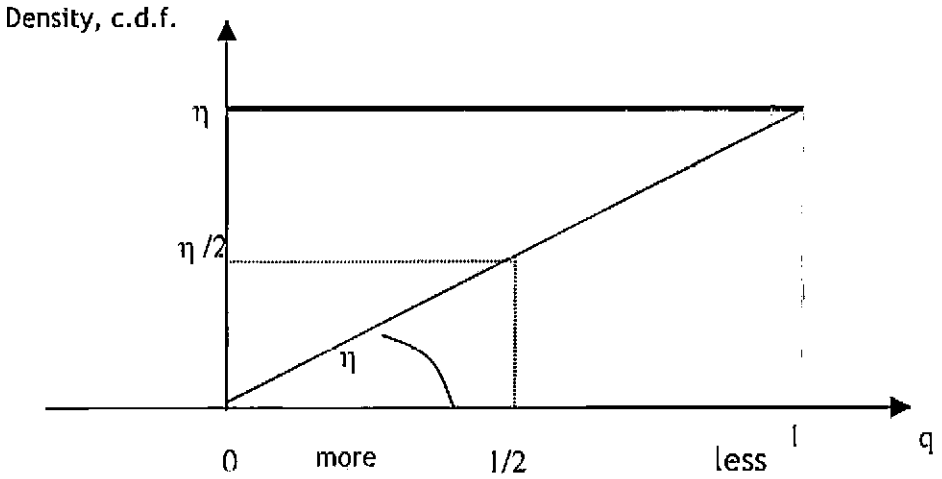


Figure 3.3: Distribution of potential consumers for TLC services (d.f. and c.d.f.)

Then, individual q's utility function is defined as

$$U: \quad \Re \times \Re \supset [0,1] \times [0,1] \rightarrow \Re^{+}$$

and, more specifically,

$$U_q = \begin{cases} (1-q)Q^e - p & \text{if the individual subscribes} \\ 0 & \text{if he does not} \end{cases}$$

The utility function exhibits network externalities because *utility* increases with the expected total number of customers. Utility depends on the identity of the individual and how he evaluates the service (q), on the expected number of subscribers (Q^e), and on the price of the connection. It captures network externalities in consumption because the utility of each individual depends positively on the expected number of subscribers connected to the network. Moreover, the magnitude of $\frac{\partial U(.)}{\partial Q^e}$ depends positively on the individual evaluation of the service (high evaluation = low q).

Consumers aggregate demand for phone services

Consider a peculiar consumer indexed by $\hat{q}$. This individual is indifferent between subscribing and not subscribing to the service, at a given connection fee p.

Thus, for him

$$(1-\hat{q})Q^e - p = 0$$

which implies

$$\hat{q} = \frac{Q^e - p}{Q^e}.$$

Thus, all consumers indexed by $q > \hat{q}$ will *not* subscribe to the service, whereas all consumers indexed by $q \leq \hat{q}$ will do so.

It is assumed that individual have perfect foresight to explain how Q^e is determined.

With such an assumption,

$$Q^e = Q = \eta q .$$

Plugging this expression in the one for $\hat{q}$, the (realized) inverse demand function for Tlc connections can be made explicit.

$$p = (1-\hat{q})\eta\hat{q}$$

which is a quadratic function of $\hat{q}$ and is depicted in the following picture.

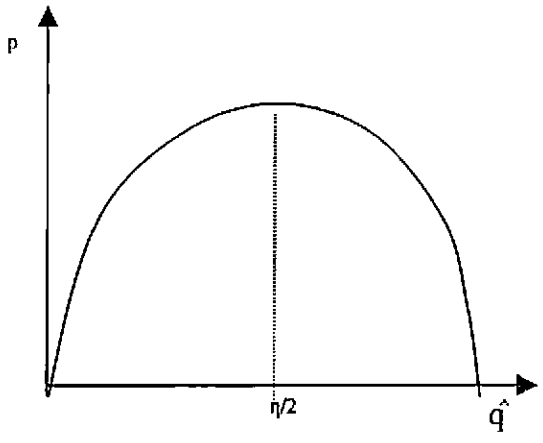


Figure 3.4 Aggregate Demand curve with network externalities in consumption

As Rohlfs (1974) and Economides (1996) have pointed out, this inverse demand function is rather to be considered a *realized* inverse demand function because it is based on the realization of rational expectations.

The intuition behind the curve is the following. At small demand level customers' willingness to pay rises with the total demand, since the network effect dominates the price effect. Once the network size reaches half of the population the negative price effect dominates so that the inverse demand function becomes conventionally downward sloping.

In the following pages, this demand function capturing network externalities will be used, taking into consideration the peculiar nature of the good studies.

3.4 Telecommunication FDI: the set up of the model

As claimed repeatedly, liberalizations, broadly defined, may concretely take different directions, always departing from situations of public monopoly.

Ravi Ramamurti (2000)[34] proposes an informal model concerning privatization and deregulation as options for telecom reform. He defines an initial and a final stage, state-owned monopoly and full competition, respectively, and two intermediate stages through which a country may pass, private monopoly and early competitive structures. His classification actually finds an empirical counterpart in the real world where all these situations have been experienced to various degrees.

It is understood that the primary motivation for Tlc reforms is raising revenues to finance public budget deficits and to collect foreign exchange reserves, that is more for macroeconomic motives than for efficiency reasons.

Many transition countries, especially LA nations privatized their Tlc sectors *without* deregulating sectors, that is allowing entry, thanks to the legal formula of exclusivity rights. Exclusivity rights guarantee investors who buy public telcos that competitors will not be allowed to enter the market for a given time window, typically 6 to 10 years. As a matter of principle, countries could have privatized the telcos and contemporaneously deregulated the sector, but for a number of reasons that are not investigated here, they just opted for a change of ownership first, and thought to reach competitive structures at a later time.

Other transition countries, including China, India and South Korea, instead, deregulated first and *then* (partially) privatized state-owned companies.

Ravamurti (1999) focuses of LA and points out that

[34] Ramamurti, Ravi (2000), "Telecom Reform Options: Privatization Vs. Deregulation", *Columbia Journal of World Business*.

"A final element in the privatization strategy of all countries in LA was permitting foreign ownership in the telephone sector. In all countries but Mexico, foreign investors were also allowed to own a controlling interest in the telephone service firms. Foreign investors were welcomed into this sector, even though they had been shooed away only a few decades earlier, because the countries needed hard currency badly and felt that the telephone sector could not be improved without the technical assistance of Western telephone companied. However, even countries that permitted foreign control required that local partners participate in the consortia that purchased these companies."

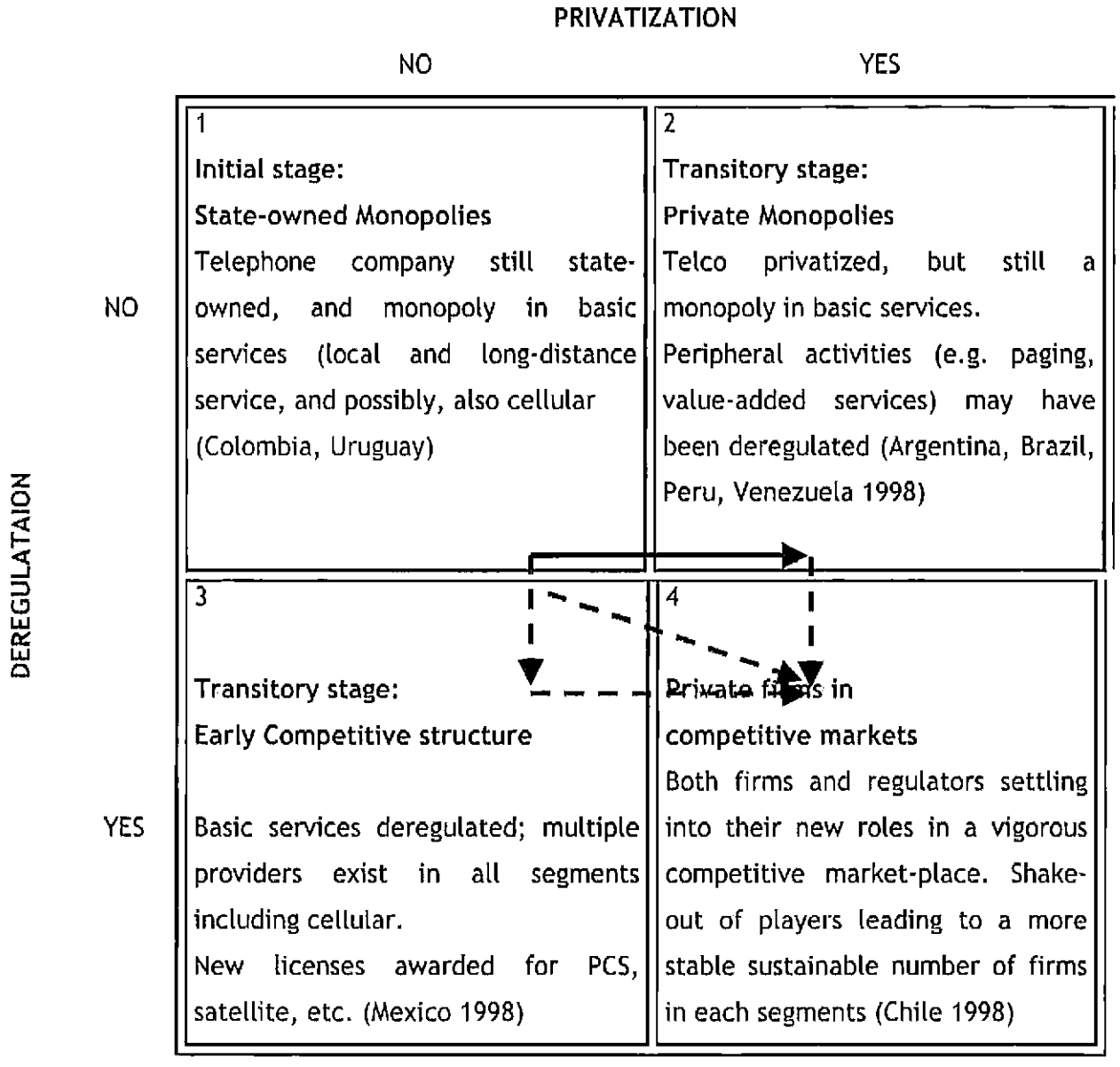


Figure 3.5 Government options in reforming Tlc sector (Ramamurti 2001)

The objective of my model is to explain the different market outcomes deriving from the options Ramamurti explores in order to define a set of evaluation criteria to understand what a government should to carry out *good* liberalization campaigns.

The model I propose tries to compare different market structures resulting from a move from a public monopoly to a market situation where a private entity can operate, for an abstract telecommunication sector. This is possibly the market for wireline connections or the market for wireless connections. In alternative, it would be possible to think about fixed and mobile services as substitutes rather than complements, and imagine that the firms described in the model can offer both wireless and wireline connections so that a firm's supply is the sum of the number of both types. This interpretation of the model is intuitively appealing for developing countries where fixed and mobile services are actually perceived as substitutes, not least by policy-makers.

Description of the game

FDI in the telecommunications sector is modeled as a three-stage game.

In the **first stage**, the government liberalizes the domestic sector.
Typical liberalization processes in transition countries pass through three groups of measures that could be differently combined among themselves: Privatization (selling the state assets), trade liberalization, and FDI liberalization (allowing for new plants to be opened by foreigners, by allowing Greenfield investment and abolishing investment restrictions).
Since Tlc connections are non-tradable goods, only privatization and direct entry through Greenfield FDI matter concretely.

Moreover, the resources required to entry a Tlc market are elevated, so that it reasonable to assume that only foreign companies can afford entry. Foreign firms could be already MNC, having established in other countries, or become MNC by investing abroad for the first time.

Thus, the choice faced by the MNC is to enter the domestic Tlc market through:

1) **Acquisition or partial privatization of the public monopolist [call it Private monopoly or PM]:** The foreign firm MNC can acquire a share σ of the monopolist with the payment of a

privatization fee υ^{PM}; in this case the privatized firm plays as a (maybe partially) private monopolist.

2) **Greenfield FDI [Direct Entry or DE]:** The foreign firm MNC enters directly the market by paying υ^{DE} and setting up her own facilities for the supply of Tlc connections; in this case the incumbent and the entrant compete à la Cournot.

This choice is the result of a bargaining between the MNC and the Government. The two agents consider the following variables:

σ Privatization share

υ^{PM} Privatization fee

ℓ^{PM} Price of the license awarded to the incumbent

ℓ^{DE} Price of a license awarded to the entrant.

π^{PM} Monopoly profits supported by the market under PM (when MNC entry removes the capacity constraint)

$\overline{\pi}_M^O$ Monopoly profits earned by the publicly owned operator under DE (when the public monopolist cannot remove his capacity constraint)

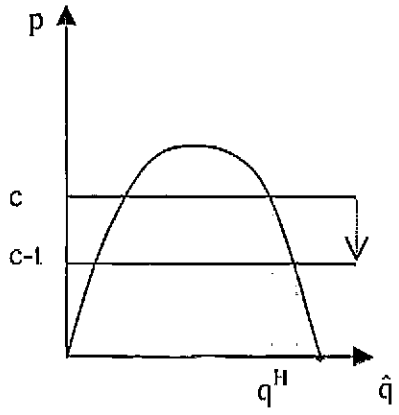
In case of partial privatization that leads to the Private Monopoly (PM) sub-game, the Government accepts any offer (σ, υ^{PM}, ℓ^{PM}) such that:

$$(1-\sigma)\pi^{PM} + \upsilon^{PM} + \ell^{PM} \geq \overline{\pi}_M^O + \ell^{DE}$$

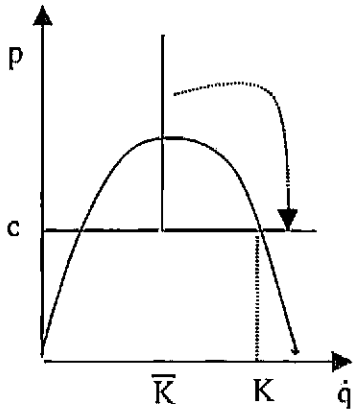
This inequality will be the fundamental relationship explained by the bargaining of paragraph 2.8.

In the second stage, the MNC decides the magnitude of the capacity expansion and the technology transfer. The effect of the MNC choice, resulting from the second stage, is represented graphically in the following graphs.

Technology transfer reduces marginal costs, whereas capacity expansion removes the constraint and allows the market to reach the unbound optimal solution.



Effect of the reduction of marginal costs due to technology transfer

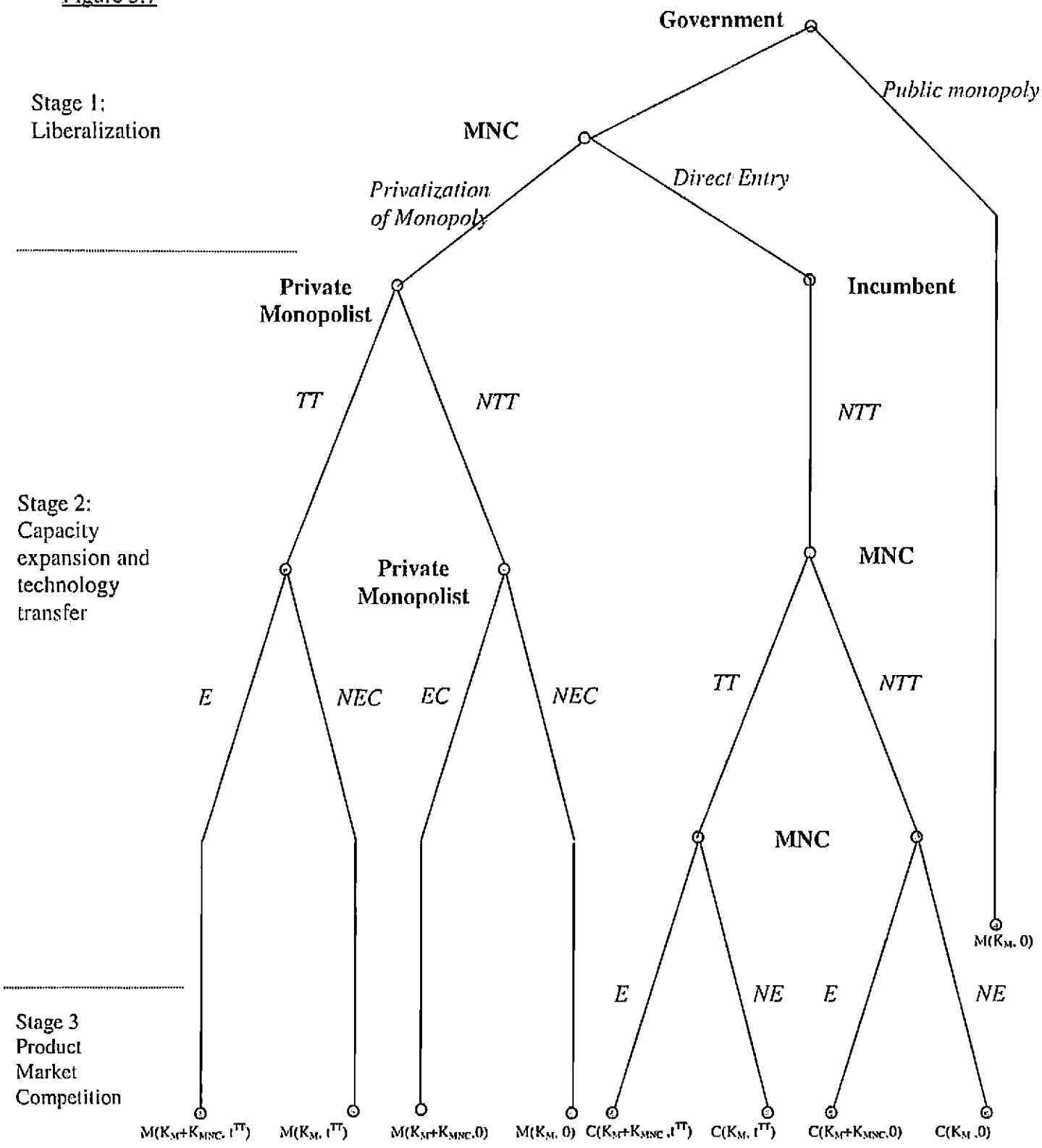


Effect of capacity expansion due to the enlargement of the network

Figure 3.6

In the third stage, depending on the mode of entry as defined in the first stage, either there exist two firms who compete à la Cournot, with possibly asymmetric marginal costs, or the private monopolist alone, reaping monopoly profits.
The tree of the game is represented in figure 3.7.

