

MEASURING BARRIERS TO TRADE AND INVESTMENT IN TELECOMMUNICATIONS

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Abstract

This paper shows that liberalization is not just about privatization, competition or regulation, as it also involves the complexity of the regulatory principles of a country. Departing from the traditional method of measuring market reform and using the most recent International Telecommunication Union (ITU) survey data, a set of indices has been constructed to measure the openness of the telecommunications market in the Asia-Pacific Economic Cooperation (APEC) countries, taking into account market access and national treatment as well as regulatory principles within the context of World Trade Organization (WTO).

The composite index of openness in this paper is represented by three main indices: Market Access Index, National Treatment Index and Regulatory Principles Index. The Market Access Index measures the degree of barriers to entry a domestic or foreign firm faces if it wishes to provide telecommunication services in a member country. The National Treatment Index measures the degree of discrimination a foreign firm faces compared to a domestic firm if it wishes to provide services in a member country. The Regulatory Principles Index measures the overall strength of the regulatory principles in competitive safeguards, interconnections policy, universal service, licensing conditions and the independence of the regulator. Sub-indices of each main index are also created.

It is evident that developed economies do not always associate with higher level of market liberalization when different instruments such as market access, national treatment and/or regulatory principles are utilized. Some developing economies are more open than their developed counterparts in some aspects. The composite index of liberalization and its sub-indices provide a useful indicator for gauging the impact of liberalization. Countries may choose a desired level of liberalization in telecommunications sector to enhance telecommunication networks and thus achieve higher economic output in general.

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Section 1: Introduction

Given the importance of the telecommunications sector and the existence of significant barriers to trade and interest in this sector, there have been substantial pressures on many countries to open up their markets, especially with the establishment of General Agreements on Trade in Services (GATS)¹ under the umbrella of the World Trade Organization (WTO) in 1995. The Agreement on Basic Telecommunications (ABT), which sets new rules relating to trade in telecommunication services, came into effect on February 5, 1998. By November 1998, specific commitments regarding market access, national treatment, and the application of pro-competitive regulatory principles were undertaken (partially or fully) by all 89 participants to the ABT.

Member countries which signed the ABT included additional commitments concerning regulatory principles in their schedules. These regulatory principles of ABT are presented in the WTO Reference Paper². The Reference Paper requires member countries to address the issues of dominance of the incumbents and to provide competitive environments for the trading members. It articulates five main principles regarding telecommunications regulation: competitive safeguards, interconnection, universal service, licensing criteria and independent regulator.

It has been pointed out that the above measures are not sufficient to ensure actual competition given the typical strength of the incumbents and their control over local telecommunications network. Also, barriers to market access do not end at the border. Non-tariff barriers such as regulatory practices and firms' anticompetitive behaviour in the telecommunications sector also limit the ability to penetrate a foreign country. Therefore, liberalization of trade and investment in telecommunication services have to deal with both tariff and non-tariff barriers.

Given the importance of the APEC region to the global trade and economic growth, we believe it is a worthwhile project to analyze the role of telecommunications industry in driving the dynamic economies in this region. Furthermore, the composition of the APEC membership allows us to conduct the analysis for both developed and developing countries in a unified framework. For these reasons, we make APEC region the subject of my analysis.

In this paper, we construct a set of indices to measure the degree of openness in the telecommunications industry across APEC countries. To be more specific, we make use of the most recent 2005 ITU survey to

¹ See www.wto.org for detailed principles and developments including GATS and ABT.

² www.itu.int/newsarchive/press/WTPF98/WTOrefpaper.html

construct indices to measure openness in terms of market access, national treatment and regulatory environment. The next section provides literature review on the measurement of trade liberalization in telecommunications. Section 3 discusses data and methodology while Section 4 presents the analysis. Section 5 summarizes the study and draws conclusions.

Section 2: Literature review

Trade liberalization in telecommunications traditionally takes the path of sector reform through privatization, introduction of competition and regulatory reform³. Privatization is always interpreted as a process of transforming from state-owned to private ownership. Varoudakis and Rossotto (2004) define a competitive market as one having low barriers to entry, price towards marginal costs and absence of collusive behaviour among the operators. The most common barriers to trade and investment in services are embedded in regulation as suggested by Deardorff and Stern (2003).

Privatization

Various measures have been utilized to proxy the reform variables. Many researchers, such as in Bortolotti et al (2002), Megginson et al (1994), Wallsten (2001) and Fink, Mattoo and Rathindran (2003) use dummy variables to indicate partial or complete privatization. In fact, it is very rare to observe 100 per cent privatization; governments are somehow directly or indirectly involved in the welfare of the privatized incumbents. As noted by many, privatization is always partial and foreign restrictions are always an issue. Ros (1999) uses a benchmark of at least 50 per cent private ownership to indicate if the incumbent is privatized or not. Bortolotti et al (2002) use state ownership as an additional variable in their study.

Regulatory reform

Although Levy and Spiller (1996) broadly categorize regulations into governance and content, the existence of an independent regulatory regime is adopted as the proxy for reform in regulation by many researchers, such as Bortolotti et al (2002), Wallsten (2001), Fink, Mattoo and Rathindran (2003) and

³ Most empirical literature puts it this way, but Manner (2002, p.6-9) defines the process of achieving competition as: privatization+liberalization+effective regulation; in the book, privatization refers to a country eliminating complete or partial government ownership in its telecommunications service providers; liberalization is the process of allowing competitive service providers into a specific sector of the telecommunications industry or into the telecommunications industry as a whole that has formerly been closed to new entrants; effective regulation is the creation of a rational regulatory scheme, which provides for a transparent process and allows the regulator to enforce its rules in an effective manner.

Estache, Goicoechea and Manacorda (2006). The independent regulatory measure in their studies is a dummy variable indicating whether the country has a separate telecommunications regulatory agency not directly under the control of a ministry. Gauging the independent regulatory authority using a dummy variable may be too simplistic, since there is no such complete independence in the real world.

A few studies have attempted to quantify the degree of independence of regulators. Edwards and Waverman (2006) construct an index for the national regulatory authorities (NRA) which are responsible for the telecommunications industry within the European Union. The index, which measures the regulatory independence from the influence of government, draws upon the NRA characteristics, member appointments and terms of office, resources and experience.

The NRA characteristics are quantified by Edwards and Waverman (2006) through variables such as whether or not the NRA is a single or multi-sector jurisdiction, whether or not it is a single or multi-member body, the source of funding, reporting, power over interconnection issues and shared role with the government.

Gutierrez (2003) focuses on regulatory governance rather than incentive regulation. His regulatory framework index is based on three dimensions, namely the legal mandate of the NRA, separation of regulatory functions from providing telecommunication services and the independence of the NRA, and four main characteristics, namely autonomy and independence, accountability, clarity of roles and objectives, and transparency and participation. These four characteristics are then formulated into six main factors such as financial and budgetary independence, removal of commissioners, power to set tariffs, power to fine operators, mechanism of solving disputes, and finally, the existence of a public hearing mechanism.

Introducing competition

The number of licensed mobile operators not owned by the incumbent is used as an indicator of competition in the telecommunications market by Bortolotti et al (2002) and Wallsten (2001). Ros (1999) uses a dummy variable to indicate if competition is allowed in the local, long distance or international segments of the telecommunication services, while Fink, Mattoo and Rathindran (2003) only look at the local service to determine if there is competition in a country. ITU considers that a segment of service, such as mobile, is competitive if more than one operator is allowed in the market, while Warren (2000) considers it competitive only when there are at least three operators.

Trade liberalization

Many who study trade liberalization use dummy variables to indicate market reform in their empirical analysis. Some use an index as a measure of liberalization, but this is far from perfect from the perspective of the WTO. In the context of the WTO on trade liberalization, quantification of the GATS schedules commences with the pioneering work of Hoekman (1995) who develops a three-category weighting method: “none” if no restrictions are applied on either market access or national treatment; “unbound” if no policies are bound for a given mode of supply/sector; “other” – if restrictions are listed for a mode of supply/sector.

With the implementation of ABT, Marko (1998) sets out various impediments covered by the agreement using a standard framework of market access and national treatment to examine the four modes of supply (cross-boarder, consumption abroad, commercial presence and presence of natural persons). A frequency measure of the telecommunication impediments is calculated for each country based on its commitments.

On the other hand, Warren (2000) comes out with a more comprehensive measure in the context of trade liberalization than other indices computed in the literature. He details a set of frequency indices of impediments to trade in telecommunication services that moves away from the traditional reliance on the GATS or various other trade agreements as the primary source. The indices are constructed from the ITU survey of actual policies, rather than those inferred from commitments made in trade negotiations.

Warren (2000) attempts to distinguish between market access and national treatment under which a few sub-indices in trade and investment are also created. The indices under market access measure policies that discriminate against both domestic and international potential suppliers who wish to provide cross-border telecommunication services, and also those locals and foreigners who intend to invest in fixed and mobile network services. The indices under national treatment measure the policies that discriminate against potential foreign suppliers of cross-border services, and also those foreigners who intend to operate fixed and mobile services through investment. Warren (2000) also provides an index of liberalization based on the simple average of the above indices.

