

Mobile Termination Benchmarking: The Case of Namibia

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Research ICT Africa

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Executive Summary

The debate over the regulation of termination rates in Europe concluded in 2009 with the recommendation by the European Commission to national regulators to reduce termination rates to the cost of termination of an efficient operator. The debate in Africa is ongoing. This paper seeks to contribute to these debates by locating them in the context of Africa.

The most common argument made to support above-cost termination rates is that termination revenues are used to extend networks to under-served areas or to subsidise retail prices for access and usage. Operators making these claims have argued that a reduction in termination rates will force them to drop subsidies on handsets and calling prices, which will lead to lower subscriber numbers, and that it will be the poor in particular who will be cut off.

However, termination rates around the world are falling, while subscriber numbers have continued to grow and retail prices continued to drop. Empirical evidence suggests that aligning termination rates with the cost of an efficient operator in a Calling Party's Network Pays (CPNP) set-up will increase competition in the sector and allow operators to compete more fairly. This will serve consumer welfare and, indeed, the wider economy.

This paper argues that:

- above-cost termination rates effectively subsidise subscribers of one network at the expense of subscribers of another network;
- above-cost termination rates shield larger mobile operators from competition from smaller operators;
- cost-based termination rates increase competition between operators and lead to lower prices, more subscribers and more investment in networks and services;
- there is no empirical evidence of the so-called 'waterbed effect' whereby prices reduced in one component automatically result in price increases in another component. It assumes that pricing strategies of all mobile operator are the same, and as such are based on revenue replacement rather than profit maximisation;
- mobile termination is a monopoly and not one side of a two-sided market; and
- whether lower termination rates will lead to lower retail rates for all operators depends on the competitive pressure in the sector. If not further regulatory interventions may be required to ensure that price reductions are passed through to end users.

The case of Namibia is presented as an example of termination rate benchmarking as an alternative regulatory strategy to overcome regulatory and institutional bottlenecks in Africa. An interconnection dispute was resolved within nine months by benchmarking the cost of termination of selected countries. The subsequent termination rate reductions led to increased competition, lower retail prices, higher subscriber numbers and increased EBITDA margins and profits for the incumbent mobile operator. The Namibian example further provides an empirical case to demonstrate that there is not automatic 'waterbed effect' with the reduction of wholesale prices resulting in an automatic increase in retail prices to recover lost revenues.

Around the world termination rates are falling while subscriber numbers have continued to grow

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Introduction

Call termination is a monopoly. While call origination can be made competitive in numerous ways, there is simply no alternative to terminating a call on the network of the operator who owns the number a caller is trying to reach. The basis of regulation of this monopoly service is that termination rates should be based on the costs of an efficient operator so that interconnecting operators, and ultimately end users, would not have to bear the costs of an inefficient operator. For many years, there has been a debate about which costs should be included in the calculation of the cost of termination, with net interconnection receivers arguing for high and net payers for low termination rates. In support of high termination rates dominant mobile operators have argued that:

- mobile termination is a two-sided market and lowering termination rates will lead to increases in access and usage prices, leading to fewer people being able to afford communication services. This is also referred to as the 'waterbed effect'; and
- lower termination rates and resultant lower profits will limit operators' capacity to invest.

This paper demonstrates that:

- there is no automatic effect (waterbed effect) inherent in the reduction of termination rates. Operators adjust retail prices to maximise profits in response to the specific competitive conditions of the market they operate in;
- the effect of high termination rates is that subscribers from one network subsidise subscribers of another network. There is no inflow of funds into the sector, just a transfer between operators;
- larger networks can use higher termination rates to prevent smaller networks from gaining market share, inhibiting competition. High termination rates imply high off-net call rates, since termination rates are wholesale cost for off-net-calls, limiting off-net calling prices downwards. High termination rates and subsequent high off-net calling prices make it expensive for a consumer to move from a large network to a smaller network, since the ratio of off-net to on-net calls made and received will increase through the switch and with it the cost for the switcher. Making more off-net calls than before increases the cost due to off-net prices being higher than on-net prices. Receiving more calls from other networks increases the indirect cost, the cost of being called from other networks. This may lead to being called less and having to call back more often, depending on user profiles;
- cross country econometric studies do not explain pricing behaviour of operators following regulatory interventions. Only detailed country case studies can deliver that;
- termination rates and on-net retail prices are not interdependent, i.e. call termination is not one side of a two-sided market;
- off-net prices and termination rates are not interdependent but dependent, i.e. there is cost causation; and
- Lowering termination rates to the cost of an efficient operator does not lead to higher retail prices and a drop in mobile subscribers. It has the potential to increase competition between operators and lead to lower retail prices and more mobile subscribers.

There is overwhelming international evidence that high termination rates encourage neither competition nor affordable pricing. In the next section the arguments made above are presented together with recommendations arising from them. Subsequent sections deal with the so-called 'waterbed effect' and the two-sided market argument. The Namibian interconnection benchmarking study is then discussed in detail to demonstrate how benchmarking can help developing countries to regulate a crucial competitive bottleneck, while developments elsewhere in Africa are referred to more generally.

Larger networks can use high termination rates to prevent smaller operators from gaining market share

Termination Rate Debate

NRAs should set termination rates at the cost of an efficient operator

The European Commission issued a draft recommendation on the regulatory treatment of fixed and mobile termination rates in October 2008 (EU, 2008), which sparked an EU-wide debate. The final recommendation, issued on 7 May 2009, incorporated comments by operators and regulators across Europe and recommended the following to European regulators (EU, 2009):

- *Cost of Efficient Operator:* National Regulatory Authorities (NRAs) should set termination rates at the cost of an efficient operator. This implied symmetric termination rates.
- *LRIC:* Cost of termination should be calculated on the basis of forward-looking long-run incremental costs (LRIC), only taking into account costs that are caused by the provision of wholesale call termination, i.e. wholesale call termination being the increment.
- *Definition of incremental costs:* Costs that can be avoided if a specific service is no longer provided, i.e. wholesale voice termination service provided to third parties.
- *Definition of traffic related costs:* Fixed and variable costs which increase with increased levels of traffic.
- *Top-Down Addition:* NRAs may use a top-down approach based on audited cost data to improve the bottom-up LRIC.
- *Next Generation Network (NGN):* The core part of both mobile and fixed networks should be based on NGN, and the access part for mobile networks should be a combination of 2G and 3G.
- *Asymmetric termination rates:* "In cases where it can be demonstrated that a new mobile entrant operating below the minimum efficient scale incurs higher per-unit incremental costs than the modelled operator, after having determined that there are impediments in the retail market to market entry and expansion, the NRAs may allow these higher costs to be recouped during a transitional period via regulated termination rates. Any such period should not exceed four years after market entry." (EU, 2009).

NRAs are required to implement symmetric termination rates based on the cost of an efficient operator. Altogether, the recommendation is likely to lead to termination rates between 1 and 2 Euro cents by the end of 2012 across the EU. Predictably, the recommendation has been applauded by new entrants and small operators, supported by national regulatory authorities and objected to by mobile incumbent operators with significant market power.

In response to the initial draft recommendations, Frontier Economics (2009) composed a report for several of Europe's mobile incumbents, concluding that the EU draft recommendation would lead to MTRs which are below the efficient cost of termination for three reasons:

- the cost of coverage is considered non-incremental to the provision of wholesale termination services;
- termination costs exclude common costs; and
- the recommendation confuses the costs of a hypothetical operator with the costs of an efficient operator.

These arguments are flawed for several reasons. Firstly, common costs that are associated with the efficient provision of termination services are included. Only common costs that are not required for providing termination services are excluded. Secondly, total termination revenue typically comprise a relatively small share of total revenues, around 10-20%.¹ Operators do not build networks and provide coverage to terminate calls, but to provide services to their customers and gain new customers. Coverage cost can therefore not be seen as part of termination cost. Further, providing termination services is also a service to a network's own customers since being able to call other networks and being able to receive calls from other networks is a benefit to these subscribers. Lower termination rates therefore increase the utility of the network to its subscribers, if passed on to these subscribers or to subscribers to other networks. Above-cost termination rates could mean that subscribers subsidise their own on-net calls with their off-net calls made or received. Thirdly, Frontier Economics (2009) argues that the LRIC costs proposed by the EU are not those of an efficient operator but rather of a hypothetical operator with costs that will be lower than those of an efficient operator. Whether or not this is the case depends on the implementation of the LRIC model and the data available from operators.

¹ For the financial year ending in 2008: MTC Namibia 11.2%, Leo Namibia, 9.8%, Telecom Namibia, 6% (NCC, 2009), Vodacom South Africa, 2009: 18.2% (Vodacom, 2009)

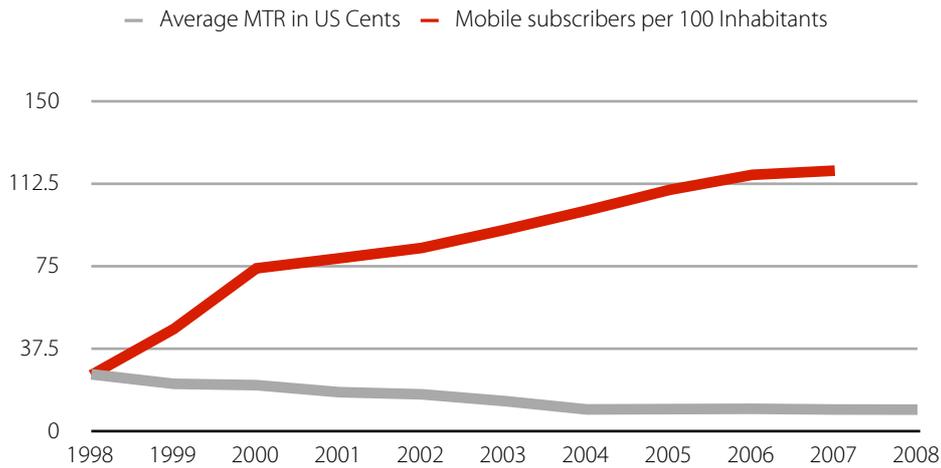


Figure 1: UK MTR vs. subscribers per 100 inhabitants (source: OVUM and ITU 2008)

An earlier Frontier Economics report for incumbent mobile operators, (2008), investigates the likely consequence of drastically reduced MTRs below efficient cost termination rates. It concludes that consumers would not be better off and that subscription levels would drop due to higher retail prices: The lower level of subscription is the result of higher retail prices, as the cost of incoming calls are not covered by termination revenues.” However, no one proposes to set termination rates below the cost of terminating calls efficiently, and the historical evidence clearly contradicts Frontier’s claim. MTRs have come down in Europe for the last 10 years and countries have not experienced lower subscription levels, nor reduced call volumes, nor increased retail prices Even countries that used zero termination rates (for example France) did not witness a decline in subscriber numbers (see Figure 2), or lower usage.

