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Mobile Termination Rates – to regulate or not To regulate?

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1. Introduction

For a long time and in many countries around the world, mobile operators were settling mobile interconnection rates through negotiation and commercial agreements, where the regulator was often only a mediator or arbiter, sometimes settling the interconnection charges in cases where the parties failed to agree. The regulation of fixed interconnection rates, on the contrary, has quite a long history. The liberalization of fixed telephony around the world has led to an ever increasing number of telephone service providers, which in turn has created a need for regulators to ensure that any-to-any interconnection is possible and that former monopolies do not abuse their power in a market, so that newcomers don't have to pay unreasonably high interconnection rates. Hence fixed telephony interconnection has been heavily regulated in many countries, compared to the global mobile telecommunications markets where the regulatory intervention has had a lighter touch, and where only recently some aspects have come under close scrutiny by regulatory authorities. One such aspect concerns mobile termination rates (MTRs). Over past few years mobile termination charges — the charges that mobile operators levy on each other and on fixed network operators for terminating calls on their networks — have become a concern in many countries throughout the world.[1]

The move towards "hand on" regulation of MTRs is especially evident in Europe, where in 2001, the European Commission (EC) set up a regulatory framework requiring National Regulatory Authorities (NRAs) to review the relevant interconnection markets. As a result many European countries introduced price control obligations on mobile interconnection charges, most commonly on mobile termination[2]. According to the EC, efforts to bring these charges down were insufficient (in 2008 MTRs ranged from 2 eurocents in Cyprus to almost 16 eurocents in Bulgaria[3]), and in May 2009, the EC adopted a recommendation on the regulatory treatment of fixed and mobile termination rates throughout the European Union (EU). In the recommendation the EC sets out clear principles for NRAs to follow when setting fixed or mobile termination rates. The recommended methodology is a Long Run Incremental Cost model (LRIC), which should ensure that termination rates will be based on the cost of an efficient operator. The deadline to reduce the wholesale charges across the EU is set for the end of 2012. According to the EC, this will lead to mobile termination rates across the EU of between 1.5 and 3 eurocents by 2012.[4]

In fact, the EU is not alone, both formal or informal regulatory pressures have been applied to mobile termination rates in many other countries as well, including Nepal, India, New Zealand. However, not everyone is moving in the same direction, and some there are recent examples of regulators moving from "hands on" to "hands off" regulation, such as the Office of the Telecommunications Authority (OFTA) of Honk Kong, China. In April 2009, it announced the deregulation of fixed-mobile interconnection charges, leaving them to be settled among operators by commercial agreements without any *ex ante* regulatory intervention.[5]

The main aim of this paper is to analyze the development of MTR regulation in the different regions of the world and to evaluate the necessity and the scope of such regulation. In doing so, it must be considered that if mobile telecommunications is such a successful and competitive high-growth sector, why would it need a widespread and severe regulation of MTRs? In order to answer this question, the paper will also compare the regulation of fixed termination rates (FTRs), as it has quite a long history in many countries, with the results of MTR regulation analysis.

It should be noted here that for the purpose of this paper, termination rate is defined as the price charged by an operator for forwarding calls from other network customers to their own customers. The main focus of this paper is **price regulation of voice termination on mobile networks**.

The first part of this paper will provide an overview of current MTR regulation regimes in different regions of the world and will then address a variety of issues raised by MTRs, such as:

- Is the regulation needed? When it is needed? What are benefits of MTR regulation?
- Should regulators consider symmetric or asymmetric regulation of MTR?
- Which wholesale services should the regulation cover: voice only or SMS as well?
- How will convergence, NGNs and "transition to IP" change the situation?

2. Interconnection charging regimes and approaches to interconnection rates regulation

This section presents some general terms used in the analysis of MTR and FTR regulation. These include a description of how operators compensate each other, how this contract is linked to how the operator charges its customers, and will also describe the various approaches used to establish interconnection charges.

2.1 Interconnection and retail charging

Interconnection charges are payments between operators to compensate each other for traffic exchanged between their networks. The termination rate is one of several interconnection charges (others include charges for origination or transit services). There are three main types of interconnection charging regime (i.e. the way how operators charge each other for interconnection, for using each others networks to provide and complete a call, which originates on one network and terminates on another network):

- **Calling Party Network Pays (CPNP)** – the originating operator pays a per minute charge to the terminating operator for the exchanged traffic. It is the most common interconnection charging regime.

- **Bill and Keep (BAK)** – under this regime, sometimes called Sender Keeps All, usually there are no per minute charges between operators, i.e. each network operator agrees to terminate calls from the other network at no charge (usually based on the condition that traffic is roughly balanced in each direction. More information on this topic is available in the GSR discussion paper "Coexistence of traditional and IP interconnection" at http://www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR09/papers.html).

- **Receiving Party Network Pays (RPNP)** – an operator receiving a call pays a per minute charge to the originating operators for interconnection. This regime is less common than CPNP, but is used in North America and Japan.

In Hong Kong, China until the deregulation of fixed-mobile interconnection charges (which took place in April, 2009), there was also a 4th type of interconnection charging regime, known as **Mobile Party Network Pays (MPNP)**. This was the regime, where a mobile network operator paid a per minute rate to a fixed operator for all minutes exchanged between networks (whether originated or terminated on the mobile network), and the fixed network operator did not make any payments to the mobile operator at all.[6] Traffic exchange payments with other mobile operators were made under a BAK regime. (For more details, see Box 1)

Box 1. Regulation of fixed-to-mobile termination in Hong Kong, China

Until April 2009, Mobile Party Network Pays (MPNP) regime was in place in Hong Kong, China. This regime was determined by the regulator – the Office of the Telecommunications Authority (OFTA), and interconnection between fixed and mobile operators was regulated asymmetrically, i.e. the mobile network operators paid a per minute rate to the fixed operators for all minutes exchanged between networks (whether originated or terminated on the mobile network). This meant that mobile operators didn't receive any revenue from fixed operators. A regulated fixed-mobile interconnection charge was applicable for all traffic exchanged between fixed and mobile customers. The original fixed-mobile interconnection rate set up in the 1980s was based on a fully distributed model, which was then reviewed annually. The initial cost was HKD 0.09/minute which fell over the years to HKD 0.0545/minute. The model was developed in conjunction with the incumbent, and has been agreed upon by all parties.

The reason behind this type of regime was that, at the time of the initial introduction of mobile telephony in Hong Kong, China in the 1980s, fixed lines were in widespread use and mobile telephony was seen as a luxury. Therefore, the MPNP regime was meant to ensure cost of using the mobile network was borne fully by mobile network subscribers.

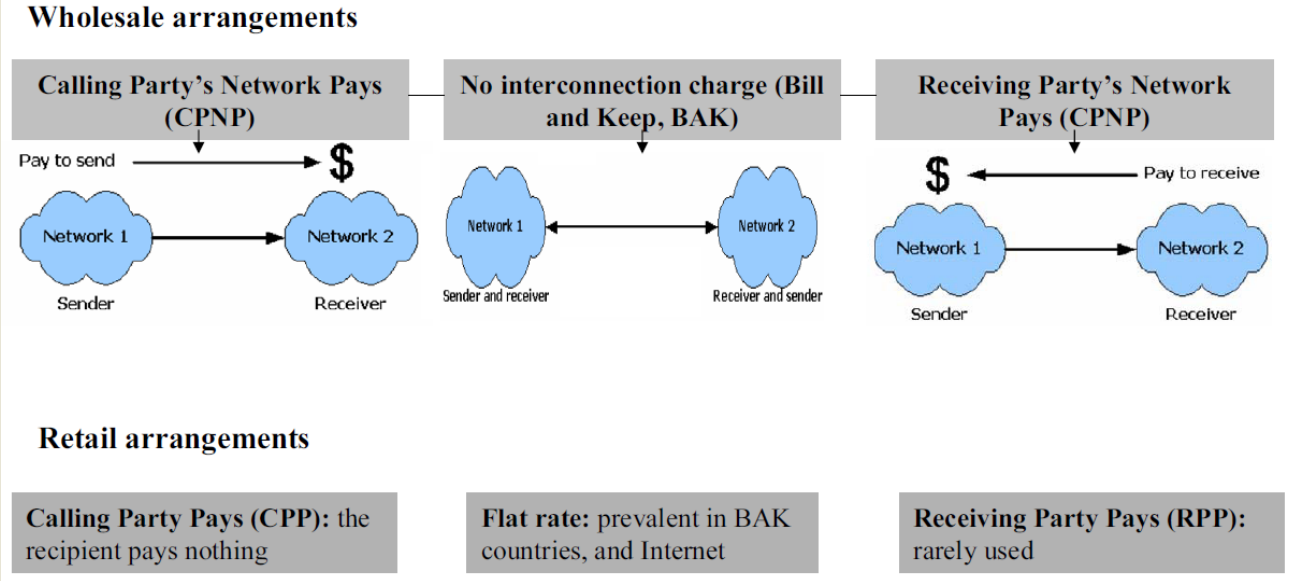
Source: Analysys Mason (2008). Case studies of mobile termination regimes in Canada, Hong Kong, Singapore and the USA.