Warren (2000) makes use of the 1997 domestic and international resale data from ITU to capture the restriction on market access of all potential suppliers. The market access index on investment of all potential suppliers is based on data such as whether or not competition exists in the fixed/mobile services; whether or not policy allowed for competition and the percentage of incumbents that are privatized.

Different weights have been assigned on these issues. He relies on call-back services data and foreign ownerships for the construction of the national treatment indices. His work, however, is incomplete, as it does not take into consideration the regulatory principles of ABT as specified in the Reference Paper. The concern of the literature not addressing the issue of regulatory principles is expressed by Blouin (2000).

Instead of using dummy variables or a simple index of openness to capture reform as discussed in previous studies, we extend the work of Warren (2000) using the most recent 2005 ITU survey to construct a policy index or a composite index in terms of market access, national treatment and regulatory principles taking into account the status of privatization, competition and regulation of each country. Thus, the policy index is capable to measure the degree of trade liberalization in telecommunications, within the context of WTO.

Section 3: Data and methodology

The main source of data used in this paper comes from the ITU World Telecommunications Regulatory Database. The ITU conducts an annual Telecommunication Regulatory Survey (the ITU survey) by sending out a questionnaire to all its members, which are mainly the regulators of the industry in member countries. The coverage of the survey in telecommunications is more comprehensive than other databases from other organizations such as the OECD or APEC. We believe that the survey data have a high degree of cross-country consistency because the answers to the survey were prepared by its members in a telecommunications-working group.

The survey is divided into six main sections: Section I is about a member country's legislative framework; Section II asks questions concerning regulatory institution; Section III surveys the regulatory issues and processes; Section IV asks about the universal access/service policy; Section V investigates the sector structure; and Section VI seeks responses about the future plans of each member country.

We construct these indices for 19 of the 21 APEC member economies. The remaining two APEC members, Hong Kong and Taiwan, are excluded because they are not included in the 2005 ITU Survey data. In addition, the data on market share, the restriction on foreign shareholdings, the adoption of the Reference Paper by member economies and policy pertaining to number portability and pre-selection are extracted from the APEC (2005).

The Composite Index (CI) of Liberalization in this paper consists of three main components: Market Access (MA), National Treatment (NT) and Regulatory Principles (RP). Within each component, sub-

indices are also created. In general, higher scores imply higher degree of market liberalization. At the later part of this section, variations of weighted RP and CI are also created. Unless otherwise specified, the equally weighted RP and CI are used as a representative throughout this paper.

Market Access Index

In the area of market access (MA), we construct two sub-indices: MA/Trade and MA/Invest. MA/Trade measures the degree of openness to market access through trade in telecommunication services. Warren (2000) uses policy data on resale and leased line to proxy the extent of the restrictions on MA/Trade. In this study, we use the most recent ITU survey data on resale of voice service for both domestic and international calls or services, and both fixed line and mobile services. we assign a score of one (1) if resale of voice services is permitted and 0 otherwise, for each of the four (4) questions. The total possible maximum score is four (4), and lowest score is zero (0). The first four columns of Table 3.1 provide the scores of each country on resale of voice services.

The second sub-index MA/Invest measures the extent of openness in market access through investment. We utilize survey data such as the number of fixed-line and mobile services operators, level of competition allowed in the telecommunication services. We categorize the services into seven segments: local, domestic, international, data, leased lines, mobile services and Internet services. We also use the percentage of incumbents privatized as well as the market shares⁴ of largest operators in domestic, long distance and mobile services markets. Following Warren (2000), we rank the number of operators that are actually operating in the market as the most important indicator of competition (weight=3), followed by the level of competition allowed by the regulator (weight=2), and the percentage of shares owned by government in the incumbent operator (weight=1).

There is no fixed rule as to how many market players should exist to constitute a competitive market in fixed line and mobile. Many, including Warren (2000), suggest that if a market has at least 3 players, it is sufficiently competitive; while ITU defines that the mobile service market is sufficiently competitive if it has at least one mobile operator. Following Warren (2000), we determine that if a country has at least three operators, a score of three (3) is assigned, a score of two (2) for two operators, and a score of one (1) is for monopoly. Since the weight for each of fixed line and mobile service is three (3), the maximum score is thus nine (9), and the minimum score is three (3).

⁴ Market shares data on local access line, long distance and mobile are extracted from APEC (2005).

Table 3.1
Resale of voice services, callback services and FDI

	Country	Resale of voice services				Total	Callback	FDI
		Domestic		International				
		Fixed lines	Mobile	Fixed lines	Mobile			
1	Australia	1	1	1	1	4	1	0.3500
2	Brunei	1	0	0	0	1	0	0.3000
3	Canada	1	1	1	1	4	1	0.3200
4	Chile	1	1	1	1	4	0	1.0000
5	China	0	0	0	0	0	0	0.2500
6	Indonesia	1	0	1	0	2	0	0.3500
7	Japan	1	1	1	1	4	1	1.0000
8	Korea	1	1	1	0	3	1	0.5000
9	Malaysia	1	1	1	1	4	0	0.4900
10	Mexico	0	0	0	0	0	0	0.5000
11	New Zealand	1	1	1	1	4	1	1.0000
12	Papua NG	0	0	0	0	0	0	0.0000
13	Peru	1	0	1	0	2	0	1.0000
14	Philippines	0	0	0	0	0	0	0.3500
15	Russia	0	0	0	0	0	0	0.0000
16	Singapore	1	1	1	1	4	1	0.7000
17	Thailand	0	0	0	0	0	0	0.2500
18	United States	1	1	1	1	4	1	1.0000
19	Viet Nam	0	0	0	0	0	0	0.0000

Notes:

- 1 Resale of voice service: Score of 1 if Yes, and 0 otherwise.
- 2 Callback services: Score of 1 if allowed, and 0 otherwise.
- 3 FDI: percentage of foreign direct investment allowed.

Sources:

- 1 ITU World Telecommunication Regulatory Database (2005).
- 2 APEC (2005).

The survey data by ITU provide the level of competition allowed in each country. We assign a score of one (1) if the service is competitive, 0.5 for partial competitiveness, 0.2 for duopoly, and zero (0) for monopoly. As there are seven segments of services in the study, the maximum score is thus seven (7) if all segments of services are competitive, and the minimum score is zero (0) if all the services are monopoly. With the assigned weight of two for the level of competition allowed, we could have a maximum score of fourteen (14).

As the number of players in the market is not a perfect indicator of the existence of a competitive market, we include a market share element to measure the market power of the largest operator, which is usually the incumbent. This includes market shares of local access line, and long distance and mobile services not owned by the largest operator. Following privatization, we use the shares not owned by the government in the privatized incumbent. Thus, we have a total maximum score of four (4) given a weight of one (1). Table 3.2 provides the scores of each country on the number of operators, level of competition and market

shares. As such, the total possible score for Market Access Index is 36, for the most liberalized market, and the minimum score is three (3) for the least liberalized market.

Each of the MA/Trade and MA/Invest indices is normalized to one. The overall Market Access Index is constructed from the simple average of these two normalized sub-indices.

National Treatment Index

For the National Treatment (NT) Index, we also have two sub-indices: NT/Trade and NT/FDI. The NT/Trade Index measures the degree of openness to foreign entrants through trade. Following Warren (2000), we utilize data on call-back services⁵. We assign a score of one (1) if a call-back service is allowed, and a score of zero (0) if not.

The second sub-index NT/FDI Index is a direct measure of openness to foreign ownership of domestic service providers. For this sub-index, we use data on foreign ownership allowed in percentage. The score of zero (0) is given to those member economies that do not allow foreign ownership. Obviously, the higher the percentage, the more open that economy is to foreign investors.

The total possible score for each of the sub-indices is one (1) for the most open economy and zero (0) for a closed economy. Columns 4 and 5 of Table 4.1 provide the score of each country on call-back services and FDI, respectively. The overall National Treatment (NT) Index is calculated the same way as the overall Market Access Index, by taking the average of the two normalized sub-indices namely NT/Trade and NT/FDI.

Regulatory Principle Index

The Regulatory Principle Index (RP) is built on the regulatory principles outlined in the WTO Reference Paper. Accordingly, there are five sub-indices representing the five principles: Competitive Safeguard (CS), Interconnections Policy (IC), Universal Service Index (US), Licensing (LS) and Independent Regulator (IR).

⁵ Call-back or international call-back occurs when the originator of a call is immediately called back in a second call as a response. A call-back is perceived as a method of making low-cost international calls via a third country, where call charges are relatively lower.

