

Competition and regulatory issues in emerging mobile payments markets: a case study of Zimbabwe

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Abstract

Mobile money, and mobile payments in particular, has revolutionised the payments system for consumers in a number of African countries, providing a cheap, safe and convenient means of remitting money and broadening access to financial services. The introduction of mobile money in theory could be beneficial for competition as it provides the consumer with a cheaper alternative to banks and other financial institutions with a much wider branch network. All these benefits serve the public in terms of accessibility, price and choice. However, a number of telecoms companies have established positions of significant market power in the mobile payments market, in addition to existing incumbent positions in the market for traditional MNO services. This raises a concern that incumbent firms will engage in strategies to reinforce their dominance in both markets. This has been borne out in a number of competition complaints lodged against incumbent mobile money providers in different countries.

This paper focusses on the Zimbabwean mobile money market where the Competition and Tariff Commission (CTC) is currently investigating the largest mobile network operator (MNO) Econet for possible abuse of dominance. Econet originally refused to allow banks access to its Unstructured Supplementary Service Data (USSD) platform for channelling their mobile banking service before eventually granting access on terms which the banks claim are discriminatory. The paper takes a broad look at the competition and regulatory environment related to mobile money in Zimbabwe. It explores the nature of the mobile payments market in Zimbabwe and theory and literature around network effects and possible competition problems which can arise in this type of market. It also deals with the issue of interoperability and the conditions where it is likely to develop versus situations where regulatory intervention is likely to be required. It then relates all of this to the Zimbabwean context in order to present some possible ways forward for regulators.

1. Introduction

Mobile money has attracted global attention because of its ability to bring people from the cash-based, 'unbanked' economy, into modern systems of 'book-entry money'. This process is commonly referred to in the industry as 'banking the unbanked' (Klein and Mayer, 2011). It involves the use of mobile phone technology to make financial transactions. Generally, this allows users to engage in transactions ranging from buying and transferring airtime, to transferring funds and making payments from their mobile devices (ITU, 2011). A 'traditional' form of this is where banks have mobile phone applications which allow their customers to interact with their bank accounts on their phones.

As a subset of mobile banking, and of particular interest to this paper, is the ability to transfer money in person-to-person (P2P) transactions i.e. from the bank account or mobile operator 'wallet' of one person, to the mobile number or mobile operator wallet of another.¹ These services allow a customer to use their mobile device to send and receive monetary value, i.e. transfer of money using their phone which in some cases includes international, cross-border and/or domestic remittance transfers.² Importantly, these services can be provided even where the sender and/or recipient does not have a bank account, which in Zimbabwe has led to a rapid adoption by users since NetOne and Telecel both launched their mobile money transfer (MMT) services in January 2011. This has included those customers in rural areas where access to banking services has been limited and remittance transfers from large cities and abroad are an important source of income (Dermish et al, 2012). This is especially relevant because of the withdrawal of the majority of Zimbabweans from using formal banking services during the prolonged period of economic distress over the past decade, leading to a largely cash-based economy and the use of direct, informal cash transfer mechanisms such as through mini-bus taxi services and travelling relatives or friends (Dermish et al, 2012).

These aspects of mobile money have important implications in terms of competition and economic development. The ability to draw in subscribers that are unbanked and marginalised by formal financial services through simple, affordable, convenient and safe platforms contributes to greater financial inclusion (Klein and Mayer, 2011), and facilitates transactions between individuals (e.g. remittances) as well as between enterprises.³ However, the gains in welfare can easily be undermined where markets are concentrated and dominant incumbents are able to unfairly abuse their strength in adjacent markets such as mobile money services to bolster their market power in primary markets (mobile telecommunication services). This is especially the case where rival operators face high barriers to entry related to network effects in particular which makes it difficult for as-efficient rivals to effectively compete for customers. In the case of the Zimbabwean market where Econet is the dominant player in traditional services and MMTs, customers have a strong incentive to use the mobile money services of the largest network (primarily due to lower

¹ Mobile wallets are broadly defined as digital or virtual applications that allow mobile users to store money and credit on their phones. See Andes, 2012.

² Throughout this paper, we refer to mobile payments, P2P, or mobile money transfer services (MMT) interchangeably.

³ The latter takes place through person-to-business (P2B) payments, business-to-business (B2B) payments, or government-to-person (G2P) payments made via mobile phone, although these are not the focus of the paper.

costs and convenience) which requires them to also subscribe to Econet's traditional mobile services offering as well through purchasing a sim card. This relationship between the two markets makes it especially difficult for rivals to encourage customers to switch which has important implications for competition between operators in the Zimbabwean market, as discussed in sections to follow.

The paper takes a broad look at the competition and regulatory environment related to mobile money in Zimbabwe. It explores the nature of the mobile payments market in Zimbabwe and theory and literature around network effects and possible competition problems which can arise in this type of market, including through international comparisons with the Zimbabwean market. It also deals with the issue of interoperability and the conditions where it is likely to develop versus situations where regulatory intervention is likely to be required. It then relates all of this to the Zimbabwean context in order to present some possible ways forward for regulators.

The paper is structured as follows: Section 1 provides a background to the market for mobile money transfer (MMT) services in Zimbabwe and its development in recent years; Section 2 reviews the literature on competition and regulatory issues in network industries and mobile money markets in particular; and Section 3 assess competition and regulatory issues specific to the Zimbabwean market and draws comparisons with developments in other countries in south and east Africa. Section 4 concludes and provides some recommendations for policymaking and enforcement through agencies such as competition authorities and sector regulators.

2. Description of the Zimbabwean mobile money market

This section provides a background to the MMT industry in Zimbabwe, how it works, and how the service is provided to customers. We also consider the growth of the sector in recent years and the regulatory environment in so far as it affects the interactions between providers with participants in the payments system such as banks.

Background to mobile money transfers in Zimbabwe

The provision of mobile banking (relying on MNO infrastructure) by banks, and the provision of MMTs by MNOs, relies on the use of the Unstructured Supplementary Service Data (USSD) codes held by MNOs which are issued and licensed by POTRAZ. This refers to a short code, such as '*200#', which is a telecommunications technology used in most GSM phones where the user can interact with a service on a real-time basis through a menu-based interface. Access to this interface is through this USSD code which, when dialled, presents the customer with a menu of options to choose from. When the customer selects a menu item, this initiates a USSD session which allows an interaction involving the servers from all the providers involved in the transaction to take place. A customer wishing to transfer money to another person will access their own network provider's USSD platform and select the option to conduct a P2P transaction from a menu. We include the process outlined for Econet customers below as an example:

Figure 1: Method for sending money over the Ecocash platform

<p>6 Send Money: How do I send money (transfer cash) using my EcoCash account?</p> <ol style="list-style-type: none"> 1. Dial *151*200# and enter your pin to access their EcoCash menu 2. Go to Option 4-Send Money 3. Select either Option 1-Registered Customer or Option 2-Unregistered Customer 4. Enter receiving mobile number using the following format (071:xxxxxxx, 077:xxxxxxx, 073:xxxxxxx) 5. Enter the amount that they wish to transfer (<i>e.g.</i> 2 for \$2 or 2.10 for \$2.10) 6. You will receive a notification on your screen advising you of how much you have said they wish to send and the mobile number you wish to send to. From there you can either Select Option 1-Approve or Option 2-Cancel the transaction. 7. On approval of the transaction, a confirmation messages will be sent to both lines with the following details: <ul style="list-style-type: none"> • Sender: Amount transferred, recipient's name (if the recipients number is registered for EcoCash) or mobile number (unregistered), approval code and their new wallet balance. • Recipient: Amount transferred sender's name and the transaction approval code. 8. Keep these confirmation messages as reference and only dispose of them when you are certain that you no longer need them and the recipient has managed to collect the money.
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Source: <https://www.econet.co.zw/ecocash/how-to-transact>

