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Financial inclusion in South Africa: Influencing factors and public policy

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Abstract

This paper explores the effectiveness of public policy in increasing financial inclusion. A large data set is used comprising repeat household surveys undertaken over a ten-year period. Contrary to previous results, the paper provides evidence of the strong impact of policy on access to financial services in South Africa. South Africa adopted a formal financial sector consensus model and, together with private sector development, succeeded in increasing access to financial services to the previously unbanked. The findings suggest that between 2005 and 2014, the most significant factors associated with financial inclusion were income, education level and age. Furthermore, those with a tertiary education were 31% more likely to have a bank account than those in the lowest education category. Policies to address the gender gap appear to have had a measure of success as the findings of this study indicate that women were 3.8% more likely to have a bank account than men. The findings further reveal that those from a black ethnic background remain less likely to be banked. Further policy interventions are therefore required.

Keywords: Economic growth, financial inclusion, financial services, logistic regression, South Africa (SA)

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1. Introduction

Since the 1990s, economic and financial authorities around the world have increasingly recognised the importance of financial inclusion for long-term economic growth. Financial inclusion broadly refers to the ability of entities and individuals to access formal financial services. The first global survey on financial inclusion by the World Bank in 2011 estimated that approximately 2.5 billion people – more than half of the world’s population – did not have access to financial services (Demirgüç-Kunt & Klapper, 2012). Ninety percent of the unbanked population was found in emerging economies (Alliance for Financial Inclusion, 2018).

Studies on financial inclusion initially explored the prevalence of the unbanked population in developed economies, at a country level and, more recently in cross-country comparisons. For instance, Kempson and Whyley (1999) investigated the sections of the population that did not have access to financial services in the United Kingdom (UK) and Hogarth, Anguelov and Lee (2005) examined the use of bank accounts over the period 1989-2000 in the US. Kempson *et al.* (2004) analysed policy responses in the early 2000s towards financial exclusion through case studies in Australia, Belgium, Canada, France, the UK and the US. Carbó-Valverde *et al.* (2007) outlined the nature and causes of financial exclusion in several European countries while Neuberger (2015) investigated financial inclusion, regulation and financial education in Germany. Cross-country studies have also examined the foundations of financial inclusion and the use of financial services (Allen *et al.*, 2016; Asuming *et al.*, 2019; Beck *et al.*, 2007, 2008; Demirgüç-Kunt *et al.*, 2015).

More recently, the focus of financial inclusion has shifted to emerging economies, where the lack of access to financial services is most pronounced. This has been the conclusion of studies looking at India (Burgess, Pande & Wong 2005; Ghosh & Vinod, 2017; Swamy, 2014), Indonesia (Johnston & Morduch, 2008) and China (Fungáčová & Weill, 2014). Several studies have been conducted on financial inclusion across Africa (Asuming *et al.*, 2019; Honohan & King, 2012; Klapper & Singer, 2015; Zins & Weill, 2016) as well as in individual countries, notably in Ghana (Akudugu, 2013), Kenya and Uganda (Johnson & Nino-Zarazua, 2011) and in South Africa (Wentzel *et al.*, 2016). These studies have broadly identified that younger, poorer individuals, especially those living in rural areas, are less likely to have access to formal financial services.

Policies to address financial exclusion have taken various forms across the world. Civil society and non-governmental organisations have also played an active role in promoting financial access, carrying out research and providing financial literacy. For example, in countries such as Mexico, Trinidad and Tobago and the US, these efforts have been led by the public sector (Chibba, 2009). Private institutions, together with non-financial firms or formal financial firms, have driven inclusion initiatives in countries such as Colombia, Ghana, Kenya, the Maldives, Mongolia, Nigeria and the Philippines (Chibba, 2009). In contrast, South Africa adopted a joint approach between the public and the private sector. The formal financial sector in South Africa developed a Financial Sector Charter in conjunction with the government, to enhance and provide new services to the poor and the financially excluded (Banking Association of South Africa, 2014).

A common thread running through most of the studies at country level or cross-country level in developed and developing economies has been the use of cross-sectional data. This has had the effect of limiting the conclusions regarding the long-term effects of policy innovations. There are limited empirical studies that have documented trends in financial inclusion over time that could assist policymakers to identify where policy interventions are required (Asuming *et al.*, 2019) and our paper specifically aims to address this gap. As a result and despite growing evidence of the importance of financial inclusion in fostering long-term growth (Allen *et al.*, 2016; Demirgüç-Kunt & Levine, 2008), little is known about its long-term underpinnings across individuals and countries (with the possible exception of the US). The key question of what types of policies promote both financial and economic development also remains a highly debated topic and this paper contributes to this limited strand of literature.

We also explore the association of ethnicity and the likelihood of being banked. The ethnicity of an individual has the potential to influence access to financial services (Johnson & Nino-Zarazua, 2011) and prior research in Europe and the US have identified that minorities are less likely to be banked (Barr, 2004; European Commission, 2008; Kempson and Whyley, 1999). However, most of the previous studies on discrimination focused on developed economies rather than emerging economies (Riach and Rich, 2002). Our paper contributes towards this limited strand of literature on the association between ethnicity and financial inclusion in an emerging economy over a ten year period.

This paper contributes to the emerging literature on the individual determinants of financial inclusion in Africa. Firstly, it informs the debate on which individual characteristics are associated with financial inclusion in South Africa. In particular our study contributed towards the limited area of research around ethnicity and financial inclusion. Our results suggest that ethnicity has a strong association with banking

status of the individual. In particular those from a black ethnicity were less likely to be banked than those from a white ethnicity are. Secondly, as little is known about the effectiveness of individual policies to foster long-term financial inclusion (Allen *et al.*, 2016), our paper contributes to this limited strand of literature. We explore the long-term impact of the Financial Sector Charter in South Africa and the actions taken by formal financial institutions to expand financial services to the previously unbanked. Unlike previous studies conducted in Africa which were conducted over one or two periods, our paper uses longitudinal data over a ten year period. Thirdly our results contributes to gender studies which have identified mixed results regarding gender disparity and financial inclusion with women less likely to have a bank account than men. Interestingly our results suggest that women are more likely to have a bank account than men, whilst controlling for other factors. We suggest that this is in a large part as a result of policy interventions and the move to electronic payments for government grants

The rest of the paper is structured as follows: Section 2 provides a theoretical background on financial inclusion, Section 3 discusses the South African policy interventions for financial inclusion, Section 4 describes the measurement of financial exclusion, Section 5 describes the FinScope household surveys, Section 6 discusses the econometric strategy, Section 7 discusses the results and Section 8 concludes while discussing potential policy implications.

2. Theoretical background

2.1 Financial inclusion and empirical support for financial inclusion

There is a long-standing debate about the role of financial development on economic growth (King and Levine, 1993; Levine, 1997, 2005). On the one hand, well-known economists such as Robert Lucas and Joan Robinson strongly dispute that financial development causes economic growth (Čihák *et al.*, 2012), whilst on the other hand Merton Miller argues that financial development does indeed cause economic growth. Others such as Goldsmith, Gurley, McKinnon, Schumpeter and Shaw posit that the impact of financial development on economic growth cannot be ignored (Levine, 2005). Pioneering contributions to the understanding of the relationship between financial development and economic growth have been made by Goldsmith (1969), McKinnon (1973) and Shaw (1973). Reviews undertaken of the studies of the link between finance and economic growth have confirmed a strong positive link between the functioning of the financial system and long-run economic growth (Levine, 1997, 2005). Others, more recently suggest

that there is a positive independent and causal relationship between finance and long-term economic growth (Demirgüç-Kunt & Levine, 2008).

Studies have found that financial inclusion can alleviate poverty, reduce income inequality, increase the wealth of the low-income population and accelerate economic growth (Beck *et al.*, 2007; Bruhn & Love, 2014; Honohan, 2008; Levine, 1998; Swamy, 2014). There is still debate, however, as to whether or not it was policy interventions that resulted in greater financial inclusion (Bruhn & Love, 2014; Burgess *et al.*, 2005; Levine, 2008). Concerns have also been expressed that the provision of access to finance could result in the indebtedness of individuals (Burgess *et al.*, 2005; World Bank, 2014). Studies around growth and financial development have found evidence of financial deepening, however this may not result in a more inclusive financial sector, especially in emerging economies, where the financial sector is concentrated on the segment of the population with higher income (Di Giannatale and Roa, 2019).