Figure 3.7



M(. , .) = Monopoly
C (. , .) = Cournot competition
TT = Technology transfer
NTT = No technology transfer
EC = Expansion of capacity
NEC = No expansion of capacity
K_M = Assets of the monopolist (pre-liberalization capacity)
K_{MNC} = Capacity expansion by the Multinational Company

The main assumptions of the model are sketched as follows

H1 [Firms]

I=[M,MNC] is the set of existing firms.

M is a initially state-owned national monopolist in the telecommunications sector.

MNC is a multinational company interested in entering the national market.

H2 [Products]

Firms supply Tlc connections that customers evaluate as perfect substitutes, and that are not tradable at international level.

H3 [Market Demand]

Consumers' decisions are represented and aggregated by the inverse demand function, $p = (1 - \hat{q})\eta\hat{q}$ characterized by consumption network externalities.

H4 [Costs]

The cost function[35] of the i^{th} firm is

$$C_i(\hat{q}_i; K_i) = \begin{cases} F_i + r\eta K_{i_i} + c_i\eta\hat{q}_i & \text{if} \quad 0 \le \hat{q}_i \le K_i \\ \infty & \text{if} \quad \hat{q}_i \ge K_i \end{cases}$$

where

i= M, MNC

c_i = c, c-t

and t is the "amount" of technology transferred by the MNC.

3.5 The domestic public monopoly

The total cost function of the monopolist is assumed to have the following form:

[35] As in Dixit, Avinash (1977), "A model of duopoly suggesting a theory of entry barriers", *Bell Journal of Economics*, 10:1:Spring, 20-32.

$$C_M(\hat{q}; K_M) = \begin{cases} F_M + r\eta K_M + c_M \eta \hat{q} & \text{if} \quad 0 \le \hat{q} \le K_M \\ \infty & \text{if} \quad \hat{q} > K_M \end{cases}$$

where

- F_M is the fixed cost;
- K_M = sup ($\hat{q}$) is the installed capacity; capacity can be thought as being fixed in the short run;
- r is the cost of capital and is exogenously determined;
- c_M=c is the constant marginal cost: for the monopolist, whereas

According to this specification the quantity of connections demanded might actually be higher than the capacity installed by the monopolist. In this case part of the demand will be unsatisfied and some form of rationing will take place. Efficient rationing is assumed.

Once capacity is installed $K_M = \overline{K}_M$ is given and the fixed component of the cost function can be redefined as

$$\Phi_M = F_M + r\,\eta\,\overline{K}_M$$

The monopolist has to take two separate decisions, that are formally a single stage maximization problem but are treated as a two-stage decision, to get an intuitive grasp of what is going on.

First, it has to install capacity and determine the optimal K_M that will allow production and supply of the connections; secondly, given the installed capacity, it has to decide how many connections to provide based on demand.

The monopolist faces an inverse demand function of the form:

$$p = (1 - \hat{q})\eta\hat{q}$$

where $\hat{q}$ and η are defined as in the previous paragraph.

The case of *free* capital is initially studied followed by the introduction of positive costs of installing capacity.

Monopoly problem when installing capacity is costless

In this case, investing in capacity is cost-less and r = 0 so that $\Phi_M = F_M$.

It is assumed that the monopolist can be either capacity constrained or not. Why should a public monopolist be capacity constrained? The economic literature has dealt extensively with the public intervention to re-finance loss-making state-owned companies or entities. The seminal literature is Janos Kornai (1979, 1980)36. According to Kornai (1986), "*the softening of the budget constraint appears when the strict relationship between the expenditure and earnings of an economic unit (firms, household, etc.) has been relaxed, because expenditure will be paid by some other institutions, typically the paternalistic state*".

Thus, Kornai defines the so-called *soft budget constraint* as one economic unit expecting other institutions to pay for its expenditure, being it a clear sign of absence of internalization of the firms' own cost and benefits.

During the 1990s, however, soft budget constraints appear to have hardened, particularly in transition countries.

Emmanuelle Auriol and Pierre M. Picard (2002)[37] model the impact of the government's budget constraint on the optimal industrial policy in industries with increasing returns to scale of development countries and single out telecommunications as a benchmark case.

They point out that, as a matter of fact, privatization processes have been launched in situations of growing public debts and large trade deficits. This has been the case both in developed[38] and in developing countries and would suggest that governments have privatized public assets not because of long run efficiency concerns, but because of critical contingent budgetary conditions. In LDC, privatizations have also been a dominant element of structural adjustment programs: The World Bank and the International Monetary Fund, often include privatization programs as a condition for assistance during debt crisis. Thus, emergency or unsustainable macroeconomic situations, affect the way and the timing privatizations are decided and implemented, and, in turn affect the competitive structure and the sectoral efficiency of a number of economic sectors that have traditionally been public and characterized by soft-budget constraints.

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[36] Janos Kornai (1979), "Resource Constrained versus Demand-constrained Systems", *Econometrica* 47:801-19.
See also Janos Kornai (1980), *Economics of shortage*, Amsterdam: North Holland.

[37] Emmanuelle Auriol and Pierre M. Picard (2002), "Privatizations in Developing Countries and the Government's Budget Constraint", WP, IDEI Toulouse.

If soft budget constraints harden, then companies, not necessarily loss-making but certainly public, do not receive additional money to carry out investment plans from their shareholders, namely the Governments, so that they can actually have installed capacity below the level that would be optimal if the constraint did not hold.

Going back to the model let's suppose, initially, that there are no capacity constraints, i.e. the monopolist can provide *any* number of connections.
Consistently with the cost and the demand function, the profit function is

$$\pi^M(\hat{q}) = p\eta\hat{q} - C_M(\hat{q})$$

In this case, the monopolist problem is to determine $\hat{q}^M$ by solving the following profit maximization problem

$$\max_{\hat{q}}[(1-\hat{q})\eta\hat{q} - c\ ]\eta\hat{q} - \phi_M$$

that has solution

$$\hat{q}_M = \frac{1}{3} + \left(\frac{1}{9} - \frac{c}{3\eta}\right)^{\frac{1}{2}}$$

or

$$\hat{q}_M = \frac{1}{3} + \Psi(c,\eta) \qquad \text{with } \Psi(c,\eta) = \left(\frac{1}{9} - \frac{c}{3\eta}\right)^{\frac{1}{2}}.$$

Monopoly problem with capacity constraints

Now, let's go back to the case with capacity constraints. Informally, one might have two cases depending on the relationship between $\hat{q}_M$ and $\overline{K}$.

If $\hat{q}_M \leq \overline{K}_M$, then the monopolist supplies exactly $\hat{q}^M$ and there exist excess capacity equal to $\overline{K}_M - \hat{q}_M$.

If installing capacity is costly, any unit of capacity installed has a marginal cost of r for the capital invested and it is not optimal to set $\overline{K}_M = K_M > \hat{q}_M$ in the first stage. When there is

[38] As, for example, Japan in 1982 and Italy in 1982.

availability of finance because r = 0, the optimal solution to install $K_M = \hat{q}_M$, that is the solution[39] when profit function is maximized with respect to K_M.

On the contrary, if $\hat{q}_M > \overline{K}_M$, then the monopolist cannot meet all the demand but has to set the supply at $\overline{\hat{q}}_M = \overline{K}_M$, and leave a demand portion equal to $\overline{\hat{q}}_M - \overline{K}_M$, unsatisfied.

It is assumed that capacity constraints are completely exogenous.

Formally, the monopolist solves a constrained maximization problem in the form

$$\max_{\hat{q}}[(1-\hat{q})\eta\hat{q} - c\ ]\eta\hat{q} - \phi_M$$

$$\text{s.t.} \quad \hat{q} \leq \overline{K}_M$$

$$\overline{K}_M < \hat{q}_M = \frac{1}{3} + \left(\frac{1}{9} - \frac{c}{3\eta}\right)^{\frac{1}{2}}$$

or, restated in terms of K_M,

$$\max_{K}[(1-K_M)\eta K_M - c]\eta K_M - \phi_M$$

$$\text{s.t.} \quad K_M < \overline{K}_M$$

$$\overline{K}_M < \frac{1}{3} + \left(\frac{1}{9} - \frac{c}{3\eta}\right)^{\frac{1}{2}}$$

that has (corner) solution

$$K_M = \overline{\hat{q}}_M = \overline{K}_M .$$

The graphical representation of the price-quantity-profit equilibria for the unconstrained and the constrained case are represented in figure 3.8.

[39] A more reasonable solution in economic terms would be to set $\overline{K} > \hat{q}_M$ or $\overline{K} = \hat{q}_M + \varepsilon$, with $\varepsilon > 0$ to take into account the possibility of demand or production shocks.

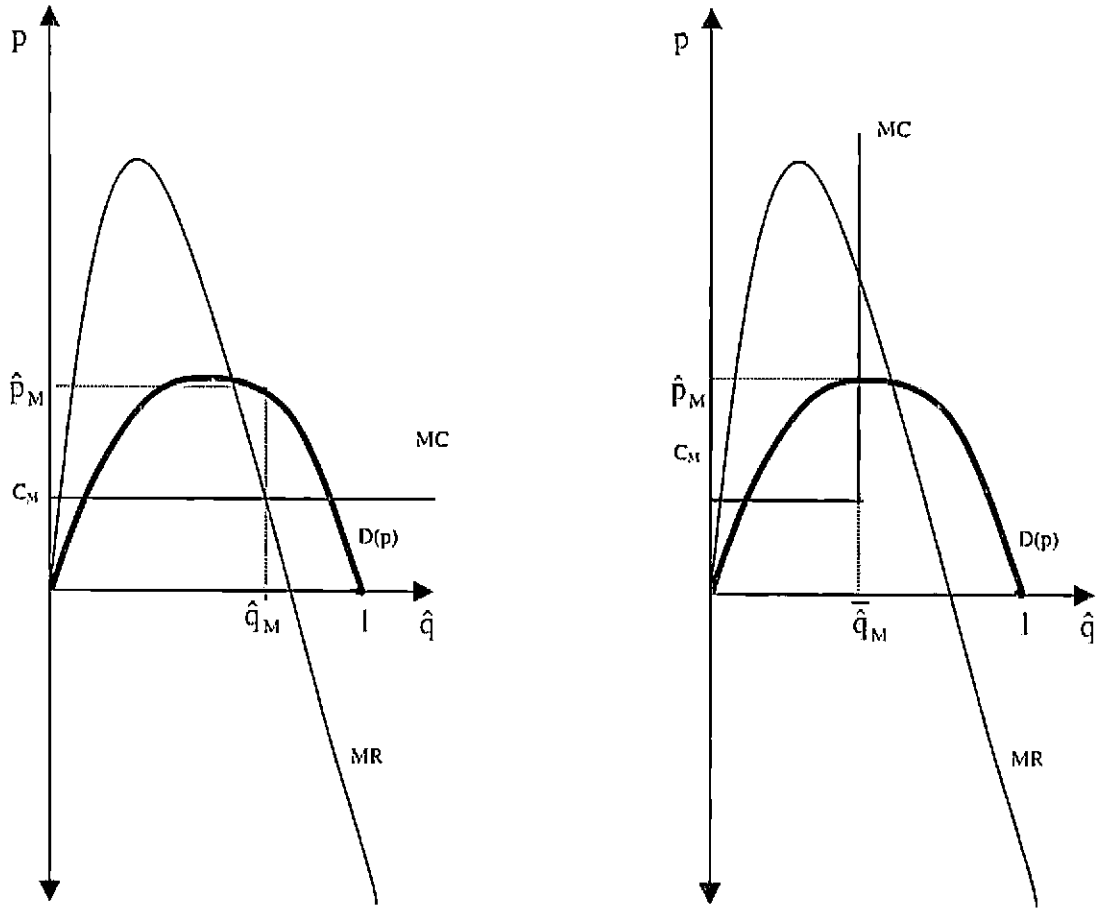

Figure 3.8

It might happen that, if the dimension of the network is small because the installed constrained capacity is limited, the monopolist might easily incur in losses, as depicted in graph 3.9, due to the fact that marginal costs are higher than the price, at low $\hat{q}$.

Thus, profits can be derived by substituting the optimal value in the profit function:

$$\pi^M(\hat{q}) = [(1-\hat{q})\eta\hat{q} - c\ ]\eta\hat{q} - \phi_M$$

to get, without capacity constraints,

$$\pi^M(\hat{q}_M) = (\eta - 4c)\frac{\eta}{9} + (\eta - 2c)\frac{\psi\eta}{3} - \phi_M$$

while, with capacity constraints,

$$\pi^M(\bar{\hat{q}}_M) = \eta^2\overline{K}^3 + \eta(\eta - c)\overline{K}^2 - \phi_M$$

and, necessarily, $\pi^M(\bar{q}_M) \leq \pi^M(\hat{q}_M)$ because $\frac{\partial \pi(.)}{\partial q} > 0$ and $\bar{q}_M \leq \hat{q}_M$.

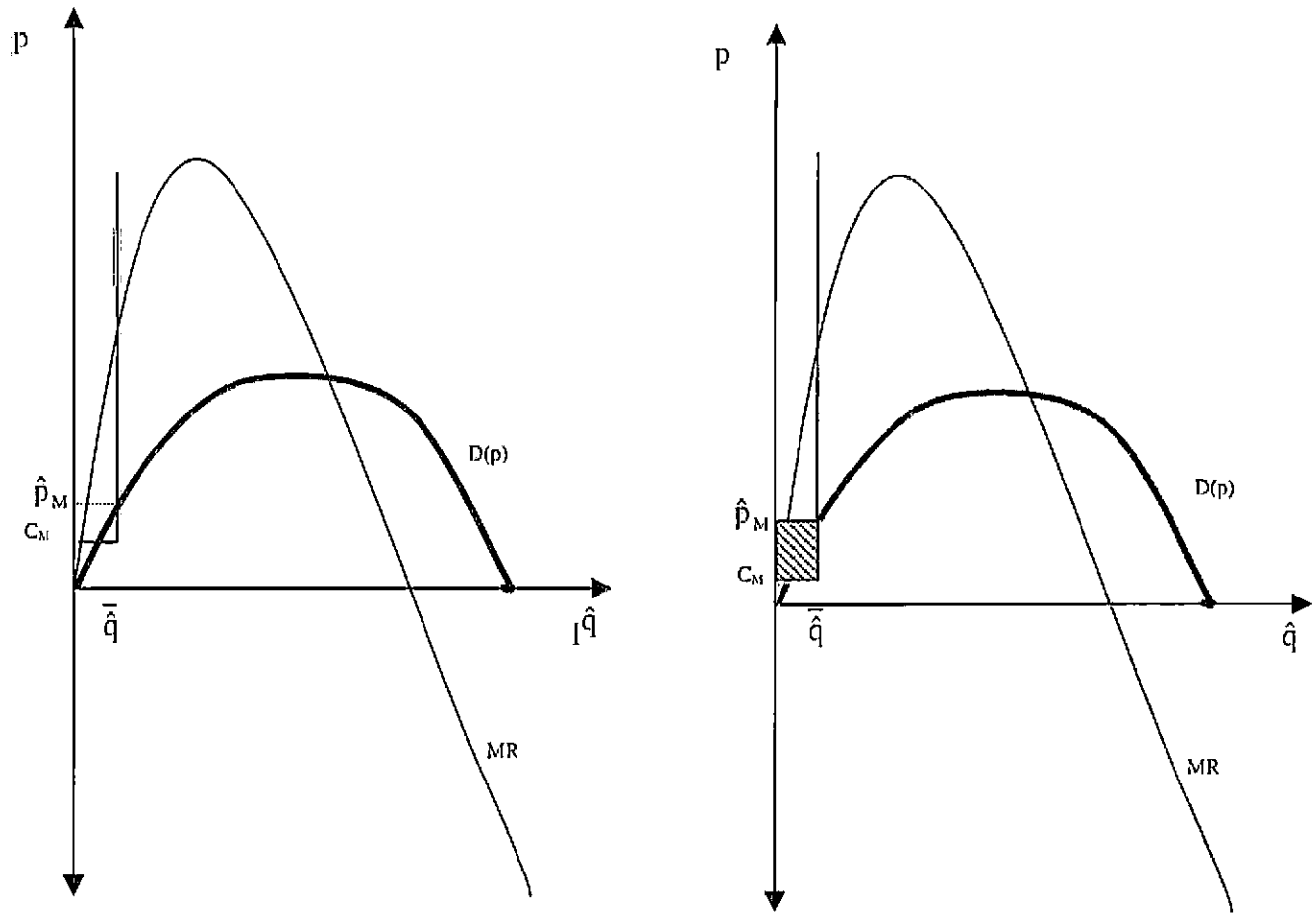

Figure 3.9

Monopoly problem when installing capacity is costly

Now let us examine the more concrete case where $r \neq 0$. The difference is that the marginal costs of installed capacity and production raises to c+r.

