Internet Services and Pricing Regulation

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Ekonomi Bisnis Regulasi dan Kebijakan Telekomunikasi
Chapter 8. Internet Services Pricing Regulation

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Reference for sub chapter A “Pricing Regulation Theory”

1. Hank Intven & McCarthy, ***Telecommunication Regulation Handbook – Module 4,*** The World Bank, 2000.
2. http://www.ictregulationtoolkit.org/en/
3. www.postel.go.id

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A. Pricing Regulation Theory

A.1. Why Regulate Prices?

- This requires that, without regulation, prices will either be:
  - Too high overall — if an operator or service provider has market power they may increase prices above competitive levels. This will suppress demand for the service, leading to a loss of social welfare, or
  - Anti-competitive —an operator or service provider with market power may engage in pricing practices that hinder competition in a market. Three important anti-competitive pricing practices are cross subsidization, price squeezes, and predatory pricing.
- But the pricing regulation must be done very carefully and meticulously, because:
  - Regulation has potentially high costs. Among other things, it substitutes the regulator’s judgment for market interactions. No matter how capable and well intentioned regulators are, they will never be able to produce outcomes as efficient as a well-functioning market.
  - Regulators should therefore forebear from interfering in pricing decisions unless regulation is justified. That is, unless the expected benefits from regulating prices outweigh the expected costs from doing so.

A.1.1. Regulatory Criteria

The list below sets out common regulatory goals, which provide useful criteria for assessing regulatory options:

- **Prevent the exercise of market power:** An important goal of regulation is to ensure that prices are fair and reasonable, where competitive forces are insufficient. Any regulatory price control mechanism should encourage prices that reflect what one would observe in a competitive environment
- **Achieve economic efficiency:** The regulatory mechanism chosen should improve economic efficiency. There are several measures of economic efficiency:
- **Technical efficiency** (or “productive efficiency”) requires that goods and resources produced in the telecommunications industry should be produced at the lowest possible cost. This ensures that society’s scarce resources are used efficiently and are not wasted,
- **Allocative efficiency** requires that the prices one observes in a market are based upon and equal to the underlying costs that society incurs to produce those services (generally

the long run incremental cost of producing the service). This will ensure that customers whose valuation of the service exceeds the cost of producing the service will purchase the service. Customers who place a lower valuation on the service will forgo it. This ensures that the “optimal” amount of the service is consumed, given cost and demand conditions. In the ICT sector prices must include some mark-up to recover shared and common costs. Mark-ups should be set so as to minimize the impact on allocative efficiency, and

- **Dynamic efficiency** requires that firms should have the proper incentives to invest in new technologies and deploy new services
- **Promote competition:** Many regulators operate under a legal framework where the goal is to permit and promote competition in telecommunications markets. Where the legal framework permits competition, it is important that regulation (at a minimum) does no harm to competition
- **Minimize regulatory cost:** All else being equal, regulators should choose a regulatory mechanism that is less costly to implement over one that is costlier to implement,
- **Ensure high service quality:** In addition to ensuring that the prices of telecommunications services are fair, regulators are also concerned that consumers should receive a high quality service. In ranking alternative regulatory options, regulators should give preference to mechanisms that result in higher quality service, all else being equal,
- **Ensure telephone prices are competitive with other jurisdictions:** This is a relevant objective in countries, such as Singapore, that use telecommunications infrastructure as a tool for competitive advantage. In these countries, telecommunications infrastructure plays an important role in attracting foreign investment. It is therefore important that telecommunications prices are competitive with other possible destinations for foreign investment,
- **Generate compensatory earnings:** Any regulatory mechanism should provide the regulated company with the opportunity to earn a reasonable profit and to achieve compensatory earnings. If not, the firm may be forced to reduce investment and quality of service may decline.

A.1.2. Pricing Principles for the ICT Sector

- **Pricing Principle 1:** In a competitive market, the efficient price of a service provided by a multiple-service operator need not be equal to its TSLRIC. Instead, the efficient price must be equal to the full economic cost of the service which exceeds the TSLRIC.

  - In perfectly competitive markets, the efficient price is equal to the underlying incremental or marginal cost of producing a service. Pricing Principle 1 recognizes that telecommunications firms are multiple services with substantial shared and common costs. Full economic costs include incremental costs, and an appropriate contribution towards shared and common costs.

- **Pricing Principle 2:** The TSLRIC of each service provided by a multiple-service operator is the price floor for that service; incremental revenue from each service must cover the TSLRIC of that service. However, a price that is equal to the full economic cost of a service will be efficient even if that price is above the TSLRIC.
  - In perfectly competitive markets, any price above incremental cost is inefficient. Pricing Principle 2 emphasizes that, for network operators, a price that is above incremental cost is not necessarily inefficient.
- **Pricing Principle 3:** The LRIC shall be the price floor for any additional increment of service provided by a multiple-service operator; revenue from each increment of service must at least cover its LRIC.
  - LRIC is the appropriate price floor because the planned increment of service for which a price is set need not be the entire quantity of the service. However, regulators increasingly use the (average) TSLRIC as the price floor in place of LRIC. The difference between LRIC and TSLIRC is that TSLRIC includes service-specific fixed costs, while LRIC does not. As a result, TSLRIC usually results in a higher price floor.
  - In the United States, some regulators have established (average) TSLRIC as the price floor for the service as a whole so that the total revenues received from the service must at least equal the service’s TSLRIC. Yet for the price floor for an additional unit of output, regulators have accepted LRIC as the proper price floor.
  - Two variants of LRIC are:
    - Total Service *Long-Run* Incremental Costs (*TSLRIC*, pronounced TS-*Lyric*)
    - Total Element *Long-Run* Incremental Costs (TELRIC)

A.2. Pricing Regulation vs. Economy Theory

A.2.1. Economic Efficiency and Pricing

In economics, the ideal of **efficient pricing** is often held up as a desirable social goal. Only efficient pricing can ensure that consumers pay the true economic value of products they buy, and that society’s scarce resources find their best possible uses.

The following are two general principles pertaining to efficient pricing:

1. The economically efficient price of any increment of service is the price that exactly recovers the full economic cost that will be incurred to provide that increment of service, and
2. In a perfectly competitive market, the price of any increment of service will be driven to the full economic cost of that increment of service, and will therefore be economically efficient.

Unfortunately, in practice, perfect competition very rarely (if ever) occurs. Telecommunications markets are very different from a hypothetical perfectly competitive market, as Table 1 illustrates. This means that, even where there is strong market competition, certain industries cannot follow the simple pricing rules based on the perfect competition model. When pricing services are provided by network operators, an alternative set of pricing principles apply. These are described here.

In telecommunications, efficient prices typically consist of:

a) Recovery of the variable costs of the product, plus

b) Mark-ups to recover the product’s fixed costs, and any shared or common costs.

