ANALYSIS OF MARKET COMPETITION IN TELECOMMUNICATIONS BUSINESS: REGULATORY PERSPECTIVE

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ABSTRACT

Competition in the telecommunications market is beneficial to consumers in terms of efficiency improvements. However, it would be difficult for the efficiency of any regulations to be improved under the inefficient market with no competition. As a real, regulations are not always potentially effective and may sometimes be imperfect like the market itself. Accordingly, any regulator's decisions to interfere or any appropriate interfering approaches are considered very necessary and beneficial to consumers. Therefore, it is required that the competitive conditions in telecommunications must be studied and analyzed along with the impacts of telecommunications regulation on the whole industry, consumers, and service providers. This will enable the survey and study of the key indicators which have already been determined so as to point out the problems and obstacles caused from telecommunications operation and the entry of new operators into the market. This particular research will impart the explanation of tools used in analyzing telecommunications businesses, the definition of competitive conditions in markets as well as analyze the problems and barriers to market entry among operators, etc. As a result, telecommunications regulators must play a pivotal role in preserving competitive conditions in the telecommunications market in order to promote telecommunications services to be excellent, have reasonable prices, and give rise to innovations continuously.

Key word: Market, Competition, Analysis, Telecommunications, Business, Regulatory.

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1. INTRODUCTION

In general, the objective of evaluating the market competitive level is to help decide whether regulation is necessary. If an industry needs a regulation, what is to be the regulatory format and at what intense level. The competition could be at a high level where no players in the market can influence price and quantity. Monopoly is obvious in a market with low competitions. A monopoly can maximize its profit by manipulating the level of services, quality and price if there is no regulation. Therefore, regulatory interferences may be necessary in low competitive markets. In highly competitive and efficient markets, appropriate regulatory formats include competition law and ex post regulation. In a market with no competition, the regulatory format commonly adopted is ex ante regulation [1].

Concentration Ratio and Lerner Index are helpful tools commonly used in identifying the market competition. Ex post regulation is appropriate for regulating price in a highly competitive industry. In opposite, a price cap may be used in an insufficiently competitive market in order to protect operators from making excessive profits through any price changes. In a market with starting competitions in which new or small operators may expose to exit via predatory pricing or in other words aggressive price cutting from existing market dominants, the regulator may enforce a minimum pricing to ensure that large operators do not cross subsidize or reduce price excessively lower than its production cost until there is no competition due to small operators' exits. Regulators might impose Rate of Return Regulation by allowing monopoly to specify pricing to achieve certain specified rate of returns at which profits would be variable accordingly.

The market definition in telecommunication industry is more complicated than that in the past due to the dynamic change of the technology. Evaluation of the industry competitive level consists of 2 steps. The first step is the most important one which is market definition. Market definition is to basically identify the scope of product or services of the consumer's choices. It can also be considered the scope of products or service of manufacturers' choices as well. Product substitutes or close substitutes can be classified as the same market. The second step is to identify the competitive level of the market defined earlier and then considers each operator's pricing power associated with changes of servicing level.

Identifying the market definition may rely on product qualification features such as similarity of other comparable products. For example, fixed line phone and mobile phone can be considered as the same market due to their similar qualifications in serving the consumers. Consumers generally compare product characteristics by their needs [2], [3], [4], [5]. In addition, market definition may also be classified by its geographic presence.

The degree of product substitution, in the consumer's view, is a key factor to define the market. Regulator should put a great emphasis on measurement of the product substitution level. In theory, the substitution is variable to the cross-elasticity of demand which is sensitive to changes in consumption volume as a result of any price change. A high positive value of cross-elasticity of demand indicates that 2 products in consideration are good substitutes to each other. In contrary, if the value is low, the products may be in different markets. For example, the cross-elasticity of demand of hi-speed internet and dialup internet can be measured from the following calculation.

$$\text{Cross-elasticity of demand between hi-speed internet \& dial-up internet} = \frac{\% \text{ Change in quantity of hi-speed internet}}{\% \text{ Change in price of dial-up internet}}$$

Another approach to define the market that employs the cross-elasticity of demand is the SSNIP test which began in 1982 by the Antitrust Division under the Ministry of Justice in the U.S. The Small but Significant and Non-transitory Increase in Price (SSNIP) test, used in Nestle-Perrier case in Europe in 1992, was later recognized by the European Union as the approach to identify the level of competition [6],[7]. The basic concept of this approach is to identify the definition of the market in which more profits could be made by increasing price if it does not cause any product switching's. If two products are in the same market, the use of SSNIP test would begin by identifying the narrowest group of products which are sure to be in the same market in consideration. Whether the operator is to make profit is to be considered especially if the price in this product group is gradually increased (by 5% in general) [8]. If prices of other close substitutes remain the same, the product switching is very likely. That means increasing the price in this product group will not enable any more profit making. In such case, the regulator would find out that the market definition or the product group in the initial consideration was too narrow and that the scope of the market should be more widened. The regulator would test the more widened product group which would be gradually expanded until there is no significant decrease of consumers as a result of any price increase. The last group as such would be regarded as the scope of the market.

