ECONOMIC THEORY AND PRACTICES

-- TELECOMMUNICATION POLICY AND REGULATION FOR COMPETITION

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Workshop on Telecommunication Policy and Regulation for Competition

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0. Introduction

The International Telecommunications Union asked me in May of 2005 to assist with Workshop on Telecommunication Policy and Regulation for Competition, in Bangkok, Thailand. This workshop, to be held July 11-July 15 of 2005, is scheduled to be attended by members of Office of the National Telecommunications Commission (NTC) and the Ministry of Information and Communications Technology (MICT) of Thailand.

The subject matter of this paper and my presentations during the workshop is as follows:

- Competition in telecommunication sector with respect to network externalities and game theory
- Regulatory impact analysis and cost & benefit analysis
- Competition indicator; and
- Case studies of other countries for their competition policy and regulation.

This paper is designed to serve as the reading material before the workshop, guidebook during the workshop, and as a reference material after the conclusion of the workshop. It is emphasized that this memorandum is not intended nor claims to be an exhaustive exposition of the topics covered. I am grateful to the Government of Thailand and the ITU for the invitation to this workshop.

1. Competition in the Telecommunications Sector

While economic theory is generally applicable to different countries and different situations, it should be remembered that any “one-size-fits-all” policy should be reviewed for its compatibility to specific situation in Thailand.

Competition in the telecom sector results in externalities and gaming which are critical to the development of competition for existing and advanced telecommunication services. Key questions to be framed include the following:

- What are the network externalities and how can the regulators create an efficient market within the context of the externalities?
- Does gaming lead to inefficient outcome? Second-best outcome? What can regulators do?
- What are some of the tools useful in Cost/Benefit analyses in conjunction with determining policies?
- What are some of the lessons from other country examples?

In answering these questions, the fundamental economic issue for the regulator is to create an environment for the industry that promotes the development of *competition*, leading to a healthy development of the industry, and not necessarily the interests of particular competing firms.[1]

For example, too much focus on creating the largest number of competitors could have the consequence of providing entry, with little of none of the benefits in cost savings and innovation that come from efficient competition. In the United States, the FCC's haste to induce entry into the local exchange market, it propounded from early on that incumbents be forced to unbundled network elements. A justice of U.S. Supreme court opined the following

> I believe the FCC's present unbundling rules are unlawful because they do not sufficiently reflect or explore this other side of the unbundling coin… Nor do they adequately explain why an incumbent should be forced to share virtually every aspect of its business. As the majority points out, … they seem to assume, without convincing explanation, that the more the incumbent unbundles, the better. Were that the Act's objective,.. would Congress have so emphasized the importance of competition? A totally unbundled world -- a world in which competitors share every part of an incumbent's existing system, including, say, billing, advertising, sales staff, and work force (and in which regulators set all charges) -- is a world in which competitors would have little, if anything, to compete about.

Impact of regulation is often complex and should be thought out carefully. Passage of new regulation is always met by gaming by industry participants to skirt the

spirit of the regulation and, sometimes, defeat the purpose of the new regulation. For this and for the reason that externalities are affected by regulation and gaming, the policy makers would be well served to think ahead of the real consequences of new regulation in the changing technological markets such as the telecom market.

1.1. Review of Network Externalities

A network externality exists when the amount that one party is willing to pay for access to a network depends on who or how many other parties are connected to it. In general, network industries such as telecom industry is believed to be exhibit externality features that makes the value of a network as a function similar to square of the number of users (n^2). Therefore, as the number of users increases, the value of the network can increase exponentially.

From the cost side, economics of networks have traditionally viewed the telecommunications networks as having a downward sloping cost curve. This means that in some cases, justification can be made for a regulated natural monopoly of one service provider responsible for a region(s) to lower total costs and realize most network externalities. It was thought that the capital intensive nature of building networks, coupled with the nature of services that make them "essential", argued in favor of regulated (through ROR or Price Cap) utility pricing that permitted monopoly status of dominant firms.

However, the industry is faced with new technologies and the new paradigm in communication which recognizes the convergence in voice and data, landline and wireless, local and global aspects of communication. The advent of new technologies—and associated lower capital costs—shattered the case for natural monopoly and network externalities have taken on new and updated meanings.

[1] From an economic perspective, whether something is a prerequisite to competition depends on whether competition, but not particular competitors, can exist.

DEFINITION OF ECONOMIC EXTERNALITY

Economic externalities in broad terms describe costs or benefits that do not directly affect the economic agents involved in a transaction or any economic activity. Consider these examples.

Example 1. Company A buys from Company B thereby benefiting both companies. However, in this transaction, Company A pollutes a river, killing fish. The fishermen will be harmed because there will be less fish to be caught. However, Company A does not care if there is no law prohibiting water pollution. Here, there is a negative externality.