Even countries that used zero termination rates did not witness a decline in subscriber numbers or lower usage

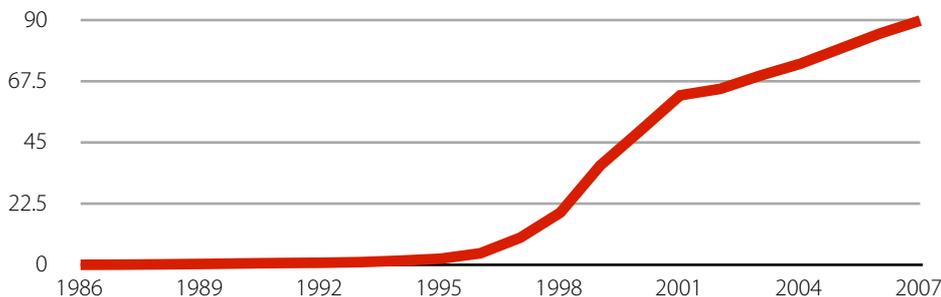


Figure 2: Mobile Subscribers per 100 inhabitants in France (ITU 2008)

In fact, the opposite has been the case. Lower mobile termination rates were accompanied by growing subscriber numbers and traffic. Figure 1 demonstrates this for the UK for mobile subscribers per 100 inhabitants and MTRs in US cents.

It is possible that the number of active SIM cards could drop due to a lowering of mobile termination rates if that reduces the need to own two SIM cards due to excessive off-net call prices. However, that would only reduce the number of active SIM cards and not the actual number of users. Incumbent operators have been eager to report on SIM cards and not on subscriber numbers for this reason.

Table 1 shows that retail prices have not increased following termination rate reductions, but have instead decreased. All 21 countries had lower termination rates in 2009 compared to 2006 and all 21 countries had lower retail prices in 2008 compared to 2006. Table 1 underestimates retail price reduction though, since the OECD price basket methodology only captures the prices of dominant operators. Only operators that have 50% market share or more are included. If no single operator has 50% market share then the biggest operators that together constitute 50% of the market are chosen. Dominant operators have, however, the least incentive to reduce tariffs. New entrants that need to gain market share are more likely to pass the cost savings from lower termination rates on to their subscribers in the form of lower off-net call prices.²

² See table 7 for a comparison of 18 African countries.

Only when dominant operators begin to lose subscribers in large numbers to the new entrant are they likely to reduce prices

Table 1: Changes in mobile low-usage basket prices compared to changes in MTR (Source: OECD 2007; OECD 2009; ERG 2006; ERG 2008a; ERG 2009)

| | OECD Mobile low-usage basket, August 2006, VAT included US\$ PPP | OECD Mobile low-usage basket, August 2008, VAT included US\$ PPP | ERG 2006 Mobile Termination rates in Euro | ERG 2009 1 July Mobile Termination rates in Euro | 2008 price expressed as 2006 price | 2009 MTR expressed as 2006 MTR |
|-----------------|--|--|---|--|------------------------------------|--------------------------------|
| Austria | 193.43 | 148.26 | 0.1121 | 0.04 | 77% | 36% |
| Belgium | 175.51 | 146.92 | 0.1397 | 0.087 | 84% | 62% |
| Denmark | 68.82 | 50.31 | 0.1134 | 0.0737 | 73% | 65% |
| Finland | 99.89 | 60.31 | 0.079 | 0.0502 | 60% | 64% |
| France | 239.68 | 216.49 | 0.098 | 0.0476 | 90% | 49% |
| Germany | 123.55 | 104.55 | 0.1139 | 0.0676 | 85% | 59% |
| Greece | 302.47 | 202.46 | 0.1248 | 0.0786 | 67% | 63% |
| Hungary | 230.48 | 217.08 | 0.1071 | 0.0589 | 94% | 55% |
| Iceland | 142.61 | 117.61 | 0.1212 | 0.0784 | 82% | 65% |
| Ireland | 202.95 | 149.95 | 0.1054 | 0.0964 | 74% | 91% |
| Italy | 233.39 | 195.23 | 0.122 | 0.0822 | 84% | 67% |
| Luxembourg | 112.84 | 107.59 | 0.14 | 0.0898 | 95% | 64% |
| Netherlands | 119.63 | 105.02 | 0.114 | 0.094 | 88% | 82% |
| Norway | 111.2 | 86.72 | 0.0885 | 0.0664 | 78% | 75% |
| Poland | 209.79 | 147.94 | 0.1352 | 0.0398 | 71% | 29% |
| Portugal | 178.44 | 153.8 | 0.1171 | 0.0661 | 86% | 56% |
| Slovak Republic | 255.4 | 241.62 | 0.1046 | 0.099 | 95% | 95% |
| Spain | 258.02 | 250.8 | 0.1131 | 0.0569 | 97% | 50% |
| Sweden | 87.92 | 77.69 | 0.0783 | 0.0297 | 88% | 38% |
| Switzerland | 145.11 | 111.03 | 0.1515 | 0.1124 | 77% | 74% |
| UK | 170.53 | 160.4 | 0.087 | 0.0563 | 94% | 65% |

Only when dominant operators begin to lose subscribers to the new entrant in large numbers are they likely to reduce prices. This pass-through, or the lack thereof, is also used as an argument against lowering termination rates to the cost of an efficient operator (Sandbach, 2007b). The argument is: why lower termination rates if the cost saving is not passed on to the consumer anyway? The answer to that is twofold. Firstly, termination rates at the cost of an efficient operator remove the subsidy³ from one operator to another. Secondly, if cost savings are not passed on then further regulatory remedies might be required to increase competition within the sector, such as retail price regulation.

Another pass-through is the one from high mobile termination rates to lower mobile on-net rates. This pass-through has, however, rarely been discussed. The extra profit from high termination rates could be used up for operational inefficiencies, high profit margins and high salaries for managers of mobile operators. If high termination rates would be subsidising on-net call rates for the poor, as is often claimed by incumbent operators, why are prepaid on-net rates not then cheaper than postpaid on-net rates? Also, on-net rates are usually not below cost and therefore not subsidised (making a profit for each minute).

Several empirical studies have recently been published that indicate that lowering MTR will indeed lead to more usage through lower retail prices. (See for example Growitsch et al, 2010). Ofcom (2010) released a market review stating that it is confident that pure LIRC as the basis for termination rates will be positive for consumers by promoting competition and reducing call prices.

³ The transfer from net termination payers to net termination payment receivers; the subsidy dominant operators claim they use to subsidise lower access and usage prices.

The next section discusses the two-sided market and the waterbed effect arguments which are related this discussion.

The Two-Sided Market Argument

Mobile call termination is frequently interpreted as one side of a two-sided market that produces a ‘waterbed-effect’ whereby adjustments to pricing in one market automatically create pricing effects in another. The two-sided argument is used by those operators benefiting from high termination rates and rejected by those who are net payers. However, any of the two sided market models fails to predict market outcomes correctly and waterbed effects cannot be empirically observed following termination rate cuts. Evans (2007) states that two fundamental principles apply for price setting in two sided markets:

- *interdependent prices*: Prices are determined interdependently, i.e. changing the price for the one side will change the price of the other side; and
- *no cost causation*: There is no direct link between incremental costs for a good or service and the price.

Two-sided market models fail to predict market outcomes correctly

Neither can be theoretically or empirically shown, as is demonstrated below. Various arguments are used for call termination being a two-sided market, each with weaknesses (see table 2). The Sandbach (2007a) and Evans (2007) arguments ignore the fact that an operator has only limited influence over the price other operators can charge for calls to their network. If networks A and B agreed to a termination rate x , then B could charge any amount, $x+a$, to its subscribers. B could in theory price calls to A so high that A receives very little termination revenue from B. A would hence not be able to subsidise retail prices for its subscribers through termination revenues. Setting termination rates would restrict off-net prices of competitors downwards to a certain extent, but not upwards. Price elasticity for calls from other networks is a function of the off-net prices of other networks, which may or may not be influenced by termination rates. Traffic between networks depends on several factors, many of which an operator cannot control, such as user profiles, market share and the off-net prices of the other operators. However, assuming that A could cause a net flow in interconnection fees from B and uses that to subsidise retail prices for its subscribers, what then happens to B’s subscribers? Could the mobile telecommunication market be two-sided for one operator and one-sided for another? Could the two-sidedness change over time? Both positions can clearly be rejected.

Table 2: Two-sided market definitions

| Author | First Side | Second Side | Comment |
|----------------------------------|--|--|---|
| Sandbach (2007a) Evans (2007) | Providing telecommunication services to own subscribers Prices = on-net, off-net, calls to fixed-line | Providing connectivity to own subscribers base for users of other networks Prices = MTR | Operator has little control over calls received from other networks due to off-net prices of other networks and user profiles of own and other network users |
| CentrePiece (2007) | Subscriptions: access price = handset + Sim | Outgoing Services: price = retail prices | Definition ignores that access price is once-off and usage prices change frequently |
| Hausman & Wright (2006) | Mobile subscribers | Fixed-line callers | Operator has little control over calls received from fixed-line network since it has little influence over retail prices of fixed-line operator. MTR only defines downward barrier. |

Hausman & Wright (2006) define the one side of the market as mobile and the second side as fixed-line subscribers. In a Calling Party Pays environment (Africa and Europe) subscribers do not pay for receiving calls. Here again an operator cannot set prices for the second side of the market. It has little influence over the price of the fixed-line operator. The CentrePiece (2007) defines access as one side and usage as the second side of a two-sided market, ignoring that access is a once-off price and usage a price that changes frequently, which excludes inter-dependability.

