

# **Financial inclusion in South Africa: a NIDS data analysis of household access and the usage of financial services and products**

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## **Abstract**

Financial inclusion refers to the ability to access essential financial services in an appropriate manner. This suggests that individuals and businesses have access to appropriate and affordable financial services and products that complement their needs. Globally financial inclusion is viewed as an important development priority, and more importantly, it is regarded as a key enabler to eradicating poverty and boosting economic participation and prosperity. South Africa's economy has been trouble with increasing rates of poverty, unemployment and slow growth. Previous research has revealed evidence advocating for the expansion of credit and financial flows relative to GDP, which has shown to have a strong link to economic growth. This study sought to Investigate and analyse the trend and depth of financial inclusion in South Africa, using the four waves of the NIDS database. We further examine the impact of access to finance on household poverty reduction and economic participation.

**Keywords:** Financial inclusion; financial services; NIDS; South Africa

**JEL:** G10, G20

## 1. Introduction

The narrative of financial inclusion has become a topic of global interest for the global community, governments, financial institution, banks and policy makers. Most established economies, such as the UK, have acknowledged the social and political importance of financial inclusion and the issue has become one of the key socioeconomic challenges on the agenda of most major institutions in most economies globally. As a result, the World Bank has made achieving universal financial access one of its 2020 objectives. Financial development is seen as a tool that can significantly lead to economic growth, reduction of income inequality, and lift households out of poverty (CGAP, 2012).

The benefits of a financially inclusive environment are not only seen through direct access to or use of financial services, but also through the indirect yet positive effects that financial development has on the segments of the population that lives in low-income households, especially through labour markets. This has been shown by empirical studies that, the regulation of bank branching doesn't only improve competition and the performance of the bank, it is also more likely to positively impact the income of the poor, in the process intensifying income distribution by increasing relative wages and the working hours of less skilled labour (Jayaratne, Jith, &. Strahan, 1996). Financial inclusion is therefore not only good for economic growth, which plays an essential role in lifting household above the poverty line, but it also helps close the gaps of income inequality.

The role that is played by financial system is quite transparent in every economy, it basically promote economic growth and development through financial intermediation by channelling funds from the surplus unit to the deficit unit of the economy (Babajide et al. 2015). This is basically what financial inclusion is, though it, poverty and inequality can be reduced, since it allows people to invest in the future, smoothen their consumption and manage financial risks (Demirguc-Kunt et al. 2017). Even the smallest amounts of financial assets provide one with a cushion from economic shocks, as well as possible loss in income in later life. While, households who are financially excluded cannot partake in the different forms of saving or wealth accumulation, such as earning interest, making savings through paying bills via direct debit, or gaining favourable forms of credit (Searle & Koppe (2014).

Generally formal financial inclusion or access formal financial products and service is usually offered by commercial banks and other regulated financial service providers. The problem that most emerging economist face is that, it is the tradition of commercial banks not to provide service to consumers who regarded uncreditable or not credit worthy, these group of consumers are mainly; emerging/ small entrepreneurs, low income earners and the poor.

This is because of the high cost that comes with the risk of rendering financial services to this group that makes it unattractive, and such a group is usually referred to as the unbanked. It is only until the beginning of the 1990s that commercial banks started considering entering this segment of the market, starting to be more open in offering some of their goods and services to the unbanked population (Schoombee 2004).

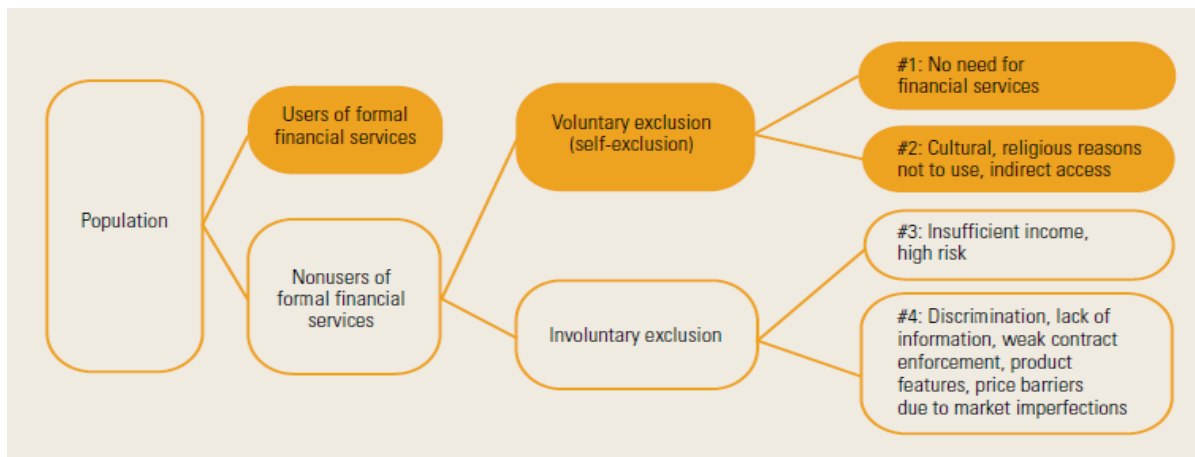
What raises concerns is that, by 2003, there were still 17 million unbanked persons in South Africa, implying that there was still serious financial exclusion at that time and this has played part in motivating us to conduct an updated study using NIDS. The rest of the paper is organized in the following order. In section 2 we provide a brief conceptual framework on financial inclusion and also look at past local and international empirical studies. In section 3, we discuss the method and overview of data we use. Section 4 we present the empirical findings of our study, it entails of the descriptive analyses, as well as the regression results with the corresponding discussion. We then conclude in section 5.