Nonetheless, the SSNIP test in practice is quite difficult since it requires substantial load of information in which operators need to know all the cross-elasticity of demand values among all products. For example, if we are to identify a product in the same market as the prepaid mobile phone, then we need to know all the cross-elasticity of demand value between a prepaid mobile phone and other close service substitutes such as fixed line phone, public phone, voice over IP (VOIP) as well as post-paid mobile phone. In this regard, identification of cross-elasticity value of all related products via econometric approach would require such a large database. Another criticism issue on the SSNIP test is that there are no certain rules on the scope of price examination on products of the same category. It is not clear how much of the price is to be increased or how long should the observation period take [9].

2. COMPETITIVE ANALYSIS

2.1. Examination of Market Power

The standard approach to examine of the market power is to analyze the market share, which is the proportion of the operator's income relative to the aggregate market income. The accuracy in analyzing the market share relies on the validity of the market definition. Large market share operators generally have high profits and tend to be those who control the market in terms of price and quantity. However, market share is not that meaningful in the market competitive analysis and should be used together with other indicators of the market structures as well as the market power.

The aggregate market share of dominant firms is an important indicator of the industry concentration and the intensity of competition. The impact of industry concentration on the intensity of competition depends on the behavior as well as the interactions among operators.

2.2. Market Share and Concentration: HHI and C4

There are 2 major approaches to measure the market concentration. The first approach is to measure the concentration of the 4 largest operators or C4 Ratio which is a rough indicator of the market power. A high C4 generally implies a high market power while a low C4 indicates an insignificant power. However, such measurement has a key limitation because it only focuses on a single group of operators in the market. For example, a high C4 may result either from a market with only 2 large dominant players or from a more competitive market with several small fragmented operators. In such case, we would not be able to identify the difference with the application of C4 [10].

A more popular indicator of the market concentration is Herfindahl-Hirschman Index (HHI), which is an index obtained from the calculation of the aggregate market share from all operators. HHI is the summation the square value of the aggregate market share of all operators in the market. The HHI value for an ideally monopoly market is 10,000 which reflects there is only one operator with 100% market share. The Ministry of Justice in the U.S. specified the minimum HHI value of 1,800 to represent the oligopoly characteristic of a market. An HHI value below 1,000 indicates that no operator has any significant power in the market. Nonetheless, HHI is just a rough indicator only. There is no certain rule to justify the intensity of competition from the HHI level [11].

2.3. Excess Profits

C4 and HHI indices are concentration measurements that cannot indicate whether dominant operators exercise their power to reduce market competition in attempts to increase their profits. Profit volume or excess profit is a clear result of the exercise of market power. Measurements of profit should be proportionate to the capital or return to capital. In general, operators in a market with perfect competition would achieve a return equaling to the weight average cost of capital (WACC), which is the average cost of capital an operator procures from both its creditors and shareholders. However, such information might somehow be difficult to collect especially in certain developing countries where the capital market is not well developed. Therefore, the substitute indices to rely on may be the return indices from those other comparable industries with similar business risk profile to telecommunication. If returns from telecom operators are relatively the same as those of operators in other businesses, it may imply that the intensity of competition in telecommunication is very close to those in such other markets. In opposite, if the return from telecommunication is higher, the regulator may have to consider whether such return is caused by the exercise of market power or by better operating efficiency.

One thing to be aware of when considering the profitability of an operator is that higher profit may be the outcome of innovation development and efficiency improvement which are actually beneficial to both operators and consumers. In such case, it is a win-win situation for both parties. Operators can make higher profits while consumers can also enjoy more benefits from the offering services. In such case, more profits could be derived from activities that improve the social welfare but not from the exercise of market power.