Table 3.2
Number of operators, level of competition and market shares

Country	Number of operators			Level of competition allowed in the services							Market shares not owned by government or largest operator					
	Fixed lines	Mobile	Total	Local	Long distance	International	Data	Leased lines	Internet	Mobile	Total	Incumbent	Local	Long distance	Mobile	Total
1 Australia	3	3	6	1	1	1	1	1	1	0	7	0.49	0.10	0.32	0.48	1.39
2 Brunei	1	1	2	0.5	0.5	0.5	0.5	0.5	0.5	0	3	0.00	0.00	0.00	0.00	0.00
3 Canada	3	3	6	1	1	1	1	1	1	1	7	1.00	0.04	0.26	0.65	1.95
4 Chile	3	3	6	0.5	1	1	1	0.5	1	1	6	1.00	0.08	0.67	0.77	2.52
5 China	3	2	5	0.5	0.5	0.5	0.5	0.5	1	0.5	4	0.89	0.00	0.66	0.34	1.89
6 Indonesia	2	3	5	0.5	0.5	0.5	1	1	1	1	5.5	0.49	0.05	0.15	0.42	1.11
7 Japan	3	3	6	1	1	1	1	1	1	1	7	0.54	0.16	0.53	0.43	1.66
8 Korea	3	3	6	1	1	1	1	1	1	1	7	1.00	0.06	0.15	0.59	1.80
9 Malaysia	3	3	6	1	1	1	1	1	1	1	7	0.33	0.05	0.10	0.59	1.07
10 Mexico	3	3	6	1	1	1	1	1	1	1	7	1.00	0.03	0.32	0.22	1.57
11 New Zealand	3	2	5	1	1	1	1	1	1	1	7	1.00	0.05	0.25	0.43	1.73
12 Papua NG	1	1	2	0	0	0	0	0	0.5	0	0.5	0.00	0.00	0.00	0.00	0.00
13 Peru	3	3	6	1	1	1	1	0	0	1	5	1.00	0.01	0.25	0.48	1.74
14 Philippines	3	3	6	1	1	1	1	1	1	1	7	1.00	0.37	0.30	0.56	2.23
15 Russia	1	3	4	0.2	0.2	0.2	1	0	0	1	2.6	0.49	0.07	0.12	0.63	1.31
16 Singapore	2	3	5	1	0	1	1	1	1	1	6	0.20	0.30	0.22	0.55	1.27
17 Thailand	1	3	4	0.5	0	0	0	1	1	0.5	3	1.00	0.48	0.00	0.35	0.83
18 United States	3	3	6	1	1	1	1	1	1	1	7	1.00	0.11	0.65	0.77	2.53
19 Viet Nam	3	3	6	1	1	1	1	1	1	1	7	0.00	0.02	0.00	0.40	0.42

Notes:

- 1 Number of operators: score of 3 if there are three or more than three operators operating in the market; score of 2 if two operators, and score of 1 if monopoly.
- 2 Level of competition allowed: Score of 1 if competitive, score of 0.5 if partial competitive, score of 0.2 if duopoly, and score of 0 if monopoly.
- 3 For those member economies reported domestic and international separately as % of market shares in long distance, the average number is used here.
- 4 Market shares of long distance for Philippines is estimated as 70% based on fixed line business, see PLDT News, www.pldt.com.ph

Sources:

- 1 ITU World Telecommunication Regulatory Database (2005).
- 2 APEC (2005).

It is difficult to measure each principle individually and independently. In fact, these principles may be interrelated and/or overlapped. For example, the competitive safeguard may be related to the independence of the regulator; interconnections policy is related to universal service and licensing; universal service is related to licensing, etc. To refrain from overlapping wherever possible, we do not use the same survey question (data) twice, even though a given question may also be relevant to the other regulatory principles. After obtaining the respective scores, each of the sub-indices is normalized to one (1), giving a total maximum score of five (5) for the main index.

(a) Competitive safeguard

The sub-index, RP/CS, aims to measure the competitiveness of the environment provided and committed by a country. The principle of competitive safeguard specifies the prevention of anticompetitive activities such as cross subsidization, use of information obtained by competitors, and withholding of technical or commercial information.

Cross-subsidization refers to the practice of charging higher prices for a service or a sector and using these surpluses to subsidize other services or sectors that are priced below cost. For instance, the incumbent can overcharge customers for services over which it still has a *de facto* monopoly, such as local residential service, in order to cut rates in competitive markets. The practices of anti-competitive acts which depress demand in one market (or a supplier) and induce demand in the other market promote inefficiency in the economic system. Thus, the existence of regulations or competition laws provides some safeguards against these practices.

Most countries use measures such as accounting separation, separation of non-competitive activities, tariff rebalancing, price cap, license conditions and regulations to prevent activities such as cross-subsidization, use of information from competitors and use of information for anti-competitive purposes. These measures are however qualitative in nature and are difficult to quantify.

In fact, many countries have the competitive safeguards in place in terms of laws and regulations, but the effectiveness and the efficiency of the mechanism of enforcement is difficult to measure. The number of violations or disputes amongst the market players could be a good indicator for the enforcement variable, but it is ambiguous because it may be lower in countries with more efficient laws and regulations.

Table 3.3
Measuring competitive safeguard

	Country	Q1	Q2	Q3	Q4	Q5	Total
1	Australia	1	0	1	1	1	4
2	Brunei	1	0	0	0	0	1
3	Canada	1	0	1	1	1	4
4	Chile	1	0	1	1	0	3
5	China	1	0	0	0	0	1
6	Indonesia	1	0	1	0	0	2
7	Japan	1	0	0	0	0	1
8	Korea	1	1	1	1	1	5
9	Malaysia	0	1	0	1	1	3
10	Mexico	1	0	1	1	1	4
11	New Zealand	1	1	1	0	1	4
12	Papua NG	1	0	0	0	0	1
13	Peru	1	0	1	1	1	4
14	Philippines	0	1	0	0	0	1
15	Russia	0	0	0	0	0	0
16	Singapore	1	0	1	1	1	4
17	Thailand	1	0	0	0	0	1
18	United States	1	1	1	0	0	3
19	Viet Nam	0	0	0	0	0	0

Notes:

- Q1: Have your country adopted the WTO Reference Paper in full?
 Q2: Does the regulatory authority have the enforcement powers?
 Q3: Does a competition authority exist in your country?
 Q4: Are appeals to the decision of the regulatory authority allowed?
 Q5: Are public consultations mandatory before regulatory decisions are made?
 For Q1-Q5: Score of 1 if Yes, 0 otherwise.

Sources:

- 1 ITU World Telecommunication Regulatory Database (2005).
 2 APEC (2005).

Nevertheless, APEC (2005) suggests that the adoption of the WTO Reference Paper by member economies is a good measure for the competitive safeguard. Apart from this, we make use of the ITU survey data on the existence of a competition authority. We also include survey data on factors such as enforcement power of the regulatory body, whether or not appeals to decision are allowed and whether or not public consultations process is mandatory. We assign a score of one (1) if the response is “yes” and zero (0) otherwise. Thus, we obtain a total possible score of five (5) and a minimum of zero (0). Table 3.3 provides the score of each country pertaining to the competitive safeguard measure.

(b) Interconnections policy

The degree of transparency and effectiveness of interconnections policy is measured by the sub-index, RP/IC. The interconnection regime is the main subject of the Reference Paper. Most potential new entrants face large capital expenditures constraints to build their own full telecommunications network and facilities. As a result, they need to be able to interconnect with the incumbents to provide services.

Table 3.4
Measuring interconnections policy

Country	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Total
1 Australia	0	0	1	1	1	1	1	1	6
2 Brunei	0	0	1	0	0	0	0	0	1
3 Canada	0	1	0	1	1	1	1	1	6
4 Chile	0	0	0	1	1	1	0	0	3
5 China	0	1	1	0	0	0	0	0	2
6 Indonesia	0	0	1	0	0	0	0	0	1
7 Japan	1	1	1	1	1	0	1	1	7
8 Korea	1	1	0	1	0	1	1	1	6
9 Malaysia	0	1	1	1	1	0	1	0	5
10 Mexico	0	0	0	0	0	1	1	0	2
11 New Zealand	0	1	1	1	1	1	1	1	7
12 Papua NG	1	1	0	0	1	0	0	0	3
13 Peru	1	1	1	0	1	1	1	0	6
14 Philippines	0	1	0	0	1	0	0	0	2
15 Russia	0	0	0	0	0	0	0	0	0
16 Singapore	1	0	1	1	1	1	1	1	7
17 Thailand	0	0	0	0	0	0	0	0	0
18 United States	1	0	0	1	1	1	1	1	6
19 Viet Nam	0	1	1	1	0	0	0	0	3

Notes:

- Q1 Are interconnections agreements made public?Are interconnections agreements made public?
- Q2 Are interconnections prices made public?Are interconnections prices made public?
- Q3 Are the operators required to publish Reference Interconnection Offer?
- Q4 Is unbundled access required?
- Q5 Is infrastructure sharing for mobile operators permitted?
- Q6 Are decisions on dispute resolution reported on the regulatory authority's website?
- Q7 Is pre-selection available?
- Q8 Is number portability available?

For Q1-Q8: Score of 1 if Yes, 0 otherwise.

Source:

ITU World Telecommunication Regulatory Database (2005).

According to the Reference Paper, interconnection with the major supplier should be made available at any technically feasible point in the network, under nondiscriminatory terms, conditions and fair quality. The interconnection should also be provided in a timely fashion, on terms, conditions and cost-oriented rates. It also calls for the interconnection agreement to be transparent and for an independent body to be responsible for dispute settlement.

Although interconnection policy has become a benchmark for many member countries, it has some drawbacks because the Reference Paper only provides the general principles. Translating these principles into interconnection agreements that comply with the WTO commitments is a new challenge for many countries, especially the developing countries. Nowadays, in most member countries, governments have taken the initiative to set up the terms for interconnection since the incumbents have no incentives to interconnect with the new entrants.