## **2. Literature review**

### **2.2. Conceptual framework**

Financial inclusion is defined as an absence of price barriers in the use of financial services. It is also known as a broad access to financial services and products. Access to financial services basically refers to the supply of these services, while use is determined by both demand and supply. While defining financial inclusion or access may seem easy, there is some complication that comes with understanding it. One major challenge is to make a distinction between individuals who are involuntary and those who voluntarily financially excluded (World Bank, 2008). These two concepts refer to those who are excluded because they are poor or regarded as high risk (involuntary) and those who are excluded because they see no need for the financial services, or choose not to use the services due to cultural or religious reasons. As such, through these concepts a bridge is created between those who have access to financial services and those who are the actual users of financial services. Figure 1, below provides a clear picture of access to and the use of financial services.

Figure 1: Use of and access to financial services



Source: World Bank (2014: 16).

Figure 1 above expresses the narrative that, some consumers may be excluded involuntarily from using financial services. One prominent group consists of households and firms that we earlier distinguished as unbankable. This group is excluded because they have insufficient income or represent an excessive lending risk. In this case, lack of use may not be caused by market or government failure. Another group is the category that may not have access because of discrimination, lack of information, shortcomings in contract enforcement, an environment with poor information, shortcomings in product features that may make a product inappropriate for or to the customer, price barriers because of market imperfections, religion, ill-informed regulations, culture, or the political capture of regulators.

## 2.2 Review of past empirical studies

Issues relating to financial inclusion have become a topic of interest for the global economic research community. As a result it has also grown to be a well-researched subject both locally and internationally. A more localized study by Ardington et al. (2004) reviewed South Africans' financial inclusion in 3 areas, namely savings, insurance and debt. Their study indicates that In 2002, only 8% of adults in the lowest LSM decile had a transaction (bank) account, while this proportion was 91% for the highest LSM decile. This result is expected, as access to commercial banks is generally limited to salaries workers (in the higher LSM categories) but excluding the poor, unemployed, self-employed and informally employed (in the lower LSM categories). They further express that, Stokvel have become an important informal savings mechanism, particularly for adults in the middle to high LSM categories (LSM5 to LSM 9).while access to formal financial services for the rural population was found to be virtually non-existent. Some major factor which they found to be prohibiting poor rural people from using commercial banks is Long distances and high transport costs.

According to the study, home loans have had very little penetration outside of the predominantly urban middle to upper income categories LSM 7-10. Level of indebtedness (debt as % of disposable income) increased across all income categories in general between 1995 and 2000. Also, in the poorer-income households, debt is primarily sourced from furniture stores, retail institutions and family, implying that poorer individuals incurred substantial amounts of debt at high interest rate on consumables rather than assets. In contrast, at the top end of the income distribution, debt is procured primarily for the accumulation of assets (housing and vehicles). The Proportion of adults with life insurance, funeral insurance and medical aid was clearly higher from LSM 6 onwards. Their overall conclusion was that, in the bottom deciles of the income distribution, the vast majority of households are excluded from formal financial services.

Nyaruwata & Leibbrandt (2009), provide an overview of the NIDS data on personal debt and access to finance. They find that, 90% of white households have access to a bank account whilst only 43% of African households do. Further discoveries indicate a greater proportion of white households having private pensions (29%) and investments (11%) than black households. While 26% whites stated that they had a bond, compared to the 4% of African respondents. Another study using the same data is Ocran (2015), conducting a logistic model on likelihood to hold risky financial assets, and it was found that this likelihood was significantly higher for those with higher income, married or living with a partner, and with at least Matric.