As an interconnection charging regime partly determines the cost of a call, operators will generally seek to recover their net costs through retail charges (See Figure 1). **Retail charging** concerns payments from consumers to operators for services received. There are generally two types of retail charging regimes:

- **Calling Party Pays (CPP**) – meaning, that a subscriber initiating a call pays the entire cost of a call. This also means that a subscriber pays only for calls made and nothing for the calls received. This retail charging regime usually coexists with CPNP, i.e. the cost of terminating outgoing calls on another network is paid by the calling party's operator, which covers the cost in the rate it charges its subscribers;
- **Receiving Party Pays (RPP) –** means that a subscriber receiving a call pays all or most of the cost of a call. In the mobile sector, this is used to refer to the case where the receiving party pays the "airtime charge" for termination on the mobile handset.[7] In this case, the originating or calling party may still pay for a local call. This retail charging regime usually coexists with RPNP.

If the wholesale interconnection regime is BAK, operators can recover the cost of a call in whatever way they choose. For example, in Singapore, where the mobile termination rate is set to zero, there exists both RPP and CPP pricing (free incoming call plans) for retail services.[8] On the other hand, flat-rate retail pricing is becoming more and more popular under BAK regime.

Figure 1. The linkage between wholesale and retail charging regimes



Source: CRA International, Gilbert, Tobin (2007). Economic study on IP interworking: White Paper; Author's presentation (2007), NGN Interconnection: pricing strategies and regulatory approaches to price regulation at ITU workshop on NGN Interconnection in the Arab Region (http://www.itu.int/ITU-D/treg/Events/Seminars/2007/Bahrain/agenda.html).

2.2 Fixing interconnection rates

A number of different procedures might be used to establish interconnection charges. These include:

- the regulator in advance determines the charges, together with other essential elements of interconnection, using different approaches to price regulation;
- the regulator sets guidelines which should be used for establishing the rates through (bilateral or multilateral) negotiations among the operators;
- operators set the rates through negotiation and commercial agreements, without the involvement of the regulators (the regulator intervenes only if parties fail to agree).

To set interconnection prices regulators might use several possible approaches to wholesale price regulation (See Table 1 for comparison of some of them). The most common include:

- **Rate of Return regulation (RoR)** – 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. The regulated price can be adjusted upward if the utility starts making a lower rate of return, and it will be adjusted downward if the utility makes a higher rate.[9] 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.[10]
- **Price-cap** – This is a process for establishing rates or prices that will be charged for a service, which are adjusted each year by an index that reflects the overall rate of inflation in the economy, the ability of the operator to gain efficiencies if compared to the average firm in the economy, and the inflation in the operator's input prices if compared to the average firm in the

economy.[11] Sometimes a **price ceiling approach** might be used for the same purpose**.** Under this approach a regulator imposes a limit on how high a price can be charged on a service, without making periodical adjustments.

- **Cost orientated or cost based pricing** means that prices should reflect their costs plus reasonable rate of return which operators are allowed to earn. Operators or regulators might use different cost bases (current cost, historical cost, forward-looking cost) and different methodologies (Fully distributed cost (FDC), LRIC) to determine the prices.
- **International benchmarking –** This is the process of establishing the price of a service based on prices in other jurisdictions. Benchmarking can be used as a common sense check on the results of cost models. Alternatively, it can be used directly to set prices.[12] The outcomes of this regulation, however, depend heavily on adjustments made. Without appropriate adjustments, benchmarking can result in interconnection rates that make little sense. The goal of adjustments is basically to try to model interconnection costs and rates without having enough information on local cost inputs.
- **Retail minus –** Under this approach, the interconnection charge will be equivalent to the retail tariff practiced by the operator less the costs avoided by not having to retail the service. The discount from retail prices is usually set as a fixed percentage of the retail price. It is widely acknowledged that retail minus implies a lower level of regulatory control than cost-based prices. Additionally, for markets where effective competition is likely to emerge, and in cases where risky investments have been made or where markets are in the early stages of development, it has been suggested that retail minus would be preferable to LRIC prices.[13] The outcome of this approach depends on the level of retail prices. This approach is usually used in the case of sufficient competition in downstream markets.

Table 1. The comparison of some approaches to price regulation

Criteria	RoR	Price-cap	Cost orientation
Prevents exercise of market power	**Yes.** A regulated operator can only earn a normal rate of return.	**Yes.** The CPI-X constraint prevents the firm from exercising market power (if chosen with care).	**Yes.** Price of a service will consist of its cost + reasonable rate of return only.
Ensures productive efficiency	**No.** An operator will not reap the benefit from reducing costs and so has no incentive to do so.	**Yes.** Firms are automatically rewarded with higher earnings when they reduce costs (penalized when costs increase).	**No.** In the case of Historical cost accounting. **Yes.** In the case of Forward-looking cost accounting.
Ensures allocative efficiency	**No.** Prices for individual services need not equal the costs of the service.	**Yes.** Firms have flexibility to set prices for individual services based on forward-looking costs. It is possible for individual prices to deviate from costs.	**Yes.** Prices for individual services equal the costs of the service. No possibilities to deviate from costs.
Ensures dynamic efficiency	**No.** No incentive to invest and introduce new technologies or services	**Yes.** The firm has incentives to invest efficiently.	**Yes.** The firm has incentives to invest efficiently.
Promotes competition	**No.** Does not generally permit pricing flexibility for the firm to set prices to reflect forward-looking costs in response to competition.	**Yes.** The firm has sufficient pricing flexibility to respond to competitive pressures by setting prices that reflect underlying costs and demand conditions	**Yes.** The firm has to set prices that reflect underlying costs. No cross-subsidization.
Minimizes regulatory costs	**No.** Rate determination proceedings are often lengthy and resource intensive.	**Yes.** Price-cap setting proceedings are infrequent (once every 3 to 5 years).	**No.** Control proceedings are lengthy and resource intensive.

CPI-X - a basic formula employed to set price caps. It takes the rate of inflation, measured by the Consumer Price Index (CPI) and subtracts expected efficiency savings X.
Productive efficiency requires that goods should be produced at the lowest possible cost.
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).
Dynamic efficiency requires that firms should have the proper incentives to invest in new technologies and deploy new services.

Source: ITU research, ITU infoDev ICT Regulation Toolkit.

3. Regional perspectives on mobile termination rates regulation

In today's market, there is no single means of dealing with mobile termination charges among countries. While mobile termination rates are regulated in some countries (such as Austria, Portugal, Cuba), they are left to the market in others (such as Brazil, El Salvador, Guatemala). Some countries only regulate mobile termination charges for fixed-to-mobile calls (e.g. Jamaica). In other countries, mobile networks are required to apply a single regulated termination charge regardless of where the call originates, and again in others (such as Colombia), only the termination rates of the larger mobile operators (which enjoy significant market power) are regulated. In this case, operators are regulated in

an asymmetric way, with some termination rates being regulated while others are set by unregulated firms. The following sections provide an overview of MTR regulation in the various regions. The overview is based on the results of the ITU Survey on Tariff Policies 2009.

3.1 Africa

Between 2005 and 2007, Africa has seen the launch of 27 new telecoms operators.[14] Despite this growth of mobile networks, it is often acknowledged that Africa represents the largest untapped pool of mobile subscribers of all the regions. This is because by global standards, the penetration rate across the continent is relatively low, with the number of subscriptions equating to 32 percent of the population at the end of 2008, compared with 82 percent in the Americas, 63 percent in Arab States, 46 percent in the Asia-Pacific region and 117 percent in Europe and CIS. As new operators have to interconnect with existing ones, this means that interconnection (and especially interconnection rates) is and will continue to be an important issue and a bone of contention among operators in this region (see Box 2 for illustration).

Box 2. Connected but not interconnected: **where mobile users must carry up to five SIM cards to make a call**

In 1997, the first cellular service was launched in Benin, with a strong initial wave of take-up. Today, there are five mobile network operators active in Benin. Initially, to promote sales, the operators looked for strategies to bring new customers on board. First, the price of SIM cards was lowered – from CFA 40,000 (USD 85.00) to CFA 35,000 (USD 75.00), then to CFA 30, 000 (USD 64.00), and so on – the most expensive SIM card now costs about CFA 2000 (USD 4.25). Then the operators came up with a marketing strategy that offered reduced prices for calls made on their own network. Each network offered (and continues to offer) different services and packages on their own networks so that today people can get discounts of up to 95 percent (by MTN Zone). It is therefore not surprising that customers can have up to five different SIM cards, using each of them to communicate inside a specific network, and to avoid making calls to other networks.

This reflects a situation where operators have no obligations or intentions to interconnect. Looking from the consumer perspective, switching SIM cards only complicates what should be a simple process, and though some use a phone that permits the use of two SIM cards simultaneously, most go back and forth between cards. With so many cards, customers are certainly able to communicate, but how connected are they really, if they must constantly switch from one operator specific SIM card to another?