Assuming for a moment that there is a two-sided market based on the definition of Sandbach (2007a) and Evans (2007):

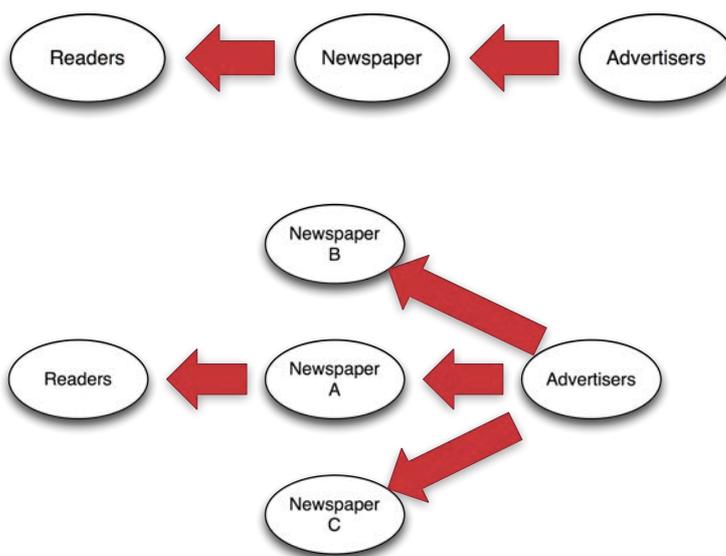
- Market A: Retail services (prices: on-net, off-net, fixed-line, peak, off-peak etc.)

- Market B: Mobile call termination (price MTR)

The first argument as to why that might be a two-sided market is that high termination rates subsidise access for poor users. Since termination rates have decreased all over the world, while subscriber numbers have increased, the opposite effect to the one predicted by two-market theory has in fact transpired (Figure 1). The second argument is about prices, whether higher prices on the one side of the market dictates a lowering of prices on the other side. Here too the opposite of what has been predicted has been the case. Lower termination rates were not followed by increases in retail prices but by decreases (Table 1). Observed subscriber numbers and prices clearly speak against two-sided markets.

Call termination is a complex matter with competitive consequences for the performance for the sector. However, the key business principle of selling high volumes cheaply, or lower volumes dearly, applies. As Growitsch et al (2010) noticed, MTRs represent wholesale revenue as well as wholesale cost. Lower MTRs will lead to lower off-net prices for new entrants and smaller mobile operators, which will reduce their off-net prices to compete with the on-net prices of dominant operators to gain market share. That will lead to more termination traffic for the dominant mobile operators. Dominant mobile operators are likely to prefer to keep off-net prices high (sell dearly) since it entails the hidden benefit of protection from competition. High MTRs mean high off-net retail rates for small operators, which makes it expensive to move from a larger to a smaller operator since this will tilt the relationship between on-net and off-net calls.

In a classical case of two-sided markets, Valletti (2006) gave the example of newspapers that can sell their newspapers more cheaply to gain a larger readership and then sell the advertising space more dearly. However, the advertising market is competitive for both readership and advertisers and the price is being driven by demand and supply. The larger the readership the more a newspaper will be able to charge advertisers.



Call termination is a complex matter with competitive consequences for the performance of the sector

That is not true for call termination, where the prices are fixed though contracts. There are no equilibrium termination prices since they are determined by contracts between operators and only change if regulators intervene or if all operators benefit from changing them. Each interconnection agreement can be seen as a pareto-efficient equilibrium. Operator A cannot be better off without operator B being worse off, no matter how economically inefficient the interconnection arrangement is. An operator cannot simply increase the MTR because its subscriber base grew. Also, advertisers not only have the choice between various daily newspapers, but also weekly ones and monthly magazines and can even choose to advertise on TV or radio instead. Some newspapers can further charge high advertising fees despite a small readership due to the average income of the readers, as in the case, for example of the *New Yorker*. Mobile termination is a monopoly and callers cannot choose on what network a call needs to be terminated when calling a particular person.

This can be illustrated further by continuing with the Sandbach (2007a) definition and assuming a situation with two mobile operators. Mobile operator A has a market share of 80% and operator B of 20%. Reducing MTRs to the cost of an efficient operator could have the following outcome:

- Operator B reduces its off-net prices to make it more attractive for subscribers of A to move to B, while maintaining its profit margin by passing on the reduction in MTR to its subscribers. This will also generate more outgoing calls to A subject to the price elasticities of B's subscribers.
- Operator A can pass on the cost saving in termination rates or keep off-net prices constant. In the latter case the profit from each outgoing minute increases. Outgoing traffic will increase should the operator drop its off-net rates, subject to the price elasticity of A's subscribers.

Table 3: Operator A's choices if B drops off-net prices

| | | Operator B (20% market share) | |
|-------------------------------|---|--|--|
| | | Reduce off-net prices | |
| Operator A (80% market share) | Passes MTR reduction on to subscribers = lower off-net prices | More traffic from B (more minutes at cost) | More traffic to B (more minutes, same profit margin) |
| | Keeps off-net prices unchanged | More traffic from B (more minutes at cost) | Same traffic to B (same minutes, higher profit margin) |

Operator A has the choice to make more money on each minute of outgoing calls and to sell the same as before or maintain its profit margin for outgoing calls and sell greater volumes. The disincentive to leave the larger and join the smaller network is reduced through lower termination rates and lower off-net rates of operator B. Why should A now increase its on-net rates? It would provide even greater incentive for its subscribers to move to B. Which option operator A chooses, whether it will be more profitable to pass on the cost saving in termination to its subscribers or to benefit from higher profit margins for outgoing calls, will depend on many market factors and strategic considerations. A key factor will be the attractiveness of operator B for subscribers of operator A. Should operator A lose customers to operator B in large numbers it could opt to reduce its off-net rates as well or even its on-net rates. Should operator B still be unattractive for subscribers of operator A (lack of number portability, lack of coverage etc.) then operator A would most likely not change any of its prices. In that case the higher profit margin from outgoing calls would compensate for the lower termination rate.

The two-sided market argument does not account for the complexities associated with setting retail prices in response to termination rate cuts

Table 4: Outcome matrix for two operators following a MTR cut when decisions are limited to raising, cutting or keeping on-net and off-net retail prices unchanged

| | | | Operator A | | | | | | | | |
|----------|--------|----------|------------|-----------|------|----|-----------|-----------|----------|-----------|------|
| | | | On-net | up | up | up | const ant | const ant | constant | down | down |
| | On-net | Off-net | up | const ant | down | up | const ant | down | up | const ant | down |
| | B | up | up | | | | | | | | |
| up | | constant | | | | | | | | | |
| up | | down | | | | | | | | | |
| constant | | up | | | | | | | | | |
| constant | | constant | | | | | | | | | |
| constant | | down | | | | | | | | | |
| down | | up | | | | | | | | | |
| down | | constant | | | | | | | | | |
| | down | down | | | | | | | | | |

However, this example represents only the simplest case. Any decision reacting to a drop in MTR would depend on the market share of operators, customer composition, regulatory environment and many other factors. The complexity increases exponentially when adding fixed-line operators and more mobile operators. Pro-competitive regulatory interventions like local loop unbundling, national roaming, infrastructure sharing and number portability will equally increase the complexity exponentially. This can be demonstrated with an outcome matrix for two mobile operators. In this example the decision each operator has to take is to either increase or decrease or keep prices constant for off-net and on-net calls following a MTR cut. This highly simplified scenario already has 81 potential outcomes (see table 4). Adding a third mobile operator would lead to 729 outcomes. Adding fixed-line operators, and hence another set of prices, several products for each operator for

which prices are set individually, and allowing price increments in percentage steps again pushes the number of possible outcomes up exponentially. Strategists within operators are likely to deal with that complexity with gut feeling and play it by ear, adjusting as the consequences are being observed.

The two-sided market argument, other than predicting market outcomes incorrectly, does not contribute to understanding such complexities. A game theoretical approach would be more suitable. However it is likely to predict the obvious: Cost-based termination rates increase the competition between operators and hence lead to lower retail prices, more subscribers and more investment – particularly in cost saving and/or service-enhancing technologies.

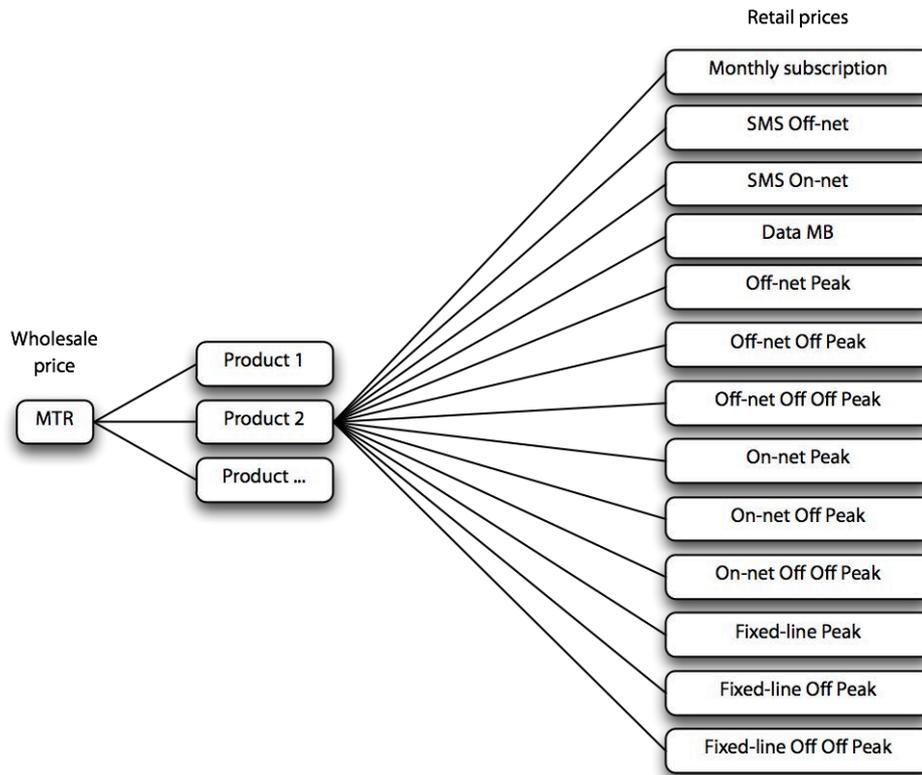
It is also possible that cost-based termination rates do not increase competition between operators and that retail prices remain entirely unaffected. Such an outcome could be the case in a country with mobile operators of equal market size and exchange of traffic.