Orthofer (2016) used two sources of information to assess the South African wealth distribution, namely the wave2 NIDS 2010/2011 and a novel sample of almost 1.2 million personal income tax records in the 2010-2011 fiscal year. It was found that the wealth share for the top 10 percent remained close to 90%-95%. The study derives total wealth by considering individual assets on pension/life (private pension, life insurance), individual assets on other financial items (cash on hand, bank account, trusts, stocks, shares), individual non-mortgage liabilities (personal loan, study loan, vehicle finance, hire purchase, credit card, store card, Mashonisa loan, micro loan), and household-level wealth (real estates, livestock, mortgages).

We also review some international empirical studies that offer different perspectives. For example, Sarma & Pais (2011) derives a financial inclusion index (IFI) at country level for 49 countries. The IFIs are compared to HDIs, and it was found that countries with high and medium IFI values belong to the group that is classified by the UNDP as countries with high human development ( $HDI > 0.7$ ). Sarma (2012) derives the same IFI as proposed by Sarma & Pais (2011), for 94 countries in 2004-2010. It was found that a general improvement in the level of financial inclusion took place during the 7-year period, as the average IFI increased from 0.373 in 2004 to 0.478 in 2010. Also, while low- and lower middle-income countries dominate the low IFI countries, the medium IFI countries are dominated by upper middle- and high-income countries. Most of the high IFI countries are also high-income countries. As a result, financial inclusion and income levels tend to move in the same direction in general.

Another study that used the Sarma & Pais (2011) approach to derive the IFI index, on 176 countries is Park & Mercado (2015). It was discovered that higher per capita income, sound rule of law and demographic factors (large population size and low dependency ratios), good governance and high institutional quality have significant positive impact on financial inclusion. They also find a strong correlation between financial access and poverty rates and some evidence on the role of financial inclusion on reducing income inequality.

Camara & Tuesta (2014) uses the PCA method to derive three indices in the first stage, to look at usage (including variables on having at least one of the financial products, people who save, and people who have a loan in the formal financial system), barriers (including variables on distance, affordability, documents and trust) and access (including variables on ATMs / 100 000 population, bank branches / 100 000 population, ATMs / 1 000 km<sup>2</sup>, bank branches / 1 000km<sup>2</sup>). In the second stage, an overall financial inclusion index is derived by considering the three dimensions in the first stage. These indices are derived for 82 countries. They find that the degree of financial inclusion is highly correlated with some macroeconomic variables such as GDP per capita, education, efficiency of a financial system and financial stability.

In our study, we use the PCA method to derive our own financial inclusion index, which we use to investigate and analyse the trend and depth of financial inclusion in South Africa, using the four waves of the NIDS database. We further examine the impact of access to finance on household poverty reduction and economic participation.

### 3. Methodology and Data

#### 3.2. Methodology

Financial Inclusion measures the inclusiveness of individual/ households in the financial sector. How inclusive the financial system is an economy, cannot be evaluated in a direct manor. This is because the financial system is represented by a variety of components along several dimensions. Likewise, financial inclusion is a concept that comes in different channels, and as such, cannot be quantitatively measured in straightforward fashion. In this study, similar to a majority of studies that attempt to measure financial inclusion, we use the principal components analyses (PCA) to derive a financial inclusion index. The Financial inclusion index will be determined by the interaction of different variables with a causal relationship.

The PCA is a data reduction method that is used to re-express a large number of variables from a dataset into fewer dimensions. The function of the PCA method is to change the dataset in such a way that, a multitude of variables can be combined into relatively fewer components that capture the best possible variation from the original variables. The PCA is also useful when identifying similar or related patterns across variables (Vyas & Kumaranayake, 2006). Each of the components that the PCA decomposes the variance of the set of variables into, is basically a weighted summation of the individual variables, done in such a way that, the weighting of every single variable is proportional to the share of the total variance that it represent. Such that:

$$P_1 = \sum_{i=1}^n a_{1i}X_{1i} \text{ Where, } a_{ki} = \frac{\sum_{i=1}^n r_{x_1x_i}}{\sum_{i=1}^n \sum_{j=1}^n r_{x_jx_i}}$$

Originally, the components are calculated in turn, where the previous component captures the elimination of the successive variation. The second principal component will be calculated in such a way that it is maybe based on a matrix with elements equal to:  $r_{x_ix_j} - a_{1i}a_{1j}$ . To identify the number of variables to be included in the index, the eigenvalue ratios are used. The eigenvalue ratios show the proportion of all the variance that is explained by each of the principal component (van der berg et al, 2003).

Table 1 below, shows the list of components that we use to generate the financial inclusion index for this study.