Source: http://www.apc.org/en/news/benin-where-mobile-users-carry-3-4-even-5-sim-card#.

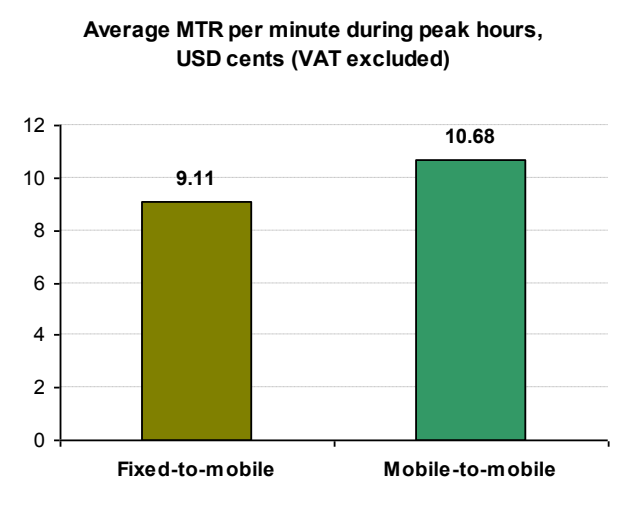
As in many African countries mobile market structures are constantly changing (more operators and service providers are entering the markets), disputes between operators regarding interconnection rates are a common issue. In response to this issue, many African regulators have chosen to impose *ex ante* price control regulation on interconnection rates, and according to the results of the ITU Survey on Tariff Policies 2009[15], 16 out of 19 countries have imposed price control on MTRs. In addition, the majority of African countries (13 countries) indicated that a **CPNP** regime is being applied for interconnection services. This also partly explains extensive regulatory intervention in the region. It is increasingly recognized that the CPNP regime together with CPP principle creates a termination monopoly problem (as there are no other ways to terminate a call – as the terminating network is the only route to the called party), therefore regulatory intervention becomes inevitable. Two countries in this region (Benin and Burundi) have the **Bill and Keep** interconnection charging regime, which is usual for Internet Service Providers, but not yet commonly used by telephony operators.

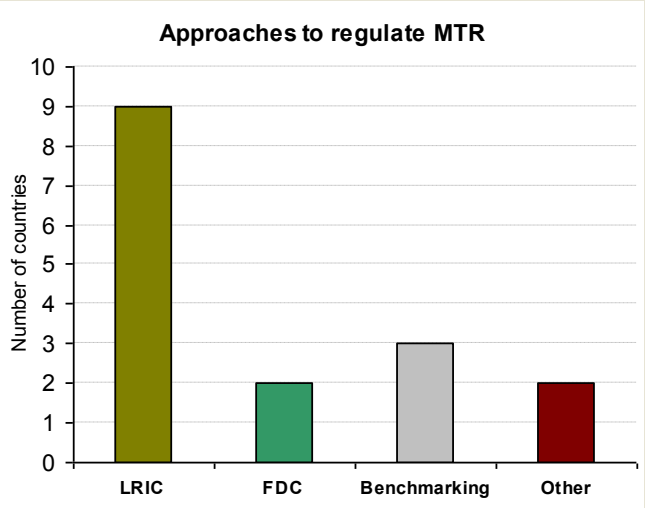
The majority of countries regulating MTRs through the cost based pricing approach are using LRIC models (60 percent), whereas benchmarking is used as an approach to set mobile termination rates in

only 20 percent of analyzed countries. Cost based price setting is usually based on detailed modeling of network costs. Therefore, this approach is considered to be a complicated but precise way to establish reasonable interconnection prices.

MTR determined by using the LRIC cost model is on average 8.12 USD cents in Africa (compared to 8.5 USD cents in Europe and CIS[16]), whereas when MTR is set using benchmarking, it varies between 6.35 and 27 USD cents. This fact confirms that the outcomes of benchmarking heavily depend on adjustments made. However, the average MTR in the region is **the lowest** between the four compared regions (Africa, Arab States, Americas, Europe and CIS). There is a slight difference between fixed-to-mobile termination rates and mobile-to-mobile termination rates, as some operators in the regions determinate MTR based on the type of originating network. Average MTRs and the distribution of approaches to MTR regulation in the African region are provided in the Figure 2.

Figure 2. Africa: Average MTR per minute during peak hours, USD cents (VAT excluded) and approaches to regulate MTR





Source: ITU Survey on Tariff Policies 2009

Box 3. Regulation of fixed interconnection rates in Africa

Sixteen out of nineteen African countries having completed the survey indicated that they regulate charges of fixed termination. It is interesting to note that regulators in Africa use the same approaches to regulate both fixed and mobile termination rates, which is not the case in other regions. If, for example, a regulator uses the LRIC cost model to set FTRs, it uses the LRIC cost model to determine MTRs as well.

On average, MTRs of incumbent operators in the African region are almost twice as much as FTRs. However, at the same time FTRs of African incumbent operators are on average 2.5 times higher than the ones applied by incumbent operators in the region of Europe and CIS. This might partly be explained by the fact that the level of competition between fixed network operators in many African countries is quite low. Some of them still have monopolies in fixed telephony markets, and in the countries were alternative fixed line operators exist, FTRs of alternative operators are exactly the same as FTRs of the incumbent operator.

Source: . ITU Survey on Tariff Policies 2009

3.2 Arab States

As an increasing number of Arab markets experience liberalization and the entry of new operators, increasing numbers of stakeholders of this region have to adapt to the changing market structures - from monopoly markets to more competitive ones. Interconnection agreements are always complex and involve difficult and sensitive issues for the parties to resolve. This is especially true after initiating the first steps of liberalizing the telecommunication market as is the situation in a number of Arab States. Therefore, it comes as no surprise, that in some cases regulators choose to regulate both MTR and FTR (e.g. Qatar and Morocco), very often by using international benchmarking as an approach to interconnection price regulation. [17]

Other Arab countries have different approaches to interconnection regulation. Some countries have only one operator, which provides both fixed and mobile telephony services, therefore no regulation of interconnection chares is in place. In others, like UAE, the interconnection agreement is subject to negotiation between the parties, with regulatory intervention only in case of a dispute.[18]

MTRs in the region are significantly higher (in some cases two, three or four times higher) than FTRs, and the average MTR in this region is higher than the average MTR of any other region. Together with CPP retail charging regime, high termination rates leads to higher retail prices. For example, according to the results of the Benchmarking Study commissioned by the Telecommunications Regulatory Authority of Bahrain, the average mobile basket across Arab countries is 50-60 percent above the OECD average.19 The study also concludes that the Arab countries have rather uniform price levels for mobile services and many operators have very few tariff packages on offer, that is, they do not make great attempts to capture customers with tailored prices.

3.3 Asia & Pacific

The Asia & Pacific region[20] distinguishes itself in regard to its interconnection regulation. Many countries in the region apply quite unique regulatory approaches, not necessarily following international practices, but tailoring their approaches to their country specifics. Some interesting regulatory practices are highlighted here, and include Singapore, Hong Kong, China, India, and New Zealand.

- **Singapore**. Different interconnection charging regimes are applied for fixed and mobile termination rates in Singapore. Retail prices for the fixed network have historically been set on a CPP basis which was accompanied by the principle that fixed termination charges were borne by the originating network. Therefore **a cost-based FTR** (0.84 SGD cents, aprox. 0.6 USD cents) is applied for all traffic that terminates on incumbent fixed networks.[21] By contrast, as mobile subscribers were charged for both incoming and outgoing calls, mobile operators were expected to recover the cost of terminating calls on their networks from their own subscribers. Thus, the **MTR** in Singapore was set at zero and remains so. This means, that a **BAK regime** (with no provisions for compensation of traffic imbalances) is applied. As retail prices are unregulated, operators have used this freedom to offer a variety of different retail pricing options, within the bounds of competitive pressure. Through three reviews of the interconnection framework (1999, 2002 and 2006), the Infocomm Development Agency has consistently decided to leave this termination structure unchanged, deciding in each case that on balance the telecommunications market was better served by not changing the system.[22]

- **Hong Kong, China.** In April 2009, the Office of the Telecommunications Authority (OFTA) of Hong Kong, China withdrew its regulatory guidance on the fixed-mobile interconnection charge. Relevant charges for fixed-mobile interconnection will now be settled amongst the relevant fixed and mobile operators without regulatory intervention. OFTA have observed that agreements

between operators have been made free from levy, which indicates a preference for BAK arrangements. Although there isn't any *ex ante* regulatory intervention, OFTA reminds operators of their license obligation to interconnect and to provide continuous service to subscribers.[23]

- **India.** Reflecting the importance of interconnection, in March 2009 the Telecommunication Regulatory Authority of India (TRAI) amended the Telecommunications Interconnection Usage Charges Regulations to state that termination charges from all types of domestic calls (i.e. fixed-to-fixed, mobile-to-fixed and mobile-to-mobile) will be reduced from 30 paise per minute (ppm) to 20 ppm (aprox. from 0.6 USD cents to 0.4 USD cents) with the termination of 3G voice calls remaining the same as that of 2G voice calls. The termination charge of international calls was reduced from 40 ppm to 30 ppm (aprox. from 0.8 USD cents to 0.6 USD cents) and TRAI expects this benefit would be passed down to subscribers in the form of lower outgoing tariffs for international calls. This amendment was carried out with the aim of promoting the networks expansion.[24]
- **New Zealand.** In 2007, the Commerce Commission's recommendation to regulate mobile termination was rejected by the Minister of Economic Development.[25] **Instead of regulation, legally enforceable and binding commitments have been made** by Telecom NZ Ltd and Vodafone NZ Ltd to reduce fixed-to-mobile charges through two individual deeds. Over a five year period (initiated in 2007), Telecom NZ agreed to reduce it's mobile termination rate from 20 NZD cents per minute (cpm) to 12 cpm (aprox. from 14 to 8 USD cents), while Vodafone NZ offered to reduce its mobile termination rate from 20 cpm to 14 cpm (aprox. from 14 to 10 USD cents). These rates were in line with the Commerce Commission's estimate of reducing the cost of mobile termination in New Zealand from 15 cpm to 12 cpm (aprox. from 11 to 8 USD cents) over five years.[26] This industry solution has been viewed as the way forward to promote an effective and competitive telecommunication market.