The growing literature on the determinants of financial inclusion have identified individual characteristics such as age, gender, education and income levels as key determinants of financial inclusion (Asuming *et al.*, 2019). In industrialised and high income countries, studies have shown that individuals from the youngest and oldest age categories, those with low income, and those from ethnic minorities are more likely to be excluded from financial services (Barr, 2004; European Commission, 2008; Kempson and Whyley, 1999). Prior studies on financial inclusion in Sub-Saharan African (SSA) have not yet explored the role of ethnicity (Akudugu, 2013; Honohan & King, 2012; Johnson & Nino-Zarazua, 2011; Klapper & Singer, 2015; Wentzel *et al.*, 2016; Zins & Weill, 2016).

Many SSA countries have vast geographical areas that make the provision of financial services outside of the urban areas both difficult and costly. It has been thoroughly documented how developing economies are pioneering the use of mobile and technological innovations to address financial inclusion (Alliance for Financial Inclusion, 2011; Rouse & Verhoef, 2016, 2017). The trends in the growth of financial inclusion and particularly, mobile payments in SSA, have attracted a number of studies on the individual determinants of financial inclusion in Africa.

Johnson and Nino-Zarazua (2011) investigated the socio-economic, demographic and geographical factors affecting access to and exclusion from, formal, semi-formal and informal financial services in Kenya and Uganda in 2006. Akudugu (2013) explored the determinants of financial inclusion in Ghana using the 2011 Global Findex Survey data. As with other parts of West Africa, Ghana has a high number of unbanked individuals with an estimated 60% of the population not having access to formal financial services. In

South Africa in 2011, Wentzel *et al.* (2016) examined the indicators of financial exclusion in the most financially vulnerable – the ‘bottom of the pyramid’. Honohan and King (2012) looked at the role of the individual, geographical and national characteristics influencing the use of financial services in SSA countries using data from each country’s most recent FinScope Household Survey (ranging from 2004 to 2009). Klapper and Singer (2015) investigated the role of informal financial services in Africa using the 2011 data from the Global Findex Survey, which indicated that less than a quarter of adults in Africa are banked at a formal financial institution. Zins and Weill (2016) examined the determinants of financial inclusion in Africa using the Global Findex Survey data for 2014 for 37 African countries with respect to age, education, gender and income and its association with formal and informal banking services. Asuming *et al.* (2019) explored the trends and determinants of financial inclusion in SSA for the period 2011-2014.

In short, there is growing interest and mounting evidence exploring the extent of financial inclusion in Sub-Saharan Africa. To date, research has focused on the individual determinants of financial inclusion and barriers to financial access. The findings of these studies broadly indicate that there are individual determinants associated with financial inclusion. Persons with higher income, better education and who are older have been associated with greater financial inclusion. However, the results as to other individual determinants such as gender, geographical area and marital status have been mixed and to date, no studies have explored the impact of ethnicity. Furthermore, most of these studies have been cross-sectional for a single country or cross-country for one year, which does not take into account any changes over time.

3. Methodology

Household data: FinScope Household Surveys

The data⁴ for this study was provided by FinMark Trust, consisting of annual FinScope Household Surveys between 2005 and 2014. This survey was first undertaken by the FinMark Trust in South Africa in 2003. By 2018, these surveys had been conducted in 18 other African countries as well as seven countries in Asia (FinMark Trust, 2018). The FinScope household surveys provide country-specific information on the use of financial services. The FinScope surveys consist of face-to-face interviews with individuals across a country, with an average of 3 898 interviews per annum of South African adults (16+ years) for the period

⁴ In South Africa, the number of basic bank accounts (supply-side data) is not reported to the Central Bank (Repetto & Denes, 2010) and thus data on the use of financial services has to be obtained from other sources.

2005 – 2014. These surveys provide a nationally representative reflection of individuals, collecting comprehensive demographic information on financial usage as well as psychographic information on the respondents (Kanter & Nagabhushan, 2012). A caveat of the FinScope Household Surveys is that interviews are not conducted with the same household each year, as different people are selected randomly for each annual survey (Porteous, 2009).

4. Empirical strategy

Logistic and probit models are among the most widely used in generalised linear models with binary dependent variables and the results are essentially the same (Cameron & Trivedi, 2009; Hahn & Soyer, 2005). The logistic model was selected over the probit model as it allows for the interpretation of the coefficients in terms of log-odds. The logistic model has been used to investigate the individual factors associated with financial inclusion in other studies (e.g. Johnson & Nino-Zarazua, 2011; de Koker & Jentsch, 2013; Wentzel *et al.*, 2016) and was therefore also used in the current study.

A logistic model was employed to investigate the demographic, economic and geographical factors associated with financial inclusion in South Africa by using data from the FinScope Surveys for the period 2005 – 2014. The datasets for the individual survey years were pooled into a cross-section for a ten-year period and the model included year dummies and the error term for individuals for t periods. In order to control for unobserved regional heterogeneity and the related omitted variable bias, the model included a control variable (*region*) for the nine provinces in South Africa. Specifically, the year dummy was interacted with the province variable to control for time and within region effects.

$$Banking\ Status_{i,t} = \beta_1 Income_{i,t} + \beta_2 Education_{i,t} + \beta_3 Age_{i,t} + \beta_4 Gender_{i,t} + \beta_5 Area_{i,t} + \beta_6 Marital\ Status_{i,t} + \beta_7 Ethnic\ Background_{i,t} + \gamma_h Year * Region_i + \varepsilon_{i,t} \quad (1)$$

4.1 Dependant variable

Banking status is the dependant variable coded 1 for having a bank account at a formal financial institution or 0 otherwise.

4.2 Explanatory variables

The model was fitted with six explanatory variables explored in previous studies of the individual determinants of financial inclusion in Africa and an additional variable for the ethnic background of the individual.

Income: The level of income of individuals or households has been associated with financial inclusion, with those from a poorer background more likely to be excluded from financial services (Allen *et al.*, 2016; Anson, Berthaud, Klapper & Singer, 2013; Fungáčová & Weill, 2014; Honohan & King, 2012; Klapper & Singer, 2015; Martínez, Hidalgo & Tuesta, 2013). The *income* variable was included in the estimation, with the average total monthly income before tax and other deductions coded into four categorical levels. The four categories were as follows: no monthly income, monthly income of R1 – R1 999 (\$0.09 - \$177), monthly income of R2 000 – R5 999 (\$178 - \$351) and monthly income of R6 000 (\$532) and above.

H1. Individuals with a higher income are more likely to be banked

Age: The age of the respondent has been included in various studies (Allen *et al.*, 2016; Anson *et al.*, 2013; Fungáčová & Weill, 2014; Honohan & King, 2012; Martínez *et al.*, 2013). To determine the extent of the relationship between age and banking status, the *age* variable was coded into a categorical variable and to allow the results to be compared to other studies. It was coded into four different age categories as follows: 16 – 29 years, 30 – 39 years, 40 – 49 years and 50 years and above.

H2. Older individuals are more likely to be banked

Education: The level of education and its association with financial inclusion has been explored and found to be positively associated with inclusion (Anson *et al.*, 2013; Fungáčová & Weill, 2014; Honohan & King, 2012; Klapper & Singer, 2015; Martínez *et al.*, 2013). The *education* variable was coded into three levels, namely, primary school (if the respondent had primary school education or less), high school/matriculation (if the individual had completed high school or had some high school education) and lastly, tertiary education (if the respondent had completed or had some tertiary education or technical training).

H3. Individuals with a higher level of education are more likely to be banked

Gender: The gender of the respondent was included as a dummy variable as the gender dimension has been explored in various studies on financial inclusion (Allen *et al.*, 2016; Asuming *et al.*, 2019; Honohan & King, 2012; Klapper & Singer, 2015). The dummy variable was coded 0 for males and 1 for females.