A.2.2. Hypothetical Perfectly Competitive Firm vs. Real World Telecommunications Operator Practices

Perfectly Competitive Firm	Real World Telecommunications Operator
Single service	Multiple services
Undifferentiated service provided by all competitors	Service differentiated by competitor (branding, different pricing plans, packaging, customer service plans, and so on)
Large number of competitors. Each competitor has negligible market share and no control over price	Fewer competitors, subject to different degrees of regulation and market forces. Market shares may not be negligible
No economies of scale or scope	Economies of scale and scope prevalent. High fixed costs, often high sunk costs
No regulation, no franchise obligations	Varying degrees or terms of regulation. Franchise obligations common (universal service, carrier of last resort, below-cost pricing of local service)
No restrictions on capital. Depreciation determined purely by technological and economic conditions (including risk)	Depreciation rates and cost of capital often below economic levels (subject to regulatory approval) and may not reflect prospective market risks
Undifferentiated and perfectly informed customers	Customer base with widely varying demand and usage characteristics

A.2.3. Difficult requirements are met in order to achieve the condition Perfect competition

a) The product concerned must be “homogeneous”. That is, the product must have identical attributes and quality regardless of who buys or sells it;
b) There must be a large number of buyers and sellers for that product;
c) Buyers must be homogeneous and perfectly informed;
d) No single consumer or firm must buy or sell anything more than an insignificant proportion of the available market volume of that product;
e) All buyers and sellers must enjoy the freedom to enter or exit the market at will and without incurring additional costs;
f) There must be no economies of scale. Economies of scale arise where the average cost of production falls as the volume of production increases. Where economies of scale exist it is more efficient for a single firm to produce a given volume than for two or more firms that between them produce the same total volume, as the larger firm;
g) There must be no economies of scope. Economies of scope arise when different products have significant shared fixed costs, so that a single firm can produce them using a common facility. Where economies of scope exist it is cheaper (and more efficient) to produce different products out of a common plant or facility than to produce them separately;
h) There must be no externalities. An externality is an unintended side effect (either beneficial or adverse) of an ordinary economic activity that arises outside the market or price system so that its impact is not reflected in market prices and costs;
i) There must be no regulation of the market or franchise obligations; and
j) There must be no restrictions on capital.

A.2.4. Forms of Market Failure

I. A **natural monopoly** is market structure in which the prevailing volume of market demand can be served at a lower average cost by a single firm, rather than by two or more firms. In other words a single firm can meet market demand at a lower cost than two or more competing firms could.

   Economies of scale are frequently cited as a reason for natural monopoly. In some industries, the fixed costs of initial entry or set-up are so large relative to operational costs that average cost declines over a substantial volume of output. In extreme cases, a firm may not reach the lowest average cost point in its cost function until the available market demand is exhausted. In markets with these characteristics, a single supplier is actually the

most efficient form of organization (unlike other monopolies that arise for legal or other reasons).

Public utilities and telecommunications carriers have long been viewed as natural monopolies, but technological change may now be gradually eroding their natural monopoly characteristic. That is because modern technology that relies increasingly on fast computers and software is making plant and equipment more modular and scalable than in the past, and is bringing down the minimum scale that a firm must achieve to operate efficiently.

II. An **externality** is a cost or benefit from an economic decision or activity that is not reflected in market prices, and falls without invitation or compensation on unwitting third parties. For example, cars that pollute the air because they are not equipped with pollution control devices impose a cost on society. If the car owners do not have to pay compensation for that cost, the outcome is a negative externality. On the other hand, the value of any network increases (to existing members) when a new member joins. If that member is not rewarded for having created the collective benefit, the outcome is a positive externality.

The effect of an externality is that society as a whole may produce “too much” of a good or service that produces a negative externality, or “too little” of a good or service that produces a positive externality.

A.2.5. Dynamic Efficiency

To ensure that regulated operators are permitted to earn sufficient revenue to finance on-going operations and future investment:

a. Dynamic efficiency is a term in economics, which refers to an economy that appropriately balances short run concerns (static efficiency) with concerns in the long run (focusing on encouraging research and development).[1] Through dynamic efficiency, such an economy is able to further improve efficiency over time. Investments in education, research and innovation are important in this process. Dynamic efficiency also refers to the ability to adapt quickly and at low cost to changed economic conditions and thereby maintain output and productivity performance despite economic 'shocks'. Dynamic efficiency is pursued through microeconomic reform and increased competition, which provide incentives for businesses to innovate and adapt.

b. Equity Objectives

- Operator-consumer equity
- Consumer-consumer equity

A.2.5.1. Discretionary Price Setting

- Discretionary price setting is a “heavy hand” type of price regulation, and usually implies that tariffs are determined on the basis of political factors by the telecom authorities or even the minister. Discretionary price setting has in particular been used in countries where telecom operators have been partly or fully publicly owned. In these cases the price setting has in reality been left to the monopoly operator, with subsequent approval by the telecom authorities. Discretionary prices have often been set below costs in order to serve social objectives or political interests. However, such a type of price setting conflicts with the goal of efficiency, as this will hamper financing of further investments in the sector. The result tends to be a very long waiting list for services that cannot be provided.
- Discretionary pricing by private operators with significant monopoly power will also result in inefficiency and under-investment, as they will have an incentive to charge high monopoly prices and restrict the market they serve. Discretionary pricing by the operators is appropriate if the market is truly competitive and the particular operators do not have significant market power. Thus even in liberalized markets, there is generally price regulation for monopoly services of incumbent operators, but discretionary pricing is permitted for new operators that have no significant market power. The purpose is to regulate monopoly power over price setting, wherever it is found, and to allow discretionary pricing wherever competition is effective

A.2.5.2. Rate of Return (ROR) Regulation

- Rate of return regulation (ROR) limits the return an operator can earn on its investment in providing services. The principle is that operators should be allowed to earn revenue covering the total operating costs, plus a return on their investment. ROR can be applied either for each service or for the entire operations of the operator. If a rate of return is to be determined for each service, it requires a detailed breakdown of its revenues and costs. ROR both ensures that the operator is allowed to secure sufficient revenue to cover its costs and a reasonable return, and prevents monopoly pricing to gain excessive profits.
- The weaknesses of ROR are that the operator lacks an incentive to innovate or to minimize costs. If the rate of return is calculated on a cost-plus basis, with its allowed return as a percentage of its investments, the operator can realize an advantage in over-investment and

inflation of costs. This incentive can be mitigated somewhat by building time lags into the process of price regulation, but this can only have a limited effect.