Customers are generally required to register at an outlet of the chosen network provider in order to have access to a mobile wallet and the MMT service, by simply producing proof of identity, filling in an application form, and being in possession of an active sim card for that network. Across all MNOs in Zimbabwe recipients of funds are then required to go to an agent of the sender's network operator to collect any transferred funds, unless the recipient is a registered wallet customer on the same network, in which case they have the option of retaining the funds received in their mobile wallet. For example, for an Ecocash customer who is a recipient of funds transferred from another Ecocash customer, they can go to an Ecocash agent to collect the funds in cash ("cash-out") or they can retain the funds in their Ecocash wallet. Recipients on a different network to the sender, need to present confirmation of the funds transferred to them (the message received contains a unique reference number) to an agent of the sender's network who will then cash-out to the recipient. Agents are therefore a critical part of the value chain for the provision of mobile money transfer services. These agents effectively act as the equivalent of bank branches for sending and receiving money transfers. Most MNOs will operate agent networks that include the owners, operators or employees of small retailers, or postal outlets (USAID, 2010). Some of these agents will be contracted as exclusive or non-exclusive agents of an MNO, whereas others, such as postal service branches and large grocery retailers in most cases, can be contracted by several MNOs. Currently, Econet has by far the largest network of agents in Zimbabwe based on data from Ports and Telecommunications Regulatory Authority of Zimbabwe (POTRAZ) (see Table 1).

Table 1: Agents by mobile network operator

	2012	2013	2014
Telecel	-	-	2,913
NetOne	32	61	451
Econet	2,301	9,108	11,186
Total	2,333	9,169	14,550

Source: POTRAZ

The growth of Econet's Ecocash facility into the leading mobile banking platform in Zimbabwe, well ahead of its rivals, has been fuelled by the ability to attract customers who were previously unbanked. Although a significant proportion of Zimbabwe's population of

13.7 million people do not use bank accounts, many of these people have access to a mobile phone and are subscribers of one of the three MNOs. The total number of mobile network subscribers in Zimbabwe for 2014 fell just below 14 million according to POTRAZ which includes multi-simming by customers.⁴ On the other hand, only 14% of the Zimbabwean population (less than two million people) have a bank account by some estimates (FBC, 2013). In addition, Econet’s growth in this area is at least partly due to their established position and brand presence in traditional mobile services.

Based on data from POTRAZ, the largest share of the market amongst the three players in mobile services (by number of subscribers) (Table 2) and in MMT service provision is held by Econet with shares consistently above 90% in the latter (Table 3).⁵

Table 2: Market shares by number of mobile money subscribers, 2012-2014

	2012	2013	2014
Telecel			8.3%
NetOne	0.1%	0.5%	1.5%
Econet	99.9%	99.5%	90.2%

Source: POTRAZ

Table 3: MNO market shares by number of subscribers, 2010-2014

	2010	2011	2012	2013	2014
Telecel	18%	17%	20%	19%	18%
NetOne	17%	18%	16%	17%	17%
Econet	65%	65%	64%	64%	65%

Source: POTRAZ

As these services grow in popularity in Zimbabwe, banks are also looking to broaden their offering to allow their clients to be able to not only use traditional banking services including mobile banking, but to enable them to execute MMTs to unbanked people directly from their bank accounts as well. This presents a dynamic growth area in the sector as banks may also perceive a competitive threat from MNOs providing MMT services, particularly because some proportion of their traditional customers are also making use of MMT services due to its convenience and lower price, for instance. We discuss the interactions between banks and MNOs below.

The provision of mobile money transfer services in Zimbabwe

In terms of the supply of MMT services, MNOs have back-office links to the payments system through host banks. In Zimbabwe, it is a requirement of the Reserve Bank of Zimbabwe (RBZ) that MMT service providers have to partner with a bank which ‘hosts’ them, at least partly because in the current legislation the RBZ is not empowered by the National Payments System Act (No. 21 of 2001) to supervise MNOs.

⁴ Where customers will use sim cards from more than one different MNO.

⁵ POTRAZ cautioned that the estimates are based on the submissions of the operators themselves and POTRAZ currently does not have a mechanism for validating these estimates. See, for example, information from Econet’s own website stating that the firm holds over 65.3% of the mobile telecommunications market; available: <http://ewzinvestor.co.zw/> [Site accessed March 2015].

Following the introduction of NetOne's OneWallet (with FBC Bank) and Telecel's Skwama product (with Kingdom Bank) in January 2011, Econet introduced Ecocash in September 2011. The early growth of OneWallet and Skwama was much slower relative to that of Ecocash, and Telecel subsequently withdrew their product, which required users to also be clients of the host bank, on the grounds that partnering with a single bank was limiting the potential market size for the product as many of their subscribers were also clients of other banks (Kabweza, 2012). Telecel apparently made a strategic decision to connect their mobile platform to more banks by partnering with the ZimSwitch Mobile platform, which we describe below. NetOne has also partnered with ZimSwitch, although Econet has not.

ZimSwitch is a financial switching company which was formed in 1994 through a partnership between six financial institutions to connect nineteen of Zimbabwe's banks.⁶ The company processes domestic card-based ATM and POS transactions amongst member financial institutions in real time online. The ZimSwitch Mobile platform enables all financial institutions connected to ZimSwitch to offer mobile banking services through USSD technology (mobile) which we describe below, via the internet, and also integrates with service providers such as utility companies (Kabweza, 2011). The platform enables users to transfer money through ZimSwitch Instant Payment Interchange Technology (ZIPIT) which acts as an aggregator that facilitates transactions when customers look to move money to and from their bank accounts for mobile payments.⁷

By connecting via the ZimSwitch platform, MNOs obviate the need to contract with individual banks or service providers in terms of providing mobile financial services (and gaining access to the national payments system) as they did before. The fact that both Telecel and NetOne partnered with the ZimSwitch platform allowed customers of different banks two options in terms of which network to use to access the mobile financial services. In this way, interoperability created benefits for customers, although the largest MNO Econet has not partnered with ZimSwitch for P2P transactions. In fact, the subject of recent complaints by various banks in Zimbabwe relates primarily to Econet's initial refusal to partner with ZimSwitch and its insistence that banks should instead integrate with its own Ecocash platform (for which a fee of \$0.30 would be levied per transaction) should they want their customers to be able to link their accounts to Ecocash and send money using this method.⁸

Econet followed a different strategy in terms of the introduction of its mobile money services by acquiring shareholding in TN Bank in November 2012 in a transaction which was conditionally approved by the competition authority. The condition required Econet to ensure that they continue to avail mobile connectivity to other competing financial institutions. TN Bank later rebranded to Steward Bank in 2013. TN Bank served as Econet's implementing partner or host bank for the launch of its Ecocash platform.