H4. Males are more likely to be banked

Area: The geographical area in which the respondent lives has been explored in some studies to determine whether living in a rural area is associated with financial exclusion (Allen *et al.*, 2016; Honohan & King, 2012; Klapper & Singer, 2015; Wentzel *et al.*, 2016). In the FinScope survey, the response to the question of where the individual lives were recorded as: in a rural/ tribal area, in an urban (formal or semi-formal) area or in a small metro area. These responses were coded as living in a rural or urban area with the variable coded 0 for an urban area and 1 for a rural area.

H5. Individuals living in an urban area are more likely to be banked

Marital status: The marital status of the respondent has been included in financial inclusion studies (Allen *et al.*, 2016; Klapper & Singer, 2015; Martínez *et al.*, 2013; Wentzel *et al.*, 2016). The *marital status* variable was recorded as follows: single and not living with a partner, single and living with a partner, divorced, widowed, married and living with a spouse and married and not living with a spouse. The *marital status* variable was recoded into a dummy variable as married/living with a partner, or unmarried. This variable was coded as 0 for unmarried and 1 for married/living with a partner.

H6. Individuals that are married/living with a partner are more likely to be banked

Ethnicity: The ethnicity of an individual has the potential to influence access to financial services (Johnson & Nino-Zarazua, 2011). The responses to the ethnic background were recorded as Black, White, Asian, Indian or Coloured. The responses were coded into the following categories – Black, White and other.

H7. The likelihood of being banked will differ by ethnicity

The explanatory variables are shown in Table 1 below:

Table 1 Explanatory variables

Name	Code/ values	Denoted as
Monthly personal income	No income R1 – R1,999 (\$0.09 – \$177) R2,000 – R5,999 (\$178 – \$351) R6,000 (\$532) and above	<i>Income</i>
Age	16 – 29 years 30 – 39 years 40 – 49 years	<i>Age</i>

	50 years and above	
Education level	Primary school High school/matriculation Tertiary education	<i>Education</i>
Geographical area	Urban Rural	<i>Area</i>
Gender	Male Female	<i>Gender</i>
Marital status	Unmarried Married/Living with a partner	<i>Marital Status</i>
Ethnic background	Black Other ethnicities White	<i>Ethnicity</i>

Source:
FinScope
Household
Surveys
(2005 –

2014)

5. Empirical results

5.1 Descriptive statistics

The logistic regression model was run on the pooled dataset comprising observations for the period 2005 – 2014. Each year reported approximately 3 900 cases, derived from face-to-face interviews with individuals 16 years or older. The surveys used nationally represented samples based on Probability Proportional to Size (PPS) sampling. These datasets included sampling weights to account for the differences in the ratio of the sample size to population size. A structural approach to this study was taken and these weights were excluded when calculating the univariate and logistic regressions (Cameron & Trivedi, 2009). The sample selections were made in particular to explore the target population, however, as a consequence of using the unweighted samples, the results should not be interpreted as estimating the census coefficients. In order to address any concerns on the heteroscedasticity and serial correlation in the error terms, the Huber-White heteroscedasticity standard errors were included in the estimation (Moser, 2005). After excluding for missing information, the total number of observations was 30, 135. The missing data related mainly to income, where respondents refused to provide the information or where

the respondent was unsure of the income they earned. In the pooled sample, 65.5 % indicated that they had a bank account and 35.5% of the sample was unbanked.

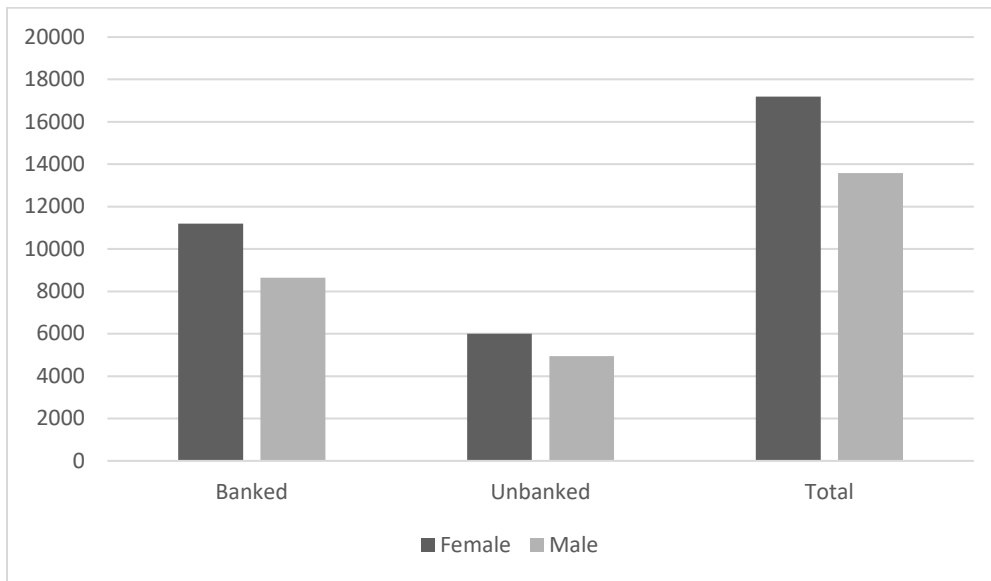


Figure 1 Banked status by gender in South Africa (2005 – 2014)

Source: FinScope Household Surveys (2005 – 2014)

As illustrated in Figure 1, females comprised 55.88% of the pooled sample, with 65.48% being banked, whereas only 63.98% of males reported having a bank account. In the 2012 FinScope annual report, it was reported that females were more likely to be banked than males due to the introduction of the SASSA system for the electronic payment of social grants (as more women were recipients of social grants) (FinMark Trust, 2012). The sample of females in this study was slightly higher than the latest population census that was conducted in 2011, which estimated that 51% of the population in South Africa was female and 49% was male.

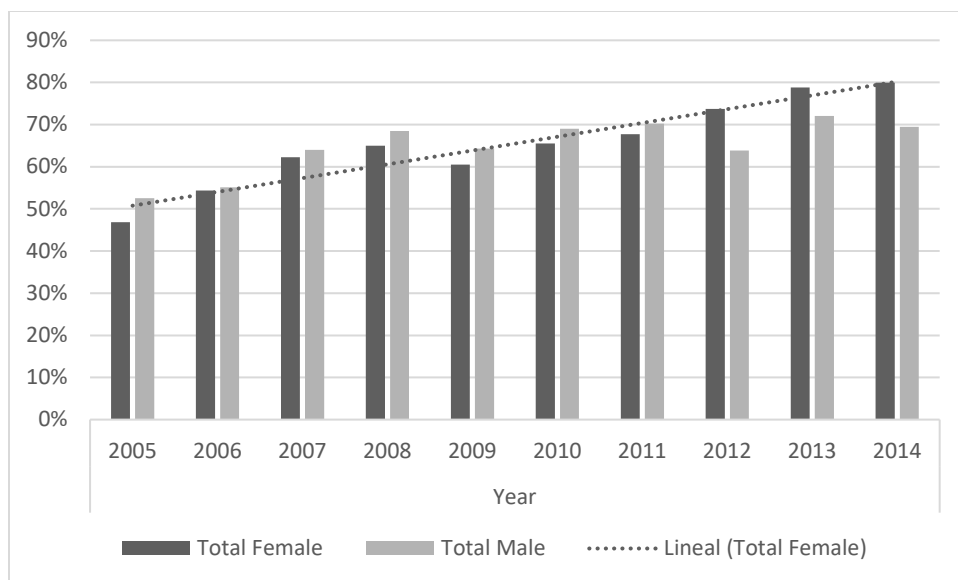


Figure 2. Percentage of the banked population by gender in South Africa (2005 – 2014)

Source: FinScope Household Surveys (2005 – 2014)

As Figure 2 illustrates, from 2012 the number of females exceeded the number of males who were banked in the pooled sample. The survey recorded the response to gender as either male or female, as did the census in 2011. Future surveys may incorporate additional gender classifications that would allow the gender dimension to be explored further. The full descriptive statistics for the pooled sample are provided in Table 2.