- Rate of return regulation is a way of regulating the prices charged by a firm. It restricts the amount of profit (return) that the regulated firm can earn. Rate of return regulation has been used extensively to regulate utilities in many countries. It has been used in the United States since public utility regulation began in the early 1900s.
- There are two steps to implementing rate of return regulation:
  - First, determine the economically appropriate revenue requirement. This is based on prudently incurred expenses and a “fair” return on invested capital, and
  - Second, set prices for individual services so revenue earned from all the regulated services is not greater than the revenue requirement
- **Calculating the Revenue Requirement:** The revenue requirement is generally calculated using the following formula:
    - *Revenue Requirement = Operating Expenses + Depreciation + Taxes + (Net Book Value * Rate of Return)*
  - The **rate of return** used is the post-tax rate of return the firm is permitted to earn. This is also known as the opportunity cost of investor capital. It is based on a weighted average of the cost of debt and equity financing.
  - **Operating expenses** should include only those expenses the firm has prudently incurred to provide the regulated services.
  - The **net book value** of the firm’s capital assets should include only those capital assets used by the firm specifically to provide the regulated service. The formula includes an allowance for depreciation, so only the book value of the assets net of depreciation should be included in this amount.
- **Setting Prices for Regulated Services**The regulator needs to set prices that allow the regulated firm to collect its revenue requirement. This requires that the sum of total expected revenue for each regulated service is no greater than the permitted revenue requirement. This can be expressed mathematically as:

$$\sum_{i=1}^{N} P_i * Q_i \leq RR$$

Where Pi and Qi are, respectively, price and quantity of service i and N is the total number of regulated services. RR is the revenue requirement. As the formula shows, in order to calculate prices under rate of return regulation the regulator first needs a reasonable forecast of demand for the regulated services.

- For a multiple-service firm, there is an element of discretion in allocating the revenue requirement amongst different services. As a guiding principle, the regulator should ensure that prices of individual services are set at prices that minimize distortion of customer behaviour.
- The costs used to determine prices under rate of return regulation are the actual embedded costs of the firm, not forward-looking economic costs.
- Under rate of return regulation, the firm can request rate increases if, for whatever reason, it believes revenues are not sufficient to achieve a normal return on invested capital.

A.2.6. Incentive Regulation

A.2.6.1. Banded Rate of Return Regulation

- With banded rate of return regulation, the regulator specifies a range of authorized earnings for the regulated firm at the beginning of the regulatory period. If actual company earnings fall within the range, the company’s prices are considered to be fair and the regulator does not intervene.
- If the firm’s earnings fall outside the permitted band the regulator intervenes:
- If earnings are higher than the permitted ceiling, the firm must share these gains with its customers,
- If earnings are lower than the floor, the company is permitted to increase rates.
- Prices are thus initially set so that earnings fall within the permitted band, and price adjustments are required only if earnings fall outside the defined range.
- Banded rate of return regulation is not a common form of price regulation. This is because banded rate of return shares most of the weaknesses of traditional rate of return regulation. It does not eliminate the need for frequent rate hearings and does little to provide incentives for the regulated firm to reduce costs, unless the regulator defines a very wide band.

A.2.6.2 Earnings Sharing

- Earnings sharing is very similar to banded rate of return regulation, but uses a more precisely defined mechanism for sharing excess profits with customers. The regulator defines a band (referred to as a “deadband”) within which the firm is free to keep all earnings. Earnings above or below some deadband are shared in various proportions between the company and the customer.
- The deadband under earnings sharing tends to be wider than under banded rate of return regulation. As a result, the firm has greater incentives to achieve productivity growth and increase efficiency.
- Some regulators have used earnings sharing mechanisms when a price cap plan is first introduced, to reduce the risk to customers and the firm of moving to a new form of regulation.
- For example, earnings sharing plans were popular forms of incentive regulation and were a component of some of the initial price cap plans implemented in the United States. However, earnings sharing does dilute the incentive efficiency properties that exist under a pure price cap regime. Over the past decade, companies and regulators have moved away from this form of incentive regulation.

A.2.6.3 Revenue Sharing

- Revenue sharing regulation is not common. Revenue sharing requires the regulated firm to share with customers any revenues over a specified threshold. (This contrasts with earnings sharing regulation in which regulated firms are required to share earnings net of costs.) Typically the regulated firm retains all of its revenue provided that total revenue does not exceed a specified threshold. The firm must share some proportion of any revenue generated above that threshold with its customers.

A.2.6.4. Price Freezes

- A price freeze specifies that a company’s prices cannot change within a defined period of time. At the end of the defined period, the regulator may undertake a rate review. The ability to capture any additional profit during the period if a price freeze give the firm an incentive to reduce its costs.
- Regulators tend to use price freezes in conjunction with other forms of regulation, especially price cap regulation. In telecommunications, price freezes in a price cap plan usually apply to

basic residential service. These services have historically been set at low levels due to universal service concerns and there is often a desire to maintain that policy under a price cap regime.

A.2.6.5. Rate Case Moratoriums

- A rate case moratorium is an agreement between the regulator and the regulated company to abstain from general rate increases for particular services. A rate case moratorium usually also suspends investigations of the firm’s earnings, guaranteeing the regulated firm that profits made at current prices will not be taken away.
- A moratorium imposes a regulatory lag. This is intended encourage the regulated firm to reduce operating costs, because the firm will be able to retain the resulting increase in earnings. The length of a rate case moratorium is typically between two and five years, and is usually specified in advance.

A.2.6.6. Pure Price Cap Regulation

- Under price cap regulation, the regulator controls the prices charged by the firm, rather than the firm’s earnings. This focus on prices (and not profits) is what provides for improved efficiency incentives.
- The regulator determines an annual price cap formula. This formula determines whether prices should change in each annual period, and by how much. The regulator usually specifies in advance how long the formula will apply for.
- Under a typical price cap, the regulated firm is permitted to alter its average price for a basket of regulated services at the rate of the general level of inflation minus an efficiency factor based on the regulated firm’s expected efficiency (the “X-factor”). Some regulators also allow the firm to adjust for changes in costs beyond its control, by including an exogenous cost component in the price cap formula (the “Z-factor”). A general example of a price cap formula is:

$$PCI_{t+1} = PCI_t * [1 + I_t - X]$$

In the above formula, PCIt+1 and PCIt are the price cap index in the current year and the previous year, respectively. CPI is the Consumer Price Index (or an alternative index of *inflation*). X and Z are adjustments for expected efficiency gains and for exogenous costs, as discussed above.

Price caps have a number of advantages over other forms of regulation that focus on the firm’s realized earnings. The fact that the regulated firm is permitted to retain any realized earnings creates strong incentives to improve efficiency and reduce costs, beyond the level required by the X-factor.

The infrequent reviews of the price cap formula reduce regulatory costs (by avoiding frequent rate cases), and encourages the firm to implement strategies to reduce costs in future periods, as well as in the current year. Finally, under price cap regulation, the regulated firm has much more flexibility in the prices that it can charge its customers as long as average prices do not exceed the cap.

Regulators around the world have used price caps extensively in the telecommunications industry. The regulator in the United Kingdom introduced price caps in 1984, and they are now increasingly common in the rest of Europe. In the United States, price cap regulation began replacing traditional rate of return regulation for telecommunications carriers in 1989. By the mid to late 1990s, nearly every state had a price cap regime in place for the telecommunications industry.

A.2.6.7. Hybrid Price Cap

Under a hybrid price cap scheme the regulator combines a price cap mechanism with a mechanism that uses realized earnings to determine prices.