When there are **no capacity constraints**, the (free) maximization problem is

$$\max_{K_M}[(1-K_M)\eta K_M - (c+r)]\eta K_M - \phi_M$$

with solution

$$\hat{q}_M = K_M = \frac{1}{3} + \left(\frac{1}{9} - \frac{c+r}{3\eta}\right)^{\frac{1}{2}}$$

or

$$K_M = \frac{1}{3} + \Psi_r(c+r,\eta) \text{ with } \Psi_r(c+r,\eta) = \left(\frac{1}{9} - \frac{c+r}{3\eta}\right)^{\frac{1}{2}}.$$

And profits:

$$\pi^M(\hat{q}_M) = [\eta - 4(c+r)]\frac{\eta}{9} + [\eta - 2(c+r)]\frac{\Psi_r \eta}{3} - \phi_M$$

that are non- negative only if

$$[\eta - 4(c+r)]\frac{\eta}{9} + [\eta - 2(c+r)]\frac{\Psi_r \eta}{3} \geq \phi_M$$

With capacity constraints, the maximization problem takes the form

$$\max_K [(1-K)\eta K - (c+r)]\eta K - \phi_M$$

$$\text{s.t.} \qquad K \leq \overline{K}_M$$

Assuming that

$$\overline{K}_M < \frac{1}{3} + \left(\frac{1}{9} - \frac{c+r}{3\eta}\right)^{\frac{1}{2}}$$

with solution

$$\hat{q}_M = \overline{K}_M = \frac{1}{3} + \left(\frac{1}{9} - \frac{c+r}{3\eta}\right)^{\frac{1}{2}}$$

such that

$$\pi^M(\overline{K}) = \eta^2 \overline{K}_M^3 + \eta[\eta - (c+r)]\overline{K}_M^2 - \phi_M$$

which non negative only if

$$\eta^2 \overline{K}_M^3 + \eta[\eta - (c+r)]\overline{K}_M^2 \geq \phi_M .$$

Graphically, the situation is depicted in Figure 3.10 which is very similar to the previous equilibrium representation except for the modification of the marginal cost.

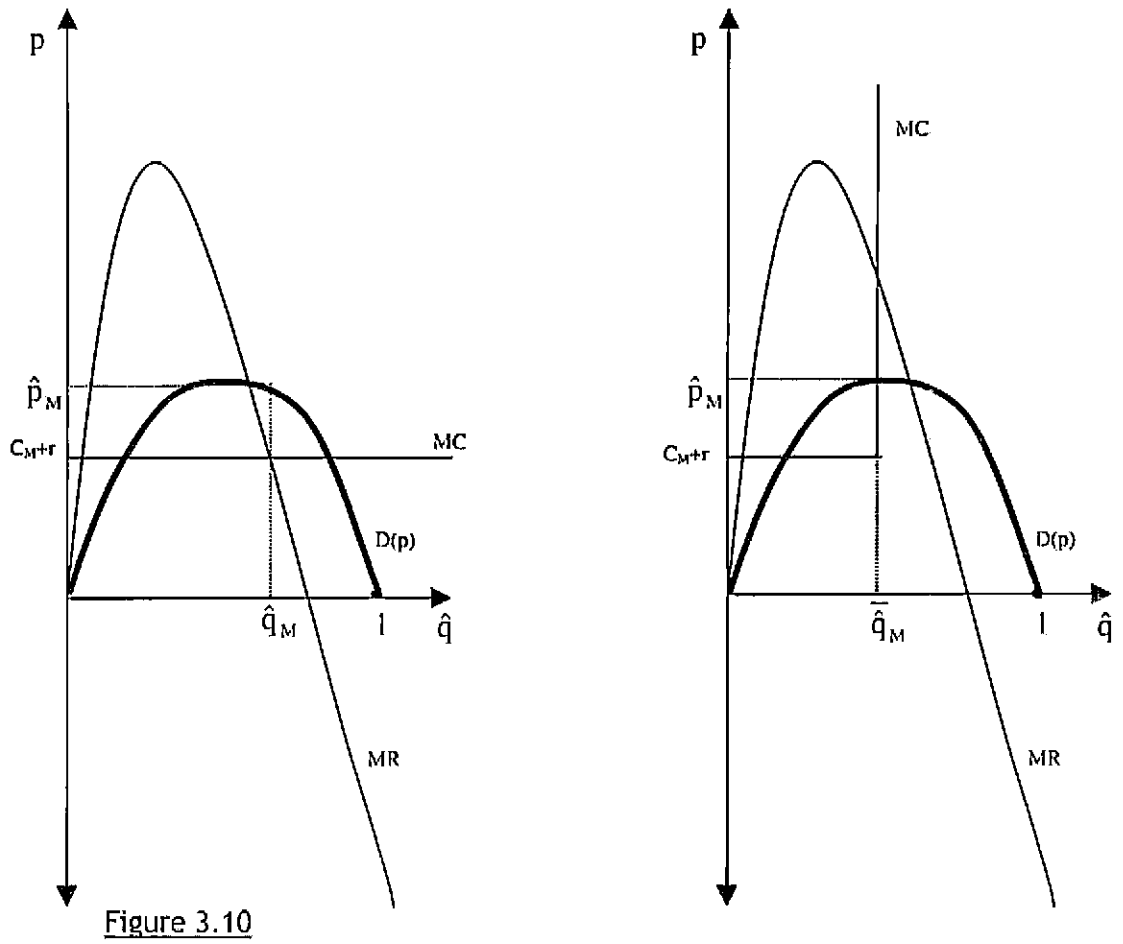

Figure 3.10

Now, let us turn to the case where the MNC enters by acquiring the public monopoly. the government faces two options regarding the liberalization of Tlc supply. It might either privatize the monopoly or let a second competitor enter. It is assumed that the small dimensions of many developing and transition countries might sustain at most two competitors; the analysis can be limited to the duopoly case, accordingly.

3.6 Privatization

The government privatizes a share $\sigma \in [0,1]$ of the monopolist by selling it to a foreign investor. It is assumed that no domestic investor in a developing country is able to take up the financial burden to buy the privatized share of the Tlc operator.

If a Tlc MNC buys a share σ of the public Tlc monopolist, she collects $\sigma\pi^M$ of the monopoly profits[40].

Technology transfer choice

In the second stage, t is determined by maximizing the profit with technology transfer.
The foreign firm can transfer her own proprietary technology. The whole theory of MNC has developed on the idea that MNC have technological advantages due to the ownership of knowledge capital (technologies, brands, patents, and so on), that has the nature of a quasi-public good. It is non-rival in consumption in the sense that the cost of replicating it, is negligible compared the cost of producing it, but it *is* excludable being it a property of MNC. Here, it is assumed that the MNC owns a technology that allows the participated firm to reduce marginal costs by an amount of t. Thus, if the MNC actually transfers technology the new total cost function for the privatized monopolist is

$$C_{PM}(\hat{q}; K_{PM}) = \begin{cases} F_{PM} + r\eta K_{PM} + (c-t)\eta\hat{q} & \text{if} \quad 0 \le \hat{q} \le K_{PM} \\ \infty & \text{if} \quad \hat{q} > K_{PM} \end{cases}$$

Where PM stands for Private Monopoly.
The cost of transferring technology is a quadratic function T(t) of t, a parameter capturing the quantity (α) and the quality (β) of the technology that is transferred,

$$T: \Re^+ \rightarrow \Re^+$$

$$T(t) = \frac{(t)^2\tau}{2}$$

$$t = \alpha\beta \qquad \alpha \ge 0, \beta \ge 0$$

The convexity of the technology transfer cost function depends on the parameter τ:

$$\frac{\partial^2 T(t)}{\partial t^2} = \tau$$

[40] It is assumed that profits can be wholly repatriated, whereas it would also feasible to introduce another parameter λ to capture the share of the profits that can be legally repatriated. In this case, the MNC would actually transfer $\lambda\sigma\pi^M$ back home.

In the case of partial privatization the problem for the MNC is to maximize the profit function modified taking into account technology transfer and the ownership structure of the acquisition:

$$\pi_f^{PM}[\hat{q}_{PM}(t);t;\sigma] = \sigma\pi^{PM}[\hat{q}_{PM}(t);t] - T(t)$$

Without capacity constraints

Given an optimal level of technology t, the problem of the domestic partially privatized monopolist is

$$\max_{\hat{q}}[(1-\hat{q})\eta\hat{q} - (c_{PM} - t)]\eta\hat{q} - \phi_{PM}$$

that has a solution similar to the one found for the public monopolist with a difference in the structure of the marginal cost:

$$\hat{q}^{PM}(t) = \frac{1}{3} + \left(\frac{1}{9} - \frac{(c_{PM} - t)}{3\eta}\right)^{\frac{1}{2}}$$

This solution can plugged in

$$\pi_f^{PM}[\hat{q}_{PM}(t);t;\sigma]$$

The problem of the MNC is then to choose the quantity of technology to transfer to maximize her profits on that market:

$$\max_{t} \sigma\pi^{PM}[\hat{q}_{PM}(t);t] - T(t)$$

or

$$\max_{t} \sigma\left\{[\eta - 4(c_{PM} - t)]\frac{\eta}{9} + [\eta - 2(c_{PM} - t)]\frac{\eta}{3}\left(\frac{1}{9} - \frac{c_{PM} - t}{3\eta}\right)^{\frac{1}{2}} - \phi_M\right\} - T(t)$$

The First Order Condition (FOC)

$$\left[\frac{2}{3}+\frac{t^{PM}}{6\eta\left(\frac{1}{9}-\frac{c_{PM}-t^{PM}}{3\eta}\right)^{\frac{1}{2}}}+\left(\frac{1}{9}-\frac{c_{PM}-t^{PM}}{3\eta}\right)^{\frac{1}{2}}\right]\eta^2-\frac{3t^{PM}\tau}{2\sigma}=0$$

Defines implicitly the optimal level of technology t^{PM} as a function of the ownership share σ.

The second order condition for t^{PM} being argmax π_r^{PM} is

$$\left[\frac{1}{3\eta\left(\frac{1}{9}-\frac{c_{PM}-t}{3\eta}\right)^{\frac{1}{2}}}-\frac{t}{4\eta[\eta-3(c_{PM}-t)]\left(\frac{1}{9}-\frac{c_{PM}-t}{3\eta}\right)^{\frac{1}{2}}}\right]\eta^2-\frac{3}{2\sigma}t<0$$

that always holds for η big enough.

Moreover, for a large η, it is easy to show that the FOC boils down to

$$\frac{\sigma\eta}{3}-t^{PM}\tau=0$$

and

$$t^{PM}=\frac{1}{3\tau}\sigma\eta$$

With

$$\frac{\partial t^{PM}}{\partial\sigma}=\frac{\eta}{3\tau}>0.$$

Using the implicit function theorem, one can derive the exact relationship between σ and t. Simulation results using consistent parameter values show that such a relation is positive as in Mattoo et al. (2001).

RESULT 1

The technology transferred by the MNC increases wits her share of ownership:

$$\frac{\partial t^{PM}}{\partial \sigma} > 0$$

RESULT 2

The technology transferred by the MNC increases wits size of the population:

$$\frac{\partial t^{PM}}{\partial \eta} > 0$$

With capacity constraints, maximization problem solved by the MNC is

$$\max_{t} \sigma \pi^{PM}[K_{PM}(t); t] - T(t)$$

$$\text{s.t.} \qquad K \leq \overline{K}$$

Once again it is assumed that

$$\overline{K} < \frac{1}{3} + \left(1 - \frac{c_M + r - t}{3\eta}\right)^{\frac{1}{2}}$$

whose solution is defined implicitly by

$$\frac{2}{3} + \frac{t^{PM}}{6\eta\left(\frac{1}{9} - \frac{c_{PM} + r - t^{PM}}{3\eta}\right)^{\frac{1}{2}}} + \left(\frac{1}{9} - \frac{c_{PM} + r - t^{PM}}{3\eta}\right)^{\frac{1}{2}} - \frac{3t^{PM}\tau}{2\sigma} = 0.$$

This equilibrium is depicted in figure 3.11 where the darker shaded area represents the gross profit before technology transfer and capacity expansion, while the lighter shaded area is the profit after the implementation of the decisions taken by the MNC in the second stage.

The technology transfer has the effect of lowering the marginal cost as in figure 3.6 and increasing the number of connection supplied in equilibrium. Besides transferring technology and lowering marginal costs however, the foreign company has the financial resource to invest and expand capacity to the optimal level, removing the constraint the public monopolist was facing before privatization.

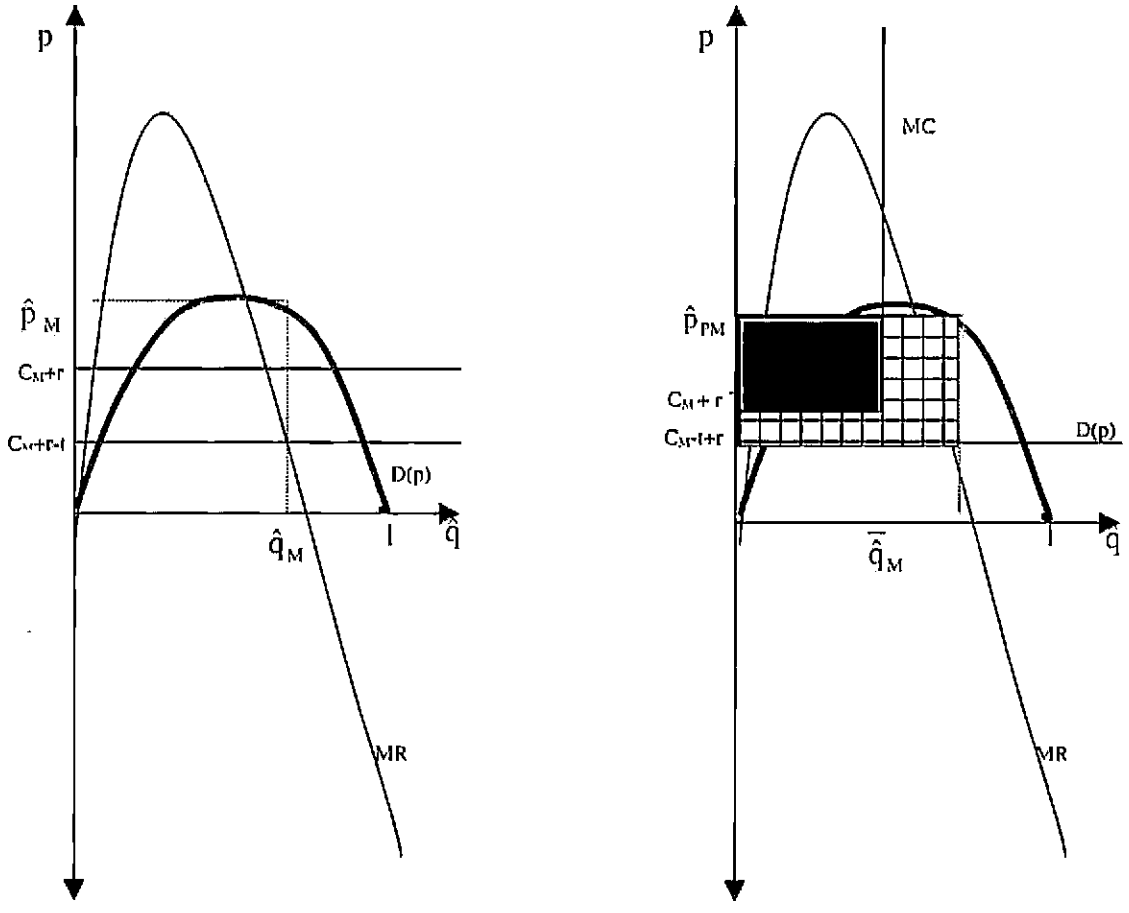

Figure 3.11

3.7 Direct Entry

The second option that the Government could explore to liberalize entry is letting a second operator into the market. In the Tlc sector a whole set of regulatory problems arise, concerning interconnection and access to existing networks as discussed in the previous chapters. The approach taken here is to assume away all regulatory problem and focus on a simplest framework of entry.

Direct entry is modeled as a Greenfield FDI, wherein the foreign firm establishes a new wholly-owned company that begins to compete with the domestic firm. The domestic firm is still publicly owned, is capacity constrained and cannot afford the marginal-cost-reducing technology, whilst the MNC can transfer technology and has free access to financing at rate r, to set up the supply of new connections and expand the capacity of the market.
It is assumed that companies compete à la Cournot on the quantities, after the duopoly is set up with the establishment of the new company.