We use the ITU survey data on whether or not interconnection agreements and prices are publicly available, whether or not there is a requirement to publish reference interconnection offers and the reporting of decisions on dispute resolutions. We also include the response if unbundled access is required for interconnections, as well as whether there is a policy on infrastructure sharing for mobile operators.

We assign a score of one (1) if the answer is “yes” for each of the six (6) responses, and a score of zero (0) otherwise. There is a range of six (6) for the maximum score and zero (0) for the minimum score. Table 3.4 shows the score of each country in terms of interconnection policy.

The policies of number portability⁶ and pre-selection⁷ are expected to affect the competitiveness of the mobile and long distance markets. We assume that the availability of number portability and pre-selection is the result of interconnection. There are generally three types of number portability: local/fixed, mobile and non-geographic. Pre-selection is usually implemented for long distance, international, fixed to mobile and all geographic calls. The data on these policies are extracted from APEC (2005).

A score of one (1) is allocated for each of number portability and pre-selection if it is available in a country and a score of zero (0) is allocated otherwise. In total, the maximum score for this index is eight (8), with a minimum of zero (0).

(c) *Universal service*

This sub-index, RP/US, measures the competitiveness of the universal service policy. Under the principle of universal service, member countries are encouraged to develop their universal service program provided it is administered in a transparent, nondiscriminatory and competitively neutral manner. In fact, the efficient interconnection regime will help to achieve the objective of universal service – to enable greater access to the largest group of people and users.

The main objective of universal service is a social one, that is, to ensure access to telecommunication services by all its citizens in a country. However, OECD (1995) challenges that universal service and

⁶ Number portability refers to the ability of a customer to transfer an account from one service provider to another without requiring a change in number.

⁷ Pre-selection is the mechanism by which end users can designate the carrier that they prefer to carry all or a certain segment (e.g. long distance) of their calls, the pre-selected carrier becomes the default carrier for all such calls.

competition are not mutually exclusive. OECD (1995) spells out the principles and framework of universal services and argues that universal service and competition can be achieved together.

The ITU survey lacks measurable variables pertaining to the definition, identification, delivery, costing, funding and monitoring of universal service. The survey data tend to skew towards funding issues. Nevertheless, we make use of the survey data on whether or not there is a definition for universal service, obligation of operators to provide the services below cost as well as responsible for the cost.

Table 3.5
Measuring universal service

Country	Q1	Q2	Q3	Q4	Total
1 Australia	1	0	1	0.8	2.8
2 Brunei	1	0	1	0	2
3 Canada	1	0	0	0.8	1.8
4 Chile	1	0	0	1	2
5 China	1	0.5	1	0.5	3
6 Indonesia	1	0	1	0.8	2.8
7 Japan	1	0	1	0	2
8 Korea	1	0.5	1	0.8	3.3
9 Malaysia	1	1	1	0.8	3.8
10 Mexico	1	0	0	0.5	1.5
11 New Zealand	1	0	0	0	1
12 Papua NG	1	0	0	0.5	1.5
13 Peru	1	0.5	1	0.8	3.3
14 Philippines	1	0	0	0	1
15 Russia	0	0	0	0	0
16 Singapore	1	0	1	0	2
17 Thailand	0	0	0	0	0
18 United States	1	0	0	0.8	1.8
19 Viet Nam	1	0.5	1	1	3.5

Notes:

- Q1: Has your country defined universal access or services?
Score of 1 if Yes, 0 otherwise. Score of 1 if Yes, 0 otherwise.
- Q2: Do you require any operators to provide the services?
On a competitive basis, score=1;
All operators/all network/facilities-based/all service based operators, score=0.5;
Others, score=0
- Q3: Do you require any operators to offer below cost prices to any subscribers?
Score of 1 if Yes, 0 otherwise.
- Q4: How the costs of universal service are funded?
If by Universal Service Fund,
Fund contributed by government/operators/others, score=1
Fund operators only, score=0.8
If by government/operators/international agencies, score=0.5
If by operators only, score=0

Source:

ITU World Telecommunication Regulatory Database (2005).

We assign a score of one (1) if the particular country has a definition of universal service and zero (0) otherwise. In principle, the universal service obligations should be allocated on a competitive basis, meaning that all potential suppliers are free to submit their bids to serve the universal target (which can be an area or a group of people); thus we assign a score of one (1) for this answer; a score of 0.5 is assigned if all operators, or all network/facilities-based operators, or all service-based providers are obligated to provide the access or service; a score of zero (0) is assigned if only the incumbent and/or some operators

are obliged to provide universal service. On the other hand, in a competitive environment, the universal services should not be provided below cost; thus we assign a score of one (1) if it is not and a score of zero (0) if it is provided below cost.

Pertaining to funding issues, for countries which have an operational universal service fund, where the source of fund comes from government and operators and/or other institutions, we assign a score of one (1); however, if the contribution comes solely from operators, we assign a score of 0.8.

According to OECD (1995), direct funding from government is the best in principle as it avoids distortionary effects associated with incorrect pricing of services. Typically, the government's subsidy comes through a universal service fund; some countries impose levies on subscribers to avoid barriers to entry to potential service providers.

For countries without an operational universal service fund, we assign a score of one (1) if the cost of universal service comes from government, 0.5 if the obligation is financed through a combination of government and operators and/or any other institutions, and zero (0) if it is solely financed by operators because the operators would most likely resort to cross-subsidy between their own services.

In other words, the existence of an operational universal service fund (though entirely funded by operators) is still superior to direct funding from operators in cases without a universal service fund. The maximum score for this index is four (4) and the minimum is zero (0). Table 3.5 provides the score of each country in terms of universal service.

(d) Licensing/authorization regime

The sub-index, RP/LA, measures the ease of market entry under various licensing regimes. While serving as a tool of allocation of scarce resources, licenses are also used by governments to raise revenues. Thus, licensing criteria can be barriers to market entry if not handled with a proper and transparent process. The Reference Paper calls for the commitments of member countries on the licensing process. Where a license is required, the criteria, terms and conditions of individual licenses, and reasons for denial of a license, should be provided.

ITU (2004, p.39) classifies market entry restrictions into four main modes: license, authorization, registration, and notification. A license (or individual license), usually customized and detailed, is issued

to a single service provider through some competitive selection process; Authorization (or class license) normally contains general conditions, issued without a competitive selection; Registration requires the submission of more information than Notification before commencing operations and the regulator may reject registration.

Table 3.6
Measuring licensing conditions

	Country	Q1: Licensing conditions in services							Q2	Total
		Local	Long distance	International	Data	Leased lines	Internet	Mobile		
1	Australia	0	0	0	0	0	0	0	1	1
2	Brunei	0	0	0	0	0	0	0	0	0
3	Canada	1	2	0	2	0	2	2	1	10
4	Chile	1	1	1	1	1	2	1	1	9
5	China	0	0	0	0	0	0	0	1	1
6	Indonesia	0	0	0	0	0	0	0	0	0
7	Japan	2	2	2	3	2	3	2	1	17
8	Korea	0	0	0	3	0	3	0	0	6
9	Malaysia	0	0	0	0	0	0	0	1	1
10	Mexico	0	0	0	0	0	0	0	0	0
11	New Zealand	3	3	3	3	3	3	3	1	22
12	Papua NG	0	0	0	0	0	0	0	0	0
13	Peru	0	0	0	0	0	1	0	1	2
14	Philippines	0	0	0	0	0	3	0	1	4
15	Russia	0	0	0	0	0	0	0	0	0
16	Singapore	0	0	0	0	0	0	0	1	1
17	Thailand	0	0	0	0	0	0	0	0	0
18	United States	0	0	0	0	0	0	0	1	1
19	Viet Nam	0	0	0	0	0	0	0	1	1

Notes:

- Q1: What is the licensing/authorization regime for each of the 7 services?
Score of 3 if "notification", 2 if "registration", 1 if "authorization", and 0 if "licence"
Q2: Are licensing agreements publicly available?
Score of 1 if Yes, 0 otherwise. Score of 1 if Yes, 0 otherwise.

Source:

ITU World Telecommunication Regulatory Database (2005).

We make use of the survey data on licensing/authorization regime for each of the seven services discussed above. Since the notification mode is the easiest way to enter the market, we thus assign a score of three (3) if the market entry requires a “notification”; a score of two (2) if it requires a “registration”; a score of one (1) if it requires an “authorization”; and a score of zero (0) if a license is required. In other words, license is the most restrictive requirement on prospective entrants. As these apply to the seven segments of the services under study, the total possible score for this response is twenty one (21) if market entry requires a “notification”, and the minimum score is zero (0) if it requires a license.

In addition, in countries where licensing agreements are publicly available, we assign a score of one (1) and a score of zero (0) otherwise. In this case, we also assign a score of one (1) to Japan and New Zealand since none of their services requires a license to operate. The score of each country in terms of licensing is presented in Table 3.6.

