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Over-indebtedness of microfinance borrowers in South Africa

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Abstract

Access to financial services has grown rapidly in South Africa, especially in the low-income population segment. At the same time, however, the level of overindebtedness has increased, making poor households even more vulnerable. Employing a binary choice logistic regression model for a unique set of crosssectional data from the 2015 FinScope survey, this study investigates the determinants of over-indebtedness among low-income earners and examines the probability of over-indebtedness given borrower demographic factors. Four of these require highlighting. First, in direct contrast to Milton Friedman's life cycle permanent income hypothesis that people borrow, namely to smooth current expenditure with an expectation of a more substantial income stream in the future, thus younger age groups are expected to be indebted, the findings indicate that those older than 60 years are more likely to be over-indebted. Second, province is significant in predicting over-indebtedness, suggesting that there are specific regional features that could increase or decrease the risk of overindebtedness. Third, the level of education is significant in mitigating the risk of over-indebtedness. Finally, using Schicks's definition of over-indebtedness, the study also found that 13.05% of microborrowers are over-indebted in South Africa. These results suggest the need to consider revisiting social policy in South Africa on questions about public education, social protection, and public policy interventions to support the elderly.

Keywords: Over-indebtedness, Microcredit, Low income, Microborrowers, South Africa,

1. Introduction

In recent times, the relevance of mainstream development economics for Africa has come under strong criticisms (Obeng-Odoom, 2013, 2018). One of the areas which has generated heated controversy is the claim that access is a stimulant of the development process (Rajan and Zingales, 2003; Levine, 2005; Bateman, 2019a, 2019b). However, formal financial institutions often serve the rich or middle-class population at the expense of the poor, who are generally marginalised not just because of their poverty but also their ethnicity, race, and gender (Morduch, 2000; Ojong and Obeng-Odoom, 2017). In mainstream development economics, however, the reasons often cited for the financial exclusion of the poor is information asymmetry, high transaction costs, and often the rigidity of the formal financial institutions to find solutions to these challenges (Beck, Demirgüc-Kunt and Honohan, 2009). Although contested, framing the problem this way provided mainstream development economists, and the world development agencies to create the conditions and recognitions for the formation of the microfinance sector in the 1970s, pioneered by Muhammad Yunus, through the formation of the Grameen Bank in Bangladesh, which offered small loans to village women (Bernasek, 2003; Bateman, 2019a, 2019b).

Recently, over-indebtedness of microborrowers was identified as the biggest threat to the survival of the microfinance sector in different parts of the world (Chen, Rasmussen, Reille and Rozas, 2010; Sriram, 2010; Mohan, Potnis and Mattoo, 2013; Lascelles, Mendelson and Rozas, 2014). Milford Bateman (2018), a leading scholar in this field, recently observed that the suppliers of credit are the main beneficiaries of the microcredit model. South African borrowers are struggling with debt as the share of household debt in disposable income was 73.4%, and the cost of servicing household debt as a percentage of disposable income was 9.5% in the fourth quarter of 2017 (South African Reserve Bank, 2017). Over-indebtedness has become common even among mining workers often better paid than workers in other manual labour industries. Of course, in the mining sector, it is the marginalised, usually black workers and women, who are the most indebted. That is evidently the case of the recent strikes in Marikana¹ where mostly black miners were struggling to make ends meet and were demanding salary increases in order to alleviate their burden of poverty

¹ Marikana is a mining town in the Rustenburg municipal area in the North West Province of South Africa. It is famously known for the protracted labour strike that took place in 2012 which descended into violence, resulting in the deaths of 34 miners at the hands of the police.

(Bateman, 2012 and Benya, 2015), a legitimate demand whose resistance by capital in cahoots with the state killed several protesters (Bond, 2013).

As such, this study seeks to provide empirical evidence for the question is over-indebtedness among low-income earners or microborrowers in South Africa perverse, are there borrower characteristics or features that could increase or decrease the risk of over-indebtedness if present; and is there empirical evidence suggesting that microfinance is detrimental to the vulnerable sections of the society? Few empirical studies have been conducted to explore the household debt phenomena (Schoombee, 2000; Daniels, 2001; Nyaruwata, 2009; Mashigo, 2006; Ssebagala, 2015; Ntsalaze and Ikhide, 2016; Bateman, 2019a, 2019b). However, these studies do not answer these questions. Indeed, most South African studies have explored over-indebtedness in the context of all consumer households; rarely was over-indebtedness explored and supported by empirical evidence in the context of microfinance.

Answering these questions, however, is important as microfinance continues to be seen by policy makers as a development tool used to target low-income earners who are mainly financially excluded by banks. Therefore, this study tries to determine the extent of over-indebtedness among low-income earners using microfinance definition of over-indebtedness largely pioneered by Schicks, which focuses on the undue strain that a borrower could be experiencing in trying to avoid default in making payments, a first study to do so in South Africa. Furthermore, the study seeks to examine socio-demographic and economic factors of borrowers, and whether these can be used to predict over-indebtedness when present. This would be useful to policy makers and micro-finance sector in curbing over-indebtedness and to protect the vulnerable members of the society.

The first section provides an introduction and background to the microfinance sector in South Africa, related debates on the provision of finance, and a discussion on socio-demographic and economic factors and whether these factors can predict over-indebtedness when present. Section 2 explores the definition and measurement of over-indebtedness, which is quite important in informing the methodology used by this study to undertake the test of over-indebtedness. Section 3 discusses the empirical results and the last section provides conclusion and recommendations based on findings.

1.1. Background to the microfinance sector in South Africa

In South Africa, financial exclusion and access to finance can be traced to the legacy of apartheid, where the black majority was excluded from financial

services (Meagher and Wilkinson, 2002). Since 2004, financial institutions began offering financial products targeting the poor. One such noticeable intervention was that of the Mzantsi bank accounts, which saw predominately excluded low-income households accessing financial services (Kostov, Arun and Annim, 2015). Moreover, the government's initiative to amend the Usury Act in 1992 and the Exemption Notice of 1999, changed credit markets (Meagher and Wilkinson, 2002) and facilitated market entrance to new players, which consequently, resulted in a breakthrough for the microfinance industry in South Africa.