Cournot duopoly with no capacity constraints

In the third stage, capacity and technology are given and firms compete à a Cournot.

Each duopolist i = M , MNC maximizes a profit function that takes into account the effect of the quantity produced by the competitor on her own marginal revenue.
As a matter of fact, ϕ_{MNC} and ϕ_M can be different.
The ex-monopolist solves

$$\max_{\hat{q}_M}[(1-\hat{q}_M-\hat{q}_{MNC})\eta(\hat{q}_M+\hat{q}_{MNC})-(c_M)]\eta\hat{q}_M-\phi_M$$

with FOC

$$[-3\hat{q}_M^2+2(1-2\hat{q}_{MNC})\hat{q}_M+(\hat{q}_{MNC}-\hat{q}_{MNC}^2)]\eta^2-c\eta\hat{q}_M=0 \qquad (a)$$

and SOC

$$-3\hat{q}_M+2-4\hat{q}_{MNC}<0$$

and the MNC that penetrates the transition country via Direct Entry solves:

$$\max_{\hat{q}_{MNC}}[(1-\hat{q}_M-\hat{q}_{MNC})\eta(\hat{q}_M+\hat{q}_{MNC})-(c_{MNC}-t)]\eta\hat{q}_{MNC}-\phi_{MNC}$$

with FOC

$$[-3\hat{q}_{MNC}^2+2(1-2\hat{q}_M)q_{MNC}+(\hat{q}_M-\hat{q}_M^2)]\eta^2-(c_{MNC}-t)\eta\hat{q}_{MNC}=0 \qquad (b)$$

and SOC

$$-3\hat{q}_{MNC}+2-4\hat{q}_{M}<0$$

SOCs for maximum hold whenever the following conditions hold jointly:

$$\begin{cases}\hat{q}_{M}\geq\frac{1}{5}\\ \hat{q}_{MNC}\geq\frac{1}{5}\end{cases}.$$

Solving the non-linear system given by equations (a) and (b) gives the explicit form of the reaction functions:

$$\hat{q}_{M}=R(\hat{q}_{MNC})=\frac{1}{3}(1-2\hat{q}_{MNC})\pm\frac{1}{3}\sqrt{1+\hat{q}_{MNC}^{2}-\hat{q}_{MNC}-\frac{3c}{\eta}}$$

$$\hat{q}_{MNC}=R(\hat{q}_{M})=\frac{1}{3}(1-2\hat{q}_{M})\pm\frac{1}{3}\sqrt{1+\hat{q}_{M}^{2}-\hat{q}_{M}-\frac{3(c-t)}{\eta}}$$

Because of the non-linearity of the demand function, each optimization actually implies *two* reaction functions. Figure 3.12 plots the qualitative behavior of the reaction functions for of the ex-monopolist for sensible values of the parameters c_i and η. Letting η grow, the two possible reaction functions of the firm diverge.

For both the ex-monopolist and the MNC only the "+" solution is assumed, so that:

$$\hat{q}_{M}=R(\hat{q}_{MNC})=\frac{1}{3}(1-2\hat{q}_{MNC})+\frac{1}{3}\sqrt{1+\hat{q}_{MNC}^{2}-\hat{q}_{MNC}-\frac{3c}{\eta}}$$

$$\hat{q}_{MNC}=R(\hat{q}_{M})=\frac{1}{3}(1-2\hat{q}_{M})+\frac{1}{3}\sqrt{1+\hat{q}_{M}^{2}-\hat{q}_{M}-\frac{3(c-t)}{\eta}}$$

It is fairly tough to find an explicit solution for the quantities produced by the duopolists in equilibrium. However, it is reasonable to assume η big once again, so that the solution converges rapidly to $q_{MNC}^{o}=q_{M}^{o}+\varepsilon>q_{M}^{o}\equiv 0{,}439$.

What happens if the ex-monopolist is capacity constrained, and the constraint cannot be removed as it has been assumed for transition countries?

Then the quantity of connections supplied by the monopolist might be lower or higher than q_{M}^{o}.

The optimal quantity supplied by the monopolist would be then:

$$\begin{cases} q_M^o & \text{if} \quad \overline{K} \geq q_M^o \\ \overline{K} & \text{if} \quad \overline{K} < q_M^o \end{cases}$$

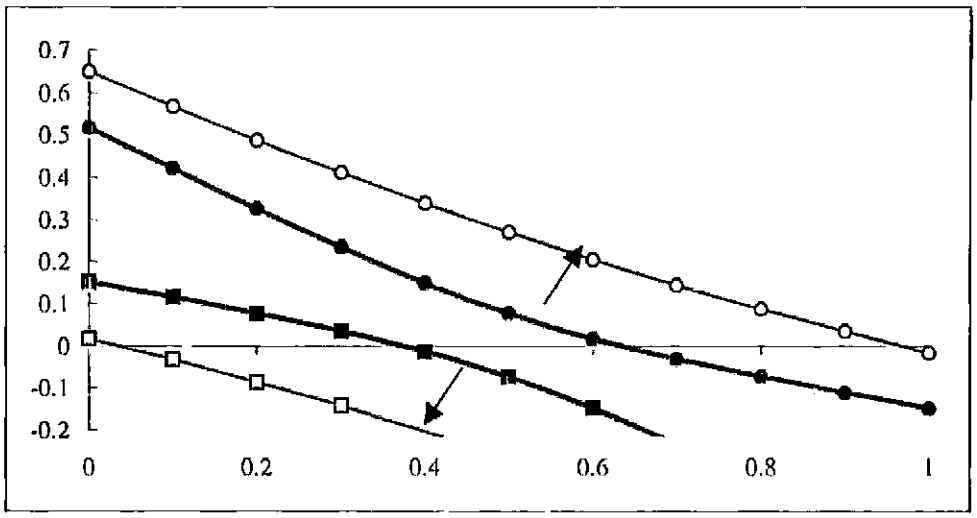

Figure 3.12

In the first case, the situation boils down to the equilibrium market outcome just discussed.

In the second case, instead, the ex-monopolist has a fixed capacity with no financial resources to expand, let alone block or prevent the competitor from entering.

Thus, the competitor actually faces a residual demand function and could behave like a monopolist on the residual demand, capture all the potential users who are not connected to the network. As a matter of principle, the MNC has now the option of maximizing the residual demand (the one not served by the ex de-jure monopolist, as a de facto monopolist) or capturing the oligopoly profits of her competitor on the number of connections not provided due to the capacity constraint. If there were no capacity constraint, the ambiguity could be solved by adding an additional hypothesis about the existence of switching costs. In the case studied here, however, the ex-monopolist *is* constrained at $\overline{K} < q_M^o$ and the entrant solves for the residual demand as an actual monopolist (with a superior technology), setting

$$\overline{\hat{q}}_{MNC}^{o} = \hat{q}^{M} - \overline{K}_M = \frac{1}{3} + \left(\frac{1}{9} - \frac{c + r - t}{3\eta} \right)^{\frac{1}{2}} - \overline{K}_M$$

while the ex-monopolist sets

$$\overline{\hat{q}}_M^o = \overline{K}_M$$

and the total number of connection offered on the market is

$$\bar{\hat{q}}^{o}_{MNC} + \bar{\hat{q}}^{o}_{M} = \hat{q}^{M} - \bar{K}_{M} + \bar{K}_{M} = \frac{1}{3} + \left(\frac{1}{9} - \frac{c + r - t}{3\eta}\right)^{\frac{1}{2}}$$

which is the same quantity offered by a private monopolist willing to improve the technology and reduce the marginal cost. This equilibrium is depicted in figure 3.13.

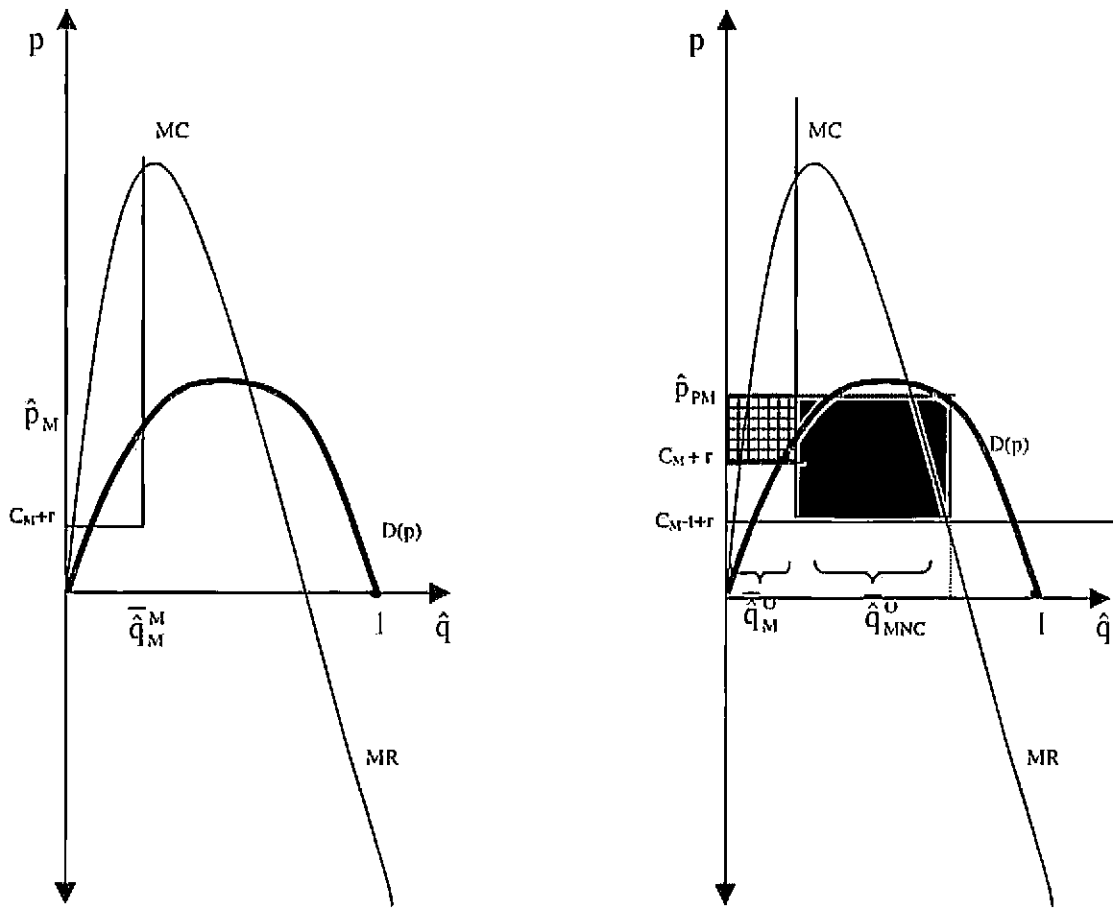

Figure 3.13. Oligopoly equilibrium when the public ex-monopolist is capacity constrained

3.8 Government-MNC Bargaining

Let's now go back to first stage and see how the Government who decides to liberalize can behave.

Consider the following variables:

- σ Privatization share
- υ^{PM} Privatization fee
- ℓ^{PM} Price of the license awarded to the incumbent
- ℓ^{DE} Price of a license awarded to the entrant.
- π^{PM} Monopoly profits supported by the market under PM (when MNC entry removes the capacity constraint)
- $\overline{\pi}_M^O$ Monopoly profits earned by the publicly owned operator under DE (when the public monopolist cannot remove his capacity constraint)

In case of partial privatization that leads to the Private Monopoly (PM) sub-game, the Government accepts any offer (σ, υ^{PM}, ℓ^{PM}) such that:

$$(1-\sigma)\pi^{PM} + \upsilon^{PM} + \ell^{PM} \geq \overline{\pi}_M^O + \ell^{DE} \quad \text{(a)}$$

It is reasonable to assume that the price of the license award to every operator is similar, so that

$$\ell^{PM} \cong \ell^{DE}$$

and (a) boils down to

$$(1-\sigma)\pi^{PM} + \upsilon^{PM} \geq \overline{\pi}_M^O$$

If the MNC has all the bargaining power, then the inequality is binding in equilibrium:

$$\upsilon^{PM} = \overline{\pi}_M^O - (1-\sigma)\pi^{PM}.$$

The MNC makes an offer $(\sigma,\ \upsilon^{PM})$, based on the following optimization problem:

$$\max_{\sigma,\upsilon}\left\{\sigma\pi^M\left[t^{PM}(\sigma)\right] - T\left(t^{PM}(\sigma)\right) - \upsilon^{PM}\right\}$$

$$\text{s.t. } \upsilon^{PM} = \overline{\pi}_M^O - (1-\sigma)\pi^{PM}$$

or,

$$\max_{\sigma}\left\{\sigma\pi^M\left[t^{PM}(\sigma)\right] - T\left(t^{PM}(\sigma)\right) + (1-\sigma)\pi^{PM}\left[t^{PM}(\sigma)\right] - \overline{\pi}_M^O\left[t_M^O\right]\right\}$$

or, equivalently,

$$\max_{\sigma}\left\{\pi^{PM}\left[t^{PM}(\sigma)\right] - \overline{\pi}_M^O\left[t_M^O\right] - T\left[t^{PM}(\sigma)\right]\right\}$$

that has FOC

$$\frac{\partial\pi^{PM}}{\partial\hat{q}}\cdot\frac{\partial\hat{q}}{\partial t^{PM}}\cdot\frac{\partial t^{PM}}{\partial\sigma} - \frac{\partial T}{\partial t^{PM}}\cdot\frac{\partial t^{PM}}{\partial\sigma} = 0$$

or

$$\left[\frac{\partial\pi^{PM}}{\partial\hat{q}}\cdot\frac{\partial\hat{q}}{\partial t^{PM}} - \frac{\partial T}{\partial t^{PM}}\right]\cdot\frac{\partial t^{PM}}{\partial\sigma} = 0$$

where the term in brackets is null because of the envelope theorem[41]. Thus, the problem has a corner solution $\sigma^{PM} = 1$, because $\cdot\frac{\partial t^{PM}}{\partial\sigma} > 0$.

[41] t^{PM} has been found exactly by optimizing π^{PM};

RESULT 3

In equilibrium, $\sigma^{PM} = 1$ and $\upsilon^{PM} = \overline{\pi}_M^O$. The MNC who has all the bargaining power fully acquires the incumbent by paying a fee equal to the profits that the public duopolist would yield in a hypothetical alternative oligopoly

The result confirms Mattoo et. al. (2002), and depends crucially on the assumption that all the bargaining power lies in the hands of the MNC.

Intuitively, the full acquisition makes the MNC reap the monopoly profits the market can sustain *after* capacity expansion. Under Direct Entry, instead, the public monopolist would still be there and make positive profits by producing the (constrained) quantity $\overline{K} = \overline{\hat{q}}_M^O$.

3.9 Domestic Welfare, policy implications and extensions

As a matter of principle, there are three elements the Government must take into consideration when choosing the design of the liberalization process, allowing entry, either partial or full privatization of the public monopolist or direct entry of a second operator: quantities, prices and revenues from de-regulation (privatization fees and licenses).

Under both alternatives, it has been pointed out previously that the total number of connections supplied to the market is the same in both equilibria, as well as the market price, i.e. quantity and prices of monopoly as determined in the capacity-quantity sub-games. This results stems straight out of the realistic hypothesis that the country experiences capacity constraints in the supply of Tlc connection. Mattoo, Olarreaga and Saggi, on the contrary, emphasize that Direct Entry is always optimal as compared to Acquisition under the assumption in their model, but they assume away capacity costraints.

The result obtained here, instead, highlights the role of MNC in removing the capacity constraint in the domestic market. Allowing entry either through privatization or de-monopolization is always better that continuing the constrained public monopoly.

Let us consider prices now. In this setting, prices after liberalization are the same under both direct entry and acquisition.

However, they could be either higher or lower than the original prices charged when capacity constraints were binding. In particular, the more serious the constraint the most likely is that final equilibrium prices are higher than before the liberalization process. This result depends mainly on the assumption of an inverse U-shaped demand function and would not

characterize the market outcome under the assumption of a monotonically decreasing demand function.

This leaves room to a number of considerations about the importance of regulatory authorities to discipline the pricing mechanism of the Tlc providers, for which we refer to paragraph 1.1 and 1.3.

A natural extension of the model would be to repeat the game once.

Imagine that the outcome of the first game is acquisition. Then, the duopoly is formed by a constrained public ex-monopolist and a technology-rich foreign-owned firm.

Then, imagine that the first time the game is played the Government does not want to introduce a completely private duopoly because it is competing with other Governments to attract the MNC, so that it decides to allow either direct entry or privatization but not both (which might explain also why the MNC has all the bargaining power).

The Government could still decide to privatize the public monopoly at a later date, *after* the foreign owned company has entered, begun to transfer technology and expanded capacity. At this point, the entrance of a second operator through Greenfield FDI would imply a standard duopoly market structure where none of the companies is capacity constrained. In this case, it can be shown that the oligopolists would split the profits sustained by the market almost evenly.

By delaying entrance of a second operator the Government obtains the complete removal of the capacity constraints, the transfer of technology, the privatization fees, the entry fees and manages to reach a Pareto-superior equilibrium by which prices are lower and quantities are higher than they would be otherwise under the circumstances detailed in this chapter.