The most common type of hybrid price cap is one where the regulator sets a price cap formula and an explicit earnings sharing requirement. If the firm’s regulated earnings exceed a certain threshold then it must share part of the gains with customers. Conversely, if earnings fall below the threshold a share of the losses falls on customers. This provides the firm an incentive to improve its efficiency, while also addressing concerns about excessive profits (for example, if the regulator sets an X-factor that subsequently appears to be too generous).

Rumus: Allowable price increase for a year = starting price + I – X

Misal:

In year 2009, the price is 100

I = inflansi tahun 2009 = 5 %

X = Productivity factor (is a variable which accounts for effects in total output not caused by inputs. For example, a year with unusually good weather will tend to have higher output, because bad weather hinders agricultural output. A variable like weather does not directly relate to unit inputs, so weather is considered a total-factor productivity variable)= Q/Z (=index of aggregate output volume/index of aggregate input volume) = 3 %

The allowable price increase for 2010 equals 100+ 5%x100 – 3 %x100 = 102

Basic Price Cap Rule: API(Actual Price Index) ≤ PCI (Price Cap index).

Contoh soal: Pada tahun 2009, API = PCI = 100; tahun 2010, PCI = 102; Indeks mrpk fungsi revenue; Operator memiliki dua jenis layanan: lokal=75 % revenue dan Internasional = 25 % revenue;

Jika tahun 2010, operator ingin menaikkan tarif lokal sebesar 1 % dibanding tarif lokal 2009, berapakah maksimum tarif internasionalnya agar tidak ditegur regulator?

Jawab: Tarif lokal 2010 = 101 → weighted revenue tahun 2010 = (75 % x 101)+ (25 % x Tarif internasional) = (75,75 + 0,25 x tarif internasional) ≤ 102 → tarif internasional maksimum =(102-75,75)/0,25 = 105 (naik 5 %)

A.2.6.8. Cap Price + QoS factor

$$PCI_{t+1} = PCI_t * [1 + I_t - X \pm Q]$$

Regulator mengijinkan kenaikan tarif layanan jika kualitas layanan operator memenuhi syarat.

Q-factor diitetapkan oleh regulator, yang mengacu pada KPI (Key Performance Indicator) yang ditetapkanoleh regulator dan berhasil dilampaui oleh operator

A.2.6.9. Rate Rebalancing

- Historically, telecommunications operators and regulators have set prices for network access as low as possible. Prices for other services, such as long distance calls, have been kept high to subsidize low access prices.
- The rationale behind such policies was to encourage customers to join the network, to realize network externalities. In practice, however, subscribership in many developing economies has been extremely low. It is questionable whether low network access prices have in fact led to economic gains.[1]
- Whatever the benefits from subsidizing access prices, economists agree that rebalancing tariffs can produce significant economic gains. Table 1 sets out estimates of economic gains from tariff rebalancing from four separate studies.
- A policy of rebalancing seeks to increase access prices, and reduce prices for services that have traditionally subsidized low access prices. The objective is to ensure that the price for each service reflects the underlying cost of providing that service.
- Tariff rebalancing can improve social welfare by:
    - Stimulating demand for services such as long distance calling,
    - Providing improved signals to actual and potential service providers to invest in network access technologies, and
    - Improving incentives for competitors to compete for a broad range of customers.

- At the same time, increased network access prices under tariff rebalancing generally have a relatively small impact on overall subscribership levels. This is because demand for network access is not very responsive to changes in price. In addition, low prices for usage can stimulate demand for access, helping to mitigate the effects of increased prices for access.

A.3. Pricing Regulation di Indonesia

- Kepmenhub Nomor : KM.19 Tahun 2001 tentang Tarif Jasa Telepon Tetap Dalam Negeri Dan Birofax Dalam Negeri
- KM.32 Tahun 2004 Biaya Interkoneksi Penyelenggaraan Telekomunikasi
- Peraturan Menkominfo Nomor: 09/Per/M.Kominfo/02/2006 tentang Tata Cara Penetapan Tarif Awal Dan Tarif Perubahan Jasa Teleponi Dasar Melalui Jaringan Tetap
- Peraturan Menkominfo Nomor: 12/Per/M.Kominfo/02/2006 tentang Tata Cara Penetapan Tarif Perubahan Jasa Teleponi Dasar Jaringan Bergerak Selular
- Peraturan Menkominfo Nomor : 03/Per/M.Kominfo/1/2007 tentang Sewa Jaringan (LAMPIRAN 1) (LAMPIRAN 2/Software) (LAMPIRAN 3)
- Peraturan Menkominfo No. 9/Per/M.Kominfo/04/2008 Tentang Tata Cara Penetapan Tarif Jasa Telekomunikasi Yang Disalurkan Melalui Jaringan Bergerak Selular (Lamp. 1)(Lamp. 2)(Lamp. 3)(Lamp. 4)
- Peraturan Menkominfo No. 15/Per/M.Kominfo/4/2008 Tentang tatacara Penetapan Tarif Jasa Teleponi Dasar Yang Disalurkan Melalui Jaringan Tetap (Lampiran I)(Lampiran II)
- Peraturan Menteri Kominfo No. 14/Per/M.Kominfo/2/2009 tentang Kliring Trafik Telekomunikasi

A.4. Soal-Soal

Soal 1.

Diketahui:

Operating expenses per bulan = 70 milyar rupiah, depreciation per bulan = 10 milyar, taxes per bulan = 20 milyar. Net book value = 1 trilyun rupiah. RoR = 10 % per bulan. Trafik = 500 Mbyte per pelanggan per bulan. Jumlah pelanggan = 1 juta.

a. Hitunglah berapa tarif (service-charge) dengan konsep volume-based (dengan satuan unit cost per unit trafik) dari suatu layanan pada suatu operator tertentu. Misal biaya abonemen = 0 (berlaku pada pelanggan “pra bayar”).

Jawab:

*Revenue Requirement = Operating Expenses + Depreciation + Taxes + (Net Book Value * Rate of Return)* = 70 M + 10 M + 20 M + (1 T*10%) = 200 Milyar rupiah = tarif x trafik.

Trafik = 500 Mbyte x 1 juta = 500 TeraByte per bulan

Tarif = 200 Milyar rupiah / (500 Tbyte) = 0,4 rupiah per kbyte.

b. Hitunglah berapa tarif (service-charge) dengan konsep volume-based (dengan satuan unit cost per unit trafik) dari soal (a) tetapi seandainya semua pelanggan adalah “pasca bayar”, misal biaya abonemen = 10.000 rupiah/pelanggan per bulan.

Jawab:

Revenue = abonemen + service charge = abonemen + (tarif x trafik) = (10.000 x 1 juta) + (tarif x 500 TeraByte) = 10 Milyar + (tarif x 500 TeraByte) = 200 Milyar → tarif = (200-10)milyar rupiah / (500Tbyte) = 0,38 rupiah per kbyte.

c. Hitunglah berapa tarif “unlimited” per pelanggan per bulan sesuai data soal (a). Misal semua pelanggan adalah “pra bayar”

Jawab: 200 Milyar rupiah = tarif unlimited x 1 juta → tarif unlimited = 200 Milyar rupiah / 1 juta = 200 ribu rupiah per pelanggan per bulan

Soal 2.