The banking sector, in particular, started to show interest in providing financial services, particularly unsecured loans to low-income households. Subsequently, banks such as Capitec, African Bank, Post Bank, and ABSA have modified their product offerings and targeted low-income households and the poor. As such, the definition of a microborrower in South Africa is not aligned to a conventional definition of microfinance borrowers, and the client characteristics of microborrowers in South Africa are very different from those in the rest of the world (Meagher and Wilkinson, 2002) and the suppliers of microcredit in South Africa evidence this. South African microcredit suppliers are reflected in Table 1 (Calvin and Coetzee, 2010).

Product	Micro deposit	Salary-based microloans	Microenterprise loans	
Suppliers	1. Primary banks	1. Primary banks	1. Primary banks	
	2. Alternative banks	2. Alternative banks	2. Alternative banks	
	3. Financial cooperatives	3. Financial cooperatives	3. Not-for-profit microenterprise lenders	
	4. Stokvels	4. Microlenders	4. Development finance institutions	
	5. Development finance institutions	5. Development finance institutions		
Stage of development	Maturing	Maturing	Early stage	

TABLE 1: PROFILE OF THE MICROFINANCE SECTOR IN SOUTH AFRICA

Source: Calvin and Coetzee, 2010

As depicted in Table 1, it is clear that microfinance providers in South Africa have diverse characteristics. As such, borrower characteristics are also different. Daniels (2001), as well as Meagher and Wilkinson (2002), noted that microborrowers in South Africa are typical government employees earning "income of between R1 000 and R5 000 per month". Considering that this study was conducted in 2001 and 2002, this salary bracket is expected to

have grown and be commensurate with inflation numbers. In order to get an updated salary bracket for microfinance borrowers, the study conducted by Orsmond, Mackenzie, Mokoena and van Rensburg (2013) on the emergence of low-cost bank branches in South Africa provides a useful reference to the definition of low entry individuals. The study defines entry-level individuals as those "individuals within LSM² 1-6, with an associated average income up to R7 500 per month, and are formally employed" (Orsmond *et al.*, 2013:1). The study also found that these individuals constitute 65% of the South African adult population. Therefore, for the purpose of this study, the definition of low-entry level individuals provided by Orsmond *et al.* (2013) would be adopted. As such, low-income earners or microborrowers are defined as those earning R7 500 per month or less.

There has been growing criticism levelled against the microfinance sector, especially related to the over-indebtedness of poor- and low-income microborrowers (Bateman, 2012 & Bond, 2013) These growing concerns relate to the lending practises of microlenders in South Africa. Futuregrowth Asset Management (2013) announced that it would "wind down" its exposure to microlenders, including Capitec, African Bank, and other unsecured lenders, on moral grounds (Shivel, 2013). Bateman (2019) goes even further and suggests that South Africa's microcredit is a United States version of the sub-prime style disaster, and the author notes that the microcredit sector has served a tiny financial elite working in the microcredit sector, while destroying other pillars of the economy and society.

It would seem that this is not only a concern in the microcredit space in South Africa as Alfonso, Morvant-Roux, Guérin and Forcella (2016), in their assessment of the Dominican Republic's microcredit industry, noted that a paradigm shift was necessary in the sector. The authors noted that the microcredit positive social outcomes were being jeopardised by focusing on growth due to increased competition. In the study of Jamaica's microfinance sector, Hossein (2016) casted doubt on the effectiveness of the microfinance sector to facilitate financial inclusion and noted that the sector was susceptible to class and client biasness and it therefore needed to be re-looked. Therefore, studies such as these are essential in providing empirical evidence on areas that require consideration

² LSM refers to Living Standard Measures, and these indicators were conceptualised by the South African Audience Reference Foundation (SAARF), and are widely used in marketing, advertising, and the tourism industry to target specific categories of consumers based on their levels of income.

and rethinking if the sector is to continue to play an essential role in the financial development of the poor.

Microfinance lenders have also found the South African market to be challenging, with some microlenders having gone bust and some banks that were players in this space collapsed. The notable collapse was that of Unibank, Saambou, and recently the placing of African Bank under curatorship. Saambou's management ascribed the bank's challenges to the poor performance of its microfinance business activities (South African Reserve Bank, 2002). Saambou could not recover from its challenges and was subsequently acquired by African Bank.

African Bank grew rapidly mainly from the unsecured loan finance and did not function like a traditional bank (Seta, 2013). African bank, together with Capitec, were classified as alternative banks, as they targeted entry level or low-income earners (Seta, 2013). While both banks enjoyed exponential growth in their assets (deposits), there was also growth in their loan books. The African Bank loan book was significantly higher than that of Capitec, with an average loan size of R17 700 compared to Capitec's R8 300 and an impairment ratio of 19.3% compared to the 8.8% of Capitec (Seta, 2013). As a result, aggressive lending coupled with a lack of proper risk management by African Bank resulted in the bank being placed under curatorship and being fined for reckless lending. In 2013, three large micro-enterprise credit suppliers, Marang Financial Services, Women's Development Business (WDB), and the ABSA Micro-Enterprise Finance Division closed operations and the absence of strong leadership were blamed for the closure of both Marang and WBD, while ABSA closed its microfinance section due to high overhead costs (Seta, 2013). Bateman (2019b) has noted that African Bank and Capitec have been used as a vehicle to promote personal enrichment of its managers at the expense of the borrowers. There are, however, limitations posed by the absence of sectoral data and, as a result, it is difficult to compare the performance of salary-based microlenders and their contribution to over-indebtedness when compared to the formal financial sector, such as banks who offer microcredit.

1.2. Overview of over-indebteness and existing literature

Studies have analysed a variety of socio-demographic and economic characteristics to determine its association with over-indebtedness. These studies are generally based on all household or commercial debt and not just microfinance borrowers/households. Maurer and Pytkowska (2011) measured

over-indebtedness among microborrowers in Bosnia and Herzegovina by debt service payments in relation to income. They classified microborrowers as over-indebted if they used 75% of their net household income on debt servicing. A total of 17% of microborrowers in Bosnia and Herzegovina were over-indebted. Schicks (2011), in her study of 531 microborrowers in Ghana, asked borrowers to list the sacrifices made in the past six months to meet loan repayment obligations. The study found that 37% of Ghanaian borrowers were over-indebted using this method. Smits and Günther (2017) assessed over-indebtedness of microborrowers in Uganda building on Schick's model and tested for financial distress by asking consumers questions regarding sacrifices made to pay loans.