Example 2. Telco A of a developing country has footprint over 50% of households in that country, leaving the rest of the country unconnected. With a start-up of a wireless Company B that covers 100% of the country, the customers of Telco A can now call their relatives in previously unserved areas. Telco A's revenues go up despite not investing in wireless Company B's network. Here, there is a positive externality to Telco A. Wireless Company B also receives positive externality from Telco A's existing network, as its network would not be as valuable without its customers ability to connect to Telco A's customers. Here, Telcos A and B provide network externalities to each other.

TYPES OF NETWORK EXTERNALITIES

In a basic network externality concept, the externality exists when: there is the ability to communicate on-net (i.e., inside the network that is chosen) and the ability to communicate off-net (i.e., with customers of other networks). With the advent of additional communication modes, services and applications, it is instructive to consider three types of network externalities.

Communication Network: Markets where the benefit of consumers comes from the ability to communicate with other consumers via the network.

Systems Network: Complementary markets such as computers and software.

Mixed Network: Combination of Communications and Systems Networks.

As telecom carriers are increasingly diversifying their service offerings, it is important to note that there are network effects or externalities between carriers' "sub-markets" or "sub-networks". In systems and in mixed networks, there is an "up" market (services) and a "down" market (customers) and the sizes of the "up" and of the "down" markets affect the benefits of the customers in the "down" market. Moreover, the size of the "down" market will determine the incentives for service providers in the "up" market to join a given system.

IMPLICATIONS OF NETWORK EXTERNALITIES

In some cases, carriers with larger sizes of installed bases derive competitive advantage if the quality of communication on-net is superior to the quality of communication off-net. In the extreme case, if the networks are not compatible, the network with the largest installed base holds the greatest competitive advantage. Generally, incompatibility of networks in any degree is likely to have anti-competitive consequences.

Reliance and affinity for the promotion of network externalities can have unintended consequences when future investments and non-compatible technologies are discouraged. In an evolving industry such as telecoms, the desire to build on existing technologies to ensure the greatest short-term network externalities for the new network can possibly steer the evolution of the industry in the wrong direction which can result in less than efficient network for the industry in the long run. Regulators play a significant role in determining standards for wireless and other technologies. While realizing network externalities are generally good, regulators must be mindful of not being unduly enticed by the short-term gains of realizing the maximum network externalities.

Issues to consider:

- Compatibility between networks (domestic and global)
- Switching costs (between networks or service)
- Long-term growth

Firms rely on features such as high installed base, high switching costs, degree of incompatibility, and the credibility of the continuing existence of the network in the future.

FOREIGN DIRECT INVESTMENT AND NETWORK EXTERNALITIES

The economics of telecommunications extend to a global scale more than ever. One area of network externalities that should interest the regulators is the intersection of foreign direct investment ("FDI") and network externalities. The technology in the forefront of industry is data and wireless access. As the technology evolves (e.g., in mobile, from 2G, 2.5G to 3G), the question of interoperability between the systems, international compatibility, foreign investments via new operators or acquisitions and equipment providers, are all very relevant to regulators and must be considered carefully.

Generally, FDI tends to have a positive effect on competition when FDI is through a de novo entry. In the case of FDI under acquisition(s), the network externality benefit tends to be greater. Given these assumptions, regulators may be in a position to create incentives to maximize social benefit in either case.

1.2. Game Theory

Every policy enacted will be met by reaction behavior of firms that can impact the results of policy objectives. As firms react to new policies, their profit maximization behavior will take on a form of gaming behavior according to their reaction-function. Additionally, firms react to each other in a gaming behavior as they seek to increase their profits.

Basic Economic Theory

The mathematician John von Neumann first articulated game theory. The first important book was The Theory of Games and Economic Behavior, which von Neumann wrote in collaboration with a mathematical economist, Oskar Morgenstern.

Game theory provides a theory of economic and strategic behavior when people or firms interact directly, rather than in a price-taking, perfectly competitive

environment. Game theory may be about chess and it is about such serious interactions as market competition, arms races and environmental pollution.

In game theory, Dominant Strategy can result where individually rational action leads to parties made worse off in terms of their own self-interested purposes.

Application in Telecom

There may be gaming among firms and the regulator and firms.

The Game between Firms:

In a simplified scenario for my exposition, I will consider two wireless firms in a market. Firm A and B are assumed to have equal technology and service and compete on pricing. The two pricing or output choices are Duopoly and Competitive where Duopoly prices are greater than Competitive prices. The following table shows the expected profits for firms A and B.

		Firm B	
		Duopoly	Competitive
Firm A	Duopoly	120, 120	30, 150
	Competitive	150, 30	100, 100

The dominant strategy for the both firms is to be competitive with their pricing; hence, the market produces efficient level of output. The firms' self-interested purposes of profit maximizing would prefer duopoly solution which can happen under collusion. In the above table the "competitive, competitive" behavior by the firms lead to socially optimal outcome.