Diketahui

Suatu provider memiliki lisensi internet dan telepon. Regulasi: Total Service Long-Run Incremental Costs (TSLRIC, pronounced TS-Lyric). Kapasitas normal bisa melayani trafik layanan telepon = 1 milyar menit dan trafik internet = 10 Tbyte. Revenue requirement = 200 milyar rupiah.

i. Hitunglah service price layanan 1 bila, bila service charge 1 : service charge 2 = 5 : 1.

Jawab:

Revenue = tarif 1 x trafik 1 + tarif 2 x trafik 2 = tarif 1 permenit x 1 milyar menit+ 0,2 tarif 1 x 10 Terabyte per kbyte = 3 milyar menit = 200 Milyar rupiah → tarif telepon = 66,67 rupiah per menit

b.Hitunglah service price layanan 2 bila, bila service charge 1 : service charge 2 = 5 : 1

Jawab: tarif internet = 0,2 tarif telepon = 13,33 rupiah per kByte

c.Hitunglah service price layanan 1 , bila provider melakukan subsidi silang (yang sebenarnya sangat tidak direkomendasikan oleh ITU & WTO), sedemikian hingga service charge 1 : service charge 2 = 50 : 1

Jawab:

Tarif 1 per menit x 1 milyar menit + 0,02 tarif 1 x 10 Terabyte/k = 1, 2 milyar menit = 200 Milyar rupiah → tarif telepon = 166,67 rupiah/menit

Soal 3.

Diketahui

Misal: I = inflansi tahun 2013 = 5 %, Productivity factor= 3 %. Allowable price internet = 1 rupiah per kbyte.

a.Hitung the allowable price pada tahun 2014, *bila kinerja layanan provider tidak lebih baik dibanding index yang ditetapkan pemerintah.*

Jawab:

$$PCI_{t+1} = PCI_t * [1 + I_t - X \pm Q]$$

allowable price pada tahun 2014 = 1*(1 + 5% – 3% + 0) = 1,02 rupiah per kByte

b.Hitung the allowable price pada tahun 2014, bila kinerja layanan provider lebih baik dibanding index yang ditetapkan pemerintah sebesar 5 %

allowable price pada tahun 2014 = 1*(1 + 5% – 3% + 5 %) = 1,07 rupiah per kByte

Soal 4.

Diketahui

Perhitungan menggunakan konsep Total Element Long-Run Incremental Costs (TELRIC). Misal suatu provider memiliki lisensi dua macam layanan. Dan Total Service Long-Run Incremental Costs (TSLRIC, pronounced TS-Lyric). Kapasitas normal bisa melayani trafik layanan 1 = 1000 unit trafik dan trafik layanan 2 = 2000 unit trafik. Revenue requirement service 1 = 2.000 unit price dan RR dari service 2 = 4.000 unit price.

a.Hitunglah service charge 1

jawab:

$$\sum_{i=1}^{N} P_i * Q_i \leq RR$$

Service charge 1 * trafik layanan 1 + Service charge 2 * trafik layanan 2 <= Revenue requirement service 1 + RR dari service 2

Service charge 1 * 1000 + Service charge 2 * 2000 <= (2000 + 4000)

Service Charge 1 <= 6 unit price/unit trafik

b.Hitunglah service charge 2

Jawab: service charge 2 <= 3 unit price/unit trafik

Soal 5.

Diketahui

Perhitungan Basic Price Cap Rule.Diketahui: Pada tahun 2012, API = PCI dari layanan telepon = 100 rupiah / menit ; tahun 2013, PCI = 105 rupiah per menit ; Indeks mrpk fungsi revenue; Operator memiliki dua jenis layanan: telepon local, revenue =80 % dari revenue total dan telepon Internasional. Jika tahun 2013, operator ingin menaikkan tarif lokal sebesar 3 % dibanding tarif lokal 2012. Berapakah maksimum tarif internasionalnya bila regulator menerapkan regulasi Basic Price Cap Rule?

Jawab: Tarif lokal 2013 = 103 rupiah per menit (naik 3 % dibanding th 2012) → weighted revenue tahun 2013 = (80 % x 103)+ (20 % x Tarif internasional) = (82,4 + 0,20 x tarif internasional) ≤ PCI tahun 2013 (= 105) → tarif internasional maksimum =(105-82,4)/0,20 <= 113 (naik 13 %)

Soal 6

In 2014, API (Actual Price Index) = CPI (Price Cap index) = 100 unit price. In 2015, inflation = + 6 %, productivity factor = +2 % and Quality factor = +3 %; Index is assumed to be a function of revenue; The operator has two types of customers: A.Internet customers time-based tariff and B.internet volume based tariff. Revenue from customers using time-based-tarriff (A) was 70 percent of total revenue; in 2014: A tarriff = B tarriff; If in 2015, the operator wants to raise customer rates over the Internet using volume-based-tarriff (B tarriff) by 5% compared with the rate in 2014, what is the maximum rates of time-based customer-tarrif (A tarriff) order not to violate the hybrid price regulation.

1. For example, a Telco in Indonesia known data is as follows: Operating Expenses = 10 T rupiah, Depreciation = 5 T rupiah, Taxes = 2 T rupiah, Net Book Value = 100 T rupiah. Compute the rate (tariff) per unit rupiah k bytes, when Telco using the concept of rate of return regulation, when traffic = 1000 terabytes and the expected rate of return is = 10%

Soal 7

Data from a mobile-Telco in the city of Bandung as follows: (i) the current network capacity = 95 terabyte / week, the price of Internet subscription with an average of 950 million rupiah per terabyte, traffic underserved = 100 Terabyte / week and traffic is lost no underserved = 5 terabyte / week (ii) when the average subscription price was raised to 1050 million rupiah / terabyte, then the network capacity was increased to 105 terabyte / week, but demand (= traffic + traffic underserved lost) dropped to 95 terabytes / week

Problem: (a) Calculate and write the demand function; (b) Calculate and write the supply function ; (c) compute in the event of market equilibrium internet service in the city of Bandung in Telco are: demand per month in units of terabytes of capacity network in units of Mbps and average subscription price in units of rupiah / KBytes.

Soal 8

In 2014, API (Actual Price Index) = CPI (Price Cap index) = 100 unit price. In 2015, inflation = + 5 %, productivity factor = +1 % and Quality factor = +2 %; Index is assumed to be a function of revenue; The operator has two types of customers: A.Internet customers time-based tariff and B.internet volume based tariff. Revenue from customers using time-based-tarriff (A) was 90 percent of total revenue; in 2014: A tarriff = B tarriff; If in 2015, the operator wants to raise customer rates over the Internet using volume-based-tarriff (B tarriff) by 5% compared with the rate in 2014, what is the maximum rates of time-based customer-tarrif (A tarriff) order not to violate the hybrid price regulation.