Daniels (2001) found that cash flows among urban South African households decreased while indebtedness generally increased and that households are consuming credit for income smoothing instead of asset accumulation. This view is supported by Hurwitz and Luiz (2007), who found that the liberalisation of the financial sector in South Africa resulted in credit growth, and superseded growth in income for poor households. Collins (2008) found that indebtedness in South Africa among rural, unsalaried households is pervasive, persistent and less easily remedied legislatively. In terms of racial differences, Daniels (2001) found that over-indebtedness of consumer households was high among the white population and low among the African and coloured population. Daniels (2001) states that this was due to the high number of low-income households and poor African and coloured people being unlikely to qualify for loans due to the absence of collateral. In addition, this study was conducted using income and expenditure figures of 1995; however, a lot has changed in the South African financial markets since 1995. Of the recent studies conducted, Nyaruwata (2009) investigated over-indebtedness among households and noted a relative concentration of over-indebted households among the low-income band. Due to financial deepening efforts such as deregulation and financial innovation, low-income households have seen improvements in access to credit. Mashigo (2006) found that poor income households have seen the most considerable increase in the number of loans and percentages of indebtedness compared to other income bands. However, poor households were still not the primary consumers of credit. Ssebagala (2015) found that in South Africa, lowincome or vulnerable groups experience heavier debt-burdens, even though they only consume a small proportion of the debt. Mashigo (2006) called for urgent measures to be put in place to deal with the explosive debt crisis. A decade after Mashigo's study on the over-indebtedness of households, Fatoki (2017) found over-indebtedness among South African households to be pervasive and recommended that the NCR play an active role in preventing adverse lending practices by financial institutions. While there has been a sizeable amount of empirical studies on over-indebtedness among consumer households, there exists a vacuum in testing the socio- economic and demographic characteristics of microborrowers, namely age, gender, race, education levels, marital status, number of dependents, geographic area, and province, as well as income, employment status, and adverse shocks for statistical significance in explaining over-indebtedness.

1.3. Socio-economic and demographic characteristics of borrowers and their association with over-indebtedness

Age

Mashigo (2006) found age to be a significant determinant of over-indebtedness. Kempson (2002) found that households that are headed by an individual who is aged in his/her twenties or early thirties tend to have the highest debt-income ratio. Bridges and Disney (2004) support this view, Khalily, Faridi and Shaheed (2016), as well as Loke (2016) who found that older age groups are less likely to live beyond their means, and are more disciplined in managing their finances. Nyaruwata (2009:25) also found that in South Africa "the age of households head category that is most likely to be over-indebted is that of household's heads between 15-20 years of age". Those younger groups were noted to have higher financial commitments because of younger families, but a lack of financial discipline was also noted as a cause for over-indebtedness. It would seem that literature agrees that age is a significant determinant of over-indebtedness.

Gender

Pytkowska and Spannuth (2011) found that gender-related differences were mixed. Nyaruwata (2009), as well as Khalily *et al.* (2016), found females to be more likely to be over-indebted than their male counterparts. However, Khandker, Faruqee and Samad (2013) in their study of over-indebtedness in Bangladesh, found that male-headed households are more indebted than female-headed households in the short-run, but not in the long run. In the context of South Africa, Daniels (2001) found that male-headed households are at least twice as indebted as female-headed households across all four debt variables. This suggests that literature is not in agreement whether the gender of the household's head is significant in estimating the probability of over-indebtedness of that household.

Race

A study conducted by Loke (2016) in Malaysia found ethnic differences to be statistically significant in determining over-indebtedness. This was also supported by a study conducted by Schicks (2013) and Bridges, Disney and Gathergood (2008) who found race to be significant in predicting over-indebtedness. In a study conducted by Daniels (2001) in South Africa, ethnicity was found to be significant, and Africans were more indebted compared to their white counterparts. While there was no evidence of a plethora of literature that has tested the probability of race to over-indebtedness, it seems that from the few studies conducted, they agree with the statistical significance of race/ ethnicity to over-indebtedness.

Education levels

Gonzalez (2008) studied the over-indebtedness of Bolivian households and found education to be the only significant socio-economic variable associated with the household's ability to repay; however, the marginal effect was considered small. Puliyakot and Pradhan's (2017) study in Tamilnadu in southern India, found no apparent relationship between education and over-indebtedness. However, Smits and Günther (2017) noted that if a borrower does not understand interest rates charged on loans and its financial implications, he/she is likely to find himself/herself over-indebted. Literature is not in agreement on whether education is significant in estimating the probability of over-indebtedness among microborrowers, but financial literacy in literature seems to be strongly associated with over-indebtedness.

Marital status

Augsburg, De Haas, Harmgart and Meghir (2015), as well as Loke (2016) found marital status to be insignificant in determining the probability of overindebtedness. However, Schicks (2014) and Davydoff *et al.* (2008) found that marital status is significant in determining the probability of over-indebtedness. Empirical studies are not in agreement whether marital status is significant in determining over-indebtedness. However, there seem to be several studies that have found marital status to be significant in determining the probability of over-indebtedness.

Income

Studies show a positive relationship between indebtedness and low income (Thaicharoen, Ariyapruchya and Chucherd, 2004; Chen and Chivakul, 2008; Disney *et al.*, 2008; Anderloni and Vandone, 2011; D'Alessio and Iezzi, 2013;

Ssebagala, 2015). Loke (2016) also found that household income had a significant effect on determining the probability of falling into over-indebtedness. The study further noted that higher income reduces the likelihood of encountering problems of insufficient income to cover living costs, compared with the low-income group. Collins (2008) found a correlation of indebtedness to income only in urban and not rural areas, and credit in urban areas consists mainly of formal arrangements and in rural areas of informal arrangements. However, a study by Puliyakot and Pradhan (2017) on the determinants of over-indebtedness in microfinance showed that household income does not hold any significant influence with over-indebtedness of a borrower's household. Literature is not in agreement whether income is strongly associated with the probability of being over-indebted.

Province and geographic area

Collins (2008) found that over-indebtedness among urban salary earners in South Africa is more significant compared to that of rural households. This could be linked to issues such as access to credit, as urban dwellers have higher levels of access to credit compared to rural dwellers. In terms of provincial variation, a study conducted by Daniels (2001:8) found the "Western Cape being the most indebted province at the lower end of the income distribution". This study noted that borrowers in Gauteng who were over-indebted were in the middle- and upper-end income spectrum. It could be argued that the Western Cape and Gauteng's dominance among the more highly indebted provinces could be contributed to the fact that finance is probably more widely available in these areas. However, no study was found that concluded that provinces or area of dwelling in South Africa was statistically significant in determining the over-indebtedness of borrowers.