(e) *Independence of regulators*

The sub-index, RP/IR, measures the degree of independence of regulators in telecommunications. Member countries which committed themselves according to the principles of the Reference Paper are to ensure the independence of their regulators. The Reference Paper specifies that the regulatory body has to be separated from, and not accountable to, any supplier of telecommunication services and that the decisions and procedures used by regulators must be impartial with respect to all market participants.

It is widely believed that weak regulators are less able to promote competition policies, and thus new entrants may be unable to compete in a fair market environment. For example, Fink, Matoo and Ranthidran (2003) argue that independent regulator is a necessary condition for effective regulations.

Many member countries in the WTO are aware of the close relationship between market liberalization and the independence of regulators. In the past, the provision of telecommunication services in many developing countries was the sole responsibility of the government, which at the same time was responsible for regulating prices and formulating policies. According to a survey by the International Telecommunication Union (ITU), there are currently at least 101 member countries which have separate functions for the telecommunications regulator and for the provision of services, and 52 of them are also separated from their sector minister (ITU, 2002, p.13). However, governments in developing countries are less inclined to empower regulatory function to these regulatory agencies.

Whenever the data allow it, we adopt the methodologies used by Edwards and Waverman (2006) and Gutierrez (2003). As discussed, Edwards and Waverman (2006) draw upon the NRA characteristics, member appointments and term of office, resources and experience, while Gutierrez (2003) works on the regulatory governance⁸. In fact, ITU (2002b) suggests that the efficiency of a regulator can be evaluated through its functions like rulemaking, enforcement, dispute resolution as well as reviewing regulatory decisions⁹.

According to the ITU survey, four member economies do not have a separate regulatory authority. They are China, Japan, Russia and Viet Nam. Some regulators (Chile and Indonesia), although separated from the ministry, are not autonomous in decision making. Thus, we assign a score of one (1) to each if (a) the

⁸ His index is based on three dimensions and four characteristics.

⁹ ITU (2002c), *Trends in Telecommunication Reform 2002*, p. 45-54.

NRA is separated from the ministry and telecommunication operations; (b) it is a collegial body¹⁰; and (c) it is autonomous in decision making, and a score of zero (0) if otherwise.

We also make use of the survey responses on the legal mandate of the regulatory authority. If the NRA is created by laws, a score of one (1) is assigned, and a score of zero (0) if it is not. Further, if the NRA reports to the legislature or parliament, a score of one (1) is assigned, and a score of zero (0) if it reports to Ministry or Minister. Many, including Edward and Waverman (2006), have suggested multi-sector agencies enjoy a greater degree of independence from their sector ministries. Some of the reasons are that a multi-sector agency has the ability to access pooled resources and information, as well as to minimize political interference. In cases where the NRA has multi-sector jurisdiction, a score of one (1) is assigned, and a score of zero (0) otherwise. If the existence of the NRA is at least two years, a score of one (1) is assigned, and a score if zero (0) otherwise.

There are various sources of NRA funding such as regulatory fees, license fees, auctions of licenses, numbering fees, contributions from operators and government appropriations. Since we are interested in the degree of independence of the regulator, we believe that the higher the government appropriation, the less independent the regulator. For this, we make use of the percentage of the budget not funded by government. The total maximum score for the sub-index is eight (8), and zero (0) is the minimum. The responses are presented in Table 3.7.

The main RP index is calculated by assuming equal weight, that is, 20 per cent for each of the five regulatory principles. It can be argued that universal service should be given a smaller weight because this requirement does not deal with market openness directly. For this reason, apart from the equal weighted RP (identified as RP1), two variations of weighted RP, namely RP2 and RP3 are computed. In RP2, the weight for RP/US is assumed to be 10 per cent, while the balance is shared equally among the other four regulatory principles. This means that the other four principles have a weight of 22.5 per cent each. On the other hand, RP3 is constructed based on the zero-weight assumption for the RP/US, that is, the other four principles are weighted 25 per cent each.

¹⁰ According to the ITU, there are two types of decision-making bodies within the regulator are predominant: a single regulator in the form of a director, director-general or chairman which has quick decision-making process in a fast changing industry but can be more subject to political influences or interferences; a collegial body on the other hand is a quasi-judicial board or commission led by a chairman and usually assisted by a secretariat has the advantage of offering a participatory approach and a sharing of responsibility but slower in decision-making process. See Reference on web resources: ITU Training Workshop on licensing (2005).

Table 3.7
Measuring independence of regulatory authority

Country	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Total
1 Australia	1	1	1	1	0	0	1	1	6
2 Brunei	1	1	0	1	0	0	0	1	4
3 Canada	1	1	1	1	1	1	0	1	7
4 Chile	1	0	0	0	0.46	0	0	1	2
5 China	0	0	0	0	0	0	0	1	1
6 Indonesia	1	0	0	1	0	0	0	1	3
7 Japan	0	0	0	0	0	0	0	1	1
8 Korea	1	1	1	1	0	0	1	1	6
9 Malaysia	1	1	1	1	1	1	0	1	7
10 Mexico	1	0	1	1	0	0	1	1	5
11 New Zealand	1	1	1	1	0.36	1	1	1	7
12 Papua NG	1	0	0	0	1	0	0	1	3
13 Peru	1	0	1	1	1	0	1	1	6
14 Philippines	1	1	1	1	0	0	0	1	5
15 Russia	0	0	0	0	0	0	0	1	1
16 Singapore	1	1	1	0	0	0	0	1	4
17 Thailand	1	1	1	1	0	0	1	0	5
18 United States	1	1	1	1	0.964	0	1	1	7
19 Viet Nam	0	0	0	0	0	0	0	1	1

Notes:

- 1 Australia and Japan: financed by only gov appropriations.
<http://www.oecd.org/dataoecd/56/11/35954786.pdf>
 2 Papua NG only financed by licensed fee.

- Q1: Is the NRA separated from the ministry as well as telecoms operations? Score of 1 if Yes, 0 otherwise.
 Q2: What is the legal mandate of the NRA? Score of 1 if by law, 0 otherwise.
 Q3: Is the NRA autonomous in decision making? Score of 1 if Yes, 0 otherwise.
 Q4: Is the NRA a collegial body? Score of 1 if Yes, 0 otherwise.
 Q5: What is the percentage of budget not financed by the government?
 Q6: Does the NRA have multi-sector jurisdiction? Score of 1 if Yes, 0 otherwise.
 Q7: Does the NRA report only to legislative or parliament? Score of 1 if Yes, 0 otherwise.
 Q8: Is the existence of the NRA is at least two years? Score of 1 if Yes, 0 otherwise.

Source:

ITU World Telecommunication Regulatory Database (2005).

Composite Index

With the three main indices, namely Market Access, National Treatments and Regulatory Principle constructed, we compute the Composite Index (CI). Corresponding to the variations in the RP Index, variations of weighted CI are also constructed. Accordingly, CI1 is based on equal weight of each MA, NT and RP1; CI2 uses the same weight for each of the main indices, that is, MA, NT and RP2. Similarly, CI3 makes use of RP3, together with MA and NT. In addition, a fourth variation, CI0, is computed based on equal weight for MA and NT but zero weight for RP (all its variations). The last variation corresponds to the one in Warren (2000).

Table 4.1
Descriptive statistics

Variable	Mean	Median	Maximum	Minimum	Std. Dev.	Obs
MA/Trade	0.53	0.50	1.00	0.00	0.46	19
MA/Invest	0.78	0.90	0.96	0.19	0.23	19
MA	0.65	0.66	0.98	0.10	0.31	19
NT/Trade	0.37	0.00	1.00	0.00	0.50	19
NT/FDI	0.49	0.35	1.00	0.00	0.36	19
NT	0.43	0.25	1.00	0.00	0.36	19
RP/CS	0.48	0.60	1.00	0.00	0.32	19
RP/IC	0.48	0.38	0.88	0.00	0.31	19
RP/US	0.51	0.50	0.95	0.00	0.27	19
RP/LS	0.18	0.05	1.00	0.00	0.29	19
RP/IR	0.54	0.63	0.92	0.13	0.28	19
RP	0.44	0.44	0.77	0.03	0.21	19
CI	0.51	0.60	0.90	0.09	0.28	19

Source: ITU World Telecommunication Regulatory Database (2005) and own computations.

Section 4: Analysis

Descriptive statistics

The descriptive statistics and correlations between indices for the APEC countries are presented in Tables 4.1 and 4.2.

From Table 4.1, there is some indication of policy variations amongst the APEC member economies as shown by the large standard deviations across the indices. This is not surprising since APEC comprises both developed (OECD) and developing countries, with different perceptions about trade negotiation and liberalization. The degree of openness as reflected in the Market Access Index (MA) ranges from a minimum of 0.10 (Papua New Guinea) to a maximum of 0.98 (the United States). The National Treatment Index covers the whole range between 0 and 1, demonstrating the extreme between allowing 100 per cent foreign ownership (and call-back services) in some countries, and foreign ownerships (and call-back services) are not allowed at all in some other countries in the APEC. The range of the Regulatory Principle (RP) index is between 0.03 (Russia) and 0.77 (New Zealand), with a standard deviation of 0.21. The gap is also seen in the Composite Index (CI) which stretches from 0.09 (Russia) to 0.90 (New Zealand), with a ratio of standard deviation to mean of 54 per cent.

