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Consumer payment choices, costs, and risks: Evidence from Zimbabwe

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Abstract: Very little is known about payment choices in the African context and in developing countries in general. Their unique infrastructures and economic nuances suggest that both the availability of instruments and supporting structures in the payment system are different from the general perception. This exploratory study investigates the payment choices in Zimbabwe, a country that claims the existence of a near cashless society. Through a descriptive and logit analysis based on survey data, we find that a strong preference for cash, coupled with cash shortages and inadequate infrastructure for electronic payments, has resulted in a multitiered pricing system, with significant premiums for digital payments. This perverse effect counters the heavily lauded benefits of mobile payments in developing countries. We argue that the demand-side bias in government policies will not effectively counter persistent currency failures and the resultant inflation, both of which have

ABOUT THE AUTHORS

Munacinga Simatele is a professor of economics at the University of Fort Hare in South Africa and holds a PhD in economics from the University of Gothenburg in Sweden. She has a passion for development and believes in transformative research that contributes to changing and improving the lives of the poor and marginalised. Munacinga has published in various peer reviewed academic journals. The current paper focuses on payment choices in an African country context and seeks to highlight the nuances that can often get lost when features unique to African countries are not considered. This work links to the wider agenda of her research on financial inclusion and marginalisation of the poor.

Edson Mbedzi is a lecturer at the National University of Science and Technology's Department of Finance in Bulawayo, Zimbabwe. He holds a PhD in Economics from the University of Fort Hare and an MPhil in Development Finance from Stellenbosch University in South Africa. His research interest is broadly in development economics but with a special focus on SME finance, national payments systems, poverty and development as well as the effects these have on economic development and policy intervention. The current paper relates to his research focus on payment choices and policy interventions.

PUBLIC INTEREST STATEMENT

Evidence in support of digital finance as a source of financial inclusion indicates that wide usage of digital payment instruments such as mobile money, can reduce the cost of payments by as much as 90%. The paper explores this assertion using data from Zimbabwe where official statistics indicate that 99% of all payment in 2019 were made digitally. We find that a large amount of transactions is conducted in parallel markets to obtain cash for use in informal markets where digital payments are not widely accepted, resulting in multi-tier pricing. The paper emphasises that for full digital payments benefits to be realised, the requisite infrastructure including regulations that govern competition must be in place. Demand-side policies also need to be complemented with supply-side policies to effectively address preference for cash in key markets. Policies that reduce merchant adoption costs to encourage widespread acceptance of digital payment instruments are encouraged.

a strong influence on payment choices. We recommend that the government should consider policies that will reduce merchant adoption costs to encourage widespread use of digital payment instruments, such as debit cards.

Subjects: Microeconomics; Development Economics; Finance

Keywords: Payment choices; cashless society; e-payments; credit cards; debit cards; mobile banking; Zimbabwe

1. Introduction

The choice of payment instruments around the world is fast growing. Relatedly, many consumers are increasingly choosing to pay with debit and credit cards, especially in developed countries, with many more having the option of using digital wallets, such as PayPal, Google Pay, and Visa Checkout. Despite these developments, cash continues to dominate as a payment instrument (Arango-Arango & Suárez-Ariza, 2019; Flannigan & Satib, 2017; Linnemann Bech et al., 2018). These payment options, however, are not as readily available in developing countries as they are in developed ones. Thus, these countries have a more limited choice of payment instruments. Nevertheless, the emergence of mobile banking and mobile money services has increased the options available to consumers in developing countries.

Understanding how and why consumers choose specific payment instruments is important for businesses and policymakers alike, as consumers' payment choices have social cost implications. Some studies have estimated that retail payments can cost up to 1% of Gross Domestic Product (GDP), and nearly 50% of this cost is incurred by retailers (Karoubi et al., 2015; Schmiedel et al., 2012). Moreover, payment instrument choices by consumers significantly affect the efficiency of the overall payment system, making it a central issue to policy (Borzekowski et al., 2006; Trütsch, 2016). Furthermore, as payment systems change, it is important to ensure that they achieve greater efficiency and become more resilient against risk. Specifically, payment systems should be designed in such a way that the costs of settlement are not a hindrance to the effective clearing of markets, or a source of instability (White, 1998). In addition, Schmiedel et al. (2012) and Arango and Taylor (2008) argue that the reduction in costs of using payment alternatives can drive the economy towards a more efficient payment system.

The bulk of the literature on payment choice finds that the choices are mainly influenced by demographic factors, such as age, income, and gender (Humbani & Wiese, 2018; Schuh & Stavins, 2010, 2012; Trütsch, 2016). The limited literature that incorporates instrument characteristics suggests that cost and security are the most important characteristics (Hayashi & Keeton, 2012; Sullivan, 2014; Trautman, 2016). These findings are largely consistent, but the literature almost exclusively focuses on developed economies with advanced financial and payment systems. One possible reason for this focus is that cash has largely dominated as a payment instrument in developing countries. For instance, according to World Bank Group (2018), only 22% of adults in developing countries used credit or debit cards to make payments in 2017, compared to 80% of adults in developed countries. Furthermore, only 40% of adults in developing countries reported owning a debit card and only 10% owned a credit card, as compared to 89% debit card owners and 55% credit card owners in developed countries. Nevertheless, the emergence of mobile banking and mobile money implies that consumers in developing countries now have a wider range of payment instruments from which to choose. The need to understand payment choices has therefore become pertinent.

The need for a study on payment choices in Africa and in developing countries is motivated by several reasons. First, very little is known about the determinants of payment choices in the African context and in the context of developing countries in general. Extant studies almost always focus on developed countries. However, the payment infrastructures in developing countries are distinct from those in developed countries. For instance, modern payment systems require specific

information and communication technology-enabled infrastructure. Digital wallets and card payments require efficient internet connections. The ITU (2020) shows the clear discrepancies in connectivity between developed and developing countries. In 2019, for example, the broadband coverage was 86.6% for developed countries, 47% for developing countries, and only 28.2% for Africa. Moreover, while developed countries had 92.9% LTE or higher mobile network coverage, the coverage in developing countries and in Africa was only 79.6% and 38%, respectively. The relevant financial services therefore differ. Consequently, the nature and inefficiencies associated with payment methods, as well as the relevant infrastructure and platforms, are also very different. Therefore, the results from developed countries are likely to have limited application to developing countries.

Second, several developing countries have demonetised their currencies, or dollarised their economies, to manage inflation or restore macroeconomic stability. These changes have had effects on the availability of cash and national payment systems. For instance, India demonetised its currency in 2016. Bandi et al. (2019) argue that the ensuing cash shortages had a significant impact on consumer payment behaviour. Similarly, Zimbabwe adopted the US dollar as its main currency in 2009, and has experienced severe cash shortages since 2016. As a result, the Reserve Bank of Zimbabwe (RBZ) made several changes in the national payment system, impacting consumers' payment choices. Relatedly, the limited research on payment choices and payment instruments in the developing country context is dominated by mobile banking and mobile money adoption studies. Examples include, Hussain et al. (2019), Auwal Kabir et al. (2015), and Lin and Nguyen (2011). Meanwhile, other studies focus on the benefits of digital payments in the African context (Demirguc-Kunt et al., 2018; Jack and Suri, 2014). The study by Bester and Bronkhorst (2012) investigates the preference of payment instruments in South Africa.