3.4 The Americas

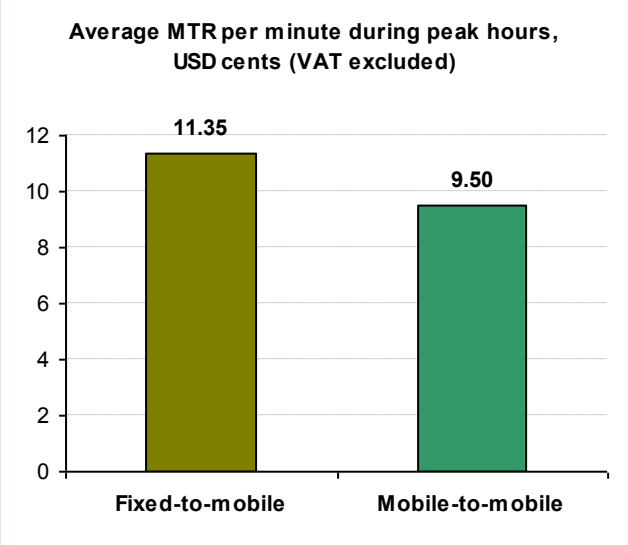
The Americas is probably the most liberal region with regards to MTR regulation. According to the results of the ITU Survey on Tariff Policies 2009[27], in more than 50 percent of countries in this region, MTRs are determined by interconnecting parties through **negotiation and commercial agreements between operators**, with regulatory intervention in the case of dispute only. In many of these countries, the legal framework sets the methodology to be used to determine interconnection prices in cases of disagreement between operators. For example, in Uruguay and El Salvador the LRIC model should be used.

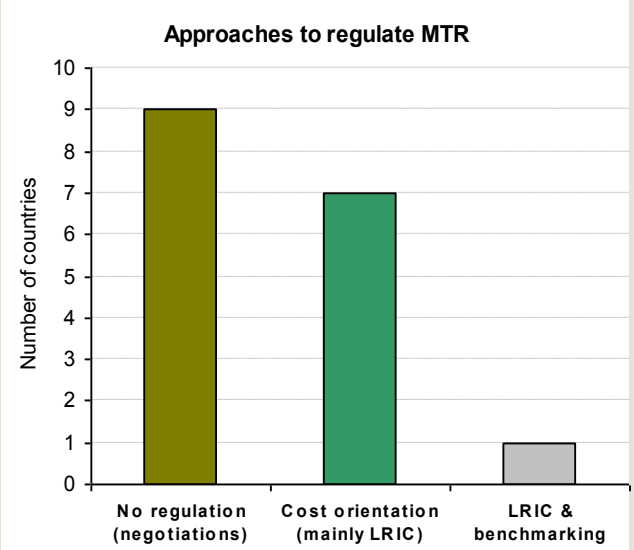
Almost all countries indicated that a **CPNP** regime is applied for interconnection services. This indicates that the interconnection charging regime cannot be considered as the only and absolute determinant for regulatory intervention. Two countries in this region (Colombia and Costa Rica) apply a **Bill and Keep** interconnection charging regime.

Countries that have decided to regulate MTRs use a cost oriented approach to MTR regulation: they use either LRIC models or a combination of LRIC modeling and benchmarking to determinate MTRs. In some countries, like Argentina, only SMP operators have to set their interconnection rates based on results of a cost model.

MTRs determined by using the LRIC cost model average 9.96 USD cents (compared to 8.5 USD cents in Europe & CIS and 8.12 USD cents in Africa), whereas an average MTR set through negotiation is 10.75 USD cents. Average MTRs for the Americas are provided in the Figure 3.

Figure 3. The Americas: Average MTR per minute during peak hours, USD cents (VAT excluded) and approaches to regulate MTR





Source: ITU Survey on Tariff Policies 2009

Box 4. Regulation of fixed interconnection rates in the Americas

In contrast with MTRs, at least 11 out of 17 countries in the Americas region indicated that they regulate fixed termination charges. In other countries, fixed interconnection rates are also set through negotiation, with regulatory intervention only in the case of necessity. For example, interconnection in Mexico is also left to negotiation between network operators. The Federal Telecommunication Commission (Cofetel) would intervene only if the parties cannot reach an agreement. The current fixed interconnection rate, agreed between operators, is 0.8 USD cents per minute, which applies for local traffic whenever unbalanced traffic exceeds 15 percent, otherwise a BAK regime applies.

Regulators, who have decided to regulate FTRs, have chosen different methods. For example, the regulator in Brazil applies a retail minus approach to FTR regulation, in Jamaica - price cap, in Argentina – price ceilings, although the majority of countries have chosen – one of the cost orientation approaches. In some countries, for example in Argentina, operators are allowed to charge slightly higher FTRs in areas of less than 5 000 inhabitants or with a density lower than 15 lines per 100 inhabitants (0.974 peso cents vs 1.151 peso cents).

Source: ITU Survey on Tariff Policies 2009.

3.5 Europe & CIS

Europe and CIS is another distinctive region with regards to MTR regulation. Especially Europe, as regulators of the European Union become more and more active in this field, not without the pressure from the EC (See Box 5 for an illustration). This is also evident from the results of the ITU Survey on Tariff Policies 2009. According to the results[28], prices of interconnection services are regulated in the majority of countries in the region:

- 15 countries out of 17 indicated that prices of **mobile termination** rates are regulated; whereas only 5 countries have imposed price regulation on **mobile origination** services. This means that in the rest of the region there is a sufficient number of competing mobile operators and that markets of access to mobile networks are fully competitive. As a result

none of the countries regulate any retail mobile service, except international mobile roaming.

- 2 CIS countries have indicated that they do not regulate prices of any interconnection services, however retail fixed telephony services (access to network, local voice, national long distance voice and international long distance voice services) are subject to price control.

Heavy regulation of termination services might be explained by the fact, that a CPNP charging regime is applied in all analyzed countries. This charging principle together with consumer ignorance is leading to the problem of termination monopoly, which will eventually call for appropriate regulatory action. Besides, MTRs in Europe (and elsewhere) have been historically higher than equivalent FTRs. Mobile operators have pointed to the cost of building and maintaining mobile networks as justification.[29] Furthermore, there has always been a big variation in MTRs between different European countries. According to the EC, in 2008 MTRs ranged from 2 eurocents in Cyprus to almost 16 eurocents in Bulgaria.[30]

Box 5. The EC calls on Czech regulator to strengthen regulatory control on mobile termination

In September 2009, the EC asked the Czech regulator (CTU), for the second time, to further reduce MTRs in the Czech Republic. The average MTR in the Czech Republic is the second highest in the EU, and for this reason the EC has urged the regulator to strengthen regulatory control on mobile termination and to impose stricter obligations on the smallest operator to treat all mobile companies alike. The EC expressed its regrets that the Czech regulator did not apply a cost model that reflects the true costs for the provision of termination services by an efficient operator. Such an approach would have led to lower termination rates and a level playing field for all mobile phone operators increasing competition and benefiting Czech consumers.

According to CTU's notified measure, Telefonica O2, T-Mobile and Vodafone have to respect a set of obligations to ensure fair competition in the Czech mobile markets. In particular, the termination rates of these operators should not exceed certain price caps. Thus, until 31 December 2009, the three largest operators can charge a maximum of 2.31 Czech crowns (≈ 9.1 eurocents) per minute while for the period from 1 January 2010 to 30 June 2010, the maximum termination rate is 1.96 Czech crowns (≈ 7.7 eurocents) per minute. The prices to be allowed thereafter would be set by CTU at the end of 2009 on the basis of the lowest cost actually faced by the three larger operators, whereby certain costs that are not related to the mobile termination service would not be taken into account.