In this case, we have assumed that there is no communication/collusion between the firms and that this is a one-time decision by the firms. Such assumption may be unrealistic in real life and the game theory model needs to be adjusted accordingly. Given that there can be communication between firms and decisions are made more than once by the firms, allowing them to learn from the game in previous game periods, there is no guarantee that two (or more) firms in the industry will lead to competitive prices and output.

DIFFERENT EQUILIBRIUMS

Dominant Strategy: An individual player in a game evaluates separately each of the strategy combinations he may face, and, for each combination, chooses from his own strategies the one that gives the best payoff. If the same strategy is chosen for each of the different combinations of strategies the player might face, that strategy is called a "dominant strategy" for that player in that game.

Dominant Strategy Equilibrium: If, in a game, each player has a dominant strategy, and each player plays the dominant strategy, then that combination of (dominant) strategies and the corresponding payoffs are said to constitute the dominant strategy equilibrium for that game.

Nash Equilibrium: A Nash Equilibrium(a) exists if each firm chooses the best strategy, given the strategy chosen by the other participant. In coordination game there might be more than one Nash equilibrium. There are two Nash equilibria in the following example.

Telecom carriers A and B, have a decision to make in adopting a new standard for their network upgrade or staying with the existing standard. Both carriers, in essence, are faced with the two choices of using a technically advanced standard or a more proven standard with less functionality. The advanced standard has greater potential for additional services and revenue growth.

PAYOFF IN TERMS OF NETWORK EXTERNALITIES

		Carrier B	
		Stardard A	Standard B
Carrier A	Stardard A	100, 100	0, 0
	Standard B	0, 0	50, 50

Here the Nash equibria are (A, A) and (B, B). There are no dominated strategies. The best strategy for each Carrier depends on the strategy chosen by the other Carrier. This is called a coordination game. This kind of game can have implication for the regulators because the regulator would like to see the (A, A) outcome of the market.

Again, the simplicity of the above game theory model has many potential flaws:

- Assumption that the payoffs are known and certain.
- Assumption that there is no communication between the two firms. If they could communicate and commit themselves to coordinated strategies, we would expect a quite different outcome.
- The two firms interacted only once. Repetition of the interactions might lead to different results.
- Dominant strategy equilibrium is based on complete rationality of the firms and there might be other variables.

ANTICIPATING THE REACTION OF FIRMS TO POLICY CHANGE

As articulated in the Lucas Critique, prediction based on historical data (in this case firm behavior) would be invalid if some policy change alters the relationship between relevant variables (such as firms' rational expectation of competitive forces). If the policy change alters the relationship between the variables, then the historical relationship between the variables would differ in the future relationship.

As a new policy/regulation is enacted, firms will act according to their reaction function that will allow them to maximize their profits. It is precisely for this reason that the policy maker must anticipate the reaction of the firms before making a policy change. Even though it might appear to be a simple concept, the policy maker should keep in mind that firms will attempt to skirt the intent of the policy if no deterrence of gaming is provided with the new policy.

Intersection of Network Externalities and Game Theory

The intersection of network externalities and game theory can have significant implications for the regulators in their policy decisions. The regulators would be well served to anticipate and analyze the behaviors of firms as firms internalize the externalities in their gaming behavior.

Gaming with respect to network externalities among firms can entail firms' decisions to invest or not invest. If a firm can benefit free from an investment of another company, it has incentive to freeload.

2. Regulatory Impact: Cost and Benefits Analysis, Competition Indicators

2.1. Regulatory Impact Analysis

In addition to articulating objectives and alternatives, regulatory impact analysis requires a cost/benefit tests that need to be applied and met before enacting a major regulatory change.

In the end, the success of policy/regulation will be judged on the desirability and the achievability of the regulatory impact. For this reason, cost and benefit analysis is often done prior and after the policy implementation. The prior analysis forms the basis for going ahead with the policy and the post implementation analysis will often be used to justify and validate the continuation of the policy.

Generally, regulators' objectives encompass issues such as the following:

- Support of universal service
- Maintaining just and reasonable rates
- Price cap for 1) flexibly-priced services and 2) non-price regulated services
- Price reduction for residential, business and access rates
- Promoting fair and reasonable competition for all telecom services
- Maintaining or improving quality of service
- Investment: upgrading of facilities, the provision of advanced digital services, and the use of new technology in its infrastructure development

On a macroeconomic level, regulators are concerned with the general social impact of regulation stemming from economic development and distributional consequences of regulation. Regulators are generally happy when their policies serve the dual purpose of spurring economic development (e.g., creating jobs, increased commerce and contribution to the tax base and GDP) and serve social needs of enhancing people's lives (e.g., universal service, bridging the digital divide, affordable prices). Regulators are also concerned with the technological innovation and general growth of the domestic telecom industry keeping up with developments around the world.

2.2. Regulatory Impact Assessment

Often, the regulatory impact can be hard to measure except in cases where the impact is patently negative or positive. For example, if the industry investment data show a dramatic slowdown of investments, absent other noticeable economic shocks, then any new sweeping regulation may need to be reviewed for its impact on industry investments.