The provision of MMTs has evolved significantly over a short period in Zimbabwe. This dynamic in the sector seems to have a great deal to do with the model followed by the

⁶ <http://www.zimswitch.co.zw/> [Accessed: 22 July 2014]

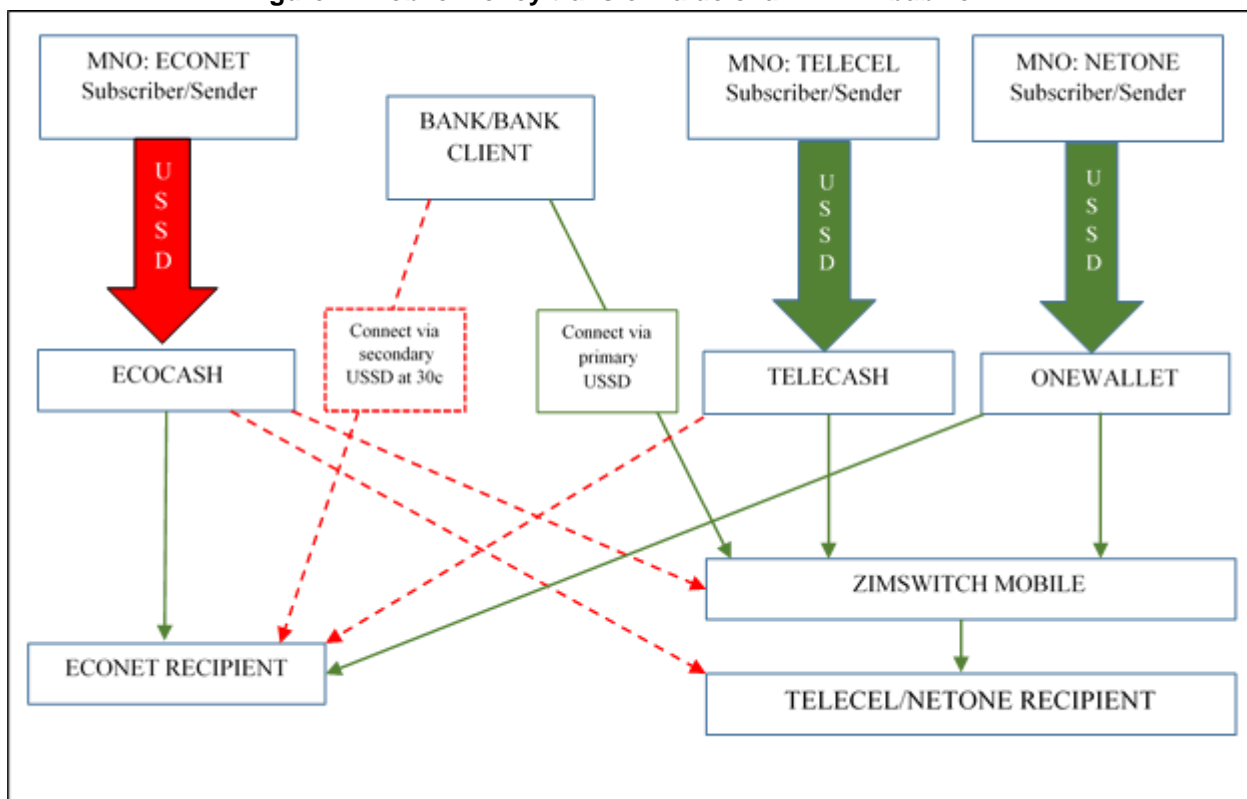
⁷ ZimSwitch website, available: http://www.zimswitch.co.zw/?page_id=301 [Accessed: 22 July 2014]

⁸ See: 'CTC goes after Econet' (13 June, 2014), *The Herald*; available: <http://www.herald.co.zw/ctc-goes-after-econet/>; and 'Econet investigated for anti-competitive behaviour in mobile money business', (13 June 2014), *Techzim*; available: <http://www.techzim.co.zw/2014/06/econet-investigated-anti-competitive-behaviour-mobile-money-business>

MNOs in delivering this service. For instance, Econet applies what is termed an ‘MNO-led’ model which means that the MNO is in control of the full process of facilitating an MMT, including running the mobile network, performing cash-ins or cash-outs, transferring funds, and settling (USAID, 2010). This is in contrast to bank-led models wherein MNOs are only involved at the level of providing the primary network infrastructure for facilitating transactions. Importantly, although MNOs still require banks to ‘host’ them with regards to accessing the payments system, there has been an evolution in the sector in so far as customers are not required to hold an account with a specific bank in order to access these services. Furthermore, the ability of Econet to introduce its own rival platform and not partner with banks initially is likely to have influenced the patterns of growth in the sector by allowing Econet to directly leverage its strength in the mobile services market into the MMT environment.

Figure 2 illustrates the relationships and interoperability between the various platforms in Zimbabwe. The ability of Econet to control interoperability with and access to its own platform, which is by far the largest, also places it in a position to drive the growth of ‘on-network’ transactions in the context of significant network externalities which we discuss below.

Figure 2: Mobile money transfer value chain in Zimbabwe



Source: Author's own interpretation

Note: Green arrow: connections which are currently enabled. Red dotted arrow: connections which are currently not enabled.

From publicly available information including the websites of the three MNOs we are able to determine that there are still constraints in the ability of customers of different networks to send money to the mobile wallets of recipients on a different network, although it does seem to be possible in some cases to transfer funds to the mobile number of recipients on another

network. This inability of customers to transact freely across networks and the constraints on the ability of banks to integrate with the Ecocash platform without additional fees drives the strong growth of Econet's platform. We discuss the possible implications for competition in sections to follow.

3. Competition and regulatory issues in mobile money markets – literature and theory

Network effects, also referred to as network externalities or demand-side economies of scale, are the effects that one user of a good or service has on the value of that product to other users. In products or industries characterised by network effects, the value of a product or service is dependent on the number of others using it (Shapiro and Varian, 1999). A number of industries exhibit network effects. One of the most pronounced network industries is telecommunications, in providing voice and data services including the Internet and the World Wide Web (Economides, 2008; Srinivasan et al, 2004). Other network industries include computer software and hardware, news and entertainment, transport and the financial services sector.).

Network effects are normally classified into two types; namely, direct (or same side) network effects, and indirect (or cross side) network effects. *Direct* network effects are present in an industry if adoption by a single user would not yield much value. Direct network effects are present when adoption by different users is complementary, so that each user's adoption payoff, and his incentive to adopt, increases as more others adopt based on horizontal compatibility (Farrell and Klemperer, 2007). In this case, each user's utility function increases with the number of additional users of the technology or product, such that the larger the installed user network, the higher the utility derived from the product (Katz and Shapiro, 1985). Mobile money exhibits same side network effects where subscribers gain directly as more users adopt the service.

Indirect network effects arise if adoption of the product improves opportunities to trade with another side of the market through complementarities. Markets that exhibit indirect network effects are commonly known as two-sided markets. Indirect network effects imply that customer utility from the primary product increases as more complements become available (Farrell and Klemperer, 2007). Indirect network effects are based on vertical compatibility i.e. users benefit indirectly from the adoption of that service. For example, in transaction markets the adoption of Master Card by consumers depends on the number of merchants who accept it for transacting. On the other hand the merchants can adopt the card on condition that it has many subscribers using it.

