FINANCIAL LITERACY, USE OF FINANCE AND WELFARE IN POST-APARTHEID SOUTH AFRICA

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Declaration

I, ***Elizabeth Lwanga Nanziri***, hereby declare that the work presented in this thesis, is my own, except where acknowledged and that this thesis or any part of it, has not been previously submitted for the award of a degree at any university.

Signature: Date: 30 *May 2016*

Dedication

This thesis is dedicated to my late dad, Benedict Lwanga Jjawe, who sacrificed all to see me excel, my mum, Passy Najjalwambi Jjawe, who taught me to always strive for GOLD, and to my boys Donald and Farouk, whose childhood I compromised along the way.

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Abstract

Black South Africans historically experienced discrimination with regard to access to basic rights, including the right to financial services. This culminated in the marginalisation of economic activities for large parts of the population, and subsequent economic inequality among the population. Guided by the proposition that access to formal finance improves welfare, the post-Apartheid government embarked on an aggressive programme to rectify this situation. The Usury Act of 1968 was repealed and the Financial Sector Charter was instituted in 2003. These reforms aimed to increase access to finance for all who required it, for economic activity and/or for consumption smoothing. But access to finance may not necessarily lead to better welfare. Empirical studies show that in order for access to finance to translate into improved welfare individuals need to possess the relevant financial skills. A financially literate population can effectively participate in the formal financial sector in a manner that improves their livelihoods, with spill-overs for the broader economy.

This thesis investigates whether there are significant differences in the welfare of South Africans who used formal financial services compared to those who did not, during the period 2005 – 2010. The study also investigates the distribution of financial literacy, and its role in the use of especially formal financial products in the country. Such an exercise is important, given that the country has a sophisticated financial sector akin to those in developed economies, and an equally sophisticated informal financial sector. If indeed financial skills are crucial, then a society that is averse to inequality would ensure that welfare is enhanced through acquisition of the appropriate financial knowledge for effective use of finance, making access to finance a worthwhile pro-poor policy.

In this study data for the period 2005 to 2009 is used to construct a measure of financial literacy. The measure takes the form of a financial literacy index constructed using principal component analysis (PCA). The results of this exercise show that the mean level of financial literacy in South Africa was 48.4 on a scale of 0 – 100 over the period. Financial literacy was below average among women, for individuals below 30 years, and those above 60 years, for Black South Africans, individuals with less than matric level of education, and those at the bottom of the monthly income spectrum. While these results are in line with empirical findings for high-income countries, the pattern seems to reflect the education, labour market, and related inequalities characteristic of post-apartheid South Africa.

Secondly, I investigate the role of financial literacy in the use of financial services by South Africans. A multinomial logistic approach is used to explore the likelihood of using financial services from formal or non-formal sources, given one's level of financial literacy. The results show that the use of formal financial services/products is positively associated with high levels of financial literacy. However, the effect is dampened by the individual's risk attitudes and characteristics such as race, gender, age, and education. There is also weak evidence of switching between formal and informal credit, insurance and savings products. This points to some form of risk-aversion towards the formal financial sector regardless of the individual's level of financial literacy.

Finally, welfare disparities between users and non-users of formal financial services are examined for the period 2005 – 2010. Two measures of welfare are constructed: The first is a well-being index, constructed by simple aggregation of individuals' responses to questions on deprivation. The second is an asset index, which is a quantitative measure constructed from the individual's possession of durable items, following the Uncentered Principle Component approach. The analysis then utilises the Recentered Influence Function (RIF) technique to decompose welfare differences. This framework allows for the investigation of a potential non-linear relationship between use of finance and welfare by decomposing the differences across quantiles of the welfare distribution and the Gini coefficient. Indeed the results point to a significant welfare gap between users and non-users of formal financial products. In some quantiles, users have higher welfare than non-users and vice versa, depending on the measure of welfare used. When using the asset index, the welfare disparity between users and non-users is significant, and larger in the middle and at the top of the welfare distribution. It is also accentuated by race, education and personal income. On the other hand, when using the well-being index, the disparity is large and significant at the lower end of the welfare spectrum. In this study, formal products in general seem to contribute more to the welfare of individuals at the top of the welfare distribution. In contrast, informal products, such as credit and insurance, have a positive effect at the bottom of the welfare distribution.

Overall, the findings suggest that there are welfare gains associated with the use of formal financial services and products, but these gains vary depending on one's position in the welfare distribution. Also, the use of formal financial services is associated with one's level of financial literacy, as well as one's observable characteristics. Thus, the positive correlation between financial literacy, use of

formal financial services, and welfare implies that South Africa would benefit from financial inclusion if education attainment (which is a platform for financial literacy) is addressed to enable effective use of financial services for welfare improvement and poverty reduction.

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Chapter One

Study Background and Motivation

1.1. Introduction

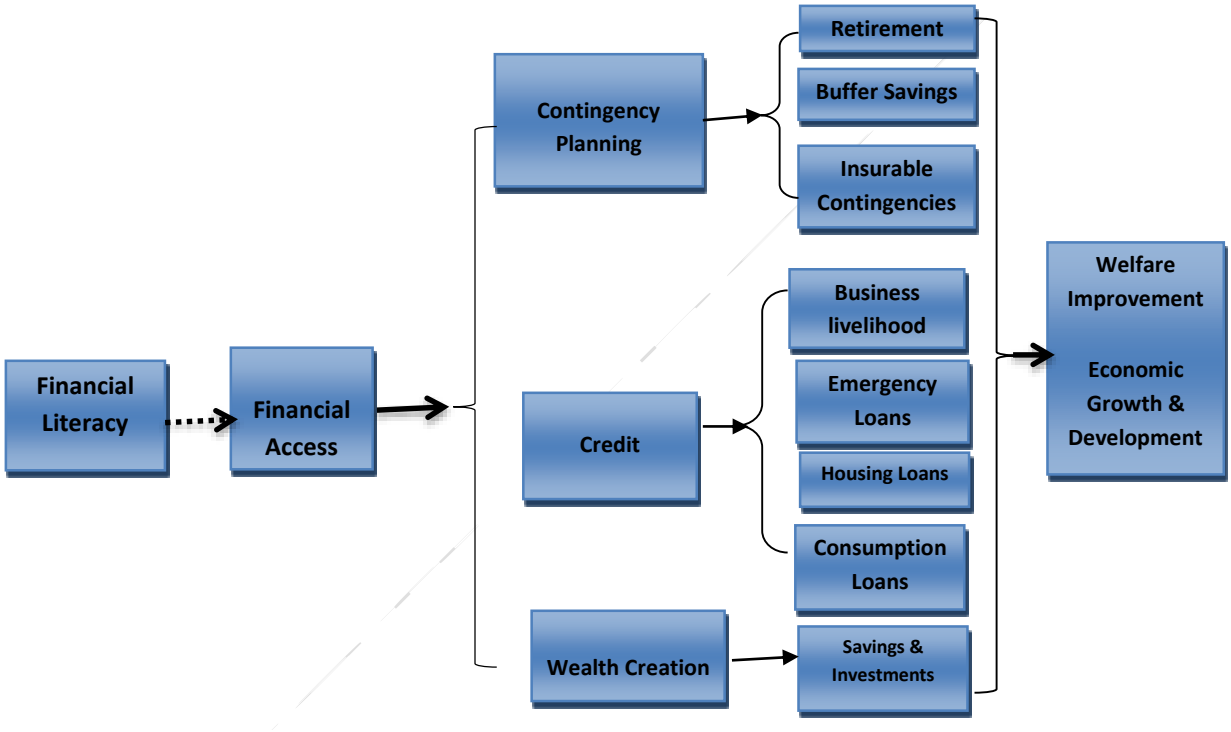
Almost 2.5 billion adults around the world remain unbanked while only 22 percent and 9 percent report saving at, and taking out credit from, formal financial institutions respectively (Demirgüç-Kunt and Klapper, 2012; Financial Inclusion 2020 (FI2020)[1]). On the other hand, over half a billion people in the world are projected to remain trapped in poverty by 2015 (Chandy and Gertz, 2011). While much of the debate around poverty reduction focuses on meeting basic needs such as food and health care, sustained long-term economic progress at household and economy-wide levels depends on access to financial products and services. These allow individuals and firms to move away from short-term decision making, to an inter-temporal allocation of resources. Thus access to and use of finance[2] are fundamental drivers for improving the livelihoods of the poor by increasing household income and resilience in an increasingly shock-prone global economy, (Karlan and Zinman, 2010; Centre for Global Development (CGD), 2009; Yunus, 2006). However, there are concerns that access to finance remains a privilege, that is, formal financial sector participation is limited to the elites, and that effective use of finance is often sub-optimal (Ardington and Leibbrandt, 2004; CGAP, 2012; Lusardi and Mitchell, 2014). It is argued that households need mechanisms to make payments, manage risks, obtain credit and loans, save and make investments, and make financial provision for their old age (Klapper and Singer, 2013; Hawkins, 2009, Beck, Demirgüç-Kunt and Honohan, 2009). Indeed the current global financial inclusion drive tries to ensure that formal financial services and products are available to those previously excluded, to enable them to live better lives and to effectively contribute to the growth of their economies. This relationship is summarised in Figure 1.1. Empirical work on the finance and welfare nexus, however, has yielded mixed results, contrary to what Figure 1.1 depicts. In some cases, access to finance has led to increased incomes of the poor relative to the non-poor, improved self-reported

[1] FI2020 is a development project for the Center for Financial Inclusion which aims for global financial inclusion by the year 2020 (see www.centerforfinancialinclusion.org)

[2] These concepts are well captured in the definition of financial inclusion as 'a state in which everyone who can use them, has access to a full suite of quality financial services provided at affordable prices, delivered by a range of providers, in a stable, competitive market'. www.centerforfinancialinclusion.org

well-being, and increased participation in entrepreneurial activities (Beck, Demirgüç-Kunt and Levine, 2007; Burgess and Pande, 2005; Honohan, 2008; Khandker and Samad, 2013). In other instances, the effect has been to reduce the welfare of the included, relative to periods prior to inclusion (see Diagne and Zeller, 2001). Does access to and use of finance lead to better welfare in South Africa?

Figure 1.1: From Financial Access to Welfare



Source: *Adopted from Narain (2007) and customised to the study*

To answer the above question, it is important to note that the subject of well-being and welfare improvement is a challenging one that can be tackled by cross-disciplinary research, using methodologies from economics, psychology, and sociology. These three disciplines are grounded in the utilitarian framework which argues that an individual's well-being is a reflection of the best choices they make under the circumstances. This flat ontology presents well-being or welfare as a result of objective conditions surrounding an individual. Under these conditions, an individual can be methodical and thorough. Building on this line of argument, behavioural psychologists relate one's state of well-being to cognitive resources such as the nature and quality of employment,

wages earned, cost of living, and the role of government welfare policy (Mullainathan, 2004). Thus, improving one's welfare is a function of one's choices plus these broader factors. In this framework, the issue of cause and effect is crucial. In other words, is it the bad financial decisions that individuals make or is it external factors that impact negatively on their welfare? The answer to such a question, behavioural psychology argues, depends on the extent of cognitive resources that an individual possesses. Subsequently the methodological approach has often included the use of laboratory and field experiments to examine the extent to which psychological resources, such as attention and self-control, determine one's well-being. Empirical work by researchers such as Mullainathan (2004), Shiv and Fedorikhin (1999) and Mischel, Shoda and Rodriguez (1989) shows that decisions made in a state of plenty are different from those made in a state of scarcity. They also show that these two states affect one's level of attention and self-control and subsequently one's welfare. On the other hand, an individual might voluntarily choose to participate in a welfare enhancing programme such as a savings plan, if they are constantly reminded to do this. This reflects a scenario of the provision of information and advice to influence one's behaviour for better welfare.

An economics perspective looks at the individual as a utility maximizer with society's welfare being the summation of individuals' utility. Whether approached from the concept of marginal utility, revealed preference, or rational choice, the methodological approach for measuring welfare in this framework involves empirical measures (Neff and Olsen, 2007). The sociology approach has more recently introduced the concept of subjectivity of welfare or well-being, and it considers individuals as part of society and having positive emotions, leading to what has come to be known as 'cognitive evaluation' by social psychology authors such Veenhoven (1996), Diener (1984) and Leonardi, Spazzafumo, Marcellini, and Gagliardi, (1999). In this framework, welfare/well-being is measured using a set of qualitative indicators.

Critical realists such as Bevan (2004), Clark and Qizilbash (2005) and Neff and Olsen (2007) have criticised the utilitarian and methodological individualism approaches to welfare by arguing for depth rather than a flat ontology for well-being. That is to say, that a human being is always in dynamic interaction with institutions, norms, cultures, and structures, such as families and organisations. Thus to analyse one's welfare status in order to improve it, requires an analysis that incorporates all these facets. Such analysis necessitates a combination of subjective and objective

measures incorporating the intransitive as well as the transitive nature of subjectivity. Although there is broad recognition of the legitimacy of this complexity, the economics literature focuses on quantitative measures and has not been able to give much substance to this complexity. However, the growing empirical economics work that incorporates psychology is a step towards addressing this gap.

This study, however, attempts to analyse the transmission (as shown in Figure 1.1) in the context of South Africa, from an economics perspective, employing quantitative econometric techniques. Two hypotheses are tested by undertaking three distinct exercises in the subsequent chapters. The hypotheses to be tested are that: i) use of formal financial services is associated with better welfare and ii) use of formal finance is determined by one's level of financial literacy. If there are welfare gains from using formal financial services, then it is important to establish the extent to which financial literacy would amplify or dampen the effective use of such services in a South African setting. The study is embedded in the specifics of the South African context, in the controls used in all the quantitative work, as well as in the treatment of informal financial options alongside formal options.

In economics, the finance-welfare nexus is among the oldest topics of debate and, within this corpus, there is a large body of literature that analyses this relationship. The pioneering work of Schumpeter (1911) and McKinnon (1973) recognise that financial institutions play an important role in a country's welfare and economic development. But this contribution depends on the financial systems (whether intermediated or market-based), which differ in developed and developing countries. Most development economists posit a linear relationship between access to finance and welfare, whereby financial intermediation that reduces the cost of access to finance (such as operating a bank account or accessing credit) has the effect of redistributing income across income quintiles (Beck, et al., 2007; Beck, Demirgüç-Kunt and Honohan, 2009; Yunus, 2006). But there are arguments that the relationship is non-linear, such that in the early stages of financial deepening, the incomes of the high income quintiles might increase at the expense of the low-middle income group (Haber, Maurer and Razo, 2003; Greenwood and Jovanovic, 1990; Lamoreaux, 1986).

In view of these arguments, researchers have employed various methods to investigate this relationship. For instance, cross-country studies have used survey data to compare incomes of low-income countries and high-income countries as a function of access to financial services. Varied measures of welfare (such as income per capita, consumption expenditure) have been used (see Burgess and Pande, 2005; Honohan, 2008; Beck, Demirgüç-Kunt and Levine, 2007). While a positive association has often been established, causality has been more challenging to establish. This gap has led to a burgeoning literature on longitudinal surveys and field experiments or randomised control trials (RCTs). The longitudinal survey approach involves providing finance (such as credit) to individuals and then following changes in their welfare over time (see Diagne and Zeller, 2001; Khandker and Samad, 2013; Ashraf, Karlan and Yin, 2006). The financial diaries approach by Collins, Morduch, Rutherford, and Ruthven (2010) followed financial behaviour of households for a period in an effort to understand their welfare dynamics in the absence of formal finance. The RCT approach on the other hand compares the before and after welfare states of two groups of individuals (the treatment and control groups) following an intervention in the form of access to financial services (see for instance Ashraf, Karlan and Yin, 2010; Bauchet, Marshall, Starita, Thomas, and Yalouris, 2011; Karlan and Zinman, 2010; Banerjee, Duflo, Glennerster, and Kinnan, 2010).

The results from using both these approaches, while throwing some light on the causality dilemma, present a further problem of external validity (lack of generalizability). This is partly because the measures of welfare differ, financial services are not homogenous and results are often context specific. The latter is important in that case studies in countries with a similar socio-economic structure to South Africa are non-existent.

The many studies undertaken thus far and the vast number of methodological approaches adopted, provide mixed results as far as the relationship between financial access and welfare is concerned. This makes policy formulation a challenge, which provides an impetus for more research in this area, in the South African context. Moreover the indicators of welfare themselves vary among studies because of the lack of standardisation and variations in variables included in social surveys. This has led to the publication of a number of guidelines; including the OECD well-being framework, the Multi-dimensional Poverty Index (MPI) of the Oxford Poverty and Human

Development Initiative (OPHDI), the Happiness Index of the United Nations, and the asset index from the Demographic and Health Surveys (DHS).[3]

Financial access has been assisted by policies that encourage financial intermediation. However, this access, accompanied by an increase in complex financial instruments, and the increasing responsibility for consumers to manage their inter-temporal consumption, now poses a new challenge. This challenge relates to financial skills to navigate and use the cocktail of products and services offered by financial services providers. These financial skills, commonly referred to as financial literacy, are lacking among various segments of the population globally.[4] Researchers argue that besides the high costs associated with formal financial services, consumers might not demand financial services if they are not familiar with them because they lack financial knowledge (Cole, Samson and Zia, 2011). Indeed, the events of the 2008/09 global financial crisis brought to the fore financial literacy as a possible missing link between financial access and its desired welfare results. Subsequently, financial institutions have heightened their focus on the subject, while government agencies and independent institutions have adopted various financial education programmes and initiatives to aggressively deal with this oversight.[5] This relates to the latent link between access to finance and welfare, illustrated by the dotted line in Figure 1.1. In other words, access to finance might be necessary but not sufficient for welfare improvement.

This concern has led to a burgeoning body of literature on the role of financial literacy in savings, wealth accumulation, retirement planning, and debt management. There are arguments that state that individuals who are financially literate are able to use financial services effectively and appropriately, and thus receive positive returns on their investments (See Xu and Zia, 2012; Lusardi and Mitchell, 2014). In low-income economies, the increase in financial access (opening bank

[3] These frameworks have been adopted in countries like Bhutan, Chile, Mexico, Morocco, South Africa, Thailand and The Philippines (See Boarini, Kolev and McGregor, 2014; Finn, Leibbrandt and Woolard, 2013; Noble, Smith, Wright, Penhale, Dibben, et al., 2000). I discuss some of the frameworks in detail in the context of the specific chapters.

[4] See Lusardi and Mitchell (2014), Xu and Zia (2012) for an overview of global trends

[5] For example, the longest panel study of income dynamics in the US (PSID) was modified to accommodate financial literacy related questions; the President's Advisory Council on financial literacy was formed in the USA (2008); Financial Literacy and Credit Counselling Centres have been formed in India (2007); the Indonesian government declared 2008 the year of financial literacy; The Jump$tart coalition (USA) now offers financial education for pre-kindergarten through college-age youths; the Financial Education Institute of Canada targets employees, while the Australian government has developed a national financial literacy framework that is incorporated into the primary and high school curriculum

accounts or high insurance take-up) attributed to financial literacy, is indicative of the contribution of financial literacy towards households' solving of credit constraints, mitigation of risks, affordability of health care and education of their children. This has spill over effects on the economic and overall prosperity of communities.[6] From the literature reviewed above, it is clear that the use of financial services is both a behavioural finance problem and a utility maximisation problem for an economic agent. Financial literacy is just one of many constraints, others being the socio-economic and demographic characteristics of the individual. Under the utility maximisation theory, individuals are posited to be forward-looking and to maximise expected lifetime utility, given economic information (Behrman, Mitchell, Soo and Bravo, 2012). But differences in financial outcomes and welfare suggest that perhaps economic agents are far from rational. Indeed, behavioural finance studies argue that psychology and markets matter in explaining why individuals make seemingly illogical and irrational financial decisions, adding that a 'rational' consumer does not perhaps exist (Garcia, 2013; Fromlet, 2001; Belsky and Gilovic, 1999; Simon, 1955).

A broad range of methodologies has been employed to analyse the relationship between financial literacy and financial outcomes. In some cases financial education seminars have been conducted and then financial behaviour/outcomes compared before and after the seminars. For instance, the Jump$tart Coalition in the United States provides financial education to pre-kindergarten through college-age youths with the hope of changing financial behaviour when students go out into the job market. In other cases, tailored surveys have been conducted to test for financial skills, as defined by varying conceptual frameworks. These frameworks are summarised in Lusardi and Mitchel (2014), Hung, Parker and Yoong (2009) and Atkinson, McKay, Collard, and Kempson (2007), incorporating behavioural aspects as well as technical skills of an individual.

In the absence of tailored surveys, an instrumental variable approach has also been used. These make use of existing surveys, with financial skills proxied by, for example, educational attainment (see Jappelli and Padula, 2011). This approach has the advantage of addressing the potential endogeneity between financial literacy and the use of financial services. A similar approach employs a simulations technique to find the optimal level of financial literacy that can guarantee

[6] see Tran and Yun (2004); Gine, Menand, Townsend and Vickery (2010); Karlan and Morduch (2009)

effective use of financial services. However, financial literacy-financial outcomes analysis is also hampered by the lack of a standard definition for financial literacy. This leads to varying results that make the formulation and implementation of financial education policies a challenge (see Xu and Zia, (2012) for summary of studies).

This study is therefore located in the aforementioned body of literature of finance and welfare. The study makes use of existing financial access surveys for South Africa and global conceptual frameworks and definitions. This, along with South African literature on the subject is used to create a welfare measure and a financial literacy measure. These measures are then used to test the two hypotheses stated earlier, by undertaking three distinct exercises, discussed in the subsequent chapters.

South Africa presents an interesting case study. As a result of racial segregation that denied the majority of the population access to financial resources, South Africa at the end of apartheid was very unequal.[7] To address these problems, the post-apartheid government pursued a series of social and financial sector reforms such as social welfare support (old age pension, child and disability grants) and financial deepening to expand access to financial services, like credit, to the previously excluded.[8] An overview of South Africa's financial sector in the two periods is provided below.

1.1.1. The Apartheid Financial System

The term 'apartheid' refers to a state of being apart,[9] which was enforced in South Africa from 1948 through legislation. The enforcement of this legislation led to marginalisation in basic services on the basis of race. Only Whites had access to quality education and to financial services, among other services. The rest of the population (Blacks, Asians and Coloureds) were confined to rural or underdeveloped areas characterised by minimal infrastructural support such as financial institutions. Subsequently, these marginalised groups devised alternative mechanisms to meet their financial demands for credit, risk management, savings, and investment. One such

[7] See section 1.1.2 for an overview of the country at the time of independence
[8] This process started in the early 1990s when over 60% of the adult population were excluded from any formal financial services (Kirsten, 2006)
[9] See http://www.capetown.at/heritage/history/apartheid.htm

mechanism that gained prominence was the stokvel[10], which is a form of informal savings mechanism.[11] Thus the country was characterised by a highly sophisticated financial sector, among the top ten in the world (Ludwig, 2006) that served the interests of the elite, alongside an equally vibrant informal sector that served the excluded majority.

The financial sector was governed by a few regulations that in themselves restricted access to and use of especially formal finance. Notable among these was the Usury Act of 1968 (hereafter 'the Usury Act') and the Credit Agreements Act 74 of 1980. The Usury Act covered money lending of up to R500 000 and capped interest rates for these loans. This legislation had a discriminatory effect on the supply of loans in that, by imposing interest rate caps that were meant to protect consumers, it compromised access to credit by low income consumers of the population. Financial institutions reduced the supply of financial services to these consumers, because of fear of not covering their costs on small loans. To try and ease the credit rigidities, the Exemption Notice of 1992 was issued, which exempted loans under R6 000 from the provisions of the Usury Act, and interest rate charges on such loans were uncapped (Kelly-Louw, 2012). But this led to a rise in unregulated and high cost micro-lending, especially to poor and low-income consumers who could still not access formal credit.[12]

Other legislation included the Alienation of Land Act of 1981. This Act compromised the accumulation of assets by individuals because the government took sole ownership of the land. If the government required a piece of land that was inhabited by Black, Coloured or Asian South Africans these residents were evacuated and relocated to unproductive low-market areas, often

[10] The word comes from 'stock fairs' which referred to rotating cattle auctions by English settlers in the Eastern Cape in the early 19th century, characterized by socializing. The practice was later adopted by black communities but not necessarily for trading. The term now refers to groups of people who meet regularly and contribute money to meet each other's financial needs in a rotating manner. While some Stokvels are formal, guided by written rules (a constitution), the majority are formed mainly on the basis of trust. The term is normally used to refer to all types of informal savings schemes including to elicit contributions for costs related to food, and other purchases, and investments-and for parties and other family costs, including funerals (burial societies) (WBS, 2009)

[11] See www.nasasa.co.za – the National Stokvel Association of South Africa

[12] Cost of credit was as high as 360 per cent per year, which also led to high default rates, accompanied by unregulated debt collection mechanisms by lenders, including seizing borrowers' bank cards and personal identification numbers to make direct deductions from borrower's bank accounts

without adequate compensation. This had the long term effect of curtailing access to formal credit where collateral is required by the lender.

1.1.2. The Post-Apartheid Financial Sector Reforms

With the advent of democracy in 1994, the post-apartheid government undertook economic reforms to reverse apartheid injustices. At this time economic growth averaged 1.7 percent per annum, per capita income was declining at 0.7 percent annually and unemployment had increased from 20 percent in the 1970s to 35 percent by 1994. Under the Reconstruction and Development Programme, strategies were put in place to transform the economy from one that served the wealthy and excluded the poor, to one that harnessed the full potential of the country's people and resources (Reconstruction and Development Program (RDP), 1994). One key strategy was Broad Based Black Economic Empowerment (B-BBEE), a precursor of the B-BBEE Act of 2003, which led to the development of the Financial Sector Charter of 2003. The 'Charter' committed its participants (members of the National Economic Development and Labour Council – NEDLAC) to 'actively promote a transformed, vibrant, and globally competitive financial sector that reflected the demographics of South Africa, and to contribute to the establishment of an equitable society. This was to be achieved by effectively providing accessible financial services to black people and by directing investment into targeted sectors of the economy'.[13] As a result, affordable financial services and products were extended to the previously excluded, notably through the low cost transactional/Mzansi account.[14]

This boosted inclusion by six million bank account holders between 2003 and 2008, many of whom were first time users (see Table 1.1). In 2007, the National Treasury and the members of the Association for Savings and Investments in South Africa introduced a matched savings/investment product to assist parents save for their children's tertiary education- the Fundisa fund.[15] By 2012, all social grant recipients were required to receive their funds through a South African Social

[13] See Banking Association of South Africa, www.banking.org.za . NEDLAC members include Government, Business, Labor and Community

[14] This account was offered by all deposit taking banks as a low income transactions banking account. The required minimum balance was R325 ($30). More recently, a Social Security Account (SASSA) was introduced through which social support recipients are required to access their funds

[15] See www.asisa.co.za/fundisa

Security Account (SASSA),[16] a form of Government-to-People payments system. Although this was intended to improve efficiency and security of payments, it also had the effect of boosting formal financial sector participation (as shown in Table 1.1), by including individuals at the lower end of the income spectrum. The country boasts a generous social welfare programme, doubling the number of recipients between 2001 and 2007 (SASSA, 2010). It was estimated that by 2010, almost 52.3 percent of South African households had at least one person receiving a social grant (SASSA, 2010).[17]

Table 1.1: Formal Financial Sector Participation Trends and Inequality in South Africa

(%)	2003	2006*	2009	2011	2013**
Currently Banked	49	53	62	65	75
Previously Banked	14	12	9	4	4
Never Banked	37	35	28	31	21
Gini Coefficient	57.7	67.4	70.0	65.4	--

***Note**: Uptake boosted by: * Mzansi Account **SASSA Accounts. Informal sector: 12 million registered stokvel members pooling up to R44 billion per year*

***Source:** FSSA (2003-2013) and www.worldbank.org/PovcalNet/index.htm*l.

In terms of credit, the Exemption Notice of 1992 was repealed and replaced by the Exemption Notice of 1999, along with the formation of the Micro Finance Regulatory Council (MFRC).[18] The new Notice exempted loans of up to R10 000 from the provisions of the Usury Act, if they were payable in instalments of less than 36 months and not advanced by overdrafts or credit cards (Kelly-Louw, 2012). Micro-lenders also had to register with the MFRC in order to qualify for this exemption. This brought some form of regulation to the micro-lending industry, but, most importantly, the instalment provision allowed many individuals to access credit.

The deprivations of the apartheid regime and the easy access to credit, accompanied by affirmative action as part of the transformation process,[19] led to a high potential for aspirational borrowing

[16] Receipts from social support were as low as R300

[17]There is evidence that small subsidies greatly increase demand for financial services (Cole et al, 2011)

[18] See www.mfrc.co.za

[19] The policy of Affirmative Action (AA) enabled the previously excluded (Blacks, Coloureds and Indians) to take up positions in the civil/public service, boosting their incomes and thus allowing them to use financial services

that could lead many consumers into debt.[20] This led to the repealing of the Usury Act, and the Credit Agreement Act of 1980 was replaced by the National Credit Act (NCA) of 2005, which was greatly influenced by the credit law reforms in New Zealand, the United Kingdom and the European Union.[21] It should be noted that the NCA was meant to regulate the credit industry which was by then characterized by abuse and exploitation of consumers following the liberation of access to credit. This Act only regulates formal credit transactions. A related bill, the Consumer Protection Bill of 2008, covers all formal financial transactions including insurance, savings and investment. The range of credit products includes: housing loans and mortgages, overdraft and personal loans, credit cards, retail credit, leases, installment sales and micro-loans. These products are provided by institutions like commercial banks, micro-lenders (that are not deposit takers, such as African Bank), retailers, and other non-bank financial intermediaries.

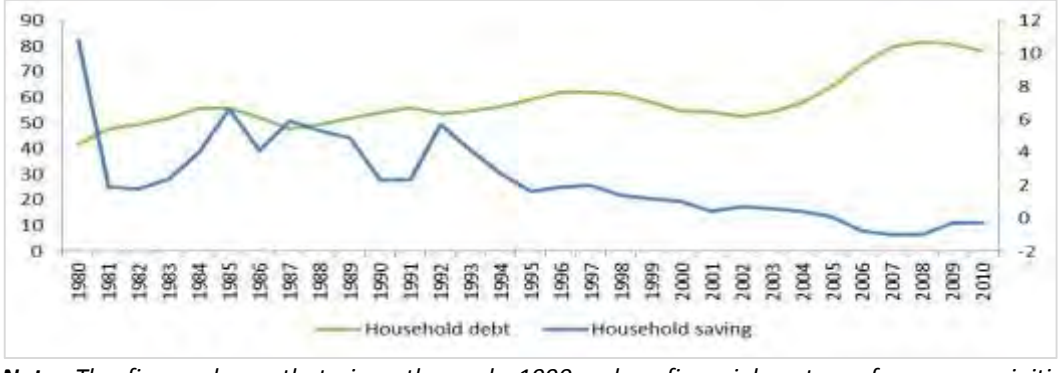
The Short Term Insurance Act of 1998 was instituted to legislate insurance relating to vehicles, home ownership, house contents, liability, and medical care such as medical aid schemes. Long-term insurance was governed by the Long Term Insurance Act of 1998 that provided for the registration of long-term insurers, for the control of some activities of long-term insurers and intermediaries, and for other insurance matters. The product range of this type of insurance includes: life assurance, disability, dreaded diseases, income protection policies, endowments, retirement annuity funds, living annuities, and compulsory annuities.[22]

But by 2004, the use of financial services was closely associated with households at the higher end of the income distribution and linked to formal employment (Ardington and Leibbrandt, 2004). Srinivasan (2006) found further that, even though more black households got access to formal credit between 1993 and 2004, the increase was not statistically significant. The Finscope survey of 2012 found that the extent of formal credit access was indeed as small as 26% of the population and about 65% of South African adults did not borrow at all. Due to the relatively easy access to credit, of those who borrowed from the formal financial institutions, 38 percent were heavily

[20] The Labour Force Surveys for this period show an increase in the labour force. Income is a requirement for access to credit. But as Figure 2.1 shows, there was a surge in indebtedness over the period
[21] See DTI, *Credit Law Review: Setting the Scene* (Pretoria, 2004)
[22] http://www.polity.org.za/polity/govdocs/legislation/1998/act98-052.html

indebted,[23] with household debt-to-disposable income skyrocketed to almost 80 percent, and household savings sank as low as -0.2 percent, as shown in Figure 1.2.

Figure 1.2: The Trend of Household Savings and Household Debt-to-Disposable Income



Note: *The figure shows that since the early 1990s when financial sector reforms were initiated, households have accumulated debt to unsustainable levels, while household savings dropped considerably.*
Source: *Author's compilation from South Africa Reserve Bank Quarterly Publications 2000-2012*

By 2012, 37 percent of South Africans were still out of the formal financial sector, with many using other sources of credit, including informal lenders, and saving through informal savings clubs/Stokvels (FinScope, 2012). The high rate of unemployment and job insecurity had the effect of forcing employees to cash in their retirement savings upon loss or change of jobs, causing them to lose out on the potential interest earnings from long-term savings. This scenario was against a background of only up to 4 million out of the 15 million working population, who reported having their retirement sufficiently catered for (Labour Force Surveys, 2010).

Two reasons can be advanced for the scenario discussed above. The first could be lack of financial literacy among consumers at the time of financial liberalization, leading to them making financial mistakes which could compromise their welfare. This argument is based on the empirical work of Lusardi and Mitchell (2014) in developed countries. The case for South Africa is not well established, however, as the only official study is the OECD pilot on financial literacy in the country undertaken in 2010.[24] The second explanation concerns policy enforcement, based on examples

[23] 7.9million of the 19.8million credit active consumers were over-indebted, that is, delinquent for over 90 days (NCR,2012)
[24] See www.fsb.co.za for an overview of the pilot

such as events in the United States in the early 1970s following the enactment of the Equal Credit Opportunity Act (see Hawley and Fujii, 1991). In this example lenders, hedging against the perceived riskiness of previously excluded consumers, charged high fees on credit, making debt-servicing a challenge for such borrowers. This not only enslaved the borrower but had the potential to curtail consumers' wellbeing by making savings and wealth accumulation impossible amidst outstanding debt obligations. This study attempts to investigate the first argument concerning the influence of consumers' lack of financial knowledge.

By 2014, South Africa's financial sector still reflected the inequalities of the past. There was a highly developed formal financial system serving the elite and large enterprises, while low-income earners and small and medium enterprises were serviced by an informal financial market, which included micro-lenders and loan sharks. Informal insurance equivalents existed in the form of policies with funeral parlours, burial societies, and undertakers, while savings and investments were catered for by Stokvels or informal clubs[25] This complexity led to additional regulatory bodies being set up to ensure that consumers and financial services providers are protected. These include: The credit ombudsman, the short-term insurance ombudsman, the long-term insurance ombudsman, the banking ombudsman, credit bureaux, the Financial Services Board, the National Consumer Tribunal and the National Credit Regulator.[26]

Complementary social reforms were undertaken including: Low-cost housing for South Africans without proper housing (including those who were victims of Apartheid-era resettlements); clean piped water; rural electrification; land reform to re-settle those who lost their property during apartheid, as well as to grant people land for economic activity; healthcare, including building clinics and immunising children against preventable diseases like polio and hepatitis; and public works to provide community based employment, for example, road-building schemes, and the installation of sewage, sanitation, and water infrastructure.[27]

This background shows that improving access to finance and improving the welfare of South Africans were legally entrenched in the country's policy framework. This justifies the focus of this

[25] See www.nasasa.co.za – National Stokvel Association of South Africa
[26] This study tested consumers' knowledge of these regulatory institutions and their related legislation
[27] See Tom Lodge, "The RDP: Delivery and Performance" in "Politics in South Africa: From Mandela to Mbeki", David Philip: Cape Town and Oxford, 2003.

study on the role of financial literacy in financial access, and the role of financial access in welfare. Several studies have been conducted to track changes in poverty and inequality in post-Apartheid South Africa.[28] However, there has been less emphasis on the effect of access to and use of finance on welfare in the post-apartheid period. Yet removing barriers to access to finance was identified as one of the mechanisms to fast-track bridging the inequality gap (see BEE Act of 2003). Further motivation is in recognition of the value of switching from defined benefits to defined contribution pension plans; high household debt-to-disposable income amidst uncertainty in income streams; and heavy reliance on non-formal financial products and services.[29] Empirical investigations in this regard would help to answer questions firstly, on the extent of financial skills among consumers in post-Apartheid South Africa. Secondly, the study could shed light on the extent to which financial skills can explain the observed use of financial services. Thirdly, it could explain the welfare differences between users and non-users of formal financial products and services. Addressing these questions can provide the empirical backing required for the country to develop a national financial education strategy. This can also influence the design and implementation of financial inclusion policies that are in line with global poverty reduction trends (see CGD; CGAP notes; FI2020).

1.2. Objective and Rationale for the Study

This thesis seeks to investigate the relationship between financial literacy and use of financial services on the one hand, and use of financial services and welfare on the other, in post-Apartheid South Africa. The specific objectives of this thesis are the following:

- To construct a measure of financial literacy that can be used to explore the landscape of financial literacy in South Africa for the period 2005 – 2009;
- To investigate the likelihood of using formal and non-formal financial services during the period 2005 – 2009, given one's level of financial literacy;

[28] For instance, studies on the effect of social grants on poverty alleviation and employment (Leibbrandt, Woolard, Finn and Argent, 2010; Booysen and van der Berg, 2005; Case and Deaton, 1998). Related studies on poverty and inequality include Bhorat, Naidoo and van der Westhuizen, 2006; Bhorat, Leibbrandt and Woolard, 2000

[29] Membership of informal financial mechanisms stood at 12 million South Africans by 2012 (Africa Response, 2012: http://www.bdlive.co.za/articles/2011/11/22/stokvel-numbers-in-sa-larger-than-any-metro).

- To examine the welfare disparities between users and non-users of formal and non-formal financial services in South Africa during the period 2005 – 2010, and to reveal what accounts for these disparities.

In addressing these objectives, this research makes the following contributions: The study will be the first to measure financial literacy for the country before 2010 and the financial literacy score it will produce can be used as a benchmark for studies after that period. This fits within the growing body of literature on financial literacy in emerging and dual economies like South Africa. It also contributes to the literature on the role of financial literacy in financial sector participation and on the debate about the welfare benefits of financial inclusion. The latter is fundamental to the fight against poverty and inequality, both in South Africa and globally. If there are significant welfare gains to being financially included, then it would benefit the country to address inequalities arising from skewed access to financial services. If financial literacy plays an important role in financial outcomes, then its distribution is worth investigating to provide input into the formulation of a national financial education strategy, to make access to finance more effective. The next section provides an overview of the data and the analytical approach used in this study.

