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The effects of lower mobile termination rates in South Africa

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ABSTRACT

The effects of a 90% reduction in mobile termination rates (MTRs) are evaluated over the period between 2009 and 2017 in South Africa. Prepaid prices and quality-adjusted postpaid prices declined by over 40%. However, only approximately 30% of the decline in prepaid prices and 60% of the reduction in quality-adjusted postpaid prices can be explained by lower MTR costs. On-net and off-net prepaid prices converged as MTR costs dropped. Regulators concerned about high retail prices and differences between on-net and off-net prices should reduce MTRs.

1. Introduction

The Independent Communications Authority of South Africa (ICASA) reduced mobile termination rates ('MTRs'), the price that mobile network operators ('MNOs') charge each other for calls between networks, by 90% between 2009 and 2017. However, [Armstrong \(1998\)](#), [Laffont, Rey, and Tirole \(1998b\)](#) and [Gans and King \(2001\)](#) show that lower MTRs can lead to higher retail prices. This is because subscribers want to join the larger network where on-net discounts are offered. High MTRs thus create 'tariff-mediated network effects', which intensifies competition for subscribers and results in lower retail prices. This result can also be explained in the context of 'two-sided markets', where profits from one side of the market (inbound calls) are used to subsidise the other (retail prices) ([Genakos & Valletti, 2012](#)). [Genakos and Valletti \(2011\)](#) find evidence that lower MTRs result in higher retail prices, in one of a series of studies on the effects of MTR reductions on prices in OECD countries.

At the same time, MNOs may use high MTRs together with on-net discounts to exclude new entrants ([Calzada & Valletti, 2008](#); [Laffont et al., 1998b](#); [López & Rey, 2016](#)) or to exploit their monopoly over fixed to mobile calls, and use these profits to expand the total number of mobile subscribers ([Armstrong & Wright, 2009](#)). In South Africa, two years prior to the entry of a third mobile operator (Cell C) in 2001, mobile incumbents Vodacom and MTN raised MTRs for mobile to mobile calls by more than 500%, which means that an exclusionary rationale for high MTRs is at least possible. Over the period analysed here (2009–2017), there was a limited-coverage fixed-line network, close to full mobile coverage and prepaid connection charges were close to free. This means that the 'market-expanding' effect of high MTRs is not likely. These market characteristics are quite different to the groups of developed countries studied previously, which typically have extensive fixed line networks more likely to result in low retail mobile prices, subsidised by high MTRs.

The effects of MTR reductions in South Africa are tested here using a unique dataset on prices collected from Research ICT Africa, Tarifica and from archive.org's 'Wayback Machine'. Hedonic regressions are used to develop an index of quality-adjusted postpaid prices, rather than the more limited 'basket of use' approach used in previous studies. Price indices for telecommunications services

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developed by Statistics South Africa, the central statistics office, suggest that prices have been flat in nominal terms (declining in real terms, after taking into account the effects of inflation). However, the price dataset developed here shows that prepaid and quality-adjusted postpaid prices declined by more than 40% in nominal terms. Only approximately 30% of the decline in prepaid prices and 60% of the decline in quality-adjusted postpaid prices can be explained by lower MTR costs. There is some evidence that suggests that the remainder of the price reductions is explained by increased competition. It turns out that on on-net and off-net prices converged as MTRs declined, reducing the risks to competition from ‘tariff-mediated network effects’.

The results suggest that regulators should continue pursuing further reductions in MTRs, particularly where they are concerned about the possibly exclusionary effects of on-net discounts. Furthermore, regulators and statistics agencies should ensure that quality-adjusted prices are used instead of average package prices, which bias postpaid prices upwards.

The rest of the paper is structured as follows. First, a brief review of the literature is provided, followed by an overview of the telecommunications industry in South Africa. Next, the methodology is discussed, followed by a description of the data and a discussion on the results. A final section provides conclusions and policy implications.