Conversely, if a linkage can be made between a new sweeping regulation and a sudden increase in investments, the regulator may use that information in its other policy formulation. A standard regulatory impact assessment *ex post* regulation enactment is to evaluate the accuracy of the prior cost/benefit analysis and leading to the validation or invalidation of the efficacy of the regulation. The cost/benefit analysis is described below.

2.3. Cost and Benefits Analysis

Cost-benefit analysis is a comparison of the estimated costs of an action with the estimated benefits it is likely or intended to produce. Almost all business decisions involve some measures of costs versus benefits. Governments' analysis also includes the broad societal costs and benefits.

For regulators, Cost and Benefits analysis of regulation broadly measures two things: 1) the cost of implementing/enforcing regulation, 2) net aggregate social benefit of the implemented regulation. In cases where the cost of implementation and enforcement is insubstantial, the focus of the cost/benefit analysis will rest on whether the regulation results in net positive social benefit.

The direct cost of enforcement, which relate to the regulators cost is rather straightforward. These cost are comprised of manpower costs and technology costs. Indirect cost to the regulator might include political costs, which are certainly out of the scope of this memorandum.

The difficulty of measuring the resulting social benefit of a regulation should not be taken lightly. Often the measurement of social benefit is controversial.

ANALYSIS LIST

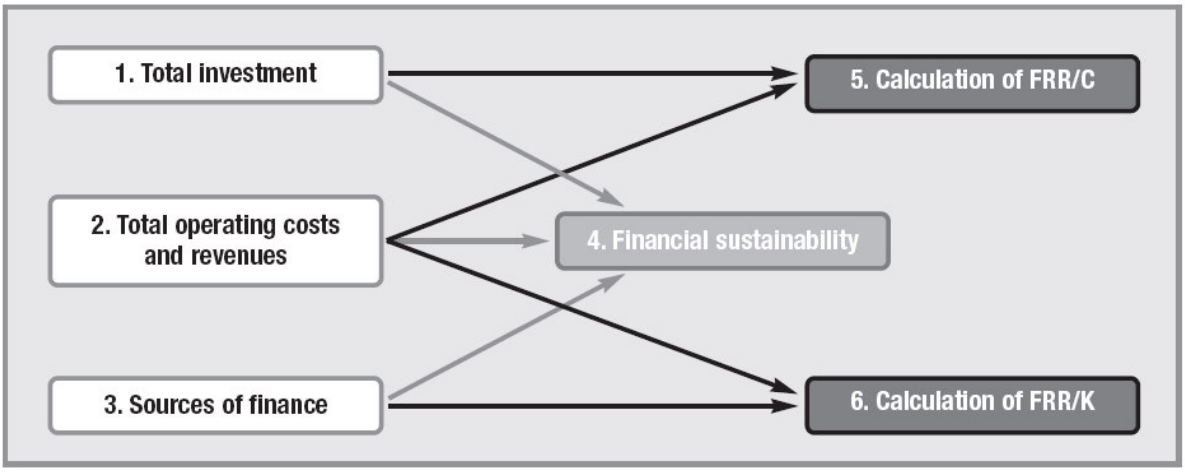
a. Feasibility and Options Analyses:

This analysis may include the cultural and political feasibility test. Other alternatives are evaluated.

b. **Financial Analysis**

A common benchmark measure of investment performance and the financial feasibility of a project (such as a new network proposed by an entrant) is the Financial Rate of Return (FRR). Often times, regulators may be in a position to select companies most likely to have a financial success and make positive contribution to the industry competition in bidding processes for licenses. Regulators may require that the bidders submit their financial plans. Those financial plans follow the basic analytical framework depicted in the chart below.

Sample Structure of Financial Analysis



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The FRR/C and FRR/K are often compared against industry standards and other "opportunity cost" based standard to justify an investment. In the end, the financial sustainability determines the potential of whether an operator has the financial and operational capacity necessary for implementing the license.

c. **Social Economic Analysis**

- Social benefits (various increase in societal utility)
- Environmental benefits

d. **Tax Transfer Analysis**

Tax revenue analysis and shifting of burden among economic agents.