2.4. Economies of Scale

Economies of scale refer to a decreased cost of production from the expanded size of production, which can be measured by comparing the increased production with the increased input. For example, if 1% of additional input of all kinds effect in additional output more than 1%, then the increasing return to scale is achieved. When an operator has higher economy of scale, its average long-term cost would be obviously less.

Regulators can use the economy of scale information to consider the service ability and the market responsiveness of operators. In general, highly concentrated industries are those with high economies of scale. Determination of the economy of scale level in an industry is dependent on 2 factors including the production volume to achieve the minimum cost and the speed to reduce cost upon the expanding production. These 2 factors can be measured in Minimum Efficient Scale (MES) and Cost Gradient. By definition, MES is the lowest productivity level to achieve the lowest long-term average cost of production. The MES size is helpful in assessing the number of capable operators in the market. The Cost Gradient basically measures the independency of an operator to utilize its production at the lowest average cost of production. If the Cost Gradient is high, a production at the lowest cost would have a very narrow range. In contrary, if the gradient is low, production at the lowest cost would lie on a wider region.

A limitation in using MES in market analysis is that this index may not be helpful in analyzing a highly dynamic market in terms of technology and product development. MES mainly focuses on the cost structure with a static assumption of the stable technology without taking into consideration the ongoing investments relating to technology and innovation. In addition, the cost structure may change with respect to the nature of the market structure. If the market structure changes, it would impact the degree of innovation level as well as the cost of production for which MES does not take into account.

2.5. Barrier to Entry and Exit

Barrier to entry refers to any limitations that prevent a new operator from entering into the market. It includes any difficulties for existing operators to expand their services in terms of variety and geographic presences. There are 3 major barriers to entry being legal, economic and strategic barriers. Legal and economic barriers are external factors while strategic barrier is the market internal factors. Investment is a sunk cost that generally affects the market entrance as well. It is necessary for a new operator to provide services to consumers at high network utilization [9]. Regulatory agencies can alleviate or eliminate such difficulty by imposing certain rules and regulation on network intern connection, access right and network utilization in order to encourage new market entrances.

Strategic behaviors of existing operators can create a barrier to entry for new players. Difficulties in network expansion of existing players are also similar. These endogenous barriers are caused by strategic behaviors of existing players in order to create or maintain the market power. For example, if a new operator is to pay high switching costs in terms of price discounts or sales promotions in order to attract more network switching, the chance to make profits would be less and thus discouraging new market entrances. Switching cost is an important factor in analyzing the telecommunications business. Existing operators may provide incentives for

consumers to create additional switching costs for new operators such as offering cheap phone service packages in exchange of a 1-2 year long-term contracts. In practice, this could be deemed as increasing switching costs for competitors. Since operators' profits in the oligopoly market are relative to each other, so increasing profits of certain players can lessen the profits of the other competitors and create market dominance. Increasing the switching cost is equivalent to increasing the cost of marketing, reducing demand of competitors and discouraging new market entrances [12].

Another essential strategic barrier is the power to control strategic resources. A clear example in the telecommunications business is an operator with a strategic advantage can limit its competitors' access to its own network. Other strategic behaviors such as discriminatory treatment and price cutting are also indications of the market dominance [13][14].

The last issue is the barrier to exit which can also reduce the intensity of competition as well. Exit difficulty creates a cost for an operator to cease its operation after which the investment cost would be unrecoverable. The barrier to exit generally discourages a new player from its first entry because it has to bear more cost of exit as a result of unsuccessful business.

3. ALTERNATIVES TO ENCOURAGE COMPETITION IN TELECOMMUNICATIONS BUSINESS

In 2009, Jamison researched on alternatives to create competitions in telecommunications business by identifying the business conditions to enable competition. Telecommunication may not be a market with perfect competition and the highest efficiency in terms of economics. But the government interference may somehow effect the welfare negatively rather than positively. Jamison later indicated detrimental conditions to the competition in terms of demand, supply and specific features of telecommunication operators. At last, he proposed alternatives to reduce such difficulties in order to effect the market with as much close to a perfect competition as possible [1].

3.1. Competition and Market Dominance in Telecommunications Business

Telecommunications business may not be as highly competitive as a market with perfect competition. However, it still has some features which can create a close to perfect competitive market without any necessary government interference. Generally, interference may be negative if the policy is more political rather than economical. Other key issues for consideration include product differentiation, quantity and number of telecom operators, output restriction, imperfection of value chain, value of information, economies of scale and ability to change production etc. In 2009, Jamison also referred to a number of empirical studies and found out that there should be at least 5 equivalents and competitive operators in the market with not more than 40% market share and that a new market entrance should not be too difficult [15].