Similar indirect network effects manifest in the mobile money sector in that the adoption of a particular mobile money system may be dependent on the number of merchants or billers who accept it. On the other hand the mobile money agents are more willing to adopt a mobile money system with a higher subscriber base. A large subscriber base allows an MNO to offer more benefits to potential agents compared to other MNOs with a smaller subscriber base. These benefits can take the form of reduced uncertainty, compatibility, and the increased availability and quality of complements. The presence of these benefits increases its utility over and above its stand-alone product performance.

As highlighted earlier, mobile money is an example of a two-sided platform. A two-sided platform refers to products and services that bring together different groups of users in two-sided networks. Such markets involve the interface of numerous producers or products and services that are supplied through multiple horizontal and vertical relationships between firms, explain by Anderson (2009) as follows:

“Transactions in two-sided networks involve a triangular set of relationships. Two user groups — the network’s “sides” — interact with each other through one or more intermediaries called platform providers. A platform embodies an architecture—a design for products, services, and infrastructure facilitating network users’ interactions — plus a set of rules; that is, the protocols, rights, and pricing terms that govern transactions. M-Banking solutions, such as Smart Communication Inc’s Smart Money or Safaricom’s M-PESA clearly demonstrate same-side and cross-side dynamics – the more consumers using the solution on one side of the network, the more valuable to consumers on the same side of the network as well as increasing value to users on the other side. In turn, the more commercial outlets on the cross-side of the platform, the more attractive to customers on the other side”.

Two-sided markets are effectively where two or more groups of customers are catered for through a platform and one group’s utility increases as the number of consumers on the other side of the market increase.

In the case of mobile money solutions in Zimbabwe such as Econet’s *Ecocash*, Telecel’s *Telecash* and Netone’s *One Wallet*, the more that consumers use the mobile money solution on one side of the network the greater the utility the consumers on the same side of the network attain. This is typically through being able to more conveniently and cheaply connect with or send money to users that are on the same network and mobile money platform versus those that are subscribers of different platforms. Users on the other side of the platform such as banks, billers, retail outlets and agents also attain more utility where there are greater numbers of users on the other side of the market.

Network effects significantly affect competition amongst firms and the way markets operate in mobile money markets. When network effects are present, the firm’s installed customer base can be considered a key asset to gain abnormal returns (Economides, 2008). In mobile money due to network effects, a firm with the larger number of users will become increasingly attractive to existing users and this will attract new users. Network effects may thus create *winner-takes-all* outcomes (Arthur, 1996).

In IT markets, customers derive utility not only from the product or service itself, but also from the networks surrounding these products (Maicas and Sese, 2011). This is because the installed base of users offers benefits to existing and potential customers in the form of reduced uncertainty, compatibility, the transfer of technical and non-technical information between members of the network and the increased availability and quality of complements, among others (Farrell and Klemperer, 2007). In this context the network of users becomes a central and strategic asset for assessing the firm’s current and future competitive position (Shankar and Bayus, 2003).

Network industries markets are prone to dominance and therefore naturally associated with the existence of monopolies (Motta, 2004). This is mainly sparrred by “winner takes all”, or

'market tipping off'. Market tipping off is where a dominant firm manages to gain advantage in consumer preference, thus becoming more and more popular.

Typical of competition in network industries, a dominant MNO may leverage a range of strategies in one of the different (adjacent) markets in order to maintain their position in their primary market whilst growing their position in the adjacent markets. In this case, the MNO can attempt to leverage the market power it holds in the market for traditional MNO services into other markets like the market for mobile payments or the market for banking services. Chicago School theorists have argued that a dominant firm has no incentive to leverage its market power into adjacent vertical or horizontal markets. This is explained using the One Monopoly Profit theory which states that a firm which has a monopoly in one market can extract all the possible rents from its original monopoly position, and will not gain anything from extending that monopoly power into adjacent markets (O'Donoghue and Padilla, 2006). To the extent that a dominant firm has been observed to strengthen its position in an adjacent market therefore, this must have a benign or pro-competitive explanation such as the greater efficiency of the monopolist.

This theory rests on strong assumptions, however, including that the adjacent market is perfectly competitive and the monopolist can credibly commit to charging the monopoly price to all customers. Post-Chicago economists have since pointed out a number of situations where these assumptions are not met and where, consequently, it is possible for anti-competitive foreclosure to occur. The most relevant in this respect is probably the theory of defensive leveraging. In this case the incumbent monopolist is concerned that in the long term, a firm that enters one market successfully may try to integrate into the adjacent market, thus threatening the dominance of the incumbent firm (Carlton and Waldman, 2002). This theory of harm can apply in either a vertical setting, where the incumbent is vertically integrated and holds a monopoly at one level of the supply chain, or in a horizontal setting, where the incumbent produces two complementary products and holds a monopoly in one of them. In this model, the incumbent may have an incentive to monopolise the complementary good market even when entry is costless provided there are network externalities (O'Donoghue and Padilla, 2006). According to O'Donoghue and Padilla (2006):

"Carlton and Waldman show that tying the complementary good to the monopoly product gives the monopolist a head start in the race to become the standard in the market for the complementary good. This incentive exists because the incumbent sees its monopoly position in the primary good market subject to the threat of entry. Otherwise, it would prefer to have competition in the complementary good market, so as to ensure the adoption of the best standard and to appropriate the rents generated by that standard via a higher price in the primary product market."

In order for Carlton and Waldman's theory to hold, entry into the tied market needs to be costly. These factors are present in the Zimbabwean markets for mobile payments and mobile services as a substantial up-front investment in infrastructure is required in order to enter the market. A licence is also required from the regulator in order to operate a mobile network in Zimbabwe and there are a number of requirements which must be met by prospective licensees:

- The applicant must be a locally registered company
- Local shareholding must be more than 50%.

- Foreign shareholding should not exceed 49%.
- The applicant should prove beyond doubt the capability to roll out services - Business plan and project proposals required.
- The applicant must provide strong financial capability – Proof of funds and cash flow analysis for 5 years required.
- The applicant should have technical capabilities to rollout services – CVs for top project team/management required.⁹

As alluded to above, markets which are subject to network externalities can also tend towards “tipping points” where the market evolves such that one product or service becomes the dominant standard. The defensive leveraging theory is particularly strong in industries with network externalities as the possibility of market tipping in the complementary product market (for example mobile payments) provides a threat to the incumbent monopolist’s position in the primary market (for example mobile services), because a successful entrant in the complementary product market then could attempt to move into the primary market. In order to remove the threat to its monopoly position in the primary market, the incumbent then attempts to exclude competitors in the market for the complementary product so as to ensure that its product becomes the dominant standard.

There is an increased likelihood that such dominance is persistent. It is often the case that in industries with network effects users will naturally tend to gravitate toward using compatible products that are compatible with products owned by the greatest number of other users (Rubinfeld, 1998). Market tipping off and associated large profits that can be reaped once the product is established as the industry’s standard and a dominant firm faces incentives to try and maintain dominance. For example the MNO can use the mobile money market to leverage their position in the mobile network services market (voice, sms and data services) through reducing customer switching (if the mobile money service is attractive, or the costs of switching are high, customers may not want to switch MNOs even if there is better pricing or service available elsewhere) and at the same time growing the mobile money market.