1.3. Data and Methodology

This study is mainly quantitative. The Finscope surveys for South Africa are utilized.[30] These surveys have been conducted in South Africa by FinMark Trust, which is an independent trust based in Johannesburg, South Africa. The surveys are conducted at an individual's level, focusing on financial access, and needs, and profiles of users of financial products and services, and the financial institutions from whom they get these products. The products are broken down into formal, semi-formal, and informal financial products. [31] The data contains terminologies used in each sub-sector as well as information on the characteristics of respondents such as age, level of education, sources of income, occupation, and indicators of economic well-being (income; housing

[30] See www.finscope.co.za for more on the scope and methodology employed in these surveys

[31] Formal products and services are from institutions that are regulated by monetary authorities (such as mainstream banks). Semi-formal products and services are from institutions that are primarily providers of non-financial services (such as retail stores and cellphone companies,) but can offer some financial services such as insurance and credit in line with their business. Informal products and services are not regulated but are obtained through a private/individual arrangement such as with informal lenders (mashonisas, funeral parlours, or burial societies)

quality and tenure; deprivation; statements on thoughts, feelings and experiences; and asset possession). While they are not designed specifically for an investigation of financial literacy, the surveys contain questions that can be aligned to those used in financial literacy studies in both developed and developing economies. These questions are used to determine respondents' financial attitudes and perceptions to finances as well as their psychological profiles. The financial concepts therein relate directly to the terminologies used in the country, while others are universally applicable (selected questions are highlighted in the empirical chapters). These surveys are repeated cross-sections conducted annually since 2003, with an average sample size of 3900 nationally representative observations. The sampling approach is a stratified multi-stage random procedure and interviews are conducted face-to-face with individuals from 18 years to post retirement years, although in some cases respondents 16 – 17 years old were also interviewed.

Since the samples are drawn with independent probabilities, for the purpose of this study, it was safe to pool the cross-sections when necessary. The structure of the questions was the same for 2003 and 2004, for 2005 through to 2009, and for 2010 to 2012 but the questionnaire was adjusted between 2004 and 2005 and between 2009 and 2010. These differences, limited my ability to use the entire dataset as questions relevant to this study were dropped or replaced in some surveys. Thus to ensure that consistency in questions was maintained across surveys, the descriptive overview and analysis for chapters two and three was done on a pooled cross-section for the period 2005 – 2009, while a pooled cross-section was used for the period 2005 – 2010 in chapter four. This provided a consistent and reasonable sample size of approximately 18 000 and 20 000 observations respectively. The basic assumption in pooling the surveys is that different individuals were interviewed in each survey so that on average changes reflect either change in the behaviour of the individuals (model effect) or changes in the make-up of the population over time (distribution effect). According to Wooldridge (2010), these pooled cross sections over time give rise to independent but not identically distributed observations, whereby any recurrence is treated as coincidental and can thus be ignored. Such a dataset is useful for policy analysis. The data was weighted to be nationally representative, with weights benchmarked on weights from South Africa's National Statistics Agency, Statistics South Africa.

In the study diagnostic tests are conducted on the pooled dataset to check that the structure of the data is maintained. Multivariate tests are performed for the equality of means of the sample

variables under the assumption of unequal variances in the cross-sections. Using Wilk's lambda, which has an F-distribution, rejection of the null hypothesis implies that the samples are heterogeneous and this variation allows for pooling of the individual samples. In this study the null hypothesis is rejected as will be shown in the next chapter. For cross-sectional data (either as single surveys or as a pooled dataset), there is also concern about potential multi-collinearity among the covariates such as education, occupation, and income. This problem is investigated by pairwise correlations among the covariates, where a high correlation coefficient indicates potential multi-collinearity. Auxiliary regressions of regressors are run on each other and to check whether the R^2 from these regressions is greater than the R^2 of the main model. Finally, the variance inflation factor (VIF) is checked, which shows by how much the variance of the coefficients is inflated. A VIF of less than 10 (as is the case in this study) is acceptable, especially if the sample size is sufficiently large to neutralise the effect of any existing collinearity and improve the precision of our estimates. In one instance however, a covariate that exhibited collinearity is excluded since its exclusion does not lead to loss of information but instead increases the degrees of freedom.

In cases where there are fewer variables than desired for the construction of a key variable, basic tests are conducted for the representativeness of these fewer variables and although not reported, the results for such test show no loss of information. For the construction of the financial literacy measure, the questions included in the questionnaire do not capture numeracy skills as they do not explicitly engage respondents in computation exercises, such as calculating compounded interest rates on savings. However, Hung, et al. (2009) argue that although financial literacy benefits from numeracy, which is more aligned to cognitive ability than to financial matters, it should only be treated as a supportive construct. This is further echoed by Kempson, McKay and Collard (2005) who argue that financial literacy is better captured in the capability component, which reflects the ability of an individual to convert knowledge into practice. This study argues that these numeracy skills were captured in other questions that reflect perceptions and attitudes.

In order to use the data for inference, this study makes use of several interrelated data analysis and estimation techniques. The financial literacy index is constructed by the use of principal component analysis, following Filmer and Pritchett (2001). The welfare index is based on Banerjee (2010), who employs the uncentered principle component approach to measuring multidimensional inequality. Discrete choice models akin to those of McFadden (1984) are then

used in investigating the role of financial literacy in financial sector participation, as well as in the choice of financial services across financial sectors. To investigate the welfare disparities among users and non-users of financial services, the study borrows from the experimental literature by having two groups: The treatment group (users of finance) and control group (non-users of finance). An extension of the Oaxaca-Blinder decomposition by Oaxaca (1973) and Blinder (1973) is used, namely the Recentered Influence Function (RIF) advanced by Firpo, Fortin and Lemieux (2007 and 2009).

1.4. Structure of the Thesis

The thesis comprises five chapters. This introductory chapter has provided a summary of the scope and contextualization of the thesis. Chapter two addresses the first objective of the study. In order to explore the financial literacy landscape of post-apartheid South Africa, a measure of financial literacy is constructed. The chapter first discusses the framework used to construct the financial literacy measure which is in the form of an index. The mean value of this index is then used to explore the distribution of financial literacy by socio-economic and demographic characteristics. The chapter concludes by establishing the determinants of financial literacy, and exploring whether the constructed measure of financial literacy is robust when considering South Africa as a country with a dual economy.

Chapter three investigates the role played by financial literacy in the individual's choice of financial services and products in the formal sector, controlling for the existence of semi-formal and informal financial products. The chapter starts with an overview of empirical findings on the role of financial literacy in financial sector participation and financial outcomes. This is followed by an econometric exercise using the discrete choice framework. This investigates, firstly, the probability that an individual participates in the formal versus a non-formal financial sector (sector-level participation: Formal, semi-formal and informal sector versus non-use). Secondly, the exercise examines the probability that an individual chooses a particular financial product (product-level analysis) given his/her financial literacy level. It will be shown that the significance of financial literacy fades when characteristics such as individual's risk are controlled for, when financial literacy is interacted with race, and when use is disaggregated by sector and by product categories.

There is also evidence of switching between the formal and informal sectors regardless of level of financial literacy.

Since access to finance is not an end in itself, chapter four investigates one of the end results of using finance, that is, improved welfare. This chapter therefore addresses the third objective of this study. It starts with an overview of the finance – welfare debate. Then the theoretical framework on which the analysis is based is provided, followed by a review of the empirical literature on the link between finance and welfare. This forms the basis for the construction of two complementary welfare measures, one subjective, and the other objective/quantitative. The motivation for this preliminary exercise is on the need to take into account the multi-dimensional nature of welfare, and the lack of consensus on its measurement. A methodological approach of Firpo, Fortin and Lemieux (2007 and 2009) is adopted for this analysis, which allows for an investigation into the welfare differences between users and non-users of formal financial services. It will be evident that the welfare of users of formal financial services is generally better than that of non-users during the period under investigation (2005 – 2010). However, the gap is larger in the middle and at the top end of the welfare distribution than at the bottom, accounted for by race, education, and personal monthly income. It will also be shown that there are welfare gains from using informal financial products for individuals at the bottom of the welfare distribution. This non-linear relationship suggests that financial inclusion initiatives should be implemented with caution for different groups in society, in terms of expected welfare gains. This is crucial, because policies to reduce inequality in access to finance often target individuals who are marginalised. These individuals also tend to have lower education and income levels. Without addressing such factors as education, financial access might have the unintended effect of making such individuals worse off than they were before accessing formal finance.

Finally, chapter five presents the main conclusions from the empirical chapters (chapters two, three, and four) and identifies potential areas of further research, building on this work. The chapter also discusses the limitations of the study as a whole. Overall, the findings are in line with global patterns of financial literacy, with financial literacy levels being low among women, the young, and those with low education attainment. The study also shows that financial literacy increases the likelihood of using formal financial services, and use of formal finance is associated with higher welfare than the use of non-formal finance. However, the combined effect of financial

literacy and such factors as the individual's risk attitudes, gender, age, and education is to dampen the significance of financial literacy in financial sector participation. Similarly, the observed better welfare of users of non-formal finance emphasizes the non-linearity of the benefits of finance, which justifies the use of the analytical technique applied in this chapter. The policy implications of this study point to a financial education strategy that should target women, the young, and individuals with low education attainment. This approach would simultaneously address factors that are likely to prevent the marginalised from realising the full benefit of using formal finance.

Chapter Two

The Financial Literacy Landscape of South Africa, 2005 – 2009

2.1. Introduction

This chapter provides a measure that can be used to investigate the distribution and determinants of financial literacy in a dual economy. This study faces the challenge of finding a representative measure of financial ability of two groups of South Africans with varying backgrounds, that is, the formally and informally served. Therefore questions that are less sensitive to demographic and geographic differences are extracted (discussed in detail in the chapter). These need to still be sufficient for an investigation into the inherent distribution and determinants of financial literacy in the country. Two domains (financial knowledge and financial capability) are considered in constructing a financial literacy index. These, either individually or in combination, can shed light on an individual's financial ability. This index shows that the average financial literacy level in South Africa in a pooled dataset over this period was 48.2, on a scale of 0 - 100. Below average financial literacy was common among Black South Africans, women, the youth, students, individuals with low incomes, those with less than matric education attainment, and rural dwellers. The study finds that financial literacy is positively associated with income and with education, and the provincial variation closely mimics the racial distribution, as well as business activities of the country. The index performs well when the population is split to analyse the significance of the dual nature of the country. The rest of the chapter is structured as follows: The theoretical and empirical underpinnings of financial literacy are presented in Sections 2.2 and 2.3 respectively. This is followed by the methodological approach and empirical strategy for constructing the financial ability measure, (the financial literacy index) in section 2.4. Results are presented and discussed in section 2.5 and concluding remarks are provided in section 2.6.

2.2 Contextualising Financial Literacy

In microeconomics, the consumption-saving trade-off assumes a rational and well-informed consumer who is capable of accumulating savings in times of high incomes and spending savings when income is low. This is in the framework of the life-cycle hypothesis advanced by Friedman (1957) and Modigliani and Brumberg (1954). This consumption smoothing over periods, whether

two-period or in a dynamic multi-period life-cycle, assumes that the individual has perfect foresight. That is, they are able to predict the economic environment and subsequently undertake complex calculations on interest rates and discount rates in order to invest (Lusardi and Mitchell, 2014). If such a model is extended to incorporate credit constraints, and the risk of death of economic agents, then the financial skills requirement becomes even more demanding. Moreover, the economic environment, risk aversion of individuals, and the availability of social welfare systems have implications for exogenous financial knowledge versus endogenous financial skills necessary for financial decision making. Empirical work summarised in Lusardi and Mitchell (2014) shows that there are few individuals who possess this financial knowledge, yet the decisions to save or invest and consume between periods is more at a personal level than being the function of social planning. So, can individuals draw up saving and spending plans? Can they engage effectively with the financial sector? How can this financial proficiency be contextualised?

Huston (2010) describes financial literacy as a form of literacy that relates to one's proficiency in making financial decisions. To operationalize it, the term has taken on varied meanings, including: Knowledge of financial products, for example understanding the difference between stocks and bonds, and fixed and adjustable mortgage rates; knowledge of financial concepts such as inflation, interest rates, credit ratings; numeracy skills; and undertakings in personal financial planning (Hastings, Madrian and Skimmyhorn, 2013). It can be thought of as the ability to read, manage, and communicate on personal finance, plan for the future and respond effectively to day-to-day personal economic shocks (Vitt, et al., 2000). However, the 21st century consumer is faced with an increasingly innovative financial sector, with sophisticated financial services and products. Conventional models of consumer choice posit that a rational consumer will engage in an inter-temporal choice process by deferring consumption and saving more in the current period (when he/she is still productive or has sufficient income). These models also assume that such a consumer possesses financial proficiency to optimize consumption between periods, with certainty. This proficiency includes: Where to invest to obtain reasonable returns, given the attributes of available products; interest rate calculations; knowledge of how to forecast market risks, prices and inflation, to mention but a few (Lusardi and Mitchell, 2014). Given the multidimensional attributes of financial products and services, and the complexity of the financial sector, an individual's level of financial literacy is crucial if optimal economic outcomes are to be guaranteed in order to improve

their welfare (Hastings, et al., 2013). Financial literacy is also important to allow them to continuously update their beliefs (Garcia, 2013) especially in imperfect markets like in the financial industry, characterised by information asymmetry. So how do individuals acquire financial literacy and how does this influence their financial behaviour? Some theories that can shed light on these questions are now discussed.

2.2.1 Development Psychology Theories

Comprising psychoanalysis, psychosocial and cognitive psychology, these theories argue that individuals' personalities, behaviours and mental processes develop over time. According to these theories, financial literacy is posited to be psychological and not learned. That is, social, cultural and historical factors shape one's financial behaviour such that individuals' spending and saving habits will be affected by their social upbringing. Indeed, Erikson (1980) argues that if an individual grows up with an engaging personality, they will most likely engage in financial matters and seek to acquire as much knowledge as they can. A person who feels that financial institutions are too controlling, through policies and procedures, will most likely stay away for fear of losing their sense of autonomy, and will have little desire to become financially fluent.

Psychoanalysts like King and Levine (1993) argue that emotions and personal relationships play an important role in the acquisition of financial knowledge. For instance, individuals often have conflicting attitudes about money. Money is more than a means of exchange. It is associated with aspects of life such as 'power versus importance', 'acceptance versus rejection' or 'fear versus security'. Individuals will therefore accept advice and subsequently seek to acquire more knowledge if they are making small financial decisions. They will, however, trust their own feelings when making big financial decisions. Individuals are also pleasure seekers and they have to deal with instinct and urges to satisfy their desire for pleasure amidst barriers, one of which is knowledge (Hilgert, Hogarth and Beverly, 2003).

2.2.2 Exchange Theory

This theory was pioneered by Robson and Ladner (2006). According to this theory financial literacy levels depend on the level of knowledge exchange among individuals, their level of interaction, type of financial information and how it is obtained. In this regard, financial knowledge diffusion is likely to be greater among working individuals than that obtained from financial education

programmes or learned from colleagues or even learned on the job. This theory is linked to learning theory (see Pavlov, 1960; Goldhaber, 2000) notions of habit formation, where reinforcement or punishment determines continuity of action. For instance, a person who gets rewarded (or penalised) for proper money management (mismanagement) will most certainly change their money management style accordingly.

2.2.3. Capability Theory

Advanced by Nussbaum and Sen in 1993, capability theory argues that an individual's overall capability is a combination of their personal capabilities and existing external conditions. It posits that the presence of external factors may inhibit an individual's financial capability, even when they possess the relevant knowledge and skills, which in turn might affect their financial well-being (Johnson and Sherraden, 2006).[32] Additionally, recent studies in behavioural finance argue that a combination of psychological factors influence financial decision making in a manner that affects the role of information (Muradoglu and Harvey, 2012; Garcia, 2013). This would have implications especially for the source of financial information for instance, and the value attached to it.

2.2.4. Human Capital Development Theory

From a human capital development perspective, and borrowing from the schooling literature, it is assumed that there is an exogenous level (initial stock) of financial literacy acquired by an individual before they join the labour market (Jappelli and Padula, 2011). This can be increased up to a level where marginal increases in the returns are worth the investment. The individual will then make a decision to increase their initial stock in a cost-benefit analysis, influenced by such factors as personal income, expected returns, age, intra-household task allocation, gender, economic environment, geographic factors such as rural/urban residence, and unobservables such as their beliefs (Becker, 1967; King and Lillard, 1983; Card, 1994, Glewwe, 2002).[33] Inherent in this

[32] This argument seems to provide the basis for using economic conditions prevailing in a country as an instrument for financial literacy, as in Jappelli and Padula (2011). However, in their study 'economic conditions' turns out to be an insignificant instrument in saving decisions of an individual.

[33] Unlike schooling, investment in financial literacy is an individual choice and need not enter the household utility function

transmission mechanism is the role of the environment within which the individual makes financial decisions, and the value attached to financial literacy.

These arguments have formed the basis for defining and subsequently measuring financial literacy in different economic settings. For instance, in developed countries, where the financial sector is well established and financial participation high, financial literacy is associated with consumer sophistication and thus emphasis is on consumer protection, while in developing countries it is associated with financial inclusion. This non-uniformity in defining and measuring the concept means that caution must be taken in replicating methodologies.[34] In the wake of the financial crisis of 2008/09, which impacted consumers in both developed and developing economies, the Organisation for Economic Cooperation and Development (OECD) proposed a comprehensive definition that combines the variants presented in Appendix A1. The OECD defined financial literacy as *the combination of consumers'/investors' understanding of financial facts and concepts, and their ability to appreciate financial risks and opportunities to make informed choices, to know where to go for help and to take other effective actions to improve their financial well-being.*[35] In light of this conceptual definition, the theoretical model adopted is a variant of the framework developed by Atkinson, et al. (2007) (see Appendix A4) as discussed in section 2.4.1. It is, however, interesting to note that, despite the differences in definition and measurement, there is increasing consensus in the findings from empirical work undertaken so far. Some of stylized facts of financial literacy from recent studies will now be presented.

2.3. Review of Previous Empirical Research

Studies undertaken so far, using pragmatic measures of financial literacy and based on varying conceptual definitions, reveal substantial disparities in financial literacy. In a series of studies conducted in 14 countries,[36] the authors define financial literacy as '*the possession of financial knowledge on interest rates, inflation, and risk diversifications, and numeracy skills'* (Xu and Zia, 2012). Using the proportion of correct answers to a set of 3 questions pioneered by Lusardi and

[34] In section 2.3 the measurement approaches employed in studies thus far are expounded, a summary of which is provided in Appendix A2 and A3

[35] OECD (2005), pp. 4

[36] Azerbaijan, Chile, Germany, India, Indonesia, Italy, Japan, Netherlands, New Zealand, Romania, Russia, Sweden, USA, and West Bank & Gaza (see Appendix A2 for results)

Mitchell (2007a), the authors find that financial literacy is low among women, the young, and the old. They also find financial literacy to be positively associated with income and education attainment. However, in Germany, Bucher-Koenen and Lusardi (2011) find no significant difference between the financial literacy levels of men and women. They report however, a stark difference between the financial literacy of individuals in the Eastern and Western regions of the country. A similar finding is reported by Fornero and Monticone (2011) between the Northern and Southern regions of Italy, and in the northern half of the US compared to states located in the eastern and southern parts (Bumcrot, Lin and Lusardi, 2011). In the US, the regional differences are reported to be correlated with a state's poverty level. Klapper and Panos (2011) attribute the higher financial literacy levels exhibited by urban dwellers in Russia compared to their rural counterparts to the high number of interactions, and hence knowledge diffusion, in areas of high density. Racial differences are also evident. For example, Crossan, Feslier and Hurnard, (2011) find that the Maori group in New Zealand have low levels of financial literacy, as do Hispanics in the USA (Lusardi and Mitchell, 2011b). The arguments advanced for these disparities are now considered.

i) Gender and Marital Status

There is no conclusive theoretical underpinning for gender differences in financial literacy. Various disciplines have attempted to explain this gender gap in relation to the potential confounders. In a Primary Mental Ability (PMA) test from the Seattle Longitudinal Study, Maitland, et al. (2000) found that men outperformed women in numeracy while women performed better in word fluency. Since numeracy is a necessary skill in financial literacy, this result presents an intuitive advantage of men over women, with larger effects of numeracy for men compared to women (McArdle, Smith and Willis, 2009). However, from the perspective of household division of labour, Hsu (2011) argues that this gender gap might reflect a strategic response for women to acquire financial knowledge in relation to intra-household roles over their life cycle. For instance, women tend to increase their financial literacy stock in preparation for retirement or for related responsibilities as they age compared to men, or when their spouses depart. This is not a reflection of men's decline in cognitive ability. Indeed Fonseca, Mullen, Zamarro and Zissimopoulos (2012) and Bucher-Koenen and Lusardi (2012) argue that there are non-traditional factors that make women acquire financial literacy differently from men, including the role of self-confidence, which

varies by sex. However, in their studies, cognitive traits such as numeracy were an important component of financial decisions, with larger effects of numeracy for husbands compared to wives.

ii) Age

According to psychology literature, there are age-based patterns over an adult's life, including cognitive decline, (Flynn, 1984; Cattell, 1987; Salthouse, 2005). This decline is said to start from 20 years of age but worsens after 60 years, confounded by cohort effects, normal aging effects, and dementia. However, in relation to financial ability, empirical studies have found an inverted U-shape relationship between age and financial literacy, that is, lower among the young and the old compared to the middle-aged. Researchers attribute this distribution to the interaction between experience and one's analytical ability.

Agarwal, Driscoll, Gabaix and Laibson (2009) argue that the young have limited experience but high analytical function, while the opposite is true for older individuals. On the other hand, the middle-aged experience a trade-off between their life experience and analytical ability, which leads to flattening or a turning point in the distribution of financial literacy. The sooner one gets exposed to financial services and products, the earlier the peak time. In an experiment they conducted on an American sample using various financial products, they found that the young and the old were not able to take advantage of financial opportunities and the two groups were prone to making financial mistakes (such as paying high interest rates, risky mortgage arrangements) arising from failure to make the relevant computations relating to the loans or credit they would take. Evidence from a study on adults 50+ by Lusardi and Mitchell (2011b) shows that senior citizens in the US exhibited low levels of financial knowledge. They could not make computations relating to retirement savings and benefits, confirming the decline in cognitive ability hypothesis. Empirical studies have found low financial literacy levels among high school students (Markow and Bagnaschi, 2005; Mandell, 1997), college students, and young adults (Lusardi, Mitchell and Curto, 2009; Chen and Volpe, 2002), which seems to confirm the limited experience-high analytical function argument affecting the young adults.

Flynn (1984) argues that, from a selection perspective, the older generation is likely to have less human capital compared to the current generation and, as a result, they are not able to partake of increasingly sophisticated financial products. The financial products menu is substantially different

between cohorts, requiring constant learning and adaption. Relatedly, the search engines for the best financial deals differ across time periods such that the older generation might find difficulty in negotiating the increasing electronic interface, compared to the young generation. Flynn's argument points to a potentially high depreciation rate of financial literacy.

iii) Education and Ability

The correlation between education and financial literacy could be driven by cognitive ability. According to Lusardi and Mitchell (2007a, 2011b), individuals with less than college education are less likely to grasp complex financial concepts such as those related to risk diversification. Since numeracy skills are enablers in basic financial tasks such as budgeting and interest rate calculations, individuals with low education levels are likely to lack these numeracy skills and consequently possess low levels of financial literacy (Christelis, Jappelli and Padula, 2010). Jappelli (2010), in a cross-country analysis of 55 countries, finds a positive relationship between education and financial literacy. Lusardi, Mitchel and Curto (2009) attempt to control for ability as a way of controlling for heterogeneity, using a dataset that contains both variables, but they still find a substantial amount of heterogeneity between the two variables. Lusardi and Mitchell (2011a) add that education is a weak proxy for financial literacy because, in regressions where they are both covariates, they are statistically significant.

iv) Income and Work Status

Analogous to the schooling literature, if education is considered as a normal good, then increases in income levels will lead to an increase in its demand (Becker, 1967; Card, 1994; Glewwe, 2002). Similarly, there is a positive association between financial literacy and income. This is closely related to work status in that individuals with stable employment (with guaranteed income flows as seen in the formal sector or self-employment) will have a higher demand for financial literacy. This is either because they can afford it compared to the unemployed or those without job security (as in the informal sector and social welfare support), or they need the financial knowledge to better manage their income streams. Lusardi and Mitchell (2014) argue further that there is learning on the job or in the workplace for the formally and self-employed compared to the unemployed, leading to differences in the financial literacy levels of the two groups. All empirical studies find a positive relationship between income and financial literacy (see Lusardi and Mitchell, 2014; Wachira and Kihiu, 2012; Dragan, 2011; Xu and Zia, 2012; Stanculescu, 2010).

v) Racial and Regional Differences

Development literature highlights the role of information, both in inter-regional migration, and in consumption of financial products and services (Banerjee and Newman, 1998). Modern sectors or urban areas with reasonable infrastructure tend to be densely populated and witness high business activity, in part due to the high degree of information diffusion. From this perspective, any regional differences in financial literacy would be as a result of the availability of financial or economic institutions that make such financial information readily available so that individuals can easily access and share it through various mechanisms (e.g. through technology, word of mouth, media). Therefore, institutional arrangements that discriminate against access to services along geographical or racial affiliations are also likely to lead to skewed information sharing. An individual's source of financial information has been found to play a role in the level of financial ability of consumers of financial services and products. Thus, the low rates of urbanisation in many developing countries (mainly in Africa, Latin America and Asia) are likely to lead to low financial literacy among populations in these countries, partly due to limited access to financial services (Xu and Zia, 2012). Using the National Longitudinal Survey of Youth (NLSY97)[37] in the US, Lusardi, Mitchell and Curto (2009) find that peers and communities play a role in the transfer of financial information. Young people whose peers planned or attended church were more likely to score highly in the financial literacy quiz and therefore more financially literate.

Bumcrot, et al. (2011) investigate the geography of financial literacy in the 50 states of the USA and the District of Columbia. They find high levels of financial literacy in the northern half of the country, while literacy levels were lowest in states located in the eastern and southern parts of the country. This variation was correlated with a state's poverty level. A similar finding is reported by Fornero and Monticone (2011) for Italy's Centre-North (high) versus the South (low), by Bucher-Koenen and Lusardi (2011) for East (low) versus West (high) Germany, while Klapper and Panos (2011) find Russian urban dwellers to be more financially literate than their rural counterparts. These variations are clearly linked to some skewedness in the institutional distribution of services

[37] The NLSY97 is a national survey on the youth of the US who were 12 years old in 1997, as they transition from school into the workplace. The data includes youth characteristics, their family background, as well as characteristics of their high school peers and community. These were examined to establish the long term influence of peers as a source of financial information on the financial literacy of young people(Lusardi, Mitchell and Curto, 2009)

among the population. For example, financial literacy variations among minority groups are reported in the US, where Hispanics and African-Americans are shown to be less financially literate than whites and Asians (Lusardi and Mitchell 2011b), in New Zealand (Maori's are less financially literate, Crossan, et al., 2011), in the Netherlands (Muslims are less financially literate (Alessie, van Rooij and Lusardi, 2011).

In the context of middle-to-low income economies, financial literacy is defined in terms of financial access. It is thus measured by the extent to which the country's population is linked to the formal financial sector, mainly through holding any type of bank account (Xu and Zia, 2012). This follows arguments by researchers like Dragan, (2011) and Cole, et al. (2011) that individuals will only demand financial services and products if they have enough knowledge about them. Indeed the FinScope surveys report that one of the reasons respondents in Malawi and Tanzania did not have bank accounts is that they had never heard of a savings account or that they didn't know how to open one. The lack of understanding of insurance products leading to low take-up has also been reported in countries like Guatemala, by Cohen and Young, (2007), rural India, by Gine, et al. (2010), in Vietnam by Tran and Yun (2004), in Uganda and in Rwanda.

It is important to note, however, that many of the empirical studies conducted on financial literacy have been done in a one-period framework, especially when cross-sectional data is used. The limitation of this approach is that it is difficult to extract the learning that takes place that allows individuals to update their knowledge. It is therefore not possible to establish whether at the time of the survey, an individual has acquired addition literacy or is still operating with their initial stock. However, this problem has been partially addressed with the advent of Randomised Control Trials (RCTs) which link financial education to specific outcomes and thus causality between knowledge acquisition and practice. Lusardi and Mitchell conduct two studies using the HRS panel in the USA. They find a comparable improvement in the financial literacy of American consumers between the two periods of their studies. Finally, the lack of standardisation in the definition of financial literacy, and the subsequently different measurement of the concept, make cross-country comparisons problematic.

South Africa presents an interesting case study, in part due to its dual economy and the fact that no rigorous empirical work has been done for the country since financial sector liberalisation in the

early 1990s. In the section that follows, the methodological approach to addressing this research gap is outlined.

2.4 Methodology

This section outlines the analytical technique used in constructing the representative measure of financial literacy. First, a variant of the OECD definition of financial literacy is adopted, aligned to the South African financial sector's characteristics. Under two domains of financial knowledge and financial capability, the relevant financial literacy questions are identified, the individual responses computed and the average scores under each domain cross-tabulated with demographic characteristics of the population. Principal component analysis (PCA) is used to construct a composite index from the two domains. This allows for the profiling of the population using the average score on the Index. Regression analysis is used to investigate the determinants of financial literacy. For robustness, the population is split into two sub-groups to reflect the duality of the country's economy to test how well the measure performs. The results are checked against a pilot study done for the country by the OECD under the Financial Services Board of South Africa.

2.4.1 Measuring Financial Literacy

From the discussion in the preceding sections, it is apparent that the definition of financial literacy greatly informs the measurement strategy adopted. It can be observed that there are four commonly employed measurement techniques: 1) taking the average number of correct responses to a battery of financial literacy questions; 2) self-assessment by respondents, which also measures the level of confidence in one's financial ability, 3) the proxy or instrumental variable approach, and 4) the outcome-based approach.

In the first approach, respondents are given a set of multiple choice questions such as the 'Big Three', pioneered by Lusardi and Mitchell (2007a) and added to the 2004 Health and Retirement Study (HRS)[38], the "Big Five", added to the National Financial Capability Study (NFCS), and the questions used by the Jump$tart Coalition to assess financial literacy among US high school and college students.[39] The major criticism of this type of measure is that all questions are weighted

[38] The Health and Retirement Study is a survey of America's households aged 50 years plus
[39] See Appendix A2 and A3 for a summary of the studies which employed this technique.

equally, that is, zero and one for the wrong and correct answers respectively. However the skills and knowledge they seek to capture are not necessarily the same in relevance or in complexity. There is therefore a likely upward bias in the scores. To address this potential bias, the factor analysis approach of weighting questions to take into account the degree of relevance, computation complexity and information content was introduced in studies such as those undertaken by Lusardi and Mitchell (2007b) and Lusardi, Mitchell and Curto (2009).

In the self-assessment approach, respondents are asked a series of questions to test their financial abilities and the responses fall into two or more categories (yes/no or agree/disagree/don't know or always/seldom/never). Once again, the responses are either averaged or an index is constructed.[40] The limitations of this approach relate to the optimism of individuals about how much they know, such that their self-assessed reports might not tally with their actual financial know-how (Hastings, et al., 2013).

The proxy or instrumental variable approach is based on the argument that the accuracy of responses to mathematical questions is a predictor of financial outcomes such as financial wealth (Christelis, et al., 2010). Major economic events can compel individuals to learn some financial terminologies and concepts (for example the global financial crisis). In this regard, high school maths scores, economic environment (at time of school enrolment and labour market entrance), personality traits (self -esteem and risk preference), and family background have often been used as a proxy for financial literacy in the absence of finance related questions or when heterogeneity is taken into account (Banks and Oldfield, 2007; van Rooij, Lusardi and Alessie, 2009 and Behrman, et al., 2012).

The outcome based measure is informed by the argument that individuals who are financially knowledgeable will demand formal financial products. In such cases, the extent of use of financial products is a reflection of the level of financial literacy in the country. Using this argument, a number of randomised control experiments have been conducted where financial education is provided and product take-up or financial or business decision-making evaluated.[41] The limitation

[40] See Xu and Zia (2012), Lusardi and Mitchell (2014) for an overview of studies which used this approach
[41] see Xu and Zia, 2012: 33-34 for a summary of these studies

of this approach can be shown in cases where up-take is a result of policy (supply driven) and not necessarily a reflection of knowledge (demand driven).[42]

The approach recommended by the OECD (2009) is adopted for this study. Financial literacy is thus defined in OECD (2005, pp.4) terms as '*the combination of consumers'/investors' understanding of financial facts and concepts, and their ability to appreciate financial risks and opportunities to make informed choices, to know where to go for help and to take other effective actions to improve their financial well-being'.* Two domains are identified, as in Kempson (2009): 1) financial awareness and knowledge, i.e. knowledge of financial concepts and financial regulations and; 2) financial capability, meaning making ends meet and planning for the future, including knowing where and how to find reliable financial information.[43] This study then follows the Principal Component method of factor analysis to find the one factor that can provide the appropriate weights to responses to the questions that are contained in each domain, while retaining as much information as possible (Filmer and Pritchett, 2001). The intuition is that these two domains are interrelated in a way that might not easily be captured by simply summing or averaging the responses of individuals, which is also equivalent to weighting all questions equally, as noted earlier. Although more commonly used in psychology and sociology, this approach is recommended by the OECD as a better method of capturing the underlying correlations among questions. It has been used in studies by the World Bank in Romania (Stanculescu, 2010), Bosnia-Herzegovina (Dragan, 2011), the UK (Atkinson, et al., 2007) and by Diagne and Villa (2011). Each of the domains in the South African context will be used to construct the composite index, as discussed below.

2.4.1.1 The Financial Knowledge Domain

Financial knowledge refers to the understanding of financial concepts, financial institutions, and financial regulations. As is the case in any field, the financial sector also has jargon which, unless individuals understand it, might make financial decisions and actions difficult. In undertaking

[42] For instance, Broad Based Black Economic Empowerment (BBBEE) in South Africa that advocates for the financial inclusion of the previously excluded from the formal financial sector, and the Equal Credit Opportunity Act of 1974 in the US (Hawley and Fujii, 1991), might have led to supply driven financial products uptake

[43] This approach allows for comparison with studies that have used it. Since the surveys do not contain data on potential instruments, the use of the IV or proxy technique could not be pursued.

financial actions especially with a second party (for example a lender, a store), disputes are bound to arise. These require that institutions be in place both to regulate and also to provide an avenue for recourse. It is desirable that individuals grasp the meaning of these terms and concepts, the regulations that govern the potential financial undertakings, as well as the mechanisms for recourse in case of financial disputes. In the South Africa financial sector, examples include such terms as budgeting, bad debt, loan term, insurance, inflation, interest rates (e.g. interest rate capping, interest payable); regulations such as FICA (Financial Institutions Compliance Act), FAIS (Financial Advisory and Intermediary Services)[44] NCA (National Credit Act), the Cooperative Banks Act, Ombudsman (Banking Ombudsman, Insurance Ombudsman) and institutions such as credit bureaus. These form the background for many financial decisions and actions. It is also argued that individuals' perceptions and trust of financial institutions should be considered.

In the FinScope surveys, respondents were asked about their knowledge and understanding of words or phrases in each of the above sub-categories. Responses were then coded as: 3=Heard of the word/phrase and know what it means; 2=Heard of the word/phrase but don't know what it means; 1=Never heard of this word/phrase. Since this domain tests whether one understands the terms and concepts presented, individuals who had heard of but did not understand these concepts were considered to be in the same category as those who had never heard of them. Following this argument variables were re-coded to equal to one if a respondent had heard of and understood a particular financial term/phrase, and zero otherwise. In other questions, respondents were instead asked which financial areas they needed financial education on. This was considered to be a self-reported financial knowledge gap which was coded as a binary variable with 1=yes (if a respondent chose a particular financial term/concept/phrase) and zero otherwise. Subsequently, the coding of such questions was reversed for consistency. Selecting only those questions that were consistent across surveys for the pooled sample, the research asked questions on the following:

i. *Knowledge and understanding of bad debt*
ii. *Knowledge and understanding of the National Credit Act (NCA)*
iii. *Knowledge and understanding of credit bureaus*

[44] Established as a FAIS Act 37 of 2002, it is responsible for regulating financial service providers, with a corresponding FAIS Ombudsman to resolve disputes between financial service providers and their clients www.fsb.co.za

iv. *Knowledge of compounding interest (saving small amounts and investing overtime)*
Gap variables:

a. *Use of financial services and products: I combined questions that related to selecting savings and investment products, insuring household contents and how to draw up and manage a budget (deals with day-to-day financial discipline)*
b. *knowledge on life insurance*
c. *knowledge on how to find out about one's credit worthiness*
d. *how interest rates work and are calculated*
e. *trust banks- this question was frequently phrased as 'You do not trust banks'*

In total, there were nine binary response questions in this domain, which equate to a maximum of nine points. Bad debt, credit worthiness, life insurance, savings, and investment products all relate to financial terms. Knowledge of how interest rates are calculated is crucial, especially in saving and borrowing decisions (also related to item four). The NCA is used here as a proxy for financial regulation, while credit bureaux proxy financial institutions, as the two are closely related. The average number of correct responses was used to get insight into the distribution of financial knowledge of South Africans.

2.4.1.2 The Financial Capability Domain

According to Kempson and Moore (2005), knowledge of financial terms, regulations and institutions is necessary, but not sufficient to measure the financial literacy levels of individuals. They argue that an additional domain should be considered which measures the translation of the knowledge into actions, for example through use of financial products and services, or management of one's financial affairs. This approach is supported by Johnson and Sherraden (2006), who argue that financial capability is a combination of individuals' acquisition of financial knowledge and skills, and their subsequent assessment of financial institutions and services. A closely related view is advanced by the United Kingdom (UK) Treasury, which defines financial capability as *the characteristic of consumers who have high levels of financial literacy combined with the motivation to act in respect of personal financial matters* (Williams and Satchell, 2011). Financial capability is said to incorporate knowledge, skills and behaviour in five areas. These include: Making ends meet; planning ahead; choosing financial products and services; staying informed; and keeping track of one's finances. As is evident, the knowledge areas feed directly

into this domain. Individuals should get the relevant financial skills to complement their decision making set in order to stay informed. This area reflects the level of sophistication of an individual, since complex financial decisions require high level skills that warrant the use of skilled individuals or institutions (Dragan, 2011, Mandigma, 2013). To accommodate diversity and preference among individuals, formal sources (financial advisors, financial institutions), informal sources (friends, family, schools, churches, community members), and the media (financial pages in newspapers or magazines, television) were considered as the main sources of financial information.