3.2. Competitive Difficulty: Market Dominance in Telecommunication

One of key competitive difficulties is the market dominance which can be used to reduce competition in the telecommunications business. There are 3 factors of market dominance including demand, supply and behavior of operators.

3.2.1. Demand Factor

Demand factor that could effect the market dominance results from a scenario in which it would be hard for a consumer to switch to another operator or if possible would be at a very high cost. Although other operators can provide better services than the existing one, such situation can still be caused by:

- **Switching Cost:** Switching cost is effective in reducing the competition although all service providers are not advantageous to one another.
- **Network Effect:** An operator who benefits from the network effect would hold advantage over its competitors and may become a monopoly unintentionally. However, if there is network interconnection among operators, this network effect would be lessened.
- **Lack of Information:** Consumer who lacks of information may not be able to make a decision correctly.

3.2.2. Supply Factor

Supply factor is the thing that effects an operator's cost of rendering service in order to provide better alternatives for consumers. The operator generally incurs a high cost in providing additional service although such alternative may be better in terms of return. Supply factor consists of:

- **Sunk Cost:** Sunk cost is detriment to market entrance. It is an engineering or technological condition but it is certainly not the intention of the operator [16].
- **Licensing Restriction:** If the licensing conditions require an operator not to provide substitute or very close substitute services, it would certainly block new entrances and certainly increase the market dominance power for existing operators who already have the issued licenses.
- **First Mover Advantage:** The advantage created by the first entrance that enables the first mover to build a client base and access to limited resources [17].
- **Control of Essential Facilities:** In certain case, some operators are the ones who control the infrastructure necessary for rendering services for other operators. Therefore, they definitely have market dominance for the services or the infrastructures that others have to rely on [18].
- **Geographic Availability of Service:** A telecommunication operator can specify a differentiated pricing from other operators if it is the only service provider in that geographic area [Donald Stockdale presentation at the 24th PURC/World Bank International Training Program on Utility Regulation and Strategy, Gainesville, Florida, June 2008.].
- **Exclusive Rights on Specific Technologies:** The operator may be the one who invents and has exclusive right in new telecommunication technologies. The advantage as such may incentivize new innovations which at the end would enable a market dominance [19].
- **Exclusive Distribution Agreements:** Some agreements provide exclusive distributorship to an upstream network operator under which its downstream clients cannot use other upstream network to provide services to its end consumers [19].
- **Access to Financial Capital:** Telecommunication is a highly capital intensive business which makes a market entrance more difficult. Certainly, existing operators may have

access to financial supports from some sources of capital that other new operators may not [20].

- **Economies of Scale or Scope:** Economies of scale occurs when there is an increase of production at a higher proportion than an increase of input. As a result, the cost of production would be decreased. In some case, an operator can achieve an economy of scope in which the cost of production of 2 different products is cheaper than that of an operator producing a single product. Therefore, the economies of scale or scope are a barrier to new entry. In addition, there is some situation where consumers are concentrated in a geographic area which enables the operator to provide services at a low cost [21].
- **Vertical Integration:** There is several level of services in the supply value chain of the telecommunications business. Such many levels of services may belong to several operators with network interconnections. However, in some cases these layers may be owned by a single operator who is vertically integrated. In such case, it would be difficult for a new entrant because it has to rely on many levels of services from a single operator [19].

3.2.3. Behavior Factor of Telecommunication Operator

Under certain environment, a telecommunication operator might be motivated to do something that may damage its competitors and consumers. This behavior may be the action from a single or possibly more than one operator.

Listed below are categories of behavior factor:

- **Cross Subsidization:** An operator can use excess profits from a market it has dominance to subsidize another market where it is not competitive. In this regard, the intensity of competition in such market may be lessened.
- **Predatory Pricing:** Predatory pricing refers to a scenario in which an operator sets up a pricing scheme in order to eliminate competitors from the market and/or to prevent any new market entrances. Most of the time, this kind of operator is willing to trade off certain or entire short-term profits in order to prevent new entrances and get rid of new competitors [22].
- **Information obtained from Competitors:** Information exposure is another limitation on market competition. A downstream operator who relies on the network of other vertically integrated operators may be exposed to information leakage from which the integrate player can exploit such information to seek for its own interest.
- **Network Technology Information:** When a downstream operator depends on the service from an upstream operator, it has to adjust the downstream technology with respect to any technological change in the upstream. In case the downstream operator is not well informed of such change, its service may be disrupted because of certain technological conflict.
- **Price Fixing:** Price fixing occurs when many operators collude in pricing and service rendering which can lessen the intensity of the market competition [19].
- **Dividing the Market:** Dividing the market occurs when many operators agree to divide the market and provide services in different individual market of its own without competing against one another. Markets may be divided with respect to the geographic presence or types of telecommunication services [23].