Adverse shocks

Gonzalez (2008) found that households that experienced adverse shocks had a higher probability of being over-indebted compared to ordinary households who experienced no shocks. Schicks (2010; 2011) noted that adverse shocks to the income or expenses of a microborrower could turn an existing debt level from acceptable to unmanageable. Schicks (2010:8), citing relevant literature, noted that adverse shocks include, "personal shocks such as illness or job loss, macroeconomic developments such as the current financial crisis and its impact on the real economy can drive borrowers into unforeseen financial difficulties, as well as natural disasters and changes in government policies". This view is supported by Liv (2013) and Smits and Günther (2017), who found that adverse shocks were positively correlated with over-indebtedness. Literature is in agreement that sudden income volatility could be a significant determinant of over-indebtedness.

Household size or number of dependents

Schicks (2014) found that household size was statistically significant and had a negative relationship with over-indebtedness, implying that when the number increases, over-indebtedness reduces. However, Liv (2013) and Loke (2016), in their study of over-indebtedness in Cambodia, found no clear correlation between over-indebtedness and household size, while Gonzalez's (2008) study in Bolivia noted that household size had an insignificant relationship to overindebtedness. Chen and Chivakul (2008) noted that larger families are more likely to borrow compared to smaller ones, as they are more likely to have a higher dependency ratio and the family size/household number is positively correlated with over-indebtedness. This is supported by studies conducted in South Africa by Nyaruwata (2009). Literature is not in agreement that household size is significant in determining over-indebtedness and whether the relationship is positive or negative.

To conclude, there is a significant amount of empirical literature on overindebtedness and on socio-economic and demographic factors of borrowers, however, these studies are mainly on all consumer household. In addition, the definition used to determine over-indebtedness varies across the different studies, most importantly most studies on consumer over-indebtedness do not use microfinance related definition of over-indebtedness, which focuses mainly on the undue strain faced by debtors in meeting debt repayments. As such, these weaknesses suggest that the relationship between access to credit for lowincome earners and over-indebtedness, is not well understood, as well as which socio-economic and demographic characteristics predict over-indebtedness. Therefore, it is necessary that this study explores over-indebtedness among low-income earners, using microfinance definitions of over-indebtedness and examine the socio-economic and demographic factors of borrowers, whether these can predict over-indebtedness among low-income earners.

2. The data and methods

2.1. Definitions

While concerns for over-indebtedness of microborrowers have grown, and with microfinance in some countries imploding, there is no consensus on the definition

or measurement of over-indebtedness. Researchers have attempted to define and measure over-indebtedness in diverse ways. Haas (2006:3) defines overindebtedness as the inability of borrowers "to repay all debts fully and on time", while Gonzalez (2008:25) defines it as "the emergence of payment difficulties that may result from unwillingness to repay, complete or partial inability to repay, or costly actions for the borrower in order to repay". Pytkowska and Spannuth (2012) define over-indebtedness of microborrowers from a household perspective and state that a household is considered to be over-indebted if it cannot meet its payment obligations arising from all the debt contracts which the household has entered into. All these definitions are focusing on the inability of a borrower to meet repayment obligations. However, the challenge that has been noted by some scholars with regards to the definitions that focus on non-payment is that it only considers debtors who have defaulted and not the borrower that could have made extreme sacrifices to pay debts. Defining undue sacrifices made by borrowers to repay debt would, however, be subjective.

Guérin, Roesch, Venkatasubramanian and Kumar (2013) point out that overindebtedness may sometimes be construed as a question of perceptions and social consequences rather than a real problem of disequilibrium among assets. revenues, and debt. Guérin et al. (2013) further concluded that whether the debt is considered being a burden depends on the nature of the debt relationship rather than the amount. Schicks (2010:6) states that "a microfinance customer is over-indebted if he/she is continuously struggling to meet repayment deadlines and structurally has to make unduly high sacrifices related to his/her loan obligation". In the context of South Africa, it should be noted that the National Credit Regulator (NCR) defines over-indebtedness as "a situation in which debtors' indebtedness has reached a level where they cannot continue paying their debts as they fall due or appear to have no reasonable prospect of being able to pay the debts when they fall due, without causing undue strain on their personal or family welfare" (South Africa, 2005). Both the definitions provided by Schicks (2010) and the NCR (2005), consider the issue of undue strain that a consumer could be experiencing in trying to avoid default in making payments. For this study, Schicks's (2010) definition of over-indebtedness is adopted.

2.2. Measurements

Literature shows that it is difficult to find a universally accepted measure of how much is too much. Scholars have used various means to study the overindebtedness phenomena, and mixed results were noted, pointing to the advantages and disadvantages of different methods used to test this phenomenon. D'Alessio and Iezzi (2013) identified four broad measures to investigate the over-indebtedness phenomena which are reflected in Table 2.

Cost of servicing debt	Households spending more than 30% (or 50%) of their gross monthly income on total borrowing repayments		
	Households spending more than 25% of their gross monthly income on unsecured repayments		
	Households whose spending on total borrowing repayments takes them below the poverty line		
Arrears	Households more than two months in arrears on a credit commitment or household bill		
Number of loans	Households with four or more commitments		
Subjective perception of burden	Households declaring that their borrowing repayments are a "heavy burden"		

TABLE 2: COMMON MEASUREMENTS OF OVER-INDEBTEDNESS

Source: D'Alessio and Iezzi, 2013

In a study conducted by D'Alessio and Iezzi (2013), it was found that methods that are used to determine over-indebtedness using the cost of service debt definitions, ignore the fact that households might have assets that could be used when debt burden is overwhelming. The availability of assets could allow heavily burdened families to access more credit, which might provide a mechanism to cope with debt pressures. Nyaruwata (2009) notes that the debt-to-income ratio (i.e., outstanding debt over flow of income) does not give a tangible point at which to evaluate whether a household has become over-indebted.

Methods that only take into consideration accounts in arrears to determine overindebtedness are heavily depended on what is acceptable in different countries and the financial circumstances of a household (D'Alessio and Iezzi, 2013). Furthermore, this measure may overlook those who still manage to meet their financial obligations but who have borrowed in order to meet those obligations; such borrowers are considered to be over-indebted. According to Schicks (2010; 2011), D'Alessio and Iezzi (2013), as well as Betti, Dourmashkin, Rossi and Yin (2007), any method that determines over-indebtedness based on defaults or arrears or declared bankruptcy, does not take into consideration that a borrower could be managing his/her debt obligations but rather suffers a substantial shock that results into loan defaults; thus, such a method omits the human element.