In two-sided markets a firm can generate revenue from either side of the network or from both which allows for complex pricing strategies. Depending on the dynamics and market shares on the two sides of the market, prices can be used strategically to enhance and leverage a firm’s strong strategic position on one side of the network to gain more market share on the other side of the market. When a network consists of mobile money and mobile network services, both provided by the same firm, the firm can use the prices of these products to maximize the network effect and its profits for example through cross-subsidising the prices of the two products i.e. the MNO could charge subscribers for transfers (i.e. for cashing in and cashing out) and then actually pay a commission to agents for their participation. In this case therefore the charge to agents is negative and subscribers pay all the costs. An MNO can offer agents minimal commission as a way to enhance their adoption of the payment system and rather make profit from subscribers to the mobile network service that use the mobile payment system, a market in which the MNO is already dominant.

The other strategy that a dominant firm in one side of a network market can use to maintain its position is to make its products partially or fully incompatible with components produced

⁹ POTRAZ website.

by other firms. This can be done through actual product incompatibility or explicit exclusion or refusal to interconnect with other firms (particularly competitors). If a firm is dominant in one of the markets it has no incentive to allow full compatibility of its products with those of its competitors. Compatibility is dependent on the intensity of the network effect i.e. the more intense the network effect, the stronger is the incentive for a firm to make its products incompatible from substitutes (Economides, 2008). The decision to choose to remain incompatible with the rival ensures that the dominant firm would keep all the network effects it creates to itself. As in the example above the dominant MNO has higher chances of attracting more subscribers to its mobile network services if it chooses incompatibility on its mobile payment system. Thus where there is a dominant firm and network effects, it is unlikely to be in that firm's interest to pursue interoperability. Whereas if there are a range of smaller firms, interoperability is more likely to develop naturally as each player has more to gain and less to lose from "pooling" the network effects. In other words interoperability should result in a larger overall market as a linked network is more attractive and hence attracts larger demand. Therefore there are gains to all from interoperability, but if there is one very large player, its losses due to weakening the network effects which help to maintain its position may outweigh these gains, and hence interoperability is not in its interest.

In markets with strong network effects like mobile money where firms can choose their own technical standards, there can be extreme market share and profit inequality whereby market shares differ significantly between the largest and smaller firms. The inequality can be exacerbated by the fact that a firm with a large market share has higher sales of complementary goods (traditional MNO services in this case) and therefore its good is more valuable to consumers relative to other players. This results in even higher sales. Equally, a firm with small market share has lower sales of complementary goods, resulting in lower sales (Economides, 2008).

In most countries, including Zimbabwe, interconnection in the mobile network services and compatibility at the level of voice and low capacity data transmission is mandated by law (Nyaga, 2014). However in most developing countries mobile money is a relatively new development which is very dynamic and interoperability has not advanced in most markets. To date there is no direct regulation on interoperability in Zimbabwe. Early regulation was viewed as stifling innovation by the MNOs. In Zimbabwe, mobile money is regulated under the national payment system by the central bank. However, interoperability among the mobile payment systems is not yet formally covered by the current statutes. The systems however are closely monitored by the Reserve Bank of Zimbabwe to ensure that it satisfies the prudential provisions which govern financial institutions.

4. Emerging competition and regulatory issues in the Zimbabwean market

How does the theory apply to Zimbabwe?

As discussed above, mobile money markets are an example of a two-sided platform where the attractiveness of the platform to customers on the one side increases with the number of entities on the other side with which they can transact (banks, agents, service providers, other customers). There are also network effects since the more customers are signed up to a given platform, the more attractive it is to other customers. The presence of network

effects makes it difficult for new entrants to grow in the market, as customers will be reluctant to switch to a platform or network with fewer users.

As the largest MNO in Zimbabwe and by far the largest provider of mobile payments services, Econet is in a very strong position. As discussed above, markets for traditional mobile telecommunications services and markets for mobile payments are strongly interlinked and the provision of mobile payments services can provide a way for MNOs to induce customer loyalty and prevent customer switching. In this case, part of Econet's strategy with regard to Ecocash may be to provide such a ubiquitous service that most consumers want to use Ecocash, thereby locking them in as Econet subscribers. The network effects inherent in both markets will tend to reinforce this as the more subscribers Ecocash and Econet have the more attractive they become to customers (and the less attractive competitors become). Econet's own annual report describes Ecocash as "a key value driver, subscriber retention and loyalty product".¹⁰ This indicates that part of the value of Ecocash is derived from its ability to help Econet retain subscribers in the mobile services market and to reduce subscriber switching.

If Econet perceives a threat from Telecel and NetOne to its market power in the mobile services market, it may have a further incentive to strengthen Ecocash in order to ensure that subscribers stick with Econet in the market for mobile services. Mobile payments have proved extremely popular in Zimbabwe as in other developing countries and Econet now has 3.3 million registered Ecocash customers (POTRAZ, 2014), with those of Telecash continuing to grow as well.

Furthermore, to the extent that Econet expects a dominant standard to emerge in the mobile payments market, it may have a further incentive to ensure that this is Ecocash, to protect its position in the mobile services market. The banks on the other hand present a potential threat to the position of Ecocash which is important in itself but also because this could reduce the value of Ecocash as a means of retaining and attracting subscribers in the traditional mobile services market. With a 65% market share in the MNO market and a market share of over 90% in the mobile payments market, Econet is in a strong position to exploit these network externalities. Subscribers may be reluctant to switch away from Econet to a smaller network. There are therefore obvious benefits to Econet to establishing Ecocash as the dominant standard in the mobile payments market.

A competition complaint¹¹

As alluded to above, a competition complaint has been laid against Econet. In 2014 the Bankers Association of Zimbabwe (BAZ) submitted a complaint to the ZCTC relating to Econet's conduct with regard to its Ecocash platform. The complaint raised a number of concerns. Of particular interest to this paper are the concerns relating to the provision of USSD services which are the means by which banks' mobile money services are facilitated

¹⁰ Econet Annual Results presentation, 2014.

¹¹ This section is based on information from: 'CTC goes after Econet' (13 June, 2014), *The Herald*; available: <http://www.herald.co.zw/ctc-goes-after-econet/>; and 'Econet investigated for anti-competitive behaviour in mobile money business', (13 June 2014), *Techzim*; available: <http://www.techzim.co.zw/2014/06/econet-investigated-anti-competitive-behaviour-mobile-money-business>

by the MNOs. The dispute arose around the mobile payments service in particular; Econet allowed banks to use the USSD service for the provision of other mobile banking services (balance checks, bill payment, bank account-to-bank account transactions etc.), but not for P2P transactions.

Econet initially refused to allow the banks access to its Ecocash platform for P2P transactions, meaning that it was not possible for bank customers using Econet to pull money from their bank account to send money via Ecocash in a P2P transaction. This meant that customers would have to go to an Ecocash outlet and physically deposit money into their Ecocash wallet (incurring a cost) in order to send money via Ecocash and banks were unable to offer a service that customers would have found convenient. In February 2014 Econet finally agreed to grant the banks access to the platform, however, this was subject to a number of terms which the banks argued to be unfair. The most important of these was the cost. P2P transactions would be charged at a rate of 30c per session compared to 5c or zero for all other mobile banking transactions. There were also requirements imposed on the banks in terms of the way that the USSD service was to be used which would have made it less convenient for customers. By contrast, Telecel and NetOne charge the banks a much lower amount or zero for using the same USSD facility on their mobile payments platforms.

We do not discuss the merits of this case here as it is still being considered by the ZCTC. The complaint is merely presented as an example of the types of competition questions which can arise in mobile money markets where there is one very large MNO. The regulatory measures which are discussed in the recommendations section could also serve to address any potential competition problems.