However, this strategy is not risk-less because the Government might be too weak from an institutional point of view to pursue the public national interest independently of the pressures of the established operator. This political economy argument might explain, in turn, why back in the 1980s and early 1990s many Governments of transition and less developed countries have granted exclusivity periods or delayed privatization until more contingent needs of fresh cash have forced them to move intensify the liberalization by allowing further entries.

References

Aghion, Philippe, and Mark Schankerman (2000), "A model of market enhancing infrastructure", CEPR Discussion Paper No. 2462.

Aghion, Philippe, and Jean Tirole (1997), 'Formal and Real Authority in Organizations'" *Journal of Political Economy*, 105:1:1-29.

Aschauer, David Alan (1989), "Is Public Expenditure productive?", *Journal of Monetary Economics*, 23:2:March.

Auriol, Emmanuelle, and Pierre M. Picard (2002), "Privatizations in Developing Countries and the Government's Budget Constraint", WP, IDEI Toulouse.

Baldwin, Richard, and Gianmarco Ottaviano (2001), "Multi-product Multinationals and reciprocal FDI dumping", *Journal of International Economics*, 54:429-448.

Balsameda, Manuel (1996), "Simultaneity Bias and the Rate of Return on Public Capital", Centro de Eastudios Monetarios y Financieros, WP.

Bjorvatn, Kjetil (2001), "On the profitability of cross-border mergers", NHH Discussion Paper No.14-2001.

Brainard, Lael (1993), "A Simple Theory of Multinational Corporations and Trade with a trade-off between Proximity and Concentration", NBER WP No. 4269.

Brander, J. and Paul Krugman (1983), "A 'reciprocal dumping' model of international trade", *Journal of International Economics*, 15:313-323.

Contessi, Silvio, and Claudia Guagliano (2002), "Modes of International Entry in theory and practice: A survey", ISLA Bocconi University, mimeo.

Dixit, Avinash (1977), "A model of duopoly suggesting a theory of entry barriers", *Bell Journal of Economics*, 10(1), Spring 1979, 20-32.

Dunning, J. H. (1977), "Trade, Location of economic Activities and the MNE: A search for an Eclectic Approach" in B. Ohlin, P.O. Hesselborn and P.M. Wijkma Ed., *The International Allocation of Economic Activity*, London, McMillan, page 395-418.

Economides, Nicholas (1996), "Network Externalities, Complementarities, and Invitations to Enter", *European Journal of Political Economy*, 12:211-232.

Edward Graham (2001), "Subsidies, Market Closure, Cross-Border Investment, and Effects on Competition: The Case of FDI in the Telecommunications Sector", Institute for International Economics Working Paper 2001-2.

Falzoni, Anna (2000), "Statistics on Foreign Direct Investment and Multinational Corporations: A Survey", CEPR data survey.

Fridolfsson, Sven-Ohlof. and Johan Stennek (1999), "Why Mergers reduce Profits, and Raise Share Prices", IUI Stockholm WP No. 511-1999.

Garcia-Mila, T. and Toby J. McGuire (1992), "The contribution of Publicly Provided Inputs to States' Economies", *Regional Science and Urban Economics*, 22:2:June.

Görg, Holger (2000), "Analysing foreign market entry: The choice between greenfield investment and acquisitions", *Journal of Economic Studies*, 27:3, 165-181.

Greenstein, Shane and Pablo T. Spiller (1996), "Estimating the Welfare Effects of Digital Infrastructure", NBER WP No. 5770.

Grossman, Gene M., and Elhanan Helpman (2002), "Managerial Incentives and the International Organization of Production", Harvard University, mimeo.

Hardy, Andrew (1980), "The Role of Telephone in Economic Development", *Telecommunications Policy*, 4:4:278-86.

Helpman, Elhanan, Marc N. Melitz and Stephen Yeaple (2002), "Trade versus FDI", Harvard University, mimeo.

Helpman, Elhan (1984), "A Simple Theory of Trade with Multinational Corporations", *Journal of Political Economy*, 92:June:451-71.

Holtz-Eakin, Douglas (1993), "State-Specific Estimates of State and Local Government Capital", *Regional Science and Urban Economics*, 23:2:April.

Holtz-Eakin, Douglas (1994), "Public Sector Capital and the Productivity Puzzle", *Review of Economics and Statistics*, 76:1:February.

Horn, Henrink and Lars Svensson (2001), "The equilibrium ownership of an International Oligopoly", *Journal of International Economics*, 53: 2.

Horn, Henrik and James Levinsohn (2001), "Merger Policy and Trade Liberalization", *Economic Journal*, April 2001.

Horn, Henrik and Lars Persson (2001), "Endogenous Mergers in Concentrated Markets", *International Journal of Industrial Organization*, 2001.

Horn, Henrik and Lars Persson (2001), "The Endogenous Structure of an International Oligopoly", *Journal of International Economics*, 53:April.

Horn, Henrik and Lars Persson (2002), "Cross Border Acquisitions and Greenfield entry", IUI WP No. 570-2002

Horstman, Ignatius, and James Markusen (1987), "Licensing Versus Direct Investment: A Model of Internalization by the Multinational Enterprise", *Canadian Journal of Economics*, 20:August:464-81.

Horstman, Ignatius, and James Markusen (1992), "Endogeneous Market Structure in International Trade", *Journal of International Economics*, 32:109-29.

Hulten, Charles R. (1994), "Optimal Growth with Infrastructures Capital : Implications for Empirical Modelling", University of Maryland WP.

Kelejian, Harry H. and Dennis P. Robinson (1994), "Infrastructure Estimations and Its Underlying Economics Specifications: A Sensitivity Analysis", *Papers in Regional Science*, 76:1:June:115-32.

Kendall, Toby and Cillian Ryan (2002), "Regional Economic Integration, Mergers and FDI", Paper presented at the 2002 EARIE Conference held in Madrid in September 2002.

Kornai, Janos (1979), "Resource Constrained versus Demand-constrained Systems", *Econometrica*, 47:801-19.

Kornai, Janos (1980), *Economics of shortage*, Amsterdam: North Holland

Madden, Gary and Scott J. Savage (1998), "CEE telecommunications investment and economic growth", *Information Economics and Policy*, 10:173-195.

Markusen, James (1984), "Multinationals, Multi-Plant Economics, and the Gains from Trade", *Journal of International Economics*, 16:May:205-26.

Markusen, James R. (1995), "The Boundaries of Multinational Enterprises and the Theory of International Trade", *Journal of Economic Perspectives*, 9:2:Spring, 169-190.

Markusen, James, and Tony Venables (1996), "The Increased importance of Multinationals in North American Economics relationships: A Convergence Hypothesis", in Canzoneri, Matthew, Wilfred J. Ethier, and Vittorio Grilli Ed., *The New transatlantic Economy*, Cambridge University Press.

Marin, Dalia and Thierry Verdier (2001), "Power inside the Firm and the Market: A General Equilibrium Approach", University of Munich and DELTA, Paris, mimeo.

Marin, Dalia, and Thierry Verdier (2002), "Globalization and the Empowerment of Human Capital", University of Munich and DELTA, Paris, mimeo.

Marin, Dalia, and Thierry Verdier (2003), "Globalization and the 'New Enterprise' ", *Journal of the European Economic Association*, 1.

Maskin, Eric and Chenggang Xu (2001),"Soft budget constraint theories: From centralization to the market", *Economics of Transition*, Volume 9(1) 2001, 1-27.

Mattoo, Aaditya, Marcelo Olarreaga and Kamal Saggi (2001), "Mode of foreign entry, technology transfer, and FDI policy", World Bank Working Paper No. 3182 wps2737.

Motta, Massimo (1992), "Multinational Firms and the Tariff-Jumping Argument", *European Economic Review*, 22:1/2:December:41-56.

Motta, Massimo (1994), "International Trade and Investment in Vertically Differentiated Industries", *International Journal of Industrial Organization*, 12:179-96.

Murphy, Kevin M., Andrei Shleifer, and Robert W. Vishny (1989), "Income Distribution, Market Size and Industrialization", Quarterly journal of Economics, August:537-64.

Norbäck, Pehr-Johan and Lars Persson (2000), "Privatization as a part of Liberalization Program in an International Oligopoly", IUI WP No. 532

Norbäck, Pehr-Johan and Lars Persson (2002), "Cross-Border Acquisitions and Greenfield Entry", IUI WP No. 570.

Norbäck, Pehr-Johan and Lars Persson (2001), Investment liberalization -Who benefits from Cross-border Mergers & Acquisitions?, IUI Stockholm WP No. 569-2001.

Norbäck, Pehr-Johan and Lars Persson (2001), "Privatization and Foreign Competition", IUI Stockholm WP No. 545-2001.

Norton, Seth W. (1992), "Transaction Costs, Telecommunications, and the Microeconomics of Macroeconomic Growth", *Economic Development and Cultural Change*, 41:1:October:175-96.

Nulens, Gert, Nancy Hafki, Leo Van Audenhove and Bar Cammaerts Eds. (2001), *The digital divide in developing countries: towards an information society in Africa*, UNO-ECA and VUB Brussels University Press.

Pereira, Alfredo M. and Rafael Flores de Frutos (1995), "Public Capital Accumulation and Private Sector Performance in the US", unpublished WP

Peter J. Buckley ad Mark C. Casson (1998), "Analyzing Foreign Market Entry Strategies: Extending the Internalization Approach", *Journal of International Business Studies*, 29:3, 539-562.

Ramamurti, Ravi (2000), "Telecom Reform Options: Privatization Vs. Deregulation", *Columbia Journal of World Business*.

Rohlfs, J. (1974), "A Theory of Interdependent demand for Communication Service", *Bell Journal of Economics*, 5:16-37.

Roller, Lars-Hendrik and Leonard Waverman (1996), "The impact of telecommunications Infrastructure on Economic Development", in Peter Howitt Ed. *The Implications of Knowledge-based growth for microeconomic policies*, University of Calgary Press.

Roller, Lars-Hendrik and Leonard Waverman (2001), "Telecommunications Infrastructure and Economic Development: A simultaneous Approach", *American Economic Review*, 91:4:September:909-923.

Shy, Oz (2000), *The Economics of Network Industries*, Cambridge University Press.

Singh, J. P. (1999), *Leapfrogging Development?: The Political Economy of Telecommunications Restructuring* (Suny Series in Global Politics), State University of New York Press.

Smith, Alasdair (1987), "Strategic Investment, Multinational Corporations, and Trade Policy", CEPR DP No. 137.

UNCTAD (1999), World Investment Report.

UNCTAD (2000), World Investment Report.

World Bank (1998), *World Bank Report: Knowledge for Development*, Washington D.C., Worldbank.

Chapter 4

An econometric analysis of telecommunication privatization, competition, and regulation in transition and emerging countries

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1. Empirical studies on telecommunications
2. Variables and data
3. Methodology
4. Empirical Results and conclusions

This final chapter provides an empirical counterpart to the legal and economic issues brought to light in the previous chapters. A panel data analysis is carried out to evaluate the effects of privatization, regulation and competition on telecommunications development in transition and emerging countries.

This part of the research has a simpler structure, and begins by reviewing empirical studies on the liberalization, broadly defined, of telecommunication sectors. The literature is based both on cases and on econometric studies and typically comes to the conclusion that liberalization has a positive effect on telecommunications development.

The feeling one might have when reading these studies is that deregulation and liberalization of telecom services are associated with significant growth in teledensity and operating efficiency, and with significant improvements in the quality and price of telecom services. The impact of privatization is less clear-cut, but most studies agree that the combination of privatization and deregulation/liberalization is associated with significant telecommunications improvements. This is certainly the result predicted by Noll (2000) in his survey article examining the political economy of Tlc reform in developing countries.

Paragraph 4.2 describes variable and data commenting on a few descriptive statistics reported in Panel 4.1, 4.2 and 4.3. To conclude, after a succinct explanation of the panel data methodology adopted in paragraph 4.3, the last paragraph reports econometric estimates, comments on the results and concludes the chapter.

4.1 Empirical studies on telecommunications

Before 1998, there has been basically no econometric study on the effect of telecommunication reforms, neither for developed countries, nor for transition, emerging, and developing countries.

Existing studies are listed in table 4.1. The methodologies used in these pieces of research tend to vary and can be loosely grouped in two main categories: Case studies and econometric studies with a cross section or a panel data structure.
Geographic coverage is also quite variable, and fluctuates between single country studies and wide panels including more than 100 countries. The study with the broadest scope, so far, is certainly Wallsten (2002), which covers 197 countries.

On balance, these studies generally indicate that deregulation and liberalization of telecom services are associated with significant growth in teledensity and operating efficiency, and with significant improvements in the quality and the price of telecom services. The impact of privatization, per se, is somewhat less clear-cut, but most studies agree that the combination of privatization and deregulation / liberalization is associated with significant Tlc improvements. This is certainly the result predicted by Noll (2000) in his survey article examining the political economy of telecom reform in developing countries.

Agustin J. Ros (1999) and Scott Wallsten (2001) provide the empirical work that the econometric exercise taken here resembles the most, despite the difference in the time coverage and in the research question under investigation.
Ros (1999) uses newly released data from the ITU to examine the effect of privatization and competition on network expansion and efficiency. However, he does not focus on foreign presence, specifically. He employs ITU data on 110 countries over 1986-1995 in a panel data regression. According to his results, countries with at least 50% private ownership of main Tlc firm have significantly higher teledensity levels and growth rates. Both privatization and competition increase efficiency, but only privatization is positively associated with network expansion.

Wallsten (2001) explores the effects of privatization, competition and regulation on Tlc performance using panel data analysis of 30 African and Latin American countries from 1984-

1997 using ITU data. He finds that competition is significantly associated with increases in per capita access and decreases in cost. Privatization is helpful only if coupled with effective, independent regulation. Increasing competition in combination with privatization is best. As a final point, he suggests that privatizing a monopoly without regulatory reforms should be avoided.

Carsten Fink, Aaditya Mattoo and Randeep Rathindran[42] (2001) analyze the liberalization of basic Tlc in Asian countries in order to identify the elements of good policy to promote through multilateral negotiations, using panel data for only 12 developing Asian economies over 1985-1999. They find that despite the de-monopolization, most government strictly control entry, keep limits on private and foreign ownership, and maintain weak regulators. In countries where comprehensive reform has been implemented, there are significant higher levels of main line availability, service quality and labor productivity.

Finally, a very clear and careful study is Bernardo Bortolotti, Juliet D'Souza, Marcella Fantini, and Domenico Siniscalco[43] (2002), which examines the financial and operating performance of 31 national telecommunication companies in 25 countries privatized in 1981-1998 using panel data at firm level. They find that privatization is significantly related to higher profitability, output and efficiency, and to significant declines in leverages. Competition reduces profitability, employment and, surprisingly, efficiency after privatization, while the creation of an independent regulator significantly increases output.

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[42] Fink, Carsten, Aaditya Mattoo, and Randeep Rathindran (2002), "Liberalizing Basic telecommunications: The Asian Experience", HWWA-Institut fur Wirtschaftsforschung, Discussion Paper No. 163.

[43] Bortolotti, Bernanrdo, Juliet D'Souza, Marcella Fantini, and Domenico Siniscalco (2002), "Sources of Performance Improvement in Privatised Firms: A Clinical Study of the Global Telecommunications Industry", *Telecommunications Policy*.