Table 1: First principal components (weights) for deriving the financial inclusion index in each wave

Item	Wave1	Wave2	Wave3	Wave4
Home loan / Bond	0.3681	0.3960	0.3723	0.4000
Personal loan from a bank	0.3018	0.2179	0.2803	0.3179
Personal loan from a micro-lender	0.0545	0.0787	0.0961	0.0383
Loan with a Mashonisa	-0.0206	-0.0240	-0.0045	-0.0460
Study loan with a bank	0.0850	0.1147	0.1860	0.1489
Study loan with an institution other than a bank	0.1092	0.0431	0.0198	0.0348
Vehicle finance (car payment)	0.3602	0.3790	0.3686	0.3868
Credit card	0.4391	0.4276	0.4535	0.3977
Store card	0.3280	0.3337	0.3364	0.2862
Hire purchase agreement	0.1181	0.0796	0.1012	0.0282
Loan from a family member or friend or employer	0.0363	0.0453	0.0390	-0.0280
Bank account	0.3225	0.3056	0.2919	0.2840
Pension or retirement annuity	0.3665	0.4047	0.3466	0.4234
Unit trusts, stocks and shares	0.2591	0.2656	0.2585	0.2463
Proportion of variation (eigenvector?) explained by the first principal components (%)	20.92	18.76	17.19	17.73

Source: Authors' own calculations using the NIDS waves 1 to 4 data.

The final set of analyses that we undertake is to fit a series of multivariate regression models to our data. We start by regressing the financial inclusion index with some demographic characteristics, in particular, gender, race, age, education level, geographical type, province, household size, employment status and level of income. We firstly regress these components using a simple OLS, across the 4 waves. We then add another regression, this time using probit model. We use the probit regression to test for the likelihood of a household being completely financially excluded, where the dependent variable is a binary variable, with 1 meaning that the household is completely financially excluded and 0 meaning that the household is not completely financially excluded. The covariates that we use in the probit regression are the same as the characteristics that we used in the OLS and we regress is for each of the four waves. We further add a quadratic function in our analyses



### **3.2. Data**

The data that we use in this study is the first four waves of the National Income Dynamic Study (NIDS). NIDS is South Africa's first national panel data study and it is conducted biannually by the Southern Africa Labour and Development Research Unit (SALDRU), based at the University of Cape Town.

Traditionally data aimed at examining financial inclusion can be provided through two channels: Demand-side data and supply-side data. Demand-side data refers to the data that provides information concerning financial services users, while supply-side data is usually gathered through household and firms surveys. Through the demand-side data we are able to measure users socio-economic and demographic and problems encountered when seeking formal financial services. Whereas the supply-side data provides information regarding regulated financial services providers. This helps us understand the geographical accessibility, pricing, and penetration or usage of financial product and services. Supply-side data is usually gathered as a set of broad indicators of formal and regulated financial service providers (World Bank, 2015)

The existence of these two channels in which financial inclusion data is presented, the manner in which financial inclusion should be measured has become a topic of concern amongst most researchers and policy makers. Most researchers have approached the measurement of financial inclusion mainly by using supply-side data to look at the usage and access to formal financial services (see Amidzc et al. (2014); Sarma (2008) and Chakravarty and Pal (2010)). There has also been some work done using demand-side data, in most cases these studies relied on individual level demand side data, with a focus on indicators related to usage and barriers individually (see Demirgüç-Kunt and Klapper (2013)).

The NIDS data primarily provides information on demand-side indicators, since it is a survey conducted on household who demand and consume financial services and products. The NIDS study entails of four main questionnaires; (Household roster questionnaire, Adult questionnaire, Child questionnaire and proxy questionnaire). The questions on finance are asked in section G of the adult questionnaire and are asked on the following three areas: ownership, value of payment and outstanding balance. In this study we focus only on ownership.

## Who is included?

The NIDS covers roughly 9000 households with The fact that NIDS is one of South Africa's largest household surveys gives it a very large scope, this comes as the main advantage of using the dataset to express a picture that represent the country's population. In this study we only observe households with at least one adult member and the number of household observed in each wave are as follows: 7274 in wave one (2008), 6749 in wave two (2010/ 2011), 8023 in wave three and 9597 in wave four (2014/2015). In our analysis, households are divided into deciles, using real per capita income in December 2016 prices. We further examine the relationship between financial inclusion of the household, labour market status of the household members and poverty. For the purpose of analysing poverty, we make use of the 2015 Statistics South Africa (Stats SA) proposed lower bound poverty line of R501 per capita per month in 2011 February, equivalent to R689 in 2016 December prices (The base month of the CPI – See Stats SA 2017). This new poverty line is derived using the basket from the 2010/2011 IES data. All empirical results are weighted using the post stratified weights.

## Limitations

There are some limitations that come with using the NIDS data to measure financial inclusion, in particular the fact that the NIDS questionnaire did not ask any questions on access and affordability. Another limit is that, for this study, we do not examine the financial inclusion of each household across the four waves. To do this, we need to only include the balanced panel component of the date (i.e. only include the households taking part in all 4 waves of NIDS). This would require a separate, more in-depth study of its own.