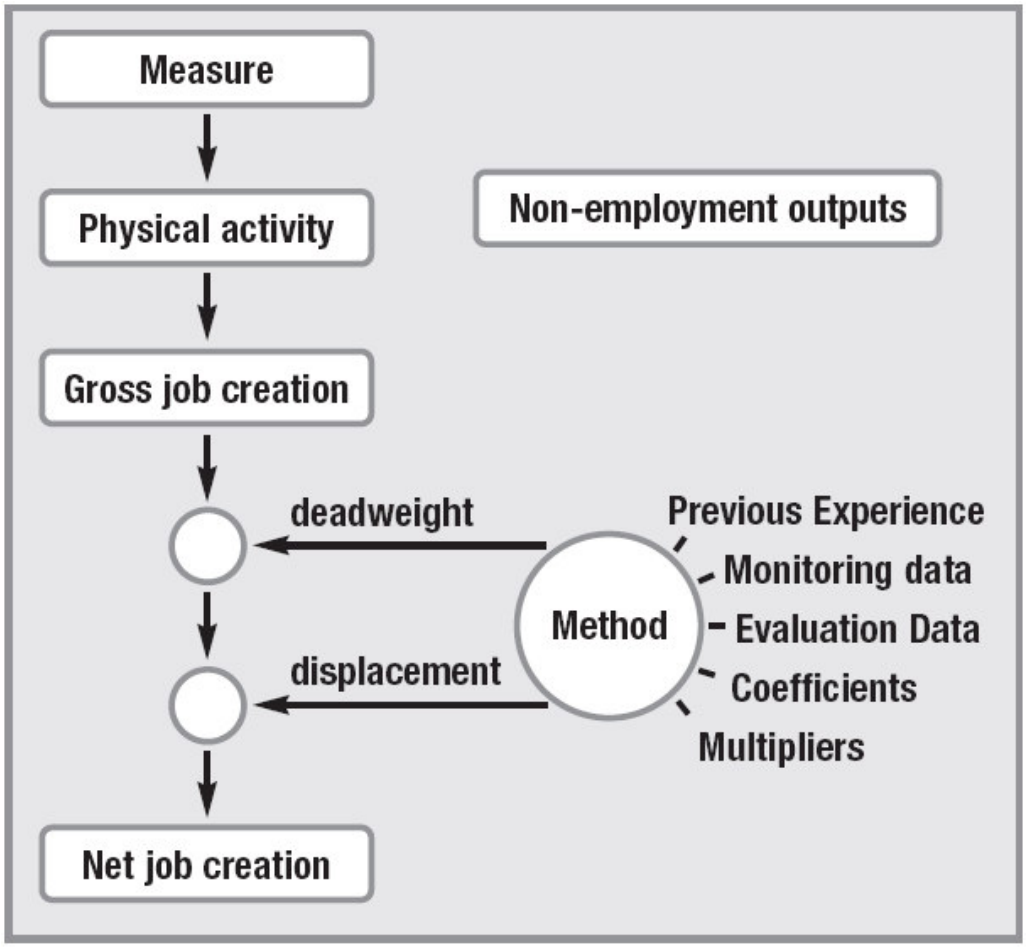
e. **Externalities Corrections**

Social costs and benefits not shown in market prices.

f. **Employment Effects**

Ultimately, employment effects leading to increase in employment is a desired byproduct of effective regulation. The following chart shows the analysis of net job creation.

Employment Effects Analysis



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2.4. Competition Indicators

Competition indicators are relied on by regulators to detect undesirable development of market power by carriers in the telecom industry. A concentrated market, in conjunction with significant entry barriers, may reduce competition in the market for telecom services. First, it may increase the likelihood that a group of competing carriers will successfully engage in coordinated interaction aimed at raising prices and lowering output. Second, it may enable an individual carrier to profitably raise price and lower output unilaterally to increase its profits. Further innovation may be stifled. Regulators are mindful of these types of potentially negative consequences

and may intervene in the market if the free market forces are not sufficient to ensure a competitive market.

The indicators that can be relied upon by policymakers, regulators, and other industry participants vary and have evolved over time. This evolution was made necessary by the dynamic nature of the industry: rapidly changing technologies and their ramifications on how the industry players behave. The policy makers and regulators have recognized such changing environments and adjusted their view of the industry and the formulation of policies. However, as the focus and the weighting of indicators may have evolved over time, the fundamental area of examination for the analysis of competition remain static:

- Market structure,
- Carrier conduct,
- Consumer behavior,
- Market performance.

Some indicators for each of the above four areas of examination are quantitative and some are qualitative, and sometimes both. I discuss below each of the four areas without formal modeling, but with economic and social theory in mind.

MARKET STRUCTURE

Competitive market structure is a market structure that is conducive to high output and low prices. It is also conducive to healthy investments leading to growth. The traditional and rather simple indicator for assessing market concentration is the Herfindahl-Hirschman Index ("HHI").[2] Once the relevant product and geographical

[2] "HHI" is calculated by squaring the market share of each firm competing in the market and then summing the resulting numbers. For example, for a market consisting of four firms with shares of thirty, thirty, twenty and twenty percent, the HHI is 2600 ($30^2 + 30^2 + 20^2 + 20^2 = 2600$).

The HHI takes into account the relative size and distribution of the firms in a market and approaches zero when a market consists of a large number of firms of relatively equal size. The HHI increases both as the number of firms in the market decreases and as the disparity in size between those firms increases. U.S. Department of Justice.

markets are determined, HHI gives the regulators a sense as to the existing market power of the firms.