This study aims to contribute to the literature on payment choices by investigating the factors that influence payment choices in an African context (specifically, Zimbabwe), a region that has been hardly researched in this regard. Furthermore, it also contributes to the literature on financial inclusion by investigating the cost of making payments. In this context, the Zimbabwean case provides additional insight. First, Zimbabwe experienced severe cash shortages and in response, the government introduced various financial instruments, which have been used for payment, with a major focus on mobile money. Mobile money has been lauded as a key instrument in reducing the cost of payments for the poor (Chiroga et al., 2017; World Bank Group, 2018). This study probes the cost of making digital payments and reveals that the benefits of digital payments should not, in fact, be assumed. Government taxes on digital payments, high agency fees, and structural rigidities that lead to a preference for cash, have resulted in a multitiered pricing system, which creates high premiums for the usage of digital payment instruments. Second, in 2019, the RBZ indicated that 99% of transactions were conducted electronically, making Zimbabwe a near cashless society. The results of this study indicate that the real figure may be much lower and suggest that the RBZ may have ignored the large transactions that take place in the informal sector, as well as those that are conducted to "buy" cash in the parallel market.

2. Literature Review

Most of the recent literature investigates how the characteristics of payment instruments affect the choice of instrument at the point of sale. The key characteristics are costs, security, convenience, and acceptability (Schuh & Stavins, 2010; Srinivas et al., 2014; Zinman, 2008). These characteristics underpin the complementary and substitutionary relationships between the payment choices. In addition, the literature also shows that demographic factors such as age, income, education, and gender also influence payment choices.

Most studies focus on the cost of paying with cash relative to the cost of paying with alternative instruments. In modern financial markets, the cost of cash is directly related to ATM surcharges or the cost of withdrawing at the counter. Evidence shows that the cost of withdrawing cash has a negative effect on the use of cash at the point of sale. For instance, Jonker (2007) demonstrates that consumers find that paying with cash is expensive compared to paying by card, due to the

cost of cash at the ATM. However, Arango-Arango et al. (2018) argue that high ATM fees can also increase the use of cash by inducing higher cash holdings. The unit cost of ATM surcharges declines with volume. Consequently, having paid the “fixed” cost of withdrawing a large amount, payments by cash are preferable to card payments, especially for small-value transactions (C. A. Arango et al., 2015; Arango-Arango et al., 2018; Stavins, 2018).

The cost of withdrawing cash is relative to the card fees charged by card issuers. Accordingly, the relative costs incurred by consumers are largely dependent on whether card fees are charged directly per transaction, as in the case of Norway, or indirectly, as done in the Netherlands (Dos Santos & Kvangraven, 2017; Humphrey, 2010; D. Humphrey et al., 2003). The literature shows that card fees for both debit and credit cards tend to decrease with the transaction size (Arango & Taylor, 2008). Consequently, card is the preferred instrument of choice for large transactions while cash is the instrument of choice when transaction sizes are smaller (C.; Arango et al., 2016; Gresvik & Haare, 2009; Stavins, 2018). Correspondingly, when card fees are charged as a fixed fee per transaction, cards tend to be the instrument of choice for larger transactions. Bester and Bronkhorst (2012) is the only study accessible in the African context, and it suggests that ATM surcharges have an impact on payment choice.

However, the ultimate effect of card fees on payment choice is a result of a complex interaction of card fees, government policies, and ATM surcharges. Several countries in the Eurozone, for example, have made cashless payments more accessible by increasing card terminals at point of sale and deterring retailers from imposing card surcharges on low-value payments. The literature suggests that these policies have worked towards a decline in preference for cash, but at a slow pace (Arango et al., 2016; Esselink & Hernández, 2017).

A common trend in the card payment market is reward schemes, such as cashback, discounts, airline miles, and gifts. Card issuers use these reward schemes to induce loyalty and increased card use. Hayashi and Keeton (2012) indicate that the introduction of such reward schemes has led to an increased use of both debit and credit cards. The literature indicates that consumers who pay by credit cards tend to offset cardholder costs by taking advantage of the reward schemes attached to the cards. For example, Hayashi and Keeton (2012) and Jain and Jain (2017) find that removing reward schemes would significantly increase the use of paper-based payment instruments. Relatedly, using the data for Canadian households, Arango and Taylor (2008) show that consumers actually pay zero and sometimes negative transaction fees due to incentive and reward programmes. Other studies also show that such indirect costs are the key determinants of the choice of payment instrument (Arango & Taylor, 2008; Carbó-Valverde & Liñares-Zegarra, 2011). However, the literature also shows that rather than replacing cash, incentive programmes tend to lead to substitution between credit and debit cards (C. C. Arango et al., 2015). This could partly be due to high fixed costs associated with the adoption of cards, leading to habitual use and lock-in network effects. In line with this, C. Arango et al. (2015) suggest that the fixed cost of adopting a card tends to lead to habit formation in payment behaviour resulting in inelasticity to variations in incentives, especially in mature card markets. Effectively, reward and incentive programmes influence the use of payment choice, but this effect tends to wane as financial markets mature.

Acceptance plays an important role in the choice of payment instruments. Unlike cash, which is universally accepted, payment instruments operate in a two-sided networked market where both consumers and retailers must be willing to engage. Consequently, increased retailer or merchant acceptance increases the use of alternative payment instruments and can lead to cash substitution (C. A. Arango et al., 2015; Bagnall et al., 2014). The literature also shows that consumer use of payment instruments affects the level of acceptance by retailers (Bounie et al., 2017; Jonker et al., 2011). An increased number of users lead to economies of scale, thereby lowering the average cost of providing the payment platform and making the payment instrument more attractive to both consumers and retailers.

In addition to direct costs, payment instruments are also associated with some degree of risk, which influences the instruments that consumers choose to use (Swartz et al., 2006). The risk associated with each instrument varies with the degree of finality. Cash is perceived as the most final and most liquid form of payment. Payment is received and settled within the transaction. Holding cash, however, exposes the consumer and the retailer to the probability of loss, theft, and counterfeiting (D. B. D. B. Humphrey et al., 2001). Bester and Bronkhorst (2012) show that the fear of loss and theft leads consumers in South Africa to prefer card payments over cash.

Debit card payment has a payment finality that is very close to cash. Authorisation by personal identification numbers ensures that sufficient funds are available at the point of sale because funds are transferred between the consumer's account and the retailer's account in real time. Although debit cards are also subject to theft and loss, the need for personal information to authorise payment makes payment cards more secure than cash (Bester & Bronkhorst, 2012; Ho & Ng, 1993). One major problem with card instruments is a one-end party authentication process, which escalates the risk of fraud. Most payment system frauds include data breaches, hoaxed websites, payment card skimmers, and fraudulent ATM card withdrawals (Sullivan, 2014). The direct cost of fraud risk for automated clearing houses, debit, and credit cards stood at US \$6.1 billion in 2012 alone (Trautman, 2016).