Soal 9

For example, a Telco in Indonesia known data is as follows: Operating Expenses = 12 T rupiah, Depreciation = 5 T rupiah, Taxes = 3 T rupiah, Net Book Value = 110 T rupiah. Compute the rate (tariff) per unit rupiah k bytes, when Telco using the concept of rate of return regulation, when traffic = 10000 terabytes and the expected rate of return is = 8%

B. Net Neutrality Pricing and Its Impact in the Long Run

B.1. Net Quality Charging Method

Imagine you are a passenger on a plane. In there is, let's say 10 premium seats, which charge two times more expensive than economy seats. Then, the aircraft corporate profit prospects earned from premium passengers compared to that obtained from economy passengers are = (2 – (15/10) – 1.1) = 40 %. Is this discrimination? Of course not! This is a priority! and technically the priorities are part of the quality guarantee. This is the soul and the spirit of the idea of the preparation of this chapter.

Internet Service Provider business simulations in this chapter conducted with refers to the Net Quality Charging Method.

II. **NET QUALITY CHARGING PRINCIPLES**: internet service charges are divided into two groups:

(i) best effort charged to all customers of network-providers, because much internet traffic is still run using the best effort mode, in this invention is called PBE.

(ii) QoS charging on the Over-the-Top services traffic served by the concept of QoS, called PQoSi, where the notation of I is to indicate a group rate of QoS internet services.

The formula used on the ISP revenue requirement planning as follows:

$$Revenue\ Requirement = \sum PBE \times QProvider + \sum_1^n PQoS_i \times QQoS_i \geq Operating\ Expenses\ + OTT\ Provider\ charge\ if\ any\ +\ Depreciation\ +\ Taxes + Non\ Taxes\ if\ any +\ (Net\ Book\ Value\ *\ Rate\ of\ Return) \quad (2)$$

where P = Price or charging, Q = quantity of traffic, PBE = charging for an Over-the-Top services traffic that is served using best-effort mode,

QProviders = the number of networks & internet provider’s customers, $PQoS_i$ = charging for an internet that is served using quality of service mode, $QQoS_i$ = quantity or traffic of the internet services that are served using QoS mode.

Details of variable formula seen in Table 1 and Table 2. Revenue and expenditure of ISP can be calculated with certainty meet the target of ROR (Rate of Return). The operating costs, expenses for taxes, the USO (universal service obligation) expense, spectrum license fee, network capacity and the number of customers is measured in the portion of NBV (Net Book Value). The optimization is done in order to find the right strategy for the company still benefit. There is the possibility of a variable in this book is placed within expenditure groups, but when ISP want to choose the opposite strategy, then that variable is an expense for ISP, then the number that is loaded into the variable column are negative numbers.

TABLE 1. Details of Variable Formula of ISP Technical Calculation

The number of Network & Internet Provider customers	SN = Z1*NBV
The number of the best effort customers	NBE = SN = Z1*NBV
The number of QoS customers	NQoS = Z2*NBE = Z2*Z1*NBV
The technical multiplier factor of average network capacity for the QoS mode	K
Total ISP Capacity	C = NBV/Z3
Average capacity given to the best effort Over-the-Top services traffic	BBE = C/NQoS = (NBV/Z3)/(Z2*Z1*NBV) = 1/(Z1*Z2*Z3)
Average capacity given to the QoS Over-the-Top services traffic	BQoS = BBE * [K / { 1 + (NQOS/NBE)* (1-K)}] = {1/(Z1*Z2*Z3)} * [K / { 1 + (Z1*Z2*NBV/Z1*NBV)* (1-K)}] = {1/(Z1*Z2*Z3)} * [K / { 1 + (Z2)*(1-K)}]
Note: NBV = Providers net book value; Values of K, Z1, Z2 and Z3 are depending on each provider; Presumption for simulation purpose: Z1 = 0.091	

TABLE 2. Details of Variable Formula of ISP Business Calculation

Cost Calculation	
Operating Cost	X1*NBV
Depreciation expense	X2*NBV
Taxes expense	X3*OE = X3*X1*NBV
Non-Taxes expense (USO, spectrum fee etc.)	X4*OE = X4*X1*NBV
OTT Provider Charge (if any)	X5*QoSR = X5*{NBV * (Y2*Z1*Z2)} = X5*Y2*Z1*Z2*NBV
Total Cost	**NBV*{X1 + X2 + (X1*X3) + (X4*X1) + (X5*Y2*Z1**Z2)}**
Revenue Requirement	**NBV*{X1 + X2 + (X1*X3) + (X4*X1) + (X5*Y2*Z1**Z2) + ROR}**
Note: NBV = Net Book value; ROR = Rate of Return; OE = Operation Expense; Values of X1, X2, X3, X4, X5, Y2, Z1 and Z2 are depending on each provider	

Revenue Calculation	
ISP Revenue from Best Effort customer	Total of best effort customer Number * Best Effort charge per customer = NBE*PBE = (Z1*NBV) * Y1 = NBV * (Y1*Z1)
ISP revenue from QoS customer = QoSR	QoS internet customer * QoS internet charge = NQoS*PQoS =(Z2*Z1*NBV) * (Y2) = NBV * (Y2*Z1*Z2)
Total Revenue	**NBV* {(Y1* Z1) + (Y2*Z1*Z2)}**
NBV = Net Book value; Values of Y1, Y2, Z1 and Z2 are depending on each provider. Presumption for simulation purpose: Y1 "average normal price" = 4.824 per user per year	
Conclusion: ROR = {(Y1* Z1) + (Y2*Z1*Z2)} - {X1 + X2 + (X1*X3) + (X4*X1) + (X5*Y2*Z1Z2)}**	

Remarks:

a) Variables are calculated as compared to how much of NBV as follows: X1 = Operating Cost ; X2 = depreciation expense ; X3*X1 = Taxes expense ; X4*X1 = non-Taxes expense; X5*Y2*Z1*Z2 = OTT Provider charge, if any; Y1*Z1 = ISP Revenue from Best Effort customer; (Y2*Z1*Z2) = ISP revenue from QoS customer = QoSR; Z1 = The number of Network & Internet Provider customers; Z1 = The number of best effort customers; Z2*Z1 = The number of QoS customers; 1/Z3 = Total ISP Capacity.