Table 2. Frequency measures for key variables

Variable	Frequency	%
Income		100
None	5 178	17.2
R1 – R1,999 (\$0.09 – \$177)	14 587	48.4
R2,000 – R5,999 (\$178 – \$531)	5 746	19.1
R6,000 (\$532) and above	4 624	15.3
Education		100
Primary School	5 045	16.7
High School/Matriculation	21 188	70.3
Tertiary Education	3 902	12.9
Gender		100
Female	16 840	55.9

Male	13 295	44.1
<i>Ethnic Background</i>		100
Black	18 538	61.5
Other	7 430	24.7
White	4 167	13.8
<i>Geographical Area</i>		100
Urban	22 325	74.1
Rural	7 810	25.9
<i>Marital status</i>		100
Unmarried	17 695	58.7
Married/Living with a partner	12 440	41.3
<i>Age</i>		100
18-29 Years	10 650	35.3
30-39 Years	6 799	22.6
40-49 Years	5 493	18.2
50 Years and above	7 193	23.7

Source: FinScope Household Surveys, 2005 – 2014

As shown in Table 2, the majority of individuals surveyed were single as 59% stated that they were unmarried compared to 41% who said that they were married/living with a partner. The surveys were conducted in both urban and rural areas, with 74.1% residing in urban areas and 25.9% in rural areas (the World Bank estimates that in 2011, approximately 63% of the population lived in urban areas and the remaining 37% in rural areas) (World Bank, 2011).

The majority of individuals reported a monthly income in the second income category (monthly income up to \$177) and had a high school education. In 2005, approximately 50% of the sample were unbanked and in 2014, this number dropped to 24%. This already suggests that there has been a substantial improvement in the provision of financial services to the previously unbanked.

5.2 Trend analysis of financial inclusion in South Africa

The following Figure 3 illustrates the number of people that are banked over the period of the study, 2005-2014.

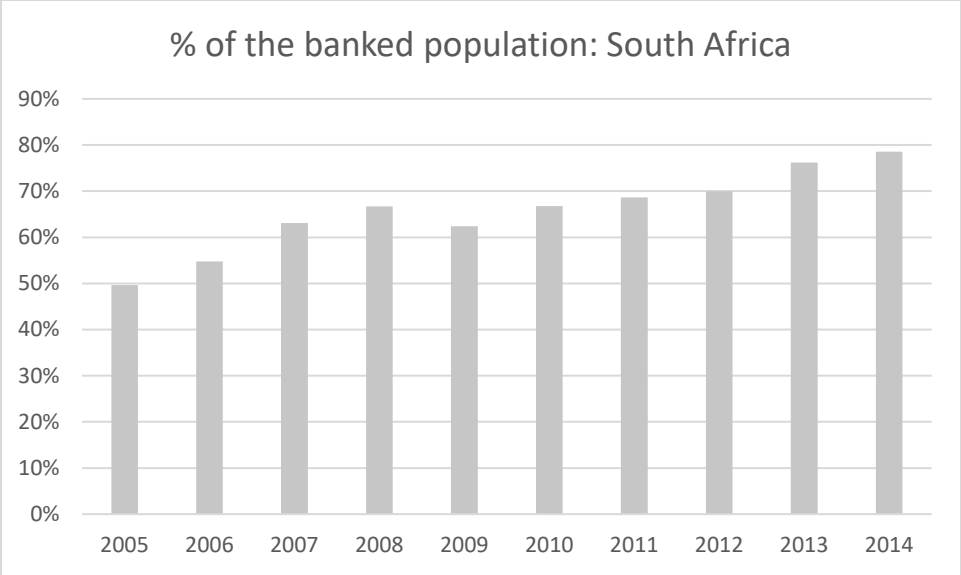
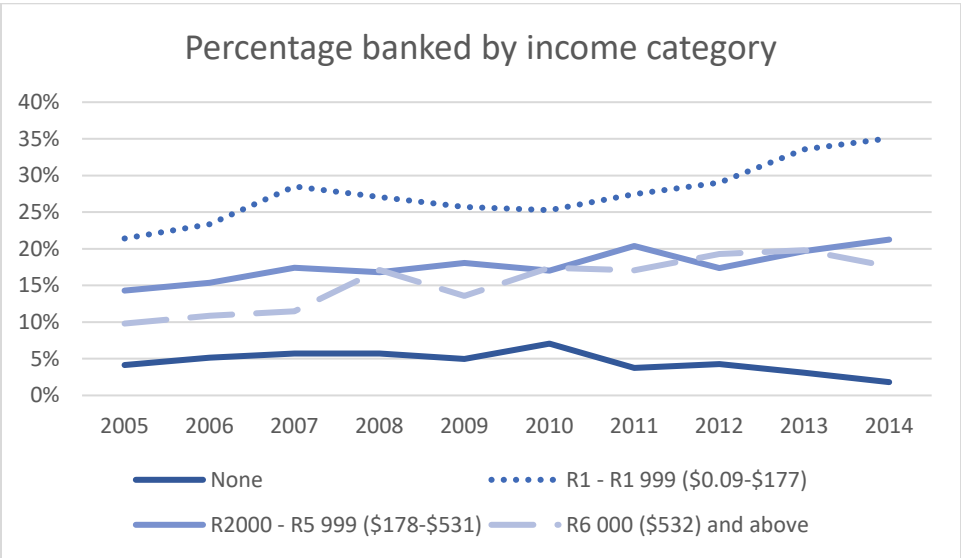


Figure 3 Percentage of the banked population in South Africa (2005 – 2014)

Source: FinScope Household Surveys (2005 – 2014)

The change in banking status as shown in Figure 3 varied over the period of the study, showing a steady upward from 2005 until 2008. Thereafter there was a decline in 2009, affected by the financial crisis, and thereafter the level of the financial inclusion continued to increase. The level of financial inclusion significantly improved from an estimated 50% in 2005 to an estimated 79% of the total population in 2014. The following Graph 2.1 further illustrates those with bank accounts per income group over the period of the study.



Graph 1 Percentage banked by income category in South Africa (2005 – 2014)

Source: FinScope Household Surveys (2005 – 2014)

The change in banking status per income group as shown in Graph 1 varied over the period of the study, with all income groups (with exception of the highest income group) showing an upward trend in banking status from 2005 until 2007. Thereafter the trend was varied across the categories. The income group earning a monthly income of R1 000 – R1 999 (\$0.09 –177) showed a marked increase in the number of banked individuals from 2005 until 2014. Those without income showed an upward trend until 2010 and thereafter showed a decline indicating that these individuals remain excluded from formal financial services.

5.3 Determinants of financial inclusion

Table 3 presents the regression results on the determinants of financial inclusion using the seven indicators. The table reports the log-odds and the marginal effects from the logistic regression. The coefficients represented the log-odds ratios and indicated how the log of the odds of a certain outcome (banked) compared to the omitted base category (unbanked) changed in response to individual characteristics.

Table 3 Results of pooled regression

Variables	Coefficient 2005 - 2014	Log-odds 2005 - 2014	Marginal effects 2005 - 2014
30 – 39 years	0.327*** (0.042)	1.387*** (0.059)	0.049*** (0.006)
40 – 49 years	0.315*** (0.048)	1.370*** (0.066)	0.048*** (0.007)
50 years and above	0.548*** (0.047)	1.729*** (0.081)	0.082*** (0.007)
High School/Matriculation	0.809*** (0.042)	2.245*** (0.094)	0.126*** (0.007)
Tertiary education	2.240*** (0.098)	9.391*** (0.921)	0.310*** (0.011)
Female	0.252*** (0.031)	1.286*** (0.040)	0.038*** (0.005)
Rural	-0.419***	0.658***	-0.064***

	(0.037)	(0.025)	(0.006)
R1 – R1, 999 (\$0.09-\$177)	1.486***	4.418***	0.302***
	(0.040)	(0.179)	(0.007)
R2, 000 – R5, 999 (\$178-\$351)	3.330***	27.942***	0.571***
	(0.063)	(1.752)	(0.008)
R6,000 (\$532) and above	4.563***	95.852***	0.639***
	(0.145)	(13.858)	(0.008)
Married	0.262***	1.299***	0.039***
	(0.034)	(0.044)	(0.005)
Other ethnicities	-0.001	0.999	-0.000
	(0.039)	(0.039)	(0.006)
White	1.131***	3.098***	0.158***
	(0.075)	(0.234)	(0.009)
Constant	-2.816***	0.060***	
	(0.146)	(0.009)	
Observations	30,135	30,135	30,135
Region FE	YES	YES	YES
Year FE	YES	YES	YES

Base categories for categorical variables are as follows: 16 – 29 years, primary school, male, urban, no income, unmarried, Black.