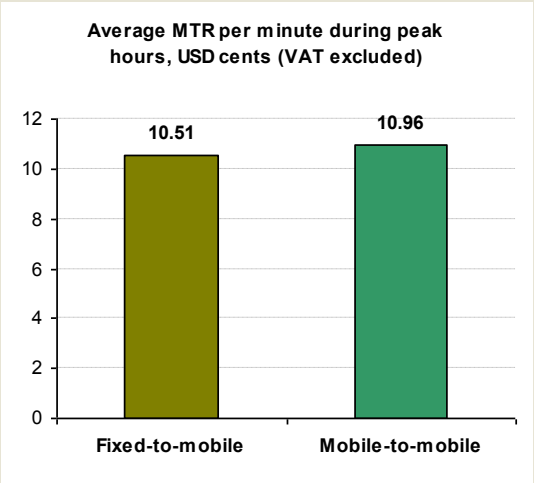
The EC reiterated the importance of using long-run incremental costing methodologies for calculating the efficient costs of termination, rather than the fully allocated costing approach. The EC also urges CTU to re-consider its proposed glide path with a view to moving more swiftly towards the efficient MTR level. This will also help to avoid the need for sudden, sharp reductions in MTRs in the future and facilitate a swifter transition to the efficient costing methodology set out in the EC Recommendation to be applied by the end of 2012.

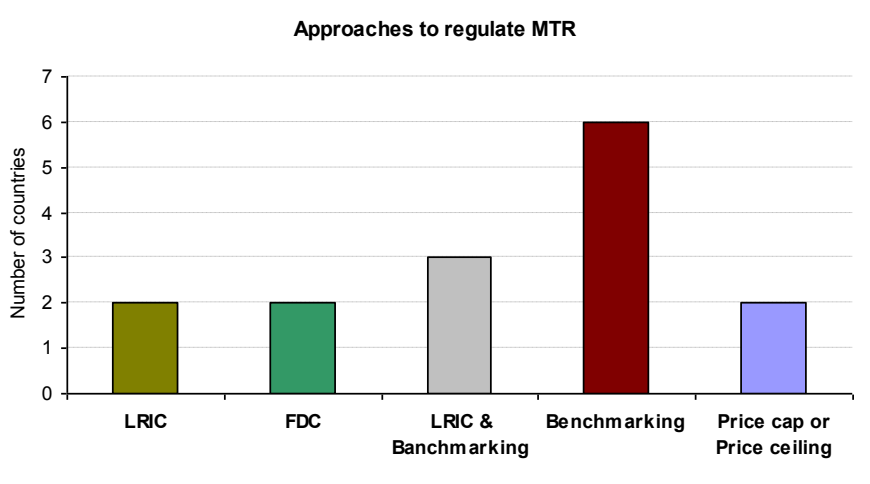
Source: The European Commission (2009). http://europa.eu/rapid/pressReleasesAction.do?reference=IP/09/1311.

The average MTR in the region is more than five times higher than the average FTR. When comparing the approaches used to regulate fixed and mobile termination rates (in the majority of countries both FTR and MTR are regulated), it is important to note, that for fixed termination rates, a cost-orientation principle dominates other regulatory approaches. In total, around 70 percent of countries use LRIC or FDC cost models to set prices of fixed termination, the rest use benchmarking. For the regulation of mobile termination rates, different regulatory approaches apply is different. Less then 30 percent of countries use one or another cost model to determine MTRs, whereas more than 50 percent use either benchmarking alone or combine it with cost modeling. This might be considered as one of the reasons for high MTRs in Europe (benchmarking reflects the general situation in the region or in the benchmarked countries and is not very useful if regulators think that MTRs are too high).

MTRs determined by applying the LRIC cost model is on average 8.5 USD cents, and 20.4 USD cents when applying the FDC cost model, whereas using benchmarking MTRs vary between 6.2 and 20.7 USD cents.

Figure 4. Europe & CIS: Average MTR per minute during peak hours, USD cents (VAT excluded) and approaches to regulate MTR





Source: ITU Survey on Tariff Policies 2009

Box 6. Regulation of fixed interconnection rates in Europe and CIS

Fifteen out of seventeen European and CIS countries indicated that they regulate **fixed termination rates**, and thirteen regulate **fixed origination** rates as well. Regulation of fixed origination rates reflects a lack of competition in the markets of access to fixed telephony networks, which means that in the majority of countries consumers still don't have enough choice of fixed telephony providers. Access to mobile networks is another matter entirely. As already mentioned, only five countries regulate mobile origination rates, which means that in the rest of the region there is a sufficient number of competing mobile operators and markets of access to mobile network are fully competitive.

FTRs of incumbent operators vary from less than 1 USD cent for local level interconnection (e.g. Germany, Ireland, Portugal) to 4.5 USD cents for double transit (in Armenia). FTRs of alternative operators are on average about 13 percent higher than those of incumbent operators. In some countries the principle of reciprocity is embedded for FTRs, meaning, that termination rates are the same on all fixed telephony networks. In other countries, regulators allow alternative operators to put a certain markup on the rates applied by the incumbent operator. For instance in Portugal, FTRs of operators other than the incumbent are regulated through the application of a 20 percent markup on the average incumbent's fixed termination rate. According to the NRA's decision of 26 October 2005, FTRs to be charged by alternative operators should be capped at an average revenue per minute of 0.90 eurocents (without VAT). Thus, operators are allowed to build tariff schedules of their choice, with as many interconnection levels and time bands as they choose, as long as the average price per minute (based on the expected termination traffic) does not exceed 0.90 eurocents.[31]

Source: ITU Survey on Tariff Policies 2009.

Operators argued that the current variance in MTRs in different countries is due to local costs such as licenses, labor and financing. The EC has had a different view.[32] In June 2008, the EC drafted the recommendation suggesting that the asymmetry between mobile and fixed as well as between different countries should be reduced. In the recommendation, adopted in May 2009, the EC sets out clear principles for NRAs to follow when setting fixed or mobile termination rates, stating that by December 31, 2012:

- NRAs should set FTRs and MTRs based on costs incurred by an efficient operator;
- FTRs and MTRs should be symmetric respectively;
- The evaluation of efficient costs should be based on current costs and the use of a bottom-up "pure" long-run incremental cost model following the principles set out in the recommendation.

In setting termination rates, any deviation from a single efficient cost level should be based on objective cost differences outside of the control of the operators concerned. In fixed networks, the EC says no such objective cost differences outside the control of the operator can be identified. In mobile networks these may include:

- uneven spectrum assignments may be considered an external factor which results in per-unit-cost differences between mobile operators;
- exogenous cost differences may arise where spectrum assignments have not taken place using market-based mechanisms, but on the basis of a sequential licensing process where, for example, later entrants mainly receive 1800 MHz frequencies and thus face higher unit costs in certain areas than operators with a 900 MHz assignment;
- but even where cost differences arise from existing spectrum assignments, NRAs should consider whether these may be removed on a forward-looking basis, either by growth of traffic volumes on later entrants' networks, or additional spectrum being made available through market-based assignment processes (e.g. the digital dividend, or refarming of the 900 MHz band).

In general, the recommendation aims to address differences between the level of FTRs and MTRs (and between MTRs) observed across the EU Member States. The EC argues that current differences cannot be explained by variations in the underlying costs, networks or national characteristics – but are mainly driven by inconsistent approaches by NRAs. Eliminating price distortions between operators across the EU will lower consumer prices for voice calls within and between Member States, saving business and household customers at least 2 billion euros in 2009-2012, and help investment and innovation in the entire telecoms sector.[33] From the EC point of view, higher mobile termination rates make it harder for both fixed and small mobile operators to compete with large mobile operators. These divergences, and differing regulatory approaches, not only undermine the notion of a Single Market but also Europe's competitiveness. Therefore, the EC is pushing for very significant cuts in MTRs (to 1.5-3.0 eurocents per minute compared to an EU average of 8.55 eurocents per minute in October 2008). [34]

Not surprisingly the largest mobile operators do not see things in the same way as the EC. Deutsche Telekom, Orange, Telecom Italia, Telefónica, Vodafone and Tele2 commissioned several consultancy firms to carry out studies that challenged the EC's proposals:

- "Assessing the impact of lowering mobile termination rates" (September 2008)
- "Comments on EC's Impact Assessment" (February 2009)
- "Call termination regulation: One model fits all?" (September 2008)

These studies conclude that drastic reductions of MTRs are likely to reduce the welfare of European customers. These studies suggest that:[35] [36]

- **Lower MTRs do not imply lower prices.** The tariffs in the mobile sector include call prices, connection charges, handset subsidies, and monthly rentals. In this context, reductions in MTRs will lower call prices but other tariffs are expected to increase, (e.g. subscription charges). Moreover, due to the waterbed effect, mobile providers are likely to raise other parts of the tariffs, such as prices for on-net calls, or to lower handset subsidies.
- **The EC recommendation underestimates termination costs,** and there is no market evidence to suggest that below cost MTRs are economically efficient.
- **The evidence used to support the interconnection model in the US is flawed.** Analysis of usage patterns shows that only heavy users would benefit from such an approach in Europe.
- **Too short transitional period towards symmetric regulation across diversified national markets might have negative consequences.** Even if symmetric termination rates are more efficient in markets with three or more facility-based providers, symmetric regulation may come at a cost, that of maintaining status quo in markets where more entry is warranted. A three year transitional period may be too short for those national markets which lack sufficient infrastructure-based competition.