Increasing retail prices would only be conceivable for an operator that is a net receiver of termination payment and which may already be operating at a loss. Such an operator could increase retail prices to limit further losses. This would, however, likely seal the operators fate.

The key argument why MTR is not one side of a two-sided market is because MTRs and retail prices are not interdependent. Telecommunication operators sell a variety of products and services, retail and wholesale. MTRs are not interdependent with retail prices for several reasons:

- Termination rates are not prices that are being set to maximise profits, but are contractual arrangements that are unlikely to change unless regulators intervene or it is in the interest of all parties involved to change them.
- An operator cannot increase MTR because its market share increased, something that would be suggested from the newspaper example of two-sided markets above. Termination rates are mostly symmetrical between mobile operators, and if they are asymmetrical due to regulatory intervention, then the smaller network can charge more. Symmetrical termination rates contradict the two-sided market argument as the larger network gets the same nominal value as the smaller network.
- MTRs are wholesale costs and wholesale revenue at the same time. MTR reductions can be passed on to subscribers, which leads to a decrease in off-net prices. Should it not be passed on then the operator makes more money for each outgoing minute compensating for the loss in the termination revenue through the MTR reduction. These are concrete choices an operator can make depending on which it thinks will be maximising profits.
- Products of mobile operators are complex and operators have many products and different off-net, on-net, peak, off-peak, SMS, MMS and data prices for each product. The MTR is just one price, maybe two prices (peak and off-peak). Operators will maximise their profits, and pricing strategies are complex and driven by user profiles, market niches and not by revenue replacement. Reducing prices may well lead to more revenue and increasing prices to less revenue following mobile termination rate cuts.
- Operators can set only their own retail prices and not those of other operators. Yet, the others' off-net prices will influence how many calls are being received.

Reducing end user prices may well result in increased revenue following mobile termination cuts



The Waterbed Effect Argument

A result of a two-sided market and an argument that is often put forward to maintain the status quo is the waterbed effect.^{4 5} The waterbed effect describes a situation whereby if mobile termination rates go down, some other prices, usually usage and access prices, need to go up, to replace the loss in termination revenue. However, this ignores the fact that operators can increase or decrease prices depending on what maximises their profit. Which strategies maximise profits depends on many factors, such as market share of operators, strategy and price elasticity to name just a few. It is far too simplistic to assume that the reduction in regulated prices will automatically mean increasing prices in other areas.

The 'waterbed effect' argument denies the fact that mobile operators have choices. It would make more sense for an operator to increase operational efficiency and to invest into cost-reducing technologies than to increase tariffs and hence reduce traffic on its network, for example. The waterbed effect further hypothesises that all operators react in the same way, indulging in revenue replacement, and are not profit-maximisation. Considering two operators, one a net termination payer and one a net termination revenue receiver. It is obvious that their reaction in relation to pricing strategy will be very different. Termination rates based on the cost of an efficient operator will mean that inefficient operators will need to adjust their business models in order to become more efficient. Hiking retail tariffs will be last on the list.

Forcing down prices in regulated segments does not lead automatically to higher prices in unregulated segments of the market

Table 5: Predicted vs. actual outcomes of termination rate reductions

| | Access & Usage Prices | Subscriber Numbers |
|-------------------|-----------------------|--------------------|
| Predicted outcome | go up | go down |
| Actual outcome | go down | go up |

Concern has been raised that forcing prices down in regulated segments might lead to higher prices in unregulated segments of the market. This too is unlikely since the unregulated segments

⁴ See for example Centre Piece (2007): "Pressing down prices in one part of a firms' operation causes another set of prices to rise." "Of course, the reverse is also true: if regulation reduces termination charges and hence revenues, operators will have to raise their prices to subscribers."

⁵ Sandbach (2007c) states that a optimal MTR would at least need to be twice the termination cost due to the waterbed effect.

are likely to be unregulated because they are competitive. It is conceivable that an operator would be able to increase subscription prices linked to new handsets, not transparently reducing the handset subsidy. However, it is doubtful that such a move would maximise profits in a competitive environment. In any case, fear of excessive pricing in one segment is not reason enough to allow excessive pricing in another.

Genakos & Valletti's (2009 and 2007) argument regarding increasing retail prices following MTR reductions is contrary to the evidence (see Figure 1 and Table 1). Neither access nor usage prices increased in response to MTR reductions in the EU. In fact the opposite transpired. Increased competition brings down access and usage prices as MTRs approach the cost of an efficient operator. The findings of Genakos & Valletti (2009 and 2007) are more likely due to weaknesses in the data used.⁶ The data shortcomings and unsuitability of cross-section country analysis are discussed in another section.

Another argument put forward is that the waterbed effect exists but is masked by other developments such as increased competition and decreasing unit costs and can hence not be observed with the naked eye. The question that arises from that is why any policymaker should pay attention to the waterbed effect if it is so limited that one needs advanced econometric techniques to find it. A more appropriate argument might be: if termination rates had not been reduced, prices would have fallen and subscriber numbers increased even further. Evidence for that cannot come from cross country comparisons however, but only from detailed country studies. One would need to analyse price changes for periods without regulatory interventions and for periods after MTR reductions controlling for many other factors. Key would be to estimate the increase in competitive pressure through lower termination rates by analysing how various operators react to lower MTRs in their pricing and product strategies.

The Subsidy Argument

Two different forms of potential subsidisation that result from high mobile termination rates need to be differentiated. One is between operators and one between services of an operator.

Cross-subsidising retail with wholesale services

The claim underlying the 'waterbed effect' and the two-sided market arguments is that wholesale service charges are used to subsidise retail services. Cross-subsidisation of retail services with wholesale services is claimed, by those propagating the 'waterbed effect' and the two-sided market argument, to be substantial. A key argument against the waterbed effect lies in the nature of cross subsidies. Claiming that on-net rates are being subsidised by termination revenue would imply that on-net rates are being offered below cost. Cross-subsidising implies that one service is offered below cost and that another service is priced high enough to compensate for losses sustained through the subsidised service. This might be the case in some instances; free off-off-peak on-net calls for example. The cross subsidisation taking place in this example is more likely to be from peak on-net rates however.

An operator claiming that it has to raise prices if termination rates are being reduced has to answer why, if it is profit maximising, it has not done so already if it can. Incumbent operators are unlikely to increase on-net rates, they would have done so already if they could and if that would have increased their profits. Price elasticity and competition are likely to reduce revenues further should an operator increase on-net rates to compensate for termination revenue.

Another factor rendering this type of service cross subsidy unlikely is that termination revenue usually makes up only a small share of total revenue. How would 10-20% of revenue subsidise 80-90% of revenue? Further, if an operator receives a net termination payment and uses that for cross-subsidising other services, what are the net payers doing?

⁶ Relying on OECD data, ie. prices of only dominant operators, might be one source of error. A further problem might be that available data for econometric analysis is insufficient to explain pricing behaviour of operators following regulatory interventions. Price elasticity for specific subscriber segments, price transparency in the market, the existence of number portability, number of operators and sequencing of market entry, past regulatory interventions, and strength and credibility of regulators are among many factors that are likely to influence product design of operators. Further distortions may stem from changing exchange rates. A OECD basket may have become cheaper or more expensive not because of price changes but because of a fluctuation of the exchange rate since OECD baskets are being expressed in US\$.

High MTRs are intra sector transfers (subsidies) between operators

As Genakos & Valletti (2009) point out, the financial benefit from high termination rates constitutes a subsidy from the fixed-line network to the mobile network or from one mobile network to another mobile network. Which network is a net receiver of termination revenue depends mainly on market size, customer composition, retail prices of all operators involved and the level of fixed and mobile termination rates.

High mobile termination rates mean not only that fixed-line subscribers subsidise mobile subscribers, but also that mobile subscribers from one network subsidise mobile subscribers from other networks. Worse, new entrants, who still have to build extensive networks, subsidise mobile operators, usually incumbent, which have amortised network infrastructure and achieved high economies of scale. To justify allocation, based on consumer welfare arguments, from one operator to another, or from subscribers of one operator to the subscribers of another operator, one would need to prove that the transfer would in fact increase welfare. Subsidising one group of subscribers at the expense of another set of subscribers makes no sense. The standard investment related argument with regard to the waterbed effect is equally implausible. The subsidisation that results from high termination rates is within the sector. Why should one operator be given a subsidy to roll out network infrastructure at the expense of other operators? Allowing highly profitable mobile operators to be subsidised by fixed-line subscribers has contributed to the decline of fixed-line phone penetration in Africa. High MTRs mean that it is expensive to call mobile phones from fixed-line phones, another reason for fixed-mobile substitution. Yet fixed-line networks are of importance for Africa, particularly for the provision of affordable broadband Internet access, and should not simply be sacrificed for sky-high EBITDA margins of dominant mobile operators.