Credit cards have the least finality of payment and settlement. Although personal information is used for verification at the point of sale, payment by credit card is deferred and has limited liability against fraud. In general, consumers have several days to dispute the transaction. This delayed finality of payment implies that credit cards have less risk associated with loss and theft. As with debit cards, credit cards require personal information, and therefore require some degree of sophistication to be used without authorisation. From this perspective, card payments are perceived to be more secure. However, as argued by Ho and Ng (1993), credit cards may also be subject to fraud. Increased use of technology has increased the possibility of identity theft and the consequent unauthorised use of credit cards (Gresvik & Haare, 2009; Shampine, 2007), leading to an increased level of risk.

The literature highlights the importance of demographic factors in the choice of a payment instrument. Most significantly, age is found to be negatively related with the use of payment cards. Correspondingly, older consumers tend to have higher cash holding. However, this is affected by their financial status. Those with higher levels of income and education tend to use cards more than cash irrespective of their age (Borzekowski & Kiser, 2008; Fujiki & Tanaka, 2018; Stavins, 2018). Gender also plays a role in the choice of payment instruments. Women are more inclined to use card payments than men (Borzekowski & Kiser, 2008; Stavins, 2018).

A less researched payment instrument is electronic payments, which take the form of either mobile banking or mobile money. In the former, consumers can make payments from money being held in their bank accounts using a mobile device. In the latter, money is stored in a mobile money account—often without the involvement of a bank, but including the mobile network operator or an associate. A mobile device is used to make payments in this case as well. This instrument is more widely used in developing, than in developed countries (Dos Santos & Kvangraven, 2017; Jain & Jain, 2017).

By nature, electronic payments are not subject to physical loss and theft. Consumers are typically connected to their money via their mobile devices, such as phones and tablets. This increases the finality of payment and the level of security by improving authorisation and authentication. On the other hand, this finality of settlement reduces the chances of preventing and reversing fraudulent or erroneous transactions (Anderson, 2012). Moreover, electronic transactions leave a transactions trail of personal information, which could be subject to risk of fraud leading to unauthorised access. Hughes and Lonie (2007) argue that this risk increases with the number of “hands” a transaction must go through before completion. This is likely to be the case with mobile

money where there is an increased use of money agents. Electronic payments are also subject to the possibility of technical failure (Anderson, 2012).

2.1. Brief Background on the Payment System in Zimbabwe

Before 2001, no specific law on national payment systems existed in Zimbabwe (BIS, 2006). Instead, payment services were regulated based on commercial law principles arising from the existing Banking Act [Chapter 24:01 of 1965], Bills of Exchange Act [Chapter 14:02 of 1895], Building Societies Act [Chapter 24:02 of 1965], Post Office Savings Bank Act [Chapter 24:10 of 1965], Reserve Bank Act [Chapter 22:15 of 1964], Companies Act [Chapter 24:03 of 1952], and the Insolvency Act [Chapter 6:04 of 1975]. Following stakeholders' initiatives, a National Payment Systems (NPS) Steering Committee was formed in 1997, with a core mandate to enact a relevant payments act. The NPS Act [Chapter 24:23 of 2001], enacted in 2001, currently governs the NPS. Subsequently, a Real-Time Gross Settlement System (RTGS) was put in place to complete the reform of the clearing and settlement systems for interbank and securities transactions.

The RBZ is the regulator and monitor of the NPS. As a result of the NPS Act, further changes were made in the payments system. Between 2006 and 2012, the Securities Commission of Zimbabwe, together with other trading stakeholders, developed the Central Securities Deposit System to facilitate electronic payments for securities trading (MPS, 2012). Between 2009 and 2013, several local and international card and mobile payment instruments were introduced in the market. EcoCash, a mobile money transfer system operated by Econet Wireless Telecommunications was the first to be introduced in 2009. Later, One-Wallet was established in 2013, followed by Telecash in 2014. These were operated by Netone and Telecel mobile telecommunication firms, respectively (Reserve Bank of Zimbabwe, 2015). In addition to compliance with the NPS Act, participating financial institutions had to sign up to a set of binding standards set out in the *Code of Bank Practice* (Bankers Association of Zimbabwe, 2015).

A critical aspect of the payment system in Zimbabwe is its various episodes of inflation. Having a bank-based system exist in the presence of macroeconomic instability and declining production leads to substantial increases in inflation. Pre-2008, month-to-month inflation reached 79.6 billion percent leading to the adoption of the United States Dollar as the official currency, alongside other foreign currencies, which were adopted as legal tender. This reduced inflation to single digits. However, the payment system continued to be largely paper-based and cash-dependent. Their reliance on a currency for which the government had no sovereignty led to severe cash shortages. For the first time since 2009, the RBZ introduced daily cash withdrawal limits, pegged initially at US \$1 000 and US\$10 000 for individuals and companies, respectively. However, liquidity problems in the country continued, and these limits were constantly revised until they reached US\$50 per week by the start of 2019. The significant liquidity constraints led the Government to promote a shift towards electronic payments. Starting in 2016, the RBZ initiated a programme to push for a shift from a largely paper-based payment system to a more electronic-based payment system primarily to address the worsening cash shortages (Reserve Bank of Zimbabwe, 2016, 2017, 2018). [Table 1](#) shows the changes in the use of electronic-related payments between 2012 and 2018.

The push towards electronic payments resulted in a large shift of official transactions to digital payments. The Reserve Bank of Zimbabwe (2018) indicated that 96% of all official payments in 2017 were made electronically. The use of retail electronic payment instruments' transactions increased from US\$20.49 billion in the first half of 2017 to US\$64.76 billion in the first half of 2018. In value terms, the most growth was experienced in RTGS (58%), mobile payments, and Internet payments. Meanwhile, in transaction volumes, most growth occurred in mobile and internet payments, with mobile payments constituting the highest share (84%). Overall, the transaction values and volumes grew by 216% and 343%, respectively (Reserve Bank of Zimbabwe, 2017, 2018). In a dramatic statement, the RBZ announced in 2019 that 99% of payments were made electronically, making Zimbabwe an almost completely cashless society. According to the RBZ's monetary policy statement,

Table 1. Trends in electronic payments by instruments between 2012 and 2018

Payment Mode	2012	2013	2014	2015	2016	2017	2018	2018 Share	% Change
<i>Transaction Values (Billions USD)</i>									
RTGS	38.72	41.80	43.83	44.87	48.11	14.50	37.64	58.12%	159.58
Cheque	0.07	0.14	0.13	0.14	0.11				
POS	0.74	1.45	1.53	1.72	2.90	1.58	4.15	6.41%	162.19
ATMs	1.62	2.38	3.19	3.85	2.28	0.12	0.78	0.12%	-34.27
Mobile	0.38	2.09	3.63	4.65	5.82	2.83	17.27	26.66%	510.60
Internet	1.10	1.36	1.22	1.61	2.50	1.46	5.63	8.69%	286.43
Total	42.64	49.23	53.53	56.85	61.72	20.49	64.76	100.00%	216.14
<i>Transaction Volumes (Millions)</i>									
RTGS	2.18	2.29	2.26	2.06	2.90	1.42	3.22	0.38%	126.73
Cheque	0.29	0.38	0.37	0.36	0.35	-	-	-	-
POS	8.71	12.01	13.99	14.54	52.41	47.69	130.09	15.20%	172.80
ATMs	6.78	9.63	12.14	13.41	12.33	2.17	1.65	0.19%	-23.87
Mobile	19.96	119.14	156.79	228.20	298.59	140.85	717.95	83.89%	409.74
Internet	0.33	0.45	0.41	0.56	1.11	0.90	2.93	0.34%	227.07
TOTAL	38.24	143.91	185.95	259.14	367.69	193.02	855.84	100.00%	343.40