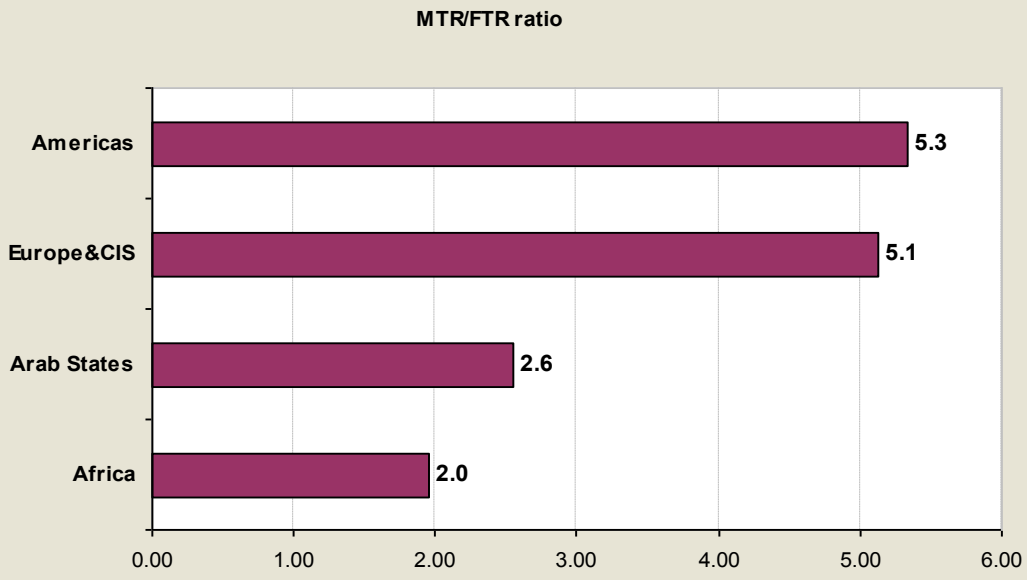
Some consultancies were also warning that prepaid customers in Europe may be among the losers. They typically make few outbound calls, but are valuable clients, because they generate termination revenues from inbound calls. Lower MTRs could mean that some prepaid customers would generate losses, unless prepaid tariffs rise and handset subsidies fall.[37] In addition, a steep drop in termination rates would decrease the incentives to aggressively compete for subscribers, since new customers are less valuable than they would be with higher mobile termination rates. It was also suggested that this might also have negative impacts on market entry where potential newcomers would not be able to generate enough returns on their investments.[38]

As in all discussions, all parties can find arguments that support their cause, however, the result and outcome will depend on many factors (such as operator strategy, market saturation, consumer loyalty, demand elasticity, etc.) and in each country, these might be very different.

3.6 Summary of the comparison

The report of one consultancy found that at the beginning of 2005 the global MTR average was 14.2 USD cents.[39] The results of the ITU Survey 2009 show that this average in mid- 2009 was 11.8 USD cents. There are significant variations in MTRs around the world and different reasons leading to the differences between MTRs and FTRs in each region. The figure 5 illustrates that the ratio of MTR to FTR varies from 5:1 in Americas and Europe & CIS to 2:1 in Africa. Table 2 summarizes the level of regulatory intervention with regards to termination rates in each region. In some cases, like Americas, the differences of regulatory intervention into the different markets (where fixed-operators have been mandated to provide cost-oriented termination rates and MTRs are left unregulated) might partly explain the differences in rates. Other cases may differ, like in Europe, where the situation is not quite so straightforward.

Figure 5: Comparison of MTR to FTR ratio by region



Source: ITU Survey on Tariff Policies 2009

Table 2: Summary of MTR and FTR regulations by region

	FTR regulation	MTR regulation	Rank of FTR*	Rank of MTR*
The Americas	In the majority of countries FTRs are regulated using **cost based** pricing approach. The average FTR is **the lowest** between compared regions.	More than half of analyzed countries don't impose ***ex ante* price control** on MTRs. The average MTR is higher than in the Africa region, but lower than in Europe & CIS, and Arab States regions.	1	2
Europe & CIS	**Heavily** regulated in almost all EU countries generally using **cost based** pricing approach. **Not regulated** in some CIS countries. The average FTR is **the second lowest** between compared regions.	MTRs have been increasingly regulated since 2001 in EU countries; many relying on international **benchmarking** to regulate MTRs. MTRs are left unregulated in some CIS countries.	2	3
Arab States	Different approaches are applied to interconnection regulation. Because of relatively recent liberalization in many Arab states, regulation of interconnection charges is relatively light (if any) so far. The average FTR and the average MTR are the **highest** between analyzed regions.		4	4
Africa	In countries that regulate FTRs, most use **cost based** pricing approach. The average FTR is **the second highest** between compared regions.	**Cost based** pricing approach is applied to regulate MTRs in many African countries. The average MTR is **the lowest** between the regions.	3	1

**** Where 4 indicates the highest rate and 1 – the lowest.***

Source: ITU Survey on Tariff Policies 2009

4. MTRs - to regulate or not to regulate?

4.1 What termination rates emerge if prices are left unregulated?

Some researchers have already addressed this question. They have found that under CPNP and CPP regimes, the termination monopoly problem and negative pricing externality (resulting from consumer ignorance regarding prices) lead to excessive MTRs.[40] Concerning the first point, call termination can only be supplied by the network provider to which the called party is connected, and under CPNP and CPP regimes, there are currently no demand- or supply-side substitutes for call termination on an individual network. In these cases, each network constitutes a separate relevant market and each network operator has a monopoly for terminating calls on its own network.[41] Therefore, each provider can propose take-it-or-leave-it offer in an unregulated market. Consumer ignorance, on the other hand, when customers are unable to identify the network they are calling (under CPP regime) or from which network they are receiving a call (under RPP regime), may lead them to base their calling decisions on average prices.[42] In addition, number portability is likely to exacerbate this problem, as prefixes can no longer be counted on to identify networks. Even if consumer ignorance might be at least

partly solved by remedies other than price regulation (such as automated price information), the problems linked to termination monopoly won't disappear.

If RPNP and RPP regimes eliminate the problem of termination monopoly, new problems arise, for example, where subscribers refuse to accept calls, which in turn would reduce the average volume of calls made. Despite the fact that a caller can freely choose from which network to make a call, under RPP regime, the danger lies in not knowing the cost or how much a call receiver will be charged. In addition, RPNP and RPP regimes will not solve the problem of high termination rates, where the number of market players in a certain market is very limited.

It is generally acknowledged that the existence of fees for access to competitors' networks (i.e, termination rates) can distort competition by increasing 'off-net' calls (calls from one mobile network to another mobile network) compared to 'on-net' calls (calls from one mobile network to the same network). In this way, operators can reduce competition by strengthening the barriers to entry (or expansion) through setting high interconnection rates (either origination, or termination) and low retail charges.[43] According to the OECD statistics on this subject, a reduction of 1 percent in the mobile interconnection rate results in a 0.69 percent and 0.26 percent reduction in average final price of mobile and fixed services, respectively. On the other hand, it has been claimed elsewhere that a 10 percent reduction in MTRs leads to 10 percent increase in mobile retail prices.[44] In any case, it may be argued that excessive MTRs inevitably lead to inefficient retail prices, inefficient investment strategies, and may lead to traffic-routing distortions (such as 'tromboning' where operators route national calls originating on the fixed network via a second country for termination on a mobile network).

At the same time, the costs of BAK are minimal, both in terms of direct and indirect costs, including efficiency losses. [45] As practical evidence shows, in cases of roughly balanced traffic, MTRs are set at zero, and in cases where traffic is imbalanced, operators tend to set relatively low MTRs (like in Mexico or Argentina). Consequently, many view BAK as the right regime for the long-term benefit of end-users. Evidence also shows that in countries with less regulatory intervention, BAK regime occurs more often. In the long term, it seems that the EC interconnection rates regulation regime should finally become a pure BAK regime with both the MTR and FTR set close to zero. But in encouraging this kind of interconnection regime, regulators should keep in mind, that even if regulatory costs decrease under BAK, this does not necessary mean that no regulatory intervention is going to be needed (there still might be disputes between different parties).

It is unlikely that there a single answer to the question raised – to regulate or not to regulate MTRs? On the one hand, it is obvious that regulation is necessary in the case of monopolistic markets and market failure. On the other hand, none of the existing situations offer a convincing argument for or against MTR regulation. There are very similar MTRs in the Americas region, where there is no *ex ante* price regulation in many countries, and in the region of Europe and CIS, where such regulation is prevalent. In addition, without regulation, excessive MTRs might be used to cross-subsidize other services such as mobile subscriptions or handsets. Although, mobile network operators argue that subsidization is efficient, being justified by, *inter alia*, a network externality, arising from new subscribers joining with a benefit to existing subscribers, this argument is not longer valid in mature markets.[46] Benefits from new subscriptions are likely to be minimal in the prevailing circumstances of market saturation, and high termination charges will lead to fewer calls to mobiles, with the consequence of reducing the value of, and willingness-to-pay for, mobile subscriptions.[47] However, in emerging markets without regulation some operators might be willing to negotiate MTRs that are below cost, as this causes off-net calls to be cheaper than on-net calls, so that consumers prefer to join the smaller network.