2. Literature review

MNOs may set different MTRs for fixed to mobile (‘FTM’) and mobile to mobile (‘MTM’) calls. [Armstrong and Wright \(2009\)](#) show that MNOs able to discriminate between FTM and MTM MTRs will set the FTM MTR at close to monopoly levels, while the MTM MTR would be set at or below cost. The latter result is driven by the fact that high MTM MTRs together with on-net discounts mean that consumers prefer to join the larger network, which generates network effects. These ‘tariff-mediated network effects’ intensify competition among MNOs for subscribers ([Gans & King, 2001](#); [Laffont et al., 1998b](#)). As a result of more intense competition, profits from high MTRs are passed back to consumers via low on-net charges and lower monthly subscription charges. Thus, MNOs prefer an MTM MTR that is low, in order to ‘soften competition’. More recent research has shown that these results rely on expectations being ‘responsive’, such that where an operator reduces prices, consumers expect an increase in the operator’s market share ([Hurkens & López, 2014](#)). Where expectations are ‘passive’, the network effect is subdued, and in a duopoly retail prices even rise with higher MTRs. Where competition is in linear (prepaid) prices, on-net prices are unrelated to MTRs since network effects are limited, while off-net prices rise with MTRs. Nonetheless, the ‘waterbed effect’ (prices rise when MTRs fall) is expected when there are three or more networks.

MNOs set monopoly MTRs for FTM calls since they do not compete with fixed line operators, and so ‘tariff-mediated network externalities’ are not generated ([Armstrong & Wright, 2009](#)).² At the same time, profits from terminating FTM calls are passed back to consumers through competition at the retail level. Where there are ‘market-expanding’ effects, pass-through is less than 100% and MNOs therefore strictly prefer a high FTM MTR. However, in South Africa over the period analysed (2009–2017), both MTN and Vodacom’s networks were close to full-coverage, and network connection charges were close to zero (the price of a prepaid SIM card over the entire period was close to zero). Also, mobile penetration increased as MTRs fell over this period (see [Fig. 2](#)). Thus, the ‘market expanding’ rationale does not explain the persistent use of high MTRs.

That MNOs in South Africa, where there was a limited-coverage fixed-line network, raised MTM MTRs by more than 500% between 1999 and 2001 (from R0.20 per minute to the FTM MTR of R1.09 per minute), is something of a puzzle given the ‘tariff-mediated network externalities’ that arise. The former CEO of Vodacom claimed that they needed to equalise the MTM and FTM MTR in order to comply with new non-discrimination requirements published by the regulator in 1999 ([Knott-Craig, 2009](#)). However, they could have chosen the lower MTM rate (R0.20) in order to comply with this obligation, if it was in their interests to soften competition for mobile subscribers (already at the time anticipated to be far greater in number than fixed line subscribers). That they did not do so means that we need to consider alternative economic reasons that might explain high MTRs.

The first and most plausible explanation is that MTN and Vodacom raised the MTR in 1999 because of the imminent entry of Cell C, a third MNO, in 2001 ([Aproskie, Hodge, Lipschitz, & Sheik, 2008](#)). Incumbents facing new entry are able to use ‘tariff-mediated network externalities’ to block entry, since consumers prefer the larger network where on-net discounts are present ([Calzada & Valletti, 2008](#); [Laffont et al., 1998b](#); [López & Rey, 2016](#))).

Nonetheless, there are other possible explanations for MTN and Vodacom choosing high MTRs. For example, where operators are unable to discriminate between on-net and off-net prices and compete in linear (prepaid) prices, profits increase by raising MTRs since each operator avoids discounting retail prices, which would generate high termination costs ([Laffont, Rey, & Tirole, 1998a](#)). While this outcome is also a possibility where on-net discounts are permitted (as is the case in South Africa), this is only where substitutability between networks is close to zero ([Laffont et al., 1998b](#)). MNOs in South Africa are highly substitutable since prepaid churn is in excess of 50% ([Vodacom, 2009–2017](#)), and therefore using high MTRs as a collusive device for linear prices seems unlikely.

There are other theories explaining high MTRs based on operators discriminating between heterogeneous customers ([Dessein, 2003, 2004](#); [Hahn, 2004](#); [Hoernig, Inderst, & Valletti, 2014](#); [Jullien, Rey, & Sand-Zantman, 2013](#)). For example, if light users receive calls but do not make them, then operators compete vigorously for light users when MTRs are high but pass-through of revenues from high MTRs to retail prices is not 100%, and operators favour a high MTR ([Jullien et al., 2013](#)). If light users are price-sensitive, then the low prices that result have a market-expanding effect too. However, these models apply to specific market settings, including that operators are highly differentiated or that customers select their network based on the MNO chosen by friends and family. Operators

² The subscriber’s MNO has a monopoly over inbound calls because calls to the subscriber must be terminated via the subscriber’s MNO.

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