Source: RBZ Monetary Policy Statements from 2012 and 2018

'In volume terms, more than 99% of payments were through electronic and mobile banking platforms with mobile banking constituting 84% in Zimbabwe in the year 2018. This has significantly contributed to the increase in financial inclusion through mobile banking, which now stands at more than 80%. In terms of regional comparison, it is pleasing to note that Zimbabwe is now amongst the leading countries in the use of mobile banking products' (RBZ MPS 2018, pp54).

Despite this, consumers complain about the high charges that they face, as well as the system and infrastructural failures associated with electronic payments in the country. For instance, in 2018, the government of Zimbabwe introduced a 2% tax on all electronic payments. Moreover, markets continue to exhibit a high preference for cash (Simatele, 2020). This has resulted in a parallel market for both the US dollar as well as the surrogate RTGS currency. In addition, a large market has developed for cash-in cash-out services where consumers buy cash using mobile money at premium rates, sometimes as high as 25%. The RBZ issued a ban on these transactions but later reversed and limited it to US\$100 per transaction (Reserve Bank of Zimbabwe, 2019b).

Furthermore, a high degree of dollarisation not only had an impact on the effectiveness and performance of economic policies, but also resulted in different pricing systems in the US dollar and local currency without proper adjustments in prudential regulations (Bonga & Dhoro, 2015). A new currency was introduced in 2019, but it has not yielded the expected results. The rapid inflation associated with the currency has exacerbated the problems associated with payment instruments in the country. By June 2020, the annual inflation had reached 737.3% (Reserve Bank of Zimbabwe, 2020).

3. Data and Methods

3.1. Methods

The study used the data collected through a survey in April 2019. Two parallel surveys were conducted. The first was a survey of 362 randomly selected consumers from Harare and Bulawayo. The two cities house 63.3% of the country's urban population and 20.9 % of the total population (ZIMSTATS, 2017). Multistage sampling was used. The first stage was the selection of the towns within Harare and Bulawayo based on the population density, and therefore likelihood of a high number of electronic transactions. In addition, the Harare and Bulawayo satellite rural areas were included. Data was collected from densely populated market areas. These places have heterogenous groups of both buyers and sellers. 362 participants were surveyed from 111 suburbs and townships. Although the selection was random, care was taken to ensure that there was a fair distribution of age group and gender. Race was considered as a factor. Nevertheless, almost all the buyers and sellers were back Africans. Therefore, the variable is dropped in the analysis. Data on attitude towards different payments, as well as on demographics, were collected.

The second was a survey of product prices for products that are common in the consumption basket. The data were collected from 120 suburbs in Harare and Bulawayo and were used to calculate the cost of making payments. The shops display the different prices for each good depending on the instrument that is used to pay. Prices for beef, mealie meal, Onion and tomato were collected. Separate data was collected for informal and small corner shops and for the large supermarket. The prices from the supermarkets did not vary by payment instrument. The price data discussed here is based on the small shops that exhibited variations in prices by payment instruments.

This exploratory study seeks to understand how perceived costs and risks influence the payment choices made by consumers. The literature typically uses various forms of multinomial logit models to estimate consumer choice (Train, 2002). Point of sale data is prevalently used to estimate payment choices. However, this was not available in the data used for this study. An alternative approach, which uses rating and preference data, was adopted. This method has been used by others, including Stavins (2018), Schuh and Stavins (2015), O'brien (2014), and Jonker et al. (2011), among others. This approach uses preferred methods of payment rather than the actual method of payment used. The challenges faced with the payment infrastructure in Zimbabwe, as enumerated below, implies that

consumers use multiple modes of payment, sometimes for the same transaction.¹ For this reason, the data showed very little variation in payment choices. The data collected also included information on preferred methods of payment and exhibit a similar pattern indicating that over 90% of the respondents prefer to pay by cash (see Table 4). As a result, the preference variable also lacked the variation required to distinguish the factors that make consumers choose between cash and other forms of payment, and therefore hinders inferential testing.

Variations exist in choices between types of electronic methods used and debit card use. Accordingly, the analysis is presented in two stages. The first is a descriptive analysis, which builds an understanding of what the payment instrument structure looks like amongst consumers in Zimbabwe. Perspectives on the impact of cost, convenience, and security were investigated. This is followed by an estimation of a choice model for digital payment methods. Consumers, in general, use multiple payment instruments depending on the source of goods and other situational variables. Consequently, logit models were estimated instead for three digital payment instruments including mobile money, mobile banking, and debit cards.

A behavioural model of payments choice was estimated for the four digital payment instruments. Formally, consumer i faces a choice among J payment instruments from which he or she derives a certain level of utility U . The consumer will select the payment method yielding the highest level of utility so that

$$U_{ij} = V_{ij} + \varepsilon_{ij} \quad (1)$$

Where V_{ij} is the observed utility for consumer i from using payment option j and relates the observed factors to the consumer's utility.

$$V_{ij} = V(X_i, S_j) \quad j \quad (2)$$

X_i is a vector of variables representing the consumer characteristics, including age, income, race, gender, location, and employment status. S_j is a vector of variables representing the characteristics of a specific payment instrument such as the level of acceptance, convenience, security, and associated costs.²

The payment method characteristics were captured as perception or attitudinal data. Trütsch (2016) argues that the choice of payment methods strongly depends on perceptions of the characteristics of the payment instruments. In our data, these perceptions were captured and measured on five-point Likert type scales, which are shown in Table 2. The use of attitudinal data to control for unobserved consumer heterogeneity provides an alternative to the conventional approach of using instrumental variables (Harris & Keane, 1999; Keane et al., 2004). Harris and Keane (1999) and Keane et al. (2004) show that the use of attitudinal information results in a better model fit and interpretation of the estimated parameters. The self-reported nature of the data means that it is possible to capture significant heterogeneity in preferences amongst consumers. The extenuating circumstances in the case of Zimbabwe have an impact on the level and nature of heterogeneity amongst consumers. These are discussed later when looking at how payment methods work in Zimbabwe.