Interoperability in the Zimbabwean market

There is currently very limited interoperability between Ecocash and the other mobile money platforms in Zimbabwe. As it stands, Ecocash customers cannot send money to either the mobile wallet or sim card of a NetOne or Telecel customer. In other words, for Ecocash customers there is no interoperability at all with the other networks. Similarly, Telecel customers cannot send money to an Econet sim or Ecocash wallet. NetOne customers on the other hand can send money to an Econet sim or Ecocash wallet.

This implies that if customers want to be able to be sent money by Ecocash customers (which is highly likely given that Ecocash has 90% of mobile payments subscribers) they have no option but to also be with Ecocash. If they want to be able to send money to Ecocash customers (also very likely), they cannot be with Telecash. Given the network effects in the industry, this puts Ecocash in a very strong position in the market.

Even if Ecocash customers could send money to the other MNO's sim cards, as described above customers would still have to cash-out the money at an Ecocash agent. If they then wanted to transfer the money to their Telecash wallet or OneWallet, they would have to go to a Telecash or NetOne agent and pay the money back in, incurring further fees. Thus, whilst this would provide interoperability of a kind, there are transaction costs as it would be inconvenient and costly to customers. In the current situation, in order to use Ecocash customers are required to have an Econet sim. This means that customers cannot purchase Ecocash services without also purchasing Econet's other mobile services.

As discussed above, interoperability is usually beneficial for smaller firms who struggle to combat the market power and network effects enjoyed by larger incumbents. Incumbents, however, may have the incentive to resist interoperability to the extent that it will enable them to preserve their dominance. In a situation where there are a number of firms of similar size, interoperability is more likely to evolve naturally than where there is one dominant firm and other smaller players (Andes, 2012). The Zimbabwean market structure obviously reflects the former example quite closely which suggests that there might be a need for some regulatory intervention to ensure there is a level playing field for smaller mobile money providers. In this regard, the question for policymakers is how best to balance the need to promote competition against the need to preserve the incentives to invest.

As noted above, interoperability is very important for small players. Whilst Telecel's fast growth in terms of subscriber numbers suggests that entry into the mobile payments market is possible without interoperability, its relative size is much smaller when measured by actual transactions. Despite having gained an 8.3% market share in terms of subscribers in six months and a 20% market share in terms of agents, Telecel has only managed to gain a market share of 0.3% in terms of transactions. This suggests that it is indeed difficult to grow in the market without interoperability.

On the other hand, there is an argument that multi-homing or multi-simming (the use of multiple sims) is common in Zimbabwe and that this effectively means that interoperability is not important as customers can simply switch between sims to send money to customers of different mobile money platforms. We do not have data on the prevalence of multi-homing in this market so it is hard to test this. We note, however, even to the extent that customers do have more than one sim, there is still inconvenience and cost attached to having to register for more than one platform and transfer balances into and out of each wallet.

The lack of interoperability may be restricting the growth of this new market. As discussed above, there is substantial latent demand for mobile financial services in Zimbabwe. To the extent that the lack of interoperability limits competition, it will lead to higher prices and less innovative products for consumers, which will in turn limit uptake.

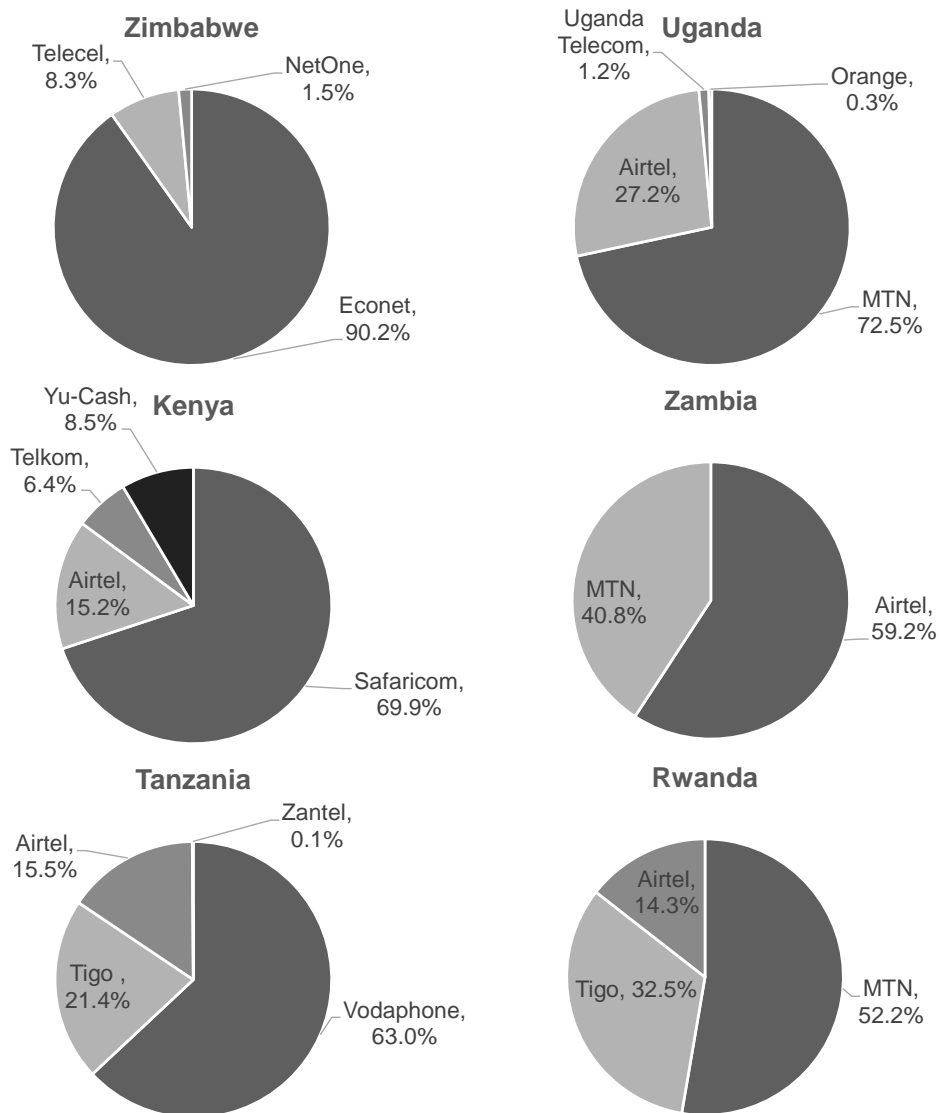
Contrast with other countries in the region

In order to try to understand why the Zimbabwean mobile money market has evolved as it has, we next present a comparison with some other countries in the region. What is striking first of all from Figure 3 is that the markets in all countries are highly concentrated and in all six countries, the leading firm has more than 50% market share.

The Zimbabwean market is particularly concentrated, with the leading firm, Econet, having a market share of over 90%. Uganda is also highly concentrated with MTN at 72.5% and Airtel at 27.2%. In Kenya, M-Pesa has a 70% market share with only one other significant competitor, Airtel Money, having 15% of the market. In Rwanda by contrast, the market amounts to a duopoly, with Airtel Money enjoying a 59% market share and MTN a 41% share. The most competitive markets appear to be Tanzania and Rwanda, where there are three significant players, being Vodaphone (63%), Tigo (21%) and Airtel (16%) in Tanzania and MTN (52%), Tigo (33%) and Airtel (15%) in Rwanda. These market shares translate into

high HHI figures in all six countries, again with the HHI figures for Zimbabwe being the highest by some margin at over 8000 (see Table 5).