The market shares used to calculate HHIs can be based on various output measures, such as revenues or the number of subscribers. Juxtaposing domestic HHI data with international HHI data can make additional comparisons.[3]

The level of market concentration generally depends on both the number of competing carriers per market and the distribution of their respective market shares. Markets can be divided into product and geographical markets. Product market would be defined by the modes of telecom service such as wireline or wireless. The service footprints of the competitors would define geographical markets. The competition between the product markets such as wireline and wireless, to the extent detectable, has the implication of diluting the HHI-type concentration of any one particular product market. For example, even if there were only one wireline company leading to a very high HHI number of 10,000 (100*100), the wireline market has competition from the wireless market.[4]

CARRIER CONDUCT

One way by which the regulators assess the development of competition by examining the pricing patterns of the firms. Further, there is non-price competition: technology upgrades and deployment (footprint expansion), capital expenditure, advertising and marketing, and quality of service, and provision of ancillary services.

Other type of carrier conduct involves inter-carrier transactions or cooperation. These activities include joint venture, sales and swaps, and affiliations.

CONSUMER BEHAVIOR

Consumers in the right competitive environment send signals to inefficient or anti-competitive firms by simply not buying from them or switching services to other

[3] HHI above 2,000 may raise a red flag with regard to a potential existence of market power.

[4] If there are blurring of the lines between product markets, an analyst must consider other ways of assessing competition to incorporate the economic concept of "contestability" between markets.

firms. A carrier can exercise market power only to the extent that its customers do not respond to price increases or other adverse competitive conduct. If enough consumers are sufficiently well-informed to take prices and other non-price factors into account when choosing their service provider, and likewise, if enough consumers have the ability and propensity to switch service providers in response to an increase in price or other harmful conduct, then the carrier will have a powerful incentive to compete on price and non-price factors.

Consumer behavior will be more effective in constraining market power when the transaction costs customers incur in choosing and switching carriers are low. Pro-competition behavior of consumers can be indicated by easy access to information, no or low switching costs (including number portability).

MARKET PERFORMANCE

Three areas of performance that indicate the healthy competitiveness of the market are as follows.

a. Pricing trends: competitive market exhibits decreasing pricing trends.

b. Output growth: competitive and healthy market tends to exhibit increasing output by the industry. The output indicators include, subscribers, minutes of use, variety or the number of products, revenues, employment, and profits.

c. Quality of Service: competition invariably leads to increase in quality of service. There are many measures of quality of service including the number of complaints, time-to-provisioning, and other indicators that can be gathered through surveys.

Competitive Indicators Table

Market Structure	• General "Sniff Test"—number of firms • Herfindahl-Hirschman Index • Geographic and product markets • Barriers to entry
Carrier Conduct	• Pricing • Technology upgrades and deployment (footprint expansion) • capital expenditure • advertising and marketing • quality of service • provision of ancillary services • joint venture, sales and swaps, and affiliations. (cooperation)
Consumer Conduct	• Access to information • Switching (number portability) • Sensitivity to price and service
Market Performance	• Pricing trends • Output growth -subscribers, -minutes of use, -variety or the number of products, -revenues, -employment, -profits. • Quality of Service

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3. Competition Policy and Regulation: Other Countries and Regions

Two of the oldest existing national independent telecommunications regulators are the FCC of the United States and OFTEL of the United Kingdom. However, their experience, while instructive, may not be universally applicable to other countries. Other countries, including Thailand, have set up national independent telecommunications regulators in the recent years. In many cases, the setting up of

regulators was accompanied by liberalization and privatization of the industry. Although the main objectives of the policymakers were consistent throughout the world, each country has strived to maintain its identity in formulating regulatory strategies that suit itself and not blindly follow some kind of “global benchmark” regulation.

PRIVATIZATION AND ESTABLISHMENT OF REGULATORY AGENCY AROUND THE WORLD

Country	Time of Privatization	Agency Established
Africa		
Angola	n/a	1999
Botswana	n/a	1996
Burkina Faso	n/a	1999
Burundi	n/a	1997
Cameroon	n/a	1998
Cape Verde	1995	1992
Central African Rep.	1990	1996
Egypt	n/a	1998
Equatorial Guinea	1987	n/a
Eritrea	n/a	1998
Ethiopia	n/a	1996
Gabon	n/a	2000
Ghana	1997	1997
Guinea	1996	1995
Guinea-Bissau	1990	n/a
Madagascar	1995	1997
Malawi	n/a	1998
Mali	n/a	2000
Mauritania	n/a	1999
Mauritius	n/a	1988
Morocco	n/a	1998
Mozambique	n/a	1992
Namibia	n/a	1992
Nigeria	n/a	1992
Senegal	1997	n/a
Seychelles	1954	n/a
South Africa	1997	1997
Sudan	1994	1996
Tanzania	n/a	1994
Togo	n/a	1999
Uganda	2000	1997
Zambia	n/a	1994
Americas		
Argentina	1990	1990
Barbados	always	n/a
Belize	1996	1988
Bolivia	1995	1995
Brazil	1998	1997
Canada	always	1976
Chile	1988	n/a
Colombia	n/a	1994
Costa Rica	n/a	1996
Cuba	1994	n/a
Ecuador	n/a	1995
El Salvador	1997	1996
Grenada	1989	n/a
Guatemala	1998	1996
Guyana	1991	1992
Haiti	n/a	1969
Honduras	n/a	1995
Jamaica	1989	1995
Mexico	1990	1996
Nicaragua	n/a	1995
Paraguay	n/a	1995
Peru	1994	1993
Trinidad and Tobago	1989	n/a
United States	always	1934
United Kingdom	1984	1984
Venezuela	1991	1991