REFERENCE	METHODOLOGY, SAMPLE AND STUDY PERIOD	MAIN FINDINGS
Ramamurti ed. (1996) Book	Survey studies of 4 Tlc, 2 airline and 1 toll-road privatization program in Latin America during 1987-91. Discusses political economy issues, methods used to overcome bureaucratic and ideological opposition to divestiture.	Privatizations are very positive for Tlc partly due to scope for technology, capital investment and attractiveness of offer terms. Much less scope for productivity improvements for airlines and roads, little improvements for airlines and roads observed.
Boles de Boer and Evans (1996) *Economic Record*	Estimate impact of 1987 deregulation and 1990 privatization of Telecom New Zealand on price and quality of telephone services. Examines whether investors benefited.	Documents significant declines in price of phone services, due mostly to productivity growth that cut costs at a 5.6% annual rate, and significant improvement in service levels. Shareholders also benefited significantly.
Petrazzini and Clark (1996) *Hong Kong U. Science and Technology WP*	Tests whether deregulation and privatization impact level and growth in teledensity, prices, service quality, and employment by Tlc in 26 developing countries. Uses ITU data through 1994.	Both deregulation and privatization are associated with significant improvements in level and growth of teledensity, but have no consistent impact on service quality. Deregulation associated with lower prices and increased employment; privatization has the opposite effect.
Ros (1999) *Journal of Regulatory Economics*	Examines effects of privatization and competition on network expansion and efficiency. Uses ITU data on 110 countries over 1986-1995 in a panel data regression.	Countries with at least 50% private ownership of main Tlc firm have significantly higher teledensity levels and growth rates. Both privatization and competition increase efficiency, but only privatization is positively associated with network expansion.
Wallsten (2001) *Journal of Industrial Economics*	Explores effects of privatization, competition and regulation on Tlc performance using panel data analysis of 30 African and Latin American countries from 1984-1997 with ITU data.	Finds that competition is significantly associated with increases in per capita access and decreases in cost. Privatization is helpful only if coupled with effective, independent regulation. Increasing competition in combination with privatization is best. Privatizing a monopoly without regulatory reforms should be avoided.
Boylaud and Nicoletti (2000) *OECD Econ. Dept. WP No. 237*	Use factor analysis and a database on market structure and regulation to investigate the effects of reforms on productivity, prices and quality of long-distance and cellular services in 23 OECD countries over 1991-97	Find that prospective and actual competition both bring about productivity and quality improvements - and lower prices - in telecom services, but no clear effect could be found for privatization

REFERENCE	METHODOLOGY, SAMPLE AND STUDY PERIOD	MAIN FINDINGS
Röller and Waverman (2001) *American Economic Review*	Estimate the impact of infrastructure investment on economic growth for 21 OECD countries over 1970-1990. GMM on a system of equations.	find evidence of a significant positive casual link, especially when a critical mass of Tlc infrastructure is present, and the critical mass appears to be at a level of Tlc infrastructure that is near universal service. They emphasizes the potential impact of non-linearities, related to the presence of network externalities, in empirical studies concerning Tlc.
Carsten Fink, Aaditya Mattoo and Randeep Rathindran (2001) *World Bank WP*	Analyze the liberalization of basic Tlc in Asian countries in order to identify the elements of good policy to promote through multilateral negotiations. Panel data for 12 developing Asian economies over 1985-1999.	Find that despite the de-monopolization, most government strictly control entry, keep limits on private and foreign ownership, and maintain weak regulators. Where comprehensive reform has been implemented, there are significant higher levels of main line availability, service quality and labor productivity.
Wallsten (2002) *World Bank WP*	Explores the effect of the sequence of reforms in Tlc to establish whether data reflect any pattern of optimal timing. Makes use of Panel data for 1985-1999 for 197 countries	Finds that countries that established separate regulatory authorities prior to privatization saw increased Tlc investment, fixed telephone penetration, and cellular penetration compared to countries that did not. In the former countries, investors are willing to pay more for Tlc firms, consistently with the hypothesis that investors require a risk premium to invest where regulatory rules are uncertain.
Bortolotti et al. (2002) *Telecommunications Policy*	examine the financial and operating performance of 31 national telecommunication companies in 25 countries privatized in 1981-1998. Panel Data.	Find that privatization is significantly related to higher profitability, output and efficiency, and with significant declines in leverages. Competition reduces profitability, employment and, surprisingly, efficiency after privatization, while the creation of an independent regulator significantly increases outpu.
Madden and Savage (1998) *Information technology and Policy*	Examine the relationship between gross fixed investment, telecommunications infrastructure investment and economic growth for a sample of transitional 27 CEE countries. Use panel data for 1991-1994 for 11 countries.	Using 11 countries for which data are available, they find that tlc investment are strongly related to economic growth and support from international programs should be encouraged to improve the channel between aggregate investment and growth, economy wide

REFERENCE	METHODOLOGY, SAMPLE AND STUDY PERIOD	MAIN FINDINGS
Fink, Mattoo and Rathindran *World Bank WP.*	Analyze the impact of reforms on sectoral performance using panel data on 86 developing countries over 1985-1999, emphasizing the role of sequencing of privatization and competition	Find that both privatization and competition lead to significant improvement in performance but a comprehensive reform program involving both policies and independent regulators, produce larger gains
Goldstein (2002) *OECD, mimeo*	Analyzes in detail tlc reforms in Algeria, Egypt, Morocco, Tunisia and Turkey emphasizing the role of institutions in relation with WTO membership and tlc commitments	Finds that situations of (well) "managed monopoly/oligopoly" are rare in the MED, though fundamental to support pro-investment microeconomic reforms;

Table 4.1 Empirical studies on telecommunication liberalization

4.2 Variables and data

The analysis is carried out at sector level, solely. The availability of panel data for 1989-2002 allows exploit the richness of the information set using panel techniques.

The econometric analysis is carried out using the proprietary dataset ISLA-Telecom, compiled by the author, containing information on 46 countries in Central and Eastern Europe, North Africa, Middle East, Latin America, Central America and in the Caribbean. Data have a panel structure whereas observations are registered for every year, indexed t and country, indexed i. The time series have different length so that, for econometric purposes, the complete panel dataset is available only for 12 year (1989-2000), implying 552 data-points.
To complement the *ISLA-Telecom* database, indicators on telecommunications have been elaborated upon data published in the ITU World Telecommunication Indicators 2002 CD-ROM and the World Development Indicator 2002 of the Worldbank.

The variables from the database that have been used in the econometric analysis are listed in table 4.2.

Dependent variables represent the available indicators of efficiency for the Tlc sector of transition and developing countries. They include:

1. **Teledensity**, the number of mainlines per capita, is the basic indicator in applied analysis, being it the most reported variable as a synthetic measure of the degree of development of the Tlc sector of a country.

   A mainline is "a telephone line connecting the subscriber's terminal equipment to the public switched network and which has a dedicated port in the telephone exchange equipment[44]". It indicates the level of penetration of telephone service in a country. As an indicator of access to tlc services, teledensity has a number of drawbacks, including the fact that many people have access to several lines (at home, at work, phone, fax), and the fact that access can be obtained through other means such as public phones and call centers where many people use a unique line;
2. Number of **fixed lines** installed;
3. **Teledensity growth** is the annual rate of growth of teledensity;
4. The **teledensity / staff** ratio weights teledensity by the number of people employed in the sector;
5. The number of **cellular subscriptions** per 100 persons is the equivalent of teledensity for wireless services.

Control variables include:

1. **GDP per capita**;
2. **Population**;
3. Percentage of the total **population** living in **urban areas**;

and are used to take into account country differences in terms of level of well-being, size, and urbanization, the latter being thought to ease network expansion.

[44] ITU World Telecommunication Indicators 2002 CD-ROM

VARIABLE	TO BE READ AS	SOURCE
f_fixedlines	Number of fixed lines installed	World Telecommunications Indicators (2002)
f_td	Teledensity = (Number of fixed lines installed)/(Population)	World Telecommunications Indicators (2002)
f_tdg	Teledensity growth = $(f\_td_t - f\_td_{t-1}) / f\_td_{t-1}$	World Telecommunications Indicators (2002)
f_td/staff	Teledensity per Tlc worker = Teledensity / staff employed in the Tlc sector	World Telecommunications Indicators (2002)
c_td	Number of Cellular subscriptions per 100 person	World Telecommunications Indicators (2002)
gdpuspc	GDP per capita in US Dollars at 1995 prices.	World Development Indicators (2002)
pop	Population/1,000,000	World Development Indicators (2002)
urbpop	Percentage of the Total Population living in urban areas	World Development Indicators (2002)
f_yearpriv	Year of initial Privatization of the incumbent, possibly partial (Dummy Variable)	ISLA-Tlc database
ysepregulator	Year of establishment of a separate regulator (Dummy Variable)	ISLA-Tlc database
f_fdishare	Share of foreign Tlc companies in the incumbent at or after privatization	ISLA-Tlc database
c_numcomp	Number of cellular operators not owned by the incumbent	ISLA-Tlc database
c_fdishare	Average share of FDI in cellular operators[45]	ISLA-Tlc database
c_numop	Number of cellular operators	ISLA-Tlc database
c_fdipen	Foreign penetration in the cellular market, equal to the sum of the FDI shares in cellular operators	ISLA-Tlc database
c_fdipenSQ	Square of c_fdipen	ISLA-Tlc database

Table 4.2 Variables used in the regression analysis

[45] For example, if there are two cellular operators owned by two foreign Tlc companies with 60% and 40%, c_fdishare is equal to 50%.

Finally, the regressors are

1. the **year of privatization**, is a dummy variable taking the value 1 when the first portion of shares of the incumbent is sold for the first time to private investors;
2. the **year of establishment** of a separate regulator; this dummy variable capturing the existence of a regulatory body which is formally separated first of all from the incumbent and, secondly, from the Government and the Ministries. The existence of separate regulators is associated with attempts to carry out broad scope Tlc reforms, as argued in chapter 1. Wallsten (2000) suggests interpreting it as an indicator of a country's propensity to undertake regulatory reforms rather than of the effect of the activity of the separate regulator, per se.
3. the **share of the incumbent owned by foreign Tlc companies** at or after privatization;
4. the **number of cellular operators not owned by the incumbent**, represents a measure of competition with respect to fixed services;
5. the **average share of FDI in cellular operators**;
6. the **number of cellular operators** operating in the country;
7. **foreign penetration in the cellular market** is equal to the sum of the share of cellular operators owned by foreign Tlc companies; this variable enters also squared.

Since private investors can be domestic of foreign, originally, both shares of the incumbent owned by private investors and foreign investors have been computed ending up to be very correlated. This correlation is natural given the strong involvement of foreign operators in Tlc reform of transition, emerging and developing country, as explained in chapter 3 but, in a certain sense is problematic for the empirical analysis. In fact, such correlation does not allow disentangling the effect of foreign control from the effect of private control, given the fact that if control is not public, it is certainly foreign.

A selection of these variables has been summarized in panels 4.1, 4.2 and 4.3, distinguishing the 4 macro-regions the 46 countries[16] in the panel belong in.

Panel 4.1 refers to the timing of privatization of the incumbent. Typical privatization reforms in developing countries involve selling a controlling stake in the national Tlc operator to a Western operating company, usually in exchange for a large front-up payment plus binding promises to aggressively update and expand service levels after gaining control. Thus, most

privatizations are initially partial. From both tables and graphs it is clear that Latin America Countries have been the front-runners of the process of privatization, that has began in the second half of the 1980s. Central and Eastern European countries, instead, have privatized very quickly in the second half of the 1990s, rapidly catching up and surpassing South and Central American Countries; finally, Mediterranean countries have been lagging behind and still count just a few operators with private participation. It is relevant to note that the average share of privatization has reached 40% only in 2001, showing that many countries are only shy privatizers. Overall, however, the trend has been growing, as explained in chapters 1 and 2.

The second institutional reform that has been emphasized, particularly in chapter 1, the establishment of separate and possibly independent regulators has followed similar patterns in the regions considered. South and Central American countries have been the early reformers, followed by CEE. The MED countries have been catching up, however, showing an almost unexpected reforming path.

Finally, panel 4.3 reports average teledensity and fixed lines by regional group.

Trends have generally been increasing, with a marked growth of the absolute number of mainlines, particularly in South America. According to teledensity data, CEE countries have the best endowment of communication infrastructure followed by the MED, and far away from both CA and SA.

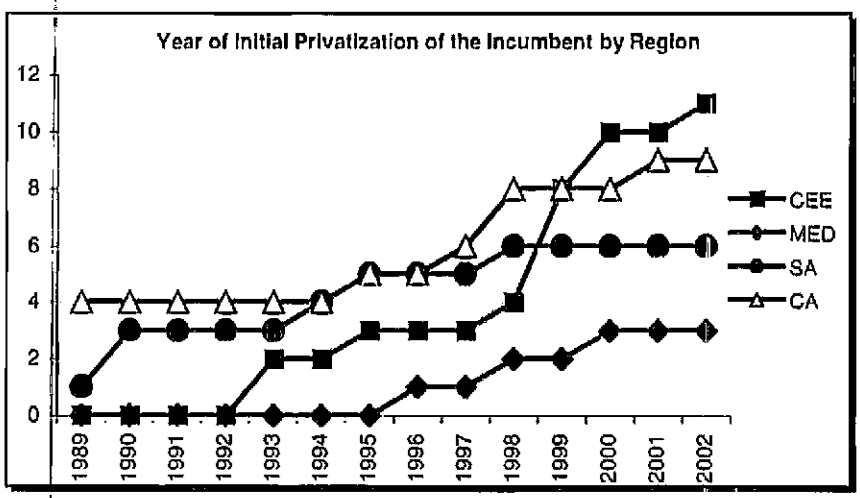
[46] The complete list of countries is contained in appendix 4.1.

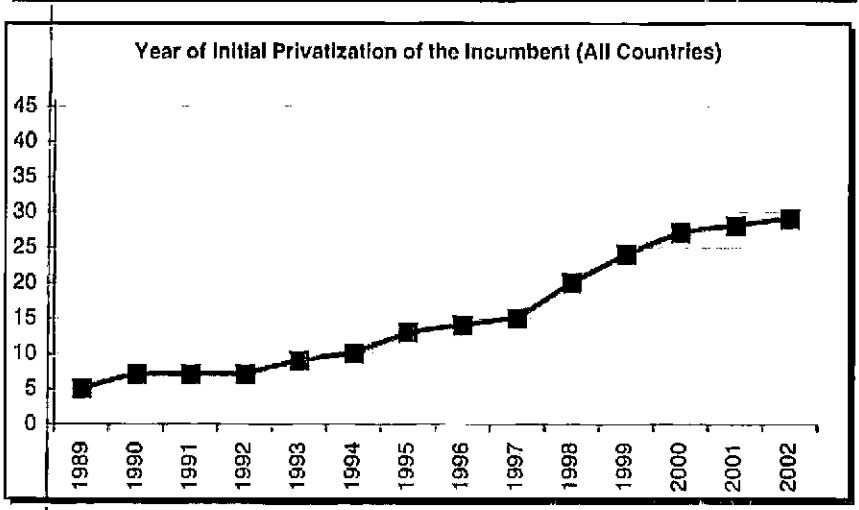
Year of Initial Privatization of the Incumbent by region

No. GROUP	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
12 CEE	0	0	0	0	2	2	3	3	3	4	8	10	10	11
12 MED	0	0	0	0	0	0	0	1	1	2	2	3	3	3
10 SA	1	3	3	3	3	4	5	5	5	6	6	6	6	6
12 CA	4	4	4	4	4	4	5	5	6	8	8	8	9	9
46 Total	5	7	7	7	9	10	13	14	15	20	24	27	28	29

Average Share of Privatization of the Incumbent by Region

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
12 CEE	0.0	0.0	0.0	0.0	8.3	10.4	14.4	14.4	14.4	21.0	34.9	41.8	45.3
12 MED	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	3.3	6.7	6.7	9.6	10.3
10 SA	8.8	13.4	20.8	19.3	19.3	29.3	39.3	39.3	39.3	44.4	44.4	44.4	44.4
12 CA	24.8	26.6	26.6	26.6	26.6	26.6	26.6	26.6	30.7	55.7	55.8	55.8	59.2
46 Average	8.4	10.0	12	11.5	13.5	16.6	20.1	20.9	21.9	31.9	36.4	37.9	39.8





Panel 4.1 Partial Privatization of the Incumbent

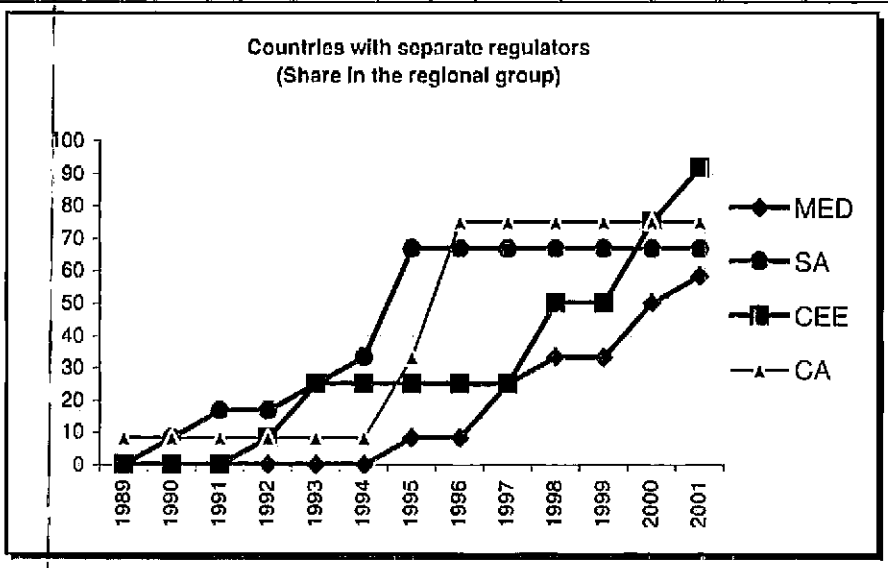
Countries with separate regulators

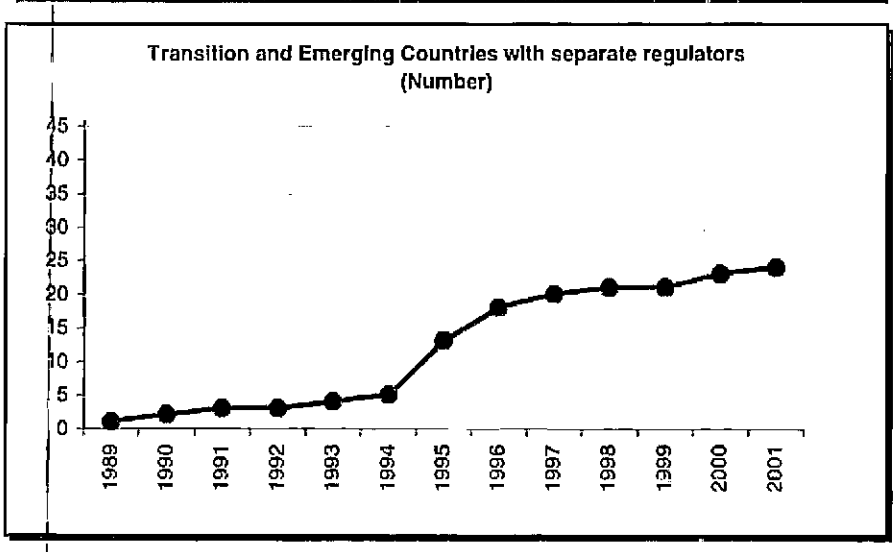
Number by regional group

No.	GROUP	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
12	CEE	0	0	0	1	3	3	3	3	3	6	6	9	11
12	MED	0	0	0	0	0	0	1	1	3	4	4	6	7
10	SA	0	1	2	2	3	4	8	8	8	8	8	8	8
12	CA	1	1	1	1	1	1	4	9	9	9	9	9	9
46	Total	1	2	3	3	4	5	13	18	20	21	21	23	24