The dataset used provides a range of questions corresponding to these areas. Respondents were asked about their perceptions of and attitudes to a given statement and their responses were recorded as 'Agree', 'Disagree' or 'Don't Know'. Coding 1= Agree and 0=Disagree/Don't know, and selecting only questions that were consistent across surveys, resulted in the following seven statements requiring binary responses:

i. *You try to save regularly*
ii. *You are saving for something specific*
iii. *You are worried you won't have enough for retirement*
iv. *You go without basics so as to save*
v. *You love spending even if you have to borrow to do so*
vi. *You read the financial pages of newspapers and magazines*
vii. *When it comes to finances you prefer to speak to friends or family for advice.*

If an individual plans their current consumption, it is expected that they would be less concerned about not having enough for retirement. Similarly, if they observe their spending patterns, prioritize and save towards what they want, then they shouldn't spend for the sake of spending especially with money they do not have (see statement 5 above). In this regard, the coding of responses to questions 3 and 5 was reversed in order to obtain a logical flow of responses. Giving a point to each affirmative response and a zero otherwise, a total of seven points is obtained. The average score provides an insight into the distribution of financial capability of South Africans.

2.4.1.3 Constructing the Financial Literacy Index

The two domains of financial knowledge and financial capability were combined to construct a composite financial literacy index from the pooled surveys (2005-2009). First, Cronbach alpha was

used to establish the reliability of the variables used to construct the Index. That is, the extent to which the individual domain questions reflect a single underlying factor or a set of highly correlated factors. Alpha ranges between zero and one, figures above 0.7 are preferred (Hung, et al., 2009). Finally, factor analysis was run on the variables to construct the index, based on two sub-scales constructed for each domain using a principal component factoring approach (PCA) to obtain the appropriate weights. The index construction approach by Fabrigar, et al. (1999) and Filmer and Pritchett (2001) commonly used in socio-economic status studies was adopted. Assuming there are j- interrelated questions in a particular domain, denoted as $q_1, q_2, \ldots., q_j$, with common factors F_1, F_2 … F_m, and unique factors U_1, U_2 … U_n, then PCF estimates a system of linear equations, as in expression 2.5 using the responses.

$$q_{1i} = a_{11}F_{1i} + a_{12}F_{2i} + a_{13}F_{3i} + \cdots + a_{1m}F_{mi} + a_1U_{1i}$$

$$q_{2i} = a_{\ 21}F_{1i} + a_{22}F_{2i} + a_{23}F_{3i} + \cdots + a_{2m}F_{mi} + \ a_2U_{2i}$$

….

$$q_{ji} = a_{j1}F_{1i} + a_{j2}F_{2i} + a_{j3}F_{3i} + \cdots + a_{jm}F_{mi} + a_jU_{ji} \qquad (2.5)$$

The interest here is a factor(s) with an eigenvalue greater than one and with the most number of loadings (weights) which are above 0.4. According to Filmer and Pritchett (2001), such a factor, usually the first principal component, would most likely account for the maximum variation in the variables (domain questions). Analogous to the literature on the construction of socio-economic status indices, a variable with a positive factor score is associated with a high level of financial literacy, while a variable with a negative factor score is associated with a lower level of financial literacy.[45] Each individual receives a weighted score, which translates into his financial literacy level. The coefficients from the estimated equations are the weights attached to each question, based on the degree of interrelation between questions (Fabrigar, Wegener, MacCallum and Strahan, 1999).

[45] See Filmer and Pritchett, 2001; McKenzie, 2003; Gwatkin, Rustein and Johnson, 2000a; Vyas and Kumaranayake, 2006

The sub-indices are thus constructed following expression (2.6) below:

$$KX_i = \sum_j \left[f_j^k \frac{(q_{ij}^k - \overline{q_j^k})}{s_j^k} \right] \qquad \text{for } i=1,\ldots, N \text{ and } j=1,\ldots\ldots, 9$$

$$CX_i = \sum_j \left[f_j^c \frac{(q_{ij}^c - \overline{q_j^c})}{s_j^c} \right] \qquad \text{for } i=1,\ldots, N \text{ and } j=1,\ldots\ldots, 7 \qquad (2.6)$$

Where KX_i *and* CX_i are the knowledge and capability sub-indices respectively, q_{ij}^k and q_{ij}^c denote the score on the knowledge and capability question *j* for individual *i*, q_j^k and q_j^c denote the sample means of the questions used in each domain, s_j^k and s_j^c are the respective sample standard deviations and f_j^k and f_j^c denote eigenvectors of the first principal component weights. Subsequently, the composite financial literacy index is a function of the knowledge and the capability sub-indices, as shown in expression (2.7).

$$FLX_i = \sum_j \left[F_j \frac{(Q_{ij} - \bar{Q_j})}{S_j} \right] \qquad \text{for } i=1,\ldots, N \text{ and } j=1, 2 \qquad (2.7)$$

Where: FLX_i is the financial literacy score for individual *i*, Q_{ij} is the score in domain *j* for individual *i*, $\bar{Q_j}$ is the sample mean, S_j is the sample standard deviation and F_j is the eigenvector of the first principal component weights.

The scores were re-scaled through a linear transformation for ease of interpretation and comparability of the sub-indices with the composite financial literacy index. Analogous to socio-economic status indices, the higher the score, the higher the implied financial literacy level of the individual (see Vyas and Kumaranayake, 2006). For example, on a 0 - 100 index, an individual scoring zero has a financial literacy of zero (financially illiterate) while a score of 100 is equivalent to a financial literacy level of 100 (financially sophisticated). The financial literacy landscape of South Africa was obtained by comparing the mean financial literacy scores across the socio-economic and demographic characteristics of individuals in the sample, and weighting the data.

It is important to note that the choice of variables used is subjective, which can compromise the validity of the index constructed using the PCA. To get around this problem, relevancy and adequacy of the questions and variables used was ensured, to allow for as much extraction of the

underlying structure and correlations as possible. Additionally, it is often advisable to transform the responses into binary responses for ease of interpretation of the loadings (in cases where the original responses were off a categorical scale).[46] However, this transformation sometimes leads to distorted weights. Since the variables used were originally binary and therefore did not require any transformation, this problem did not arise.

2.4.2 The Correlates of Financial Literacy

To achieve the second objective of this chapter, the contextual framework discussed in section 2.2 and the data allowed for an estimation of a linear ordinary least squares regression model specified as in expression 2.8, the coefficients of which represent the magnitude and direction of the association between the covariates and financial literacy.

$$FLX = \boldsymbol{x\beta} + \varepsilon \tag{2.8}$$

More explicitly expressed as:

$$FLX = \beta_0 + \beta_1 gender + \beta_2 age_{cat} + \beta_3 pinc + \beta_4 popgrp + \beta_5 education + \beta_6 province + \beta_7 geoarea + \beta_8 marstt + \beta_8 occup + \beta_8 som + \varepsilon \tag{2.9}$$

where $\boldsymbol{FLX}$ is the individual's financial literacy index constructed in the preceding sub-section (2.4.1), $\boldsymbol{x}$ is a vector of the explanatory variables, namely the individual's socio-economic and demographic characteristics, $\boldsymbol{\beta}$ is a vector of parameters to be estimated, and ε represents unobservable factors that could not be controlled for.

$\boldsymbol{FLX}$ is a continuous variable ranging from 0 – 100 and the vector of explanatory variables are constructed as follows:

$\boldsymbol{gender}$ = *A dummy variable 0 = female, 1 = male*

[46] See Vyas and Kumaranayake (2006)

age_{cat} = *Categorical variable (recorded in levels in some surveys and in categories in others, and transformed into categories for consistency. Subsequently there is no quadratic term)*

$pinc$ = *Categorical variable ranging from 1-4 for individual's monthly income (variable was captured as income groups for most surveys, and transformed for consistency)*

$popgrp$ = *Categorical variable ranging from 1-4 for racial groups: African, Coloured, Asian/Indian, White*

$education$ = *Categorical variable for individual's education attainment ranging from 1-8: no formal education, some primary, primary completed, some high school, matriculated, some university, university completed, any other post-matric qualification*

$province$ = *Categorical variable ranging from 1-9 for the nine provinces: Eastern Cape, Free State, Gauteng, Kwa-Zulu Natal, Limpopo, Mpumalanga, Northern Cape, North West, Western Cape*

$geoarea$ = *Dummy variable 0 = rural, 1 = urban*

$marstt$ = *Categorical variable ranging from 1-4 for marital status: Single, divorced, widowed, married/living with partner*

$occup$ = *Categorical variable ranging from 1-8 for individual's profession: Pensioner, formally employed, housewife, student, informally employed, self-employed, unemployed, or other*

som = *Categorical variable for major source of income: Formal, informal, grants, none, refusals*

2.4.3. Summary Statistics

The weighted descriptive statistics are provided in Appendix A5. They show a slightly higher proportion of females, at 52% compared to 48% males. Blacks form 76% (slightly under-represented) while the rest of the population groups make up the remaining 23%. The majority of the sample has some high school education (40%), the largest age group is the 18-29 year olds, with the oldest respondent being 92 years. More respondents were interviewed in urban areas (57%) with a regional distribution in favour of Gauteng, Kwa-Zulu Natal, Eastern Cape and Western Cape Provinces. 27% of the respondents were formally employed, followed by pensioners, and the self-employed. About 60% of the sample earned a personal monthly income of less than R1000, with 16.5% grant recipients, and in some cases individuals held more than one job. The average household size was four and about 60% of the sample earned a household income of less than R6000 per month. The data is weighted using the Statistics South Africa weights as benchmarks. This sample is therefore nationally representative of the major population groups of the country and is balanced in terms of gender and region.

Table 2.1 shows the proportion of affirmative responses to the domain questions. Panel A shows that about 44% of the respondents reported knowledge of 'Bad Debt', 11% knew credit bureaus, and only 2% knew the NCA even though these terms are closely related.[47] Knowledge of budgeting and interest rates was low, and respondents admitted to not trusting banks, and about 24% claimed they knew how to use savings, insurance and investment products. On average, respondents scored five out of the nine points, with almost one third scoring between zero and four points. The mean score varied across the sample. As reported in Appendix A6, it was higher for men than for women, and the White sub-population scored the highest amongst the population groups, with seven points, followed by the Indian sub-group, at 6.4, the Coloured sub-group at 5.7 and the Black sub-group at 4.7. There was a slow but steady rise in score with increasing age, tapering off after 59 years. Individuals with less than matric scored below average while those with matric level of education and above scored above average, however students scored far lower than those in other occupation categories. Grant recipients answered up to four questions correctly,

[47] The NCA regulates formal credit transactions and it requires lenders to be registered but knowledge of 'Bad Debt' could imply a bad experience with credit either from formal or from informal sources

while scores increased with increasing personal income and household income. As expected, urban dwellers scored above average and higher than their rural counterparts, while individuals who were participating in the financial sector (currently banked) scored better than those who had never banked over the period.

In the capability domain, Panel B shows that, 47% of our sample claimed to save regularly, yet only 19% alluded to spending wisely, and 21% said that they were not worried about having enough for retirement. The majority of the respondents scored between two and three points, with just about 1% scoring all or no points. Overall, the average score for the sample was three out of seven points. Decomposing the mean score by socio-economic and demographic characteristics, there is a similar pattern as in the knowledge domain. These results are reported in Appendix A7.

Notice that if only one domain was to be considered as a measure of financial literacy, as in some studies (see Appendix A1), then South Africans would be more financially literate using the knowledge domain than using the capability domain, going by the average score in each of these domains. Similarly, using the "Big Three", as in several studies (see Xu and Zia, 2012) would make the picture even worse, since Table 2.1 shows that only 1.8% of the sample reported knowledge of the interest rate concept while 23.9% reported knowledge of saving and investment, which is akin to the concept of a compounding interest rate.

A key element in this domain is the source of financial information used by consumers[48], which in part reflects their level of sophistication. The statistics show that the majority of the respondents reported using 'friends and family' as a source of financial information, while 'financial pages' are rarely used (see Panel C).

[48] For example, Lusardi, Mitchell and Curto (2009) find a significant correlation between peers and communities as a source of information and higher levels of financial literacy among youths

Table 2.1: Correct Responses for Financial Literacy Domain Questions

Panel A: Financial Knowledge	N	Percent
Bad-debt	8162	43.61
National Credit Act	434	2.32
Credit Bureaus	2029	10.84
Saving and Investing makes you secure	4481	23.94
How to Use Services and Products	2652	14.17
Interest Rates	347	1.85
Drawing-up and Managing a Budget	135	0.72
Life Insurance	36	0.19
How to Check Credit Worthiness	25	0.13
Trust Banks	154	0.82
None	263	1.4
Panel B: Financial Capability		
Save Regularly	8806	47.05
Save for specifics	734	3.92
Save at all Costs	820	4.38
Have enough for Retirement	3972	21.22
Spend wisely	3640	19.45
Financial Information source-Friends and Family	518	2.77
Read Financial Pages	10	0.06
None	215	1.15
Panel C: Sources of Financial Information		
Friends and Family	11466	61.26
Financial Pages	1225	6.55
Other (financial advisers, money lenders, churches, schools, community, employers)	6026	32.2

Note: The table shows the proportion of respondents who scored a point for a positive response to a particular question. 'None' implies that these respondents did not respond to any question and thus scored no point in a particular domain. This is also a balancing item. Data is weighted to be nationally representative. The weights are benchmarked to Statistics South Africa

Source: Own calculations from Finscope surveys 2005-2009

2.5 Results

2.5.1 The Distribution of Financial Literacy in Post-Apartheid South Africa

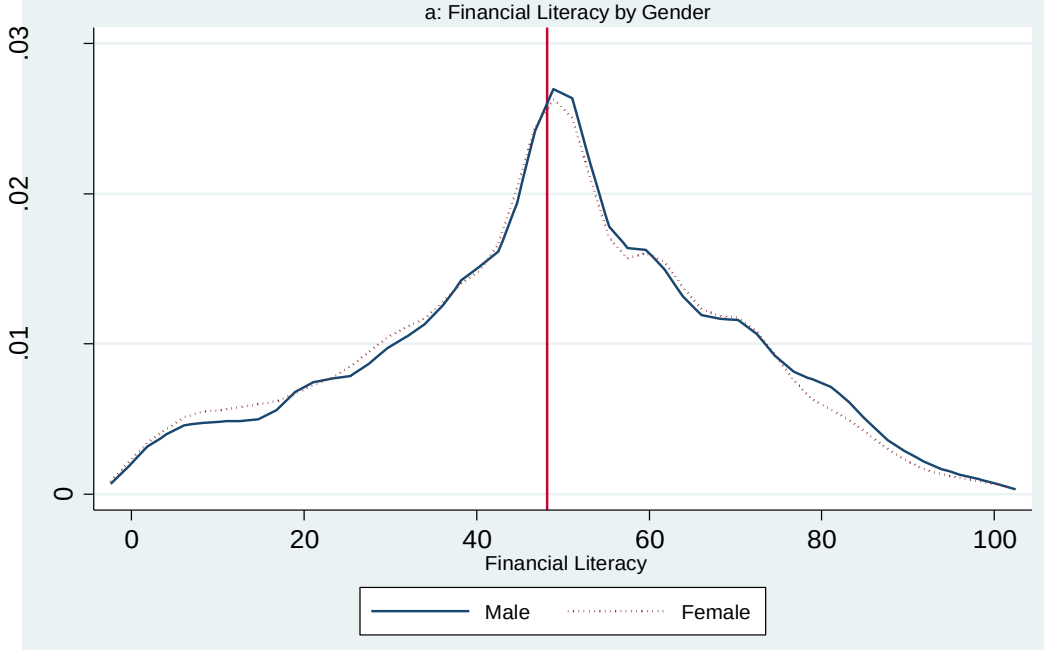
The Index follows a normal distribution, with a mean financial literacy score of 48.4.[49] Figures 2.1(a-j) provide density plots for weighted within-in group financial literacy by various categories.[50] There is no visible difference in the distribution of financial literacy scores by gender, marital status, and geo-area. There are, however, substantial shifts in the distribution by personal income, education, and race. Overall, there is a large number of individuals around the country's mean, but the

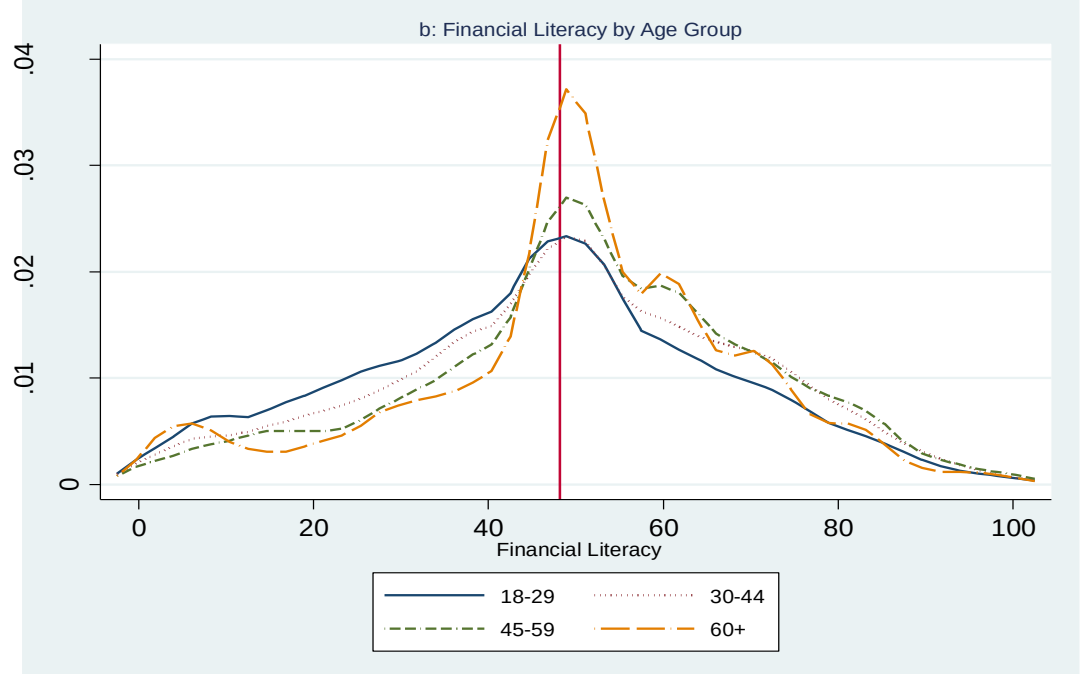
[49] See full set of results in Appendix A8

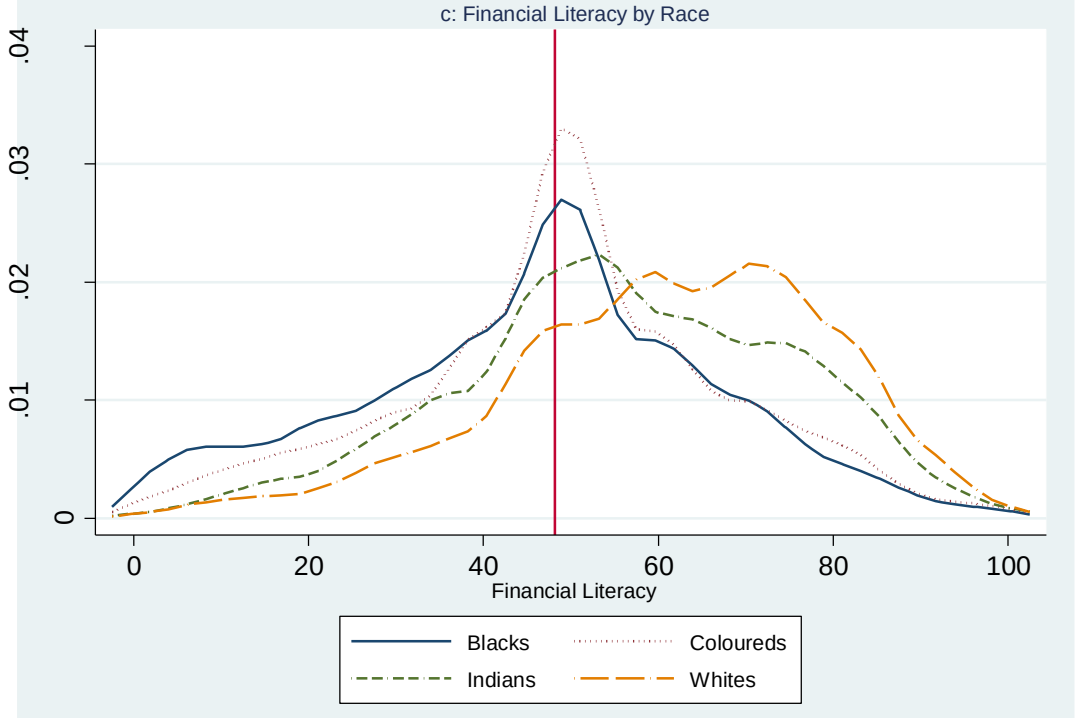
[50] All data are weighted by weights bench marked on Stats SA weights to make the statistics nationally representative

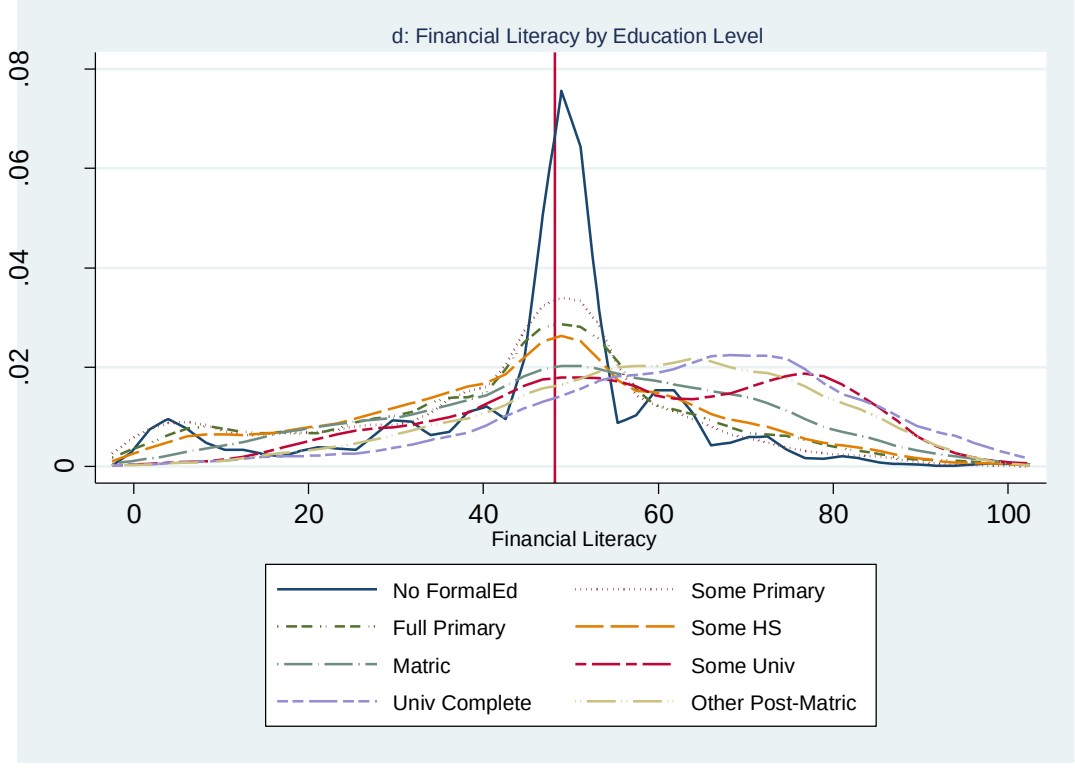
densities get flatter and fatter for any shift to the right of the national mean, implying that there are few financially literate individuals, and that those who are literate, had really high scores.

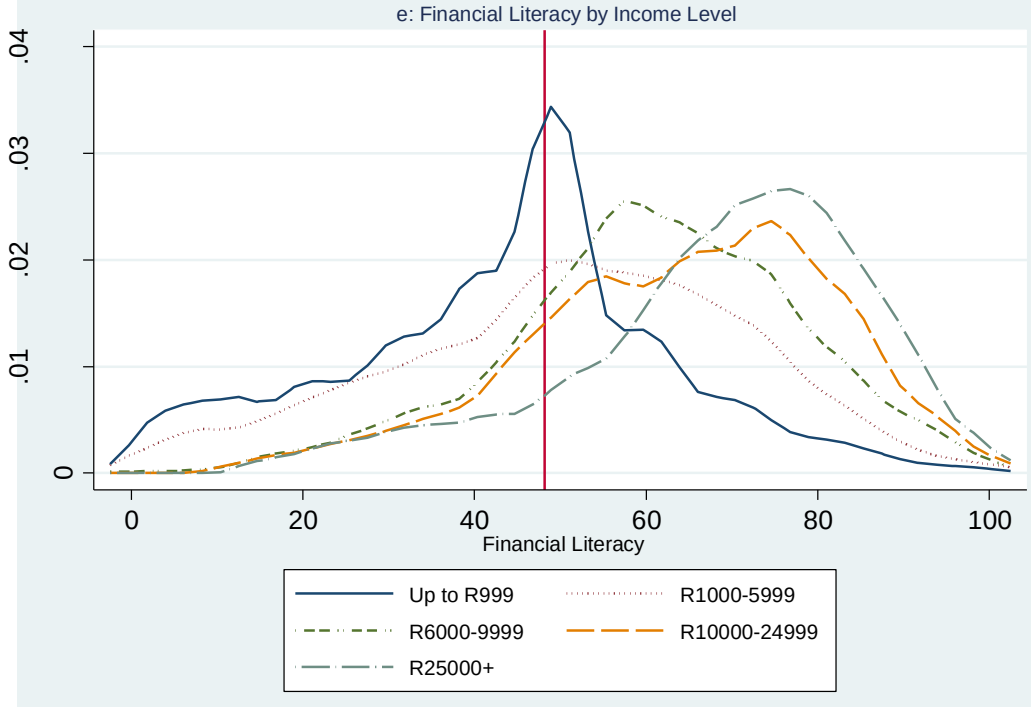
Figure 2.1: The Landscape of Financial Literacy in South Africa from a Pooled Sample

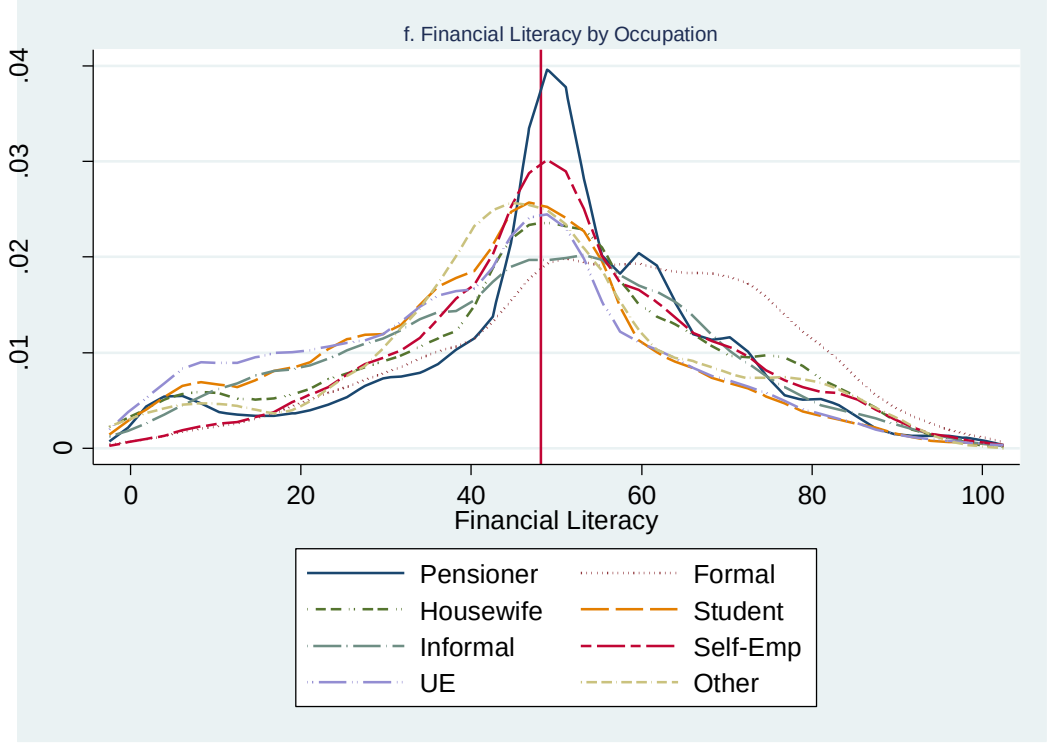


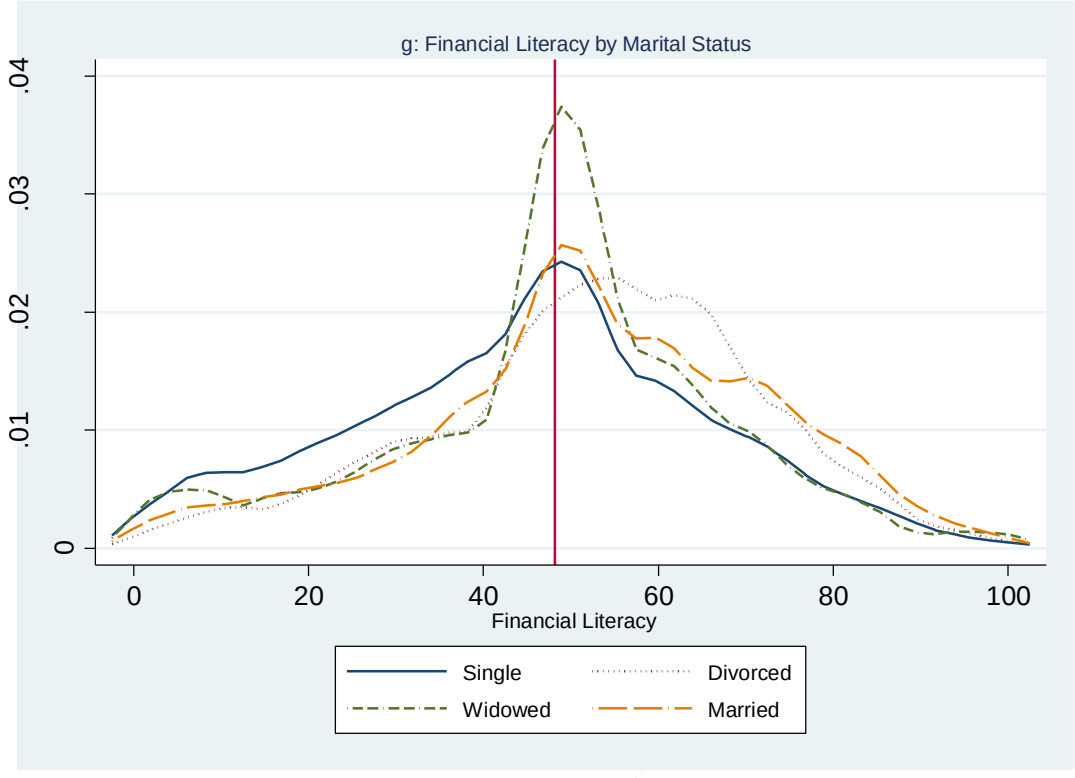


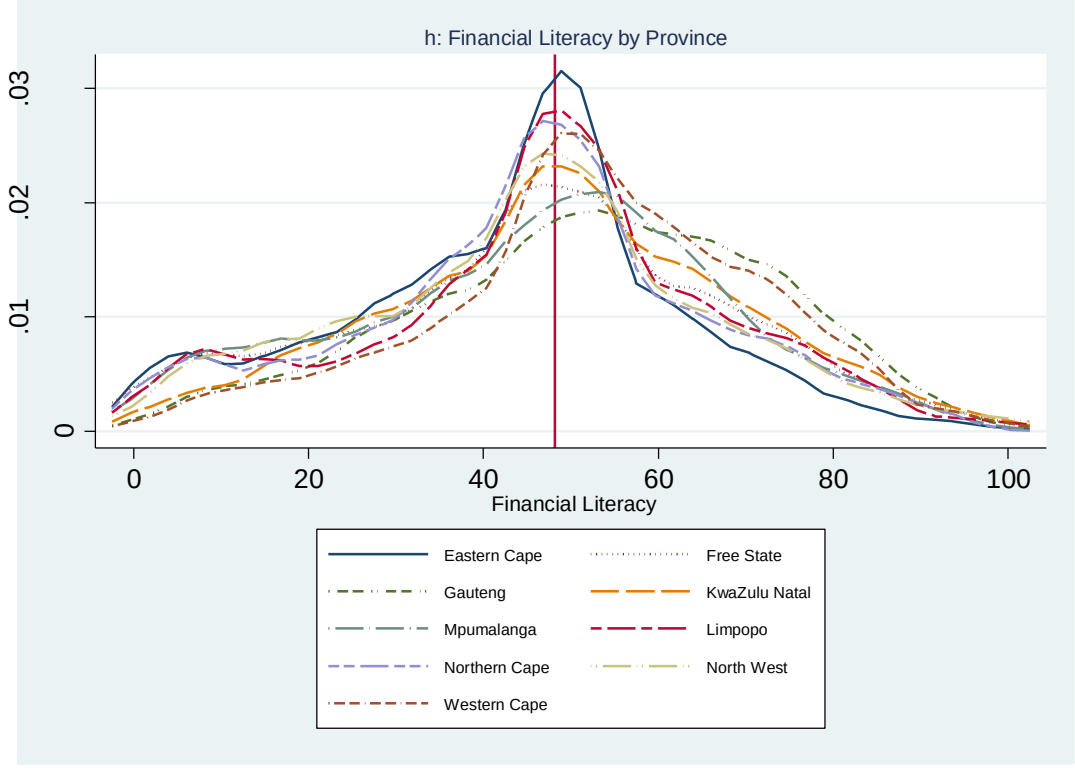

c: Financial Literacy by Race
0
.01
.02
.03
.04
0
20
40
60
80
100
Financial Literacy
Blacks
Coloureds
Indians
Whites

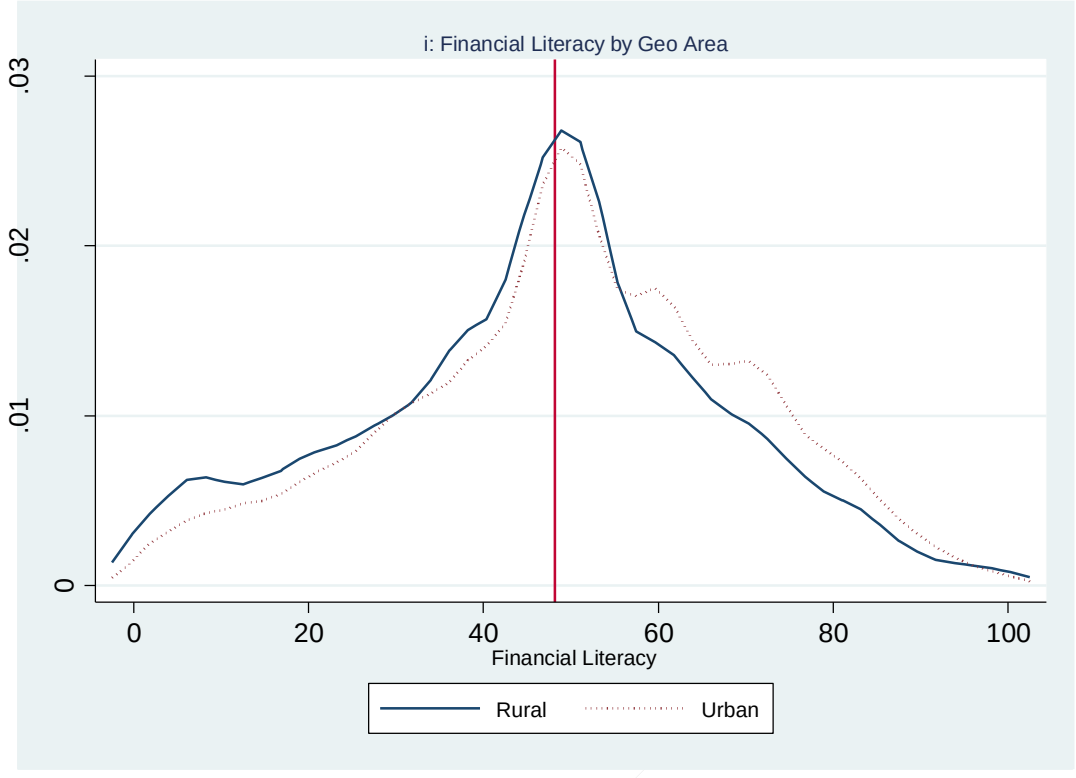

d: Financial Literacy by Education Level
0
.02
.04
.06
.08
0
20
40
60
80
100
Financial Literacy
No FormalEd
Some Primary
Full Primary
Some HS
Matric
Some Univ
Univ Complete
Other Post-Matric

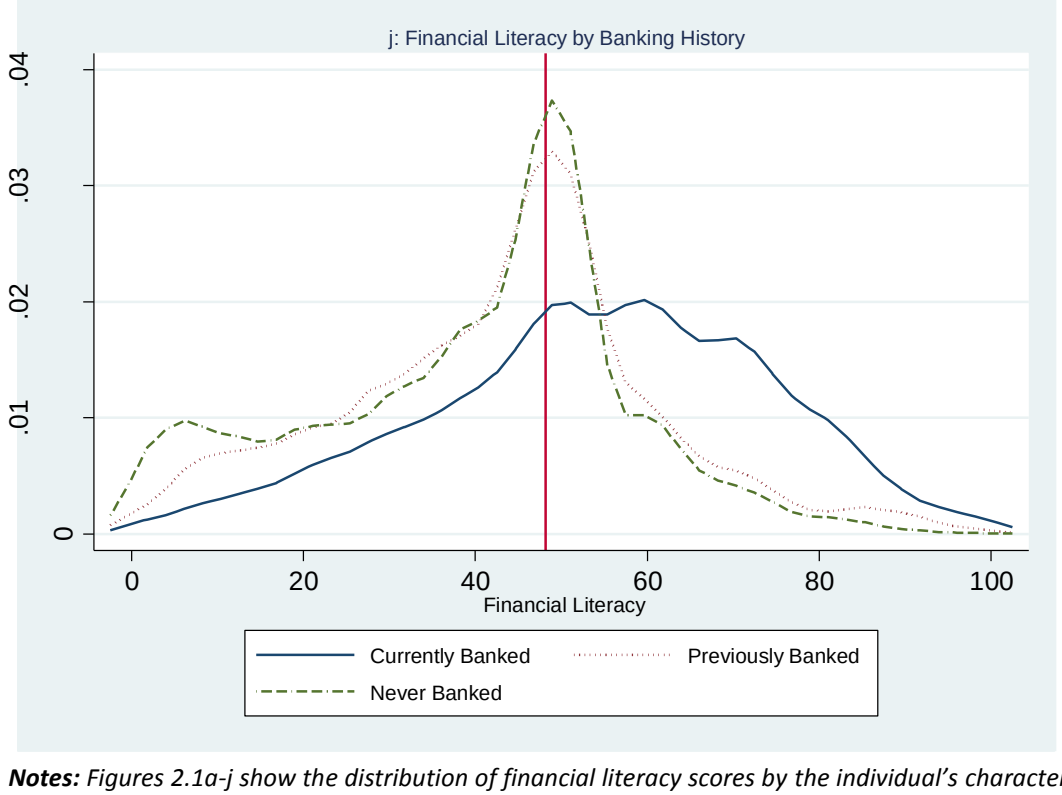

e: Financial Literacy by Income Level
0
.01
.02
.03
.04
0
20
40
60
80
100
Financial Literacy
Up to R999
R1000-5999
R6000-9999
R10000-24999
R25000+


f. Financial Literacy by Occupation
0
.01
.02
.03
.04
0
20
40
60
80
100
Financial Literacy
Pensioner
Formal
Housewife
Student
Informal
Self-Emp
UE
Other


g: Financial Literacy by Marital Status
0
.01
.02
.03
.04
0
20
40
60
80
100
Financial Literacy
Single
Divorced
Widowed
Married


h: Financial Literacy by Province
0
.01
.02
.03
0
20
40
60
80
100
Financial Literacy
Eastern Cape
Free State
Gauteng
KwaZulu Natal
Mpumalanga
Limpopo
Northern Cape
North West
Western Cape



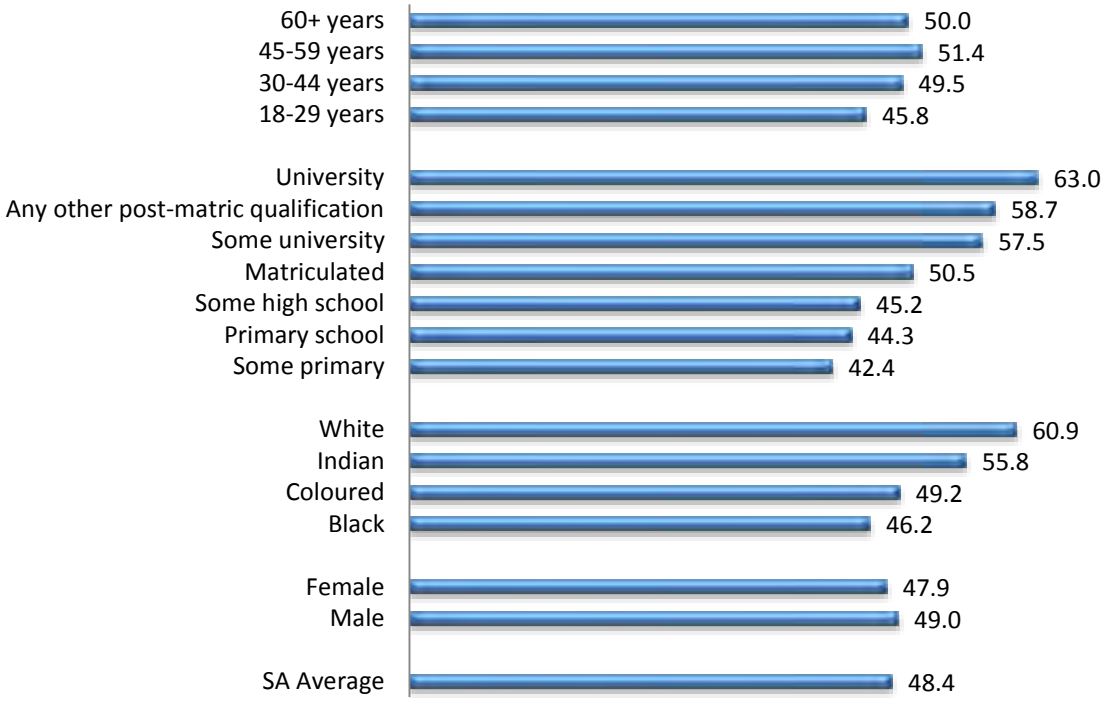


Notes: *Figures 2.1a-j show the distribution of financial literacy scores by the individual's characteristics. The data is weighted to be nationally representative. The vertical line shows the national average of 48.4 out of 100.*

To get a clearer view of the distribution, the average Index scores were decomposed by the socio-economic and demographic characteristics of the population. As shown in Figure 2.2, lower than average levels of financial literacy were evident among women, black South Africans, those with less than matric (high school), and 18-29 year olds.