The financial benefit from high-termination rates constitutes a subsidy from the fixed line network to the mobile network or from one mobile operator to another

Table 6: Key arguments for termination rates based on the cost of an efficient operator

| Arguments | Description | MTR at cost of efficient operator |
|---|--|---|
| High MTRs protect against competition | Dominant mobile operators can use high MTRs to defend their market share against new entrants. High MTRs imply high off-net rates for new entrants and small operators, making it expensive for a subscriber to change from the larger to the smaller network. A dominant mobile operator can also starve smaller mobile operators and fixed-line operators by combining high MTRs with high off-net and fixed-line retail charges, causing net interconnection outflows. | Large operators can no longer use their size as protection against competition. |
| Cost-based termination rates reduce profits | The Genakos & Valletti (2009 and 2007) papers demonstrate that EBITDA margins may be affected by lower termination rates, which is to be expected since lower termination rates increase competition and lead to lower, not higher retail prices. EBITDA margins of operators that were shielded by high termination rates from competition are naturally bound to decline under competitive pressure. However, in Namibia the opposite has been the case. The EBITDA margin of the incumbent operator increased from 50.9% to 53.8% and its subscriber base increased by more than 25% due to lower prices which continued to expand the market in 2009 after a significant termination rate cut (43%). | The average profit in the industry is likely to either be unaffected or to increase. Fairer competition may lead to lower prices and expansion of the market. Operators that built a business model around high termination rates will need to adjust to maintain profitability. |
| No guarantee of a pass through from high MTR to on-net rates | A pass through from high mobile termination rates to lower mobile on-net rates (service cross subsidisation) is rarely discussed. The extra profit from high termination rates could be used up for operational inefficiencies, high profit margins and high salaries for managers of mobile operators. If high termination rates would be subsidising on-net call rates for the poor, as often claimed by incumbent operators, why then are prepaid on-net rates not cheaper but more expensive than postpaid on-net rates? Also, on-net rates are usually not below cost and cannot therefore be subsidised. | Off-net rates are typically higher than on-net rates. That no longer needs to be the case once the termination rate is set to the cost of an efficient operator, removing a potential bias from network use in a country. |
| Pass through of MTR reduction to retail prices (off-net prices) depends on competitive pressure in sector | Doubts about the pass through from lower termination rates to retail prices is used as an argument against lowering termination rates (Sandbach, 2007b). The argument is: why lower termination rates if the cost saving is not passed on to the consumer anyway? The answer to that is twofold. Firstly, termination rates at the cost of an efficient operator remove the subsidy from one operator to another. Secondly, if cost savings are not passed on then further regulatory remedies might be required to increase competition within the sector. | Whether fixed-line and mobile operators change their off-net prices depends on the competitive pressure in the sector. Further regulatory interventions might be required. A suitable intervention would be to set off-net equal to on-net prices once MTRs are at cost of termination. |
| Termination is a service to own subscribers | Providing termination services is also a service to operators' own customers since being able to call other networks and being able to receive calls from other networks is a benefit. This implies that a high MTR reduces the value the operator provides to its own subscribers by making and receiving calls to other networks more expensive. | Operators receive the cost of termination for their service while providing a service to own customers (being able to receive calls from other networks). |

Case Study vs Cross Country Study

The 'waterbed effect' is a theoretical concept and has not been documented empirically. Nor has there been any convincing evidence that call termination is one side of a two-sided market. The empirical studies analysing a panel of countries used to justify this argument produce questionable results for several reasons:

- Mobile penetration rates and mobile retail prices in a country depend on many factors such as number of fixed and mobile operators, sequence of market entry, technologies deployed, market share of operators, user profiles of subscribers, brand loyalty, contractual lock-ins and club effects, price elasticity of demand, income elasticity of demand, levels of disposable income, business models used by operators, penetration of substitute technologies like fixed-line and cable TV, past regulatory interventions and their sequence, regulatory strategies, communication laws and policies and many other social and economic factors. Constructing data sets with enough data points to account for such diversity is impossible. This is acknowledged by the CEG (2009) study.
- Most studies investigating the impact of MTR reduction on retail prices use the OECD price baskets methodology, which only captures the retail prices of dominant operators (or of those that together constitute 50% market share). Examples for such studies are CEG (2009) and Genakos & Valletti (2009). Including smaller operators would indicate price changes following regulatory interventions better. Dominant operators are likely to change retail prices at a slower pace, if at all. New entrants that need to gain market share are more likely to pass through termination rate savings to their subscribers, in particular since this brings their off-net prices closer to the on-net prices of dominant operators. Table 7 provides an example of the difference in effective mobile prepaid prices for usage baskets defined by the OECD (OECD, 2006) for dominant operators compared to the cheapest available in a country. It shows that the smaller operators can be as much as 60% cheaper compared to the dominant operator.
- The Genakos & Valletti (2009 and 2007) papers demonstrate that EBITDA margins may be affected by lower termination rates, which is to be expected since lower termination rates increase competition and lead to lower, not higher, retail prices, though traffic may increase as a result. EBITDA margins of operators that were shielded by high termination rates from competition are naturally bound to decline under competitive pressure. Lower EBITDA margins following MTR cuts do not constitute proof of a waterbed effect. Nor do lower EBITDA margins of operators from one country compared to EBITDA margins of operators from another country based on the level of MTR.
- *Omitted variables may render models invalid:* An example is the paper by Sandbach and Hooft (2009), which tries to estimate the impact of telecommunication policies on mobile penetration and usage without including prices in its models. Including prices, which are undoubtedly significant factors in explaining access and usage in economic theory, could lead to changes in significance levels and coefficients, or even signs of coefficients.

EBITA margins of operators shielded by high termination rates from competition are bound to decline under competitive pressure

The CEG (2009) study, commissioned by Ofcom based on cross country comparison, also delivers questionable results⁷. First, it intends to contribute to the "debate about the relative performance of the Calling Party Network Pays (CPNP) and Bill and Keep (B&K) charging regimes in delivering better outcomes to consumers particularly with regards to retail prices, usage and the take-up of mobile services." Yet CPNP and B&K are not mutually exclusive. France has a CPNP regime and until 2003 B&K as well. The comparison should rather have been between CPNP and RPNP. On the data side, the final data set only has 3% of data points from a country practicing B&K – the USA – out of 146 observations. This is not enough to draw any conclusion about the differences between the two billing systems.

A panel data model based on operators rather than at the country level could potentially deliver better results. Such an approach would need to incorporate all operators of a country. This would increase the data available by a factor of three or four and allow to include significant explanatory variables such as market share and year of market entry into the model. The waterbed effect is a hypothesis about the pricing strategies of operators and as such need to be tested at the operator level.

A less econometrically sophisticated but more plausible method would, however, be to look into specific cases. Did Vodafone UK increase its retail prices after any MTR reduction in the UK? And

⁷The authors are transparent about the weakness of the data used.

how did the smaller operators or the net-interconnect-payers react? CPNP vs. RPNP could have been better studied using India, which changed from RPNP to CPNP, as a case study.

The next chapter presents a case study of Namibia which analyses prices for all operators and all products after MTR reductions.. It demonstrates that rather than resulting in increase enduser rates to recover their losses, - the so called 'waterbed effect' - the lowering termination rates by the regulator increased competition in the sector and led to lower retail prices and more subscribers.

Table 7: Cheapest prepaid product in a country compared with cheapest prepaid product from dominant operators for OECD usage baskets (2006 definition) for 18 RIA countries (Source: www.researchictafrica-data.net)

| | Cheapest prepaid product in the country in USD | | | Cheapest prepaid product from dominant operators | | | Difference (% = difference / dominant price) | | | | | |
|---------------|--|-------------|-----------|--|-------------|-----------|--|------|-------------|------|-----------|-------|
| | Low User | Medium User | High User | Low User | Medium User | High User | Low User | | Medium User | | High User | |
| | | | | | | | % | USD | % | USD | % | USD |
| Botswana | 5.04 | 10.28 | 20.67 | 5.04 | 10.28 | 20.67 | 0% | 0.00 | 0% | 0.00 | 0% | 0.00 |
| Ethiopia* | 3.74 | 7.59 | 14.98 | 3.74 | 7.59 | 14.98 | 0% | 0.00 | 0% | 0.00 | 0% | 0.00 |
| Mozambique | 7.45 | 15.07 | 29.88 | 7.45 | 15.07 | 29.88 | 0% | 0.00 | 0% | 0.00 | 0% | 0.00 |
| Senegal | 6.12 | 12.31 | 24.25 | 6.12 | 12.31 | 24.25 | 0% | 0.00 | 0% | 0.00 | 0% | 0.00 |
| South Africa | 7.64 | 15.38 | 29.63 | 7.64 | 16.12 | 33.13 | 0% | 0.00 | 5% | 0.74 | 11% | 3.50 |
| Tunisia | 5.06 | 10.24 | 20.19 | 5.06 | 10.24 | 20.19 | 0% | 0.00 | 0% | 0.00 | 0% | 0.00 |
| Zambia | 6.57 | 13.28 | 25.99 | 6.60 | 13.54 | 26.37 | 0% | 0.03 | 2% | 0.26 | 1% | 0.38 |
| Cameroon | 8.59 | 16.42 | 30.45 | 9.30 | 17.91 | 33.22 | 8% | 0.71 | 8% | 1.49 | 8% | 2.77 |
| Uganda | 6.33 | 12.90 | 24.05 | 6.95 | 13.90 | 26.85 | 9% | 0.62 | 7% | 1.00 | 10% | 2.80 |
| Burkina Faso | 11.04 | 22.65 | 45.19 | 12.54 | 25.98 | 52.52 | 12% | 1.50 | 13% | 3.33 | 14% | 7.33 |
| Côte d'Ivoire | 7.00 | 14.34 | 28.88 | 8.15 | 16.34 | 31.59 | 14% | 1.15 | 12% | 2.00 | 9% | 2.71 |
| Ghana | 2.29 | 4.36 | 8.01 | 3.04 | 6.10 | 12.16 | 25% | 0.75 | 29% | 1.74 | 34% | 4.15 |
| Benin | 4.92 | 11.05 | 24.75 | 7.50 | 14.74 | 27.84 | 34% | 2.58 | 25% | 3.69 | 11% | 3.09 |
| Kenya | 3.35 | 6.37 | 11.42 | 5.93 | 11.82 | 22.78 | 44% | 2.58 | 46% | 5.45 | 50% | 11.36 |
| Namibia | 5.06 | 10.74 | 22.19 | 8.96 | 18.27 | 36.19 | 44% | 3.90 | 41% | 7.53 | 39% | 14.00 |
| Rwanda | 3.74 | 7.94 | 16.59 | 6.87 | 13.63 | 26.45 | 46% | 3.13 | 42% | 5.69 | 37% | 9.86 |
| Nigeria | 3.63 | 7.58 | 15.48 | 7.76 | 15.85 | 32.13 | 53% | 4.13 | 52% | 8.27 | 52% | 16.65 |
| Tanzania | 2.93 | 6.06 | 12.24 | 7.26 | 15.24 | 31.84 | 60% | 4.33 | 60% | 9.18 | 62% | 19.60 |

* Ethiopia only has one operator

Namibian Benchmarking Case Study

Benchmarking is an alternative regulatory strategy in resource constrained environments

This section describes how benchmarking was used to resolve a termination rate dispute in Namibia. First, the process followed in Namibia is described, followed by sections on regulatory best practice, termination rate trends and cost of termination. The Namibian termination rate case which is then discussed examines the impact on prices, subscriber numbers and profitability of the mobile incumbent operator.