## 4. Empirical Findings

### 4.2. Descriptive Statistics

Table 2: Proportion of households (%) with at least one member having each source of finance

Item	Wave 1	Wave 2	Wave 3	Wave 4
Home loan / Bond	8.57	7.13	7.25	5.68
Personal loan from a bank	8.63	6.77	10.78	16.41
Personal loan from a micro-lender	0.93	0.95	0.65	1.73
Loan with a Mashonisa	1.69	1.82	2.05	2.97
Study loan with a bank	0.99	0.70	0.47	0.86
Study loan with an institution other than a bank	0.62	0.56	0.48	0.69
Vehicle finance (car payment)	7.34	4.88	3.99	6.29
Credit card	12.50	8.06	9.76	9.74
Store card	22.07	15.84	21.37	31.30
Hire purchase agreement	5.40	3.98	4.90	6.52
Loan from a family member or friend or employer	2.85	3.44	2.24	8.76
Bank account	56.89	60.48	68.13	78.50
Pension or retirement annuity	8.36	10.14	4.46	13.12
Unit trusts, stocks and shares	2.71	2.35	1.11	2.76

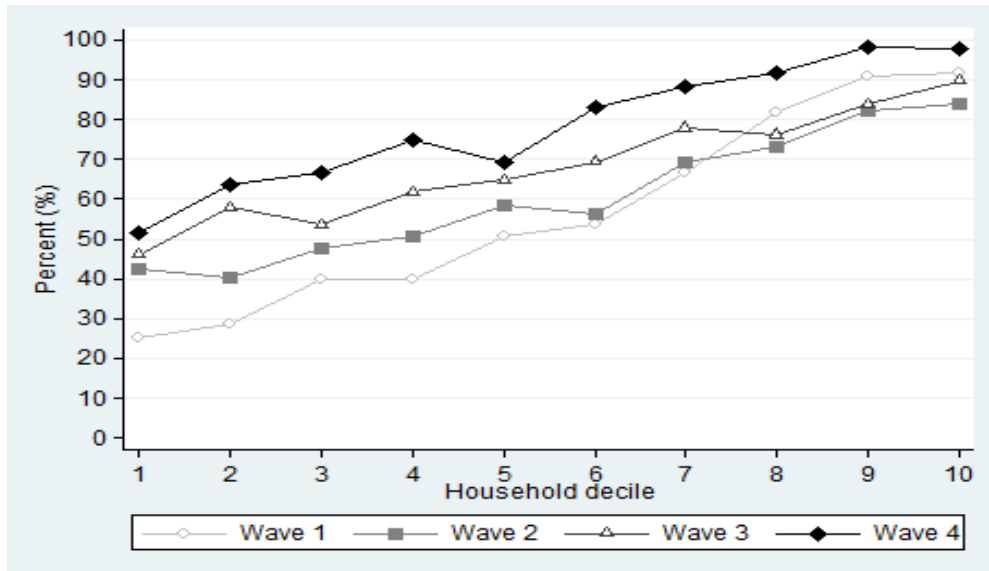
Source: Authors' own calculations using the NIDS waves 1 to 4 data.

In Table 2, we show the proportion of households with at least one member having access to some form of the observed financial services. A general observation indicates that, there has been an increase in access to most of the financial services between wave 1 and wave 4. The proportion of households having at least one member with a bank account increased from almost 57% in wave 1 to over 78% by wave 4, while those with access to a personal loan from a bank Nearly doubled (8.63% to 16.41%) between the first and the last wave. We also considered variables from informal financial sources, such as loans from Mashonisa (loan sharks) which have increase from 1.7% in wave 1 to 2.97% by wave 4, and loans from a family member, friend of employer which has shown an increase from less than 3% to 9% in wave 1 and wave 4 respectively. Accesses to other important services such as, higher purchase agreements, store cards and pension or retirement annuity have also fairly increase over the 4 waves.

We also observe a decrease in the access to some of the major financial services, home loans/ bonds were at 8.63% in wave 1 and it gradually declined over the years ending up at 5.68% by wave 4. There has also been a slight decline in study loans with a bank and vehicle finance. One factor that stands

out is the use of credit cards, which has decrease from 12.5% to 9.74% in wave 1 and 4 respectively. Even though this output is meant to indicate the change or trends of access to financial services, the changes over the 4 waves may have come about as a result of change of attitude, behaviour or interest of the recipients towards the service, as opposed to the accessibility of those services.

Figure 2: Proportion of households (%) with at least one member having a bank account, by decile



Source: Authors' own calculations using the NIDS waves 1 to 4 data.