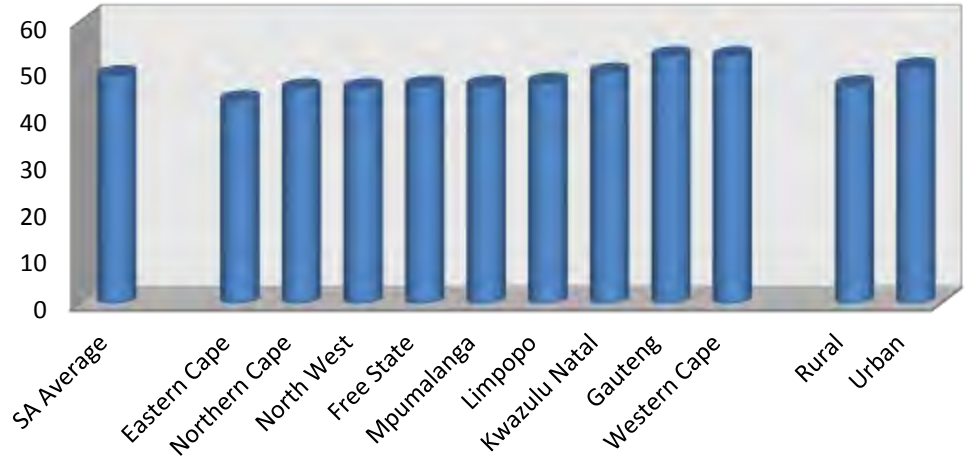
These results are similar to those reported by studies in upper-middle income economies like the USA, Europe, Japan, and New Zealand, as well as in low-middle income countries such as India, Indonesia, West Bank and Gaza (see Xu and Zia, 2012 for a summary). Financial literacy levels increased with level of education and with age, slightly tapering off at 60 years. This finding is the inverted U-shape reported by Lusardi and Mitchell (2011a); Xu and Zia (2012); and Jappelli and Padula (2011). According to Jappelli and Padula (2011), this is evidence of a decline in cognitive ability in the latter years of an individual's life. Lusardi, Mitchell and Curto (2009) and Johnson and Sherraden (2006) found similar low levels of financial literacy among youths in the USA.

Figure 2.2: Financial Literacy by Age, Education, Gender, and Ethnic Background



In terms of geographical distribution, Figure 2.3 shows that in only three out of the nine provinces did individuals score above the country's average, that is, Western Cape (52.46), Gauteng (52.45) and KwaZulu Natal (48.9), while North West (45.6), Northern Cape (45.6) and Eastern Cape (43.1) lag behind. Provinces with the highest levels of financial literacy are associated with the lowest levels of poverty (P_0/P_1=5.74/0.013, 4.87/0.014, and 22.12/0.068 respectively) while those with the lowest literacy levels also rank among the poorest (P_0/P_1=34.02/0.111, 26.13/0.072 and 42.17/0.145 respectively).[51] These results also mimic the pattern of population groups and business activity in that Whites, who have the highest scores, are concentrated in the Western Cape province while Indians/Asians who follow closely, are concentrated in KwaZulu Natal. Gauteng and KwaZulu Natal also happen to be the financial and business hubs of the country respectively. On the other hand, the province of Eastern Cape is predominantly Black, and this population group has the lowest financial literacy levels.

Figure 2.3: Financial Literacy by Province



Results of the distribution of education by population group, although not included, show that Blacks and coloured on average had less than a matric level of education, which is associated with lower financial literacy levels. The majority of Whites had on average attained a post matric education level, which is associated with above average financial literacy (see Figure 2.2). Rural

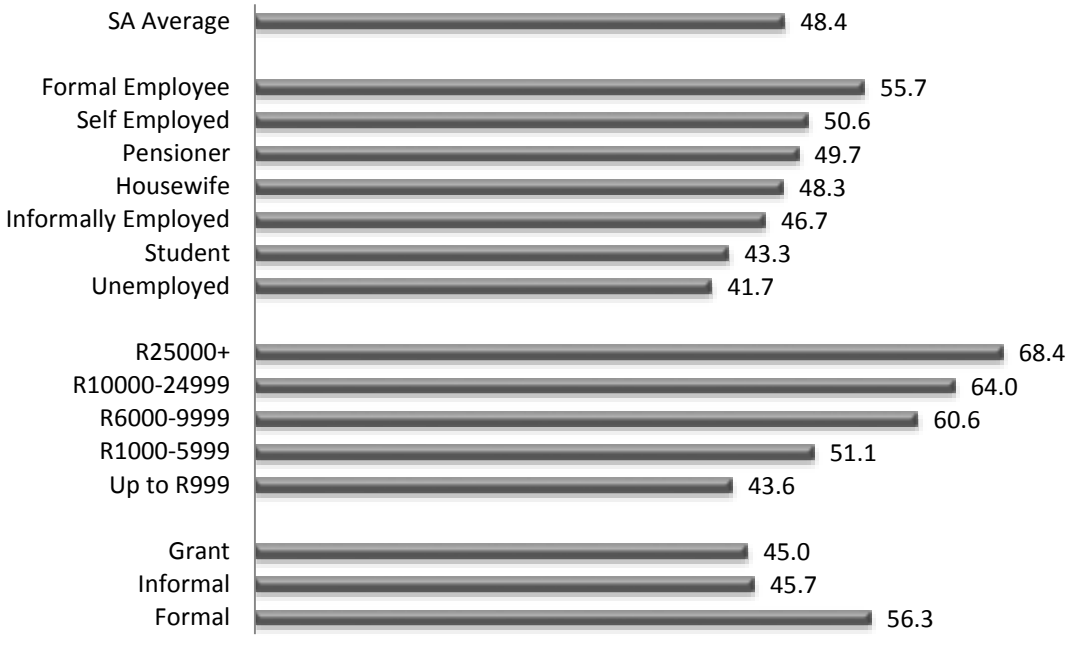
[51] P_0 is the head count poverty and P_1 is the poverty gap. See the Living Conditions Survey 2008/09 and Woolard and Leibbrandt (2009) on these and other provincial poverty measures.

dwellers on average had lower financial literacy levels than their urban counterparts, 46.24 and 50.07 respectively. This finding is in line with those reported in almost all empirical studies on this subject, where the difference is attributed partly to the high interactions in high density areas such as urban areas, which allow the diffusion of knowledge (Klapper and Panos, 2011).

Figure 2.4 disaggregates the Index values further by economic variables like major sources of money, occupation, and income categories. On average, the formally employed, the self-employed and pensioners have above average financial literacy, while students and the unemployed score the lowest in the occupation category. Lower levels of financial literacy among students have also been reported by Beal and Delpachitra (2003) among Australian university students; Markow and Bagnaschi (2005); Mandell (1997); Lusardi, Mitchell and Curto (2009); Chen and Volpe (2002) among college students and young adults. Individuals receiving money through formal sources have higher scores while recipients of informal income sources and grants have below average scores. This difference could be due to the requirement by formal employers that employees use formal financial mechanisms, which in turn requires financial proficiency. It is worth noting that grant recipients in South Africa, as is the case elsewhere, are either unemployed or marginalised[52]. This finding highlights the lower financial literacy observed among the unemployed. Finally, financial literacy scores increase as income levels increase, a result similar to that found in most studies conducted in the area, reflecting either the increase in demand for financial products and services that require financial proficiency, or an increase in affordability of investment in acquiring financial literacy.

[52] Grants include: Child support, Foster Care support, Care Dependency, Old Age support, Disability, War Veteran, Social Relief of Distress, and Grant-in-Aid. There are as many as 8 million grant recipients on average, per year. www.sassa.gov.za

Figure 2.4: Financial Literacy by Occupation, Income, and Source of Money



2.5.2 The Determinants of Financial Literacy in Post-Apartheid South Africa

The estimation results reported in Table 2.2 (the full set of results are in Appendix A9) point to some interesting findings about the correlates of financial literacy in South Africa over the period under review. Whereas men have higher levels of financial literacy than women, this difference is not statistically significant. This result can be compared to a similar finding reported by Bucher-Koenen and Lusardi (2011) for East Germany, where gender did not matter in relation to an individual's financial literacy level. Furthermore, despite evidence of the inverted U-shape in the relationship between age and financial literacy, and the middle age group scoring higher than any other group, the estimation results show no statistical significance of the age variable. This result seems to suggest that the problem of financial illiteracy in South Africa probably cuts across age groups. Compared to Blacks, Whites and Asians had statistically higher scores. Similar racial and regional differences are reported by Bumcrot, et al. (2011) in the US; Crossan, et al. (2011) in New Zealand; Alessie, et al. (2011) in the Netherlands, Dragan (2011) in Bosnia-Herzegovina; and Xu and Zia (2012). Interestingly, being divorced or widowed or married is statistically significantly associated with high levels of financial literacy, compared to being single. This result might in part

reflect the nature of marriage contracts in the country or, as argues Hsu (2011), strategic learning in light of the financial responsibilities awaiting divorcees and widowers or widows, following separation from or the death of their partners.[53] Higher levels of income were statistically significant determinants of financial literacy, confirming arguments that such individuals can either afford the cost of acquiring financial literacy and thus seek more financial knowledge to better manage the financial wealth or, that they demand more services and products, which requires financial proficiency. Contrary to empirical results of studies undertaken elsewhere, residing in an urban area was not a statistically significant determinant of financial literacy in South Africa. This result remains unchanged even when the provincial variable is omitted (see model 2). However, residing in the Eastern Cape, Northern Cape and Mpumalanga was associated with lower financial literacy compared to Western Cape.

[53] In South Africa, those married in community of property share equally in the wealth of the partnership. This includes financial obligations, such as debt and investments. Thus married individuals are more motivated to learn about finances or to fall victim to the financial mistakes of their spouses – but only if they are married under this regime

Table 2.2: Correlates of Financial Literacy in South Africa

Variable		(1)	(2)	(3)	(4)
Gender	Female	-0.123	-0.0469	-0.116	-0.103
(Male)		(0.444)	(0.445)	(0.444)	(0.440)
Race	Coloured	0.873	0.719	0.903	0.906
		(0.607)	(0.545)	(0.605)	(0.604)
(Blacks)	Asian/Indian	2.653***	4.057***	2.764***	2.789***
		(0.899)	(0.827)	(0.898)	(0.890)
	White	4.467***	4.525***	4.517***	4.488***
		(0.903)	(0.906)	(0.903)	(0.874)
Education	Some Primary School	-3.855***	-3.857***	-3.803***	-3.690***
(No Education)		(1.244)	(1.232)	(1.244)	(1.245)
	Primary school	-2.748**	-2.872**	-2.696**	-2.371**
		(1.212)	(1.206)	(1.211)	(1.209)
	Some high school	-2.090*	-2.094*	-2.031*	-1.900*
		(1.094)	(1.082)	(1.093)	(1.090)
	Matriculated	-1.205	-1.077	-1.139	-0.936
		(1.202)	(1.188)	(1.200)	(1.195)
	Some university	3.739**	3.476**	3.822**	4.192**
		(1.687)	(1.681)	(1.684)	(1.690)
	University completed	4.810***	5.032***	4.914***	5.081***
		(1.534)	(1.526)	(1.530)	(1.530)
	Other post matric	3.380**	3.425**	3.454**	3.926***
		(1.503)	(1.486)	(1.503)	(1.498)
Age Category	30-44 years	0.0692	-0.255	0.0653	0.0362
(18-29 years)		(0.605)	(0.610)	(0.605)	(0.604)
	45-59 years	0.744	0.373	0.746	0.824
		(0.772)	(0.775)	(0.772)	(0.771)
	60+ years	0.202	0.0105	0.214	0.0588
		(1.296)	(1.289)	(1.297)	(1.295)
Personal	R1000-5999	-1.228*	-1.251*	-1.243*	-1.434**
Monthly		(0.706)	(0.702)	(0.706)	(0.687)
Income	R6000-9999	2.177*	2.119*	2.182*	2.137*
(Up to R999)		(1.122)	(1.114)	(1.122)	(1.101)
	R10000-24999	2.077	2.197	2.040	2.040
		(1.365)	(1.364)	(1.363)	(1.358)
	R25000+	5.294**	5.696**	5.256**	5.322**
		(2.424)	(2.454)	(2.425)	(2.448)
Constant		52.56***	51.85***	52.85***	52.22***
		(1.924)	(1.830)	(1.900)	(1.710)
Mean VIF		2.75	2.75	2.75	2.75
Observations		15,692	15,692	15,692	15,692
R-squared		0.164	0.157	0.164	0.157

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Note: Table reports OLS estimates of financial literacy based on the theoretical model specification. Base category in bold parentheses. Pairwise correlation test between income/education and education/occupation detected no collinearity. Appendix A9 shows the full set of results

The regression results so far confirm the patterns revealed in the descriptive statistics and they are generally similar to global patterns (see Lusardi and Mitchell (2014) and Xu and Zia (2012)). In particular, they point to the significance of characteristics such as race, education, and region (province). However, in order to isolate the effects of demographic and geographic variables, a hierarchical OLS is estimated in which financial literacy scores are regressed first against demographic characteristics and then geographical location (province) added in the second level. Except for gender and geo-area, which are binary variables, the regressors are categorical variables for which dummy variables were created[54]. Table 2.3 reports the variation in financial literacy accounted for by the two sub-groups of variables.

Table 2.3: Demographic versus Geographic Variation in Financial Literacy

Model	Variables	R^2 Change	*F* Change	*p*
01:	Demographic	0.103	60.878	0.0000
02:	Provinces	0.007	16.244	0.0000

Note: *The table shows the disaggregation of the contribution of the demographic and geographic variables*

Demographic variables accounted for 10% of the variation, while the inclusion of province contributed only 0.7% additional predictive power. The implication of these results is that the significance of the provincial variable, at least for three of the nine provinces, is likely to be closely aligned to the demographic characteristics of the provinces. Thus, any attempt to address the provincial financial literacy gap would only be effective if it is complemented by initiatives that address the demographic differences.

2.5.3 Exploration into the Dual Structure of the South African Economy

This section explores the assertion that South Africa comprises two sets of individuals, that is, a group that can be compared to those in high income countries, and another that is comparable to groups in low-income economies. The idea was to test whether there are structural differences between these two groups, and whether these differences could alter the results of the measure of financial literacy. Analogous to the argument advanced by Vyas and Kumaranayake (2006) on

[54] This approach was used by Bumcrot, et al. (2011) to isolate the effect of the demographic variables from the geographical variations in financial literacy in the USA

the construction of separate socio-economic status (SES) indices for rural and urban dwellers, it is possible that some questions or variables used to construct the financial literacy index were seen differently by different groups. Additionally, the hypothesis that financial literacy is associated with financial sophistication in high income countries while it is associated with simply having a bank account in developing economies (Xu and Zia, 2012) was tested.

Figures 2.5a and 2.5b show that there are clearly two groups, with regard to financial literacy: One group comprises quintiles 1, 2 and 3 while the second group is made up of quintiles 4 and 5. It is also clear that the pattern of scores of quintiles 1, 2 and 3 are similar and so are the scores of quintiles 4 and 5. Additionally, the characteristics of individuals in quintiles 1 – 3 and quintiles 4-5 are also comparable. Thus income-quintiles 1-3 represent the low-income sub-group and income-quintiles 4-5 form the high-income sub-group. Separate sub-indices for each sub-group are then constructed. Finally, the sub-indices are combined to form a composite index that is a weighted aggregate of the sub-group indices.[55] Depending on the composition of each group, the index constructed in this manner would be driven by the scores of the dominant group. If the average financial literacy score from this index turns out to be lower than that constructed on the undivided sample, then the earlier analysis would be an overestimate of true financial literacy. The benefit of this overestimation is that it provides some form of upper limit, therefore, if it is low, then the country's overall financial literacy position is worse.

[55] The weighting in this case refers to the fact that principal component will attach separate weights to the questions when the analysis is done on the sub-groups and when it is done on the full sample

Figure 2.5a: Financial Knowledge Scores by Income Quintiles

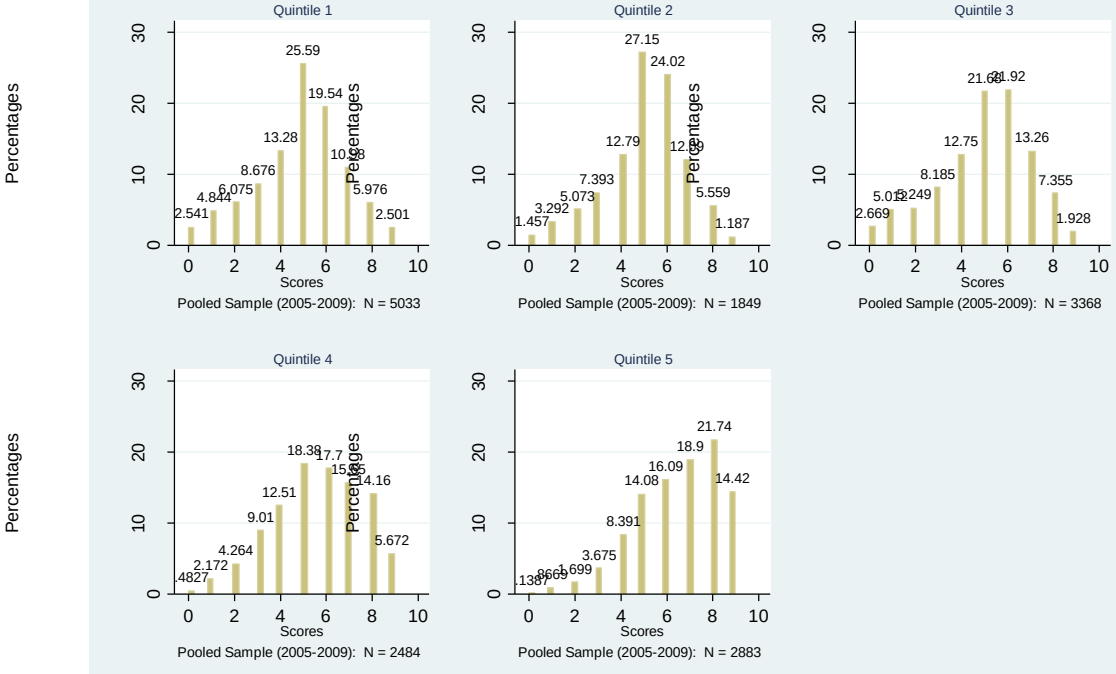
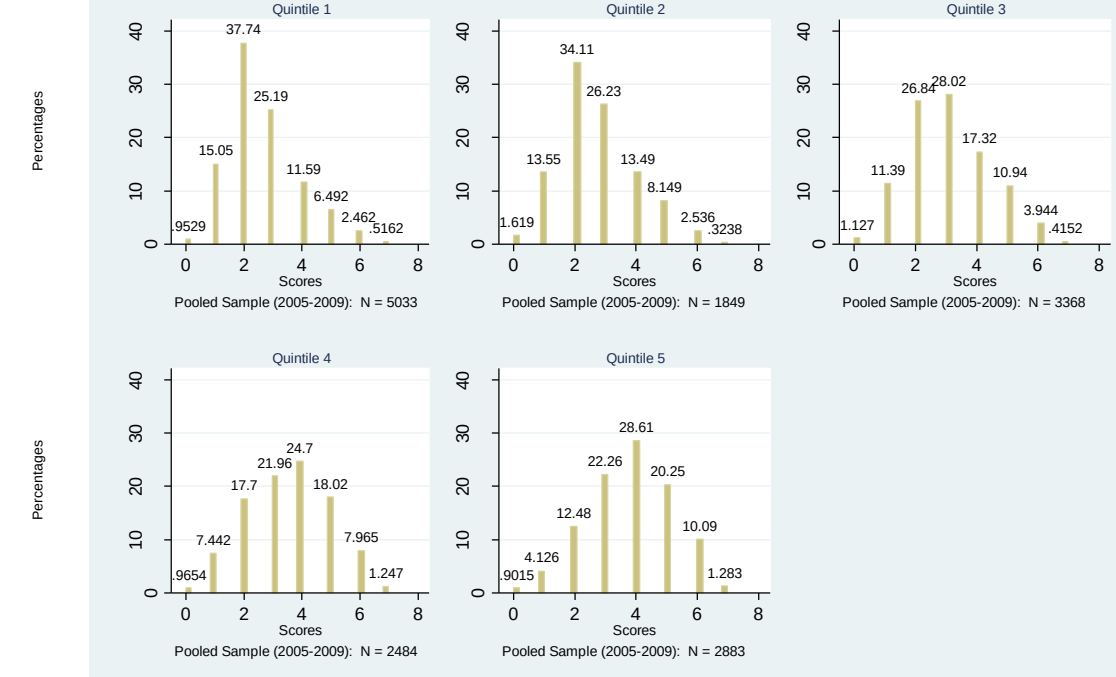


Figure 2.5b: Financial Capability Scores by Income Quintiles



Appendix A10 shows that the low-income sub-group comprises more women, Blacks, individuals with less than matric (up to some high school education), 18-29 year-olds, rural dwellers and single people. On the other hand, the high-income sub-group is characterised by more men, whites, individuals with at least a matric level of education, 30-44 year-olds, residents of Gauteng province, urban dwellers, and married individuals, and almost all of them have a bank product. The next section examines the performance of the sub-groups in the two financial literacy domains, which is used to construct a composite measure.

2.5.3.1. Financial Knowledge of the sub-groups

The responses by the two sub-groups will be compared to the questions selected for the financial knowledge domain, and the results are reported in Table 2.4. Knowledge of bad debt gets the highest response from both sub-groups, followed by knowledge of saving and investing, how to use financial services, and products and knowledge of credit bureaus. Overall, the high-income group claim to know more on matters related to debt, but the low-income group slightly out-perform their high-income counterparts for most of the questions in this domain. The explanation for this might be that these are self-reported responses and individuals in the low-income might be overconfident in financial matters,[56] or they might really be honest about their responses, the validity of which we test in the next domain (the capability domain) where self-acclaimed knowledge is converted into actions.

Table 2.4: Responses to the Financial Knowledge Questions by Sub-group

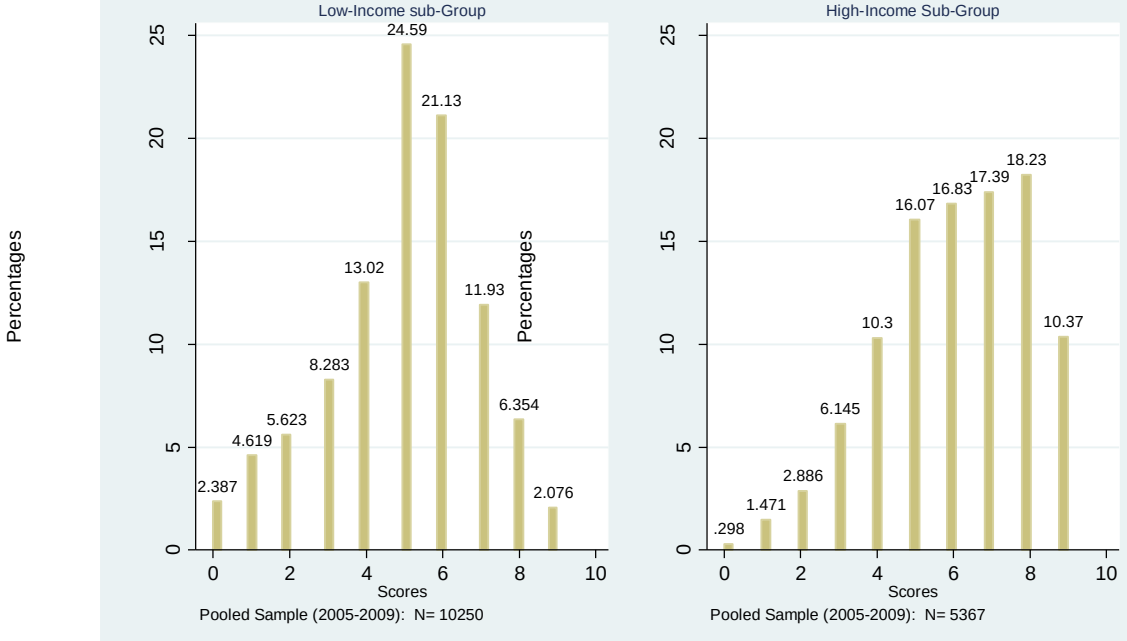
	(%) Low-income Group	(%) High-income Group
Bad-debt	32.46	61.50
National Credit Act	1.61	4.09
Credit Bureaux	11.30	11.66
Knowledge of Saving and Investing	28.53	16.39
Know how to use services and products	19.22	4.76
Interest Rates	2.38	0.97
Draw and Manage Budget	1.02	0.22
Life Insurance	0.28	0.06
Check Credit Worthiness	0.15	0.05
Trust Banks	1.10	0.20
None	1.95	0.11

Notes: The table shows the average responses for each question in this domain. The results are weighted to be nationally representative. The low-income quintile is the sum of quintiles 1-3 while the high-income quintile is the sum of quintile 4-5. Quintiles were constructed from the individuals' monthly income.

[56] See Shen (2014) who argues that overconfidence on financial matters is common among individuals, which often leads to them making financial mistakes that compromise their wellbeing

Next, a closer look is taken at how each of the sub-groups scored, where knowledge of each of the questions in Table 2.4 is equivalent to one point. As shown in Figure 2.6, the majority of respondents in the low-income sub-group scored four points out of nine, while their high-income counterparts scored eight out of nine points on average. So, it is obvious that individuals knew terms or concepts in isolation. However being able to answer a combination of questions would be more beneficial to an individual than having many individuals knowing just one concept.

Figure 2.6: Distribution of Knowledge Scores by Sub-Groups



Note: The figure shows the distribution of the number of questions answered by respondents

2.5.3.2 Financial Capability of the sub-groups

A similar exercise to the one related to the knowledge domain yields the summary results of Table 2.5. These results show that 'saving regularly' scores highest for both income groups, followed by 'having enough for retirement' and 'spending wisely'. Besides accidental sources of information, both groups report using family and friends as a source of financial information. Once again, there were more responses on average, from the low-income group compared to the high-income group.

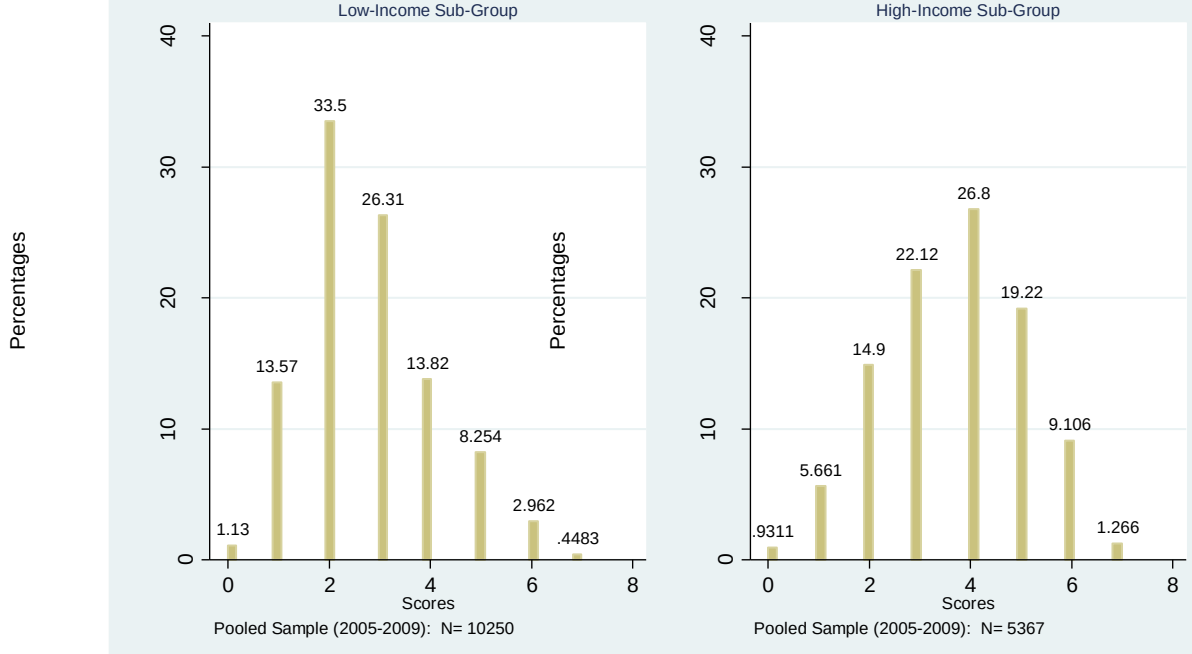
Table 2.5: Percentage Responses in the Capability Domain

	(%) Low-income	(%) High-income
Save regularly	32.49	72.83
Save for something specific	3.72	4.12
Save at all costs	5.55	2.41
enough for Retirement	27.79	9.33
Spend wisely	26.03	7.78
Source of financial information		
Friends & Family	39.27	15.02
Financial Pages	2.28	2.63
Other	21.74	6.95
None/Accidental	36.71	75.41

Notes: The table shows the average responses for each question in this domain. The results are weighted for national representation. The low-income quintile is the sum of quintiles 1-3 while the high-income quintile is the sum of quintiles 4-5. Quintiles were constructed from individuals' monthly income

Total points scored were counted to determine how capable individuals in the sub-groups were. In this domain, the low-income group scored on average two out of seven points, while the high income group again out-performed them, with an average of four points out of a total of seven points, as shown in Figure 2.6. Again, a combination of practices is desirable as these practices are interrelated.

Figure 2.7: Distribution of Capability Scores by Sub-Groups



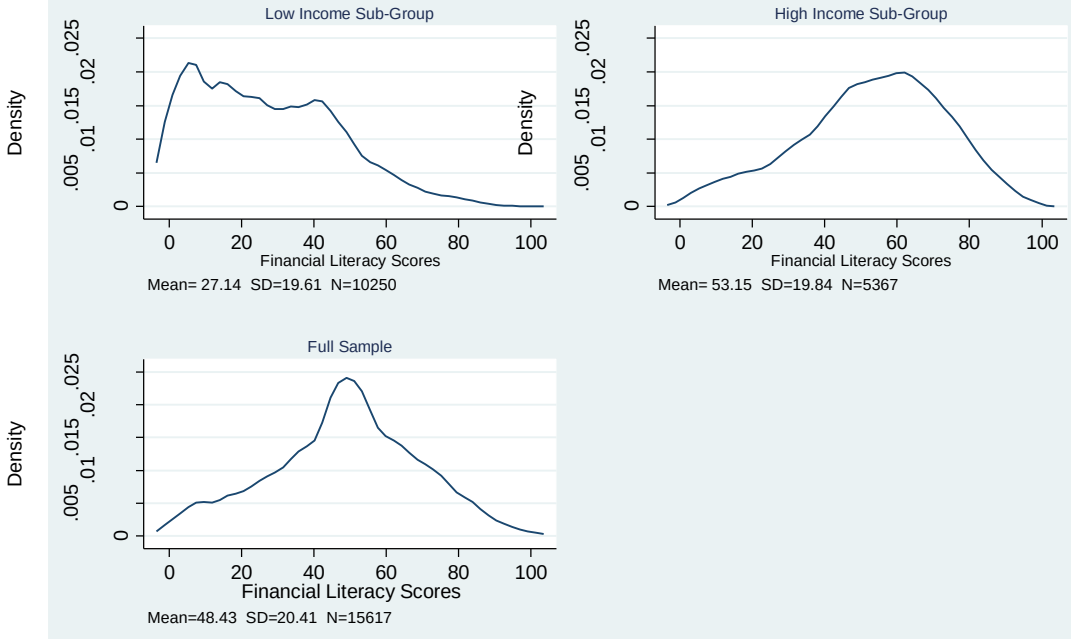
Note: The figure shows the distribution of the number of questions answered correctly by respondents in each sub-group

2.5.3.3 Financial Literacy of the sub-groups

In this section, the results from the preceding sub-sections are used to obtain the financial literacy scores of individuals in the two sub-groups, following a similar approach to that discussed in section 2.4. These sub-sample indices are then compared with the index constructed for the full sample. Shown in Figure 2.8, the average financial literacy score for high-income individuals is almost twice that of their low-income counterparts. The index constructed for the full sample (lower panel), would appear to be driven by the scores of the high-income sub-group.