Therefore, decisions to pursue regulatory intervention should not be taken lightly and the timing would depend on a number of factors including:

- the degree of market power enjoyed by the different players and the overall degree of price competition in the marketplace;
- the potential delays that would be incurred by reliance upon negotiation;
- the resources available to the regulator; and
- the level of complaints concerning retail prices received from consumers and business groups.

In addition, regulators should keep in mind that a range of market-based solutions exists. Although, these solutions may not be sufficient in themselves, they remain necessary in solving interconnection related problems. These include:

- permitting more operators to enter the market, including virtual mobile network operators;
- encouraging measures that facilitate customer choice and changing operators; and
- ensuring tariff transparency so that consumers can compare rates between operators and between countries.

4.2 Symmetric or asymmetric regulation

Another subject that generates substantial debate is whether all market players should be subjected to the same extent of regulation. Answers to this question are quite controversial, as several types of symmetry and asymmetry might be discussed in this context:

- symmetric or asymmetric regulation between newcomers and incumbents and/ or between operators with different size of networks;
- symmetric or asymmetric regulation between different types of networks; and
- symmetric or asymmetric regulation according to the origin of a call.

The first type to consider is **symmetric or asymmetric regulation between newcomers and incumbents** and/ or between **operators with different size of networks**. Some researches suggest that usually smaller mobile operators tend to have higher termination rates than their larger competitors, but downward regulation of the large operators' rates tends to have a positive effect on the termination rates of unregulated operators. [48] On the other hand, others have proved, that asymmetric regulation of only the larger operators in any given market induces the smaller operators to increase their termination rates.[49] Evidence shows that market players have different views on this issue, too. In Mexico for example, the smaller fixed operators have complained to the regulator about the excessive and anticompetitive mobile interconnection rates. According to them, on-net tariffs that are below the mobile interconnection rate prove that the rate is anticompetitive. At the same time, Telefonica (the second mobile operator in Mexico according to the number of subscribers) has filed a complaint before the Competition Commission charging Telcel (the largest mobile operators with over 70 percent of market share in 2008) with discriminatory treatment of on-net vs. off-net. They argued that on-net prices that are below the mobile interconnection rate harm Telefonica. It seems that Telefonica was seeking to solve this issue by having Telcel raise its on-net prices, not by having Telcel reduce its mobile interconnection rate. A regulation that eliminates the discriminatory treatment between on-net and off-net by requiring the incumbent firm to raise on-net prices and not to alter the mobile interconnection rate would be the worst possible solution. This would be like using regulation to implement a collusive

agreement among the mobile operators. Discrimination in favor of on-net calls cannot be considered anticompetitive, *per se*, but a mobile termination rate above costs helps facilitate that discrimination as an instrument to raise rivals' costs.[50]

In the short term, different asymmetries might be justified, especially in the initial phase of a liberalization process and competition development, when regulators might feel that it is necessary to support newcomers. However, in the long term, asymmetric regulation will lead to inefficiencies, with operators lacking the incentive to increase efficiency of their service provision. Nevertheless, differences in regulation can be justified as long as smaller operators, that were licensed relatively late, face cost disadvantages due to external factors (which they cannot influence). While exempting smaller operators from regulation altogether, and if imposing regulation on larger providers is not efficient, regulated termination rates may well differ between firms, as long as theses differences reflect disadvantages that newcomers face.[51] What is important in this case is that the same cost standard and methodology are applied in principle to all operators.[52] This is point is underlined in the current EC recommendation.

The second type, **symmetric or asymmetric regulation between different types of networks**, concerns mobile vs. fixed networks. Again, practices vary. For example, in the United States, reciprocity requirements imposed by the regulator (FCC) mean that fixed-to-mobile termination charges are set equal to those for mobile-to-fixed termination, which are quite likely below the cost of mobile termination. With little termination revenue, mobile operators may choose to charge mobile subscribers directly to recover their costs and/or to induce their subscribers to discourage incoming traffic. In Honk Kong, China, asymmetric regulation was in force until April, 2009. Mobile network operators paid a per minute rate to the fixed operators for all minutes exchanged between networks (whether originated or terminated on the mobile network), and mobile operators didn't not receive any revenue from fixed operators. In Jamaica, only fixed-to-mobile termination rates are set by the regulator, using a fully distributed cost (FDC) model.

Once again, asymmetric regulation between fixed and mobile network operators could be justified, in the short term when the provision of fixed termination and mobile termination services involves different costs. However, in the long term, bearing in mind the fixed and mobile convergence and evolvement of "all IP" networks, the asymmetries will become less and less reasonable.

The third type is **symmetric or asymmetric regulation according to the origin of a call**. Very often, debates focus on whether internationally originated calls should be terminated at the same rate as nationally originated calls. Looking from a cost perspective, no matter where a call is originated the termination part of a call usually is the same (from the nearest point of interconnection to a device), and so it is argued that the price of termination should reflect this. However, sometimes regulators might want to protect national operators from a negative cash flow balance and allow different termination rates for internationally originated calls. Although this might be considered as discrimination according to the origin, this may also lead to high grey route termination market. If termination rates for international calls remain high, operators may find other way to send a call (e.g. using transit services of other operators in the country sometimes legally, sometimes illegally). So again, regulators should think very carefully about the potential benefits and losses when considering termination rates according to the origin of a call.

4.3 The scope of regulation

Until now, the main focus of this paper has been on the regulation of voice termination. However, with the increasing importance of SMS services (especially, in some developing countries), there is an increasing concern about the regulation of SMS termination. Until now, there have been strong

arguments for the case against regulation resulting in little or no regulation of SMS services. However, some regulatory actions that have already been taken in this respect are worth mentioning. For example:

- In 2005, ARCEP (the French regulator) published its market analysis for SMS termination on individual mobile networks. It found that the three French mobile network operators - Orange, SFR and Bouygues Telecom - each possessed significant market power (SMP) for termination of SMS on their individual networks. ARCEP proposed to impose regulations similar to voice termination. This includes the obligation to provide SMS access and termination, non-discrimination, transparency, regulatory cost accounting and accounting separation. It also proposes to introduce an initial price cap of 2.5 euro cents per message on SMS termination.[53] After examination of the case, the EC granted the French regulator the right to regulate the wholesale price of mobile phone text messages, because according to the EC, the request was "reasonable, proportionate and justified".[54] France was the first European country to propose the regulation of the wholesale price of SMS.
- In October 2009, the EC, however, called on the Danish telecoms regulator (NITA) to reconsider its regulatory approach for terminating calls to non-geographic numbers operated by service providers that offer premium rate services to end-users. Unlike national regulators in other EU Member States, NITA regulates the price of these services, setting them at the same level as "ordinary" termination services. However, terminating calls to service providers are generally characterized by different competitive conditions than terminating calls to end-users and are therefore not necessarily subjected to regulation.[55]
- In 2006, the Telecom Regulatory Authority of India (TRAI) proposed to regulate termination charges for SMS services. When operators opposed the move, TRAI reconsidered and has since threatened to intervene if mobile operators do not reduce premium SMS service rates.[56]

Telecom analysts say that sending an SMS involves only the cost of the SMS server and signaling because it does not take the voice path.[57] However, with SMSs being extremely popular in some countries, traffic imbalance among operators and increasing third party usage of the medium for advertisements and commercial reasons, regulators may feel there are grounds to regulate the termination charge for SMSs. The aim of regulated SMS termination might be to open this market to third party service providers that can provide more effective competition, and ultimately reduce end user prices. However, NRAs should carry out a regulatory impact assessment, which weighs the net economic benefits of the obligation against the cost of implementing the measure. It is doubtful that cost based SMS termination would pass such a regulatory impact test, especially when regulatory costing and accounting separation measures are included as well. Full accounting separation has not been required even for voice termination, except for a relatively few fixed operators.[58] Given the low price elasticity of SMS services that mobile operators usually price well above cost, the profits are often used to either subsidize other more price-sensitive services or to invest in network and service developments. So, from the point of view of the operator, regulatory intervention on SMS termination prices could have the effect of slowing down innovation and investment in the market, while at the same time doing little to enhance uptake of SMS services.[59]

Therefore, as long as this service is not the service of first necessity, regulators may consider monitoring changes in the market and facilitation of new entries, rather than applying *ex ante* regulation. On the other hand, the issue of consumer protection needs to be addressed, not least because SMS is a particularly attractive service for younger subscribers. There may be an issue of exploitation to be addressed here, when for example, young people need protection from some SMS content services.[60] An additional problem concerns unsolicited SMS or "spam" (see Box 7).