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The results of the logistic regression indicated that the seven variables have a significant positive association with the banking status of an individual. In line with evidence documented in prior research (Honohan & King, 2012; Klapper & Singer, 2015; Wentzel *et al.*, 2016), income was the most significant predictor of the banking status of the individual. These results are in line with the expectations of *H1*. The log-odds with respect to earnings categorised in the highest income category suggest that those in the highest income category were 95.9 times more likely to be banked than those with no income, whilst controlling for other factors. As the log-odds do not measure the economic magnitude of the effects, the marginal effects were determined. The marginal effects suggests that being in the highest income category increases the probability of having a bank account by 63.9% compared to those in the lowest income category.

A significantly positive association between education and banking status was found in line with the expectations of *H3*. It was the second most significant factor associated with banking status of the individual. Previous studies have found a significant positive association between education and financial

inclusion (Allen *et al.*, 2016; Aterido *et al.*, 2013; Klapper & Singer, 2015; Wentzel *et al.*, 2016). The log-odds indicated that those with a tertiary education were 9.39 times more likely to be banked than those with little or no education, whilst controlling for other factors. The marginal effects were also determined to quantify the magnitude of the effect of education on the likelihood of having a bank account. The results suggest that those with tertiary education were 31% more likely to have a bank account compared to those with little or no education.

The age of the individual was found to be positively associated with financial inclusion, in line with expectations of *H2*. The results of the log-odds ratio indicate that persons 50 years and older are 1.73 times more likely to be banked than those in the age group of 16 – 29 years. This finding corroborates previous studies, which found that older people are more likely to be banked than the youngest age groups (Allen *et al.*, 2016; Wentzel *et al.*, 2016). Specifically, the marginal effects of the present study suggest that those aged 50 years and older are 8.2% more likely to have a bank account than those in the 16-29 age category. To further explore the association of age and the banking status of individuals we interact the age variable with the individual characteristics in the pooled sample. The dependent variable remains whether the individual has access to a bank account. See Table 4.

Table 4 Pooled dataset with age interaction terms											
VARIABLES	(1)	VARIABLES	(2)	VARIABLES	(3)	VARIABLES	(4)	VARIABLES	(5)	VARIABLES	(6)
30 – 39 years	1.018 (0.138)	30 – 39 years	1.305*** (0.084)	30 – 39 years	1.379*** (0.071)	30 – 39 years	1.392*** (0.128)	30 – 39 years	1.499*** (0.077)	30 – 39 years	1.479*** (0.071)
40 – 49 years	1.405*** (0.176)	40 – 49 years	1.365*** (0.101)	40 – 49 years	1.405*** (0.081)	40 – 49 years	1.578*** (0.163)	40 – 49 years	1.453*** (0.092)	40 – 49 years	1.412*** (0.079)
50 years and above	1.726*** (0.194)	50 years and above	1.808*** (0.123)	50 years and above	1.891*** (0.101)	50 years and above	1.659*** (0.183)	50 years and above	1.919*** (0.109)	50 years and above	1.530*** (0.086)
High School/ Matriculation	2.148*** (0.231)	Female	1.277*** (0.062)	Rural	0.713*** (0.039)	R1 – R1, 999 (\$0.09-\$177)	4.495*** (0.246)	Married	1.686*** (0.121)	Other	1.061 (0.065)
Tertiary education	9.934*** (1.471)	30-39 Female	1.11 (0.091)	30-39 Rural	1.006 (0.085)	R2, 000 – R5, 999 (\$178-\$351)	31.582*** (3.311)	30-39 years Married	0.710*** (0.068)	White	2.556*** (0.278)
30-39 High school	1.449*** (0.206)	40-49 Female	1.012 (0.093)	40-49 Rural	0.913 (0.086)	R6,000 (\$532) and above	54.397*** (11.887)	40-49 years Married	0.748*** (0.078)	30-39 years Other	0.735*** (0.072)
30-39 Tertiary education	1.05 (0.279)	50 years and older Female	0.934 (0.075)	50 years and older Rural	0.739*** (0.062)	30-39 years and R1-R1, 999	0.966 (0.100)	50 years and older Married	0.683*** (0.065)	30-39 years White	0.868 (0.188)
40-49 high school/ Matriculation	0.958 (0.129)					30-39 years and R2000-R5, 999	1.042 (0.173)			40-49 years Other	0.802** (0.084)
40-49 Tertiary education	0.817 (0.280)					30-39 years R6,000 and above	2.352** (0.899)			40-49 years White	1.373 (0.322)
older than 50 high school/ Matriculation	0.973 (0.120)					40-49 years and R1-R1, 999	0.827* (0.095)			50 years and older Other	1.168* (0.105)
older than 50 tertiary education	0.536* (0.199)					40-49 years and R2000-R5, 999	0.775 (0.137)			50 years and older White	2.044*** (0.375)
						40-49 years R6,000 and above	4.033*** (1.909)				
						50 years and older R1-R1, 999	1.088 (0.128)				
						50 years and older R2000-R5,	0.657** (0.117)				
						older R6,000 and above	1.442				
Observations	30,135		30,135		30,135		30,135		30,135		30,135
Individual characteristics	YES		YES		YES		YES		YES		YES
Province FE	YES		YES		YES		YES		YES		YES
Year FE	YES		YES		YES		YES		YES		YES
Pseudo R squared	31.06		31.02		31.05		31.1		31.06		31.12

Robust standard errors are in parentheses

*** p<0.01,
** p<0.05,
* p<0.1

Across all columns, there is a positive association of age with banking status of the individual and in most cases the coefficient is statistically significant. The overall fit of the models are good with the pseudo R^2 ranging from 0.311 to 0.312. Across the columns (1) to (6) we find a positive association with age and that older individuals are more likely to be banked. In column (1), those in the age group 30-39 years old with a high school education, and those older than 50 years with a tertiary education are significantly more likely to have a bank account than their counterparts are. In column (2) although the individual coefficients are significant and of the expected sign, the interaction terms are not significant. Thus the impact of the age of the individuals on their likelihood of having a bank account does not appear to be affected by the gender of the individual. In column (3) those aged 50 years and older living in a rural area were significantly less likely to have a bank account than their urban counterparts.

In column (4) those aged 30-49 with an income of R6 000 and above are more likely to be banked relative to other categories. Across all age groups, in column (5) we find a positive association with age and married individuals. With the inclusion of the interaction term, the results indicate that effect of the age on the likelihood of having a bank account is reduced when the individual is married. The results in column (6) indicate that income and ethnicity are significant in determining the likelihood of having a bank account. In particular, individuals classified in the 'other' category, between the ages of 30 and 49 are less likely to have a bank account relative to their counterparts. However, there is a significantly positive association of whites 50 years and older and the likelihood of having a bank account. These results suggest that individuals in the highest age category from a white ethnicity are significantly more likely to have a bank account relative to their counterparts.

The findings of this study suggest that there is a significantly positive association between the banking status and marital status of the individual, in line with the expectations of *H6*. These findings confirm previous studies that suggest that married individuals are more likely to be banked (Allen et.al, 2016; Klapper & Singer, 2015; Wentzel et.al, 2016). The findings of this study also suggest that individuals in rural areas are less likely to be banked, and confirm *H5*. This finding is in line with prior studies that suggest that there is a negative relationship between living in a rural area and the banking status of the individual (Beck & Brown, 2011; Honohan and King, 2012).

The findings of this study suggest that there is a significant association between ethnicity and banking status, whilst controlling for other factors and confirms *H7*. There was a statistically significant association between the white ethnic background and the likelihood of being banked. The results indicate that those from a white ethnicity were significantly positively associated with having a bank account. Specifically, the

findings suggest that Whites were 15.8% more likely to be banked than Blacks. The implications of this result suggest that despite the policy interventions aimed at increasing access to financial services for those of a black ethnic background, there is still a need for targeted policy interventions. The results also indicate that those classified as 'other ethnicities' are not statistically different from individuals of a black ethnic background.