Figure 3: Mobile money market shares in Uganda, Zimbabwe, Kenya, Zambia, Tanzania and Rwanda



Source: Various online sources including company websites and publicly available data

Note: all market shares are measured by mobile money subscriber numbers except for Tanzania where the data comes from the Financial Inclusion Tracker Study conducted by Intermedia in 2012. The data used is the latest available for each country and is for the following years: Zimbabwe, 2014; Uganda, 2013; Kenya, 2011; Zambia, 2014; Tanzania, 2012; Rwanda, 2013.

As discussed above, in a market with network effects one would expect that where there is one very large player, interoperability is unlikely to develop naturally. In such cases, the large incumbent has an incentive to preserve the network effects which arise from the lack of interoperability in order to protect its strong position. This may be the case even where there are other significant players if there is a high degree of asymmetry in the size of the different players such that network effects make the large firm seem much more attractive to consumers. On the other hand, where there are several firms with relatively equal market shares, interoperability may occur naturally as the network effects do not favour one firm in particular, and all firms will likely gain from interoperating as the combined network becomes more attractive to consumers and the size of the market expands (Andes, 2012).

In reality, in the case of the six countries considered here, only one has implemented a form of interoperability. In Tanzania, all the mobile money providers except the largest (Vodaphone) agreed in June 2014 to allow their mobile payments platforms to interoperate. Together this joint network will account for almost 50% of subscribers, putting the three smaller players on a more level playing field with Vodaphone. The operators and Vodaphone are also involved in crafting a set of operational regulations for interoperability in Tanzania (CGAP, 2014). It is perhaps unsurprising that this development has arisen in Tanzania, since it has one of the least concentrated markets of the countries in the sample and has three significant players in the mobile money market.

As shown in Table 4, Tanzania also has the least concentrated market for traditional mobile services (measured in terms of subscriber numbers). By contrast, Kenya and Zimbabwe both have one firm with a much higher market share than the others in the MNO market as well as the mobile money market. In both cases, the dominant player in the MNO market has been able to establish a similarly strong position in the mobile payments market. As discussed above, the large incumbent firm may have the ability and incentive to protect its position in the MNO market through maintaining its dominance in mobile payments, particularly if it feels threatened by growing competitors in the MNO market. This presents it with an incentive to resist interoperability which would effectively destroy the link between the two markets and prevent it from the beneficial ability to lock customers in to its network through the ubiquity of its mobile payments product.

Table 4: MNO market shares by mobile network subscribers, 2014

Kenya		Zimbabwe		Uganda		Zambia		Rwanda		Tanzania	
Safaricom	68%	Econet	65%	MTN	53%	MTN	51%	MTN	49%	Vodacom	37%
Airtel	16%	Telecel	18%	Airtel	37%	Airtel	49%	Tigo	36%	Airtel	31%
Telkom	8%	NetOne	17%	Uganda Telecom	6%			Airtel	15%	Tigo	25%
Yu Mobile	8%			Africell	4%					Zantel	6%

Source: Various online sources including company websites and publicly available data

Another way that firms can enhance rather than reduce the network effects in mobile payments is to charge a higher price for transfers to unregistered recipients than to registered recipients. This means that to send money to another customer of the same mobile money platform is cheaper than to send money to someone who is not a customer and may be a customer of a competing platform. Thus customers can send money more cheaply to customers of the same network, creating incentives for subscribers to stick with the platform with the most users. This is similar to the effect of high interconnection charges between MNOs in the market for traditional mobile services.

In order to see how different market structures influence the rates charged to send money to unregistered recipients we calculated the average price to send \$20 to registered and unregistered recipients in the six countries, weighted by the participants' market shares. We then calculated the percentage difference between what is charged for transfers to registered and unregistered recipients. As shown in Table 5, transfers to unregistered recipients in Zimbabwe are 28% more expensive than transfers to registered recipients. In Tanzania, transfers to unregistered recipients are just 5% more expensive, practically the

same price. This may reflect the difference in market dynamics in the two countries which has been discussed above, where there is an incentive for Econet, the largest player in Zimbabwe to try to make other networks seem unattractive. The difference in the cost of payments to registered and unregistered recipients is also high in Kenya, which, as has been discussed above, has a similar market structure to Zimbabwe.

Table 5: Features of mobile money markets in six countries

	Zimbabwe	Uganda	Kenya	Zambia	Tanzania	Rwanda
Number of players	3	4	4	2	4	3
Market share of largest firm	90%	73%	70%	59%	63%	52%
Industry HHI	8207	5998	5228	5162	4667	4188
Interoperability	No	No	No	No	Partial	No
% difference between registered and unregistered (weighted average)	28%	9%	37%	22%	5%	22%

Source: market shares and HHI, see Figure 3; price differential, websites of MMT providers listed in Figure 3

The brief country comparison set out above has illustrated that other countries face similar challenges to Zimbabwe in regulating the fast-growing mobile payments market. Where there is asymmetry already in the MNO market in terms of one player that is much larger than the rest, this seems to lend itself to an even more unbalanced market for mobile payments, where the network effects in both markets are mutually reinforcing. Zimbabwe, however, appears to be a particularly extreme case. At the other extreme, Tanzania, where the MNOs have more even shares of the market, seems to be developing a more competitive mobile payments market and even moving naturally towards interoperability between the different mobile payments platforms. This suggests that in the more asymmetric markets such as Zimbabwe and Kenya, attention needs to be given to possible regulatory solutions to prevent the dominance of the main player becoming entrenched and difficult to undermine. In these types of cases, the pressure for interoperability may need to come from the regulator, rather than the market.

5. Conclusion and possible policy implications in Zimbabwe

The growth of MMTs in Zimbabwe is directly linked to developmental objectives in terms of increasing the access of all individuals in the society to a safe, secure and affordable means of transacting. This is consistent with the increased emphasis globally on inclusive economic growth which speaks largely to participation and the ability of people to play a part in the process of growth as well as sharing in its benefits. However, the benefits derived from MMTs to poor customers in particular can be eroded over time where MNOs in dominant positions can leverage that dominance to make it difficult for rival operators to compete. This can take place through various mechanisms discussed in this paper, including defensive leveraging, which is enhanced where there are market tipping and network effects, where the product of the incumbent firm becomes the dominant standard, and when it can use its pricing and strategies in both sides of a market to protect its position.

In this regard, the Zimbabwean market is particularly interesting when considering the strong position of Econet in the primary market for traditional mobile telecommunications services, as well as its strong position in the adjacent market for MMTs. The comparisons above of Ecocash with the platforms of other providers in the region suggest that as in Kenya, the

incumbent firm is able to leverage its strong position in the market to charge prices (to unregistered users, for instance) that enhance the network benefits of customers switching to its platform. Furthermore, through limited interoperability with rival MNO platforms, customers face an incentive to join the MMT platform which they perceive to have the largest subscriber base, thus requiring the customer to purchase the sim of that network as well. In contrast, the market in Tanzania has tended towards interoperability to the benefit of consumers as reflected in the pricing comparisons.