D'Alessio and Iezzi (2013), as well as Betti *et al.* (2007), found that the criteria used to look at the number of commitments were not reliable in detecting debt

situations reliably since when a borrower has a large number of outstanding small debts, it does not necessarily imply a condition of difficulty. Schicks (2010; 2011) and Betti *et al.* (2007), in their studies on over-indebtedness, favoured the subjective approach of measuring over-indebtedness. This approach necessitates that a borrower's perception of his/her debt is used as a measure to determine over-indebtedness. Considering that the different measurements or methods address various aspects of over-indebtedness as they each provide potentially valuable information regarding the state of over-indebtedness of a borrower, it is essential to use a combination of these measurements to test over-indebtedness. This study measures over-indebtedness in line with Schicks's (2010; 2011) definition, which emphasises two components, namely (1) a borrower is continuously struggling to meet repayment deadlines, and (2) structurally must make unduly enormous sacrifices related to his/her loan obligation.

2.3. Theoretical framework

In reviewing the over-indebtedness of microborrowers, one has to note that the credit rationing theory by Stiglitz and Weiss (1981) act as a departure point in understanding the participation of microlenders in the economy. This theory states that asymmetry problems produce credit rationing in an economy and as a result, poor- or low-income households tend not to have access to credit to formal institutions due to these problems. Consequently, these households would borrow from friends and family, as well as informal sources such as mashonisas (informal moneylenders). This demand for credit by low-income households can be linked to the life cycle theory developed by Ando and Modigliani (1963) which provides a framework for analysing household behaviour by recognising that current consumption is determined by current and future expected income. Hurwitz and Luiz (2007) deduce that the life cycle theory shows that expenditure and credit usage may be a function of expected future earnings rather than proportional- to current savings.

It seems that for microborrowers, the permanent income hypothesis (Friedman, 1957) assists in understanding why microborrowers borrow, namely to smooth current expenditure with an expectation of a more substantial income stream in the future, as such, the younger groups are expected to borrow and constitute the higher number of those indebted.

2.4. Data

This study used 2015 FinScope data, which are nationally representative of South Africans aged 16 years and older (FinMarkTrust, 2015). Data was

gathered through conducting face-to-face interviews with 5 000 individuals and weighted and benchmarked according to Statistic South Africa's 2015 mid-year population estimates.

Due to the nature of microfinance in South Africa, as mentioned previously, the definition of a microborrower is not straightforward. As mentioned, using Orsmond *et al.*'s (2013) definition of low-income earners, microborrowers, are defined for the purposes of this study as those earning R7 500 per month or less who have borrowed from both formal- and informal institutions. This population group is the largest (65%) among income earners in South Africa. As a result, of the 5 000 individuals interviewed in the survey, only 2 330 respondents earned a monthly income of less than R7 500 and consequently, qualified to be used for further empirical testing as microborrowers.

In the FinScope Consumer 2015 survey (FinMarkTrust, 2015), a respondent is considered over-indebted if:

- i) He/she is borrowing to repay another debt,
- ii) He/she does not want to borrow or had a loan application turned down because of too much debt,
- iii) He/she has had debt that was restructured,
- iv) He/she defaulted on a debt obligation,
- v) He/she has a garnishee or emolument order or has been garnished.

The first model to test over-indebtedness, applied the FinScope (FinMarkTrust, 2015) definition of over-indebtedness and is classified as Model 1. The second model applied Schicks's (2010) definition of over-indebtedness and was classified a Model 2. In the survey, the following questions were considered to be indicators of a debtor that is struggling to meet repayment deadlines: (1) You have considered going to see someone to help you with your debt problems? or (2) You usually have problems making ends meet? or (3) Your household's debt situation worsened to such an extent over the past three months that you considered seeking assistance from someone else? The question "Your household considered reducing other commitments in order to repay its debt during the past three months?" was used as an indicator of a borrower that made "undue high sacrifices related to his/her debt obligation". A borrower was classified as over-indebted if he/she has answered "yes" to one of the first three questions and has also answered "yes" to the last question regarding undue sacrifices related to the debt obligation.

2.5. Empirical model

This study applied a binary choice logistic regression model to estimate the likelihood that a respondent is over-indebted. The model is expressed as follows:

$$\operatorname{Log} \frac{P}{1-P} = \alpha + \beta_i X_i + \varepsilon$$

The dependent variable is a binary dummy variable that equals 1 if the respondent is over-indebted and 0 otherwise. P refers to the probability that a respondent is over-indebted, and 1- p refers to the probability that a respondent is not over-indebted. Log (p/(1-p)) is the log of odds that a respondent is over-indebted, β_i are the coefficients of the explanatory variables, and X_i refers to the explanatory variables as defined in Table 3. \mathcal{E} is the stochastic disturbance term in the regression. Logit and probit models are appropriate when attempting to model a dichotomous dependent variable, e.g., yes/no, agree/disagree, like/dislike, etc. and it ensures that the estimated probabilities lie between the logistical limits 0 and 1 (Gujarati, 2004). According to Green (2000), the distinction between the two models does not result in a significant difference. This view is supported by Gujarati (2004), who noted that the only difference lies in the logistic distribution that has slightly fatter tails.

Information criterion statistics (e.g., Akaike Information Criterion (AIC) or Bayesian Information Criterion (BIC), respectively) rank the evidence in the data to select models from a set of *a priori* models. Moreover, information criteria explicitly value the parsimony of the model by including a penalty for an increased number of variables. Information tests are comparative, with lower values indicating the preferred model. In this study, Model 2 is the preferred model; hence, the descriptive statistics are only for this model.