Benchmarking

Benchmarking termination rates is the process of establishing interconnection rates based on cost of termination in other jurisdictions. Undertaking full forward-looking cost modelling is challenging, expensive, time-consuming, and often requires information that is not available in developing countries.⁸ The cost of termination for a country incorporates all country-specific characteristics. Benchmarks may need to be adjusted for several country-specific factors such as population density, local area size, extent of urbanisation, traffic patterns and call durations, input prices, scale economies, exchange rates and taxes. Whenever countries or operators seem similar, there are always enough factors that are different to expose the selection to criticism. In terms of population density Australia and Namibia are very similar, but in terms of average household income, labour and site cost, and traffic patterns the two countries are very different. It is therefore crucial to get the cost of termination for a wide selection of countries.

Process

Following a dispute about interconnection charges between Namibian telecommunication operators, a consultative workshop on interconnection models was hosted by the Honourable Minister of Information and Communication Technology Joel Kaapanda on 13 October 2008 in Windhoek. The outcome of the workshop was an agreement amongst operators that benchmarking was the preferred approach to determine interconnection rates prescribed by the regulator when operators fail to agree. The Namibian Communications Commission commissioned Research ICT Africa (RIA) to do the study.

The termination rate benchmarking needed to be conducted within the legal and regulatory framework of Namibia that pertained at the time. The Communications Act 8 of 2009 was not enacted at the time of the dispute and the termination rate could only be regulated through the licences of the two mobile operators, Leo and MTC. Clause 20.1c of these licences required termination rates to be cost-based:

"provide interconnection in a timely fashion on terms, conditions (including technical standards and specifications) and cost-based rates that are transparent, reasonable, having regard to economic feasibility, and sufficiently unbundled so that the interconnecting party does not pay for network components or facilities that it does not require for the service to be provided, it being understood that no unreasonable and unrecoverable costs will be imposed on the Licensee in connection with any unbundling."

The final study benchmarked adopted international best practice, termination rate trends and termination cost data available to derive an interconnection model.⁹ Various interconnection models were discussed with operators. In an iterative process operators were asked to submit their comments in writing to the Namibian Communications Commission (NCC). The final consensus solution was only reached after the completion of the study.

Regulatory Best Practice and Termination Rate Trends

Namibia used the European Union (EU) and selected African countries as benchmark for regulatory best practice and termination rate trends. Three conditions were required for the selection of countries. The billing system needed to be based on Calling Party's Network Pays (CPNP), countries needed already to have implemented, or to to have been in the process of implementation cost-based termination rates, and data needed to be available.

⁸ ICT Regulation Toolkit, <http://www.ictregulationtoolkit.org/en/index.html>

⁹ The study is available from the webpage of the Namibian regulator (NCC): <http://www.ncc.org.na/publications>

Generally mobile terminate rates are far away from the cost of termination

The EU recommendation (EU, 2009) along with the guidelines on interconnection arrangements for members of the East African Community issued by the East African Regulatory, Postal and Telecommunications Organisations (EARPTO, 2008) served as a basis for establishing the regulatory best practice. Termination rate reductions towards the cost of an efficient regulator along a glide path were established as key best practice elements for CPNP countries.

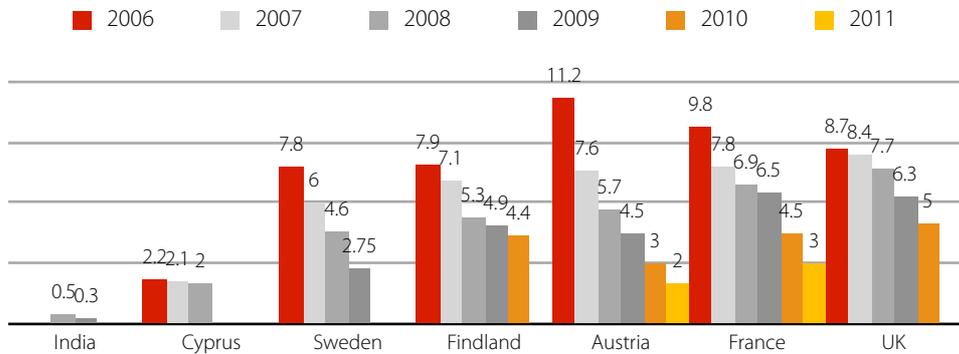


Figure 3: MTR Trends in Euro cents (Source: ERG, Ofcom, ARCEP, RTR, FICORA)

Table 1 and Figure 3 demonstrate actual and announced termination rate reductions. Generally, MTRs are still far away from cost of termination in Europe and elsewhere. The international trend for mobile termination rates is towards the cost of an efficient operator. Austria and France see this at between 1 and 2 Euro cents (N\$/ZAR 0.12 to 0.24).

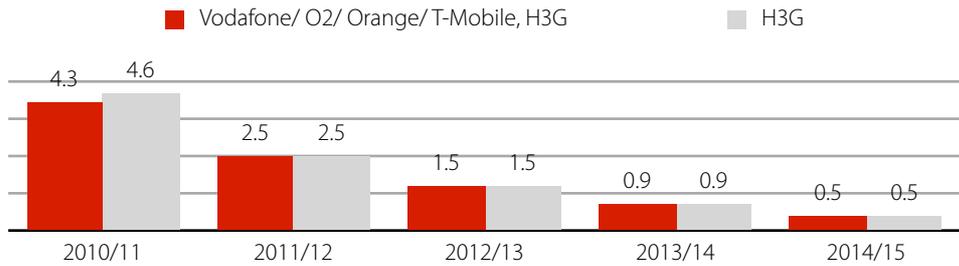


Figure 4: Ofcom's Proposed MTRs (UK pence per minute -2008/09 prices)

Figure 4 shows the proposed MTR model of Ofcom (2010) for the UK. Ofcom estimates that the cost of termination based on a pure LRIC model would drop to 5 UK pence (0.055 ZAR/N\$) by 2014 due to increases in data volume and a decline in costs of network equipment with the spread of 3G technology.

International comparisons indicated that Namibia's mobile termination rates were very high at the beginning of 2009 (Figure 5). Additionally, MTR trends point to rates in CPNP countries falling rapidly towards the cost of an efficient operator.

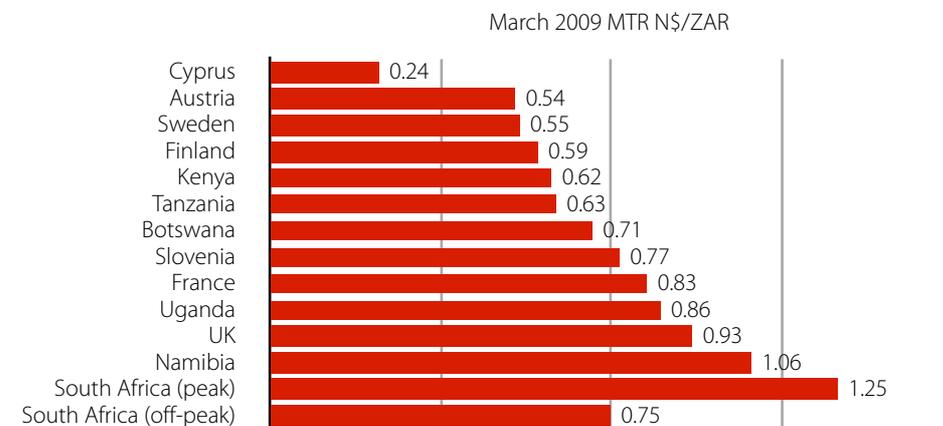


Figure 5: Mobile termination rates in N\$/ZAR compared (annual average exchange rate for 2008)

Cost of Termination

The previous section demonstrated how heterogeneous mobile termination rates are across Europe and Africa. The trend is towards termination rates that are equal to the cost of an efficient operator, but most European countries will only get there in 2011 or later. Another aspect is taking into account country-specific cost factors. Looking at termination rates in Europe tells us very little about the link between population density and termination rates, for example, let alone cost of termination.

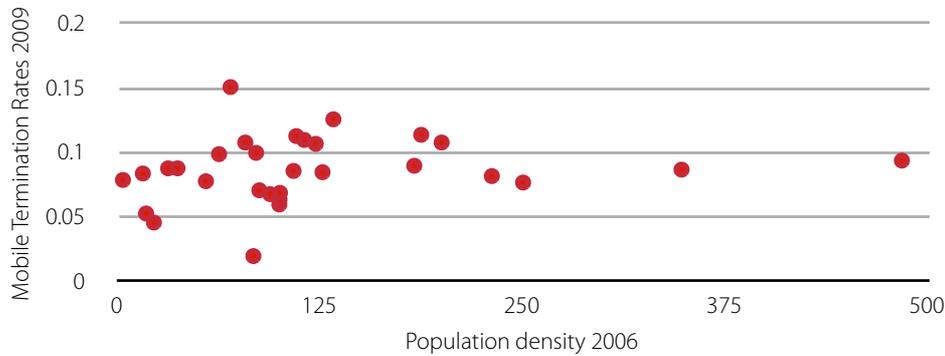


Figure 6: Population density plotted against mobile termination rates (source ERG)

Figure 6 shows that there is no correlation between population density and MTRs in Europe. Countries like Sweden and Finland, which have among the lowest population densities, are also among the five countries with the lowest MTR. Population density is not correlated to MTRs and might not even be correlated to the cost of termination. Some costs are lower in rural areas, e.g. wages, larger cell sizes and less costly traffic management. Costs may be higher in many African countries than in Europe because of equipment prices, which are often subject to import duties/taxes, but other costs may be lower, such as labour and site costs.

Constructing cost-based termination rates therefore requires costs to be benchmarked. Cost data is very difficult to come by and most regulators and operators consider it highly confidential. Cost data from Austria, Sweden, Tanzania, Australia and France were made available by regulatory authorities to the Namibian Communications Commission for its 2009 benchmarking study (NCC 2009). These needed to be brought into the Namibian context.