Table 4.2 provides Pearson correlation coefficients. The correlation coefficient between MA/Trade and NT/FDI is 0.69 and is significant at the 1 per cent level. This suggests that allowing higher limits on

foreign ownership is likely to be associated with the removal of some trade restrictions such as the resale policy of voice services. The low correlation (0.52) between MA/Invest and NT/FDI provides weak evidence that allowing higher foreign ownership enhances market access (through investment) in the telecommunications market, and vice versa. A correlation of 0.73 between RP/CS and RP/IR suggests the importance of independent regulators in enhancing competitive safeguards, and vice versa.

Among the main indices, MA, NT and RP seem to be highly correlated with each other, with coefficients of approximately 0.80. It may be inferred that countries that have better regulatory principles tend to be more competitive in the market access and national treatment, and vice versa.

Figure 4.1 shows the main indices of liberalization in telecommunications, namely Market Access, National Treatment, Regulatory Principle, as well as the Composite Index for the 19 member economies in APEC. Recall that the higher the index value, the more liberalized the economy is.

It is generally perceived that developed countries are more liberalized than their less developed counterparts. Thus, my analysis will focus on those developed countries that do not score higher than some of the developing countries based on the performances of the main indices and their respective sub-indices.

Market Access

In this section, we discuss the performance of the sub-indices as well as that of the main index. The indices are reported in Table 4.3. The rankings of the top 5 and the bottom 5 countries of each category are listed on Table 4.4¹¹.

It is not surprising to observe that most developed countries and just a few developing countries perform well in the MA/Trade Index, as they adopt a very open policy (which is measured by the resale of voice services in both the domestic and international calls regardless of whether the calls are executed through a fixed line or mobile phone). In the MA/Invest Index, the United States maintains a leading position in providing the best market access through investment. Canada, however, ranks number 3, behind the Philippines, see Table 4.4.

¹¹ In some indices, there are more than one country having the same score, in this case more than 5 are reported.

Table 4.2
Pearson correlation coefficients

	MA/Trade	MA/Invest	MA	NT/Trade	NT/FDI	NT	RP/CS	RP/IC	RP/US	RP/LS	RP/IR	RP	CI
1 MA/Trade	1												
2 MA/Invest	0.54 ***	1											
3 MA	0.95 ***	0.77 ***	1										
4 NT/Trade	0.74 ***	0.44 ***	0.72 ***	1									
5 NT/FDI	0.69 ***	0.52 ***	0.71 ***	0.45 ***	1								
6 NT	0.84 ***	0.55 ***	0.84 ***	0.90 ***	0.79 ***	1							
7 RP/CS	0.65 ***	0.53 ***	0.69 ***	0.56 ***	0.64 ***	0.65 ***	1						
8 RP/IC	0.81 ***	0.55 ***	0.81 ***	0.81 ***	0.64 ***	0.86 ***	0.67 ***	1					
9 RP/US	0.29 **	0.37 ***	0.35 ***	0.03	0.10	0.07	0.29 **	0.38 ***	1				
10 RP/LS	0.52 ***	0.36 ***	0.53 ***	0.53 ***	0.57 ***	0.64 ***	0.25 ***	0.54 ***	-0.14	1			
11 RP/IR	0.46 ***	0.34 ***	0.47 ***	0.41 ***	0.35 ***	0.45 ***	0.73 ***	0.47 ***	0.05	0.15	1		
12 RP	0.80 ***	0.63 ***	0.83 ***	0.69 ***	0.65 ***	0.79 ***	0.86 ***	0.89 ***	0.45 ***	0.52 ***	0.70 ***	1	
13 CI	0.93 ***	0.69 ***	0.95 ***	0.84 ***	0.78 ***	0.95 ***	0.76 ***	0.91 ***	0.27 **	0.61 ***	0.55 ***	0.91 ***	1

Notes:

*** Significant at 1 percent level

** Significant at 5 percent level

Source:

ITU World Telecommunication Regulatory Database (2005) and own computations.

Figure 4.1: Index of liberalization in APEC countries

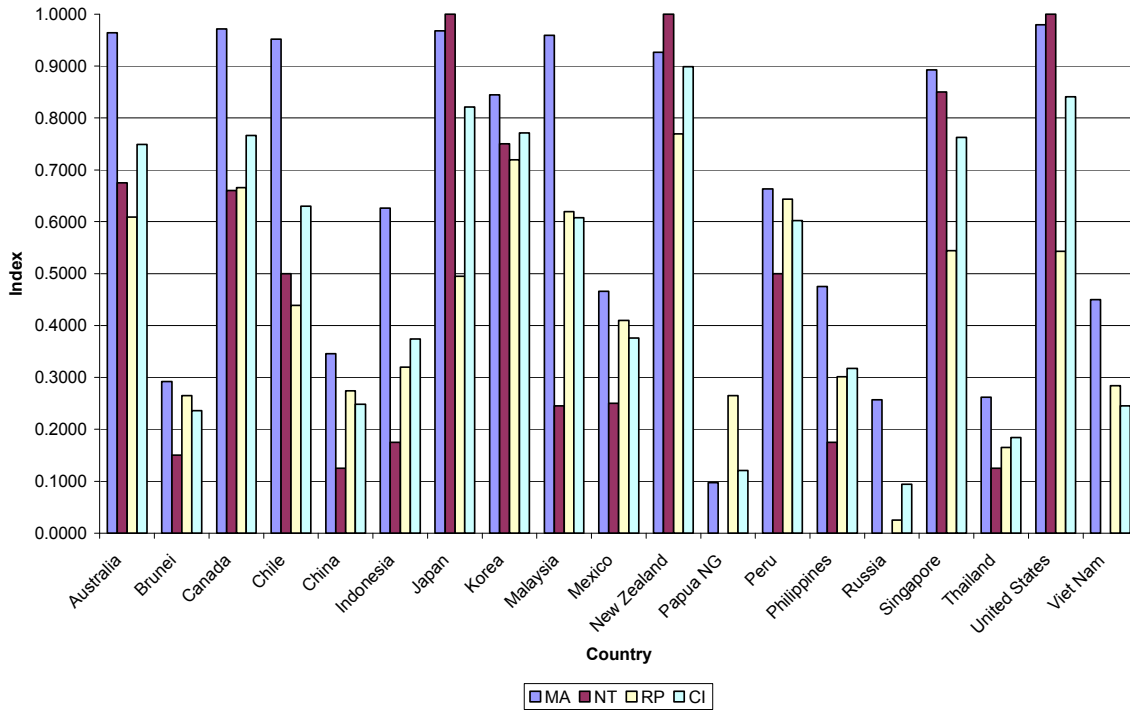


Table 4.3
Quantifying market access and national treatment policies

	Country	MA/Trade	MA/Invest	MA	NT/Trade	NT/FDI	NT
1	Australia	1.0000	0.9275	0.9638	1	0.3500	0.6750
2	Brunei	0.2500	0.3333	0.2917	0	0.3000	0.1500
3	Canada	1.0000	0.9431	0.9715	1	0.3200	0.6600
4	Chile	1.0000	0.9033	0.9516	0	1.0000	0.5000
5	China	0.0000	0.6914	0.3457	0	0.2500	0.1250
6	Indonesia	0.5000	0.7531	0.6265	0	0.3500	0.1750
7	Japan	1.0000	0.9350	0.9675	1	1.0000	1.0000
8	Korea	0.7500	0.9389	0.8444	1	0.5000	0.7500
9	Malaysia	1.0000	0.9186	0.9593	0	0.4900	0.2450
10	Mexico	0.0000	0.9325	0.4663	0	0.5000	0.2500
11	New Zealand	1.0000	0.8536	0.9268	1	1.0000	1.0000
12	Papua NG	0.0000	0.1944	0.0972	0	0.0000	0.0000
13	Peru	0.5000	0.8261	0.6631	0	1.0000	0.5000
14	Philippines	0.0000	0.9508	0.4754	0	0.3500	0.1750
15	Russia	0.0000	0.5142	0.2571	0	0.0000	0.0000
16	Singapore	1.0000	0.7853	0.8926	1	0.7000	0.8500
17	Thailand	0.0000	0.5231	0.2615	0	0.2500	0.1250
18	United States	1.0000	0.9592	0.9796	1	1.0000	1.0000
19	Viet Nam	0.0000	0.9006	0.4503	0	0.0000	0.0000

Source: ITU World Telecommunication Regulatory Database (2005) and own calculations.