Variable name	Description
Model_1	Over-indebted if the person is borrowing to repay another debt, does not want to borrow or had loan application turned down because of too much debt, had debt restructured, defaulted on a debt obligation, had a garnishee or emolument order, or has been garnished.
Model_2	Over-indebted if the person has (1) considered going to see someone to help him/ her with debt problems, or (2) usually have problems making ends meet, or (3) the debt situation worsened to such an extent over the past three months that the borrower has considered seeking assistance from someone else, and the household has considered reducing other commitments in order to repay its debt during the past three months.
Age group	Respondent's age group $(1 = \text{Youth } 16 - 35 \text{ years}, 2 = \text{Adults } 35 - 60 \text{ years}, 3 = \text{Seniors } 60 + \text{years})$
Gender	Respondent's gender $(1 = Male, 2 = Female)$
Race	Respondent's race (1 = Black, 2 = Coloured, 3 = Asian/Indian, 4 = White)
Education	Educational achievements of the respondent (1 = No schooling, 2 = Primary school, 3 = Secondary school, 4 = Post-Secondary School)
Employment	Respondent's employment status (1 = Employed, 2 = Unemployed, 3 = Retired)
Marital status	Respondent's marital status (1 = Married, 2 = Widow, 3 = Divorced, 4 = Single)
Personal income	Monthly household income (1 = No income, 2 = R1 – R999, 3 = R1 000 – R2 999, 4 = R3 000 – R7 500)
Geographic area	Geographic area in which the respondent resides (1 = Urban, 2 = Traditional, 3 = Farms)
Province	Province in which the respondent resides
Adverse shocks	Borrowed for (1) medical reasons and (2) emergencies such as death etc. $(1 = \text{Yes}, 2 = \text{No})$
No. of dependents	Number of dependents that the respondent has

TABLE 3: COMMON MEASUREMENTS OF OVER-INDEBTEDNESS

3. Results

3.1. Descriptive results

The descriptive analysis of the total sample of microborrowers (2330) reflects that those over-indebted were 304 out of the total sample. The primary features of the data show that 58% of the respondents were aged 16 to 35 years. Females constituted 55% of the sample. Africans were overly represented at 85%, with Asians or Indians at 2% of the sample size. The sample racial distribution reflects the racial percentage distribution of the country. It is also worth mentioning that blacks were the primary low-income earners, which is consistent with the inequality statistics of South Africa. As such, whites represented only 4% of the sample of low-income earners. The majority of respondents had a secondary

school education (83%), were unemployed (58%), single (69%), lived in urban areas (60%), and have not reported adverse shocks (78%) to their financial resources.

Using Schicks' (2010) definition of over-indebtedness, 13% of the respondents were found to be over-indebted (304 out of the total sample size (n = 2 330)). In terms of the characteristics of the over-indebted, it was noted that the majority (61%) of those over-indebted were between 16 and 35 years of age. This confirms the findings of a descriptive study conducted by Ntsalaze and Ikhide (2016) on the over-indebtedness of low-income households in South Africa, who found that households with heads aged between 31 and 40 years, had the highest level of over-indebtedness. Africans are the most over-indebted (90%) when compared to other races (e.g., Asian/Indian = 1%). Education was measured in terms of education levels, ranging from "no schooling" to post-secondary/university education. The majority (83%) of those over-indebted had secondary schooling, which is between Standard 8 (Grade 10) and Standard 10 (Matric/Grade 12). These results are consistent with the work of Ntsalaze and Ikhide (2016).

In terms of marital status, those who were single (never married) the majority (73%) were over-indebted, followed by married respondents (20%). Those living in the urban areas constituted the highest percentage of those over-indebted, followed by those in traditional areas. Nyaruwata (2009), also found urban dwellers to be highly over-indebted, and a high percentage of those over-indebted were from Gauteng. Gauteng is considered the most urbanised province in the country. The percentage of those who used borrowing for adverse shocks/ emergencies was only 24% compared to those who were over-indebted and borrowed for other reasons (76%). This may indicate that respondents borrowed to supplement consumption as also found by Meagher and Wilkinson (2002).

3.2. Empirical results

Table 4 shows that age is significant in Model 1 only for seniors (at 5% significance with a positive relationship to over-indebtedness). The odds ratio for seniors 60+ years is more than that of youth aged 16 to 35 years, implying that on average, a senior of 60+ years is 14.452 times more likely to be over-indebted than a youth aged 16 to 35 years (see Table 4 overleaf). According to the results, there is no difference in the odds of being over-indebted between adults (35 - 60 years) and the youth (16 - 35 years). In Model 2, results were statistically insignificant. The finding that age is significant in predicting over-

indebtedness is consistent with several other studies (Thaicharoen *et al.*, 2004; Mashigo, 2006; Loke, 2016). However, in terms of findings per age group, findings of this study are contrary to those of Kempson (2002) who found that households that are headed by an individual aged in their twenties or early thirties tend to have the highest debt-income ratio. It should be noted though, in the context of South Africa, that the elderly are increasingly finding themselves being financially responsible for their grandchildren, who are mainly orphaned by the human immunodeficiency virus (HIV) pandemic (Nyasani, Sterberg and Smith, 2009) or whose parents are unemployed, which, in turn, could result in over-indebtedness in this age group.

Gender was found to be insignificant in this study across both models to predict over-indebtedness among microfinance borrowers in South Africa. This finding is consistent with that of Augsburg *et al.* (2015) and Loke (2016) who found that gender is not statistically significant in predicting over-indebtedness. However, the findings of Thaicharoen *et al.* (2004) and Mashigo (2006) identifies gender as a significant determinant.

Race is statistically significant in Model 2 in predicting over-indebtedness. The odds ratio for a coloured is higher than other groups, holding other factors constant. These findings are consistent with that of Loke (2016), who found ethnic differences to be significant in predicting the likelihood of borrowers living beyond their means.

All categories of education in Model 1 are significantly associated with a lower probability of being over-indebted than those who received "no schooling". The more educated a person becomes, the less likely he/she will be over-indebted, possibly because education is, under normal circumstances, positively related to personal income. This finding is consistent with findings by Bridges and Disney (2004), Mashigo (2006), and Nyaruwata (2006), who found education to be significant in predicting over-indebtedness and it had a negative relationship with over-indebtedness. However, Nyaruwata (2006) found high school and primary schooling to be statistically insignificant, with only tertiary academic education being statistically significant. Liv (2013), Thaicharoen et al. (2004), as well as Puliyakot and Pradhan (2017) found no apparent relationship between education and over-indebtedness.