A stylised utility function is adopted to estimate the factors that affect payment instrument choice. It is specified as a function of both the consumer characteristics and the payment instrument characteristics, as represented in the equation below.

$$U_{ij} = \alpha_j + \beta X_i + \gamma S_j + \varepsilon_{ij} \quad (3)$$

Table 2. Scale items

Attitude towards	Question**	Scale
Cost	Please rate the <i>COST</i> of using each payment method. Consider the cost of using or owning the payment method, not the cost of an item purchased.	Very high to very low
Security	Suppose a payment method has been stolen, misused, or accessed without your permission. Please rate the <i>SECURITY</i> of each method against permanent financial loss or unwanted disclosure of personal information.	Very risky to very secure
Acceptance	Please rate how likely each payment method is <i>ACCEPTED</i> for payment by stores, companies, online merchants, and other people or organisations.	Rarely accepted to almost always accepted
Convenience	Please rate the <i>CONVENIENCE</i> of each payment method.	Very convenient to very inconvenient

**Items are the same for each instrument, i.e. Cash, Cheque, Mobile wallet money, Money order, POS Debit card, POS Credit card, POS Prepaid card, ZIPIT Bank Transfer, RTGS Mobile Banking Transfer, RTGS Internet Banking Transfer

α_j is the mean utility from payment method j . As mentioned before, the payment instruments to be used include Mobile money, Mobile banking and debit cards. Consumer characteristics are captured by the age of the respondent (AGE), the monthly income (INC), type of employment (distinguished by formally employed, informally employed, and unemployed), and gender (GEN). Payment characteristics are captured by acceptance (ACC), convenience (CONV), security (SEC), and cost (COST).

Accordingly, the utility function to be estimated takes the form in equation (4)

$$U_{ij} = \alpha_j + \beta_1 AGE_i + \beta_2 INC_i + \beta_3 EMP_i + \beta_4 GEN_i + \gamma_1 ACC_{ij} + \gamma_2 CONV_{ij} + \gamma_3 SEC_{ij} + \gamma_4 COST_{ij} + \varepsilon_{ij} \quad (4)$$

ε_{ij} is assumed to be IID.

4. Results and Discussion

Table 3 shows a summary of the sample characteristics. 54% of the respondents are from Bulawayo while 46% are from Harare. Almost all of them are black Africans and only 5% are non-black. Most respondents are formally employed. The mean age and income of the sample are 33.78 years and US\$600.11, respectively.

Table 4 shows percentage use of different payment instruments by type. Individuals tend to use a mixture of payment instruments. The most popular of these are electronic payments, cash, and card payments. Of the card payment users, almost all use debit cards. Of all the respondents, 92.76% indicated that they use debit cards to pay for transactions. In contrast, only 3.06% and 6.11% indicated that they are using credit cards and prepaid cards, respectively. Transaction level data are not available. However, respondents were asked to indicate the typical purchases made at larger shops as well as smaller shops where card payments are not accepted. Consumers typically use cash to buy goods from small vendors and electronic instruments to pay in supermarkets and well-established convenience shops.

4.1. What does it cost to make a Payment in Zimbabwe?

The price survey data were used to calculate price differentials using the US dollar value as the base instrument. The survey data showed the different prices per good for the different payment

Table 3. Sample demographics

	Frequency	Percent
Sample size	361	-
Males	209	57.89
Females	152	42.11
Age	-	-
mean	33.78	-
maximum	76	-
minimum	20	-
Income	-	-
mean	US\$600.11	-
maximum	US\$4000	-
minimum	US\$90	-
Race: Black	341	95
Other	20	5
Employment status	-	-
<i>Unemployed</i>	31	8.83
<i>Self-employed</i>	92	26.21
<i>Formally employed</i>	228	64.96
City: Bulawayo	196	54.29
Harare	165	45.71

Table 4. Percentage of users per payment method in sample

Instruments	Percentage users
Card payments	93.11
<i>Credit card</i>	3.06
<i>Debit card</i>	92.76
<i>Prepaid card</i>	6.11
Electronic payments	99.72
<i>Mobile money</i>	98.89
<i>Mobile banking**</i>	51.81
<i>Internet banking</i>	29.92
<i>Bank account number**</i>	86.31
Paper payments*	1.93
cash	99.17

* Money orders and cheque payments

** Differ by routing process

instruments. In most large shops, points of sale are linked directly to an exchange rate system which calculates the equivalent prices when different currencies are used. RTGS and US dollar prices are displayed. In the smaller shops where no direct link to the exchange rate exists, prices for different instrument are displayed in RTGS, apart from the foreign currencies, notably US dollar and South African Rand. All cash prices were converted into RTGS equivalence at the official US dollar rate to allow comparison across instruments, which were expressed in RTGSs. The differences were calculated as deviations from the US dollar prices expressed in RTGS terms. The results showed that the prices do not differ by payment instrument when purchases are made at a large supermarket. However, these prices differ in smaller shops and in a few informal vendors who accept different

Table 5. Cost differential from cash in RTGS prices

Product purchased	USD official price*	Electronic bank payment		Bank card		Ecocash		RTGS		Other cash	
		Price	difference	Price	difference	Price	difference	Price	difference	Price	difference
Beef/kg	8,75,232	11,62	-2,87	12,02	-3,3	13,63	-4,88	11,53	-2,78	13,25	-4,5
Mealie/10 kg	12,204,624	16,22	-4,02	16,62	-4,4	18,53	-6,3	16,06	-3,86	17,99	-5,8
Onion/kg	2,15,769	2,89	-0,73	3,29	-1,1	3,39	-1,2	2,86	-0,7	2,56	-0,4
Tomato/kg	1,70,184	2,31	-0,61	2,71	-1,01	2,71	-1,01	2,24	-0,54	3,29	-1,58

*USD official price derived by multiplying the USD price by the official exchange rate(3,039/USD) as at end of April 2019 when data was collected

instruments, as shown in Table 5. EcoCash attracts the highest premiums followed by other currency (South African rand in this case). These premiums likely reflect the risks associated with the payment instrument from the retailer’s perspective. Poor Internet and mobile reception oftentimes cause payments to stall. Retailers are therefore likely to build up a higher premium for such payments to cover the likelihood that they will not receive the payment in real time.

As discussed above, a dual parallel currency market exists in Zimbabwe. The US dollar is sold at rates higher than the official exchange rate. In addition, the local RTGS cash is sold at premium rates using electronic cash. To check the effect of these parallel markets on the cost of payment, we calculated the percentage price differential when US dollar prices are converted into RTGS equivalence at the official price and when they are converted using the parallel exchange rate. Table 6 shows that the official exchange rate leads to bigger price differentials than when the parallel market rate is used. As a result, consumers prefer to buy the local currency on the local market rather than buy the US dollar even if this means that they would pay less in dollar terms. One main reason is that buying US dollars both at the parallel and official rate is almost impossible. Moreover, salaries are paid using bank transfers in the local currency, making it more convenient to purchase the more readily available RTGS cash on the parallel market.

4.2. Attitude towards Payment Instruments

The discussion on the perceptions about payment instruments in this section includes instruments available for online payments only. The inclusion of these instruments is important, as they can work as substitutes for point of sale purchases. Although there is no evidence that online purchases take place on the same scale as mobile money, the data suggests that there are a substantial amount of people using these instruments for making payments online.