In figure 2, we present a decile distribution of the proportion of households with at least one member having a bank account. In each of the four waves we see a substantial increase in the proportion of members who have access to bank accounts, especially for the first seven deciles. Between wave 1 and wave 3, we see a decrease in the rate of household members with bank account, in the three upper deciles. The general point is that, in either wave, there is a positive gradient over the decile distribution. There is however some noticeable trends with the proportion of members who have bank accounts in almost all the waves. Quite remarkable is that of the three last waves, in wave 2 we see a negative trend between the first and the second deciles, also observed in the case of the third and second decile in wave 3 and the same for decile four and five in wave 4. This is remarkable because, these negative trends indicate to us that, even though having a bank about is regarded as a fairly strong indicator for financial inclusion, in these instances, there is a higher proportion of households from poorer deciles who have bank accounts than those from household in a richer or higher income decile.

In Table 3, we consider the proportion of households with at least one member having access to some form of the observed financial services, grouped by poverty status. A household is regarded as poor if its per capita income is below the 2015 Stats SA proposed lower bound poverty line of R501 per month.

Table 3: Proportion of households (%) with at least one member having each source of finance, by poverty status

Item	Wave 1		Wave 2		Wave 3		Wave 4	
	Poor	Not poor	Poor	Not poor	Poor	Not poor	Poor	Not poor
Home loan / Bond	0.1	11.8	0.2	9.6	0.3	8.8	0.2	6.7
Personal loan from a bank	1.4	11.4	2.0	8.5	1.9	12.8	6.5	18.3
Personal loan from a micro-lender	0.8	1.0	0.1	1.2	0.1	0.8	3.0	1.5
Loan with a Mashonisa	1.0	1.9	3.1	1.4	2.3	2.0	5.1	2.6
Study loan with a bank	0.3	1.3	0.3	0.8	0.0	0.6	0.0	1.0
Study loan with an institution other than a bank	0.3	0.7	0.2	0.7	0.1	0.6	0.8	0.7
Vehicle finance (car payment)	0.1	10.1	0.1	6.6	0.0	4.9	0.3	7.4
Credit card	1.0	16.9	0.6	10.7	0.5	11.8	1.3	11.3
Store card	6.9	27.9	7.3	18.9	8.2	24.3	17.5	33.9
Hire purchase agreement	2.5	6.5	2.0	4.7	3.0	5.3	6.1	6.6
Loan from a family member or friend or employer	3.1	2.8	4.5	3.0	3.2	2.0	12.2	8.1
Bank account	30.5	67.0	42.3	67.0	50.8	72.0	56.4	82.7
Pension or retirement annuity	0.4	11.4	0.6	13.5	0.8	5.3	0.9	15.4
Unit trusts, stocks and shares	0.0	3.7	0.1	3.1	0.1	1.3	0.4	3.2

Source: Authors' own calculations using the NIDS waves 1 to wave 4 data.

The general observation in Table 3 suggests that poverty is associated with financial exclusion. This conclusion is made from observing that, in all of the four waves, households who are regarded as poor have a lower rate of access services we use to measure financial inclusion, as opposed to the households who are regarded as not poor. What seems to be standing out in this regard is that, the proportion of households who had members with bank accounts in the poor group, were less than over 50% of the proportion of those who are regarded as not poor in wave 1.

By wave 2, the proportion of poor households with members who have bank accounts, increased by almost 40% between wave 1 and 2, while that of households who are regarded as not poor remained unchanged at 67% between the first two waves.

The proportion of households with members who have bank accounts then continue with a gradual increase for both the poor and none poor household, from wave 2 onwards. Other strong indicators of financial inclusion such as access to home loan, personal loan from a bank, credit card, vehicle finances and store cards are also seen in very high proportions in the households which are not poor as opposed to the poor households, confirming the observation that there is a strong relationship or connection between poverty and financial exclusion.

#### 4.2. Econometric Analysis

Table 4 is the first part of our econometric analyses. We present findings of the OLS regressions, regressing the financial inclusion Index (derived by the PCA method as discussed earlier) on households using a number of demographic variables for each wave. Table 4 on the other hand, present corresponding estimates, however this time with the use of the probit regression. We use the probit regression to test for the likelihood of a household being completely financially excluded.