Province is significant to both models in determining over-indebtedness. In Model 1, people living in the Kwa-Zulu Natal Province, North West Province, and Northern Cape Province were more likely to be over-indebted than those in the Eastern Cape Province. These results, however, do not suggest, as urban

	Model_1			Model_2				
	Log of odds	Odds ratio	Z	P> z	Log of odds	Odds ratio	Z	P> z
Constant	1.099	3.000	0.670	0.500	-2.112	0.121	-0.98	0.326
Age group (reference=Youth 16-35) Adults 35-60 Seniors 60+	0.402 2.671	1.495 14.452	0.920 2.590	0.358 0.010**	-0.412 -1.022	0.662 0.360	-0.71 -0.84	0.476 0.403
Gender (reference=Male) Female	-0.162	0.851	-0.36	0.721	0.820	2.270	1.47	0.142
Race (reference=Black) Coloured Asian/Indian White	-0.552 -0.883 0.143	0.576 0.414 1.154	-0.81 -0.94 0.12	0.417 0.345 0.902	-2.680 0.000 -0.623	0.069 1.000 0.536	-2.35 -0.44	0.019 0.662
Education (reference=No schooling) Primary school Secondary school Post-Secondary School	-1.580 -2.412 -2.373	0.206 0.090 0.093	-1.68 -2.73 -2.45	0.093* 0.006*** 0.014**	-1.054 -1.710 -1.153	0.349 0.181 0.316	-0.79 -1.46 -0.76	0.427 0.145 0.446
Employment (reference=Employed) Unemployed Retired	-0.060 -1.375	0.942 0.253	-0.13 -1.48	0.897 0.139	0.058 1.085	1.059 2.961	0.08 0.81	0.938 0.416
Marital status(reference=Married) Widow Divorced Single	0.463 0.114 0.377	1.589 1.120 1.457	0.60 0.12 0.73	0.547 0.903 0.468	-1.027 -1.825 -0.390	0.358 0.161 0.677	-0.97 -1.47 -0.59	0.330 0.140 0.555
Personal income (reference=None) R1000-R2999 R3000-R7500	-0.505 0.611	0.603 1.842	-0.94 1.14	0.346 0.254	-0.550 0.556	0.577 1.743	-0.78 0.87	0.438 0.384
Geographic area (reference=Urban) Traditional Farms	-0.160 -0.410	0.852 0.664	-0.30 -0.57	0.764 0.566	1.418 -1.016	4.129 0.362	1.77 -0.75	0.077 0.455
Province (reference=Eastern Cape) Free State Gauteng KwaZulu-Natal Limpopo Mpumalanga North West Northern Cape Western Cape	0.648 0.573 1.459 0.090 1.033 1.397 3.657 1.239	1.911 1.774 4.303 1.094 2.810 4.042 38.726 3.454	0.80 0.84 1.76 0.09 1.22 1.75 3.24 1.53	0.426 0.403 0.079* 0.925 0.223 0.079* 0.001*** 0.126	0.000 1.741 -0.775 -1.235 0.070 1.662 2.909 2.836	1.000 5.705 0.461 0.291 1.073 5.271 18.347 17.047	1.86 -0.60 -0.79 0.05 1.61 2.26 2.47	0.062 0.551 0.432 0.963 0.108 0.024 0.014
Adverse shocks (reference=Yes) No	0.182	1.200	0.42	0.673	-0.843	0.431	-1.47	0.142
No. of dependents (reference=None) 1 dependent 2 dependents 3 or more dependents	1.100 0.902 0.385	3.003 2.463 1.470	1.720 1.440 0.700	0.085* 0.151 0.481	-1.373 -1.177 -0.796	0.253 0.308 0.451	-1.23 -1.80 -1.27	0.219 0.071 0.203
Log likelihood Pseudo R squared Hosmer-Lemeshow chi2(8) AIC BIC	-1113191. 0.140 9.330 2226444 2226546	800			-692730.0 0.187 4.580 1385516 1385608	040		

TABLE 4: REGRESSION RESULTS

Notes: ***p<0.01, **p<0.05, *p<0.1 *Source:* Mjuza and Ntsalaze, 2019 and development economists suggest that cities and regions in Africa are 'abnormal'. Instead, particular institutions and historical processes intermingle to shape specific social relations and socio-spatial divides (Obeng-Odoom, 2010, 2016). As Model 2 suggests, people living in the Gauteng Province, Northern Cape Province, and Western Cape Province were more likely to be over-indebted than those in the Eastern Cape Province. These differences can better be understood in the wider political economy of development and the context of underdevelopment in apartheid and post-apartheid South Africa, as well as global world system, not just to the specific cities and regions in the country (Obeng-Odoom, 2010, 2016). These findings and their analyses suggest that there province-specific factors that influence the probability of a borrower to be over-indebted require additional studies.

Adverse shocks on both models were statistically insignificant in determining over-indebtedness. This was contrary to findings by Schicks (2014) as well as Smits and Günther (2017) who found adverse shocks to be significant in determining over-indebtedness and financial distress.

The number of dependants/household size is statistically significant in both models and positively associated with over-indebtedness in Model 1. This implies that, on average, the odds or chances of someone with Household size (2) being over-indebted are less than those of someone with Household size (1). While the household size was found to be significant in predicting over-indebtedness by both models, Model 1 found the relationship to be positive, while Model 2 found the relationship to be negative. This could be because both models were looking at slightly different definitions of over-indebtedness. This finding agrees with the findings of Mashigo (2006), Chivakul and Chen (2008), Nyaruwata (2009), Puliyakot and Pradhan (2017), as well as Smits and Günther (2017), that household size is significant in predicting over-indebtedness of households.

In order to assess goodness of fit, the Hosmer-Lemeshow test was used – a method that is common in assessing goodness of fit for logistic regression models (Paul, Pennel and Lemeshow, 2013). The Hosmer-Lemeshow test is "a chi-square test conducted by sorting the n records in the data set by estimated probability of success, dividing the sorted set into g equal-sized groups, and evaluating the Hosmer-Lemeshow C statistic" (Paul *et al.*, 2013:1). Before logistic regressions were done, associations between the dependent and the independent variables were investigated using the chi-square test. The null hypothesis is (in a statistical test) when there is no significant relationship

between two measured phenomena – the intercept and all coefficients are zero. The results indicate that the models were statistically significant. For a good model, the chi-square value of the Hosmer-Lemeshow test should not be rejected, and its probability should be greater than the level of significance, say 0.05 (Hosmer and Lemeshow, 1980). The Hosmer-Lemeshow test was >.1, indicating that two models fit the data.