Perceived risk

In the survey, the consumers were also asked to rate their perception regarding the risk, convenience, and acceptance of the various payment instruments used. Figure 1 shows the perceived risks associated with the different payment methods. Cash is seen as the riskiest instrument followed by mobile banking and RTGS payments. Although the literature suggests that risk is negatively associated with the use of payment instruments, the data in Figure 1 suggest that this may not be the case with cash. Despite the high-risk perceptions, it is still one of the most frequently used payment instruments, with just over 99% of the respondents indicating that they use cash for payments. This can be attributed to the acceptability of cash by retailers.

Acceptance

Table 6. Comparative cost of making payments

Product purchased	Mobile banking		Debit card		EcoCash		Other Cash	
	Official	parallel	Official	parallel	Official	parallel	Official	parallel
-								
Beef/kg	3,94	-32,8	0,63	-0,37	-12,68	-55,73	-9,54	-51,39
Mealie/10 kg	3,84	-32,9	1,47	-0,36	-9,86	-51,8	-6,66	-47,4
Onion/kg	3,09	-33,9	-10,3	-0,52	-13,7	-57,1	14,15	-18,6
Tomato/kg	1,79	-35,7	-15,2	-0,59	-15,2	-59,2	-39,9	-93,3

Figure 1. Perceived risk of payment instruments.

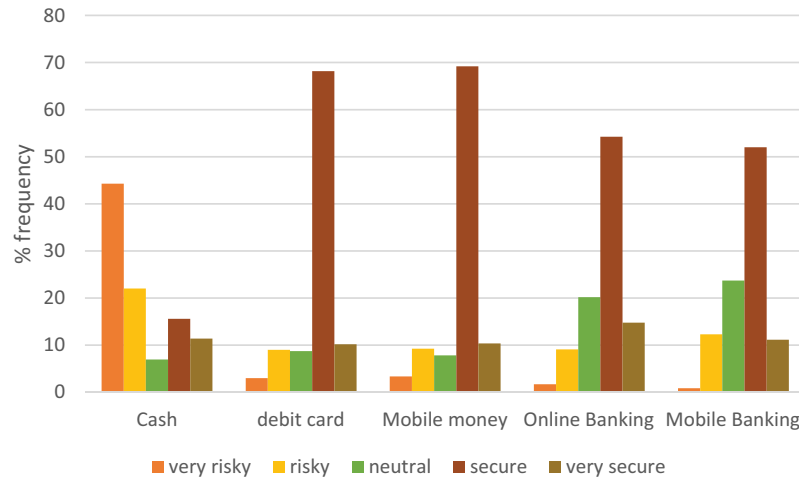
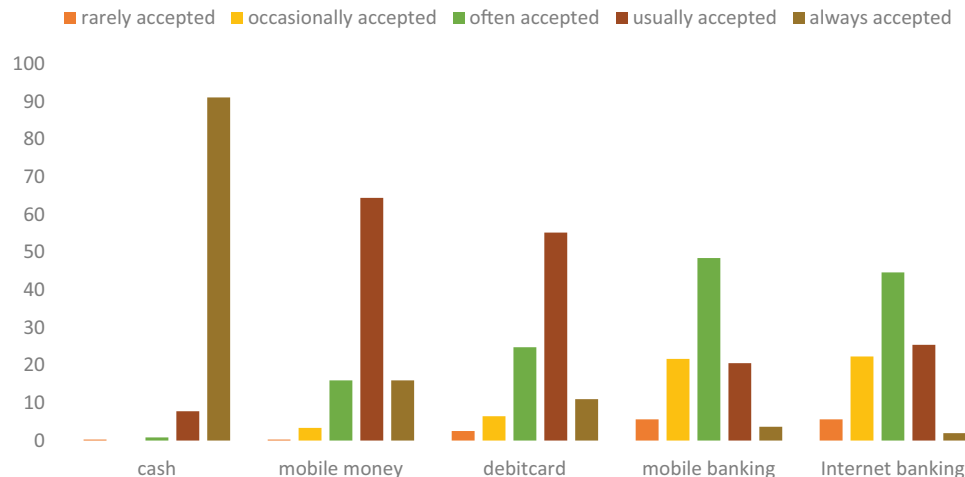


Figure 2. Perceived retail acceptance of payment instruments.



One of the reasons cash may still be very widely used despite the perceived risk is that it is readily accepted. In a two-sided market, as is the case with payments, consumer preferences are bound by retailer acceptance of payment instruments. In the survey, the consumers were asked to rate their perception of the acceptability of the different payment instruments. Figure 2 indicates that cash is by far perceived as the most accepted instrument followed by e-wallet (mainly EcoCash) and debit cards. These are the most widely used payment instruments.

Perceived cost

The cost of using a given payment instrument is known to affect its use. Cash is perceived as the least expensive mode of payment, followed by e-wallet and debit card, as shown in Figure 3. Respondents indicated that e-payment instruments often fail at the point of sale. The failure takes various forms. Due to network problems, a payment may not be possible at all. Therefore, the consumer is forced to search for cash to make a payment. However, most banks have imposed a restriction of a maximum of 50 RTGS dollars per week on withdrawals, making it very difficult to access cash. As a result, consumers are forced to buy cash on the parallel market, which adds a premium on the cost of payment using electronic methods.

Figure 3. Perceived cost of using payment instruments.

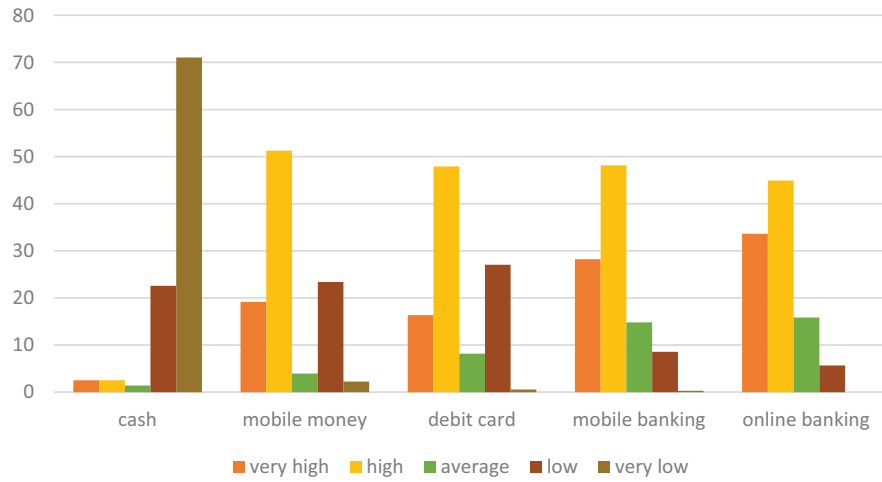
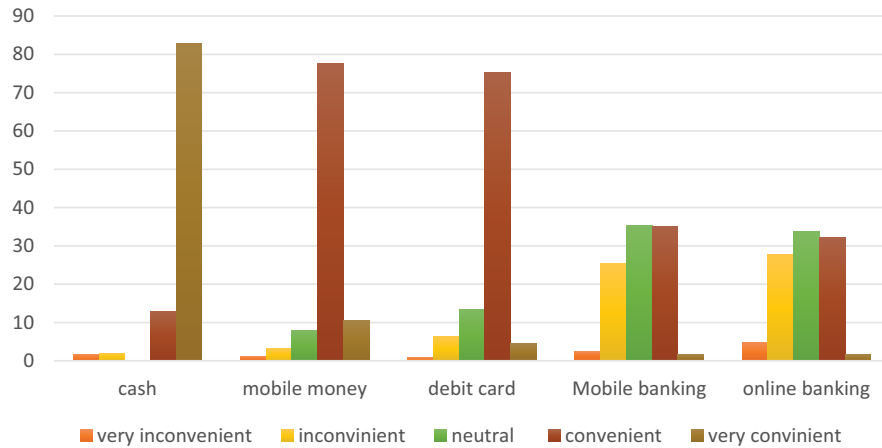


Figure 4. Perceived convenience of various payment instruments.