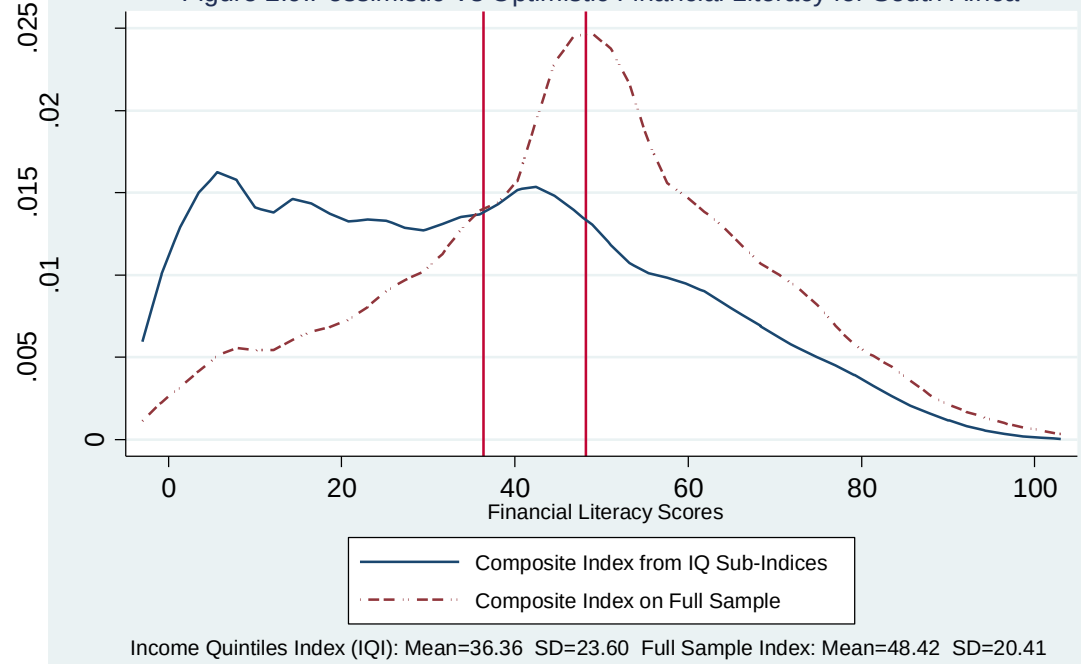
How do the sub-group indices compare with the index constructed on the full sample? In Figure 2.8, the sub-sample indices are additively combined to obtain an overall index for the country, which is overlaid on the index constructed without dividing up the population. While it looks like the average financial literacy level of the country might be over-estimated by using the full sample index, the patterns in the distribution of financial literacy, as well as its determinants remain unchanged. This supposed over-estimation is investigated further in the section that follows.

Figure 2.8: Distribution of Financial Literacy of the Sub-Groups



Note: The figure shows the distribution of financial literacy in each sub-group compared to the full sample

Figure 2.9:Pessimistic Vs Optimistic Financial Literacy for South Africa



Income Quintiles Index (IQI): Mean=36.36 SD=23.60 Full Sample Index: Mean=48.42 SD=20.41

Note: The IQI was constructed from the income-quintiles

2.5.3.4 Analysis of the Distributions and Structural Differences of the Sub-groups

Are the visual differences in the distribution of the financial literacy of South Africa's two sub-groups statistically significant? First a two-sample Kolmogorov (1933) and Smirnov (1933) test (K-S hereafter) is conducted to compare the financial literacy distributions of the two sub-groups. The K-S statistic, given by the expression below,

$$D_{n,n'} = sup_x |F_{LIC,n}(x) - F_{HIC,n'}(x)| \quad (2.9)$$

Where; $F_{LIC,n}$ and $F_{HIC,n'}$ are the empirical distributional functions of the low-income (LIC) and high-income (HIC) sub-groups respectively, $D_{n,n'}$ is the difference in the empirical cumulative distribution functions (CDFs) of the two sub-groups' financial literacy, and the *sup* is the supremum function (the least upper bound). The null hypothesis is that the two sub-groups financial literacy distributions are the same, which is rejected if $D_{n,n'} > c(\alpha)\sqrt{\frac{n+n'}{nn'}}$ (Smirnov, 1933, 1948). This test is better than the t-test in that it does not make any assumption on the distribution of the data, i.e. non-parametric (see Stephens, 1974).

The results in Table 2.6 show that the financial literacy scores for the low-income group are statistically significantly smaller values than the scores for the high-income group. The largest difference is 0.31. The null hypothesis is therefore rejected and it is concluded that the two distributions are not equal.

Table 2.6: Two-sample Kolmogorov-Smirnov Test for Equality of Distribution Functions

Smaller group	D	P-value	Corrected
Low-income	0.314	0.000	
High-income	-0.001	0.997	
Combined K-S:	0.314	0.000	0.000

Note: The table shows the results of the K-S test for the low and high-income sub-groups' equality. Ties exist in the combined dataset: There are 6893 unique values out of 15617 observations
Source: Stata output

The second test was done to check whether the structural differences between the low-income sub-group and the high-income sub-group could render the index for the full sample unrepresentative. Using the full sample constrains the variance of the residual to be the same in both the low-income

and high-income groups (Gould, 1999)[57]. Let us consider the general expression (2.8) in section 2.3.2 such that:

$$FLX = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k + u, \;\; u \sim N(0, \sigma^2) \qquad (2.10)$$

where the x_i's are the socio-economic and demographic characteristics of the individuals. If the two sub-groups are considered, equation (2.9) could be estimated for each sub-group as given by expression (2.10).

Low-income group: $FLX = \beta_{01} + \beta_{11} x_1 + \beta_{21} x_2 + \cdots + \beta_{k1} x_k + u_1, \;\; u_1 \sim N(0, \sigma_1^2)$

High-income group: $FLX = \beta_{02} + \beta_{12} x_1 + \beta_{22} x_2 + \cdots + \beta_{k2} x_k + u_2, \;\; u_2 \sim N(0, \sigma_2^2)$ (2.11)

On the other hand, when the data is pooled (as it was in the earlier estimation), then model 2.12 below is estimated.

$$FLX = \beta_{01} + \beta_{11} x_1 + \beta_{21} x_2 + (\beta_{02} - \beta_{01}) s_2 + (\beta_{12} - \beta_{11}) s_2 x_1 + \cdots + u, \;\; u \sim N(0, \sigma^2) \quad (2.12)^{58}$$

Evaluating model 2.12 shows that the variance of the residuals of the low-income group was constrained to be equal to the variance of the residuals of the high-income group, as shown in expression 2.13.

Low-income group: $FLX = \beta_{01} + \beta_{11} x_1 + \beta_{21} x_2 + \cdots + u, \;\; u \sim N(0, \sigma^2)$

High-income group: $FLX = \beta_{02} + \beta_{12} x_1 + \beta_{22} x_2 + \cdots + u, \;\; u \sim N(0, \sigma^2)$ (2.13)

What is clear from expression 2.13 is that the coefficients are the same. If indeed the residuals have the same variance in the two sub-groups, then the standard errors from the pooled model are more efficient (Chow, 1960). However this section abstracts from constraining the variance of the residuals in the two sub-groups, and a variant of the variance-unconstrained model given by 2.12 is estimated. First, individual sub-groups' regressions are estimated (expression 2.11). Then

[57] See www.stata.com/support/faqs/statistics/pooling-data-and-chow-tests

[58] s_2 is created to allow for the interaction of high-income group characteristics with those of their low-income counterparts. Note that I could alternatively have generated the low-income interaction term. The results remain the same regardless.

residuals are predicted for both sub-groups, and the inverse of the variance of the residuals used as weights to re-estimate model 2.12. This model should produce the same standard errors as those obtained in the individual sub-group estimation, and the coefficients from the pooled regression can be compared. The hypothesis that the coefficient $\beta[s_2 x_i], \quad (i = 1, \dots, k\ covariates)$, of the interaction terms should equal zero if the effects of the covariates from either sub-group are the same. For instance, if $x_1 = education$, then β_{11} (which appears both in expression 2.11 and 2.12) would be the effect of education of individuals in the low-income sub-group, while the effect in the high-income sub-group is given by $\beta_{11} + (\beta_{12} - \beta_{11})$. In other words, the test is to see if $(\beta_{12} - \beta_{11})$ is equal to zero, and if it is not equal to zero, whether it is statistically significant.

The results reported in Appendix A11 show that there are slight differences between coefficients in the individual models and the pooled model. Except for education and gender, which show a slight significance at the 10% level, all t coefficients are not statistically significant. It can be concluded therefore, that the composite financial literacy index constructed off the full sample is indeed representative as a financial literacy measure that takes care of the duality of the South African economy. In Chapter 3 this finding is put to a further validation test by considering the extent to which financial literacy levels of South Africans account for their use of financial services and products over the same period, 2005-2009.

Given that there are no prior studies along the same lines conducted for South Africa, these results could not be validated in the South African context. But the results of a pilot study conducted in 2010 by the OECD and the Financial Services Board of South Africa (FSB) could be benchmarked on these results. While the exact scores in both studies cannot be compared, owing to methodological differences, (on account of the actual variables or questions used in the pilot study and in this study), the descriptive statistics can shed light on the extent of convergence or divergence in the results. Just as in this study, the OECD pilot study relied on the same framework, although their analysis was based on a simple aggregation of the responses from individuals to the domain questions. Notwithstanding the methodological differences, and whether analysed from individual domains or as a composite, the results of the pilot show that financial literacy is higher among the White population group and lowest among Blacks. The young and the elderly, women, those with less than matric education attainment, those with low living standards, as well as non-urban

dwellers had low levels of financial literacy. Overall, the results of the pilot too pointed to a social class and education bias, where higher scores were observed for those with higher education and higher standards of living compared to poorer and less educated South Africans. These results resonate with our findings, as discussed in the preceding section.[59]

2.6 Concluding Remarks

This chapter sought to investigate the distribution and determinants of financial literacy in post-Apartheid South Africa, an economy with diverse social and demographic characteristics, to fill the empirical research gap on such economies. By adopting a definition that closely reflects the South African financial sector, I construct a financial literacy measure from the two closely interrelated domains of financial knowledge and financial capability, using observational data collected for the purpose of profiling the use of financial products and services by South Africans, across time periods.

The variables used in the construction the financial literacy measure are in line with the microeconomic framework of a consumption and saving decision making process of an individual between time periods. Use is made of the development psychology, behavioural finance, learning, and capability theories to further contextualise the concept of financial literacy.

The results revealed a national average financial literacy score of 48.4, and dramatic differences in financial literacy using pooled data for the period 2005-2009. Below average financial literacy was more common among women, young adults (including students), and individuals with less than matric education, Blacks, the unemployed, and rural dwellers. The provincial variation in financial literacy levels, though reflective of the racial distribution and business activities in the country, was not a statistically significant contributor to variations in the overall financial literacy of the country. While urban dwellers exhibited above average financial literacy, this variable too was not statistically significant. Similarly, even though there was evidence of the inverted U-shape in the association between age and financial literacy, age was not a statistically significant correlate

[59] The OECD pilot conducted a tailored survey on a sample of N=3112 weighted using the 2010 mid-year population estimates to represent 35.9 million South Africans see www.fsb.co.za for more details

either. Race, education, and income were the only significant contributors to differences in t financial literacy scores of South Africans.

A further revelation was that South Africans exhibited financial knowledge but this knowledge was not accompanied by financial capability. According to the capability theory, this behaviour can be attributed to a potentially unsupportive external economic environment within which the individual has to convert knowledge into practice. Another possible explanation, borrowed from behavioural economics, pertains to psychological biases that underlie differences in financial capabilities over and above financial knowledge. De Meza, Irlenbusch and Reyniers (2008) identify procrastination, aversion to loss and regret, status quo bias, and mental accounting as some of the biases.

The study also empirically established that dual economic characteristics of the South African population did not alter the representativeness of the financial literacy index and the final results. The results were robust whether based on an index constructed from a full sample, or a weighted aggregate of sub-indices constructed from the high and low income sub-groups.

These results are comparable to studies in developed economies. They also mimic the pattern observed in the OECD pilot study that was conducted for the country one year after the period of this study. It is therefore safe to suggest that this study provides baseline results on the subject, which has not been done before. By using rigorous methods on a small pool of relevant and fundamental questions, this study has shown that it is possible to arrive at similar results as one would obtain by conducting a fully-fledged survey on financial literacy, which is a costly exercise.

Overall, the pattern revealed by the distribution of financial literacy and its determinants in this study seems to reflect more of the education, labour market, and related inequalities characteristic of post-apartheid South Africa. In this regard, the following suggestions are made towards possible policy interventions:

i. Formulation of financial education guidelines to be incorporated into the school curriculum, especially in the high school years

ii. Implementation of financial literacy initiatives at community level to cater for individuals outside of the formal employment and education structures. This is in light of this study's findings that family and friends are main sources of financial information

iii. Addressing socio-economic inequalities, such as education attainment especially matric and above, and augmenting income generating policies to ensure stable incomes

In making these recommendations, I acknowledge that this study is a preliminary investigation on the subject of financial proficiency in the context of South Africa. Future research could endeavour to incorporate a dynamic component that allows for an evaluation of the learning that takes place over time (through updating values and beliefs), since financial decision-making is a continuous process.

This section covered the construction of a measure of financial literacy. The next chapter examines the extent to which financial literacy influences South African consumers' choice of financial services.

Chapter Three

Financial Literacy and the Use of Financial Services and Products in South Africa, 2005 – 2009: A Multinomial Logit Approach

3.1. Introduction

The preceding chapter showed significant variation of South Africans with below national average financial literacy scores using pooled data for the period 2005 – 2009. This was mainly accounted for by education and income, with a racial and geographical bias. In 2003, government began financial sector reforms to extend financial services to the previously disadvantaged, the majority of whom were Blacks, had low education, and resided in rural or underdeveloped areas. How did the levels of financial literacy among South Africans influence their decisions to shift from non-formal financial mechanisms on the one hand, and to choose between the various formal financial services that were presented to them on the other? To answer these questions, this chapter analyses the choices of financial services made by consumers, given their financial literacy levels. In particular, I investigate the role played by financial literacy in an individual's decision to use formal or non-formal transactional, credit, insurance or savings products.

The investigation is embedded in the general framework of the choice of financial services. In this framework, a consumer's choices are guided by both the products' characteristics as well as the consumer's characteristics, including level of financial literacy. The role of the consumer's risk attitudes is explicitly investigated. Behavioural finance, and indeed inter-temporal utility maximization, embody an individual's discounting preferences based on their attitude to risk, in choosing between financial products. Recent arguments posit that risk attitudes and financial sector participation should be modelled simultaneously (Rieger, Wang and Hens, 2013; Garcia, 2013). The role of education, age, ethnic background, marital status, geo-area, and other characteristics is considered, to provide more insight into the potential opportunities and challenges of a financial education policy, to affect usage patterns of financial services. Finally, the significance of the segmentation of South Africa's population is examined and the results are compared with studies that link financial literacy to financial sophistication for the high income

quintiles while linking it to basic financial services take-up for the lower income quintiles (see Xu and Zia, 2012).

It will be shown that financial literacy has the effect of increasing the likelihood of using formal and semi-formal products, but the effect only remains significant for credit and insurance products once 'use' is disaggregated into product categories. It will also be demonstrated that the risk-attitudes of individuals greatly dampens the effect of financial literacy, leading to a certain degree of switching between formal and non-formal financial products, regardless of a person's financial literacy level. Additionally, the effect of financial literacy is dampened by certain individual characteristics, such as age, gender, and race.

The chapter is organised as follows: Section 3.2 presents an outline of the debate on the role of financial literacy in financial sector participation and financial outcomes. The theoretical framework for the use of financial services is presented in section 3.3. Section 3.4 provides a review of approaches used in the literature to investigate the role of financial literacy in access and use of finance globally, and in South Africa. In section 3.5 the analytical framework used in this chapter is discussed, followed by the empirical model in section 3.6. Empirical findings are discussed in section 3.7 and the conclusions drawn are discussed in section 3.8.

3.2. The Role of Financial Literacy: An Overview

The importance of financial literacy was first highlighted as far back as 1787 as the reason for why Americans were perplexed, confused and stressed.[60] The subject gradually became a focal point in the financial sector and for policy makers through to the 21st century as shown from the excerpt below:

"Just as it was not possible to live in an industrialized society without print literacy—the ability to read and write, so it is not possible to live in today's world without being financially literate... Financial literacy is an essential tool for anyone who wants to be able to succeed in today's society, make sound financial decisions, and—ultimately—be a good citizen." Prof. Annamaria Lusardi, George Washington University

[60] http://financialcorps.com/history-of-financial-literacy-the-first-200-years/

When the global financial crisis of 2008/09 exposed the financial vulnerabilities of consumers, research on the subject heightened, especially in developed economies. This research shows that there are differences in the financial decisions made by financially literate consumers compared to their less literate counterparts (see Lusardi and Mitchell, 2014 for an overview). Most of the analyses assumes a linear relationship, however, especially with respect to the formal sector. Moreover, participation in this sector is presumed to be superior to participation in other financial sub-sectors such as the informal sector. For instance, Klapper and Singer (2013) rank the sectors such that the formal financial sector is above the informal and this is in turn superior to not using financial products at all. But this ranking is subjective and could have implications on research findings, especially in cash economies where voluntary exclusion from participation in the formal sector is likely to be high. An individual can learn good financial practices from childhood, through experience or learning on the job (Agarwal, et al., 2009) and also purposively, to better manage their finances. For instance, an individual who inherits wealth might be forced to equip themselves with financial skills to better manage their inheritance. Similarly, planning to buy large assets such as property or machinery might require one to participate in the formal financial sector to build a financial record in preparation for any credit supplement to finance such a purchase. On the other hand, some cultures might entrust certain individuals with a household's financial responsibility, thus requiring them to be equipped with financial skills as early as possible in preparation for such household tasks.[61] It is thus not clear whether it is exogenous or endogenous financial literacy that individuals ought to have, and whether it should be associated with formal institutions per se.

Focusing on the formal sector alone is perplexing, as it reveals that not all financially literate and sophisticated individuals perform well in financial undertakings (Cole et al., 2011). For instance, professors of finance often abstain from financial investments even when they are well aware of the potential positive returns (Fromlet, 2001). At the same time, as in the case of South Africa, individuals keep allegiance to non-formal financial mechanisms while embracing the formal financial products (FinScope surveys 2003-2012). These behavioural patterns point to caution when drafting financial education strategies and they also call for more research into the subject.

[61] Ashraf, Karlan and Yin (2010) find that women in the Philippines were in charge of household finances and they therefore participated more than men in a financial management experiment

Some of the theoretical advancement that can aid our understanding of consumers' actions when making financial decisions will now be discussed.

3.3. Theoretical Underpinnings

This section gives an overview of theories that contextualize the use of financial services. The focus is on those theories that are relevant to investigating the South African setting.

3.3.1. Rational Choice Theory

Developments in consumer choice theory are still ongoing. However, despite the refinements underway, the neoclassical foundations of rational choice theory posit that consumers make choices to maximise their happiness through a process of consistent ranking of alternatives (Grune-Yanoff, 2012), so that the patterns picked up are a reflection of cost-benefit analyses, as the consumer compares different courses of actions (Becker, 1967). For instance, consumers would like to get the most useful financial product at the lowest cost, compared to a similar product, either from the same source or from an alternative one. Similarly, consumers would choose to acquire more financial knowledge at the lowest cost but with the highest returns. The notion of rationality in this setting relates to completeness of the consumer's preferences (ability to rank his actions), transitivity (or consistency of his orderings) and the independence of irrelevant alternatives (no switching of the order with the introduction of new products). The key assumption in this school of thought is the existence of full and perfect information about the available options and the outcomes of the choices made. Additionally, consumers are assumed to have the cognitive ability and time to weigh one choice against another. This ideal scenario is said to lead to equilibrium, which in financial theory laid the foundation for Markowitz's work, and later Sharpe's, on diversifying risks in money and capital markets (Fromlet, 2001). Indeed, Modern Portfolio Theory is premised on perfect predictions, flexible prices, and complete knowledge of all the actions of all players in the financial market.

Empirical work by Kahneman and Tversky (1979) waters down the cost-benefit analysis process, arguing that individuals will attach more value to what they already own or have than what they expect to obtain, regardless of the prospective benefits from alternative potential acquisitions. The assumption of the existence of perfect information in decision making, and rationality, especially

in the financial sector, has also been criticised by several economists in the behavioural finance/economics field. Their arguments are discussed below.

3.3.2. Behavioural Finance Theory

This theory combines psychology and market phenomena to explain why and how individuals make seemingly irrational and illogical decisions to spend, save, invest, and borrow (see Belsky and Gilovich, 1999). The argument is that psychology does matter for financial analysis and decisions. Pioneered by Herbert Simon in 1955, the theory refutes the existence of a rational consumer, given the realities of the investment world and the financial environment in general. This argument is echoed by Fromlet (2001) who argues that heuristics play a role in financial decisions such that decisions made by individuals might not necessarily reflect their disposition, and new information might not easily change an individual's financial decision. Moreover, information varies such that not all consumers get the relevant information, while they also require skills to use such information appropriately. Furthermore, some consumers exhibit preferences for certain types of information, with the combined effect of unpredictable and inconsistent financial decisions.

In light of the above arguments, this study utilises a combination of the rational choice theory and behavioural economics. While a rational agent is assumed, a subjective ranking of preferences is imposed, especially in terms of the source of the financial services he chooses. In this regard, the interpretation of results in this study is cognisant of this subjectivity, as well as the behavioural aspects that might underlie seemingly inconsistent results. The complete analytical approach followed in this study is expounded on in section 3.5.

3.4. Empirical Literature on the Role of Financial Literacy

A number of empirical findings seem to make a case that there is a role for financial literacy in demand for and effective use of financial products and services. These findings are summarised by Lusardi and Mitchell (2014) and, Xu and Zia (2012) where differences in results depend mainly on the measure of financial literacy used. Surveys conducted in developed economies find that individuals with low levels of financial literacy tend to make sub-optimal financial decisions, leading

to what is commonly referred to as financial mistakes.[62] Such individuals do not plan for retirement (Lusardi and Mitchell, 2007a), borrow at high interest rates (Lusardi and Tufano, 2009), acquire fewer assets (Lusardi and Mitchell, 2007b), and participate less in the formal financial sector (Alessie, et al., 2011). It is further argued that individuals with high levels of financial literacy tend to save and accumulate wealth, plan for retirement, exhibit more risk diversification, show sophisticated investment behaviour, manage debt better, and make better mortgage related decisions (Ameriks, Caplin and Leahy, 2003; McArdle, et al., 2009; Christelis, et al., 2010; Behrman, et al., 2012; Jappelli and Padula, 2011; Van Rooij, et al., 2009; Diagne and Villa, 2011). Clarke, Morrill and Allen (2012) find an increase in the participation of financially literate consumers in the 401k savings plans in the USA.

In most of these studies, a set of questions was given to respondents and their scores averaged either through a simple summation or by use of a weighting technique. At best these results provide a one-period state of financial literacy, without insight into the initial state of one's financial literacy level. The main criticism of this approach is that the questions have mainly emphasized numeracy skills. However, as was argued in the preceding chapter, and in the theoretical literature discussed in the preceding section, numeracy is simply a construct of financial literacy (Sen, 1993) which might not necessarily capture the behavioural component. Additionally, it is not clear whether literacy levels are exogenous or if they have been acquired over time, say through use of financial products. To overcome this challenge, the longest panel of study of income dynamics in the USA was modified to include financial literacy related questions. This study finds evidence of better financial literacy levels of individuals in this panel compared to their levels in earlier periods (Lusardi and Mitchell, 2014). Similarly, Jappelli and Padula (2011) model investment in financial literacy across time periods and find that financial literacy and saving are positively correlated. While these studies manage to find the optimal level of financial literacy, it's not clear whether this optimal level applies for other product categories and across financial sub-sectors (formal, semi-formal, or informal). This makes it difficult to use such a level as a benchmark across countries.

[62] For the definition and most common financial mistakes, see Agarwal, et al. (2009); Amromin, Huang and Sialm (2007); Barber and Odean (2000); Bergstresser and Porteba (2004); Calvet, Campbell and Sodini (2009); Gross and Souleles (2002)

It should be noted that the financial services considered in the studies discussed thus far are mainly related to credit, savings, and investment, where the costs and benefits from these services are captured through interest rates and inflation. Hence knowledge of how to calculate these rates is an indicator of the potential use of these services. From this perspective, such questions would be applicable even in South Africa, given the resemblance of the country's financial sector to that of developed economies. As noted earlier, however, this knowledge might not be overly important in cash economies where non-market assets are the norm, or where non-formal financial mechanisms are equally sophisticated. This is common in low-middle income economies and in some high-middle income economies like South Africa too. On account of data, studies in low-middle income economies have taken the form of tailored surveys, and financial literacy has been found to affect insurance take-up following financial education interventions such as in Guatemala, Indonesia, Uganda, and Vietnam (Tran and Yun, 2004; Cohen and Young, 2007; Gine, et al., 2010). While it is prohibitive due to costs, this approach provides a direct and sometimes qualitative way of checking financial knowledge application, albeit still in a one period framework.

In the preceding chapter, education was shown to be a positive correlate of financial literacy. To this end, Banks and Oldfield (2007) use numeracy and cognitive skills (which are the basic constructs of financial literacy) as proxies and they find that these are strong predictors of economic outcomes like wealth accumulation. Christelis, et al. (2010) use the SHARE data and find a strong correlation between equities and stockholding and mathematical ability, verbal fluency, and recall skills. It is easy to see that these proxies can be a challenge in countries where there is poor record keeping in terms of education. Additionally, if the education system in a country impacts negatively on school outcomes, using education scores might lead to negatively biased results regarding the role of financial literacy. Indeed pupil scores in many low-middle income countries have multiple confounders, thus compromising the credibility of such scores as a proxy for financial literacy. Moreover, Behrman, et al. (2012) argues that financial literacy itself is a proxy for education, which raises concern about potential reverse causality, further discrediting the use of education as a proxy. Since the South African education system is skewed due to apartheid, this approach could not be investigated, as the bias seemed obvious.

The growing literature on randomised experiments attempts to address the issue of endogeneity between financial literacy and education. Results show that providing financial skills to individuals

improves their use of formal financial products, which opens up opportunities associated with welfare improvement. For instance, a randomized control experiment in Morocco reported an increase in formal financial sector participation, but mainly for consumption (AFI/WB, 2011). The effect was greater for individuals with lower initial levels of education, which is linked to cognitive ability, and possibly exogenous financial literacy.

The discussion thus far points to an overall positive role of financial literacy in the use of financial services, mainly in the formal financial sector. However, most of the empirical literature suffers from potential omitted variable bias mainly related to an individual's risk preferences and perceptions which are closely related to wealth accumulation (Behrman, et al., 2012). Indeed Cox, Brounen and Neuteboom (2011) find that households with high financial literacy and lower risk-aversion are more likely to use interest-only mortgages, and individuals who are sophisticated understand risks and benefits, and are more likely to use alternative low-cost credit products. From a sociological perspective, Hofstede (2001) argues that risk is closely related to individualism (or collectivism) and uncertainty avoidance, which might influence participation in the financial sector. For instance, financially literate but risk-averse individuals might not engage with the formal sector if they are accustomed to existing alternatives. On the other hand, a high degree of collectivism (as seen in the stokvel arrangement in South Africa) might lead to risk-seeking behaviour owing to the existence of a 'social cushion' (Hsee and Weber, 1999). This study examines the interplay between financial skills, risk attitudes and financial product choice from formal and non-formal sources of consumers in South Africa over the period 2005-2009. The supposition is that there are instances when financial literacy might not be enough to explain financial products uptake.

A further observation on the literature is the focus on the role of financial literacy in the choice of formal sector products. Its influence on choice of products in the informal financial sector is not as frequently investigated. This despite the fact that in countries like South Africa the latter is equally vibrant (see Appendix A12). Known exceptions include Wachira and Kihiu (2012) who model the effect of financial literacy on the choice of formal and informal credit choices in Kenya. They find that financial literacy increases, the likelihood of individuals using formal credit compared to using informal credit or not using credit at all. Klapper and Singer (2013) also model the role of the informal sector, although not in relation to financial literacy. They find substantial financial services usage in the informal sector by individuals who are not served by the formal sector. This

study addresses this research gap by using a multinomial logit approach to accommodate all potential sources of financial products in South Africa for transactional, credit, insurance, saving, and investment purposes. This methodological approach has been used in related studies such as those of Wachira and Kihiu (2012) and Diagne and Villa (2011). However, these two studies only looked at credit. Ardic and Yuzereroglu (2006) model choice of financial products from state banks versus non-state banks, but they don't model the role of financial literacy in the choice of products by source.

The only known study of financial literacy in South Africa was a pilot survey conducted by the OECD in partnership with the Financial Services Board of South Africa in 2010 to investigate the financial literacy landscape in the country. However, the study did not explicitly model financial literacy and financial sector participation. This study not only closes this empirical gap but it also provides a baseline study for the country, as pointed out in the preceding chapter. Given that there were significant differences in financial literacy by gender, age, race, and education level, an interaction of financial literacy with these variables is incorporated in the models.

This chapter investigates the interplay between financial literacy, individuals' risk attitudes and key characteristics, and the observed use of financial services in South Africa during 2005-2009. The focus is on how consumers' levels of financial literacy, affect the observed financial product choices made following financial sector reforms in the country. Most of the studies cited above model this relationship focusing either on developed economies or developing economies and less on dual economies. This is largely because of a shortage of data on the latter. This study attempts to fill this research gap. Additionally, only one product category has usually been analysed in the studies reviewed. In this study however, a range of products is analysed as well as product sources, since they are all available to the consumer, explicitly distinguishing between formal, semi-formal and informal products and sources. This is important for South Africa since the country is in the process of formulating a national financial education strategy to curb the rising household financial mismanagement evidenced partly by the over-indebtedness of households and low retirement savings (see Figure 1.2 in Chapter One). Moreover, the sophistication and popularity of South Africa's informal sector is cause for concern for the formal financial sector and the dynamics therein should be taken into account by policymakers as they pursue and enforce formal financial access strategies.

3.5. Analytical framework

Drawing insights from the theoretical arguments above, a utility maximizing agent has to make a decision whether to use formal financial products. It is assumed that such a representative consumer will make a choice of using regulated or non-regulated financial products and services in order to transact or access credit or plan for the future (investing) or even mitigate risk and uncertainty (Klapper and Singer, 2013). In this case, the choice process itself is guided by the individual's characteristics, their preferences, how knowledgeable they are regarding financial matters and the regulatory framework governing the products and services available to them. Moreover, costs (both time and monetary) associated with these products and services, and risk preferences will contribute to the decision to use formal or informal mechanisms (Honohan, 2008).

Thus a utility maximizing consumer i, with financial knowledge level FLX, will use a financial product/service *j* that maximizes his utility (U), for example, wealth or wellbeing, given a vector of individual characteristics (X). The general form is provided in the expression below.

$$U_{ij} = \left(\beta_j X_{ij}, \varepsilon_{ij}\right), \quad for\ i = 1,2,3 \dots, N\ and\ \ j = 1,2,3,..,J \tag{3.1}$$

where U_{ij} is the utility derived by individual i from consuming product *j*, *X* is a vector of explanatory variables (both choice-specific and individual-specific characteristics) and β is a k-dimensional vector of parameters to be estimated, containing the effects of the explanatory variables on the utilities, ε_{ij} is the standard unobserved disturbance term. Since the consumer will either maximize or not maximize (binary outcome), the residuals will also be bounded between zero and one. Following McFadden (1984), the error term (ε_{ij}) in expression (3.1) is not normally distributed. Thus, the statistical model is based on the probability that the utility from choice *j* is greater than the utility from choice *k.* That is:

$$P\left(U_{ij} > U_{ik}\right) \qquad \forall\ k \neq j \tag{3.2}$$

This framework can be operationalized using a logistic model within a multiple choice structure (Greene, 2003), given by expression (3.3):

$$P(y_i = j|X_i) = \frac{\exp(\beta_j X_{ij})}{\sum_{k=1}^{J} \exp(\beta_k X_{ij})} \tag{3.3}$$

Where: P (.) is the probability that the product/service chosen maximizes the consumer's utility; $j = 1, \ldots, J$ and the coefficients (β_j's) are K x 1, estimated by maximum likelihood to obtain marginal effects. Since the interpretation of these marginal effects can be challenging, especially in the case of dummy variables constructed out of categorical variables (Greene, 2003), the odds ratio can instead be computed or the predicted probability ratio (commonly used in related literature), which allow for a more flexible and meaningful interpretation, regardless of whether the covariates are continuous or discrete. This yields the expression below:

$$Odds\ Ratio = odds(y_i = 1|X_i)/odds(y_i = 0|X_i) = \exp(X_i\beta) \quad (3.4)$$

Expression 3.4 can be transformed to make interpretation even simpler, by taking logs on both sides so that the resulting expression 3.5 is a linear relationship between the log-odds, the parameters, and the explanatory variables.

$$\ln \text{odds}\ (y_i = 1|X_i) = X_i\beta \quad (3.5)$$

X will be zero if the odds ratio refers to the reference group and will equal one otherwise. Positive values above one indicate that higher values of the explanatory values increase the predicted probability of choosing a given category compared to the reference category. Coefficients of less than one indicate that the effect of higher values of the explanatory variable is to reduce the probability choice of a particular category, compared to the reference category (Greene, 2003; Wooldridge, 2010).

The probability of each option can then be predicted and compared to the actual frequencies to see how well the explanatory variables predict the outcome. The predicted probability should lie between zero and one, and there should be as many predicted values as the number of categories of the outcome variable. The predicted probability ratio (PPR), given by expression 3.6, is simply a ratio of the group's odds to the reference group's odds.

$$PPR = \left(\frac{odds_{group}}{odds_{reference\ group}}\right) \quad (3.6)$$

This theoretical framework provides the basis for the empirical model discussed in the next section.

3.6. Empirical Model for the Use of Financial Services

The use of financial services is modelled subject to an individual's level of financial literacy, given that the individual wishes to improve their financial welfare. This follows from the theory of rational consumer choice in the presence of discrete (multiple) options, which makes my estimates the probability that an individual selects a given financial product to maximise their well-being. Unlike the transportation modes of McFadden (1984), financial products serve different but closely related purposes. As such, the error terms are not independent across product categories, since a consumer can use more than one product. This challenge can be overcome by obtaining the possible product combinations.[63]

In this study, a consumer can use financial products from multiple sources (for instance formal or informal credit). By ranking the product sources so that *formal is preferred to semiformal which is preferred to informal, which is in turn preferred to non-use,*[64] and identifying the possible combinations, it is possible to ensure that the error terms are independently distributed as in McFadden, 1984. It is therefore assumed that a rational individual, who seeks to maximise his financial well being, will demand financial services and products, subject to his unobservable and observable characteristics (which include his level of financial literacy), as well as the products' characteristics. As stated earlier, the consumer chooses either to use or not use any of the product categories for transaction (TXN), credit and loans (CL), insurance (INS) or savings and investment (SI), in the formal, semi-formal or informal sectors. The informal channels are included given the history, product, and membership diversity of South Africa's informal sector. Thus the specification used follows Sahn, Younger and Genicot (2002), which is a set of ordered multinomial logits for the sectors (sector-specific effect) and for product categories (within-product effect) such that for each product option, the utility derived by an individual is given by expression (3.9).

$$U_{ij}(FLX, X, Z) = f(FLX_i) + D(X_{ij}, Z_j) \quad (3.9)$$

[63] While a two-level nested logit might be better suited to estimate the probability of making choices in such a setting, this could not be used on account of fewer observations for some of the product combinations at the lower levels, which yields poorly estimated proportions (see Cameron and Trivedi, 2010)

[64] See Klapper and Singer (2013) for a similar ranking of sources of financial services, although it is possible that consumers do not rank these sectors as such.

where FLX_i is the financial literacy index constructed in chapter two, which is a weighted score of the financial literacy level of the individual who chooses option *j*, X_i is a set of individual's specific characteristics that do not vary with the discrete choice, Z_j is a set of choice specific variables, the function D indicates the quality of financial product *j* and is a function of the characteristics of the product as well as those of the individual. According to Sahn, Younger and Genicot (2002), this functional form allows for separation of the individual's attributes from the choice-specific characteristics. Notice that even if the relationship was quadratic, a linear logarithmic function could still be recovered. Furthermore, the function D is assumed to be linear in the X_i and Z_j variables. The X_i variables include: age, education, marital status, income, occupation/source of money, province/region and risk preferences. The Z_j variables measure the quality of the product/option which include attributes such as accessibility (distance), affordability (cost in terms of user fees, charges), and appropriateness. The surveys used in this study consistently ask for distance to the nearest formal financial service point (banks or shopping centres where a financial institution is likely to be). Thus informal services are unfortunately not covered. This time measure of access is used as a proxy for the cost associated with formal products, as in Sahn, Younger and Genicot (2002). In this case, an increase in access time is expected to reduce demand for formal products in favour of non-formal alternatives. Similarly, an increase in the financial literacy of a consumer is expected to increase their demand for formal products and reduce the demand for non-formal products under the ranking considered in this study.

Since discrete choice models identify the difference $U_j - U_0$, where U_0 refers to the base utility, which in this case is the choice of non-use, the characteristics for the non-use option are normalised to zero. The regressions are then estimated along two dimensions: 1) Use by financial sector (formal, semi-formal, and informal)[65] and 2) Use by financial product category. Since utility is not observed, by estimating the probability that an individual chooses a certain option, it is assumed that the chosen option reflects the highest utility, compared to the available options. The estimated model is therefore given by expression (3.10). Attempts to include a policy or regulatory variable proved challenging, since one was not introduced during the period of this study. An

[65] See product classification in Appendix A12

attempt to isolate the Mzansi account as a proxy was futile because of very low frequencies of users in the dataset.

$$P(y_{ij}|FLX_i) = \alpha_j + \delta_i access_{ij} + \gamma_i FLX_i + \tau_i Risk_i + \theta_i FLX_i * Risk_i + \beta_i X_{ij} + \varepsilon_{ij} \quad (3.10)$$

Where; y_{ij} is the outcome of any of the three dimensions, for individual i choosing option j and the interactive term captures the combined effect of an individual's financial literacy level and risk type. Additional interactions are included to capture the combined effect of financial literacy and significant individual characteristics related to financial literacy. The covariates include both choice-specific and individual-specific socio-demographic characteristics, as defined below:

access	=	dummy variables for categories of distance measured in minutes: Less than 15 minutes (omitted category), 15-45 minutes, greater than 45 minutes
FLX	=	Continuous variable of the respondent's financial literacy level on a scale of 0 – 100 (construction discussed in Chapter 2)
Risk	=	Dummy variable of two categorical variables: i) 'In life, one must take risks': 0 if neutral, 1 if risk averse, 2 if risk-loving. ii) 'You hate owing money': 0 if neutral, 1 if risk loving, 2 if risk averse. (Neutral is the omitted category)
X	***=***	***is a vector of explanatory variables defined below:***
Gender	=	binary variable 1 if male (omitted category), 2 if female
Age	=	dummy variable for age in categories: 18-29 years (omitted category), 30-44years, 45-59years, 60+ years
Education	=	dummy variable for categories of education: No formal education (omitted category), primary school, high school, post-matric school
Income	=	dummy variable for categories of monthly income: up to R999 (omitted category), R1000-5999, R6000-9999, R10000-24999, R25000+
Race	=	dummy variable for population group: Blacks (omitted category), Coloureds, Indians, and Whites
Marital status	=	dummy variable for marital status: Single (omitted category), divorced, widowed, married/living with a partner

Province	=	dummy variable for province: Eastern Cape (omitted category), Free State, Gauteng, Kwa-Zulu Natal, Limpopo, Mpumalanga, Northern cape, North West, Western Cape
Area	=	Binary variable 0 if rural, 1 if urban. (Rural is the omitted category)

A series of multinomial logit models are estimated, since the outcome is categorical. For the product categories, four sub-regressions are estimated, one for each of the four product categories of: transaction; credit and loans; insurance (short and long-term); and savings and investments. Additionally, ordered logits are estimated to test the significance of the sectors as cut-off points. If the coefficients of the cut-offs are significant, then the sectors should not be merged into one category. The sectors considered as product sources are formal (regulated financial institutions, mainly banks and insurance companies); semi-formal (merchant institutions that have registered as financial service providers and exchange their goods for the equivalent of these services, such as retail stores) and informal (informal savings clubs, family and friends, mashonisas, or informal lenders).