Table 4.4
Ranking of Market Access and National Treatment Indices

MA/Trade			NT/Trade		
Top	Country	MA/Trade	Bottom	Country	NT/Trade
1	Australia	1.0000	1	Australia	1
2	Canada	1.0000	2	Canada	1
3	Chile	1.0000	3	Japan	1
4	Japan	1.0000	4	Korea	1
5	Malaysia	1.0000	5	New Zealand	1
6	New Zealand	1.0000	6	Singapore	1
7	Singapore	1.0000	7	United States	1
8	United States	1.0000			

MA/Invest			NT/FDI		
Top	Country	MA/Invest	Bottom	Country	NT/FDI
1	United States	0.9592	1	Chile	1.0000
2	Philippines	0.9508	2	Japan	1.0000
3	Canada	0.9431	3	New Zealand	1.0000
4	Korea	0.9389	4	Peru	1.0000
5	Japan	0.9350	5	United States	1.0000

MA			NT		
Top	Country	MA	Bottom	Country	NT
1	United States	0.9796	1	Japan	1.0000
2	Canada	0.9715	2	New Zealand	1.0000
3	Japan	0.9675	3	United States	1.0000
4	Australia	0.9638	4	Singapore	0.8500
5	Malaysia	0.9593	5	Korea	0.7500

MA/Trade			NT/Trade		
Bottom	Country	MA/Trade	Top	Country	NT/Trade
1	China	0.0000	1	Brunei	0
2	Mexico	0.0000	2	Chile	0
3	Papua NG	0.0000	3	China	0
4	Philippines	0.0000	4	Indonesia	0
5	Russia	0.0000	5	Malaysia	0
6	Thailand	0.0000	6	Mexico	0
7	Viet Nam	0.0000	7	Papua NG	0

MA/Invest			NT/FDI		
Bottom	Country	MA/Invest	Top	Country	NT/FDI
1	China	0.6914	1	China	0.2500
2	Thailand	0.5231	2	Thailand	0.2500
3	Russia	0.5142	3	Papua NG	0.0000
4	Brunei	0.3333	4	Russia	0.0000
5	Papua NG	0.1944	5	Viet Nam	0.0000

MA			NT		
Bottom	Country	MA	Top	Country	NT
1	China	0.3457	1	China	0.1250
2	Brunei	0.2917	2	Thailand	0.1250
3	Thailand	0.2615	3	Papua NG	0.0000
4	Russia	0.2571	4	Russia	0.0000
5	Papua NG	0.0972	5	Viet Nam	0.0000

Source: ITU World Telecommunication Regulatory Database (2005) and own calculations.

The high score of the Philippines is mainly due to the fact that the remaining market shares not owned by the largest operator are significantly larger in the Philippines than in Canada, Japan and Australia. In Canada, for instance, the main operator in the fixed-line services controls about 96 per cent of the local access lines and 74 per cent of the long distance market. This potentially causes barriers to entry to new entrants seeking to penetrate the Canadian markets. In the Philippines, the respective market shares are only 63 per cent and 70 per cent. While the United States, Canada, Japan and Australia maintain their status as the most liberalized markets as measured by the main Market Access Index, New Zealand (0.9268), drops behind less developed countries such as Malaysia (0.9593) and Chile (0.9516), owing to the existence of a duopoly in the mobile market.

National Treatment

The National Treatment Index and its sub-indices for all the countries are presented in Table 4.10. As all the developed countries allowed call-back services, they obtain a perfect score in the area of NT/Trade. Chile, Japan, New Zealand, Peru and the United States allow 100 per cent foreign direct investment and they are the most foreign investment-friendly nations as measured by NT/FDI. Canada, however, with a foreign investment cap at 32 per cent, falls far behind many developing countries like Mexico (8th, 50 per cent), Malaysia (9th, 49 per cent), Indonesia (11th, 35 per cent) and the Philippines (12th, 35 per cent). Canada ranks 13th in terms of the NT/FDI Index.

In terms of the overall National Treatment (NT) Index, Japan, New Zealand and the United States score perfectly. In fact, most advanced economies are fairly open to foreign service providers. Although Chile does not impose any limits on foreign direct investment, the policy that prohibits call-back services causes its ranking to fall behind many of its developed counterparts¹². Canada, on the other hand, ranks seven in the overall National Treatment Index.

Regulatory Principe Index

The performance of the sub-indices and the main index is depicted in Table 4.5. As expected, three out of the four member countries that do not fully adopt the WTO Reference Paper and/or are not members of WTO rank in the bottom 5 in the RP/CS Index. The exception is Malaysia. As Japan does not have a separate regulator, it performs poorly in the RP/CS Index and ranks far behind many developing countries

¹² Chile and Russia did not response to the ITU survey, by default; we assume that it was disallowed.

like Chile and Malaysia. On the other hand, the United States ranks lower than Peru¹³. In terms of interconnections policy (RP/IC), Peru performs as well as its more developed counterparts like Australia and Canada. Japan, New Zealand and Singapore have the best interconnections policy among the APEC members.

Table 4.5
Quantifying regulatory principles

	Country	CS	IC	US	LS	IR	RP1	RP2	RP3
1	Australia	0.8000	0.7500	0.7000	0.0455	0.7500	0.6091	0.5977	0.5864
2	Brunei	0.2000	0.1250	0.5000	0.0000	0.5000	0.2650	0.2356	0.2063
3	Canada	0.8000	0.7500	0.4500	0.4545	0.8750	0.6659	0.6929	0.7199
4	Chile	0.6000	0.3750	0.5000	0.4091	0.3075	0.4383	0.4306	0.4229
5	China	0.2000	0.2500	0.7500	0.0455	0.1250	0.2741	0.2146	0.1551
6	Indonesia	0.4000	0.1250	0.7000	0.0000	0.3750	0.3200	0.2725	0.2250
7	Japan	0.2000	0.8750	0.5000	0.7727	0.1250	0.4945	0.4939	0.4932
8	Korea	1.0000	0.7500	0.8250	0.2727	0.7500	0.7195	0.7064	0.6932
9	Malaysia	0.6000	0.6250	0.9500	0.0455	0.8750	0.6191	0.5777	0.5364
10	Mexico	0.8000	0.2500	0.3750	0.0000	0.6250	0.4100	0.4144	0.4188
11	New Zealand	0.8000	0.8750	0.2500	1.0000	0.9200	0.7690	0.8339	0.8988
12	Papua NG	0.2000	0.3750	0.3750	0.0000	0.3750	0.2650	0.2513	0.2375
13	Peru	0.8000	0.7500	0.8250	0.0909	0.7500	0.6432	0.6205	0.5977
14	Philippines	0.2000	0.2500	0.2500	0.1818	0.6250	0.3014	0.3078	0.3142
15	Russia	0.0000	0.0000	0.0000	0.0000	0.1250	0.0250	0.0281	0.0313
16	Singapore	0.8000	0.8750	0.5000	0.0455	0.5000	0.5441	0.5496	0.5551
17	Thailand	0.2000	0.0000	0.0000	0.0000	0.6250	0.1650	0.1856	0.2063
18	United States	0.6000	0.7500	0.4500	0.0455	0.8705	0.5432	0.5548	0.5665
19	Viet Nam	0.0000	0.3750	0.8750	0.0455	0.1250	0.2841	0.2102	0.1364

Notes:

- 1 RP1: Equal weight of 0.20 for each of the 5 principles; including weight for US is 0.20.
- 2 RP2: Equal weight of 0.225 for each of the 4 principles; weight for US=0.1.
- 3 RP3: Equal weight of 0.25 for each of the 4 principles; weight for US is 0.
- 4 CI0: Equal weight for MA and NT; RP is excluded.
- 5 CI1: Equal weight for MA, NT and RP1.
- 6 CI2: Equal weight for MA, NT and RP2.
- 7 CI3: Equal weight for MA, NT and RP3.

Source: ITU World Telecommunication Regulatory Database (2005) and own calculations.

However, according to the RP/US Index, many developing economies, especially Malaysia and Viet Nam, move against the trend by securing the top two highest rankings while New Zealand ranks in the bottom five under the same category. The United States and Canada also rank far behind many developing economies. The poor rankings of these developed countries are attributable to the funding issues and to the obligation to provide universal service; both of which make these countries less competitive. In developed economies like the United States, Canada and New Zealand, the regulators require that the operators provide universal service at below costs. Also, instead of requiring the obligations to be allocated on a

¹³ This is by default as the United States does not in the ITU survey explicitly indicate if appeals to the decision of the regulatory authority are allowed, and if it makes public consultations a mandatory process.

competitive basis or make all operators obliged, many developed economies require only some operators to provide the services.

New Zealand has the best licensing regime in the APEC as reflected by the RP/LC Index. This is because all its seven segments of services in the study do not require a license to commence operation. Chile is much ahead of Australia and the United States. This is because most services in Chile only require registration while Australia and the United States require licenses for all services in order to enter the markets.

As for the RP/IR Index, a developing country, Malaysia, which does not fully commit to the adoption of WTO's Reference Paper, appears on the top 5 of the index (see Table 4.6). This is partly due to the fact that the regulators in many developed countries are financed through government appropriation, as in Australia (100 per cent), New Zealand (64 per cent) and the United States (3.6 per cent). The funding from government potentially makes those regulators less independent from political influences in the decision making process. One may argue that, although some developing countries do not rely on government funding, their decision making process is more likely to subject to political influences and corruption.

Given their high scores in the RP/US Index, Peru and Malaysia outperform their more developed counterparts, like Australia and the United States, although in general, developed countries still perform better (in terms of ranking) than developing countries in the main RP index.

Weighted Regulatory Principle Index

Table 4.7 shows the ranking of each country using the variations of weighted RP. Based on the top-5 list, Malaysia slips one level below, to sixth place, swapping position with Australia when RP2 is used as compared to RP1. Other top four positions remain unchanged. When the weight for RP/US reduces to zero, the ranking for Malaysia falls further to eighth, behind Singapore. Meanwhile, Canada and Korea switch positions, with Canada now ranking second, and Korea third.