Average number of fixed lines by regional group

		1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
12	CEE	0	0	0	8.3	25	25	25	25	25	50	50	75	91.67
12	MED	0	0	0	0	0	0	8.3	8.3	25	33.3	33.3	50	58.3
10	SA	0	8.3	16.7	16.7	25	33.3	66.7	66.7	66.7	66.7	66.7	66.7	66.7
12	CA	8.3	8.3	8.3	8.3	8.3	8.3	33.3	75	75	75	75	75	75





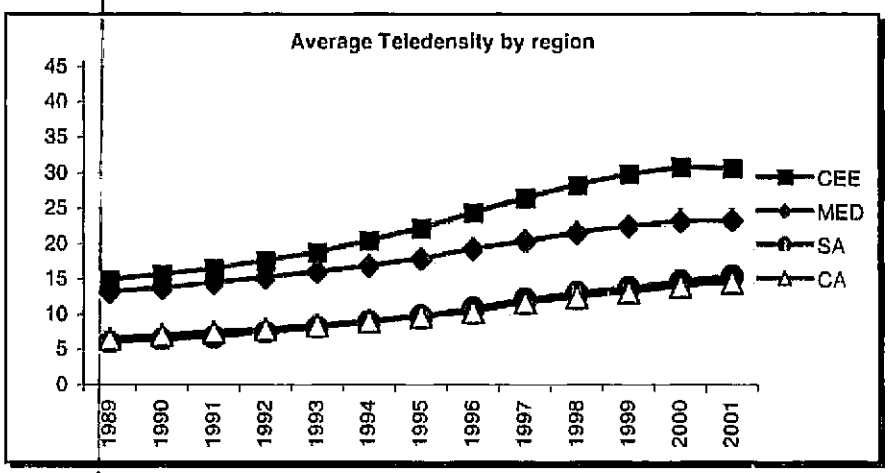
Panel 4.2 Separate Regulators

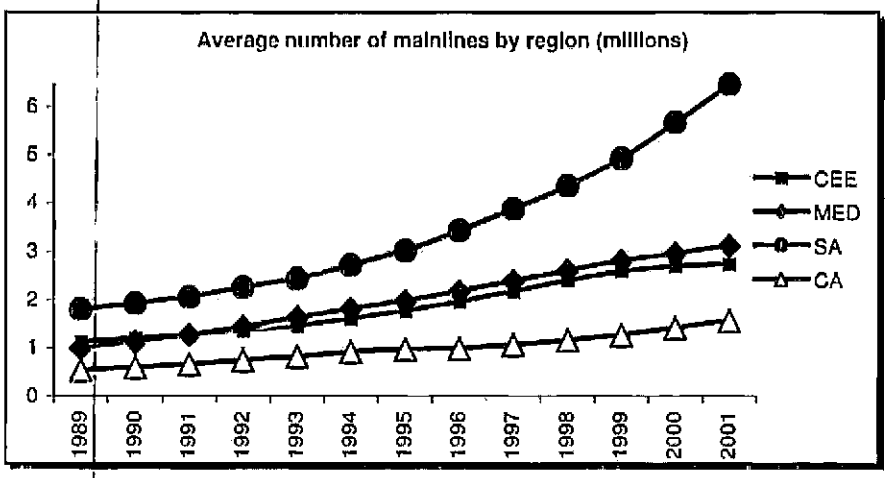
Average teledensity by regional group

No.	GROUP	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
12	CEE	14.83	15.53	16.39	17.51	18.69	20.30	22.11	24.28	26.38	28.26	29.70	30.73	30.52
12	MED	13.09	13.66	14.36	15.14	15.92	16.75	17.73	19.12	20.27	21.48	22.34	23.05	23.23
10	SA	5.95	6.32	6.72	7.37	8.03	8.79	9.59	10.72	12.02	12.96	13.64	14.53	15.33
12	CA	6.44	6.98	7.41	7.80	8.30	8.98	9.59	10.31	11.60	12.36	13.09	13.93	14.48
46	Average	10.08	10.62	11.22	11.96	12.73	13.70	14.76	16.11	17.57	18.77	19.69	20.56	20.89

Average number of fixed lines by regional group

		1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
12	CEE	1.12	1.18	1.25	1.34	1.44	1.59	1.75	1.95	2.16	2.39	2.57	2.68	2.72
12	MED	0.98	1.10	1.26	1.42	1.61	1.79	1.96	2.15	2.37	2.59	2.79	2.94	3.10
10	SA	1.78	1.90	2.03	2.23	2.42	2.70	2.99	3.42	3.86	4.34	4.92	5.67	6.44
12	CA	0.53	0.59	0.65	0.72	0.81	0.90	0.95	0.98	1.05	1.14	1.26	1.41	1.55
46	Average	1.10	1.19	1.30	1.43	1.57	1.74	1.91	2.12	2.36	2.61	2.88	3.17	3.45





Panel 4.3 Fixed lines and Teledensities by Region

4.3 Methodology

The baseline underlying model is the unobserved effects model[47] (UEM) that can be written, for a randomly drawn cross section observation i, as

$$y_{it} = x_{it}\beta + c_i + u_{it}$$

where α_i is a time invariant, and represents a country fixed effect, allowed to be correlated with x_{it}, the vector of time and country varying explanatory variables[48].
The fixed effect treats the intercept as a fixed, unknown parameter. In effect, the model entails specifying a different intercept for each country in the data sample.

Equation 1 is the basic equation estimated:

$$y_{it} = c_i + \mu_1 Z_{it} + \beta_1 X_{it} + \varepsilon_{it} \qquad (1)$$

y_{it} = standard indicators for the telecom sector with i = country, t = year.

Just for expositional purposes, the explanatory variables are broken down in a matrix of control variables and a matrix of regressors, which are of specific interest for this study. Z has been singled out as a matrix of control variables.

The alternative to the Fixed effects model is a Random effects model, where

$$y_{it} = x_{it}\beta + \varepsilon_{it}$$

and

[47] Jeffrey m. Wooldridge (2002), *Econometric Analysis of Cross-Section and Panel data*, MIT Press.
[48] Under the assumptions:
FE1: $E(\varepsilon_{it} | x_{it}, c_i) = 0$, $t = 1,2,\ldots,T$;

FE2 $\operatorname{rank} \sum_{t=1}^{T} [(x_{it} - \overline{x})'(x_{it} - \overline{x})] = \operatorname{rank}[E((X_{it} - \overline{X})'(X_{it} - \overline{X})] = K$

under FE1 and the finite sample version of FE2, $\hat{\beta}_{FE}$ can be shown to be unbiased conditional on X.

Efficiency is guaranteed by the additional
FE3: $E(\varepsilon_i \varepsilon_i' | x_i, c_i) = \sigma_\varepsilon^2 I_T$.

$$\varepsilon_{it} = c_i + u_{it}.$$

The Random Effects model also allows for the intercept to vary across countries, but it presumes that this variation arises from a country-specific random error.

Here, the alternative between the use of a Fixed Effects and a Random Effects model is evaluated with the use of a Hausman specification test of the form

$$\text{Hausman Statistic} = \left(\hat{\beta}_{FE} - \hat{\beta}_{RE}\right)' \left[A\hat{V}ar\left(\hat{\beta}_{FE}\right) - A\hat{V}ar\left(\hat{\beta}_{RE}\right)\right]^{-1} \left(\hat{\beta}_{FE} - \hat{\beta}_{RE}\right).$$

Since Fixed Effect is consistent when x_{it} and c_i are correlated, but Random Effects is inconsistent, a statistically significant difference is interpreted as evidence against one of the Random Effects assumption[49].

The test statistic is distributed as a $\chi^2(r)$. Rejecting Ho: "the difference in coefficients is not systematic", suggests that the assumptions underlying the Random Effects model, that the random components are uncorrelated with the other explanatory variables is violated and Fixed Effects provides a much better set estimate of the economic relationship.

4.4 Empirical results and conclusions

This paragraph presents the results of the estimation of equation (1) above and is organized by Tlc indicator, i.e. by dependent variable.

Results for teledensity are reported in table 4.3 and 4.4, the difference being that table 4.3 reports results for Fixed Effects regressions, whilst table 4.4 reports the ones for Random Effects. In fact, Hausman specification test rejects Fixed Effects as the most suitable model. Control variables are significant except for population, which has a p-value mildly above 0.10. GDP per capita is positively correlated with teledensity as well as the percentage of the population living in urban areas; this is consistent with the informal evidence provided in figure 1.1, that shows the correlation between richness of a country and its endowment of

connections. The negative sign of the coefficient for the population, even if slightly insignificant, shows larger populations impact negatively on teledensity.
Privatization processes (f_ypriv) turn out to be significantly correlated with teledensity but the foreign-owned share of the incumbent (f_fdishare) has a negative significant sign. The first finding is consistent with Wallsten (2001), but the second one is somewhat surprising, especially because it is particularly robust to different specifications of the model.
There exist two possible plausible explanations. First of all, there might exist a problem of endogeneity in the way the analysis is structured. In fact, I have not controlled for the possibility that countries with a very poor telecommunication structure might decide to transfer higher shares of the incumbent into foreign hands with the intention of improving the situation of their Tlc infrastructure. That might explain why f_fdishare and teledensity are inversely correlated. Secondly, Governments who are owners of particularly efficient or money-making operators might find more profitable to retain shares of the incumbent and sell only minority shares to foreign investors basically capping their possibility of taking part to the capital and the managerial decision of the firm.

The establishment of a separate regulator has a positive significant effect on teledensity of a magnitude close to the one of privatization.
As for the competition variable, if the number of wireless operators not owned by the incumbent is definitely not significant, the variable capturing FDI cellular penetration is. Foreign penetration in the cellular market captures the competitive effect coming from foreign presence in the wireless market, and it is equal to the sum of the share of cellular operators owned by foreign Tlc companies. Thus, the global presence of many foreign owned operators provide a competitive stimulus to the fixed operator, who apparently increases teledensity to respond to such a form of competition.

The regression that makes use of teledensity growth as a dependent variable, brings no significant coefficient, confirming one of Ros (1999)'s results.

Turning to the third Tlc indicator (table 4.6), the number of fixed lines per units of employees in the Tlc sector, the results are very similar to the ones reported for teledensity with the control variables, population, GDP per capita, and urbanization, significantly and positively correlated to the indicator. All other regressors maintain the same significance and

[49] Non-correlation between the random components and the other explanatory variables.

signs of the previous regressions, and also the share of the incumbent maintains the same sign as in the previous case, possibly with the same explanation.

Table 4.6 contains the output of the regression run using as a regressor the number of cellular subscription per 100 persons (c_td), an indicator of teledensity for the wireless sector. Here the only significant control variable is GDP per capita (z_gdpuspc).
Again, the establishment of a separate regulator (Yseparegulator) has a positive effect on cellular teledensity, but one has to take into account the fact that the coefficient is mildly non significant.
As expected, the number of operators present on the market (c_numop) is positively correlated to the indicators and significant, as well as the proxy for cellular FDI penetration. This regressor has been entered into the regression squared to take into account possible non-linearities. In effect, the relationship, besides being positive, might be concave, the impact-effect being stronger when foreign penetration is lower.

The simple empirical evidence provided here is consistent with previous studies and with conventional wisdom. The existence of separate regulator and privatization processes have positive effects on indicators relating to the efficiency of the telecommunication sector. However, foreign participation in the incumbent itself does not generate positive benefits. Foreign Participation actually carries the risk of realizing a mere transfer of monopoly rents if appropriate measures are not taken to avoid the pure exploitation of domestic markets, which is especially difficult in countries where Governments have little bargaining power with respect to MNC. However, competition from possible substitute for fixed line connections, such as cellular services, appear to be a successful agent of change, especially when wireless companies are owned by foreign Tlc companies. In effect, setting up a wireless network is relatively easier and more profitable in countries where a large share of the population is stuck in long waiting lists and wishes to access telephone.
However, constrained by the scarcity of data, a number of issues remain unresolved For example, it would be useful to know what type of regulation a country adopts, because the variation among countries could be quite large, as highlighted in chapter 1. Moreover, it could be interesting to collect firm-specific data, rather than country data that are relatively easier to access, but do not allow the perception of a more detailed view of the effects of privatization, competition and regulation. Finally, the econometric studies carried out so far neglect the possible effect of endogeneity in the regression analyses. In fact, the same

factors affecting Tlc performance might also affect reforms, competition, privatization and regulation[50].

Dependent variable: Teledensity (fixed effects)

	Coefficient.	Standard Error	t	P>|t|
gdpuspc	.0020013	.0001732	11.55	0.000
pop	.0256765	.0814628	0.32	0.753
urbpop	.2952613	.0582863	5.07	0.000
f_ypriv	1.795211	7246882	2.48	0.014
yseparregulator	1.306274	.4631994	2.82	0.005
f_fdishare	-.0253728	.0130083	-1.95	0.052
c_numcomp	.2074554	.3297252	0.63	0.530
c_fdipen	.0174088	.0035039	4.97	0.000
c_fdishare	-.0003854	.0083501	-0.05	0.963
cons	-12.41984	3.659669	-3.39	0.001
sigma_u				
sigma_e				
rho				
F(46, 494)		74.50		Prob>F = .00
Hausman test			$\chi^2(9) = 12.65$	Prob>χ^2 = 0.1789
R-squared:	within = 0.5758	between = 0.3704	overall = 0.391	
t = 1989-2000				
i = 46				

Table 4.3

[50] Using the microeconometric literature on program evaluation, an interesting direction in cross-country study has been suggested in the political economy literature by
Torsten Persson and Guido Tabellini (2002), "Do constitutions cause large Governments? Quasi-experimental Evidence", *European Economic Review*, 46.
The use of Average Treatment Effects and Score Estimators, using reforms as a treatment variable, allows to identify causality in the sense of Rubin (1974).
Rubin D. B. (1974), "Estimating the Causal Effect of Treatments in Nonrandomized Studies", Journal of Educational Psychology, 66:688-701.
These suggestion has been taken up, for example, in
Contessi, Silvio and Carlo Altomonte (2002), "Disentangling the treatment effect of European Structural Funds on regional growth using a regression discontinuity approach", Bocconi University, mimeo.

Dependent variable: Teledensity (Random effects)

	Coefficient.	Standard Error	t	P>|t|
gdpuspc	.0021189	.0001653	12.81	0.000
pop	-.0664979	.0412037	-1.61	0.107
urbpop	.2338477	.049563	4.72	0.000
f_ypriv	1.688736	.7191393	2.35	0.019
yseparregulator	1.600073	.4423749	3.62	0.000
f_fdishare	-.0249169	.0128067	-1.95	0.052
c_numcomp	.1925888	.3250121	0.59	0.553
c_fdipen	.0172319	.0034895	4.94	0.000
c_fdishare	.001218	.0082996	0.15	0.883
cons	-7.371153	3.28832	-2.24	0.025
sigma_u	8.7317852			
sigma_e	2.9883821			
rho	.89515139			
F(46, 4)			74.50	Prob>F = .00
R-squared:	within = 0.5732	between = 0.4738	overall = 0.485	
t = 1989-2000				
i = 46				

Table 4.4

Dependent variable: Teledensity growth (fixed effects)

	Coefficient.	Standard Error	t	P>|t|
gdpuspc	.0003408	.000392	0.87	0.385
pop	.1958588	.184344	1.06	0.289
urbpop	.2331202	.1318974	1.77	0.078
f_ypriv	1.782965	1.639914	1.09	0.277
yseparregulator	-.0893631	1.048184	-0.09	0.932
f_fdishare	.0261983	.0294367	0.89	0.374
c_numcomp	-1.170666	.7461427	-1.57	0.117
c_fdipen	-.0059398	.007929	-0.75	0.454
c_fdishare	.0171345	.0188956	0.91	0.365
cons	-11.94989	8.281548	-1.44	0.150
sigma_u	8.0163883			
sigma_e	6.7624784			
rho	.58423839			
F(45, 494)			2.53	Pr.>F = .00
Hausman test			$\chi^2(9) = 19.20$	Pr.>χ^2= 0.023
R-squared:	within = 0.5758	between = 0.3704	overall = 0.3915	
t = 1989-2000				
i = 46				

Table 4.5

Dependent variable: Fixed Lines / staff

	Coefficient.	Standard Error	t	P>|t|
gdpuspc	.0144758	.0016368	8.84	0.000
pop	6.42285	.7696219	8.35	0.000
urbpop	1.222751	.5506614	2.22	0.027
f_ypriv	18.82024	6.846511	2.75	0.006
yseparregulator	14.45663	4.376088	3.30	0.001
f_fdishare	-.3011964	.1228961	-2.45	0.015
c_numcomp	3.045964	3.115087	0.98	0.329
c_fdipen	.1883225	.033103	5.69	0.000
c_fdishare	.180835	.0788877	2.29	0.022
cons	-148.7517	34.57482	-4.30	0.000
sigma_u	173.02891			
sigma_e	28.232818			
rho	.97406658			
F(45, 494)		73.14		Pr>F = .00
Hausman test			$\chi^2(9) = 76.33$	$Pr>\chi^2 = 0.0000$
R-squared:	within = 0.571	between = 0.1850	overall = 0.1666	
t = 1989-2000				
i = 46				

Table 4.6

Dependent variable: Number of Cellular subscriptions per 100 person

	Coefficient.	Standard Error	t	P>|t|
gdpuspc	.0027318	.0002965	9.21	0.000
pop	-.062001	.1385436	-0.45	0.655
urbpop	-.1340443	.101137	-1.33	0.186
yseparregulator	1.193401	.7690114	1.55	0.121
c_numop	3.265883	.72581	4.50	0.000
c_fdipen	.0231409	.007473	3.10	0.002
c_fdipenSQ	-.0000505	.0000124	-4.07	0.000
cons	-1.993133	6.368009	-0.31	0.754
sigma_u	5.3974914			
sigma_e	5.1929922			
rho	.51930252			
F(45, 496)	3.56			Prob>F = .00
Hausman test			$\chi^2(7) = 71.86$	Prob>χ^2 = 0.000
R-sq:	within = .4187	between = 0.533	overall = 0.329	
t = 1989-2000				
i = 45				

Table 4.7

References

Altomonte, Carlo, and Silvio Contessi (2003), "Disentangling the treatment effect of European Structural Funds on regional growth using a regression discontinuity approach", Bocconi University, mimeo

Boles de Boer, David, and Lewis Evans (1996), "The Economic Efficiency of telecommunications in a deregulated marmet: the case of New Zealand", *Economic Record*, 71:24-35.