3.6.1. Summary Statistics

Before presenting the estimation results, a summary of the data used in the analysis is provided. As mentioned earlier, the study makes use of the FinScope surveys for South Africa for the period 2003 – 2012. The analysis in this chapter is based on a pooled dataset of the cross-sections from 2005-2009. Only these years had consistent question framing and responses to enable the desired investigation in this chapter. Given that the data was described extensively in section 2.4.3, this section provides only a summary of the variables used in this chapter.

The pooled dataset, presented in Table 3.1, shows that 59% of the population use formal financial products compared to 38.9% who use informal financial products, while 27.2% do not use any financial product. Formal products comprised mainly transactions, semi-formal products were mostly credit and loans, while informal products were mostly short-term insurance. Consumers use formal and informal mechanisms equally for saving.

Table 3.1: Products Use, Risk-Attitudes and Access

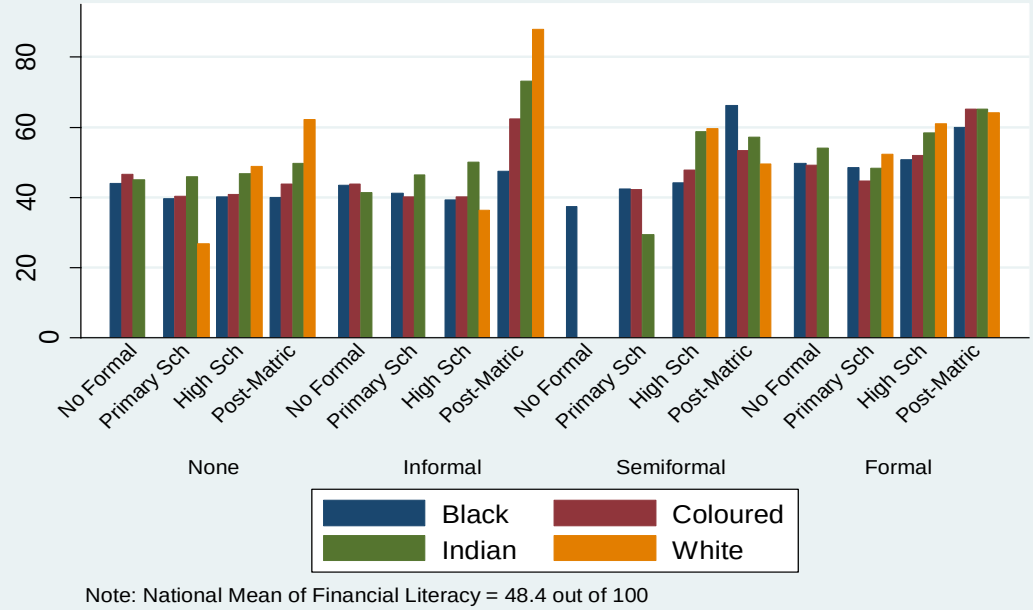
Variable	N	Mean	SD	Min	Max
Formal	18694	0.590	0.492	0	1
Semi-formal	18694	0.190	0.392	0	1
Informal	18694	0.389	0.488	0	1
Non-Using any Product	18694	0.272	0.158	0	1
Product categories					
Formal:					
Transaction	18694	0.575	0.494	0	1
Credit & Loans	18693	0.098	0.298	0	1
Short-term insurance	18694	0.233	0.423	0	1
Long-term insurance	18694	0.175	0.380	0	1
Savings & Investment	18694	0.128	0.334	0	1
Semi-formal:					
Transaction	7433	0.049	0.217	0	1
Credit & Loans	18694	0.147	0.354	0	1
Insurance	4941	0.266	0.442	0	1
Informal:					
Credit & Loans	18694	0.096	0.295	0	1
Insurance	7594	0.645	0.478	0	1
Savings & Investment	18694	0.124	0.330	0	1
Risk1: Hate owing money					
Neutral	18694	0.0370	0.189	0	1
Risk averse	18694	0.865	0.342	0	1
Risk loving	18694	0.0980	0.297	0	1
Risk2: Take risks in life					
Neutral	18694	0.111	0.314	0	1
Risk averse	18694	0.255	0.436	0	1
Risk loving	18694	0.635	0.482	0	1
Access					
Less than 15 minutes	18694	0.313	0.464	0	1
15-45 minutes	18694	0.524	0.499	0	1
Over 45 minutes	18694	0.0938	0.292	0	1

Notes: The table shows the weighted proportions of individuals using the various products and services in the formal, semi-formal, and informal financial sector. The formal transaction category includes the Mzansi account which was instituted by the Financial Sector Charter. Excluding this product reduces the formal transactions usage minimally to 54.8%

On average, individuals use one product in the formal financial sector. The majority were within 15-45 minutes of access to a financial service point. About 64% (26%) self-identified as risk-lovers (risk-averse). Responses to the two statement '*in life one must take risks'* and *'you hate owing money'* were considered as a measure of risk-attitude, which showed that as many as 87% (10%) claim to be risk-averse (risk-lovers) respectively. It is easy to see that the former is a more objective measure of risk attitudes.

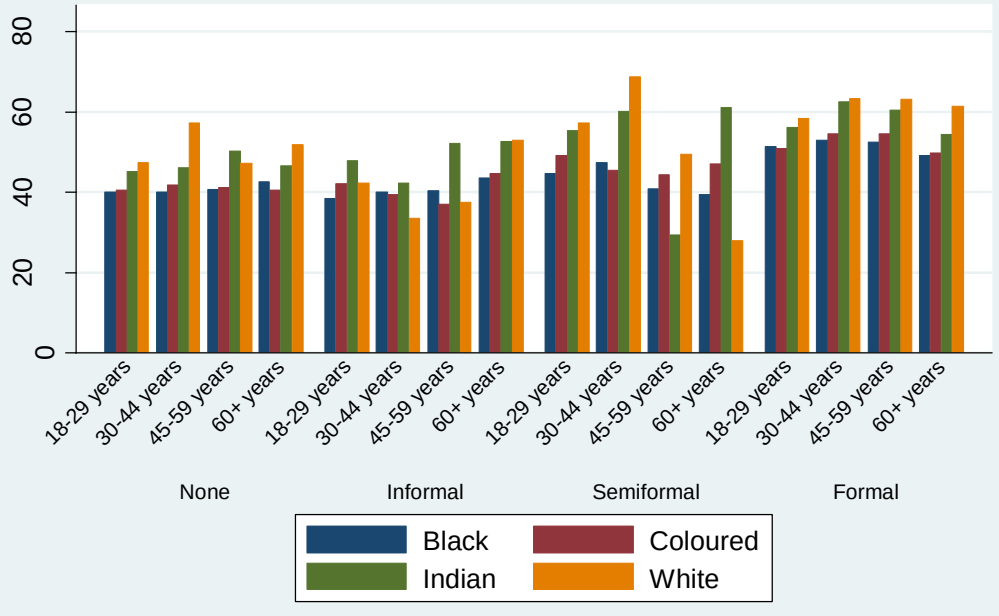
The study examines the interplay between the confounders of financial literacy discussed in the preceding chapter (education, income and race) and use of financial services. The idea is to establish the extent of the interactive effect of these variables compared to the individual effect of financial literacy in explaining the observed patterns of use of financial services. Figures 3.1 to 3.3 trace this interplay and there is a noticeable skewness of formal financial usage towards Whites who on average have high school and above education levels, and consequently high financial literacy levels. Blacks and Coloureds on the other hand use more informal services partly due to their low levels of formal education. Figure 3.3 shows that, while individuals earning R10 000 and above were most likely to use formal products, a good number were also excluded. Notice also that there were no Whites with 'No formal education'.

Figure 3.1: Financial Literacy, Education, Race and Use of Financial Services by Sector



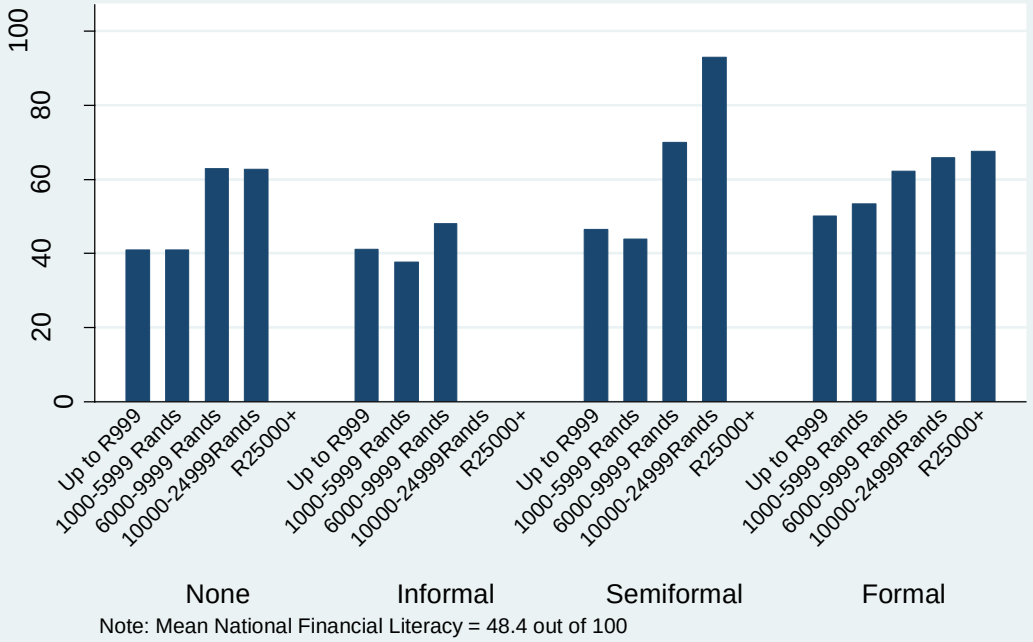
Note: National Mean of Financial Literacy = 48.4 out of 100

Figure 3.2: Financial Literacy, Race, Age and Use of Financial Services by Sector



Note: National Mean Financial Literacy = 48.4 out of 100

Figure 3.3: Financial Literacy by Income and Use of Financial Services by Sector



Note: Mean National Financial Literacy = 48.4 out of 100

A dual economic structure exists for groups in South Africa. That is, the country has a group that mimics those in developed economies and another that is akin to groups in the developing world. For this reason the exercise that was undertaken in the previous chapter is repeated and the sample divided by income quintiles. The lower three quintiles are combined as a low income group (LIG) while the top two quintiles are combined to form a high income group (HIG).[66] The idea is to try and accommodate views that associate financial literacy with consumer sophistication, as seen in high income economies, while also associating it with having a bank account, as it may be interpreted in low income economies.[67] Table 3.2 reports the mean differences in financial literacy levels between users of financial products across financial sectors- formal, semi-formal, and informal, for these two income groups in South Africa.

According to Lusardi, Michaud and Mitchell (2011), financially sophisticated consumers tend to demand and use sophisticated products (such as Individual Retirement Accounts (IRAs), stocks, bonds, and mutual funds). It is therefore expected that individuals in the HIG will have higher financial literacy levels and use more formal products. Similarly, the LIG are expected to make less use of the formal sector because of their presumed low levels of financial sophistication. These may hamper their ability to manoeuvre through the complexities of the formal financial sector, and ultimately limit their demand for formal financial products. Additionally, more use of formal savings and investment products is expected from the HIG on the one hand, and greater use of formal transactional products by the LIG on the other hand.

[66] See Appendix A10 for the characteristics of each group
[67] See Lisa and Xu (2012)

Table 3.2: Financial Literacy and Products Use by income group

		Low-Income Group		High-Income Group			Full Sample	
		N	Mean	N	Mean	Diff.	N	Mean
Overall Financial Literacy		8531	44.84	3984	56.97	-12.13***	12515	48.7
Sector:	Formal	3699	50.51	3799	57.79	-7.27***	7478	54.19
	Semiformal	194	46.07	16	47.93	-1.86	210	46.21
	Informal	1269	39.91	69	41.12	-1.22	1338	39.97
	Non-use	3369	40.40	120	41.52	-1.12	3489	40.44
Transaction								
	Formal	1886	56.06	1448	63.19	-7.12***	3334	59.16
	Non-use	6622	41.62	2535	53.42	-11.80***	9157	44.89
Credit & Loan								
	Formal	182	57.56	1156	62.98	-5.42***	1338	62.98
	Semiformal	756	54.67	731	59.59	-4.92***	1487	57.09
	Informal	545	38.97	207	44.71	-5.74***	752	40.55
	Non-use	7048	43.91	1890	53.62	-9.70***	8938	45.97
Insurance								
	Formal	307	59.63	682	63.78	-4.15***	989	62.49
	Semiformal	40	48.24	31	53.87	-5.63	71	50.70
	Informal	438	51.25	26	59.60	-8.35***	464	51.71
	Non-use	7746	43.88	3245	55.54	-11.67***	10991	47.32
Savings & Investment								
	Formal	414	56.43	1158	63.07	-6.64***	1572	61.32
	Informal	616	43.48	411	50.13	-6.65***	1027	46.14
	Non-use	7501	44.31	2415	55.20	-10.89***	9916	46.97

*Diff =mean (LIG) – mean (HIG); H_0: diff = 0, H_a: diff < 0; ***p<0.01, **p<0.05, *p<0.1*

Notes: The table shows the results of a two-sample t-test for differences in financial literacy levels of users and non-users of financial services by financial sector and product categories, for the low-income and high-income groups. The data is pooled for the period 2005-2009 and weighted to be nationally representative

The table shows that on average users of formal financial products and services in the LIG and HIG had higher than average levels of financial literacy, followed by the semiformal product users, while the informal product users had the lowest literacy levels. This pattern also cut across all product categories. The use of formal financial services stood at about 60% from a sectoral perspective, split 50:50 between the LIG and HIG. However, a closer look at the distribution by product category shows that use of formal financial services was more pronounced among the HIG, who also had higher than average financial literacy levels. This is in line with the 'duality and sophistication' assertion about this population. More evidence is shown by the level of formal products non-use among the LIG. This same group on average used more of the formal transaction products on the one hand, and informal credit, insurance and savings products on the other, compared to their

high-income counterparts. There was also considerably more use of formal financial products by the HIG especially in the credit/loan, insurance and savings product categories. Interestingly, even in the 'non-use' category, individuals in the HIG exhibited higher than average financial literacy, while their counterparts in the LIG had below average financial literacy. In line with our expectations, formal financial products and services users had, on average, higher financial literacy levels, compared to non-users and users of semi-formal or informal financial services. Overall, the mean difference in financial literacy between the LIG and HIG was statistically significant, although the difference between the financially excluded and informal users was marginal in the two groups. This picture might be indicative of potential voluntary exclusion and thus biased results on the role of financial literacy in product usage. The estimation results are discussed below.

3.7. Empirical Results

The results reported in Tables 3.3 to 3.5 in this section are based on model (3.10), identified in section 3.6. All estimations use up to 12,000 observations that are weighted to be nationally representative. Weights are benchmarked to Statistics South Africa's weights.

3.7.1. Sector-Level Estimates

Results for the sector-specific effect of financial literacy, reported in log-odds, are presented in Table 3.3. Recall that log-odds can be either greater than or less than one, where values of one and above reflect an increase in the probability, while values below one are associated with a decrease in the probability. These estimates can be interpreted as percentage increases or decreases in the use of financial products in relation to the omitted sector (Wooldridge, 2010).

The base model shows that financial literacy had the effect of increasing the log-likelihood of using formal and semi-formal financial sector products by 1.024% and 1.015% respectively, relative to not using any financial product. The log-likelihood decreases by 0.996% at a 10 per cent level of significance for the use of informal products (Table 3.2: Columns 1-3). The full set of results, presented in Appendix A13 show that Whites were 2.46% more likely to use formal products, compared to their Black counterparts, and were 0.454% less likely to use informal products. Having some formal education was associated with a greater likelihood of using formal than non-formal products, compared to having no formal education at all, and this high likelihood was greater at higher education levels. Finally, as expected, higher incomes are associated with being more likely

to use formal products and less likely to use informal products. Incorporating the interactions of these variables in the regression showed that the effect of the age-race interaction term was to slightly reduce the significance of financial literacy in the use of semiformal financial services and had no effect on informal product use across all racial groups and age brackets. However, Whites aged 45 and above were more likely to use formal financial services than their younger counterparts. It should be noted that, although the descriptive statistics revealed a high correlation between education, race, and product usage, an attempt to include the education-race interactive term was not possible because of empty cells for Whites and Indians with less than high school education. The rural dummy shows that urban dwelling was associated with a greater chance of using formal products by 1.48%, compared to rural dwelling. This result is in line with Annim and Arum (2013).

In Columns 4-6, the two measures of risk attitudes are incorporated. These were meant to capture the simultaneous effect of financial literacy and an individual's attitudes towards risk. The risk measure of agreement with *"in life, one must take risks"* marginally reduces the significance of using semi-formal products, with no effect on informal product usage. Except for increasing the log-odds of using formal products by the risk-lovers, risk does not seem to have an effect on product usage by sector, neither individually, nor interactively with financial literacy. On the other hand, using the risk measure of agreement with the statement *"you hate owing money",* appears to make the odds shift in favour of informal sector products, especially for the risk-lovers, and slightly for the formal sector products. But financial literacy remains statistically significant for the use of formal products.

Overall, both the risk-averse and risk-lovers show a preference for using informal financial sector products over formal sector products, and the effect is stronger for risk-lovers. The marginal effects of the interactive term between financial literacy and risk attitude shows that increasing financial literacy for the risk-averse and risk-lovers had no statistically significant effect on the use of non-formal services. However, the effect remained marginally positive and statistically significant for the use of formal sector products.

From a choice-specific characteristics point of view, being even 15 minutes away from formal financial service points was instead associated with increasing the log-odds of using informal

products by up to 1.25% at a 5% level of significance, and this likelihood increased to 1.5% at a 1% level of significance for financial access points that were 45 minutes away. There was no statistically significant effect in the semi-formal and formal sectors at this level of sectoral use.

The results for the rest of the covariates show some similarities with global patterns regarding use of financial services. For instance, compared to Blacks, Whites are more likely to use formal financial services while Indians are less likely to use informal services than to use no services at all. Individuals with post-high school education are less likely to use informal services, and are more likely to use formal products. Earnings above R1000 are associated with a negative likelihood of using informal products and a positive likelihood of using formal products, for earnings above R10000. Finally, urban dwellers are more likely to use formal financial services, compared to individuals in rural areas. Compared to men, women are more likely to use all forms of financial services available. These findings are similar to those for Kenya by Wachira and Kihiu (2012), Ghana and South Africa by Annim and Arun (2013) and for a number of countries as summarised in Xu and Zia (2012). Moreover, the pattern is similar whether use is aggregated at sector level or disaggregated at product level as shown, in appendix A13, A14 and A15.

Table 3.3: Multinomial Logit Estimates of Use of Financial Services by Sector

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Base Model			Risk= '*in life, one must take risks*'			Risk= '*you hate owing money*'	
Variable	Informal	Semi-formal	Formal	Informal	Semi-formal	Formal	Informal	Semiformal	Formal
Access (<15minutes)									
15-45 minutes	1.248**	1.053	1.049	1.254**	1.058	1.057	1.257**	1.072	1.055
	(0.133)	(0.220)	(0.085)	(0.134)	(0.221)	(0.086)	(0.134)	(0.224)	(0.086)
> 45 minutes	1.500***	0.452*	1.057	1.525***	0.462*	1.086	1.531***	0.460*	1.095
	(0.233)	(0.185)	(0.138)	(0.238)	(0.189)	(0.142)	(0.239)	(0.189)	(0.143)
Financial Literacy	0.996*	1.015***	1.024***	0.993	1.034**	1.020***	0.993	1.035**	1.019***
	(0.002)	(0.004)	(0.002)	(0.007)	(0.014)	(0.006)	(0.007)	(0.014)	(0.006)
(Neutral)									
Risk-Averse				1.125	2.643	1.338	1.124	2.819	1.337
				(0.395)	(2.049)	(0.467)	(0.395)	(2.192)	(0.469)
Risk-Loving				1.150	2.965	1.703*	1.150	3.111	1.711*
				(0.374)	(2.142)	(0.545)	(0.374)	(2.263)	(0.549)
Risk-Averse*				1.001	0.976	1.005	1.001	0.975*	1.005
Financial Literacy				(0.008)	(0.015)	(0.007)	(0.008)	(0.015)	(0.007)
Risk-Loving*				1.005	0.981	1.004	1.004	0.980	1.004
Financial Literacy				(0.007)	(0.014)	(0.007)	(0.007)	(0.014)	(0.007)
Constant	0.138***	0.001***	0.033***	0.131***	0.001***	0.025***	0.128***	0.001***	0.028***
	(0.038)	(0.001)	(0.131)	(0.050)	(0.001)	(0.010)	(0.049)	(0.001)	(0.011)
Observations	12,117	12,117	12,117	12,117	12,117	12,117	12,117	12,117	12,117

Standard Errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Notes:

i. The table shows multinomial estimates reported in log-odds, of three models of financial products use by financial sector.

ii. In the base model risk is not controlled for, but included in subsequent models.

iii. The reference category in all models is 'Non-use' of products, while for the rest of the covariates this is provided in brackets.

iv. Appendix A13 shows the full set of results, including the control variables.

v. The results are weighted to be nationally representative. The weights are bench-marked to Statistics South Africa for the period of the study.

vi. Results are also robust, using ordered logit for the significance of the financial sectors, as identified in the study.

Table 3.4: Multinomial Logit Estimates of Use of Financial Services by Product Categories (Base Model)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Transaction			Credit & Loan			Insurance		Saving/Investing	
VARIABLES	Semi-formal	Formal	Informal	Semi-formal	Formal	Informal	Semi-formal	Formal	Informal	Formal
Access (<15 minutes)										
15-45 min	1.048	0.961	1.141	1.079	0.866	1.161	0.934	1.281**	0.857**	0.946
	(0.500)	(0.052)	(0.105)	(0.076)	(0.081)	(0.128)	(0.249)	(0.123)	(0.063)	(0.072)
>45 min	0.550	0.609***	1.167	0.537***	0.323***	0.670**	0.865	0.695**	1.045	0.923
	(0.480)	(0.059)	(0.161)	(0.077)	(0.080)	(0.123)	(0.385)	(0.128)	(0.117)	(0.129)
Financial Literacy	1.004	1.031***	0.990***	1.023***	1.019***	1.021***	0.998	1.022***	0.998	1.026***
	(0.011)	(0.001)	(0.002)	(0.002)	(0.002)	(0.003)	(0.006)	(0.002)	(0.002)	(0.002)
Constant	0.000	0.024***	0.062***	0.006***	0.001***	0.005***	0.000	0.000***	0.038***	0.001***
	(0.000)	(0.005)	(0.017)	(0.002)	(0.001)	(0.002)	(0.000)	(0.000)	(0.009)	(0.000)
Observations	12,117	12,117	12,117	12,117	12,117	12,117	12,117	12,117	12,117	12,117

Standard Errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Notes:

i. The table shows the log-odds of multinomial logit estimates for four models of use of financial services by product categories and their sources.

ii. The base category in all models is 'Non-Use' of financial products while for the covariates they are provided in brackets.

iii. A full set of results, with control variables, is presented in Appendix A14.

iv. The data is weighted to be nationally representative, with weights benchmarked to Statistics South Africa

Table 3.5: Multinomial Estimates of Use of Financial Services by Product Categories (Full Model)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Transaction			Credit & Loan			Insurance		Saving/Investing	
VARIABLES	Semiformal	Formal	Informal	Semiformal	Formal	Informal	Semiformal	Formal	Informal	Formal
Access (<15minutes)										
15-45 minutes	0.957	0.964	1.146	1.088	0.894	1.167	0.928	1.269**	0.858**	0.947
	(0.468)	(0.052)	(0.105)	(0.076)	(0.084)	(0.128)	(0.247)	(0.122)	(0.063)	(0.072)
>45 minutes	0.447	0.616***	1.190	0.548***	0.338***	0.676**	0.853	0.684**	1.053	0.929
	(0.407)	(0.060)	(0.165)	(0.079)	(0.084)	(0.124)	(0.380)	(0.126)	(0.118)	(0.131)
Financial Literacy	0.950**	1.046***	0.975***	1.046***	1.044***	1.028***	1.002	1.025**	0.994	1.047***
	(0.023)	(0.006)	(0.006)	(0.008)	(0.015)	(0.009)	(0.021)	(0.012)	(0.005)	(0.009)
Risk-Averse (Neutral)	0.048**	1.971**	0.589*	4.425***	7.674**	2.153	1.928	2.610	0.940	2.174
	(0.069)	(0.668)	(0.179)	(2.052)	(6.616)	(1.114)	(2.159)	(1.802)	(0.258)	(1.127)
Risk-Loving	0.015***	3.665***	0.926	5.186***	9.533***	1.487	1.359	2.283	1.101	4.219***
	(0.019)	(1.150)	(0.248)	(2.276)	(7.855)	(0.732)	(1.477)	(1.518)	(0.276)	(2.035)
Risk-Averse*Financial Literacy	1.069**	0.991	1.020***	0.977***	0.973*	0.988	0.996	0.997	1.006	0.986
	(0.035)	(0.006)	(0.008)	(0.008)	(0.015)	(0.010)	(0.024)	(0.013)	(0.006)	(0.009)
Risk-Loving*Financial Literacy	1.080***	0.982***	1.014**	0.976***	0.974*	0.994	0.997	0.996	1.004	0.976***
	(0.031)	(0.006)	(0.007)	(0.008)	(0.014)	(0.009)	(0.023)	(0.012)	(0.006)	(0.008)
Constant	0.000	0.010***	0.082***	0.002***	0.000***	0.003***	0.000	0.000***	0.039***	0.000***
	(0.000)	(0.003)	(0.029)	(0.001)	(0.000)	(0.002)	(0.000)	(0.000)	(0.01)	(0.000)
Observations	12,117	12,117	12,117	12,117	12,117	12,117	12,117	12,117	12,117	12,117

Standard Errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Notes:

i. The table shows the log-odds of multinomial logit estimates for four models of use of financial services, one for each product category, incorporating the risk-attitudes of individuals.

ii. The base category in all models is 'non-use', while base categories for the risk variable is 'risk-neutral'. The risk measure used is a response to the statement *'in life, one must take risks*', which are coded as 'yes=risk-loving', 'no=risk-averse' and 'don't know=neutral'.

iii. Appendix A15 shows the full set of results, incorporating key covariates.

iv. The results are weighted to be nationally representative with weights benchmarked to Statistics South Africa.

3.7.2. Product-Sector Level Estimates

Turning to the within-product effect, Tables 3.4 and 3.5 present the multinomial results of the four models estimated for each product category. As in the previous cases, it is expected that an increase in financial literacy would favour the use of formal financial products rather than non-formal products. Other factors remaining constant, an increase in financial skills should highlight the benefits, of using formal products compared to non-formal products. It is also expected that the closer individuals are to formal product service points, the greater the likelihood of them using these products, and a simultaneous reduction in the likelihood of using non-formal products. Thus, this variable, in addition to the effect of financial literacy within a product category, should capture some form of switching behaviour between a particular formal and non-formal financial product.

Table 3.4 shows that financial literacy is associated with a statistically significant increase in the log-odds of using formal products in general, but equally so for semi-formal credit and informal insurance, while reducing the log-odds of using informal credit usage. Access to formal financial products 15-45 minutes away has the effect of increasing the log-odds of using only formal insurance products, and reducing the log-odds of using informal savings. Beyond 45 minutes, the effect is to reduce the log-odds of using formal transactions, formal and semi-formal credit, and informal and formal insurance. This has no significant effect on usage of the rest of the product categories or sectors. Thus, while a shorter travelling distance to a service point does not seem to increase formal product usage, greater time spent travelling leads to a statistically significant switch away from this sector.

Depicted in Table 3.5, responses to the statement *'in life, one must take risks'* are used as measures for an individual's risk-attitudes, plus as an interactive term between risk and financial literacy, as in the previous models. The results show that an increase in financial literacy had the effect of increasing the log-odds of using formal products across product categories. However, increasing financial literacy for risk-averse individuals had the effect of leading them to switch from formal to semi-formal transactions and from semi-formal to informal credit. Similarly, for the risk-lovers, there was a switch across all product categories except in the insurance and informal savings product categories where there was no significant risk-related effect. These results are obtained by computing the marginal effects of financial literacy and risk, where the magnitudes decline

slightly. This provides further evidence of the dampening effect of risk on the probability of financially literate consumers using formal financial products. This effect was greater for risk-lovers, which is consistent with the sectoral results. Finally, the effect of access to formal financial service points is similar to the results in the base model. It should be noted that these results incorporate the effect of other covariates of interest, like age, education and income, presented in Appendix A14 and Appendix A15.

Further analysis using an alternative measure of risk attitude, responses to the statement *'you hate owing money',* shows no major changes regarding the effect of financial literacy on use of formal products. There is a significant reduction in the use of semi-formal credit and formal insurance. These results however, seem to be closely related to the framing of the question.

The choice of a base category may have implications for the results in a multinomial regression (see Cameron and Trivedi, 2010). Variants of model 3.10 are therefore estimated using risk-averse individuals on the one hand and risk-loving individuals on the other, as base categories. The results do not change, especially in terms of level of significance of usage of formal financial services.

Although the results are not shown here, interacting financial literacy with age, gender, and race shows a dampening effect of financial literacy in product choice. For instance, the use of formal investment products only remains significant for those over 60 years of age. Compared to men, the combined effect of being a woman and financial literacy is an increase in the likelihood of using formal transactions, credit, insurance, savings products, and informal insurance. There is a decline in the likelihood of using informal credit and savings products. The racial effect was an increase among coloureds and Asians in the likelihood of using formal transaction and credit products, and a lower likelihood of using informal insurance, and informal savings especially for the Coloured group. It is worth noting that the effect for the Coloured group is similar to that for the Black group.

The above results are somewhat paradoxical in as far as the role of financial literacy in South Africa is concerned. In the remainder of this section however, an attempt is made to interpret them by product category. The results for the increased use of formal transactional products is as expected. However, since financial literacy introduces awareness of the operation of the system, users quickly work out the associated costs and benefits. They may therefore switch to using alternatives in the semi-formal sector that provide immediate rewards, such as cash-back payments, or loyalty

points which can be exchanged for merchandise, thus keeping their engagement with the formal sector to a bare minimum. This behaviour is what the risk measure seems to be capturing.

It should be noted however, that the utility derived from transactional products in the semi-formal sector is secondary utility, and unless an individual's demand for the first line products increases, the individual is less likely to demand semi-formal financial products. The intensified use can thus be interpreted as a cost-benefit analysis by the consumer of say, immediate rewards from retail stores versus the costs that might be associated with maintaining a cheque account. Indeed the effect of decreased use of formal transactions is significant, and in favour of an equally significant use of semi-formal transactional products, especially for the risk-lovers. This result represents involuntary uptake of financial products, rather than knowledge based demand. From a South African perspective, such an argument is probable, considering that financial reforms set out to increase access (see the Financial Sector Charter, 2003).

Although the effect of financial literacy on use of credit products is positive, it is dampened by an individual's attitudes towards risk, for both the formal and semi-formal sector in favour of informal credit, which emphasizes the dampening effect of consumers' risk attitudes. This result might reflect ex-poste credit or debt related knowledge acquired when consumers become credit active. That is, as more terminologies and credit operations are encountered, consumers shy away from formal credit. For instance, a consumer who is blacklisted or pursued by debt collectors would become familiar with debt related terminologies *ex-poste*.

Usage of insurance products is not responsive to the risk attitudes of individuals, and the interactive terms do not have a significant effect. These results could be indicative of either indifference when it comes to insurance products, or involuntary insurance. This product category is perhaps one of the most complex among formal products, and with an equal range of financial products and services available in the informal sector. For instance, funeral policies, which form 29% of formal insurance products in this study’s representative sample, are also available through burial societies or from undertakers, and these form over 90% of informal insurance (FinScope Surveys, 2005-2009). Case, Garrib, Menendez and Olgiati (2013) argue that the change in mortality patterns in South Africa, that claim middle-aged individuals, necessitate that contingency plans be put in place to cater for the cost of funerals and ensure continued support for the deceased's

family. This product can thus be viewed as a necessity from a societal perspective and the choice of product source becomes a matter of affordability, and the role of financial literacy in this choice is minimal.

The involuntary perspective can be linked to formal and semi-formal credit services, which often come with mandatory insurance. For instance, vehicle financing requires that the vehicle be insured, at least until it's fully paid off. Personal and consumer loans carry a credit insurance fee. Cell-phone companies make provision for insuring contract phones. That the value of financial literacy is not great for uptake of this product is indicated in Table 3.3 where users of informal insurance were as financially literate as users of formal insurance products. Use of formal insurance products might once again reflect involuntary insurance on other services, like formal or semi-formal credit or simply a matter of affordability associated with high income. Informal insurance use could be voluntary and for low income earners, driven by cultural or societal norms.

The significance of financial literacy for the use of informal savings product is not surprising. Klapper and Singer (2013) find that, out of the 36% of Africans who reported saving, only 13% did so at a formal financial institution. The results of this study seem to suggest that saving and investment practices in the informal sector are guided by factors other than financial literacy, such as habits. For instance, if an individual is accustomed to using rotating savings clubs (ROSCAs) or stokvels (which are popular in South Africa), even financial education on the dangers of saving informally might not change their attitude towards informal savings mechanisms. Indeed, the summary statistics reveal that the proportion of people saving informally is the same as that of those saving formally, indicating the popularity of the informal savings sector. This behavioural pattern is akin to '*home bias'* in the behavioural finance literature, where investors prefer domestic (local) markets (mechanisms) even when alternative mechanisms promise better returns (Fromlet, 2001). This is evidence of the irrational and illogical patterns covered in behavioural economics theory.

Finally, for choice-specific characteristics, the expectation is that shorter travel durations to the nearest formal financial service will have the effect of reducing the log-odds of using non-formal products. The insignificance of the log-odds of using most of the products, even those in close proximity confirms the earlier argument that the motivation to use formal products may lie outside

of conventional factors such as financial knowledge, and accessibility of formal sources. Indeed, evidence from recent studies conducted using the Findex dataset shows that factors such as user fees, and documentation prevent many financially excluded individuals from using formal financial services (Demirgüç-Kunt and Klapper, 2012).

The above results are empirically supported by studies in both developing and developed economies. In the section that follows, an investigation is made as to whether the proxy used to capture choice-specific characteristics compromised the results in any way.

3.7.3 Robustness checks

This section looks at the robustness of the results obtained in the analysis thus far. First, a test is conducted to establish whether there was an omitted variable problem relating to the quality and characteristics of financial services and products. To determine the extent of the potential bias arising from this omission, model 3.10 is re-estimated excluding the alternative-specific characteristics, which in this case are represented by the variable access to formal financial service point, measured in minutes. The idea is to assess the difference in the coefficients estimated with the exclusion of this variable. The estimation results reported in Appendix A17 show that there was hardly any change in the estimated coefficients with the exclusion of the access variable. Two arguments can be advanced for this result. The first is that the quality of financial services from the formal, semiformal, and informal sectors was not important in the estimates. The second is that the proxy used was poor and the use of other measures, such as direct costs or fees relating to products in each sector, may have led to a better assessment of their impact.

Estimates in the preceding sections show that higher incomes are significantly associated with formal product usage. A further investigation is therefore undertaken of using income as a proxy for the costs associated with services offered by the different sectors. Excluding this variable from the regressions increases the effect of financial literacy. This might explain why the exclusion of access to formal financial services as a variable, while retaining the income variable did not alter the results drastically. In fact, exclusion of both further increased the effect of financial literacy.

There are concerns that policy recommendations may become challenging if a continuous index is used as an explanatory variable. In this regard, model 3.10 is once again re-estimated using an aggregation of the components of the index variables into two groups: Financial awareness variables, and financial policy related concepts. In the former, variables included were: Knowledge of how interest rates work or are calculated, knowledge of financial products and knowledge of how to draw up a budget. Policy related variables included National Credit Act, and credit bureaus. Although the full set of results are not shown, they reveal that knowledge of financial policies was less significant for consumer's product choice than financial awareness.

3.8 Summary and Concluding Remarks

This chapter covers an investigation of the role of financial literacy in the use of financial products and services in South Africa. The analysis uses a pooled dataset from the FinScope surveys for the period 2005-2009. Discrete choice models are used to control for possible product and financial sector choices available to individuals. The approach of Sahn, Younger and Genicot (2002), akin to that of McFadden (1984), is used to control for both individual-specific and choice-specific characteristics. Two levels of models are estimated to allow for as much disaggregation of product and services usage as possible. These levels are sector-level use and product-level use.

Based on the aforementioned methodology, these results show that there is greater use of formal products by consumers with financial literacy levels above the national average of 48.4. However, this effect is dampened by the risk attitudes and age of consumers, and is amplified by characteristics such as gender and race. Consumer's risk attitudes led to a subtle switch between formal and informal credit products, but this had no significant effect on insurance products, as both formal and informal sector insurance products were used. This result suggests that while formal product users exhibit an understanding of the relevant financial concepts, formal use might also be a reflection of involuntary use of insurance arising from demand of other services such as mortgage and vehicle finance, and credit insurance. The informal effect might represent a need by low income groups that are serviced by the informal sector. While access to financial service points is crucial for formal financial sector participation, the results of this study are not conclusive with regard to choice-specific characteristics. It would appear that higher income levels influence the likelihood of formal product usage more than does proximity to financial service points.