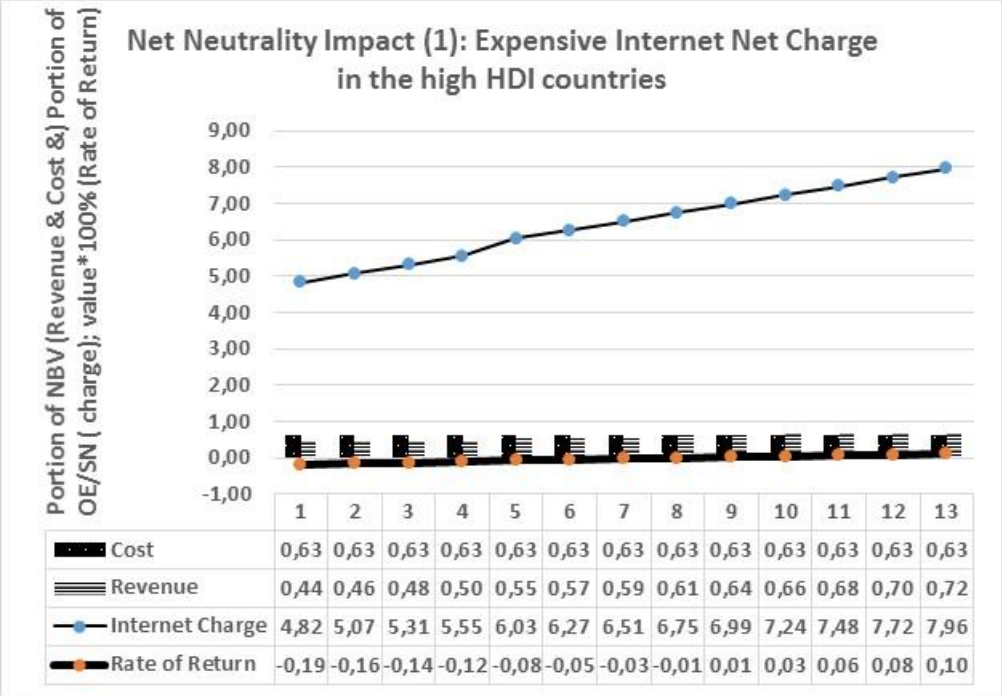
b) Variables are calculated as compared to others as follows: X3 = tax expense as compared to operation cost; X4 = non-tax expense as compared to operation cost; X5 = OTT provider charge, if any, as compared to ISP revenue from QoS customer (= QoSR); Y1 = average charge to the best effort customer = ISP Revenue from Best Effort customer as compared to The number of best effort customers; Y2 = average charge to the QoS customer = ISP revenue from QoS customer (= QoSR) as compared to The number of QoS customers; Z2 = The number of QoS customers as compared to The number of Network & Internet Provider customers.

B.2. Calculation Simulation in the Net Neutrality Era

In the Net Neutrality era, the providers cannot use all key words of the network QoS methods which are: QoS internet customer, QoS internet subscriber charge, average capacity given to the QoS Over-the-Top services traffic and providers' revenue from QoS customer. So the key words are considered equal to 0, which means that X5, Y2, Z2 = 0. When Net Neutrality is applied, ISP are prohibited from priority against internet traffic (technically is not discriminating!!) meaning that all data traffic is technically should be treated as the best effort!!

Internet traffic climbed unusually when internet defined as a human right, it caused of huge traffic consuming bandwidth, but contains a little information value, are treated the same as the traffic with a small bandwidth and contain high-value information, it is technically very difficult to handle the data traffic that has a pattern like this without making priorities towards traffic allowed.

Economically, the first adverse effects of Net Neutrality are a going on in the high level of HDI (Human Development Index) countries presented in figure 1. Internet charge in high HDI countries should be increased in order to obtain a reasonable profit, if the internet charge is set for the presumption normal price = 4.824, then the providers will incur a loss of 18.6%. Providers reasonable profits, nearly 10%, can only be obtained after they raised the internet charge up to 165% compared to the presumption normal charge. This will cause high HDI countries will have problems to meet the obligation to provide service life of the internet as a human right.



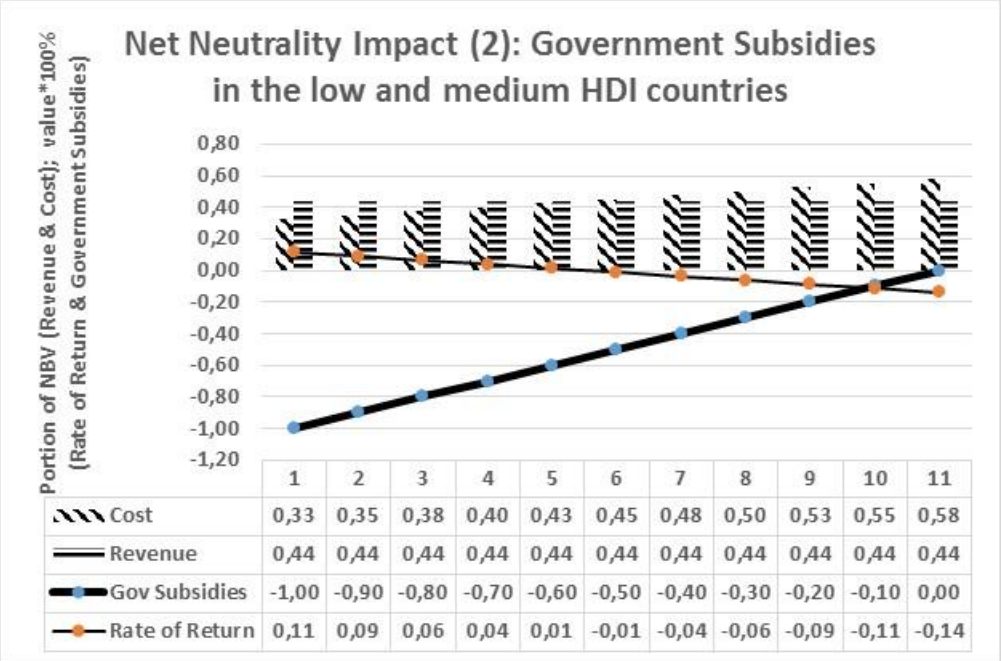
	1	2	3	4	5	6	7	8	9	10	11	12	13
Cost	0,63	0,63	0,63	0,63	0,63	0,63	0,63	0,63	0,63	0,63	0,63	0,63	0,63
Revenue	0,44	0,46	0,48	0,50	0,55	0,57	0,59	0,61	0,64	0,66	0,68	0,70	0,72
Internet Charge	4,82	5,07	5,31	5,55	6,03	6,27	6,51	6,75	6,99	7,24	7,48	7,72	7,96
Rate of Return	-0,19	-0,16	-0,14	-0,12	-0,08	-0,05	-0,03	-0,01	0,01	0,03	0,06	0,08	0,10

Fig. 1. Adverse Effects of Net Neutrality in the High Level of HDI Countries

The second adverse effects of judgment of a priority as a discrimination by Net Neutrality is occurring in medium and low level HDI countries, as seen in figure 2. In most of the countries in the world, the internet charge cannot be raised to 165%, because the purchasing power of people is limited. An alternative solution is to do a subsidy by the government to the Internet Service Provider in order to stay alive, if this cannot be done, then sooner or later Internet services in these countries will die. How to enter the factor of government subsidies on HOTTCM is to enter negative numbers in the sector of non-tax expenses. Non-tax expense which under normal circumstances is a providers expenditure submitted the relevant state frequency spectrum licenses, participation in USO etc.