Country	Time of Privatization	Agency Established
Asia		
Armenia	1998	n/a
Bahrain	1981	1996
Bhutan	n/a	1998
Georgia	1994	n/a
India	n/a	1997
Indonesia	1995	n/a
Israel	1990	n/a
Japan	1985	n/a
Jordan	2000	1995
Kazakhstan	1994	n/a
Kyrgyzstan	n/a	1997
Malaysia	1990	1998
Maldives	1988	n/a
Mongolia	1995	1995
Nepal	n/a	1998
Pakistan	1996	1996
Philippines	always	1979
Qatar	1998	n/a
Singapore	1993	1992
South Korea	1993	n/a
Sri Lanka	1997	1991
United Arab Emirates	1976	n/a
Europe		
Albania	n/a	1998
Austria	1998	1997
Belgium	1996	1993
Bulgaria	n/a	1998
Croatia	1999	2000
Czech Republic	1994	1993
Denmark	1991	1991
Estonia	1993	1998
Finland	1998	1988
France	1997	1997
Germany	1996	1998
Greece	1996	1995
Hungary	1993	1990
Iceland	n/a	1997
Ireland	1996	1997
Italy	1998	1998
Latvia	1994	1992
Lithuania	1998	n/a
Luxembourg	n/a	1997
Malta	1998	1997
Netherlands	1994	1997
Norway	n/a	1987
Poland	1998	n/a
Portugal	1995	1989
Romania	1998	n/a
Russia	1997	n/a
Serbia	1997	n/a
Slovakia	2000	1993
Slovenia	1996	n/a
Spain	1992	n/a
Sweden	2000	1992
Switzerland	1998	1992
Turkey	n/a	2000
Oceania		
Australia	1997	1992
Kiribati	1983	n/a
New Zealand	1990	n/a
Papua New Guinea	n/a	1997
Solomon Islands	1990	n/a
Vanuatu	1990	n/a

Source: ITU-BDT Telecommunications Regulatory Database.

3.1. ***Uganda***

The regulation and the experience of Ugandan telecommunications industry is an instructive focus for the Thai government. First, Uganda is significantly behind Thailand in terms of economic development, which has a nascent regulatory environment; it has fewer legacy constraints in many respects. There are advantages of "starting new" that might lead to innovative and courageous policies that may be more difficult in more established economy. Second, the reform program recently undertaken by Uganda incorporated all of the fundamental activities – organizational unbundling, privatization, and introduction of competition and development of a regulatory framework – leading to dramatic transformation.

Ugandan telecommunications have experienced a very rapid growth in the last ten years by which the telephony penetration rate has increased at a healthy rate (mostly in wireless). Some of this growth can be attributed to good regulation as well as the technology development. Some of the key initial features of the regulation and the industry are these:

The Ugandan Government prepared a national Telecommunications Policy early in 1996 that accomplished the following:

- The postal and telecommunications operations of UPTC was unbundled into Uganda Post Limited (UPL) and Uganda Telecommunications Limited (UTL);
- UTL was privatized;
- The telecommunications sector was liberalized; and
- A regulatory agency for the telecom sector was established.

In addition to the ever-present focus on quality and affordability, specific reference to system extension (i.e., increasing the geographic coverage of service) was included. These two factors effectively established a link between sector reform and the Ugandan government's broader objectives for socio-economic development and poverty alleviation. The core focus on geographic coverage provided the platform for more specific rural development initiatives in the future, and the lack of attention to

privatization revenues allowed for more flexibility in designing (and imposing) those initiatives throughout the reform (including, most significantly, the licensing) process.

The Ugandan government took steps toward operationalizing its telecommunication sector reform program by promulgating the Communications Act, which did the following:

- Established the Uganda Communications Commission (UCC) as the industry regulator and the Uganda Communications Tribunal as the agency responsible resolution disputes within the industry;
- Provided for the incorporation and privatization of UTL;
- Provided for competition in basic telephone service through the licensing of a second national operator (SNO);
- Required operators to provide payphones and public call offices and related services in rural areas; and
- Established a fund for rural communications development, to be administered by the UCC.