Box 6. Telecom Regulatory Authority of India acts against SMS "spam"

Telecom Regulatory Authority of India (TRAI) has acted on the problem of unwanted messages on mobiles recently. It has issued notification prohibiting unsolicited commercial communications through SMS.

TRAI has stipulated that all mobile operators have to prefix an identification tag before all application-to-peer (A2P) SMSs being sent from their SMS centres from February 1, 2009. A2P refers to messages generated from bulk messaging systems licensed by TRAI. This tagging will help to create a trail, making it easier to detect the sender. If the recipient of the SMS has registered with the national do-not-call registry, a complaint can be lodged with the TRAI. However, if the recipient is not registered, the regulator is not bound to act on the complaint.

Source: http://blogs.lemagit.fr/2009/02/03/telecommunications-regulation-authority-of-india-acts-against-sms-spam/.

4.4 Convergence, IP and NGNs

The migration to all-IP networks is now well underway across the telecoms sector. Developments in the market environment reflect the move, where a number of market players around the world are already operating NGN core networks, increasing numbers of players are deploying NGN access, and others have made significant commitments to roll out fibre access networks (FTTx) or have migration plans for moving to all-IP networks. Fixed and mobile operators are steadily migrating their networks to IP. Mobile operators have actually been ahead of the curve relative to fixed NGNs, and the launch of 3G and the introduction of IP multimedia subsystems (IMS) have them well on the way to all IP networks.[61]

The differences between current interconnection charging regimes for different types of services (for example, mobile voice, fixed voice) is largely a consequence of the regulation that was developed for separate technologies (fixed and mobile). Internet interconnection (interconnection between ISPs), however, was typically unregulated, and developed a form of BAK known as peering, which is becoming ever more popular as calls begin to migrate towards voice over IP technologies. In addition, the distinction between FTR and MTR is blurring. For example, if a call is delivered to a WiMax handset, should it be considered as fixed or mobile call termination (especially having in mind different WiMax standards that are available on the market today)? Or, if a service provider has a particular territory covered by WiFi spots and uses its WiFi network to provide voice services, should its termination services be treated as fixed termination or mobile termination?

Thus, this growing and universal trend towards the adoption of IP-based technology in fixed and mobile networks, the development of fixed-mobile convergent services and the growth of non-voice multi-media services on all networks means that the traditional distinction between fixed and mobile voice services, and between voice and data services, are likely to become less relevant in the future.[62] Therefore todays' regulatory mechanisms need to be updated or even multi-variable, and flexible, as operators use all the opportunities that innovation offers to bring costs down below the regulator-envisioned baseline and yet still make a profit.

The shift in telecom markets from a limited number of uniform and homogeneous services to a market with a wide range of different services, tailored towards serving particular service and user needs, complicates the regulation of prices. In this new dynamic market environment, regulators must often seek new standards for price regulation, rather than attempting to determine specific prices with limited information.

5. Conclusions

To sum up, there exists a broad variety of mobile interconnection regimes, and mobile termination (or mobile interconnection in a broader context) is treated differently by regulators across the world. There are significant variations in MTRs across different countries with many reasons why MTRs and FTRs are different in each of them. In some cases, like in the Americas, the differences of regulatory intervention (where fixed-operators have been mandated to provide cost-oriented termination rates and MTRs are left unregulated) might partly explain the differences in rates. Elsewhere, such as in Europe, the situation is not so straightforward. Operators have different views, too: some like the idea of having and retaining mobile termination rates, whereas others think that it is reasonable to try to avoid these kinds of payments.

It's difficult to judge whether one model is better than another. There is a striking similarity between MTRs applied in the Americas region, and MTRs in the Europe and CIS region, despite that fact that in the first there is no *ex-ante* price regulation in many countries, and in the latter such regulation is prevalent. In fact, in many cases the maximization of consumer utility, and not always the absolute size of MTR, could be the best criteria for regulators to base their decisions on.

[1] Littlechild, S.C. (2006). Mobile termination charges: Calling Party Pays versus Receiving Party Pays. Telecommunications Policy, Vol. 30, Issues 5-6, p. 242-277.

[2] In the majority of EU countries mobile origination market is being considered as fully competitive market and mobile origination rates are left without regulation.

[3] http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/09/222&format=HTML&aged=0&language=EN&guiLanguage=en

[4] http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/09/222&format=HTML&aged=0&language=EN&guiLanguage=en

[5] http://www.itu.int/ituweblogs/treg/Hong+Kong+++Deregulation+Of+FixedMobile+Interconnection+Charge.aspx

[6] Analysys Mason (2008). Case studies of mobile termination regimes in Canada, Hong Kong, Singapore and the USA

[7] http://stats.oecd.org/glossary/detail.asp?ID=6734

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[9] http://rru.worldbank.org/documents/publicpolicyjournal/087irwin.pdf

[10] http://www.ictregulationtoolkit.org/en/Section.2154.html

[11] http://www.regulationbodyofknowledge.org/chapter4/narrative/04/

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[13] Goncalves, R. (2007). Cost orientation and xDSL services: Retail-minus vs. LRAIC. Telecommunications Policy, Vol. 31, Issues 8-9, p. 524-529.

[14] http://www.itudaily.com/home.asp?articleid=514200802

[15] Nineteen countries of this region filled the questionaire: Benin, Botswana, Burundi, Congo (Dem. Rep.), Côte d'Ivoire, Equatorial Guinea, Gambia, Ghana, Kenya, Lesotho, Mali, Mauritius, Mozambique, Senegal, Swaziland, Tanzania, Uganda, Zambia, Zimbabwe.

[16] It should be noted here, that the comparison of rates in this paper does not take into account the differences between levels of incomes in the regions (purchasing power parity might be taken into account for more precise comparison).

[17] Seven countries of this region replied to the ITU Survey on Tariff Policies 2009: Djibouti, Iraq, Qatar, Lebanon, Morocco, UAE, Oman.

[18] http://www.tra.ae/TRA%20Regulations.php

[19] http://www.tra.org.bh/en/pdf/AREGNETPriceBenchmarking2008Final080605.pdf

[20] Three countries of this region filled the questionaire of ITU Survey on Tariff Policies 2009: Nepal, Viet Nam, Tonga.

[21] Analysys Mason (2008). Case studies of mobile termination regimes in Canada, Hong Kong, Singapore and the USA

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[23] http://www.ofta.gov.hk/en/press_rel/2009/Apr_2009_r3.html

[24] http://www.trai.gov.in/WriteReadData/trai/upload/PressReleases/658/pr9mar09no25.pdf

[25] http://www.med.govt.nz/templates/ContentTopicSummary____10696.aspx

[26] http://www.med.govt.nz/templates/MultipageDocumentTOC____26538.aspx

[27] Seventeen countries of this region filled the questionnaire: Argentina, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Jamaica, Mexico, Panama, Paraguay, Peru, St. Vincent and the Grenadines, Nicaragua, Uruguay.

[28] Seventeen countries of this region filled the questionnaire: Armenia, Austria, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Germany, Iceland, Ireland, Lithuania, Malta, Moldova, Norway, Portugal, Serbia, Turkey.

[29] http://www.deloitte.co.uk/TMTPredictions/telecommunications/Mobile-termination-rates-Europe-EC.cfm

[30]http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/09/222&format=HTML&aged=0&language=EN&guiLanguage=en

[31] http://www.anacom.pt/template31.jsp?categoryId=215626

[32] http://www.deloitte.co.uk/TMTPredictions/telecommunications/Mobile-termination-rates-Europe-EC.cfm

[33] http://europa.eu/rapid/pressReleasesAction.do?reference=IP/09/710&format=HTML&aged=0&language=EN&guiLanguage=fr

[34] http://europa.eu/rapid/pressReleasesAction.do?reference=IP/09/710&format=HTML&aged=0&language=EN&guiLanguage=fr

[35] http://www.frontier-economics.com/_library/publications/Frontier%20publication_MTRimpact.pdf

[36] http://www.npt.no/ikbViewer/Content/108741/Tele2%20Bilag%202%20-%20offentlig.pdf

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[38] http://www.teraconsultants.fr/spip.php?article171

[39] http://reports.tmgtelecom.com/mtr/TMG%20MTR%20datasheet.pdf

[40] http://papers.ssrn.com/sol3/papers.cfm?abstract_id=458222

[41] http://ec.europa.eu/information_society/policy/ecomm/doc/library/public_consult/termination_rates/explanatory.pdf

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[51] Dewenter, 2007

[52] http://www.teraconsultants.fr/IMG/pdf/Book_Asymmetries_Mobile-2.pdf

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[54] http://europa.eu/rapid/pressReleasesAction.do?reference=IP/06/1041&format=HTML&aged=0&language=EN&guiLanguage=en

[55]http://europa.eu/rapid/pressReleasesAction.do?reference=IP/09/1580&format=HTML&aged=0&language=EN&guiLanguage=nl

[56] http://www.business-standard.com/india/news/telcos-against-sms-termination-charge/248184/

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