Table 4: OLS regressions on financial inclusion index

	Wave1	Wave2	Wave3	Wave4
Gender of household head: Male	0.0115	0.0776	-0.0624	0.0527
	[0.0537]	[0.0668]	[0.0606]	-0.0528
Race of household head: African	-0.287*	-0.626***	-0.207	-0.26
	[0.147]	[0.206]	[0.187]	-0.1941
Race of household head: Coloured	-0.0991	-0.0988	-0.188	-0.1123
	[0.153]	[0.303]	[0.236]	-0.2035
Race of household head: Indian	-0.38	-0.0347	0.378	0.1616
	[0.321]	[0.424]	[0.331]	-0.374
Age of household head	0.0624***	0.0704***	0.0280***	0.0547***
	[0.00799]	[0.0105]	[0.00817]	-0.0078
Age squared of household head	-0.000575***	-0.00071***	-0.000221***	-0.0005***
	[7.93e-05]	[0.000112]	[8.23e-05]	-0.0001
Years of education of household head	-0.0524**	-0.0725***	-0.0411*	-0.1035***
	[0.0254]	[0.0264]	[0.0248]	-0.0223
Years of education squared of household head	0.0104***	0.00917***	0.00709***	0.0135***

	[0.00213]	[0.00225]	[0.00195]	-0.0017
Geo type: Urban	0.348***	0.220***	0.0921*	0.1500***
	[0.0620]	[0.0606]	[0.0558]	-0.0495
Province: Western Cape	0.106	-0.318	0.162	-0.0846
	[0.111]	[0.227]	[0.161]	-0.1158
Province: Northern Cape	0.11	-0.193	0.0357	-0.0721
	[0.0998]	[0.146]	[0.149]	-0.102
Province: Free State	-0.0578	-0.133	0.0982	-0.1393
	[0.176]	[0.130]	[0.0968]	-0.1481
Province: KwaZulu-Natal	0.0432	-0.143	-0.252***	-0.2293***
	[0.0782]	[0.0963]	[0.0954]	-0.0607
Province: North West	0.206	-0.280**	-0.118	-0.0271
	[0.138]	[0.120]	[0.127]	-0.121
Province: Gauteng	-0.203**	0.0493	0.0179	0.0309
	[0.0836]	[0.119]	[0.0985]	-0.0813
Province: Mpumalanga	0.0277	0.167	-0.00664	-0.0704
	[0.0821]	[0.112]	[0.113]	-0.0754
Province: Limpopo	0.175**	-0.00536	-0.0388	0.0263
	[0.0873]	[0.117]	[0.0919]	-0.0816
Household size	0.112***	0.102***	0.101***	0.1213***
	[0.0120]	[0.0125]	[0.0115]	-0.0105
Number of employed	0.291***	0.325***	0.390***	0.3283***
	[0.0392]	[0.0525]	[0.0431]	-0.0388
Log real per capita income	0.518***	0.360***	0.418***	0.4635***
	[0.0394]	[0.0456]	[0.0374]	-0.0356
Constant	-6.451***	-4.760***	-4.814***	-5.9508***
	[0.424]	[0.421]	[0.435]	-0.4018
Sample size	7,228	6,734	8,012	9 577
R-squared	0.475	0.38	0.349	0.4505
Prob. > F	0	0	0	0

Source: Authors' own calculations using the NIDS waves 1 to 4 data.

Standard errors in parentheses

\*\*\* Significant at 1%    \*\* Significant at 5%    \* Significant at 10%

Table 5: Probit regressions on complete financial exclusion [Please amend if necessary]

	Marginal effects			
	Wave1	Wave2	Wave3	Wave4
Gender of household head: Male	0.0109	0.00321	0.013	-0.0048
	[0.0187]	[0.0211]	[0.0178]	-0.0082
Race of household head: African	0.153***	-0.00721	0.0384	-0.0085
	[0.0538]	[0.0596]	[0.0451]	-0.0336
Race of household head: Coloured	0.185**	-0.0274	0.0752	0.0698
	[0.0762]	[0.0595]	[0.0647]	-0.057
Race of household head: Indian	0.241	0.0803	-0.176***	-0.0282
	[0.162]	[0.132]	[0.0354]	-0.0355
Age of household head	-0.0144***	-0.0106***	0.000426	-0.0056***
	[0.00322]	[0.00343]	[0.00263]	-0.0012
Age squared of household head	0.000120***	8.67e-05**	-2.69E-05	0.0000***
	[3.09e-05]	[3.46e-05]	[2.78e-05]	0
Years of education of household head	0.00334	-0.0188**	-0.0150*	0.0055
	[0.00696]	[0.00877]	[0.00767]	-0.0034
Years of education squared of household head	-0.00246***	0.000198	-0.000527	-0.0015***
	[0.000550]	[0.000650]	[0.000576]	-0.0003
Geo type: Urban	-0.130***	-0.0649***	-0.0467**	-0.0314***
	[0.0215]	[0.0239]	[0.0201]	-0.0105
Province: Western Cape	-0.163***	0.139**	0.133***	-0.0469***
	[0.0283]	[0.0561]	[0.0443]	-0.0124
Province: Northern Cape	-0.167***	-0.0151	0.0164	-0.0316**
	[0.0219]	[0.0458]	[0.0329]	-0.0119
Province: Free State	-0.180***	-0.0531	-0.0164	-0.0334**
	[0.0223]	[0.0421]	[0.0297]	-0.0115
Province: KwaZulu-Natal	-0.145***	0.0546	0.0503**	-0.002
	[0.0227]	[0.0356]	[0.0256]	-0.0114
Province: North West	-0.186***	0.0107	0.121**	-0.0275**
	[0.0231]	[0.0469]	[0.0487]	-0.0113
Province: Gauteng	-0.168***	-0.110***	-0.0474*	-0.0394***
	[0.0259]	[0.0371]	[0.0263]	-0.0126