There is compelling evidence that financial literacy is associated with the use of formal financial products in South Africa. However this knowledge alone is not sufficient and probably not the major driver of demand for such products. Indeed the dynamics revealed in this study suggest that other factors could be the presence of an equal product range in the non-formal financial sector, policy and regulation related factors, or factors related to cultural dimensions of individualism vs collectivism (Hofstede (2001)) and uncertainty avoidance (such as belief systems, cultural practices, and social networks). These may have either interactively or individually influenced financial decisions by South Africans over the period of the study. This argument could not be empirically investigated, however, because of limitations related to the data used.

The effect of risk in this study shows that South Africans might not be sophisticated enough to take advantage of the benefits of formal products in the South African financial system. This result differs slightly from the findings of Cox, et al. (2011) for Dutch households. It is therefore possible that the effect of financial literacy picked up in the study was more the result of financial sector reforms in post-Apartheid South Africa during the period 2005 -2009, such as the enforcement of financial access which led to individuals learning by doing. This argument is corroborated by responses to the questions used to capture financial literacy, discussed in the previous chapter, and the results obtained by the incorporation of a risk measure.[68] The effect of increased use of formal financial services is not uniform for all product categories, however. The results show an overall positive effect of financial literacy for use of transactional and savings products but no significant effect for insurance and credit products, nor for informal savings. The decline in the log-odds of using saving and investment products reflects, to some extent, the poor saving culture of South Africans. Indeed, the period of this study was characterized by the lowest rate of household savings in post-Apartheid South Africa, of close to -0.2% of households' disposable income (SARB, 2012). However, the positive association with use of non-formal products suggests that the effect of factors other than financial skills is stronger in determining the use of informal financial products in South Africa. These results are robust when using an ordered logit. The directions are consistent,

[68] Notice that from Table 2.1, individuals exhibit knowledge of some concepts but not of other closely associated concepts. For instance one could have learnt about 'bad debt' as a victim of delinquency and not know how interest rates work or credit bureaus function or how the 'National Credit Act' regulates debt related transactions.

and the sectors defined in this study were statistically significant, implying that the products therein are unique.

Thus the presence of a vibrant informal financial sector, and low levels of trust in the formal financial system have the potential to crowd out the use of formal financial products regardless of the financial literacy of the population. Moreover, the less poor were less likely to use informal financial products. Whites, individuals with formal education, and 30-59 year-olds were more likely to use formal products. In most cases (except for savings), the gender dummy was insignificant with regard to determining use of formal products.

These results suggest that perhaps the availability of low-cost formal insurance products could increase the likelihood of uptake by the low-income group currently using informal insurance products. A financial education programme might require that the content is function-specific or product-specific, to target the needs of the different demographic groups, as opposed to a one-size-fits-all curriculum. For instance, targeting Blacks and Coloureds would increase the likelihood of these groups using formal transaction, credit, and insurance products. Finally, there is some evidence that knowledge of general financial concepts might increase the use of financial products more than knowledge of financial policies.

Chapter Four

Finance and Welfare Disparities in South Africa, 2005-2010: A Recentered Influence Function Decomposition Approach

4.1. Introduction

The preceding chapter presented evidence that, while financial literacy is associated with use of formal financial services, consumers might opt for particular non-formal services even when they are financially literate. The Apartheid era led to the creation of informal financial mechanisms that met the financial needs of those excluded from formal financial structures. It is possible, therefore, that these mechanisms came to provide sufficient utility for these users. For instance, there could be welfare gains that compel users of non-formal products to remain loyal to such mechanisms, and make them hesitant to embrace formal financial services available in the reformed post-Apartheid financial sector. This chapter therefore investigates whether there are significant welfare disparities between users and non-users of formal and non-formal financial services.

The chapter begins with a brief overview of the debate about the benefits of access to and use of finance (formal and non-formal financial services) in section 4.2. This is followed by details of the theoretical framework adopted for the study in section 4.3. Empirical studies related to the focus of this study are highlighted in section 4.4, which forms the basis of the choice of the welfare variables discussed in section 4.5. Access to and use of formal finance is revisited in section 4.6 as being synonymous with financial inclusion. The empirical strategy is discussed in section 4.7 and the empirical results are presented and discussed in section 4.8. Section 4.9 concludes the chapter.

4.2. The Finance and Welfare Debate: An Overview

The relationship between finance, welfare and poverty is an ongoing debate.[69] It is argued that households need mechanisms to make payments, mitigate risk, obtain credit and loans to solve their credit constraints, save and make investments, and make financial provision for their old age.

[69] See Beck, et al., 2007; Beck, et al., 2009; Demirgüç-Kunt and Levine, 2009; Greenwood and Jovanovic, 1990; Innovation for Poverty Alleviation

Households will improve their welfare if they can access finance, and improve the prosperity of their communities, with spill over effects into the economy (Hawkins, 2009; Cull, Ehrbeck and Holle, 2014).

2.5 billion people remain unbanked globally, and almost half a billion are projected to remain trapped in poverty.[70] Poverty reduction strategies focus on meeting basic needs, such as food and health care. However, sustained long-term economic progress at both household and economy-wide levels depends on access to financial products and services. These allow individuals and firms to move away from short-term decision making, to an inter-temporal allocation of resources. Access to financial services is therefore posited to be a fundamental driver for improving the livelihoods of the poor, by increasing household income and resilience in an increasingly shock-prone global economy (Karlan and Zinman, 2010; CGD, 2009; Yunus, 2006). Thus the global financial inclusion drive aims at ensuring that formal financial services and products are available and affordable to those who need them, to enable them to live better lives and effectively contribute to the economic growth of their countries.

Mechanisms to improve access normally include increasing financial depth by putting in place financial intermediaries, or by reducing the cost of operating a bank account or acquiring credit. It is argued that these mechanisms have the effect of redistributing income between income quintiles (Beck, et al., 2007). However, these authors point out that the distributional effect is a function of need versus demand for financial services, as well as the purpose for which services are accessed. For instance, loans advanced to a wealthy entrepreneur might have a higher redistribution effect than those advanced to a less wealthy entrepreneur. There are also arguments that the relationship between access to finance and redistribution is non-linear in that, in the early stages of financial deepening or access to financial services (such as credit), the benefits accrue to the rich such that the incomes of the high income quintiles increase at the expense of the low-middle income groups, until a turning point (Greenwood and Jovanovic, 1990; Haber, et al., 2003; Lamoreaux, 1986).

[70] This figure was for 2013 and the projection was for 2015. The statistics were still valid by the time of this study

Political theorists, however, argue that deep and competitive financial markets (as seen in South Africa) can allow new entrants (enterprises and individuals), with less dependency on political connections (Rajan and Zingales, 2003) while reducing problems associated with adverse selection and information asymmetries that push the cost of acquiring finance too high (Petersen and Rajan, 1995).

In light of these arguments, policy makers have adopted various mechanisms to improve financial access to encourage use of financial services by those at the lower-end of the income spectrum. Common among the mechanisms is reducing the cost of operating a bank account or acquiring credit.[71] More direct interventions include "Banking the Poor" through "Government-to-People" (G2P) payment systems whereby monetary transfers are made to specific groups with a caveat that they receive their funds through a formal financial pay-point. This addresses concerns raised by the World Bank's Composite Access Indicator that financial inclusion is out of reach for those living on less than $2 per day.[72] What proportion of the observed welfare gains can be attributed to an individual's access to or use of financial services and products? At what point in the distribution, and for whom is the gain significant? To answer these questions, a theoretical explanation for the possible transmission mechanism will be identified.

4.3. Theoretical Model

This study is situated within the theory of welfare economics, incorporating a consumer's utility, or units of happiness, which is crucial in assessing well-being, and therefore enters the social welfare function for policy recommendations. It is assumed that providing access to finance will cause consumers to reveal their preferences either in actions (such as affordability of housing, health care, education, wealth accumulation) or in words, such as feelings of happiness, sense of worth, (Knight and Gunatilaka, 2014). Unequal access to finance is therefore a potential source of inequality in the consumption of basic goods and services by consumers, with implications for

[71] For instance, in India, Pakistan, Bangladeshi, Vietnam, Thailand, Sri Lanka (Hannig and Jansen, 2010) and South Africa's Mzansi account

[72] For instance, Brazil's Bolsa Familia, Columbia's Familia en Accion, Mexico's Oportunidades, and South Africa's Old Age Pension and Child Care support (Bold, Porteous and Rotman, 2012)

society's welfare and overall poverty. This relationship can be represented by the following reduced welfare function:

$$W = f(I(USE), X) \quad (4.1)$$

where; I is a measure of inequality (for example the Gini) that is presumed to arise out of unequal access to finance, USE is a measure of use of at least one service from the formal financial sector, and X is a vector of covariates. Controlling for the consumers' socioeconomic and demographic characteristics as covariates, such a vector contains variables that in themselves might be influenced by welfare. Similarly, an individual's welfare status might determine their use of financial products and services. Moreover, the use of financial services might be a matter of choice or a policy initiative rather than determined by the characteristics of an individual. These issues therefore present two problems: potential reverse causality, and selection bias. To test for the net effect of the use of financial services therefore requires an econometric approach that controls for the choice to use, given an individual's initial characteristics. These issues are dealt with in the discussion on the development of the empirical model adopted for this study in Section 4.7. The empirical work on the subject will now be examined.

4.4. Review of Related Empirical Literature

Empirical evidence of the relationship between finance and welfare is mixed. The Indian social banking experiment shows that the expansion of credit and savings facilities to the rural poor can improve the head count poverty ratio (Burgess and Pande, 2005). The authors argue that even though they use wages of agricultural workers as a measure of welfare for the poorest group in the country, their results were robust at an aggregate poverty level. Implicit in this argument is the fact that the benefits of access to finance have an income and regional dimension such that there are welfare difference between rural and urban users and non-users of formal finance.

In a cross-country analysis of 52 developed and developing countries, Beck, Demirgüç-Kunt and Levine (2007) find that financial development disproportionately improves income distributions in favour of the poor. Using the income of the poorest quintile, the Gini coefficient and the standard deviation of the income distribution as measures of welfare, the authors find that in countries with better developed financial intermediation, the incomes of the poorest quintile grow faster than

the gross domestic product (GDP) per capita of their less developed counterparts, even after controlling for endogeneity. The authors argue that they were able to replicate their results using infant mortality and school enrolment rates as social measures. But estimates from about 160 countries on adults using formal financial services show that, while econometric results point to an association between access to finance and lower inequality (measured by the Gini coefficient), there is less evidence of causality between this access and lower poverty headcount (Honohan, 2008). Khandker and Samad (2013) follow micro-credit recipients in Bangladesh for a period of 20 years, and found significant welfare gains (for example: increased income and consumption, accumulation of assets, investment in children's schooling) resulting from microcredit participation, with a gender bias in favour of women. They add that the benefits of borrowing outweigh accumulated debt, thus increasing households' net worth and reducing poverty and debt-asset ratio. Their results, they argue, are robust after controlling for heterogeneity and participation or selection bias. However, group dynamics in the microfinance model might play a role in financial outcomes, the absence of which might lead to different results at an individual level of financial access. This thesis focuses on the individual and not groups of consumers or households and therefore the results might differ from those of the aforementioned studies.

In Malawi, Diagne and Zeller (2001) find that providing micro-credit to poor smallholder farmers to raise their incomes through purchase of seeds, fertilizers, and other inputs for maize and tobacco, had the effect of lowering net crop income for the participants compared to their non-participating counterparts. They argue that conditions surrounding access to financial services must reflect the actual opportunities and constraints faced by the poor, otherwise the results might not be welfare enhancing.

A South African randomised experiment conducted by Karlan and Zinman (2010) partly addresses some of the concerns surrounding access, by relaxing risk assessment procedures to entrepreneurs. The experiment categorised credit as ‘consumer credit’ as opposed to ‘entrepreneurial credit’ which is seen to be unproductive. The main focus of the experiment is the risk preference of the borrower. Their results show that marginal loans under the new classification of loans produced significant economic and subjective outcomes to borrowers (for instance, job retention, increased income, food consumption-quality and quantity, household decision making and mental outlook). They, however, find negative effects mainly on mental health, due to stress.

Despite this, the authors argue that the net effect of credit expansion is indeed positive if borrower profiles, especially of the poor, who are considered high risk, are properly scrutinized and contracts drafted in accordance with these profiles. Their earlier study in a similar setting (see Karlan and Zinman, 2009), points to information asymmetry which they find to play a role in borrower default rates.[73] The implication is that individuals might opt out of using financial services if they are poorly assessed or if they believe that they might be worse off following access to inappropriate financial services. Even at the same level of financial access, one therefore would expect to see different welfare outcomes, since consumers will behave differently in response to the information they receive and based on their inherent preferences and risk profiles. This argument is advanced by the behavioural and financial economists discussed in the third chapter. Thus, under different circumstances, individuals will only opt for those financial products or services which address their needs.

It is easy to see that welfare differences following access to finance discussed in the studies highlighted above are related to the measure of welfare adopted and the financial products used. It is argued that income is often reported with high measurement error or it is often missing in household surveys. Hence it might produce biased results if it is used as a proxy for welfare. Furthermore, as in the case of the Indian social banking experiment (Burgess and Pande, 2005), the benefits might be greater in the short-term, with disproportionate benefits for different groups in society. Indeed, there seems to be consensus of non-linearity in the welfare benefits from the use of financial services based on the individual's characteristics. This raises questions as to whether the results would be consistent if non-monetary measures of welfare are considered, or if individuals hold more than one product simultaneously, and if these products are from formal and non-formal sources.

These arguments form the basis for a South African investigation adopting more subtle but complementary measures of welfare. This includes accounting for the various sources of financial services, and multiple product holding, identified in chapter three. Methodologically, this study attempts to mimic experimental literature since experiments might offer more reliable results,

[73] Borrower default is a sign that the borrower is facing some challenges and cannot therefore be considered to be well-off at least during the time of indebtedness

especially where sensitivity and robustness checks could be hampered by the absence of panel data. The next sections discuss the methodological approach adopted in this study.

4.5. Measuring Welfare

The Oxford dictionary defines 'welfare' as "the health, happiness and fortunes of a person or a group".[74] This definition points to a multi-dimensional concept and one that can pose a challenge to achieve, as Blundell, Preston and Walker state:

*"The measurement of household welfare is one of the most compelling yet demanding areas in economics. To place the analysis of inequality and poverty within an economic framework where individuals are making decisions about current and lifetime incomes and expenditures is a difficult task, made all the more challenging by the complexity of the decision-making process in which households are involved and the variety of constraints they face. [.....] there is a strong relationship between theoretical concepts from microeconomics and the appropriate use of micro data in evaluating household welfare" (*Blundell, Preston and Walker, 2009*: pp 1-50)*

Given this multi-dimensionality, this study moves away from using income or other money-metrics and macro measures, because of their potential heterogeneity. Evidence from the field experiments alluded to earlier, as well as literature on the subject, suggests that there are 'softer' proxies for well-being (see Ashraf, et al., 2010; Karlan and Zinman, 2010; Khandker and Samad, 2013) associated with the individual's capability to be or to do things of intrinsic value. In this study, and in line with available literature, welfare is discussed along two dimensions: Well-being and wealth.

Several frameworks have been advanced to measure well-being. The OECD well-being framework proposes a comprehensive reconciliation of indicators from the development literature[75] categorised into two broad domains: Material conditions, and quality of life (see Boarini, et al., 2014). According to this framework, the following dimensions are important in society and are a source of disparities in individual well-being.

[74] Synonyms include: well-being, good health, happiness, comfort, security, success, protection, safety, prosperity

[75] See summary of studies in Alkire (2007) and Skidlesky and Skidlesky (2012)

i) Consumption possibilities – this includes food and clothing. It is assumed that an individual has sufficient income or assets that can be transformed to enable consumption.

ii) Housing and related infrastructure – related to access to shelter and such facilities as clean water, sanitation, electricity, fuel, and communication connectivity

iii) Work – both in formally legislated and non-legislated or unregulated activities that can be used to support one's well-being. This dimension relates to the working conditions and relationships that bring economic security.

iv) Health – related to access to health care, longevity, and morbidity

v) Education and skills – including access to education, school enrolment and graduation.

vi) Social connections

vii) Empowerment and participation

viii) Vulnerability – such as living in disaster prone areas or protection against social and economic risks

ix) Life evaluations, feelings, and meaning – which feed into the measurement of subjective wellbeing

x) Environmental conditions

This framework can be adapted to different country settings by assigning different weights to the above dimensions. Another welfare framework is the Alkire Foster method developed by the Oxford Poverty and Human Development Initiative.[76] This Multi-dimensional Poverty Index (MPI) measures the extent of deprivation. In many poverty and inequality studies, the extent of deprivation has been used as an indication of welfare.[77] This is constructed from two components, the multi-dimensional headcount ratio, and the average intensity of poverty ratio. An individual who is deprived in more than three of the indicators of these two components shows a high prevalence of being poor (Finn, Leibbrandt, and Woolard, 2013). If being poor is synonymous with inadequate well-being, then a measure of deprivation can be a proxy for measuring well-being.

[76] See Alkire and Foster (2011)

[77] See for instance Alkire and Housseini (2014); Finn, et al., (2013); Noble, et al., (2000); Noble, Zembe and Wright (2014); Woolard and Leibbrandt (2009). Appendix 17 shows a possible framework for the construction of a Multi-dimensional Poverty Index

While these frameworks highlight consensus on the qualitative and quantitative dimensions of welfare, they also caution that operationalisation of these approaches is country-specific. In this regard, this study attempts to capture these two dimensions by constructing two measures of welfare from the indicators that are provided by this framework and that are closely aligned to the subject of this study, that is, use of finance. The literature discussed in the preceding chapter shows that one financial outcome is wealth accumulation. Indeed, access to finance provides an opportunity for acquiring durables or assets, either through credit arrangements or savings. In this regard, an asset index is constructed in this study. Assets are a component of the 'material conditions' domain in the OECD wellbeing framework, and they are also part of the 'living standards' domain in the MPI framework. However, these assets are not corrected for net value, given that it is possible to acquire them on credit. The second measure of welfare is the wellbeing index which is constructed from the rest of the dimensions provided in the frameworks. The justification for this separation is that the post-Apartheid Reconstruction and Development Plan referred to in the introductory chapter implemented a number of basic services for housing, electricity and energy, education, water and sanitation. Combining possession of assets and access to these services in one welfare measure might mask their true relationship with the financial sector reforms. The construction of each of these measures is now discussed in the sub-sections below.

4.5.1. The Well-Being Index

In the FinScope surveys used for this study, respondents were asked to respond on a scale of 1-5, where 1= 'often'; 2= 'Sometimes'; 3= 'Rarely'; 4= 'Never' and; 5= 'Don't know', t to a set of indicators, summarised in Table 4.2. A well-being index (WB) was then constructed by summing responses to these indicators of deprivation for the period 2005-2010. The question of interest was framed as follows: *"In the last 12 months, how often have you or your family....."*

i. *gone without enough food to eat*
ii. *felt unsafe from crime in your home*
iii. *gone without medicine or medical treatment*
iv. *gone without cash income*
v. *gone without clean water to drink or cook*
vi. *gone without shelter*
vii. *gone without electricity in your home (apart from power cuts)*
viii. *gone without fuel to heat your home or cook food*

These indicators also compare relatively well with those identified in the MarkData Survey (1995) by Moller and Sarris (2001) used in a study on South Africa. Following Finn, et al. (2013), responses to the above question are said to be individual-specific and they have equal probability. It is thus safe to assume a linear and additive relationship between the variables and the position by individuals between the lowest and the highest scores. This approach assumes that all questions are weighted equally and the well-being index is thus constructed according to the expression below:

$$WB_i = \sum_{j=1}^{J} x_j \qquad (4.2)$$

Where; i= 1, 2,..., N; j is the number of deprivation questions asked and x is the response or score for each respondent. The higher the score for an individual, the more well-off the individual. It is therefore desirable to have a high score and we assume that this is the case for an individual who has access to financial services and products. Implicit in this argument is the assumption that well-being is a function of use of financial services and products. Other confounders of well-being include age, income, education, region/location, gender, marital status, and number of children (Blaauw and Pretorius, 2013; Bookwalter and Dalenberg, 2004).

4.5.2. The Asset Index

This variable is constructed from an individual's possession of assets. This is based on the argument that asset counts might be better at capturing the long-term welfare of individuals or households. This is because income or expenditure variables not only exhibit substantial measurement error but are rarely recorded in many surveys. The use of assets to measure welfare is also widely used, such as in the Demographic and Health Surveys (DHS), in which an asset index is constructed using the PCA method (Gwatkin, et al., 2000a; McKenzie 2003). The choice of assets listed is strongly aligned with the choice of assets in the DHS. These assets should not be confused with financial assets as the latter form part of the measure of financial use discussed in the next sub-section.

An asset index is constructed using a weighting method and households or individuals are ranked according their scores. Simple summing across assets is often criticized on the basis of assuming equal weights for the items considered, which often differ in value as well as in their distribution in the population. This is a function of the utility derived by individual consumers. A weighting

procedure such as factor analysis is preferred, because it takes into account the underlying correlation between these items and their distribution in the population.[78] A critique often raised against this approach is the negative weights it attaches to rare and unique items that are valued differently among individuals or across different geographical locations (for example between urban and rural areas). The result is that individuals or households possessing such items often get a lower ranking or are considered worse-off than those who possess nothing at all.[79]

In recognition of this criticism, this study makes use of Banerjee (2010)'s uncentered version of the principal component in which every variable is divided by its mean (in the binary variable case, p_i) and then the first principal component of the cross-product matrix is extracted. Thus the first principal component of this "uncentered PCA" procedure is considered as the asset/wealth index. According to Banerjee (2010), this index is guaranteed to give an asset index that obeys the principle of monotonicity, that is, it gives non-negative scores with an absolute zero (hence there is no need to re-scale), and it can be used to calculate Gini coefficients even when all variables are binary variables. The Gini calculated in this way (using continuous variables) also obeys all the standard inequality axioms such as showing an increase in inequality if a "correlation increasing transfer" is affected. These advantages are crucial for this study where the focus is related to inequality. The individual's ranking on the welfare distribution scale is also crucial for the interpretation of results for policy, as well as for the method of analysis employed.

The wealth index is constructed according to the following expression:

$$WLT(S) = [1 - \sum_{i=1}^{n}(2r_i - 1)/n^2]y_i \qquad (4.3)$$

Where; WLT is the wealth index, S is an *nxm* matrix such that *A = A(S)* is a scaled version of S obtained by dividing each member of S by the mean of the relevant column, $y_i = (Ax)_i, i = 1,2,\dots,n$ (where x is the first Eigen vector associated with the maximal Eigen value of the non-negative square matrix $A'A$ normalized so that its components sum to 1) $and\ r_i(i = 1,2,\dots,n)$ is the rank of individual *i* in the re-arrangement of the vector $y = (y_1, y_2, \dots, y_n)$ in non-increasing order. The items used to construct this index were selected following similar studies such as in the

[78] See Filmer and Pritchett (2001); Gwatkin, et al. (2000a); Vyas and Kumaranayake (2006)
[79] See Banerjee (2010) for a mathematical proof of this argument

Demographic Household Surveys. As in the case of the well-being index, it is desirable to have a high wealth score. It is assumed that this is the case for users of financial services and products.

4.6. Measuring Use of Financial Products and Services

Access to and use of financial products and services in this study was discussed in Chapter Three. In this chapter, use of financial products and services is constructed as a binary variable equal to one if an individual uses at least one product in the categories of 'transaction', 'credit and loan', 'short-and long-term insurance' and, 'savings and investment' products from a formal or the semi-formal financial institution. Non-users comprise users of products from the informal financial sector.[80] A product-specific perspective follows a similar categorization, in which use of financial product or service equals 1 if the individual uses a formal or semi-formal product and zero if the product is from the informal financial sector. The exclusion of the complete non-user is examined in section 4.8.5. Following a similar approach as in Klapper and Singer (2013), that is, ranging use from formal > semi-formal > informal, an individual who uses products across sectors is classified according to the highest sector. This breakdown at product level is available in the data to the last detail of source and purpose, which reduces the vagueness in classification (see Appendix A12). The next sub-section delves into the estimation strategy employed in this study.

4.7. The Empirical Strategy

This section discusses the identification and decomposition strategies adopted in this study. The welfare measures discussed in section 4.5 form the dependent variables of the study. The first exercise involves establishing the relationship between use of financial products and welfare for the population in this study. This is achieved by estimating an ordinary least squares (OLS) regression of the welfare variables (asset index and well-being index independently) on use of financial services among other covariates pointed out in sections 4.5 and 4.6. The estimated model takes the form:

[80] A similar approach was also used by Klapper and Singer (2013) during their investigation of the extent of financial inclusion in Africa, using the Findex dataset. In a South African setting, combining formal and semi-formal products did not lead to any loss of information. The operating frameworks in these two sectors can also be likened to each other.

$$W_i = f(USE_i, X_i) \quad (4.4)$$

Where; W_i is the welfare score of individual i (i.e. the asset or well-being score), X_i is a vector of the individual's characteristics and USE_i is a binary variable where '1 (users) = use of financial products from the formal or semi-formal or informal financial sectors" and "0 (non-users) = not using any form of financial product". The idea is to establish whether there are significant differences in the welfare of users and non-users. In a second estimation, USE is a categorical variable where "0 = not using financial products", "1 = using informal financial products", "2 = using semi-formal financial products" and "3 = using formal financial products". Results from Chapter Three show that variables such as education and income influence the likelihood of using financial products. To avoid the problem of potential heterogeneity caused by these variables, their predicted values are used in the estimation of the welfare model 4.4.

The next step involves transforming the welfare variables and then using these new variables in the decomposition of the welfare differences between users and non-users in the relevant models. The empirical approach used is based on Firpo, Fortin and Lemieux (2007; 2009). This approach addresses some of the potential challenges alluded to in the analytical exercise in Section 4.3. The next sub-sections discusses the identification and decomposition approach.

4.7.1. Identification Strategy

We observed in Section 4.3 that there is potential reverse causality between welfare and access to and use of finance. In the absence of panel data and a randomized experiment, this study attempts to mimic the treatment effects literature (see Rosenbaum and Rubin, 1983; Heckman, 1979) using observational data. Two groups are formed: The treatment group (individuals who use at least one formal or semi-formal financial product or service) and the control group or non-users (individuals who use informal financial products or none at all). Appendix A18 shows the characteristics of these two sub-groups, and the focus is on the difference between their welfare. Emerging patterns from the empirical evidence point to a distribution-specific effect of use of financial products in that the benefits of using formal financial products might be different along the welfare distribution. This informs the analytical approach used in this study and discussed below, a version of which was used by Knight and Gunatilaka (2014).

Supposing the probability of individual i being a user of formal financial products is *p,* then the conditional probability of this individual being a user given his characteristics $X = x$ is given by $p(x) = \Pr[USE = 1|X = x]$. This is the propensity score. Welfare, however, is determined by observable characteristics X_i and unobservables ε_i, and this relationship can be represented as follows:

$$W_{it} = g_i(X_i, \varepsilon_i) \quad (4.5)$$

for t=user, nonuser, and the function $g_i(X_i, \varepsilon_i)$ has an unknown value mapping, that is to say, no functional form is imposed *apriori*. But the vector X includes variables that would equally be influenced by welfare (such as education and income) thus causing some endogeneity problem. To overcome this problem, the predicted values of these variables are used in regression (4.5). It is assumed that welfare (W), USE and the observed characteristics (X's) have a joint distribution but that this does not restrict the analysis (FFL, 2007). From the data on W, USE and X, the distributions of $W_{use}|USE = 1 \sim F_{use}$ and that of $W_{nonuse}|USE = 0 \sim F_{nonuse}$ can non-parametrically be identified. To obtain the counterfactual distribution that we would have observed if non-users had the observed and unobserved characteristics of users, $W_{nonuse}|USE = 1 \sim F_{counterfactual}$, two assumptions of 'ignorability' and 'common support' are made, plus I invoke the 'inverse probability weighting' technique to assign individuals to groups.[81] This is crucial for the decomposition of the welfare changes into composition and welfare effects.

By the 'ignorability' assumption, if (USE, X, ε) have a joint distribution such that ε is independent of use of financial services for all $X = x$, then the distribution of unobserved factors in the determination of welfare is the same across groups, conditional on a vector of observable factors. According to FFL (2007), this rules out selection into either group based on unobservables. 'Common support' on the other hand assumes that there are no financial products/services that are legally held by some individuals and not by others, that is, there is no exemption rule in using some product types. This implies that for all x in X, *p(x) = Pr[USE =1 | X = x] < 1* and *Pr[USE = 1] > 0*.

Given these assumptions, one can consider a functional of the joint distribution of $(W_{use}, W_{nonuse})|USE$ such that the overall distributional changes can be decomposed into the

[81] See Firpo, Fortin and Lemieux, (2007, 2009a); Frollich and Melly (2010)

'explained or composition' and the 'unexplained or welfare' effects. Let v(F_t) be a distributional statistic of interest (the quantile and gini in this paper) of the welfare measure $(w_t)'s$ distribution F_t, where t = 0, 1 for non-users and users of financial services respectively. (w_t) is first re-weighted with the inverse of the probability of being in each group of 'user', 'non-user' or the 'counterfactual'. The three weights that are required are $\widehat{w_u} = \frac{T}{\hat{p}}$, $\widehat{w_{nu}} = \frac{1-T}{1-\hat{p}}$ and $\widehat{w_c} = \frac{1-T}{\hat{p}} * \left(\frac{\hat{p}(X)}{1-\hat{p}(X)}\right)$, which correspond to 'users', 'non-users' and the 'counterfactual' respectively, and $\hat{p}$ is the true probability of being a 'user' given X (covariates).[82] Subsequently, the estimation of the distribution statistics $\widehat{v_u}$, $\widehat{v_{nu}}$ and $\widehat{v_c}$ follows a plug-in approach, wherein, replacing the cumulative distribution function by the empirical distribution, produces the estimators of interest $\widehat{v_t} = v(\widehat{F_t})$, t = users, non-users; $\widehat{v_c} = v(\widehat{F_c})$, where; $\widehat{F_t}(w) = \sum_{i=1}^{N} \widehat{w_t}\,(T_i) * 1\{W_i \leq w\}$, t = users, non-users and $\widehat{F_c}(w) = \sum_{i=1}^{N} \widehat{w_c}\,(T_i) * 1\{W_i \leq w\}$. $\widehat{F_c}$ represents the distribution of welfare that individuals would have got as 'non-users' if they had 'user' characteristics. The welfare and composition effects are thus given as $\hat{\Delta}_s^v = \hat{v}_u - \hat{v}_c$ and $\hat{\Delta}_x^v = \hat{v}_c - \hat{v}_{nu}$ respectively, and the overall change is given as in expression (4.6), which is similar to the Oaxaca-Blinder decomposition.

$$\underbrace{v(\hat{F}_u) - v(\hat{F}_{nu})}_{overall\ effect} = \underbrace{\left[v(\hat{F}_u) - v(\hat{F}_c)\right]}_{welfare\ effect} + \underbrace{\left[v(\hat{F}_c) - v(\hat{F}_{nu})\right]}_{composition\ effect} \tag{4.6}$$

It should be noted that the welfare variable used in this decomposition is a transformed one, and the decomposition is done on quantiles, which makes this approach different from the ordinary Oaxaca-Blinder decomposition. The transformation exercise is now discussed.

4.7.2 The Recentered Influence Function and the Decomposition

The Recentered Influence Function (RIF) approach proposed by Firpo, Fortin and Lemieux (2007; 2009a&b) can be used to investigate the impact of changing the distribution of covariates on the marginal quantiles of the welfare distributions $F_W(w)$ of the 'user' and 'non-user' groups as well as of the 'counterfactual'. In other words, these are partial effects of the covariates along the welfare distribution. This unconditional quantile regression approach has the following advantages over the conditional quantile regression approach: Firstly, the definition of the [treatment] effect is not

[82] p^ is obtained by running a probit model of the form Pr(USE|X)= f(X, ε) and getting the predicted value

a function of the covariates.[83] Secondly, the function is estimable at a root-n convergence without any parameter restrictions. Thirdly, estimates are comparable to those estimated using approaches tailored for non-linearity. This implies that the RIF regression is a first-order approximation of a non-linear relationship, such as variance, which is often used as an additional measure of inequality (Frollich and Melly, 2010: pp 428-429). The influence function (IF) allows one to establish the influence of an individual observation on the distribution statistic.

For each level of welfare, estimates are obtained for the sample quantile q_τ, the density function $f_w(q_\tau)$ at the quantile using kernel methods[84] , and form a dummy variable $1\{W \leq q_\tau\}$, with one indicating whether the value of the outcome variable is below q_τ and zero otherwise (second term of expression 4.7). Adding back the statistic to the influence function yields the RIF given by expression (4.7).

$$RIF(W; q_\tau, F_W) = q_\tau + \frac{\tau - 1\{W \leq q_\tau\}}{f_w(q_\tau)} \quad (4.7)$$

where the second term in expression (4.7) represents the Influence Function (IF). The exercise is repeated using a global measure of inequality, the Gini coefficient. In this case, defining the Gini coefficient as $v^{GC}(F_W) = 1 - 2\mu^{-1}R(F_W)$, where the $R(F_Y)$ represents the generalized Lorenz curve (interpreted as the proportion of, say, wealth accruing to the 100p% lowest accumulators), that tracks the cumulative total of y divided by the total population size against the cumulative distribution function (FFL, 2007), then it's IF can be represented as in expression (4.7).[85]

$$IF(w; v^{GC}) = A_2(F_W) + B_2(F_W)w + C_2(w; F_W) \quad (4.8)$$

Where; $A_2(F_W) = 2\mu^{-1}R(F_W)$; $B_2(F_W) = 2\mu^{-2}R(F_W)$; $C_2(w; F_W) = -2\mu^{-1}[w[1 - p(w)] + GL(p(w); F_W)$. Thus the RIF for the Gini is given by:

[83] As in a purely random treatment scenario, the inclusion of the covariates is merely for making the identification assumptions plausible and to increase the efficiency of the model (Frollich and Melly, 2010)
[84] It is desirable that the choice kernel has compact support (e.g. the Epanechnikov, tri-cubic) and a band-width that ensures consistent estimates
[85] See FFL, 2007; Monti, 1991 for the derivation of this expressions

$$RIF(w; v^{GC}) = 1 + B_2(F_W)w + C_2(w; F_W) \quad (4.9)$$

Expressions (4.7) and (4.9) thus represent the generalized form of the recentered welfare functional that is decomposed according to expression (4.6).

An Ordinary Least Squares (OLS) regression is estimated using the new dependent variables (Recentered WB index and Asset index) on the covariates, for the different quantiles. The coefficients on the covariates show the variation in the effect of each covariate across the different quantiles of the recentered WLT and WB distributions. Plotting these coefficients allows one to compare the variation in the welfare of users and non-users across quantiles.

If use of formal financial services is welfare enhancing, then one expects a positive and significant welfare difference between the two distributions in favour of the users. In line with the empirical literature, the difference is expected to be greater at the lower end of the welfare spectrum compared to the upper end,[86] where the marginal benefit of use of financial products is greatest. But in light of the history and vibrancy of South Africa's informal financial sector, some of these hypotheses could be refuted.

In keeping with the definition and construction of the financial use variable in this study (see section 4.6), this exercise is conducted for users and non-users of formal financial products at an aggregate level, as well as at individual product level. The motivation for the latter is based on evidence from experimental studies showing that the welfare effects of use of financial products might be product-specific (see Cull, Ehrebeck and Holle, 2014; Gine, et al., 2010; Karlan and Zinman, 2009; Cohen and Young, 2007; Tran and Yun, 2004).

4.7.3. Summary Statistics

This chapter makes use of data for the period 2005 – 2010. The extra dataset for 2010 is added merely to make use of the latest data and it does not create inconsistencies in the study, since the results of the preceding sections do not feed into the exercise in this chapter. Table 4.1 shows that up to 63% of South Africans report using at least one formal financial product. Disaggregating this

[86] See for example Khandker and Samad (2013), Ashraf, Karlan and Yin (2006), Cohen and Young (2007) for welfare- financial use related outcomes

usage by sector shows a dominance by the formal financial sector followed by the semi-formal sector. However, a further disaggregation into product categories shows that the bulk of usage is for formal transactional products. This would include the Mzansi low-cost account embraced by many first time formal financial services users. Indeed, for the rest of the categories there is a higher proportion of non-users with marginal use of semi-formal credit products and informal insurance. The low usage of formal savings and investment products and a reasonable high percentage of those abstaining completely is confirmation of the trend seen over the last two decades, in which the household saving rate has been declining, sometimes into negative territory (Figure 1.2 Chapter 1). These summary statistics make the decomposition exercise by products even more relevant, as aggregate level analysis might yield biased results. Further breakdown of usage by race shows that almost the entire white population is banked, with usage spreading across all the product categories, in proportions greater than the rest of the racial groups, while Blacks, who are also the majority, use formal financial products the least (Table 4.1: Panel B).[87]

The mean responses to the well-being indicators are reported in Table 4.2. The table shows that there were few incidents of self-reported deprivation in the dimensions of food, medication, shelter, water, energy, or feelings of insecurity. Overall, South Africans report having reasonable levels of well-being. The correlation of most of the variables in Table 4.2 with the use of formal financial services shows an overall positive relationship compared to using informal or semi-formal products, and not using any financial products.

The proportion of South Africans in possession of the assets of interest to this study is shown in Table 4.3. It can be seen that more individuals reported having a fridge, an electric stove, a microwave, a cellular phone, access to tap water on their premises, as well as flush-toilets within their dwellings. Pairwise correlations showed a high and positive correlation between these variables and formal products (and semi-formal credit) but a negative correlation with informal sector products as with not using financial services from any sector.

[87] As discussed in the introductory chapter, the influence of race reflects the history of the country whereby access to key services were determined on the basis of race.