This scenario presents some interesting challenges for regulation. In most cases, competition law enforcement cannot on its own mandate interoperability between providers of mobile services generally. Additionally, competition law cases tend to be drawn out and litigious which is a resource intensive process. Instead, there may be a direct role for other regulatory agencies in changing the set of rules in the market to encourage greater rivalry, including through interoperability. This is through the ability of sector regulators to facilitate and stipulate arrangements between players which support smaller operators while also encouraging and rewarding investment by large incumbents. One example of this is the use of asymmetric call termination rates in the South African telecommunications sector (see Paelo, 2014).

In Zimbabwe, recent developments suggest that a regulatory solution is being pursued, correctly in our view, to address some of the concerns raised in the complaint discussed above. The ZCTC has recently been able to facilitate interactions between the Reserve Bank of Zimbabwe and the sector regulator for telecommunications, POTRAZ, in addressing competition concerns regarding pricing and access in MMT services.¹² Based on research on the sector the ZCTC had identified potential competition concerns as well issues that could best be resolved by sector regulators. While the Reserve Bank of Zimbabwe and POTRAZ are still considering their positions in this regard, this approach by ZCTC suggests that regulatory coordination is important for dealing with restrictions on participation and competition where there are likely to also be significant efficiency gains to consumers through the strategies and investment of large incumbents. This approach is important in the discussion about interoperability, where the authorities need to balance enforcement against abuses of a dominant position in a market, against the pro-competitive benefits of firm strategies. For instance, regulators need to consider the right of firms to benefit from their investments in infrastructure and technology which tend to be substantial in telecommunications markets as is seemingly the case with Econet. If the authority wishes to encourage interoperability for instance, then terms need to be reached that still reward the innovation and investment of the incumbent firms such as Econet. This may involve some form of compensation being paid by rival operators to the dominant player.

Further to this, where there are network effects, consumers do benefit from lower fees, for instance, of transacting over the same network as the person they are sending money to. This is an important efficiency which accrues to customers that would need to be weighed against the likely medium- and long-term effects of reduced rivalry in the sector. Other things equal, regulating for a more fair and competitive environment in the short term, is more likely to result in *sustainable* efficiencies, innovation, variety and favourable prices in the future.

¹² See, for example, 'Zimbabwe: CTC meets RBZ, Potraz over Econet Inquiry'; *The Herald*; available: <http://allafrica.com/stories/201502100528.html>

6. References

- Anderson J. (2009). 'M-Banking in Developing Markets: Regulatory Implications of Two-sided Networks'; Working Paper. Tias Nimbias Business School, University of Tilburg.
- Anderson, J. (2014). 'Competitive and Regulatory Implications of Mobile Banking in Developing Markets', *Technology Banker*. Available: <http://www.technologybanker.com/regulations>
- Andes, S. 'Making the Market: How Interoperability and Tipping Points Can Influence Network Size', *The Heinz Journal*, Volume 9 (2012), Issue 2.
- Arthur, W. B. (1996). 'Increasing Returns and the New World of Business'; *Harvard Business Review*, 74(4): 100–108.
- Carlton, W. and Waldman, M. 'The Strategic Use of Tying to Preserve and Create Market Power in Evolving Industries'; *RAND Journal of Economics*, (2002) 33(2) 194–220.
- Dermish, A., Hundermark, B. and Sanford, C. (2012). 'Mapping the retail payment services landscape – Zimbabwe'. FinMark Trust.
- Economides, N. 'Antitrust Issues In Network Industries'; forthcoming in *The Reform of EC Competition Law*, Ioannis Kokkoris and Ioannis Lianos (eds.), Kluwer (2008). New York University, New York.
- Farrell, J. and Klemperer, P. 'Chapter 31: Coordination and lock-In: Competition with switching costs and network effects'; in Armstrong, M. and Porter, R., *Handbook of Industrial Organisation*, Volume 3 (2007).
- FBC Securities. (2013). 'Competitive landscape and Investment Case for Zimbabwe Banking Sector'.
- Gallaughier, J. M. (2008). 'Understanding Network Effects', Available: <http://www.gallaughier.com>.
- International Telecommunication Union (ITU). (2011). *The Regulatory Landscape for Mobile Banking*. GSR11 Discussion Paper.
- Kabweza, L. S. M. '12 Banks implementing ZimSwitch Mobile. Platform to be mobile network neutral' (20 October 2011). Available: <http://www.techzim.co.zw/2011/10/12-banks-implementing-zimswitch-mobile/> [Accessed: 22 July 2014]
- Kabweza, L. S. M. 'Telecel reveals they killed off the Skwama mobile money service' (24 September 2012). *TechZim*. Available: <http://www.techzim.co.zw/2012/09/telecel-reveals-they-killed-off-the-skwama-mobile-money-service/> [Accessed: 22 July 2014]
- Klein, M. and Mayer, C. (2011). *Mobile banking and financial inclusion: the regulatory lessons*. World Bank Policy Research Working Paper No. 5664.
- Klemperer, P. (2005). 'Network Effects and Switching Costs'. Available: <http://www.nuff.ox.ac.uk/economics/papers/2006/w6/New%20Palgrave.pdf>
- Maicas J. P and Sese, F. J. (2011). 'Network effects in the mobile communications industry: An overview: Recent Developments in Mobile Communications'; Available: http://cdn.intechopen.com/pdfs/24906/InTech-Network_effects_in_the_mobile_communications_industry_an_overview.pdf
- Mas, I. and Radcliffe, D. 'Mobile Payments Go Viral M-PESA in Kenya' (March, 2010).

- Michael L. Katz and Carl Shapiro, Systems Competition and Network Effects, *The Journal of Economic Perspectives*, Vol. 8, No. 2, p. 93-115, American Economic Association Stable.
- Motta, M. (2004). *Competition Policy: Theory and Practice*. Cambridge University Press (New York).
- Nyaga, J. K. 'Mobile Banking Services in the East African Community (EAC): Challenges to the Existing Legislative and Regulatory Frameworks'; in *Journal of Information Policy*, 4 (2014): 270-295.
- O'Donoghue, R. and Padilla, J. (2006). *The Law and Economics of Article 82 EC*. Hart Publishing: Oxford.
- Paelo, A. 'Leveling the playing field: asymmetry in call termination rates'. *CCRED Quarterly Competition Review* (February, 2015).
- Rubinfeld, D. L. (1998). 'Competition, Innovation, And Antitrust Enforcement In Dynamic Network Industries', Antitrust Division, U.S. Department of Justice, Software Publishers Association, San Jose, California.
- Shankar, V. and Bayus, B. L. (2003). 'Network effects and competition: an empirical analysis of the home video game industry'; *Strategic Management Journal*, Vol. 24: 375-384.
- Shapiro, C. and Varian, H. R. (1999). *Information Rules*. Harvard Business School Press.
- Srinivasan, R., Lilien, G. L. and Rangaswamy, A. (2004). 'First In, First Out? The Effects of Network Externalities on Pioneer Survival'; *Journal of Marketing*, Vol. 68 (January 2004), p. 41-58.
- USAID (2010). 'FS Series #9: Enabling mobile money interventions: primer, diagnostic checklist, and model scopes of work'. Prepared by Chemonics International Inc. for the United States Agency for International Development (USAID) Financial Sector Knowledge Sharing Project. Available: http://pdf.usaid.gov/pdf_docs/PNADW294.pdf