Province: Mpumalanga	-0.185***	-0.132***	0.0156	-0.0548***
	[0.0225]	[0.0320]	[0.0320]	-0.0091
Province: Limpopo	-0.167***	-0.0125	-0.0161	-0.0450***
	[0.0241]	[0.0414]	[0.0326]	-0.0091
Household size	-0.0348***	-0.0416***	-0.0316***	-0.0226***
	[0.00428]	[0.00469]	[0.00405]	-0.0026
Number of employed	-0.0991***	-0.0893***	-0.124***	-0.0556***
	[0.0121]	[0.0172]	[0.0145]	-0.0077
Log real per capita income	-0.135***	-0.106***	-0.0618***	-0.0606***
	[0.0111]	[0.0134]	[0.0114]	-0.0068
Sample size	7228	6734	8012	9 577
Observed probability	0.3659872	0.3480555	0.2728968	0.1638
Predicted probability	0.287162	0.3154241	0.2232207	0.0771
Pseudo R-squared	0.2942	0.1652	0.1747	0.2798
Prob. > Chi-square	0	0	0	0

Source: Authors' own calculations using the NIDS waves 1 to 4 data.

Standard errors in parentheses.

\*\*\* Significant at 1%    \*\* Significant at 5%    \* Significant at 10%

Our output show some interesting and in some instance expected findings. For example, we can see that the OLS regression output indicates that, the household head age variable is positive and significant in all four waves, while the household head age-squared variable negative and significant for all the waves, these coefficients simply suggest that households headed by middle-age people are associated with higher financial inclusion index. As age increase, the FII will also increase, until at a certain age when it starts to decline. The household age variable is in mostly negative and significant when testing for the likelihood of the household being financially excluded, while age-squared coefficients are positive in all waves. What this means is that, households headed by middle-age people are associated with lower likelihood to be financially excluded. The male coefficients are almost always positive, yet insignificant in both regressions. In wave 1, Africans were associated with 0.29 units and 0.63 in wave 2, lower financial inclusion index compared to their white counterparts and this is also confirmed with the wave 1 results of the exclusion likelihood result, which tells us that, Africans and coloureds are more likely to be financially excluded compared to Whites. Households from the urban area are associated with a higher financial inclusion index, compared to households from the rural area.

The findings of the OLS regression is also confirmed by the probit regression output, which indicates that in all four waves, households from the urban area were significantly less likely to be financially excluded.

There is also strong evidence indicating that an increase in the size of the household is associated with a greater financial inclusion index, and that a household that is bigger by size is less likely to be financially included. We also see evidence that suggest that, in wave 3 and 4, household from KwaZulu-Natal had, on average, a lower financial inclusion index than households from Eastern Cape. This is similar to household from Gauteng in wave 1, and North West provinces. The findings from the Gauteng province are however contradicted by the probit regression output, which indicate that, in wave 1, households from Gauteng where less likely to be financially excluded compared to those from the Eastern Cape province.

The number of employed and real per capita income coefficients are as expected, based on hour findings in Table 3; Similar to an increase in real per capita income, an increase in the number of employed household members is associated with an increase in the financial inclusion index of the household, while a household with a larger number of employed members is less likely to be financially excluded across all 4 waves. This supports the conjecture that, poor households with less income are more likely to be financially excluded and we can conclude that, financial inclusion is associated with some level of income above the poverty line.

## **5. Conclusion**

This study set out to examine the trends and depth of financial inclusion in South Africa, using a large, nationally representative dataset with rich covariates. Our analysis show that, there was a general increase in financial inclusiveness over the 4 waves. There is however, strong indication that financial inclusion is mostly associated with households with a higher income, while the likelihood of financial exclusion is more prevalent in poor households. We also found that households with low real per capita income and fewer employed members are associated with greater likelihood of financial exclusion. We further discovered that households that are bigger in size and those which are headed by middle aged persons are associated with positive financial inclusion index, and as such less likely to be excluded.

Key policy implication is that, more financial services targeted at low income households can help eradicate poverty. More thorough empirical analysis is required to examine the financial inclusion further (i.e. using the balanced panel component of the data to examine whether the financial inclusion or exclusion of the households is chronic or temporary over time).

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