The steps taken by the Ugandan government, including the establishment of the independent regulator has lead to policies conducive to investments and development of the telecom industry in Uganda that has equaled or surpassed most of its neighboring countries.

3.2. Some of the Lessons to Think About (Ugandan Experience)

a. Do Not Necessarily Focus on Privatization or Licensing Proceeds

The privatization and licensing process – including the selling of state-owned assets and the introduction of new private operators for greenfields development – affects the overall reform and regulation program in important ways.

While the commercial interests of operators are often aligned with the broader policy interests of government, this is not always the case. Areas where these interests are not aligned can present tough choices for governments. A well-intentioned determination to offer attractive terms to promote a lively and competitive bidding process, and secure a generous winning bid, can have repercussions for years

on market structure and industry dynamics. Because the carriers in Uganda had limited working capital to begin the deployment of infrastructure across the country, high cost in privatization transfer or licensing fees would have impeded the roll-out process and the operational efficiency of the carriers.

b. **Assess the Relative Benefits of Competition and Scale Economies**

The fundamental economic tradeoff in market design is between economies of scale (offering the prospect of low prices through reduced unit costs of production) and competition (offering the prospect of low prices through the discipline imposed by a market). There is no general answer to the question of how best to balance the tradeoff.

Policymakers should be sure to carefully analyze the competitive possibilities, and to not underestimate the potential benefits of competition. Companies often respond in interesting and dramatic ways as others challenge them. Within truly competitive markets, a combination of professional pride and a natural competitive instinct appears to consistently drive a cycle of entrepreneurial activity and service improvements. It is a powerful dynamic that cannot be replicated administratively. Of course, when markets are not workably competitive, regulation is necessary.

In Uganda, several standards and issues relating to network externalities and gaming were left up to the market (albeit through regulation that promoted competition). A prime example of this is the regulators 1) making sure that there are three competitors, 2) leaving up to the carriers the selection of wireless standards (GSM), 3) allowing flexibility for the carriers in meeting roll-out obligations (wireline or wireless).

c. **Take a Close Look at the Rural Customer**

This customer base needs to be evaluated and served differently than the traditional urban base. Most fundamentally, rural customers will often have little appreciation of the potential benefits of products and services that have not previously been marketed directly to them. More education – not just marketing, but perhaps other forms as well – is surely required.

Separate from the difficulties associated with evaluating the demand for rural service, there are aspects of the rural customer's purchasing patterns and demand drivers that are unique, and both service providers and the regulator need to attend to these aspects.

d. **There's More than One Way to "Regulate" Price, but Only One Way to Regulate Other Aspects of Service**

When there are many choices for telecom needs—multitude of landline and wireless service providers—high elasticity of demand, which is often overlooked as a significant restraint on market power, is particularly important. This type of demand response – particularly when combined with significant supply competition - reduces the burden on regulatory agencies to administratively control price. Rather than focusing on costly price regulation, focusing on creating healthy and sustainable competition may be desirable for many countries.

Currently, the regulator in Uganda has been "hands-off" with respect to wireline and wireless telecom tariffs. The indicators are that the competition among the carriers and between wireline and wireless access has induced a very significant reduction in prices over the last several years.

4. List of References

4.1. Competition in the Telecom Sector

Anonymous. 1999. *Trends In Telecommunication Reform: Convergence and Regulation. International Telecommunication Union (ITU).*

Charles Phillips (1993), The Regulation of Public Utilities.

Jino Kim with Steve Ostrover (2002) *Uganda Telecommunications: A Case Study in the Private Provision of Rural Infrastructure*.

4.2. Network Externalities and Game Theory

Federico Mini (1999), "*The Role of Incentives for Opening Monopoly Markets: Comparing GTE and RBOC Cooperation with Local Entrants"*, Georgetown University.

John von Neumann and Oskar Morgenstern, The Theory of Games and Economic Behavior.

Katz, M.L. and C. Shapiro (1985), *"Network Externalities, Competition and Compatibility,"* American Economic Review, 75, pp. 424-440.

Matutes, C. and P. Regibeau (1998), *"Mix and Match: Product Compatibility Without Network Externalities,"* Rand Journal of Economics, 19, pp. 221-234.

Gilbert, R. (1992), "*Symposium on Standardization in Network Industries,"* Journal of Industrial Economics, 40, pp. 1-8.

Mikhail Klimenko and Kamal Saggi (2004), "Technical Compatibility and the Mode of Foreign Entry under Network Externalities", NET Institute working paper.

4.3. Regulatory Impact and Cost/Benefit Analysis

Raymond J. Kopp, Alan J. Krupnick, and Michael Toman (1997), "Cost-Benefit Analysis and Regulatory Reform: An Assessment of the Science and the Art", Resources for the Future, Working Paper.

Degarmo, Sullivan, Canada (1992), Engineering Economy.

Galal, Ahmed and Bharat Nauriyal. 1995. "*Regulating Telecommunications"*, Washington, DC: World Bank Policy Research Working Paper.