On the bottom-5 list, the ranking of Papua New Guinea improves. It disappears from the list when the weight for RP/US reduces from 20 to 10 per cent and zero, subsequently. Instead, Viet Nam is added to the list. Russia is not affected by the change in the weight for RP/US, it consistently ranks at the bottom while other bottom-5 countries stay in tact on the list.

Table 4.6
Ranking of Regulatory Principle Sub-indices

RP/CS			RP/LS		
Top	Country	CS	Bottom	Country	LS
1	Korea	1.0000	1	New Zealand	1.0000
2	Australia	0.8000	2	Japan	0.7727
3	Canada	0.8000	3	Canada	0.4545
4	Mexico	0.8000	4	Chile	0.4091
5	New Zealand	0.8000	5	Korea	0.2727
6	Peru	0.8000			
7	Singapore	0.8000			

RP/IC			RP/IR		
Top	Country	IC	Bottom	Country	IR
1	Japan	0.8750	1	New Zealand	0.9200
2	New Zealand	0.8750	2	Canada	0.8750
3	Singapore	0.8750	3	Malaysia	0.8750
4	Australia	0.7500	4	United States	0.8705
5	Canada	0.7500	5	Australia	0.7500
6	Korea	0.7500	6	Korea	0.7500
7	Peru	0.7500	7	Peru	0.7500
8	United States	0.7500			

RP/US			RP/IS		
Top	Country	US	Bottom	Country	IS
1	Malaysia	0.9500	1	Brunei	0.2000
2	Viet Nam	0.8750	2	China	0.2000
3	Korea	0.8250	3	Japan	0.2000
4	Peru	0.8250	4	Papua NG	0.2000
5	China	0.7500	5	Philippines	0.2000
			6	Thailand	0.2000
			7	Russia	0.0000
			8	Viet Nam	0.0000

RP/US			RP/IS		
Top	Country	US	Bottom	Country	IS
1	Malaysia	0.9500	1	Mexico	0.3750
2	Viet Nam	0.8750	2	Papua NG	0.3750
3	Korea	0.8250	3	New Zealand	0.2500
4	Peru	0.8250	4	Philippines	0.2500
5	China	0.7500	5	Russia	0.0000
			6	Thailand	0.0000

Source: ITU World Telecommunication Regulatory Database (2005) and own calculations.

Table 4.7
Ranking of weighted Regulatory Principles Index

	Country	RP1	Rank	RP2	Rank	RP3	Rank
1	New Zealand	0.7690	1	0.8339	1	0.8988	1
2	Korea	0.7195	2	0.7064	2	0.6932	3
3	Canada	0.6659	3	0.6929	3	0.7199	2
4	Peru	0.6432	4	0.6205	4	0.5977	4
5	Malaysia	0.6191	5	0.5777	6	0.5364	8
6	Australia	0.6091	6	0.5977	5	0.5864	5
7	Singapore	0.5441	7	0.5496	8	0.5551	7
8	United States	0.5432	8	0.5548	7	0.5665	6
9	Japan	0.4945	9	0.4939	9	0.4932	9
10	Chile	0.4383	10	0.4306	10	0.4229	10
11	Mexico	0.4100	11	0.4144	11	0.4188	11
12	Indonesia	0.3200	12	0.2725	13	0.2250	14
13	Philippines	0.3014	13	0.3078	12	0.3142	12
14	Viet Nam	0.2841	14	0.2102	17	0.1364	18
15	China	0.2741	15	0.2146	16	0.1551	17
16	Brunei	0.2650	16	0.2356	15	0.2063	15
17	Papua NG	0.2650	17	0.2513	14	0.2375	13
18	Thailand	0.1650	18	0.1856	18	0.2063	16
19	Russia	0.0250	19	0.0281	19	0.0313	19

Notes:

- 1 RP1: Equal weight of 0.20 for each of the 5 principles; including weight for US is 0.20.
- 2 RP2: Equal weight of 0.225 for each of the 4 principles; weight for US=0.1.
- 3 RP3: Equal weight of 0.25 for each of the 4 principles; weight for US is 0.

Source: ITU World Telecommunication Regulatory Database (2005) and own calculations.

Weighted Composite Index

The weighted CI is presented in Table 4.8. New Zealand is on the top of the list as the most liberalized economy in the region based on CII, while Russia scores the lowest as the least liberalized economy. Chile is the most liberalized economy amongst the developing countries, even more liberalized than some of the OECD countries like Mexico.

The United States, which is perceived by many as the most liberalized country, fails to receive the top ranking in CII; it ranks after New Zealand due to its lower score in the Regulatory Principle Index (RP1). Canada, on the other hand, loses to Japan and Korea because of its low score in the National Treatment Index.

A small country and a newly industrialized economy, Singapore, is seen to be more liberalized than its larger and advanced counterparts like Australia. Although Australia has a more competitive market access policy and a better regulatory principle than Singapore, that effect is offset by the less favorable national treatment policy, especially pertaining to foreign direct investment.

Table 4.8
Ranking of Composite Index

	Country	CI1	Rank	CI2	Rank	CI3	Rank	CI0	Rank
1	New Zealand	0.8986	1	0.9202	1	0.9419	1	0.9634	3
2	United States	0.8409	2	0.8448	2	0.8487	2	0.9898	1
3	Japan	0.8207	3	0.8205	3	0.8202	3	0.9838	2
4	Korea	0.7713	4	0.7669	5	0.7625	6	0.7972	7
5	Canada	0.7658	5	0.7748	4	0.7838	4	0.8158	6
6	Singapore	0.7622	6	0.7641	6	0.7659	5	0.8713	4
7	Australia	0.7493	7	0.7455	7	0.7417	7	0.8194	5
8	Chile	0.6300	8	0.6274	8	0.6248	8	0.7258	8
9	Malaysia	0.6078	9	0.5940	10	0.5802	10	0.6022	9
10	Peru	0.6021	10	0.5945	9	0.5869	9	0.5815	10
11	Mexico	0.3754	11	0.3769	11	0.3783	11	0.3581	12
12	Indonesia	0.3738	12	0.3580	12	0.3422	12	0.4008	11
13	Philippines	0.3173	13	0.3194	13	0.3215	13	0.3252	13
14	China	0.2483	14	0.2284	14	0.2086	15	0.2353	14
15	Viet Nam	0.2448	15	0.2202	16	0.1955	17	0.2251	15
16	Brunei	0.2356	16	0.2258	15	0.2160	14	0.2208	16
17	Thailand	0.1838	17	0.1907	17	0.1976	16	0.1933	17
18	Papua NG	0.1207	18	0.1162	18	0.1116	18	0.0486	19
19	Russia	0.0940	19	0.0951	19	0.0961	19	0.1285	18

Notes:

- 1 CI0: Equal weight for MA and NT; RP is excluded.
- 2 CI1: Equal weight for MA, NT and RP1.
- 3 CI2: Equal weight for MA, NT and RP2.
- 4 CI3: Equal weight for MA, NT and RP3.

Source: ITU World Telecommunication Regulatory Database (2005) and own calculations.

When the weight for RP/US reduces to 10 per cent as in the case of CI2 in Table 4.8, Canada moves one level up to the fourth on the top-5 list as compared to the CI1 list, switching position with Korea, while the other top three countries are unaffected by the change. Meanwhile, Korea slips further to 6th place when RP/US is given a zero weight (CI3). New inclusion to the top-5 list is Singapore. However, when RP is totally excluded from the weighted CI as in CI0, New Zealand has to give way to the United States and Japan, to rank third while Canada and Korea both fall off the chart, ranking sixth and seventh, respectively.

Section 5: Conclusions

Departing from the traditional method of measuring market reform, we make use of the most recent ITU survey data to construct indices of trade liberalization in terms of market access, national treatment, and the regulatory principles, all within the context of WTO.

There is evidence that developed countries do not always have higher levels of market liberalization. Some developing countries may be more open than their developed counterparts. We have shown that liberalization is not just about privatization, competition or purely regulation, as it also involves the regulatory principles of a country. Weak regulatory principles may pose as a barrier to entry to potential entrants. By taking into accounts these factors, we now have a better-represented index of market liberalization.

In the construction of the indices, we have used subjective weights for variables. For example, we treat market access, national treatment and regulatory principles as having equal weights. In reality, the effects of policy reforms in these three areas may be of different magnitudes, which would call for different weights. In the measure of openness of market access through investment in fixed line and mobile service, we place the existence of competition higher than the level of competition allowed, and both are placed higher than the privatization and market shares. These weighting schemes may be subject to debate.

Yet, the composite index of liberalization and its sub-indices are still useful for gauging the impact of liberalization. Countries can choose the desired level of liberalization in telecommunications sector in order to enhance telecommunications network and to achieve higher economic output.

Among the bottom five, both Papua New Guinea and Russia are constantly on the list across CI0, CI1, CI2 and CI3. Brunei improves its ranking if a smaller weight for RP/US is used. Other countries are quite constant in their ranking across the various variations of weighted CI.

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