MTC, Namibia’s incumbent mobile operator, chose not to provide any cost data to the NCC, while Telecom Namibia and Leo provided the requested information. A rough estimate based on traffic information provided by MTC and its annual report was used as a common sense check as to whether the cost benchmarks from other countries would be applicable to Namibia. Table 6 presents these estimates. For Leo and MTC the direct costs and depreciation, as indicated in the 2008 financial statement, were divided by the total call volume. An estimate of the cost termination is 50% of that figure, since every call consist of termination and origination.

There is no correlation between population density and mobile termination rates in Europe

Table 8: Estimates of the cost of termination in Namibia based on annual reports and cost and traffic data submitted by operators to the NCC

| | Telecom Namibia | Leo | MTC |
|---|-----------------|--------|---------|
| Direct cost in N\$ '000 as per information provided to NCC | 155,456 | | |
| Direct cost and depreciation in N\$ '000 as per annual report | | 77,962 | 371,219 |
| Total minutes | 537,141 | 31,914 | 775,819 |
| Direct cost and depreciation per minute in N\$ | 0.29 | 2.44 | 0.48 |
| Estimated termination cost (50% of direct cost and depreciation per minute) | 0.14 | 1.22 | 0.24 |

MTC is, following the definitions used in the EU, the most efficient mobile operator in Namibia. Leo’s cost of termination was very high due to low traffic on its network. Its termination cost would not have been a suitable ceiling for the cost of an efficient operator.

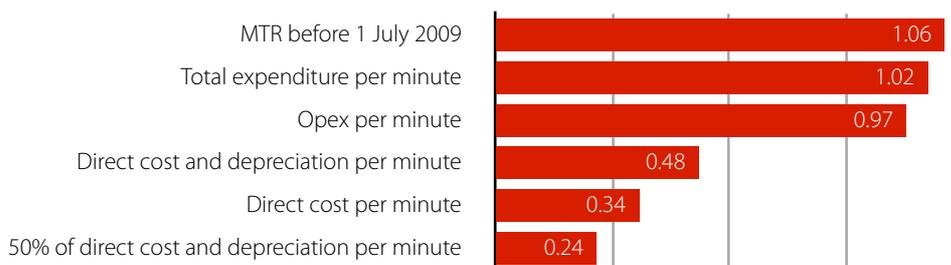


Figure 7: MTC's cost per minute (Source: MTC annual report 2008 and information submitted to NCC)

How far away termination rates were from cost of termination at the beginning of 2009 can be seen from Figure 7. MTC's total expenditure for the financial year ending September 2008 divided by call volume was less than the MTR at the time.

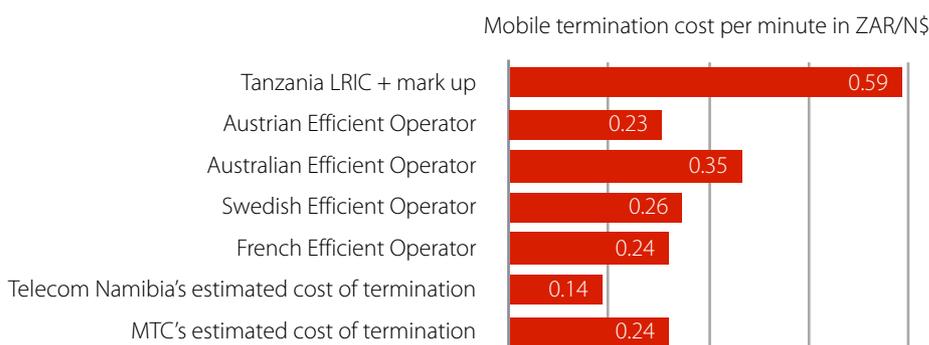


Figure 8: Cost of termination in N\$/ZAR

The average cost of termination was estimated to be in the region of N\$/ZAR 0.23-0.35 (figure 8). Australia has nearly identical population density to Namibia and used a model with 96% population coverage but only 44% market share. MTC had 87% market share and 95% population coverage. The figures for Australia should therefore be comparable with Namibia. Higher labour and site costs in Australia should be offset by more minutes used per user compared to Namibia.

Namibia's Benchmarking Model

The principles for the Namibian benchmark model, in line with international best practice and international trends, were:

- termination rates should be close to the cost of an efficient operator;
- cost of termination is determined based on benchmarking the cost of termination in jurisdictions that implemented accounting separation or other means to establish the cost of termination;
- termination rates should be technologically and service neutral in line with Namibia's ICT policies and the anticipated telecommunications bill;
- termination rates should facilitate emergence of IP-based next generation networks (NGNs); and
- recommendations should be implemented in terms of the current licence conditions and acts.

The recommendation that emerged from these principles and the cost estimates was that the new termination target rate should be N\$0.30. This was based on the cost of termination of the most efficient operator (MTC) plus 25% mark-up. The four models that were discussed with all operators were:

- Model 1: Immediate drop to N\$0.30 starting 1 July 2009
- Model 2: Symmetric glide path to N\$0.30 that started 1 July 2006
- Model 3: Symmetric glide path to N\$0.30 starting 1 July 2009
- Model 4: Asymmetric glide path to N\$0.30 starting 1 July 2009

Models 1 and 2 were compromise models from the side of Leo and Telecom Namibia. For Leo these models needed to be complemented by other regulatory interventions. MTC and Leo were both uncomfortable with setting the termination rate at the cost of an efficient operator, and both mentioned that they might prefer a LRIC study in the longer run. Telecom Namibia wished to have higher termination rates for outgoing international calls due to costs of the international gateway. Table 9 summarises the responses of operators.

Table 9: Summary of operator comments

| | Leo | Telecom Namibia | MTC |
|--|--|--|--|
| Model 1: Immediate drop to N\$0.30 starting 1 July 2009 | 2nd choice: if accompanied by other regulatory interventions | 2nd choice: Removing distortionary factors immediately, but request higher transit charge for outgoing international calls | No comment |
| Model 2: Symmetric glide path to N\$0.30 that started 1 July 2006 | 2nd choice: if accompanied by other regulatory interventions | 1st choice: Compensates for market distortions of past years | No comment |
| Model 3: Symmetric glide path to N\$0.30 starting 1 July 2009 | Rejected: sees no reason to wait to remove market distorting factors | Rejected: only gradually removes market distortions and disadvantages TN and consumers unjustifiably for two years longer | No comment |
| Model 4: Asymmetric glide path to N\$0.30 starting 1 July 2009 | 1st choice: because of current traffic imbalance | Rejected: only gradually removes market distortions and disadvantages TN and consumers unjustifiably for two years longer | No comment |
| MTC model: reduction to N \$0.60 until 2011 | Rejected: sees no reason to wait to remove market distorting factors | Rejected: only gradually removes market distortions and disadvantages TN and consumers unjustifiably for two years longer | Drop in EBITDA margin to 37% because of having to compete on a level playing field |

In the end operators agreed to a compromise model (Table 10) with advantages for all operators:

- Immediate drop of termination rates to N\$0.60 to catch up with the region and international developments;
- Immediate converged termination rates;
- Glide path to the estimated cost of an efficient operator; and
- Immediate fixed-mobile convergence of termination rates.

Table 10: Compromise Model

| | Current | 1 July 2009 | 1 January 2010 | 1 July 2010 | 1 January 2011 |
|--|--------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| MTR | 1.06 | 0.60 | 0.50 | 0.40 | 0.30 |
| FTR | 0.63 | 0.60 | 0.50 | 0.40 | 0.30 |
| Originating internationally, terminating locally via Telecom Namibia | 0.59 | 0.60 | 0.50 | 0.40 | 0.30 |
| Originating in Namibia and terminating internationally | Government Gazette | 0.60 + international settlement rate | 0.50 + international settlement rate | 0.40 + international settlement rate | 0.30 + international settlement rate |

This meant that MTC and Leo had time to conduct LRIC studies and contest the results of the cost estimate of this study if they wished to do so. Telecom Namibia benefited from similar fixed termination rates as the current ones for six months while mobile termination rates were lowered. The compromise model also provided room for the NCC to monitor market development and assess further regulatory interventions to safeguard fair competition. At the same time as the interconnection dispute was resolved the international voice monopoly of Telecom Namibia was ended by issuing international voice licences to Leo and MTC.

Consequences of Termination Rate Reduction

During the termination rate debate in 2009 MTC argued that its EBITDA (earning before interest, tax, depreciation and amortisation) margin would drop to 36% if termination rates were reduced to the cost of an efficient operator. The termination rates have since dropped to N\$ 0.5 from N\$ 1.06 while MTC's EBITDA margin rose from 50.9% in 2008 to 53.8% in 2009. The financial year ending September 2009 only covers 3 month after the first termination rate drop. The 2010 financial report will reveal more. One thing is clear however; MTC will invest more not less as threatened since the lower termination rates will lead to fairer competition and hence the need to stay ahead of the field. MTC announced in its 2009 financial report investments into 4G technology (LTE =Long Term Evolution) investments of N\$180 million and N\$ 115 million into the West African Cable System.

Table 11: MTC key performance indicators

| | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---------|---------|---------|-----------|-----------|
| Subscribers | 403,743 | 555,501 | 743,509 | 1,008,658 | 1,283,530 |
| EBITDA Margin | 61% | 60.2% | 52.2% | 50.9% | 53.8% |
| After-tax profit million N\$ | 292.9 | 337.2 | 339.6 | 356.2 | 387.5 |
| Dividend paid in million N\$ | 110 | 80 | 245 | 221 | 370 |
| Dividend payment as share of after tax profit | 37.6% | 23.7% | 72.1% | 62.0% | 95.5% |

Also remarkable is that MTC's subscriber numbers increased further to nearly 1.3 million subscribers. Leo and Telecom Namibia also managed to attract new customers, indicating that the lower prices led to an expansion of the market.

Prices of MTC have equally not increased as predicted but have instead decreased or remained the same. Figure 8 shows the cost of OECD usage bundles for the cheapest postpaid or prepaid product of MTC. The prices for Tango Prepaid per second prices were slashed by more than half in December 2009, and a new, substantially cheaper postpaid product was introduced in early 2010, effectively reducing MTC prices again. Telecom Namibia and LEO also offered new products and cheaper prices.