In addition, another goodness of fit test was conducted using both the Cox and Snell R Square and the Nagelkerke pseudo R Square to measure the percentage of variation in the dependent variable that is explained by the model. In other words, it measures the predictive accuracy of the model. While the values of the Cox and Snell R square range from 0 to 75% (Allison, 2014), those of the Nagelkerke R Square range between 0 and 100%. The results show that the models explained over-indebtedness and were adequate for use.

4. Conclusion

The study highlights several important findings and proves that concerns for over-indebtedness of low-income microborrowers in South Africa are justified. Importantly, this study notes that those aged 60+ years are more likely to be over-indebted compared with younger age groups. The findings contrast with numerous earlier studies such as those conducted by Kempson (2002), Nyaruwata (2009), and Loke (2016) who observed that young age groups are more likely to be over-indebted.

Further, these results show a deviation from Friedman's life cycle permanent income hypothesis where younger age groups are expected to be indebted. These findings also suggest that financial resources may be inadequate at retirement age for the elderly. While the study did not venture into investigating the reasons for elderly borrowers to be over-indebted, a South African study conducted by Nyasani, Sterberg and Smith (2009) sheds light on the possible reasons for the elderly (60+ group) to be likely over-indebted. The study found that the elderly are increasingly finding themselves being financially responsible for their grandchildren, who are mainly orphaned because of the HIV pandemic or whose parents are unemployed. Hence, policymakers and industry stakeholders should pay more attention to old age indebtedness and take steps to protect microcredit borrowers from accumulating more debt in their retirement years. Furthermore, growing pressure on the elderly could also put pressure on the country's social system, as there would be calls for the social security benefits to increase commensurate to the financial needs of the elderly.

Consistently across educational levels, results show that higher education levels are negatively correlated to the odds of being over-indebted, highlighting the importance of a particular type of quality public provision of education in addressing over-indebtedness. Finally, this study found that the province where the borrower dwells were significant in predicting over-indebtedness, with borrowers residing in Northern Cape being likely to be over-indebted, suggesting that there are specific regional features that could increase or decrease the risk of over-indebtedness that should not be ignored by policymakers and regulators.

Although the data set used for the empirical analysis are cross-sectional, the results of the study have some far-reaching implications for future studies on the nature, extent, and possible determinants of over-indebtedness, most importantly for those over the age of 60. It is important that the government of South Africa pays even more attention to curbing household over-indebtedness and also provide remedial measures where borrowers experience over-indebtedness.

Biographical Notes

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	l	No	Y	Yes	Т	otal
	Proportion	Std Error	Proportion	Std Error	Proportion	Std Error
Age group Youth 16-35 Adults 35-60 Seniors 60+	0.58 0.30 0.12	0.01 0.01 0.01	0.61 0.32 0.07	0.03 0.03 0.02	0.58 0.30 0.12	0.01 0.01 0.01
Gender Male Female	0.44 0.56	0.01 0.01	0.49 0.51	0.04 0.04	0.45 0.55	0.01 0.01
Race Black Coloured Asian/Indian White	0.85 0.10 0.02 0.04	0.01 0.01 0.00 0.00	0.90 0.05 0.01 0.04	0.02 0.01 0.00 0.01	0.85 0.09 0.02 0.04	0.01 0.01 0.00 0.00
Education No Schooling Primary school Secondary school Post-Secondary School	0.03 0.11 0.83 0.03	0.00 0.01 0.01 0.00	0.02 0.08 0.83 0.06	0.01 0.02 0.03 0.02	0.03 0.11 0.83 0.04	0.00 0.01 0.01 0.00
Employment Employed Unemployed Retired	0.29 0.59 0.12	0.01 0.01 0.01	0.46 0.47 0.07	0.04 0.04 0.02	0.31 0.58 0.12	0.01 0.01 0.01
Marital status Married Widow Divorced Single	0.20 0.10 0.02 0.68	0.01 0.01 0.00 0.01	0.20 0.04 0.02 0.73	0.03 0.01 0.01 0.03	0.20 0.09 0.02 0.69	0.01 0.01 0.00 0.01
Personal income No Income R1-R999 R1000-R2999 R3000-R7500	0.21 0.32 0.31 0.15	0.01 0.01 0.01 0.01	0.18 0.26 0.28 0.29	0.03 0.03 0.03 0.03	0.21 0.32 0.31 0.16	0.01 0.01 0.01 0.01
Geographic area Urban Traditional Farms	0.60 0.34 0.06	0.01 0.01 0.01	0.58 0.36 0.06	0.04 0.04 0.02	0.60 0.34 0.06	0.01 0.01 0.01
Province Eastern Cape Free State Gauteng KwaZulu-Natal Limpopo Mpumalanga North West Northern Cape Western Cape	$\begin{array}{c} 0.16\\ 0.05\\ 0.22\\ 0.13\\ 0.13\\ 0.09\\ 0.08\\ 0.02\\ 0.11\\ \end{array}$	$\begin{array}{c} 0.01 \\ 0.00 \\ 0.01 \\ 0.01 \\ 0.01 \\ 0.01 \\ 0.01 \\ 0.00 \\ 0.00 \\ 0.01 \end{array}$	0.15 0.04 0.28 0.10 0.08 0.13 0.09 0.01 0.11	$\begin{array}{c} 0.03 \\ 0.01 \\ 0.04 \\ 0.03 \\ 0.02 \\ 0.02 \\ 0.02 \\ 0.00 \\ 0.02 \end{array}$	0.16 0.05 0.23 0.13 0.13 0.10 0.08 0.02 0.11	$\begin{array}{c} 0.01 \\ 0.00 \\ 0.01 \\ 0.01 \\ 0.01 \\ 0.01 \\ 0.01 \\ 0.01 \\ 0.00 \\ 0.01 \end{array}$
Adverse shocks Yes No	0.04 0.78	0.15 0.04	0.24 0.76	0.09 0.09	0.22 0.78	0.03 0.03
No. of dependents No dependents 1 dependent 2 dependents 3 or more dependents	0.30 0.22 0.21 0.28	0.01 0.01 0.01 0.01	0.29 0.21 0.20 0.30	0.04 0.03 0.03 0.04	0.30 0.22 0.21 0.28	0.01 0.01 0.01 0.01
Sample Size	2	020	3	104	۷.	050

Appendix

DESCRIPTIVE ANALYSIS OF THE SAMPLE SIZE

Source: Mjuza and Ntsalaze, 2019 128