Bortolotti, Bernanrdo, Juliet D'Souza, Marcella Fantini, and Domenico Siniscalco (2002), "Sources of Performance Improvement in Privatised Firms: A Clinical Study of the Global Telecommunications Industry", *Telecommunications Policy*.

Boylaud, Olivier, and Giuseppe Nicoletti (2000), "Regulation, Market Structure and Performance in Telecommunications", OECD Economic Department WP No. 237.

Fink, Carsten, Aaditya Mattoo and Randeep Rathindran (2002), "An Assessment of Telecommunications Reform in Developing Countries", World Bank WP No. 3182.

Fink, Carsten, Aaditya Mattoo, and Randeep Rathindran (2002), "Liberalizing Basic telecommunications: The Asian Experience", HWWA-Institut fur Wirtschaftsforschung, Discussion Paper No. 163.

Goldstein, Andrea (2002), "Institutional endowment and regulatory reform in telecoms: a five-country comparison in the MEDA region", paper presented at the 2002 ERF conference held in Dubai (Qatar).

Madden, Gary and Scott J. Savage (1998), "CEE telecommunications investment and economic growth", *Information Economics and Policy*, 10:173-195.

Noll, Roger G. (2000), "Telecommunications Reforms in developing Countries", in Anne O. Kreuger Ed., *Economic Policy Reform: The Second Stage*, University of Chicago Press.

Persson, Torsten, and Guido Tabellini (2002), "Do constitutions cause large Governments? Quasi-experimental Evidence", *European Economic Review*, 46.

Petrazzini, Ben and Theodore Clark (1996), "Costs and Benefits of Telecommunications Liberalization in Developing Countries", Hong Kong University of Science and Technology, mimeo.

Ramamurti, Ravi (2000), "Telecom Reform Options: Privatization Vs. Deregulation", *Columbia Journal of World Business*.

Röller, Lars-Hendrik and Leonard Waverman (2001), "Telecommunications Infrastructure and Economic Development: A simultaneous Approach", *American Economic Review*, 91:4:September:909-923.

Ros, Agustin (1999), "Does Ownership or Competition Matter? The Effects of Telecommunications Reform on Network Expansion and Efficiency", Journal of Regulatory Economics, 15:1:65-92.

Rubin, D. B. (1974), "Estimating the Causal Effect of Treatments in Nonrandomized Studies", *Journal of Educational Psychology*, 66:688-701.

Wallsten, Scott (2001), "An Econometric Analysis of Telecom Competition Privatization, and Regulation in Africa and Latin America", *Journal of Industrial Economics*, 49:1:1-20.

Wallsten, Scott (2002), Does Sequencing Matter? Regulation and Privatization in Telecommunications Reforms, World Bank WP.

Wooldridge, Jeffrey M. (2002), *Econometric Analysis of Cross-Section and Panel data*, MIT Press.

Appendix 4.1

Central and Eastern Europe

1 Albania
2 Bulgaria
3 Croatia
4 Czech Republic
5 Estonia
6 Hungary
7 Latvia
8 Lithuania
9 Poland
10 Romania
11 Slovak Republic
12 Slovenia

Mediterranean Countries

13 Algeria
14 Cyprus
15 Egypt
16 Israel
17 Jordan
18 Lebanon
19 Libya
20 Malta
21 Morocco
22 Syria
23 Tunisia
24 Turkey

Latin America

25 Argentina
26 Bolivia
27 Brazil
28 Chile
29 Colombia
30 Ecuador
31 Paraguay
32 Peru
33 Uruguay
34 Venezuela

Central America and Caribbeans

35 Barbados
36 Costa Rica
37 Cuba
38 El Salvador
39 Guatemala
40 Haiti
41 Honduras
42 Jamaica
43 Mexico
44 Nicaragua
45 Panama
46 Trinidad and Tobago

Conclusions

There is a mounting optimism at the international level on the potential relevance of the information technology revolution to help less developed countries to "leapfrog" development. This has led to a new interest in the study of reforms in the telecommunication sectors. Telecommunications (Tlc) are thought to help developing countries skip over *stages* of development and accelerate their *pace* of development with the final aim of becoming members of the postindustrial society.

However, it is well documented that many countries are still endowed with tiny networks, although, at the same time, network developments might take place rapidly.

Researchers have identified several economic and legal obstacles that inhibit Tlc development. This dissertation tries to shed light on the effect of Tlc reforms in transition and developing countries, focusing on the advantages and the risks posed by the participation of foreign firms to these processes.

The analysis of the features of the multilateral deals on Tlc within the system of agreements of the World Trade Organization I have presented in chapter 2 has evaluated the potential impact of commitments on Foreign Direct Investment in the sector. In particular, the Annex on Telecommunications (AT) of 1994 and by the Fourth Protocol of the GATS of 1997, also called Basic Telecommunication Agreement (BTA), have been analyzed in detail, along with the Reference Paper, a short document containing regulatory principles, which constitutes an absolute novelty in the multilateral set of rules on the WTO.
Significantly, the BTA does not only allow for cross-border supply of telecommunications, but also enables foreign companies to provide local, long-distance and international service, including all voice and data service, through any means of network technology. In principle, the provisions it contains would allow foreign suppliers to build their own facilities to

compete with incumbents and to re-sell existing network capacity over private leased circuits.

The result of such analysis has showed how, in effect, 56 of the 69 countries covered by the original 55 schedules annexed to the Fourth Protocol committed to permit foreign ownership or control of all Tlc services and facilities. In 18 countries, including the US, the UK and Germany, foreign-owned companies have been permitted a 100% stake in domestic telecom operators since 1998. The remaining countries decided not to fully liberalize FDI. In particular, some significant WTO members like India, South Africa, Turkey, and Indonesia did not take any commitment at all, or put quite substantial limits on the FDI liberalization effort. Other countries such as Brazil, Canada, Mexico, France, Israel, and Portugal kept foreign investment limits on selected services.

I have shown how, in general, the level or value of Market Access agreed by countries in the WTO agreements can be quite different from the one applied in practice. The liberalization process has begun before WTO negotiations and consequently MA commitments are not necessarily the results of multilateral negotiations. In fact, many countries did not make significant commitments that would go beyond the liberalizing policies they were already implementing or were willing to implement at the time of the negotiations.

A few countries made commitments above the existing situation in their domestic markets and several African and Caribbean countries were actually allowed to make commitments based on their *future* liberalizations. Another group of countries undertook independent liberalization processes after the signature of the WTO agreements, and clearly these measures were never embodied into their original schedules. Central and Eastern European countries, for example, have harmonized their laws and regulations with the *acquis communautaire* in order to speed up the negotiations for their accession to the European Union.

Thus, it has been claimed that one should not easily attribute to the WTO Tlc agreements the liberalizing impetus that is often assigned to multilateral treaties.

Nevertheless, recent events prove that these agreements might play an important role in the liberalization of Tlc, not least in emerging countries. Right after the completion of this dissertation, the WTO has made available on her website the first official documents related to the US Request for the Establishment of a Panel concerning Mexican measures affecting

Tlc services[51], submitted in 2002. The Panel is expected to deal with a number of issues concerning:

1) Mexico's failure to ensure that Telmex provides Interconnection to US Cross-Border Basic Tlc supplier on Reasonable Rates, Terms, and Conditions in violation of specific MA and NT commitments for basic Tlc inscribed in the Mexican GATS schedule of commitments, and of the Reference paper Mexico incorporated in his additional commitments,
2) Mexico's failure to ensure US Basic telecom Suppliers reasonable and nondiscriminatory access to and use of public telecom networks and services.
3) Mexico's failure to provide NT to US-owned commercial agencies, and
4) Mexico's failure to prevent Telmex from engaging in anti-competitive practices.

To all intents and purposes, this is the first case of request for the establishment of a WTO panel based exactly on the competition-enhancing measures I have discussed and one of the parties involved in the panel is precisely a non-developed country. In truth, such a request proves that the GATS/WTO commitments might have much more power than claimed by many critics, even as far as the subtle and difficult implementation of regulatory principles is concerned.

Together with the fundamental legal analysis, I have provided an equally important economic investigation. In order to analyze the incentives that countries have pondered at the signature of the agreements and to evaluate the effect of possible reforms in countries that have not signed or implemented their commitments so far, in chapter 3, I have developed an original model of entry in the Tlc sector of transition and developing countries.

The model has been based on three empirical regularities that characterize Tlc sectors of transition, emerging and developing countries:

- The existence of public monopolies, and an on-going process of de-monopolization and privatization;
- Extended waiting lists reaching 4 years, and consumers willing to put down deposits for the privilege of *waiting* for a phone line[2].

[1] WT/DS204/3.

[2] In countries that launched reforms between 1986 and 1991, the waiting time for a connection, measured in years, was 4.1 in Argentina, 5.7 in Chile, 9.0 in Jamaica, 1.6 in Malaysia, 4.9 in Mexico and 2.5 in Venezuela.

- The intensified activity of multinational corporations (MNC) as active actors in the telecommunications sectors.

Given these regularities, I inferred that some countries experience capacity constraints due to past under-investment in Tlc infrastructure. Under-investment is frequent in transition countries because of the contingent need of securing financial resources to guarantee macro-economic stability, after the beginning of the transition process. Thus, entry of foreign investors through Foreign Direct Investment might be a good policy instrument in the hands of governments who want to remove the under-investment constraints and improve the supply of Tlc services, whereas different modes of entry might naturally have different impacts on domestic Tlc development, ranging from differences in the extent of technology transfer and/or capacity expansion and/or competition implications.
In general, there are different elements the Government must take into consideration when choosing the design of the liberalization process, allowing entry, either partial or full privatization of the public monopolist or direct entry of a second operator: My model shows the effect of entry on quantities, prices and revenues (privatization fees and licenses) under the realistic assumption of capacity constraints, for these different options.
The result obtained highlights the potential role of MNC in removing such capacity constraint in the domestic market. I have shown that, in theory, allowing entry either through privatization or de-monopolization is always better than continuing the constrained public monopoly.

This leaves room to a number of considerations about the importance of regulatory authorities to discipline the pricing mechanism of the Tlc providers, that I have left outside the picture but are worth, nevertheless, research effort.

Since the model has a static nature I suggest a natural extension that would repeat the game once. Imagine that the outcome of the first game is acquisition of the incumbent. Then, the duopoly is formed by a constrained public ex-monopolist and a technology-rich foreign-owned firm. Imagine that the first time the game is played the Government does not want to introduce a completely private duopoly because it is competing with other Governments to attract the MNC, so that it decides to allow either direct entry or privatization but not both (which might explain also why the MNC has all the bargaining power). The Government could still decide to privatize the public monopoly at a later date, after the foreign owned

company has entered, begun to transfer technology and expanded capacity. At this point, the entrance of a second operator through Greenfield FDI would imply a standard duopoly market structure where none of the companies is capacity constrained. In this case, it can be shown that the oligopolists would split the profits sustained by the market almost evenly. By delaying the entrance of a second operator the Government obtains the complete removal of the capacity constraints, the transfer of technology, the privatization fees, the entry fees and manages to reach a Pareto-superior equilibrium by which prices are lower and quantities are higher than they would be otherwise under the circumstances detailed in this chapter. However, this strategy is not risk-less because the Government might be too weak from an institutional point of view to pursue the public national interest independently of the pressures of the established operator. This might explain, in turn, why back in the 1980s and early 1990s many Governments of transition and less developed countries have granted exclusivity periods or delayed privatization until more contingent needs of fresh cash have forced them to move intensify the liberalization by allowing further entries.

To verify the empirical validity of my model, I have constructed a proprietary database called *ISLA-Telecom* and, in chapter 4, I have performed an econometric analysis based on a panel of 46 transition and emerging countries for the period 1989-2000.

Using a set of different indicators for the Tlc sector, I have shown that privatization processes are significantly correlated with increases in teledensity but the foreign-owned share of the incumbent has a negative impact on sectoral indicators. The first finding is consistent with empirical evidence provided by the World Bank [Wallsten (2001)], but the second one is somewhat surprising, especially because it is particularly robust to different specifications of the model. I interpret it as a signal of endogeneity due to the failure to control for the possibility that countries with very poor telecommunication structures might be the ones that transfer higher shares of the incumbent into foreign hands, and viceversa. In addition, the shares of money-making operators might be retained by Governments that want to maximize their revenues and accordingly put a ceiling on the share sold to foreign investors.

As for regulatory reforms, I have confirmed that the establishment of a separate regulator has a positive significant effect on teledensity of a magnitude close to the one of privatization. As for competition, the variable "foreign penetration in the cellular market", which captures the competitive effect coming from foreign presence in the wireless market, apparently increases teledensity, teledensity growth and the ratio between fixed lines and staff, possibly as a response to such a form of competition. Also the number of cellular

subscription per 100 persons responds positively to the establishment of a separate regulator, to the number of operators present on the market and to cellular FDI penetration.

The simple empirical evidence provided is consistent with previous studies and with conventional wisdom. The existence of separate regulator and the privatization processes have positive effects on indicators relating to the efficiency of the telecommunication sector. However, foreign participation in the incumbent itself does not generate positive benefits. Foreign Participation actually carries the risk of realizing a mere transfer of monopoly rents if appropriate measures are not taken to avoid the pure exploitation of domestic markets, which is especially difficult in countries where Governments have little bargaining power with respect to MNC. However, competition from possible substitutes for fixed line connections, such as cellular services, appear to be a successful agent of change, especially when wireless companies are owned by foreign Tlc companies. In effect, setting up a wireless network is relatively easier and more profitable in countries where a large share of the population is stuck in long waiting lists and wishes to access telephone.

To conclude, let me quote Roger Noll (2000) who claims that the "*main hole in research about neoliberal reform of telephone service in developing countries is empirical knowledge. [...] The comparative performance of different methods for reorganizing the incumbent and different regulatory systems and their dependence on the history and circumstances of a country, in some cases have not been identified by theory, and in other cases have not been quantified*".

This dissertation certainly contributes to fill in such hole by focusing on the specific role of foreign companies, which has been previously neglected by the literature both theoretical and empirical.

Despite the research effort, a number of issues remain unresolved and open to further research.

My theoretical analysis underestimates the role of regulation. Besides modeling the role of regulators in transition and developing countries, it would be useful to collect information on the *type* of regulation adopted by the countries I study, because the variation is without doubt large, as highlighted in chapter 1.

In addition, no explanation is given to the empirical fact that most countries actually limit the share of FDI in the Tlc sector. The most straightforward extension of my model would be to change the structure of the bargaining game and remove the assumption that the MNC has all the bargaining power. This would certainly allow explain why there exist caps on foreign equity (and voting) participation and would account for the empirical result I have found by which FDI shares are negatively correlated to Tlc efficiency indicators.

As for the pure empirical analysis, it would be important to collect firm-specific data, rather than country data that are relatively easier to access, but do not provide a more detailed view of the effects of privatization, competition and regulation on firms' strategies. In particular, I expect that regulatory changes might have different effect on the governance structures of privatized Tlc, on investment patterns and on capital structure variations.

Finally, the econometric studies carried out so far neglect the possible effect of endogeneity in the regression analyses, as pointed out in the interpretation of the empirical results. The same factors affecting Tlc performance might well affect reforms, competition, privatization and regulation, also, and more refined econometric techniques are expected to control for endogeneity. It should also be understood that the quality of data collected for non-developed countries is widely acknowledged to be poor and many results stemming from empirical analyses might be negatively affected by such data problems.

The chief research agenda is now to combine the richness of institutional detail with a large and detailed enough statistical sample to support stronger conclusion about the direct links between distinct policy decisions and sector performance.