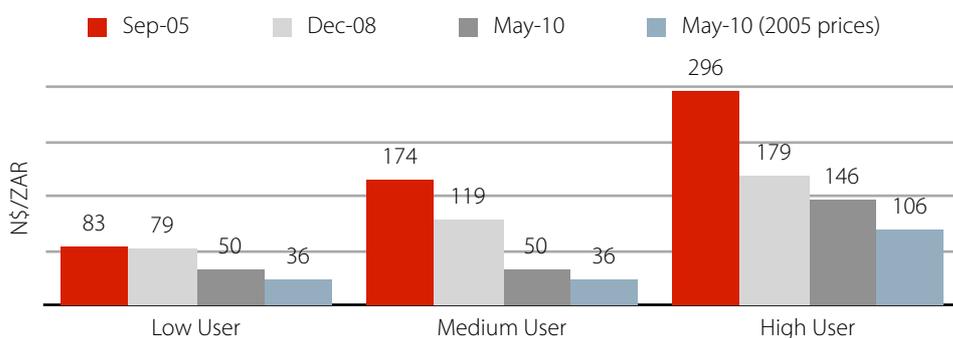
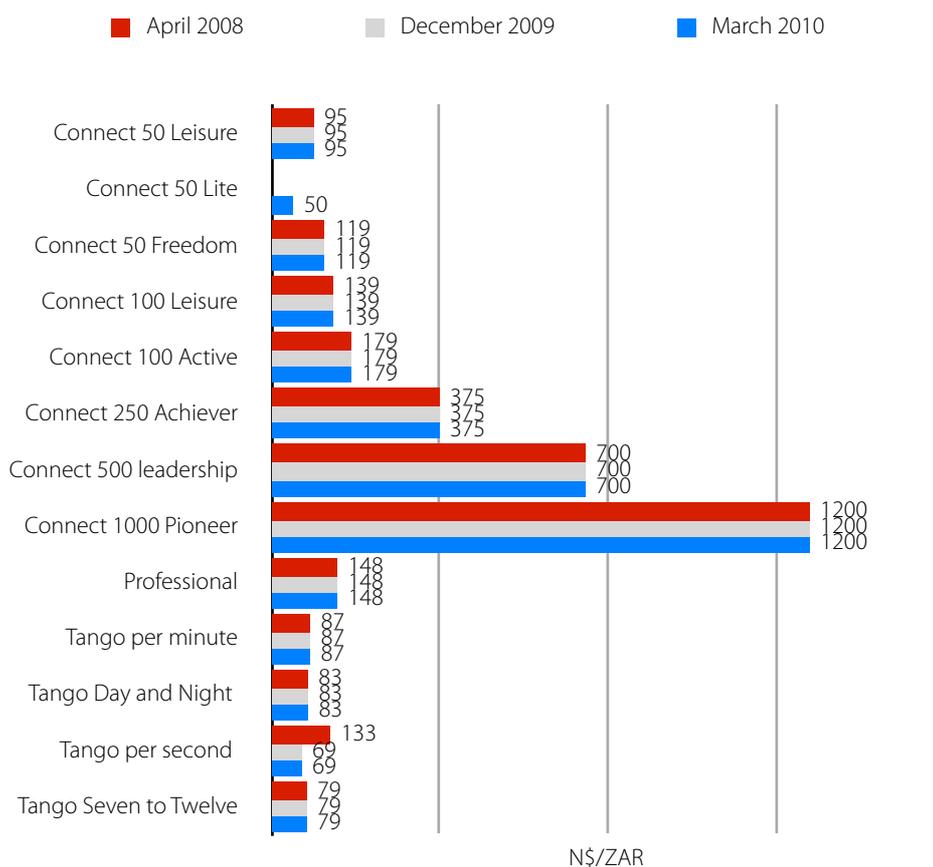


Figure 9: MTC cheapest product (prepaid and post paid for OECD usage baskets (2006) definition) in N\$/ZAR

Figure 10 shows the cost of the OECD low user basket prior to and after two termination rate reductions for MTC. None of MTC's product increased in price. The OECD basket methodology does not capture recent specials and promotions run by MTC such as 100 free SMS and doubling up of prepaid airtime, which reduce the cost of usage as well.



The dominant operator MTC's user numbers increased further following the termination rate cut

Figure 10: Cost of OECD low user basket in N\$/ZAR for MTC

Telecom Namibia not only reduced its off-net rates following the termination rate reductions but also on-net prices leading to prepaid prices for the cost of the low user bundle in March 2010 being only a third of the April 2008 figure.

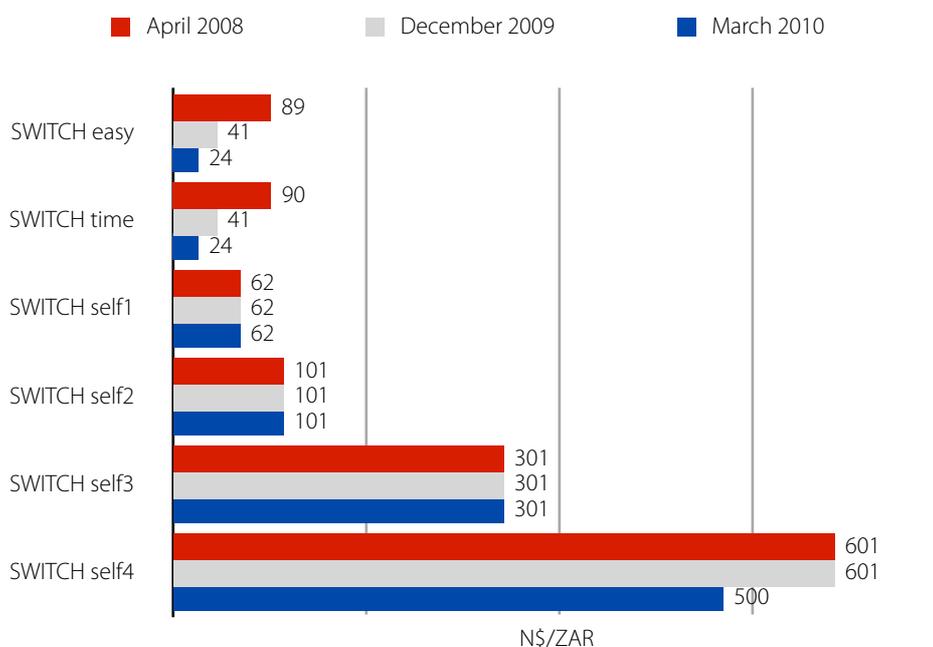


Figure 11: Cost of OECD low user basket in N\$/ZAR for Telecom Namibia

Leo restructured its product offerings and added nine new postpaid products. The new postpaid products are different in nature and cannot be compared to the basket price of the postpaid

products prior to the termination rate cuts. Figures 12 and 13 thus display postpaid and prepaid calling rates directly. None of the tariffs increased. This shows that there is clearly no waterbed effect in Namibia.



Figure 12: Leo's Postpaid rates compared

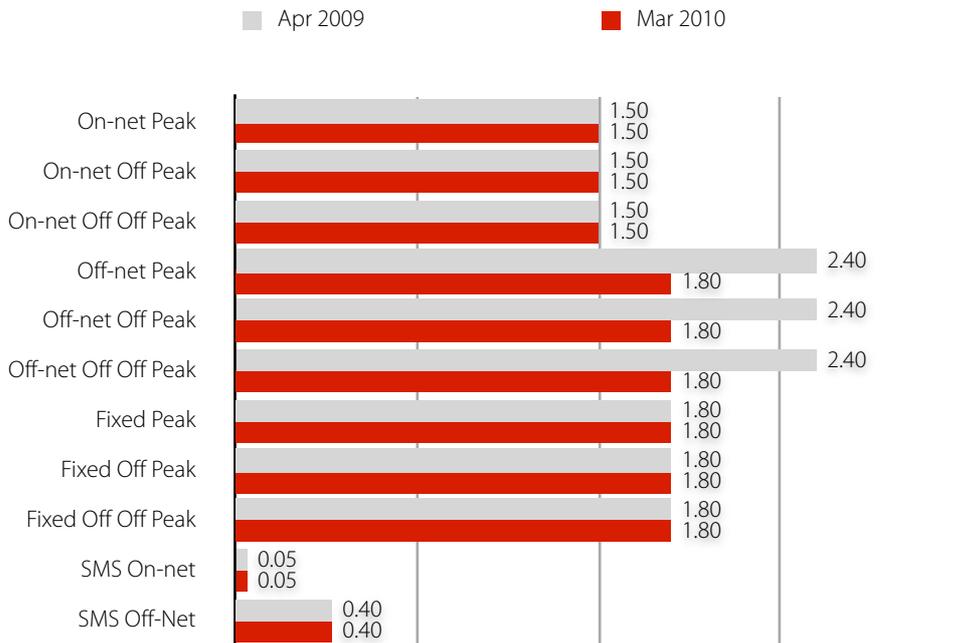


Figure 13: Leo's Prepaid rates compared

Conclusion

This policy paper has provided evidence that the mobile termination market must be regulated as a result of its inherent monopolistic characteristics and that incumbent mobile operators' arguments in support of the status quo are self-serving. Termination rates should be prescribed on the basis of the costs of an efficient operator. This cap needs to be re-evaluated regularly since new technologies reduce costs and increasing demand for voice and data increases the economies of scale and hence also lower costs.

The case of Namibia demonstrates how benchmarking can be used to increase fairness in competition among operators, and that regulatory interventions can lead to cheaper prices, more subscribers and more investment. A waterbed effect could not be observed following any of the termination rate reductions since 1 July 2009. It also showed how a bottleneck can be overcome relatively quickly and inexpensively by using alternative regulatory strategies such as benchmarking, and by placing the burden of contestation onto operators that have the relevant data, skills and resources to contest the benchmarks if they feel they are unjustified.

Further regulatory interventions may be required to allow operators to compete fairly. Off-net rates are typically higher than on-net rates. That does not need to be the case any longer once the termination rate is set to the cost of an efficient operator. A regulatory intervention requiring symmetric off-net/on-net tariffs would remove a potential bias from network size in a country.

The case study of Namibia further demonstrates that there is no 'waterbed effect'. This is demonstrated by examining the impact of this regulatory intervention on retail prices using the OECD pricing basket methodology across all services and products. It highlights the importance of policy makers and regulators assessing the likely consequences of regulatory interventions for their own country, than knowing how their country compares to other countries. In this respect case studies are more likely to be useful than cross-country studies or panel data studies for this purpose.

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