Additionally, a payment may be authorised by the bank but not received by the retailer. When this happens, consumers must obtain a letter from the retailer. This letter is submitted to the bank, which must issue a chargeable bank statement as proof that money was deducted. Correspondingly, the statement is submitted to the retailer for the refund process to begin. This refund process can take up to four weeks. These perceptions are reflected through the rankings of convenience by method of payments as shown in Figure 4. The rankings almost mirror the perceptions on instrument use.

Factors affecting instrument choice

Finally, the respondents were asked to indicate their preferred method of payment. Respondents also indicated the reason for their choice; they were allowed to give as many reasons as they wanted. The results shown in Table 7 indicate the preferred methods, as well as the frequency of the reasons cited for that choice. The most commonly cited reason for the preference of cash was the cost associated with other methods. This is followed by convenience, especially with respect to mobile money and acceptance.

4.3. Determinants of Electronic Payment Instruments

In this section, we investigate the factors that affect the choice of payment instruments amongst consumers in Zimbabwe. Equation (4) is estimated using a logistic model. Three separate

Table 7. Preferred method of payment and number citing reason for use

Payment method	Availability	Ease of Use	Cost of other methods	Convenience	Security	Acceptance
Cash RTGS	2	1	20	10	3	20
Cash USD	4	14	99	29	18	41
Mobile/E-wallet	14	15	14	46	24	13
Swipe/Bank Transfer	4	8	6	15	12	10

Table 8. Factors affecting choice of electronic instruments (odds ratios)

-	Mobile money	Mobile banking	Debit card
Age	0.951 (0.015) ***	0.989 (0.014)	0.973 (0.036)
Gender	1.195 (0.348)	1.39 (0.401)	0.222 (0.213)
Income	1.0 (0.0004) ***	1.0 (0.000) ***	1.0 (0.003) ***
Employment	0.415 (0.93)	1.05 (0.721)	0.05 (0.068)
-	0.33 (0.221)*	1.61 (1.03)	0.329 (0.424)***
Security	-	-	-
cash	0.843 (0.084) *	0.826 (0.079) **	-
mobile money	0.616 (0.336)	-	0.569 (0.278)
mobile banking	-	1.35 (3.4)	2.35 (1.55)
Internet banking	3.47 (1.87) **	2.55 (1.37)*	0.357 (0.261)
debit card	-	-	2.82 (1.45)**
Acceptance	-	-	-
cash	0.78 (0.31)	-	-
mobile money	1.12 (0.412)	-	-
mobile banking	-	2.01 (0.454) ***	-
Internet banking	0.902 (0.342)	1.53 (0.389)*	3.61 (1.67) ***
debit card	-	-	-
convenience	-	-	-
cash	1.43 (0.314)	1.129 (0.279)	0.293 (0.239)
mobile money	2.23 (0.786) **	-	2.2 (1.04) *
mobile banking	-	-	-
Internet banking	0.52 (0.18) *	1.21 (0.199)	-
debit card	-	-	5.7 (3.76) ***
cost	-	-	-
cash	0.864 (0.84)	0.844 (0.157)	3.41 (1.72) **
mobile money	1.57 (0.591)	1.56 (0.431)	0.373 (0.15)**
mobile banking	-	0.834 (0.225)	0.153 (0.132) **
Internet banking	0.94 (0.37)	-	1.45 (1.03)
debit card	-	-	-
constant	0.09 (0.231)	0.005(0.01) ***	0.023 (0.104)

diagnostics

Pearson $\chi^2(251) = 87.92$ Prob > $\chi^2 = 1.0000$

Hosmer-Lemeshow $\chi^2(8) = 1.05$ Prob > $\chi^2 = 0.9979$

Tjurs R2 0.505

Adjusted McFadden R2 0.304

Standard errors in brackets

Table 9. Percentage change in odds per mode of payment

-	Mobile money	Mobile banking	Debit card
Age	- 4.9 **	- 1.1	- 2.7
Gender	18.6	38.8	- 77.8
Income	0.2 ***	- 1.1***	- 1.1***
Employment	- 58.4	5.5	- 95
-	- 67.1	60.8 **	- 67.1***
Security	-	-	-
cash	- 15.7 *	17.4 *	-
mobile money	- 38.4	-	- 43.1
mobile banking	-	25.3	131.1
Internet banking	247.1 **	52.6 *	- 64.3
debit card	-	-	182.2***
Acceptance	-	-	-
cash	- 22	-	-
mobile money	12.1	-	-
mobile banking	-	101.1 -***	-
Internet banking	- 9.8	- 32.5 *	261.1***
debit card	-	-	-
convenience	-	-	-
cash	43.2	29.9	- 70.7
mobile money	123.3 **	-	-
mobile banking	-	22.5	119.9*
Internet banking	- 48 *	-	-
debit card	-	-	470***
cost	-	-	-
cash	- 13.6	- 15.5	240.9**
mobile money	56.9	56.5	- 62.7**
mobile banking	-	-	- 84.7**
Internet banking	- 6.0	- 16.6	- 45.8
debit card	-	-	-

equations are estimated for electronic instruments that are used at the point of sale. These are mobile banking, mobile money, and debit cards. To estimate the equation, the characteristics of the instrument in question are included as explanatory variables, as well as those of substitute and complementary instruments. To avoid overfitting, the insignificant variables are dropped using the information criteria tests. Therefore, parsimonious models are presented in [Tables 8 and 9](#).

The results in [Tables 8 and 9](#) are shown in two formats. [Table 8](#) shows the results with odds ratios, while [Table 9](#) shows the results as percentage change in odds ratios. The use of percentage changes instead of marginal effects was deemed more appropriate because of the Likert style nature of the data. An increase in the security of digital payment instruments increases the odds of using them as a means of payment. For instance, a unit increase in internet banking security increases the odds of using mobile banking (by 3.5) and internet banking (by 2.6) as a form of payment. Similarly, a unit increase in debit card security increases its use 2.8 times. As expected, an increase in cash security reduces the odds of using digital payment instruments (both mobile and internet banking) by 0.8. The results in previous literature show that various aspects of security associated with digital payments affect the choice of instrument. Trütsch (2016) finds that internet security, which is associated with

mobile payments, increases the use of various types of mobile payment instruments. In addition, Schuh and Stavins (2015) show that security of personal information, associated with various types of online payments, has a positive effect on the adoption and usage of digital payment instruments.