The findings of this study suggest that there is a gender dimension in explaining financial inclusion and, in contrast to other studies, there is a significantly positive association between females and having a bank account in contrast to the expectations in *H4*. Our study used data from samples over a ten-year period, and thus the results incorporate the changes in banking status across time and the improvement in banking status of women. The results indicate that females are 3.8% more likely to be banked than males. This corroborates the earlier univariate results, which indicated that 65.48% of women are banked as opposed to 63.98% of men. Over the period of the study, targeted interventions and formal financial sector commitments were made to expand access for the women, as they were identified as less likely to be banked than men. The findings reflect a significant improvement in addressing the gender gap over the study period.

A possible explanation for the increase in the number of bank accounts opened by women is due to the deteriorating economic conditions in South Africa over the period of the study. There has been growing unemployment and an increase in the number of female-headed households. Another factor that is likely to have significantly affected the banking status of women was the launch of the SASSA Mastercard debit card in 2012. SASSA launched this debit card to facilitate the electronic payment of social grants. These social grants included the old age grant, war veterans grant, disability grant, grants in aid, child support grant, foster child grant, care dependency grant and social relief in distress grant (South African Social Security Agency, 2018). Women were likely to have been recipients of these grants, due to their role as caregivers.

To assess the impact of the launch of the SASSA electronic payment system further, a sub-set of the data was created for the period prior to the introduction of the new SASSA system (which occurred in 2012) and for the period thereafter. The regressions were run separately and the results were interpreted before and after the introduction of the SASSA card. The results are presented in Table 5.

Table 5 Results of logistic regression showing pre- and post-2012

	2005 - 2011	2005 - 2011	2012 - 2014	2012 - 2014
VARIABLES	Log-odds	Marginal effects	Log-odds	Marginal effects
30 – 39 years	1.279*** (0.063)	0.038*** (0.008)	1.687*** (0.139)	0.075*** (0.012)
40 – 49 years	1.286*** (0.073)	0.038*** (0.009)	1.510*** (0.141)	0.060*** (0.013)
50 years and above	1.473*** (0.081)	0.059*** (0.008)	2.540*** (0.239)	0.126*** (0.012)
High School/Matriculation	2.592*** (0.127)	0.151*** (0.008)	1.378*** (0.123)	0.044*** (0.013)
Tertiary education	11.460*** (1.226)	0.355*** (0.013)	3.431*** (0.827)	0.148*** (0.025)
Female	1.084** (0.039)	0.012** (0.005)	2.109*** (0.132)	0.104*** (0.009)
Rural	0.611*** (0.027)	-0.076*** (0.007)	0.775*** (0.057)	-0.034*** (0.010)
R1 – R1,999 (\$0.09 – \$177)	4.076*** (0.186)	0.280*** (0.008)	6.329*** (0.560)	0.387*** (0.017)
R2,000 – R5,999 (\$178 – \$351)	31.109*** (2.379)	0.581*** (0.009)	26.845*** (3.188)	0.581*** (0.017)
R6,000 (\$532) and above	73.520*** (11.949)	0.635*** (0.010)	255.795*** (82.618)	0.667*** (0.016)
Married	1.365*** (0.054)	0.047*** (0.006)	1.192** (0.084)	0.023** (0.009)
Other ethnicities	1.020 (0.046)	0.003 (0.007)	0.934 (0.075)	-0.009 (0.011)
White	3.482*** (0.302)	0.183*** (0.011)	2.049*** (0.305)	0.087*** (0.016)
Constant	0.063*** (0.010)		0.161*** (0.033)	
Observations	21,648	21,648	8,487	8,487
Region FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Each column represents the estimation results of the unweighted pooled logistic regression of equation 1 with region and year fixed effects with the pooled sample split between 2005 – 2011 and 2012 – 2014.

Reference categories: 16 – 29 years, primary school or less education, male, no income, unmarried, Black.

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The marginal effects of age in the period prior to 2012 suggest that those age 50 years and older were 5.9% more likely to have a bank account than the youngest age category, and those in the other age

categories were 3.8% more likely to have a bank account than the youngest age category, whilst controlling for other factors. After 2012 the marginal effects for age suggest that those age 50 years and older were 12.6% more likely to have a bank account than the youngest age category. Those aged 30 – 39 years were 7.5% more likely and those aged 40 – 49 were 6% more likely to have a bank account than the youngest age category, whilst controlling for other factors. Thus the effect of age is more pronounced after the introduction of the SASSA payment system and suggest that further government interventions are needed to address the youngest age group (16 – 29 years) who remain least likely to have a bank account.

The marginal effects of education in the period prior to 2012 suggest that those with tertiary education were 35.5% more likely to have a bank account than those in the lowest education category, and those with some high school were 15.1% more likely to have a bank account than those in the lowest education category, whilst controlling for other factors. After 2012 the marginal effects for education suggest that those with tertiary education were only 14.8.5% more likely to have a bank account than those in the lowest education category, and those with high school education were only 4.4% more likely to have a bank account than those in the lowest education category, whilst controlling for other factors. Thus the effect of education is less pronounced after the introduction of the SASSA payment system and suggest that the effect of the lack of education as a barrier to having a bank account was reduced after the period 2012.

A potential impact of the launch of the SASSA electronic payment system was that more women would open bank accounts. The marginal effects for females in the period prior to 2012 suggest that females were 1.2% more likely to have a bank account than males, whilst controlling for other factors (at the 5% significance level). However, after 2012, the association with gender was highly significant with females being 10.4% more likely to have a bank account than males, whilst controlling for other factors. Thus from 2012, women were more significantly more likely to have a bank account than men. This finding was also highlighted in the 2012 FinScope annual report, indicating that females were more likely to be banked than males due to the new SASSA system (FinMark Trust, 2012).

With respect to the geographical area where the individual resides, those living in rural areas prior to 2012 were 7.6% less likely to have a bank account than those residing in urban areas. Subsequently, the marginal effects suggest that those living in rural areas were only 3.4% less likely to have a bank account than those residing in urban areas. These findings suggest that the government policy of paying grants electronically positively impacted those living in rural areas to open bank accounts.

The government policy to pay grants electronically positively impacted those earning between R1 – R1, 999 (\$09 – \$177) as they were 38.7% more likely to have a bank account than those in the lowest income category compared to prior 2012 when they were 28% more likely to have a bank account than those in the lowest income category. The marginal effects for the next income category remained the same as prior to 2012, whilst the likelihood of having a bank account for the highest income category strengthened from 63.5% to 66.7%.

Furthermore, this change impacted positively on ethnicity. People from a white ethnic background were 18.3% more likely to be banked than those from a black ethnic background prior to 2012. After 2012, however, Whites were 8.7% more likely to be banked than Blacks, whilst controlling for other factors. Thus the likelihood of having a bank account for Blacks increased over time and the policy to pay government grants electronically positively impacted access to financial services for Blacks.

The implementation of government-to-person payments not only reduced the cost per transaction for the government, but it impacted positively on financial inclusion. This highlights the important role that the state plays in addressing financial inclusion. These policies, in particular, addressed the inclusion of the previously excluded groups. More individuals were provided with access to the financial system and in particular, the increase in the number of women and those from a Black ethnicity who opened bank accounts.

To further explore the association of gender and the banking status of individuals we interact the gender variable with the individual characteristics. The dependent variable is whether the individual has access to a bank account and the independent variables include individual characteristics associated with financial inclusion. See table 6 below.