The results of calculations are presented in second figure is generated by assuming that the best effort charge is the same as presumption values = 4.824 and traffic QoS = 0. In order that providers to break even, required government subsidies of about 55% of the net book value. The government subsidies in the amount of 100% of the net book value will cause the providers will receive a gain of 11.4%.

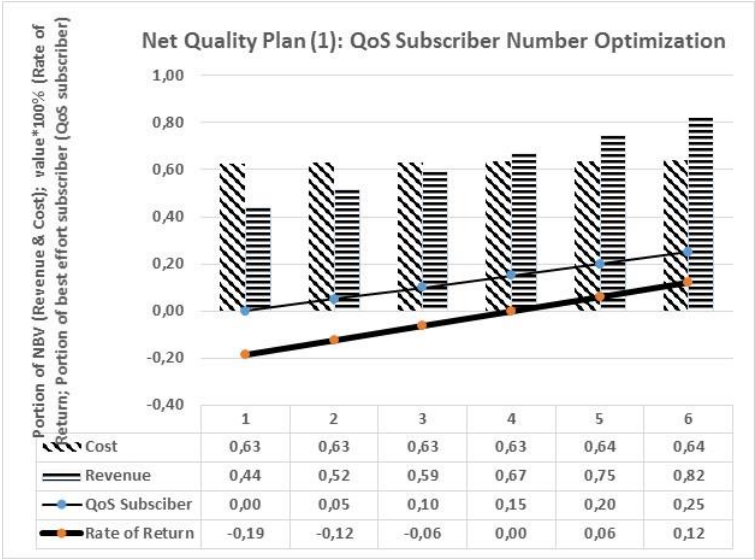
Government subsidies obviously not a good option because it would change the nature of the internet providers of revenue center into a cost center, and almost impossible to do, then the only alternative that has been done is not following the rules of Net Neutrality!



	1	2	3	4	5	6	7	8	9	10	11
Cost	0,33	0,35	0,38	0,40	0,43	0,45	0,48	0,50	0,53	0,55	0,58
Revenue	0,44	0,44	0,44	0,44	0,44	0,44	0,44	0,44	0,44	0,44	0,44
Gov Subsidies	-1,00	-0,90	-0,80	-0,70	-0,60	-0,50	-0,40	-0,30	-0,20	-0,10	0,00
Rate of Return	0,11	0,09	0,06	0,04	0,01	-0,01	-0,04	-0,06	-0,09	-0,11	-0,14

Fig. 2. Adverse Effects of Net Neutrality in the Low and Medium Level of HDI Countries

B.3. Calculation Simulation in the Network Quality Era

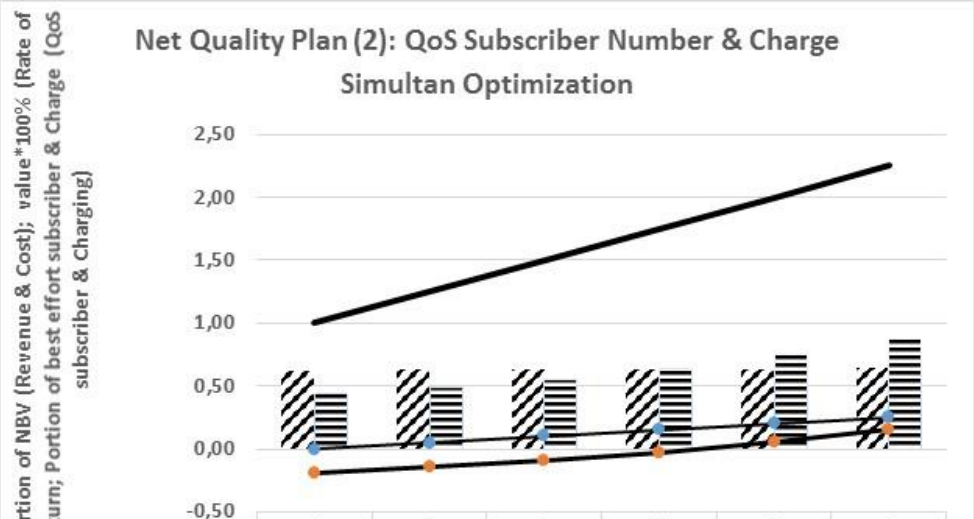


	1	2	3	4	5	6
Cost	0,63	0,63	0,63	0,63	0,64	0,64
Revenue	0,44	0,52	0,59	0,67	0,75	0,82
QoS Subsciber	0,00	0,05	0,10	0,15	0,20	0,25
Rate of Return	-0,19	-0,12	-0,06	0,00	0,06	0,12

Fig. 3. QoS Custumer Optimization in the Net Quality Era

In figure 3 presents an optimization of ISP' business in the era of Net Quality, with the aim to get the optimal number of QoS customer. Assumed that average charge of QoS customer equal to twice than the best effort customer charge. Seen that providers have started to break even when the number of QoS customers reached 16% of the best effort customers. Advantages provider of 10% can be achieved when the number of QoS customers reached 23% of the best effort customers.

In figure 4 presents an optimization of the number of QoS customer and the charge simultaneously in the Network Quality era. During the first iteration QoS customer is equal to zero and charging of the QoS customers are the same with no QoS customer situation. In the second iteration, and so on, simultaneously the number of QoS customers increased by five percent and QoS service charge is increased by 25%. Providers began to get a gain of 6% when the number of QoS customers reached 20% of the best effort customer and the QoS charge was 200% of the best effort charge. In the sixth iteration looks that providers benefit from 16% when the number of QoS customers reached 25% compared to the best effort customers and QoS charge was 225% compared to the best effort charge.



	1	2	3	4	5	6
Cost	0,63	0,63	0,63	0,63	0,64	0,64
Revenue	0,44	0,49	0,55	0,64	0,75	0,87
QoS Subsciber	0,00	0,05	0,10	0,15	0,20	0,25
Rate of Return	-0,19	-0,15	-0,09	-0,02	0,06	0,16
QoS Charge	1	1,25	1,5	1,75	2	2,25

Fig. 4. Providers Calculation in the Net Quality era QoS number & Charge Simultan Optimation

B.4. SIMULATION SUMMARY

Some conclusions are derived from the simulation is as follows:

a. As a result of the implementation of Net Neutrality, the internet service charge has certainly become much more expensive:
   i. It was cannot be done in a low and medium HDI countries. Need the Government subsidies so that the providers can still serve their customers, and because it was not to do, then practically Net Neutrality will certainly not be executed, officially or quietly.
   ii. In countries with a high HDI levels, internet charge could be raised, but will undermine the implementation of Universal Service Obligation which treating the internet as a human right.
b. Priority over the internet traffic is normal and mandatory, and certainly cannot be construed as an act of discrimination because it is part of a network key word that is the Quality. the changes in the Network Capacity Average to QoS customer QoS given far greater than the decline in the customer's best effort
c. The solution is to implement a Network Quality. Sustainability of the network will take place, and the internet is traffic on the network would be also guaranteed to stay alive.