3.3. Alternatives to Increase Competition

In the telecommunications business, regulators may attempt to increase the competition in order to drive the market to be as close to perfect competition as possible in terms of price, service, quality and innovation. However, the target goal as such should not be the one that is unachievable in the market with perfect competition. Otherwise, the market would be distorted and negatively effect the consumers which result in the loss of efficiency in terms of economics.

3.3.1. Interconnection of Telecommunication Network

Network interconnection can increase the competition because an operator can access to the service of other operators by paying an interconnecting charge. Interconnection can create more equivalence among players in the competition. Issues relating to network interconnection include [24]:

- Interconnection Pricing
- Costing Methods and Models
- Publication of Prices
- Providing Network Information
- Standard Offers

3.3.2. Access to Essential Facilities

Market regulation that allows competitors to access to essential facilities is significantly helpful in reducing difficulties of market entrance. Issues relating to this matter include [25].

- Pricing of Essential Facilities
- Non-discriminatory Access

3.3.3. Service Resale

Regulator may allow an operator with market dominance to provide certain services to its competitors at a wholesale price such that they can resale services to their consumers.

3.3.4. Structural and Functional Separation

Regulators in some countries enforce the separation of operators in terms structure and function in the market. For example, wholesale and retail are separated from each other in order to prevent a vertical integration which enables the operator as such to benefit from the market dominance [26].

3.3.5. Accounting Separation

Accounting separation is a regulating mechanism used in preventing a cross subsidization. In accounting, an operator must report its sales revenue and expenses to the regulator to clarify that it can operate and compete in the market on its own.

3.3.6. Equal Access

Equal access is a policy that enforces no differences in access to a similar service offered by different operators. For example, a consumer can select a long distance call service from other network providers without any obligation to rely on similar service from its current operator.

3.3.7. Number Portability

Number portability is a method to reduce a cost of switching an operator or a service provider which could increase competition among various operators [27].

3.3.8. Customer Access to Information

Clarified information relating to any issues for considerations would be helpful for consumers in making their valid and accurate decisions. Then it would be hard for an operator to take advantage of well informed consumers.

3.3.9. Removal of other Barriers to Entry and Competition

Certain regulatory conditions may be a barrier to entry or lessen the competition. For example, issuance of operating license with any certain conditions that do not benefit consumers as the regulator initially intended should be cancelled or improved in order to achieve the target desired.

3.3.10. Retail Regulation

Rather than focusing on regulating the operator directly, sometimes it is better to regulate telecommunication services at the retail level although this might not help reduce the market dominance or any discriminative behaviors that prevent competitions. However, it could stimulate competitive conditions in the retail market, such as [28], [29].

- Price Ceiling Control
- Minimum Price Control
- Imputation: Imputation is a test with a key condition that the aggregate of an operator's revenues from rendering competitive or nearly competitive services and from providing essential services to its competitors must not be less than that of the other case in which the aggregate of the wholesale revenues and the total costs incurred in providing retail services (if any).
- Net Revenue Test: Net revenue test is a test to compare the revenue from 2 different cases 1) the revenue from services rendering for consumers and 2) the revenue when there is no service provided to consumers. This test is undertaken to indicate whether there is any cross subsidization or any predator pricing.

4. CONCLUSION

Telecommunications regulators play a very important role to increase the market competition which can be critical for the networks success and can have significant effects on investment. In the telecommunications business, regulators may attempt to increase the competition in order to drive the market to be as close to perfect competition as possible in terms of price, service, quality and innovation. Basically, mobile services are provided in a competitive market by the licensed carriers and a range of service providers. In addition, the increasing total number of mobile users and continued rapid technological improvement promises reduced unit costs which, in the face of competitive pressure, are likely to lead to significantly lower market prices. In summary, regulators are involved as both enforcers of competition law and advocates for the removal of impediments to the development of fully competitive markets. This includes the opportunity to apply competition legislation, enforcement, and remedies to anti-competitive behavior, as well as to advocate for legislative and regulatory reform.

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