Table 6: Pooled data with gender interaction terms

VARIABLES	(1)	VARIABLES	(2)	VARIABLES	(3)	VARIABLES	(4)	VARIABLES	(5)	VARIABLES	(6)
Female	1.277*** (0.062)	Female	1.348*** (0.087)	Female	1.240*** (0.047)	Female	1.368*** (0.094)	Female	1.425*** (0.055)	Female	1.258*** (0.046)
30 – 39 years	1.305*** (0.084)	High School/ Matriculation	2.308*** (0.141)	Rural	0.616*** (0.033)	R1 – R1, 999 (\$0.09-\$177)	4.547*** (0.280)	Married	1.551*** (0.081)	Other	0.965 (0.055)
40 – 49 years	1.365*** (0.101)	Tertiary education	11.705*** (1.668)	Female Rural	1.117* (0.072)	R2, 000 – R5, 999 (\$178-\$351)	30.888*** (2.711)	Female Married	0.748*** (0.049)	White	2.861*** (0.335)
50 years and above	1.808*** (0.123)	Female High School/ Matriculation	0.956 (0.070)			R6,000 (\$532) and above	130.686*** (26.523)			Female Other	1.062 (0.076)
Female 30 – 39 years	1.11 (0.091)	Female Tertiary education	0.669** (0.124)			Female R1 – R1, 999	0.952 (0.074)			Female White	1.139 (0.167)
Female 40 – 49 years	1.012 (0.093)					Female R2, 000 – R5, 999 (\$178- \$351)	0.811* (0.101)				
Female 50 years and above	0.934 (0.075)					Female R6,000 (\$532) and above	0.492** (0.139)				
Observations	30,135		30,135		30,135		30,135		30,135		30,135
Individual characteristics	YES		YES		YES		YES		YES		YES
Province FE	YES		YES		YES		YES		YES		YES
Year FE	YES		YES		YES		YES		YES		YES
Pseudo R squared	31.02		31.02		31.02		31.03		31.06		31.01
Robust standard errors in parentheses											
*** p<0.01,											
** p<0.05,											
* p<0.1											

Across all columns, there is a positive association of gender with banking status of the individual and the coefficient is statistically significant. The overall fit of the models are reasonably good with the pseudo R^2 ranging from 0.310 to 0.311. Across the columns (1) to (6) we find a positive association with gender and specifically that females are more likely to be banked than their male counterparts. In column (1) and column (6) although the individual coefficients are significant and of the expected sign, the interaction terms are not significant. Thus the impact of the gender on the likelihood of having a bank account does not appear to be affected by the age and ethnicity of the individual. Thus it appears that women are not more likely to have a bank account if they are in an older age category or based on their ethnicity. In column (2) the results indicate that education levels are significant in determining the likelihood of being banked. With the inclusion of the interaction term however, the positive effect of higher education levels on the probability of a woman having a bank account, is lessened. In column (3) the results indicate that living in a rural area is significant in reducing the likelihood of being banked. With the inclusion of the interaction term, the effect of living in a rural area is more apparent. In column (4) the results indicate that women with an income of R6 000 and above are more likely to be banked relative to other categories. In column (5) we find a significant positive association with gender and marital status of individuals on the likelihood of being banked. Whilst the interaction term is highly significant, the results indicate the effect of the marital status of women on the likelihood of being banked, is lessened.

5.4 Robustness checks

The model specification was modified to assess whether the model was robust to changes in the sample specification. The pooled sample was divided into two groups, namely, by gender, to assess whether the baseline model was robust to changes in sample selection. The primary relationships of interest remained significant with the appropriate sign, thus supporting the baseline model (see Table 8 in the appendix). One variable differed from the baseline model, namely, the relationship between banking status and other ethnicities, which were significant. In the baseline model, coming from a White or Black background had a significant association with banking status, however, the relationship between other ethnicities was not significant. In contrast, in the female group, those from other ethnicities were 1.6% more likely to be banked than Blacks. There was a change in the sign for the male group, with other ethnicities being 1.8% less likely to be banked than Blacks. These results, whilst supporting the baseline model, suggest that the role of ethnicity also has a gender disparity.

A regression was also run with errors clustered on a regional level (for the nine provinces), to control for possible correlation between error terms across individuals within regions. The primary relationships of interest remained significant with the appropriate sign, thus supporting the baseline model (see Table 9 in the appendix for the results of this regression).

To assess whether the model is robust to changes in the sample selection, the regressions were run separately for each survey year (see Table 10 in the Appendix). The results in column (1) to column (10) were compared to the baseline model. The dependent variable remained the banking status of the individual and independent variables consisted of the individual characteristics. The overall fit of the models are good with the pseudo R^2 ranging from 0.272 to 0.351. In most survey years, in columns (1) to (10) the primary relationships of interest remained significant with the appropriate sign, thus supporting the baseline model. Across all columns (1) to (10) there is a significantly negative association of individuals living in a rural area and the probability of having a bank account. Thus in each survey year, individuals living in a rural area were less likely to own a bank account compared to their urban counterparts. Furthermore across all columns (1) to (10) there is a significantly positive association of individuals with tertiary education and the probability of having a bank account. With respect to gender, there is a positive and significant association with banking status in columns (7) to (10). This confirms the earlier results indicating that women are more likely to have a bank account than the men from the year 2010 onwards. With respect to ethnicity, across all columns there is a significant positive association with those in the white category and banking status except for column (9) where the result was not significant. Thus whites are more likely to own a bank account than other ethnicities are. Overall the results are in line with the baseline model, confirming that the baseline model is robust to changes in the sample selection.

In unreported results, regressions were run on the pooled dataset but removing one year from each of the survey data period from 2005-2014 respectively. These results were compared to the baseline model, which included all survey years. These results of these regressions supported the baseline model, with all the main variables of interest remaining significant with the appropriate sign and confirm that the results are robust to changes in the pooled sample.

5. Conclusion

Regulators and policymakers around the world have recognised the importance of financial inclusion for long-term economic growth. Further research is needed to identify the determinants of financial inclusion,

especially in emerging markets, where exclusion is most pronounced. In particular, countries in Africa have higher financial exclusion rates than in other parts of the world. In this study, the long-term effectiveness of state interventions to address financial inclusion were assessed. This study explored the factors associated with financial inclusion in South Africa. The data was obtained from the FinScope Surveys in South Africa over a ten-year period. This data was obtained from repeat surveys to assess how these factors changed over time and to compare the findings with other studies in SSA.

The findings reveal that income is significantly positively associated with financial inclusion. In particular, those in the sample who had the lowest income were least likely to be banked. This suggests that policy interventions should be targeted at the lowest income groups to improve access to financial services. This finding is in line with other studies in SSA which have highlighted the association of income with financial inclusion. Education levels were also significantly positively associated with financial inclusion, and individuals with tertiary education were most likely to be banked. Promoting financial literacy could increase the number of banked individuals, especially for individuals with little or no formal lower education. The study also found a significant positive association with age, suggesting that those in the youngest age category, 16 – 29 years, were less likely to be banked than those in the older age categories. This finding is in line with the results of other studies in SSA, highlighting the importance of policy interventions targeted at the younger age groups.

This study uniquely explored the association of ethnic background with the likelihood of being banked in South Africa. The results indicated that there was a significant association between ethnic background and being banked, with Whites being 15.8% more likely to be banked than Blacks. Encouragingly this effect is reducing over time. After the introduction of the government policy to pay grants electronically in 2012 resulted in a number of new bank accounts being opened by Blacks. However, further policy interventions are needed to address financial exclusion for those from a Black ethnic background. The results for the other ethnic groups were inconclusive. Current research has not explored the association between ethnic background and financial inclusion. Future studies could explore this further, providing greater insights into the relationship between ethnicity and financial inclusion.

This study also contributed to the debate on the gender dimension of financial inclusion. Previous studies in Africa have found that females are less likely to be banked than their male counterparts or that the gender dimension was not significantly associated with financial inclusion, whilst controlling for other factors. In contrast, the findings of this study suggest that there is a significantly positive relationship between financial inclusion and being female. The increased likelihood of women having a bank account

is partly due to growth in bank accounts after the launch of the SASSA MasterCard in 2012, together with financial inclusion policy interventions.

These findings are encouraging, as the gender disparity with respect to financial inclusion seems to have increased over the period of the study, indicating that women are now positively associated with having a bank account. The findings confirm the success of state policy interventions to address financial exclusion. Overall, South Africa's formal financial sector consensus model has positively affected financial inclusion, with an estimated 75% of the population accessing financial services.

Our research was conducted in a single country and as socio-economic circumstances differ across regions and countries, conducting research in other countries over time could enhance the findings of this paper. A limitation of our study was that we were not able to fully explore the gender dimension and future studies could address the gender dimension with more inclusive categories for gender. Furthermore, our study did not include macro-level indicators of financial inclusion and future studies could include these indicators to better understand the relative importance to financial inclusion.