As expected, an increase in acceptance increases the odds of paying with digital instruments. The variable is significant in the mobile banking and debit card equations. Only the mobile and internet banking acceptance variables are significant. In both cases, acceptance increases the odds of using these instruments at the point of sale. Internet banking acceptance increases the odds of internet banking and debit card use by 1.53 and 3.6, respectively. Relatedly, a unit increase in mobile banking acceptance increases internet banking use by a factor of 2, although, this is only significant at the 10% level. Given the challenges associated with the mobile banking infrastructure in Zimbabwe, those with access to online banking are likely to switch to making online payments rather than using mobile banking at the point of sale. This suggests a preference for online purchases and payment of utilities.

The convenience offered by digital payment instruments in general, increases the odds of using them. The relevant variables are significant in the mobile money and debit card equations. A unit increase in mobile banking convenience increases the odds of paying with a debit card by a factor of 2.2, but interestingly, reduces the odds of paying with mobile money. Meanwhile, a unit increase in debit card convenience increases its use by a factor of nearly 6. Similarly, an increase in mobile money convenience increases the odds of using mobile money by 2.23; it also increases the odds of using a debit card. The literature supports the importance of convenience in making choices about payment instruments. See for example, Schuh and Stavins (2015), Trütsch (2016), and Schuh and Stavins (2015) find that convenience has the strongest effect on payment choices.

The cost variables are only significant in the debit card equation. As expected, the higher the cost of cash, the higher the odds of using debit cards. Complementarity is observed again between the various digital instruments. The higher the mobile money and mobile banking cost, the lower the odds of using debit cards as a payment instrument. When mobile money cost increases, Table 9 shows that the odds of using a debit card as a form of payment instrument reduces by 62%. The largest cost impact is shown by cash. An increase in the cash cost increases the odds of debit card use by over 100%. This supports existing studies showing that cash and debit cards have a substitutionary relationship as forms of payment. For instance, David et al. (2016) find that debit cards are perfect substitutes amongst French consumers.

The above discussion demonstrates that there is a complementary relationship between the various digital payment instruments in Zimbabwe. However, the increase in cash cost and convenience has a negative effect on them. Although, this result may be counterintuitive, it supports the assertion that the poor payment infrastructure within Zimbabwe forces the consumers to possess multiple forms of payment at a time. Simatele (2020) shows that if a mobile money payment fails at the point of sale, for example, the consumers are forced to pay with a debit card or provide their banking number. This complementary relationship is also observed between internet banking convenience and credit card use as payment instruments.

In line with the literature, some demographic factors are found to be significant determinants of payment instruments. The odds of using digital payments reduce with age. This finding is in line with Carbó-Valverde and Liñares-Zegarra (2011) and C. Arango et al. (2015) who show that younger consumers tend to use digital payment instruments more than older consumers. The gender variable is insignificant in all the equations. The income variable is significant in all three equations. However, the magnitude of this effect is very negligible. The results also show that individuals with formal employment are more likely to use mobile banking, but are less likely to use a debit card. While the reduced odds of using mobile money are expected, the result that consumers with formal employment are less likely to use debit cards is counterintuitive. However, it can be explained by the fact that most people employed in the informal sector receive cash payments, while employees in the formal sector are paid via electronic means, mostly via bank transfers. The acute shortage of cash implies

that the bulk of cash that is deposited in banks is more likely used either through mobile banking, or with debit cards. For such consumers to use EcoCash as a means of payment, they would have to transfer money between their bank and mobile money accounts. While this is common practice, it is more likely that individuals who have debit cards would find it more convenient to pay using debit cards where they are accepted relative to using mobile money. Conversely, formally employed consumers, most of whom receive their wages and salaries using banks transfers, are more likely to pay using mobile money relative to using a debit card. Moreover, it is common that individuals in the informal sector are traders and they purchase their merchandise from supermarkets and wholesalers who accept debit cards as a form of payment.

5. Summary and Conclusion

This study presented a narrative of the usage of payment instruments in Zimbabwe and discussed the costs of making payments. We discovered that the payment environment in Zimbabwe is unconventional. Although the bulk of official transactions are conducted electronically, there is a strong preference for cash. This, coupled with acute cash shortages, has resulted in multitiered pricing, in which retailers charge a premium on digital instruments to account for the associated risks. This has been fuelled by a persistent failure in efforts to introduce a viable local currency in the face of low domestic productive capacity and high import dependency. Policy responses have largely focused on the demand side. Consequently, most of these efforts have been inflationary, even as the markets continue to exhibit a preference for foreign exchange. The auction system introduced recently is unlikely to eliminate these practices without addressing the supply side of the economy, which is riddled with structural rigidities.

The study also investigated the consumer perceptions of the key characteristics of payment instruments used at the point of sale. We found that cash is perceived to be the riskiest, yet the most widely accepted instrument. Debit cards are not as widely accepted as mobile money but offer the most cost-effective option for consumers. This contrasts with extant findings, mainly in developed economies, which indicate that debit cards are almost as widely accepted as cash. While mobile money is widely accepted, infrastructural inefficiencies and lack of competition make it expensive. The government needs to consider policies that increase the acceptance of payment instruments, such as cards. One example of such a policy that has been implemented successfully in developed countries is the removal of direct payment costs paid by merchants to platform providers. This could be funded through the intermediate money transfer tax, which was introduced in 2018.

Logit models were estimated for three digital payment instruments. The results revealed that risk and cost influence the usage of these payment instruments more than convenience and acceptance. A complementary relationship is observed amongst electronic instruments. This could be explained by the unusual payment infrastructure and incidents of severe cash shortage in Zimbabwe, which always force consumers to carry multiple payment instruments. This, in turn, has resulted in high payment costs for consumers. Being a two-sided market, the payment system has adapted to make consumers move between different instruments even though the process is not costless. The high costs contrast with the lauded benefits of electronic payments. Simatele (2020) argues that dominance in mobile network and mobile money markets generates significant market power in the payments market in Zimbabwe. Consequently, consumers have no alternative providers in the face of inefficiencies and service failures. The inconvenience, risks, and costs of payment instruments borne by consumers, because of such market dominance, are often underestimated. Understandably, in developed and transitional countries, electronic payment systems are driven by the level of financial sector and technological infrastructure development. Therefore, financial inclusion efforts in Africa, which are largely anchored on digital finance and payments, need to be premised on strong infrastructure, consumer protection, and regulation of competition. Policies to this end need to be developed and strengthened.

The results could be refined with the use of point of sale data. Such data has the advantage of providing information on decisions made at the point of sale, which could more closely estimate the consumer's choice. The results of this study are based on a perception data set and provide a very good indication of factors that influence the usage of instruments. Previous literature has highlighted the importance of attitude data as has been used in this study. Nevertheless, future research should explore the use of grocery level data to make the results more comparable to the payment studies in the literature.

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Declaration of interest statement

There is no potential conflict of interest by the authors.

Ethics

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Notes

1. This happens, for example, when a mobile money transaction fails at the point of sale, but reflects as a deduction on the consumer's account. Consumers often chose to pay with another method, such as cash or debit card rather than leave their groceries behind.
2. As noted earlier, race is dropped in the analysis due to very little variation.

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