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Appendix

Table 7 Pooled sample with data split by gender

VARIABLES	Male	Male	Female	Female
	Log-odds	Marginal effects	Log-odds	Marginal effects
30 – 39 years	0.182*** (0.068)	0.025*** (0.009)	0.427*** (0.055)	0.068*** (0.009)
40 – 49 years	0.204** (0.080)	0.028** (0.011)	0.365*** (0.062)	0.058*** (0.010)
50 years and above	0.510*** (0.080)	0.070*** (0.011)	0.511*** (0.060)	0.081*** (0.009)
High School/Matriculation	0.890*** (0.068)	0.125*** (0.010)	0.764*** (0.054)	0.126*** (0.009)
Tertiary education	2.475*** (0.149)	0.318*** (0.016)	2.114*** (0.130)	0.305*** (0.015)
Rural	-0.467*** (0.059)	-0.064*** (0.008)	-0.379*** (0.049)	-0.060*** (0.008)
R1 – R1,999 (\$0.09 – \$177)	1.555*** (0.064)	0.308*** (0.011)	1.444*** (0.054)	0.294*** (0.010)
R2,000 – R5,999 (\$178 – \$351)	3.476*** (0.089)	0.601*** (0.012)	3.205*** (0.091)	0.540*** (0.011)
R6,000 (\$532) and above	4.924*** (0.207)	0.681*** (0.012)	4.140*** (0.204)	0.596*** (0.012)
Married	0.452*** (0.060)	0.062*** (0.008)	0.131*** (0.044)	0.020*** (0.007)
Other ethnicities	-0.127** (0.062)	-0.018** (0.009)	0.098* (0.051)	0.016* (0.008)
White	0.949*** (0.123)	0.126*** (0.015)	1.299*** (0.099)	0.185*** (0.012)
Constant	-2.683*** (0.213)		-2.701*** (0.202)	
Observations	13,295	13,295	16,840	16,840
Region FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Each column represents the estimation results of the unweighted pooled logistic regression of equation 1 with region and year fixed effects for sub-samples by gender.

Reference categories: 16 – 29 years, primary school or less education, male, no income, unmarried, Black.

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 8 Results of equation 1 with errors clustered by region

Variables	Log-odds	Marginal effects
30 – 39 years	0.327*** (0.049)	0.049*** (0.007)
40 – 49 years	0.315*** (0.017)	0.048*** (0.003)
50 years and above	0.548*** (0.100)	0.082*** (0.014)
High School/Matriculation	0.809*** (0.057)	0.126*** (0.008)
Tertiary education	2.240*** (0.178)	0.310*** (0.018)
Female	0.252*** (0.044)	0.038*** (0.007)
Rural	-0.419*** (0.069)	-0.064*** (0.010)
R1 – R1,999 (\$0.09 – \$177)	1.486*** (0.110)	0.302*** (0.019)
R2,000 – R5,999 (\$178 – \$351)	3.330*** (0.084)	0.571*** (0.013)
R6,000 (\$532) and above	4.563*** (0.131)	0.639*** (0.014)
Married	0.262*** (0.032)	0.039*** (0.005)
Other ethnicities	-0.001 (0.088)	-0.000 (0.013)
White	1.131*** (0.129)	0.158*** (0.016)
Constant	-2.816*** (0.151)	
Observations	30,135	30,135
Region FE	YES	YES
Year FE	YES	YES

Each column represents the estimation results of the weighted pooled logistic regression of equation 1 with year fixed effects and the standard errors clustered at a regional level.

Reference categories: 16 – 29 years, primary school or less education, male, no income, unmarried, Black.

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0

<i>Table 10: Individual survey years</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
VARIABLES	LOGISTIC	LOGISTIC	LOGISTIC	LOGISTIC	LOGISTIC	LOGISTIC	LOGISTIC	LOGISTIC	LOGISTIC	LOGISTIC
30 – 39 years	1.206 (0.150)	1.312** (0.163)	1.430*** (0.177)	1.181 (0.155)	1.305** (0.172)	1.373** (0.203)	1.291 (0.203)	1.417*** (0.189)	1.849*** (0.277)	1.845*** (0.274)
40 – 49 years	1.494*** (0.207)	1.133 (0.168)	1.771*** (0.262)	1.211 (0.180)	1.438** (0.212)	0.895 (0.152)	1.161 (0.197)	1.25 (0.188)	1.668*** (0.279)	1.716*** (0.296)
50 years and above	2.153*** (0.297)	1.513*** (0.225)	1.529*** (0.225)	1.317* (0.192)	1.477*** (0.208)	1.069 (0.165)	1.397** (0.216)	1.953*** (0.297)	2.819*** (0.467)	3.220*** (0.578)
High School/ Matriculation	2.334*** (0.288)	3.020*** (0.371)	2.615*** (0.321)	3.006*** (0.414)	2.479*** (0.329)	2.195*** (0.302)	2.450*** (0.337)	1.555*** (0.225)	1.278 (0.204)	1.353* (0.224)
Tertiary education	11.75*** (2.963)	14.72*** (4.056)	13.60*** (3.929)	12.64*** (3.901)	10.98*** (2.921)	8.635*** (2.624)	8.642*** (2.627)	3.338*** (1.303)	3.085** (1.401)	4.455*** (1.883)
Female	0.938 (0.082)	1.239** (0.114)	1.041 (0.096)	0.982 (0.091)	0.982 (0.092)	1.194 (0.131)	1.350*** (0.153)	1.878*** (0.191)	2.152*** (0.240)	2.512*** (0.291)
Rural	0.614*** (0.069)	0.487*** (0.057)	0.549*** (0.062)	0.736*** (0.085)	0.802* (0.092)	0.563*** (0.069)	0.545*** (0.074)	0.819* (0.099)	0.794* (0.105)	0.718** (0.095)
R1 – R1, 999 (\$0.09-\$177)	2.957*** (0.355)	4.280*** (0.507)	4.216*** (0.496)	4.187*** (0.479)	5.944*** (0.688)	3.597*** (0.465)	3.879*** (0.596)	3.914*** (0.539)	7.373*** (1.098)	11.65*** (2.249)
R2, 000 – R5, 999 (\$178-\$351)	31.38*** (6.416)	47.85*** (10.830)	37.72*** (8.458)	29.01*** (5.430)	41.82*** (7.998)	22.29*** (4.656)	18.54*** (3.830)	15.48*** (2.893)	35.77*** (7.658)	47.07*** (11.180)
R6,000 (\$532) and above	62.55*** (24.220)	99.43*** (46.140)	69.13*** (35.670)	54.43*** (20.390)	127.4*** (59.770)	80.83*** (38.420)	62.76*** (25.290)	172.7*** (93.300)	399.0*** (237.200)	335.9*** (186.000)
Married	1.103 (0.109)	1.182 (0.126)	1.484*** (0.156)	1.434*** (0.151)	1.472*** (0.152)	1.778*** (0.208)	1.227* (0.143)	1.474*** (0.170)	1.167 (0.147)	0.936 (0.118)
Other	1.01 (0.107)	0.758** (0.087)	0.818* (0.098)	1.042 (0.125)	1.07 (0.131)	1.561*** (0.213)	1.259* (0.176)	1.085 (0.138)	0.934 (0.129)	0.755* (0.117)
White	4.639*** (0.858)	2.906*** (0.717)	4.414*** (1.049)	3.492*** (0.718)	2.222*** (0.521)	2.885*** (0.754)	3.328*** (0.878)	1.955*** (0.452)	1.453 (0.351)	3.310*** (1.062)
Constant	0.0872*** -0.0184	0.105*** -0.0239	0.129*** -0.0278	0.117*** -0.0265	0.103*** -0.024	0.163*** -0.0397	0.102*** -0.0273	0.220*** -0.0553	0.179*** -0.0478	0.0863*** -0.0269
Observations	3,447	3,240	3,277	3,281	3,187	2,717	2,499	2,890	2,897	2,700
Province FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Pseudo R squared	32.49	35.07	32.07	29.53	32.15	30.11	27.44	27.22	30.44	30.32
Robust standard errors in parentheses										
*** p<0.01,										
** p<0.05,										
* p<0.1										