Table 4.1: Use of Financial Services by South Africans during 2005 – 2010 (Pooled Data)

Panel A: Mean Use of Financial Services and Products

	Variable	Mean	SD	Min	Max
Overall financial services use					
	Non-formal	0.383	0.486	0	1
	Formal	0.617	0.486	0	1
Use by financial sector					
	Non-users	0.217	0.412	0	1
	Informal	0.091	0.288	0	1
	Semi-formal	0.074	0.262	0	1
	Formal	0.618	0.486	0	1
Use by product category					
Transaction	Non-use	0.398	0.490	0	1
	Formal	0.602	0.490	0	1
Credit					
	Non use	0.590	0.492	0	1
	Informal	0.061	0.239	0	1
	Semi-formal	0.212	0.409	0	1
	Formal	0.136	0.343	0	1
Insurance					
	Non-use	0.592	0.491	0	1
	Informal	0.136	0.343	0	1
	Semi-formal	0.044	0.205	0	1
	Formal	0.228	0.419	0	1
Savings & Investment					
	Non-use	0.756	0.429	0	1
	Informal	0.104	0.306	0	1
	Formal	0.139	0.346	0	1

Panel B: Mean Formal Products Use by Racial Group

	N	Transactions	Credit & Loan	Insurance	Savings
Blacks	12774	0.60	1.068	0.607	0.397
Coloureds	3946	0.64	1.126	0.811	0.381
Asians	1538	0.77	1.400	0.905	0.576
Whites	3858	0.94	1.910	1.500	0.879

Note: *The table shows mean use of financial services, as categorised by product type and major financial sector in South Africa. These variables are used to construct an aggregate financial inclusion variable which equals one if an individual uses at least one formal or semi-formal product and equal to zero for use of informal products The data is weighted to be nationally representative, using survey weights aligned to those of Statistics South Africa.*

Source*: FinScope Surveys 2005-2010*

Table 4.2: Mean of the Indicators of Well-being for the Period 2005-2010 (Pooled Data)

Variable (N=20205)	Often	Sometimes	Rarely	Never
Gone without food	0.033	0.193	0.160	0.612
Felt unsafe	0.122	0.263	0.175	0.437
Gone without medication	0.059	0.232	0.163	0.540
Gone without cash	0.149	0.254	0.148	0.447
Gone without water	0.051	0.122	0.129	0.696
Gone without shelter	0.005	0.0196	0.061	0.909
Gone without electricity	0.076	0.151	0.148	0.603
Gone without heat	0.034	0.133	0.140	0.674

Note: The table shows the mean responses to the indicators of deprivation that were used to construct the well-being index. The data is weighted to be nationally representative.
Source: Own calculations from the FinScope surveys 2005-2010

Table 4.3: Mean Asset Possession by South Africans for the Period 2005-2010 (Pooled Data)

Variable	Mean	SD	Min	Max
Geyser with hot water	0.317	0.465	0	1
Fridge	0.757	0.429	0	1
Microwave	0.481	0.500	0	1
Flush toilet	0.596	0.491	0	1
VCR	0.161	0.368	0	1
Vacuum cleaner	0.143	0.350	0	1
Washing machine	0.310	0.463	0	1
Computer or Laptop	0.138	0.345	0	1
Electric Stove	0.726	0.446	0	1
Tumble dryer	0.083	0.276	0	1
Telkom-line	0.125	0.330	0	1
Kitchen sink	0.432	0.495	0	1
Freezer	0.180	0.384	0	1
Tap-water	0.804	0.397	0	1
Mnet	0.144	0.351	0	1
Dishwasher	0.036	0.186	0	1
Vehicle	0.268	0.443	0	1
Cellular phone	0.780	0.413	0	1
Hifi or home-theatre	0.535	0.499	0	1

Note: The table shows the variables used in the construction of the wealth index. Data is weighted using sample weights aligned to those of Statistics South Africa (O=No, I=Yes)
Source: Own calculations from the FinScope surveys 2005-2010

4.8 Empirical Results

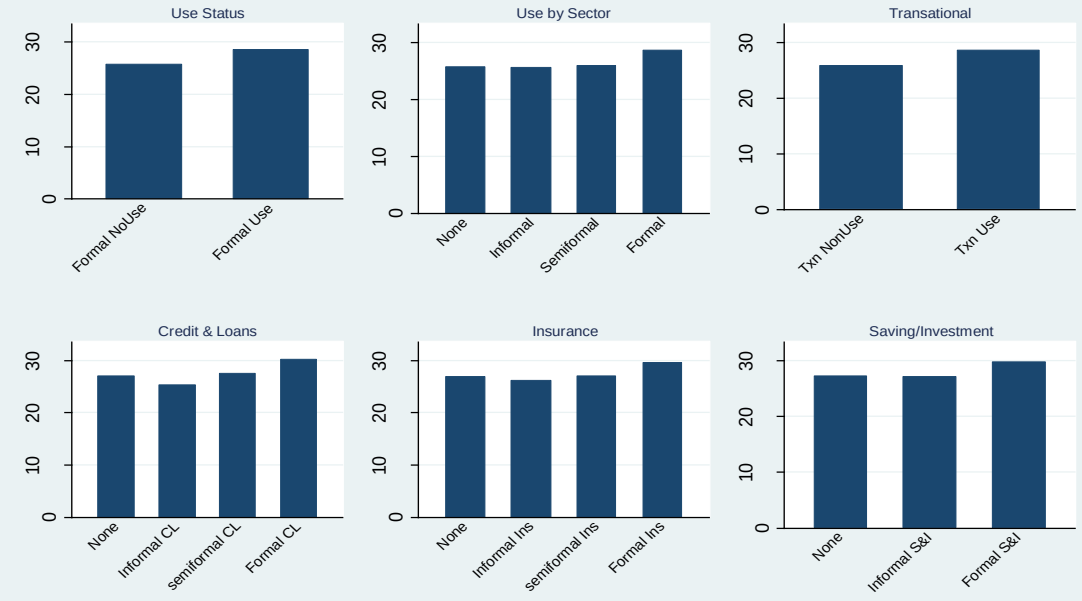
Before presenting the results of the decomposition exercise, the welfare measures constructed were examined to see how these relate to financial services usage and the socio-economic and demographic characteristics of South Africans. In what follows, the distributions of the well-being and asset indices are presented, followed by estimates from the OLS regression of welfare on use of financial services. Finally, estimates of the RIF regressions at the various quantiles and of the Gini coefficients from these two variables are reported.

4.8.1. Distribution of Welfare

The index for well-being (WB) ranges between 8 and 39, and has a mean of 27.66 and a standard deviation of 4.91 (a higher score reflects better welfare). This average allows one to investigate the overall distribution as shown in Figure 4.1. The mean well-being of users of formal financial products is shown to be higher than that of non-users, emphasizing what was revealed by the descriptive statistics. This pattern is, on average, replicated in product categories. However, there is an interesting pattern in the case of credit and insurance products, where credit and insurance non-users have a mean score that is comparable to that of semi-formal credit users and higher than that of informal-credit or insurance users. This result seems to suggest that semi-formal credit might not necessarily be welfare enhancing. In terms of the demographics, the lower panel of Figure 4.1 shows that mean well-being increases with education and personal income levels. The regional distribution is as expected, with urban dwellers having a higher mean than their rural counterparts. This result is similar to that obtained by Moller and Saris (2001).

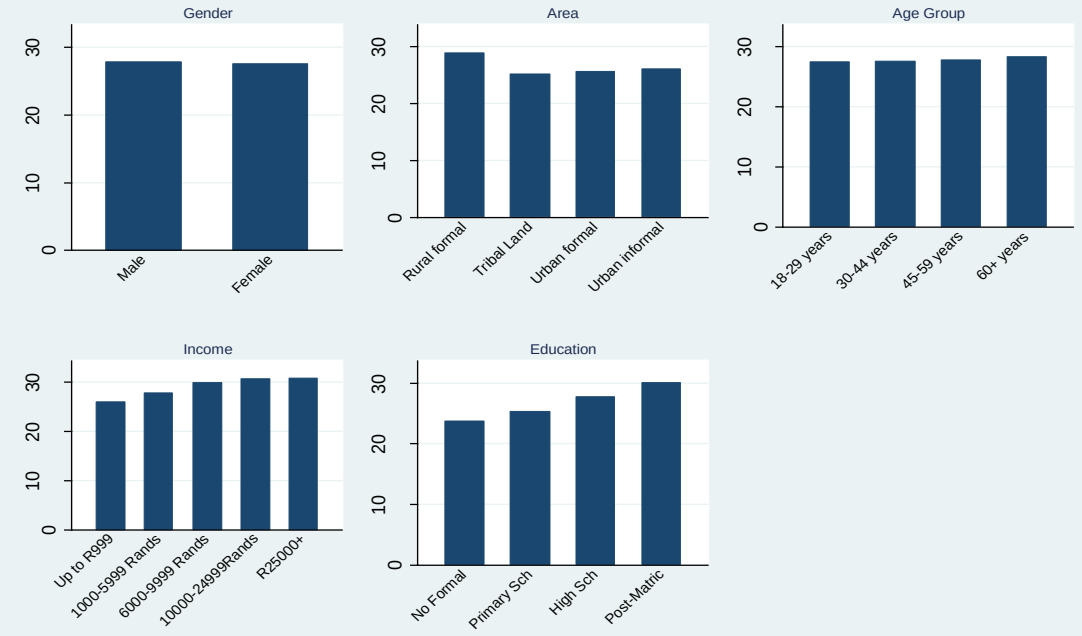
Figure 4.1 Mean Well-Being by Financiall Services Use and Demographics

Panel A: Well-being by Products Use



Mean= 27.66 SD=4.91

Panel B: Wellbeing by Demographics

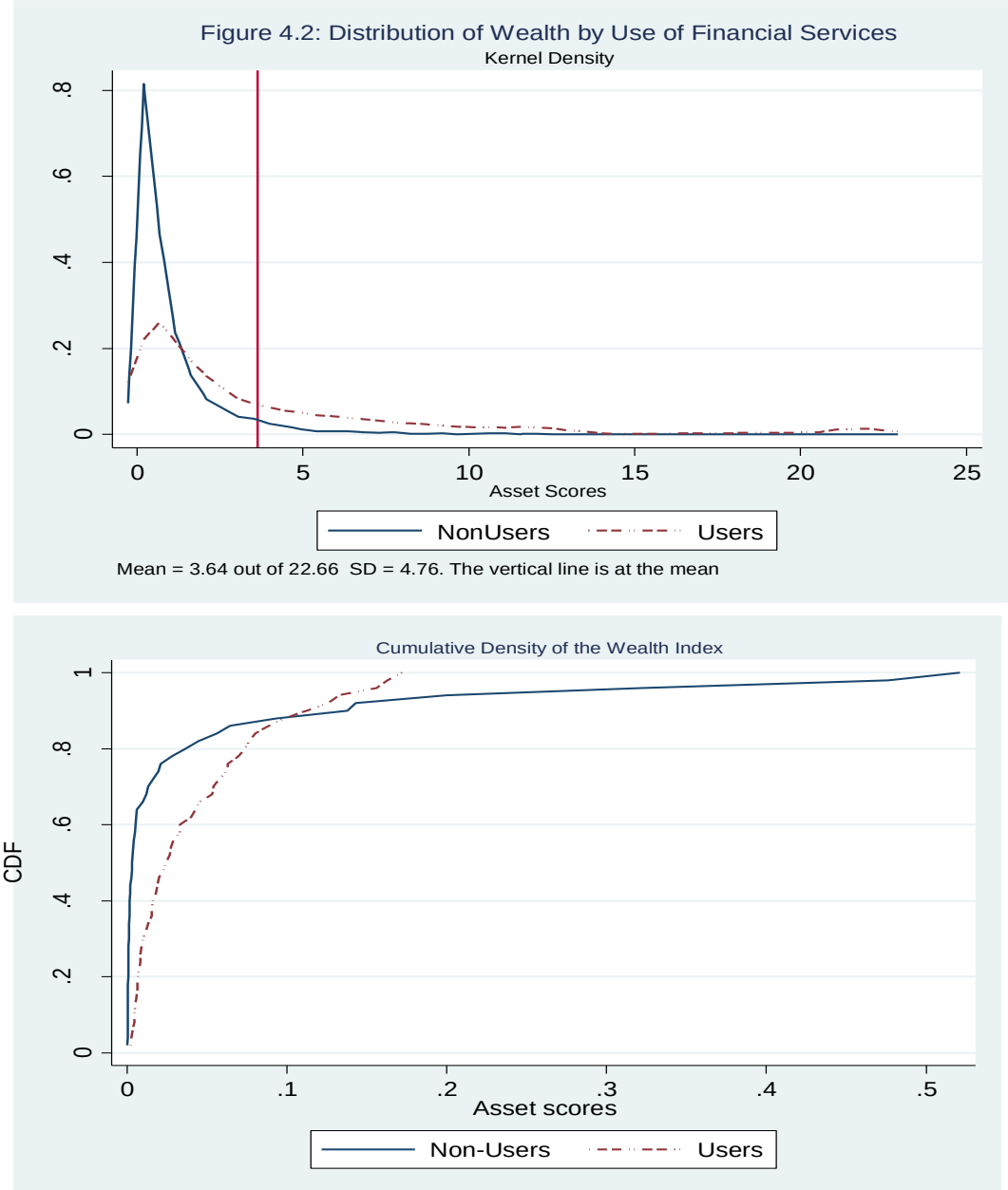


Mean= 27.66 out of 32 SD=4.91

Note: *The figure shows mean scores for individual wellbeing. The top panel of the figure shows the mean well-being for USE at aggregate level, as well as by sector and by product category. The results are weighted to be nationally representative.*

Source: *Own calculations from the FinScope surveys 2005-2010*

The second measure of welfare, the asset index, ranges between 0 and 22.66 points. With a mean of 3.46. The density plot in Figure 4.2 shows that the majority of South Africans were below the national average index score. A comparison between users and non-users of financial services shows that more non-users score below the national average. Indeed, the second plot of Figure 4.2 shows that almost 100% of non-users scored below 5 compared to about 60% of users. Users of products from the formal sector have a better spread than non-users, whose scores are concentrated close to the zero mark.



Note: The figure shows the distribution of wealth among users and non-users of financial products. The cumulative density scores are re-scaled as the distribution flattens out at the upper tail
Source: Own calculations from the FinScope surveys 2005-2010

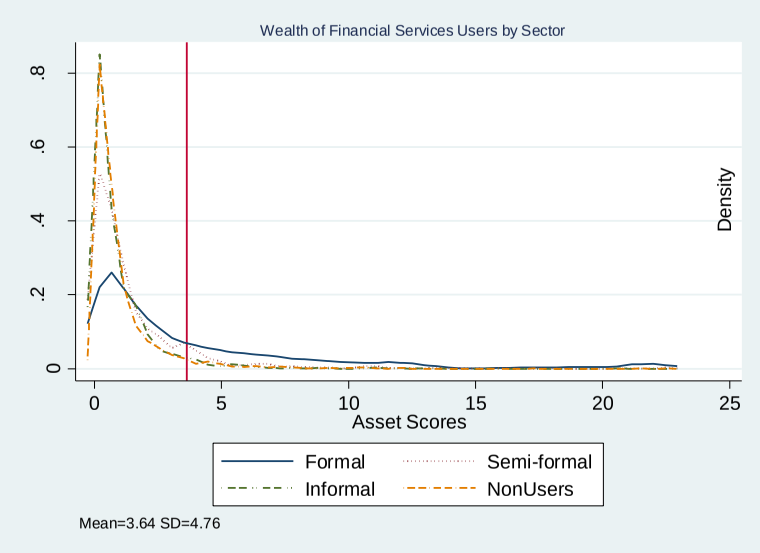
A closer look at use by sector and by product category is presented in Figure 4.3. This shows that in terms of only formal products, formal credit users have the best welfare overall, followed by formal insurance users. Users of formal savings and investment products appear to have a similar distribution of wealth scores to those of transaction products users, lagging behind credit and insurance products users.

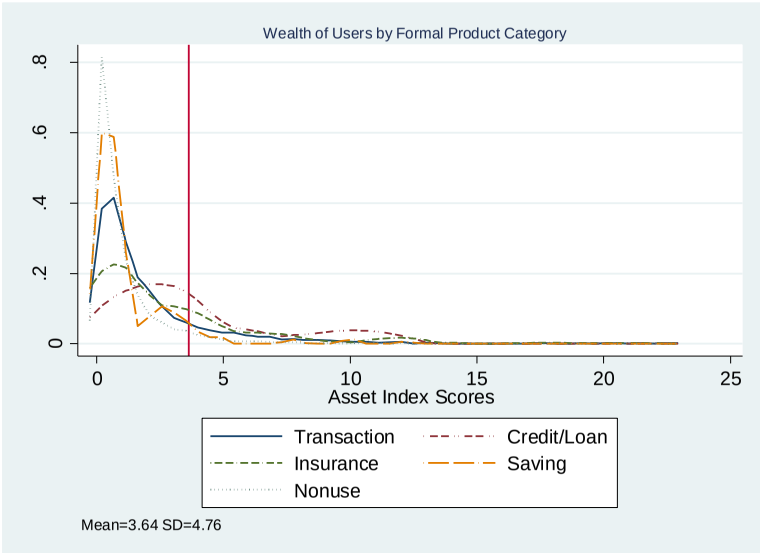
There is a noticeably higher concentration below the national average for non-users of transaction products, compared to users. Credit, insurance, and savings and investment products present an interesting and somewhat similar distribution pattern. Scores of users of formal credit and insurance products are spread generously below and above the national average, whereas scores of users of semi-formal and informal credit and insurance products are concentrated at the lowest end of the scale. The pattern shown by the credit and insurance products is not entirely surprising. In most cases in the South African credit market, credit contracts require borrowers to have credit insurance on cash borrowed as well as on the items acquired on credit, which partly explains the similarity in the welfare distributions of users of these products. The savings and investment product category also shows an almost even spread of scores for the users of formal products, considering that the proportion of South Africans who claimed that they save is small. The implication is that savings and investment products have the potential to contribute positively to welfare.

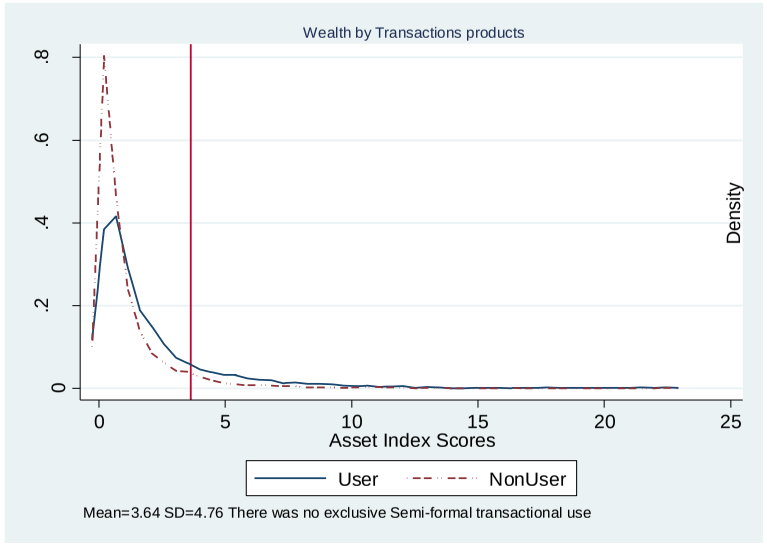
The distribution by demographics, shown in Figure 4.4, has a similar pattern to that of the wellbeing index, in terms of income and education variables. Average wealth increases with increasing income and education levels, with above average scores for individuals earning at least R6000, and for those with at least a matric level of education. But the patterns of income and education seem to be inter-related. The intuition is that we expect individuals' prospects of employment to increase after matriculation (post high-school), and the higher their earning, the more affordable durables are for them. Furthermore, having job tenure increases one's chances of qualifying for credit and accumulating wealth or assets. There is also a somewhat positive correlation between age and wealth, which might reflect the urgency of individuals to acquire assets once they reach their mid-years (30 years plus), and to build this asset base until retirement.[88]

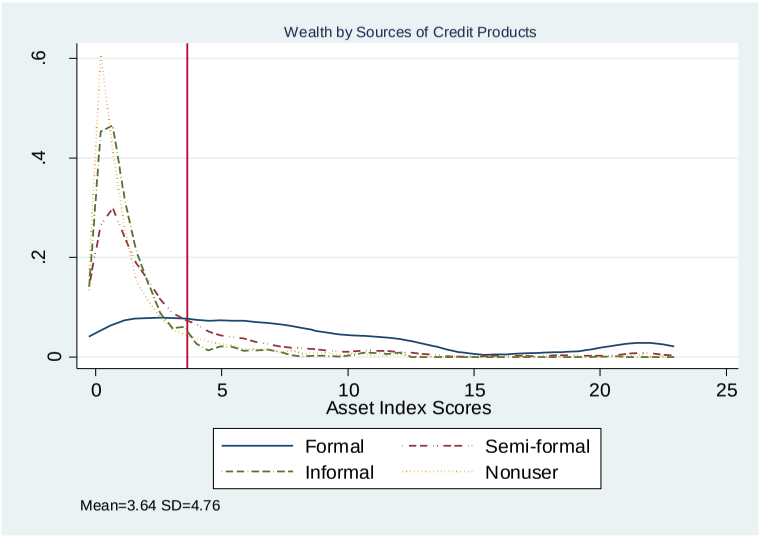
[88] A study by Lusardi, et al. (2011) showed that higher income earners will tend to acquire financial literacy to accumulate and better manage their wealth in preparation for retirement

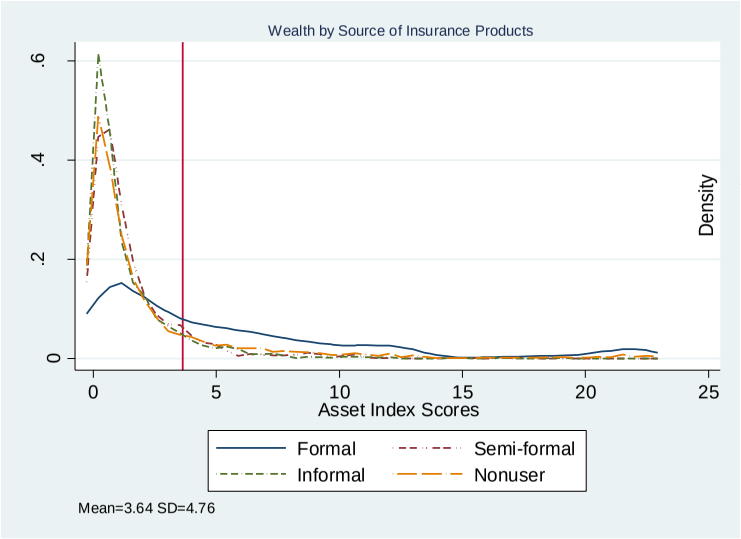
Figure 4.3: Distribution of Wealth by Financial Sector and Product Category

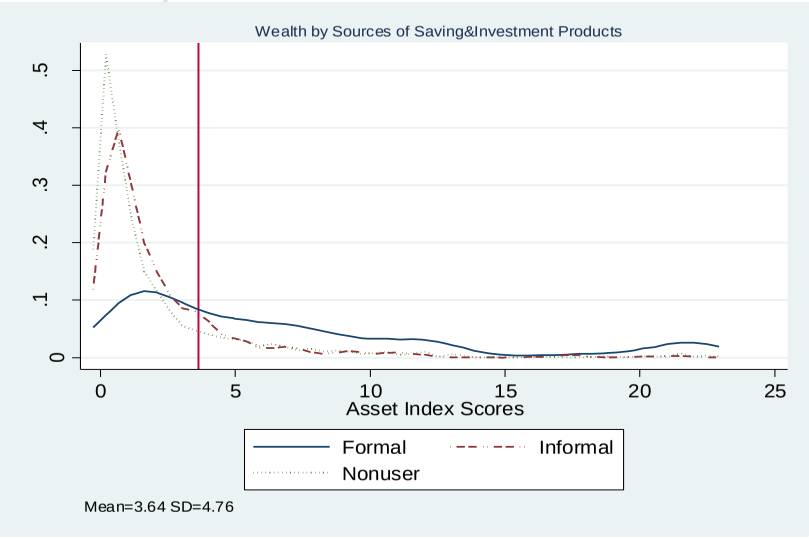




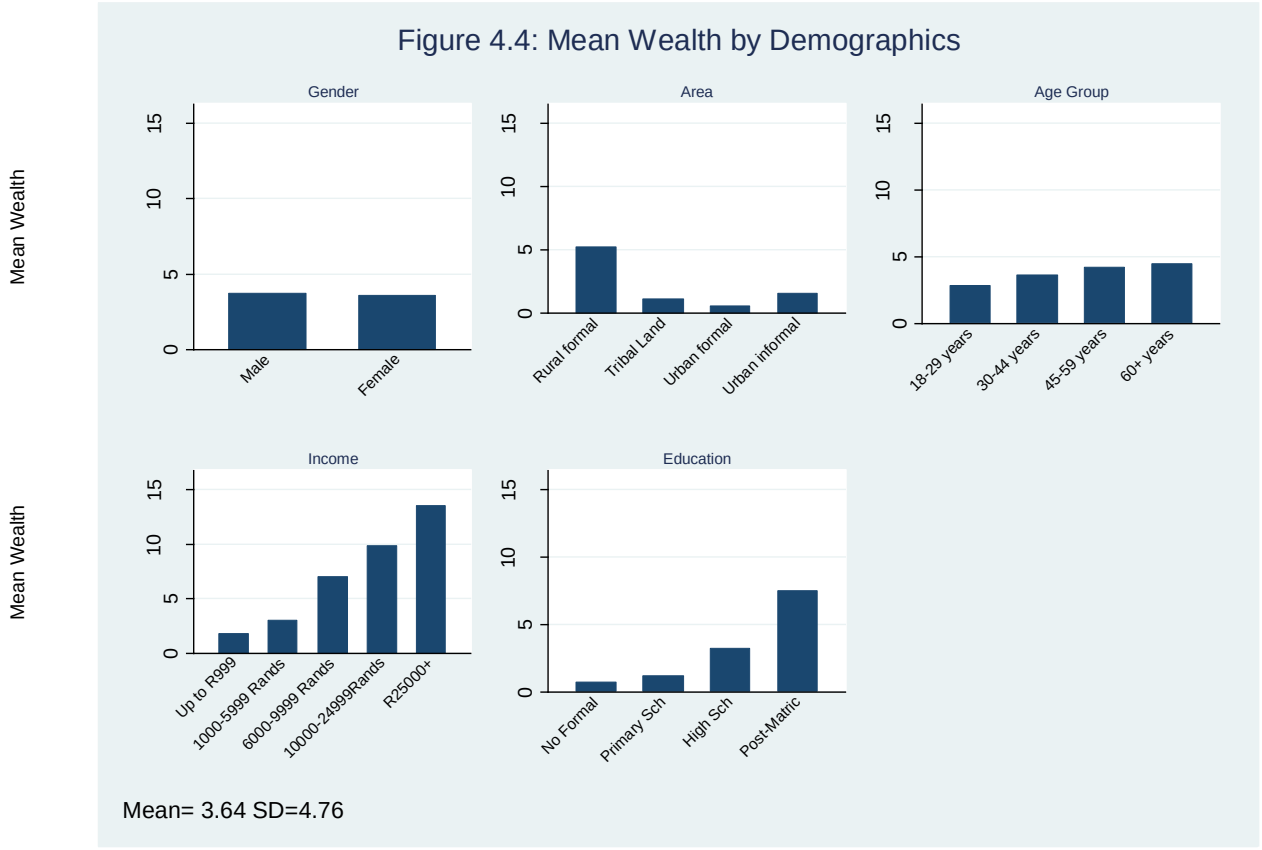








Note: The figure shows the distribution of wealth among users of financial products and services. The vertical line shows the national average score on a scale that runs from 0 to 39. The data is weighted to be nationally representative. The weights are aligned to those of Statistics South Africa



Note: *The figure shows the distribution of wealth by demographic characteristics of South Africans. The data is weighted to make the distribution statistically significant. Weights are aligned to those of Statistics South Africa.*
Source: *Own calculations using FinScope surveys 2005-2010.*

It is worth noting that the difference in the distributions of these two measures of welfare can be linked to the fact that the asset index is a proxy for the tangible uses of access to finance, whether in terms of credit (future income) or cash money (current income). The latter is commonly used as a measure of welfare in related studies, for example Honohan, (2008a) and Burgess and Pande (2005). Well-being, on the other hand, is more qualitative and not observable, and is an outcome of several factors, with access to finance being one of them. In this regard, these two measures can be thought of as being complementary in that they capture different aspects of one's welfare.

4.8.2 The Effect of Use of Financial Products on Welfare

Table 4.4 shows that use of financial products or services is associated with a positive and significant welfare outlook, compared to not using any product at all. This effect remains significant even after controlling for all possible confounders of welfare. Columns 1-4 show results when use is aggregated, that is, of formal, semi-formal and informal financial products use. The effect is stronger when well-being is used as a measure of welfare.

Table 4.4: The Effect of Use of Financial Products on the Welfare of South Africans (2005 – 2010)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			Aggregate Use				Use by Sector	
Variables	Wealth (Base)	Well-being (Base)	Wealth (Full)	Well-being (Full)	Wealth (Base)	Well-being (Base)	Wealth Full	Well-being Full
Users	2.261***	3.937***	0.439***	1.883***				
	(0.063)	(0.139)	(0.048)	(0.163)				
Informal Sector					0.048	1.080***	0.168**	1.249***
					(0.101)	(0.226)	(0.0693)	(0.236)
Semi-formal Sector					0.715***	2.893***	0.189**	1.893***
					(0.111)	(0.250)	(0.086)	(0.294)
Formal Sector					2.782***	4.497***	0.588***	2.140***
					(0.063)	(0.143)	(0.052)	(0.178)
Male			-0.189***	0.072			-0.190***	0.073
			(0.038)	(0.129)			(0.038)	(0.129)
Blacks			-5.897***	-3.472***			-5.870***	-3.420***
			(0.080)	(0.272)			(0.080)	(0.272)
Coloureds			-4.711***	-1.092***			-4.682***	-1.045***
			(0.096)	(0.325)			(0.095)	(0.325)
Asians			-4.052***	-4.417***			-4.033***	-4.378***
			(0.120)	(0.407)			(0.119)	(0.407)
Primary School			-0.063	-0.332			-0.105	-0.412
			(0.107)	(0.363)			(0.107)	(0.363)
High School			0.409***	1.075***			0.315***	0.912**
			(0.104)	(0.355)			(0.105)	(0.357)
Post High Sch.			1.636***	1.733***			1.502***	1.512***
			(0.121)	(0.412)			(0.122)	(0.416)
30-44 years			-0.022	-0.352**			-0.024	-0.351**
			(0.047)	(0.160)			(0.047)	(0.160)
45-59 years			-0.070	-0.656***			-0.071	-0.658***
			(0.068)	(0.231)			(0.068)	(0.231)
60+ years			0.200***	0.515**			0.223***	0.551**
			(0.077)	(0.262)			(0.077)	(0.262)
Urban			1.469***	3.113***			1.448***	3.084***
			(0.039)	(0.132)			(0.039)	(0.132)
Up to R999			-5.818***	-1.555			-5.720***	-1.406
			(0.297)	(1.012)			(0.297)	(1.013)
R1000-5999			-5.507***	-0.184			-5.511***	-0.216
			(0.295)	(1.006)			(0.295)	(1.006)
R6000-9999			-3.701***	-0.044			-3.719***	-0.080
			(0.301)	(1.026)			(0.301)	(1.026)
R10000-249999			-2.632***	-0.280			-2.637***	-0.297
			(0.305)	(1.039)			(0.305)	(1.039)
Constant	0.799***	21.44***	12.05***	25.42***	0.799***	21.44***	12.10***	25.32***
	(0.055)	(0.122)	(0.327)	(1.112)	(0.054)	(0.121)	(0.327)	(1.116)
Observations	22,018	22,018	18,364	18,364	22,018	22,018	18,364	18,364
R-squared	0.055	0.035	0.513	0.109	0.103	0.048	0.514	0.110

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Note:

i. The table shows the effect of financial services use on welfare.

ii. In columns 1-4, USE is a binary variable with 1=use of formal or semi-formal or informal products while 0=not using any product at all.

iii. In columns 5-8, USE is a categorical variable where 0='Not using', 1='Informal', 2='Semi-formal' and 3='Formal'

These results are in line with existing empirical findings on the subject (see for instance Blaauw and Anmar, 2013; Bookwalter and Dalenberg, 2004). Findings are that welfare increases with level of

education, it is higher individuals with high incomes, and for urban dweller. Results in columns 5-8 show usage disaggregated by sector. Formal product usage is associated with higher welfare than non-usage, a pattern that is seen for both semi-formal and informal product use. In the next section, the analysis is conducted at this disaggregated level, restricted initially to product users in the three sectors (formal, semi-formal and informal). Analysis done at an aggregate sector-level would yield unreliable results, since the characteristics of users of products from these three sectors, as well as the complete non-users, are statistically different, as shown in earlier chapters.

4.8.3 The RIF Regression Results

Using second term in equation (4.7), the influence function of each observation is computed from the 5th percentile using the Epanechnikov kernel and a bandwidth of 0.06. Survey weights benchmarked to Statistics South Africa were used. Additional sample weights were computed for the treatment, control and counterfactual sub-samples. Table 4.5 reports the RIF regression coefficients for the 10th, 50th and 90th quantiles for users and non-users of financial products and services, while the Gini RIF regression coefficients are reported in Table 4.6. To complement the tabulated results, Figure 4.5 shows a plot of the RIF regression coefficients on both wealth and well-being. The point to note from the RIF regression results is that covariates with a positive slope make a positive contribution to the welfare distribution, while those with a negative slope contribute negatively to the welfare distribution, (FFL, 2007). It is also worth noting that these results show both the within and between-group effects (FFL, 2009), for users and non-users, as well as a combined effect (effect of covariates given that one uses or does not use financial services). The motivation for this interactive analysis rests in empirical studies that point to financial exclusion not being a random status but one that is closely linked to factors such as lack of the necessary financial knowledge or being part of the marginalized in society (social status), as was the case in Apartheid South Africa.[89]

Figure 4.5 shows that there is a clear difference between the welfare distributions of users and non-users of financial services, across the different quantiles. This is shown by the gap between the two plots in each category. In some cases the gap is smaller at the lower quantiles and progressively widens at higher quantiles, while in other cases there is a visible convergence. Overall, the effect of using formal products is non-monotonic, regardless of the welfare measure being used, falling above or below the distribution of the financially excluded.

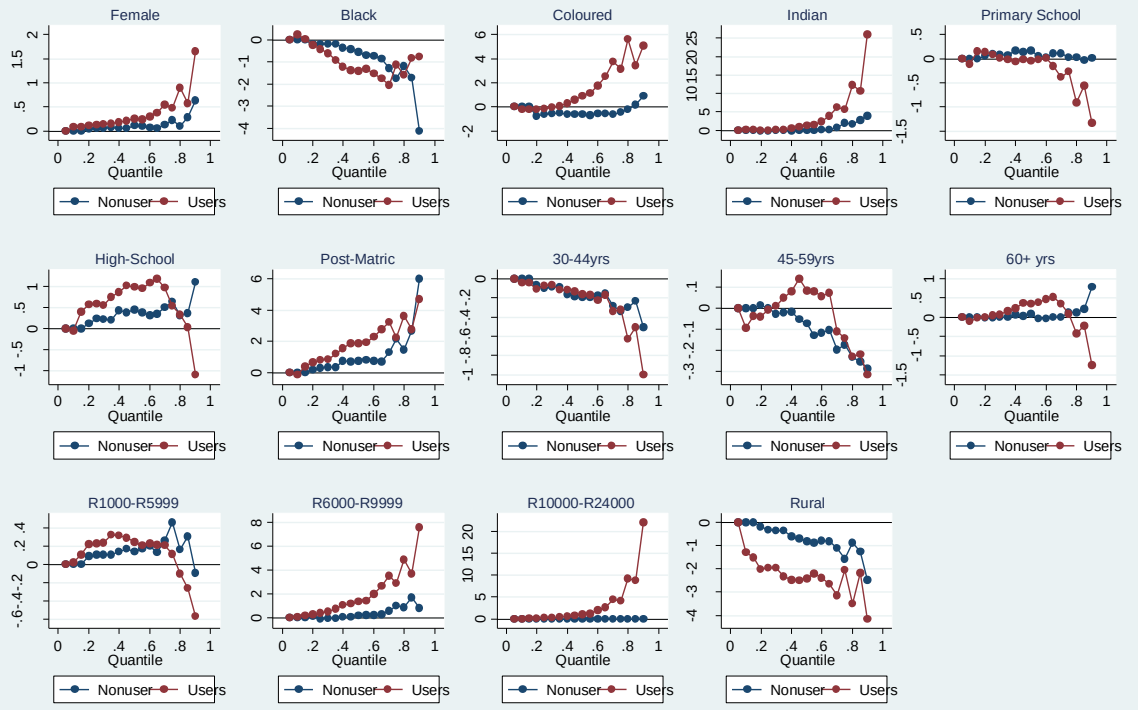
[89] See Lusardi and Mitchell (2014), Cole, et al. (2011), and Klapper and Singer (2013) for factors that might lead to financial exclusion. Results in Chapter 3 show that socio-economic and demographic factors were interactively significant determinants of use of financial products and services in South Africa

This difference is accentuated by the individuals' characteristics. For instance, from the top panel of both Table 4.5 and Figure 4.5, one can see that the effect of being a woman and a user is rising welfare across quantiles when compared to a somewhat stationary effect for non-users. Indeed, the within group effect shows that the gap widens, moving from lower quantiles for non-users {0.017 (q50-q10) versus 0.230 (q90-q50)} but it narrows as one moves up to higher quantiles for users {0.456 (50-10) versus 0.02 (90-50)}. Despite the oscillation at the top end of the distribution, it is clear that women who use financial products and services have better welfare than their non-user counterparts, and this effect is as immediate as the 30th quantile. Using the well-being measure, however, the lower panel in Figure 4.5 shows that the effect of being a woman and a user is negative welfare at lower quantiles and zero at higher quantiles compared to being a woman and a non-user, although this effect is not statistically significant, as shown in Table 4.5. Overall, the results are consistent with experimental studies that have reported gender related differences in the outcomes of financial inclusion programmes. For instance, some financial inclusion interventions have reported an increase in women's empowerment and a positive mental outlook (which is subjective), in a manner that improves women's welfare, with spill-overs to the entire household.[90]

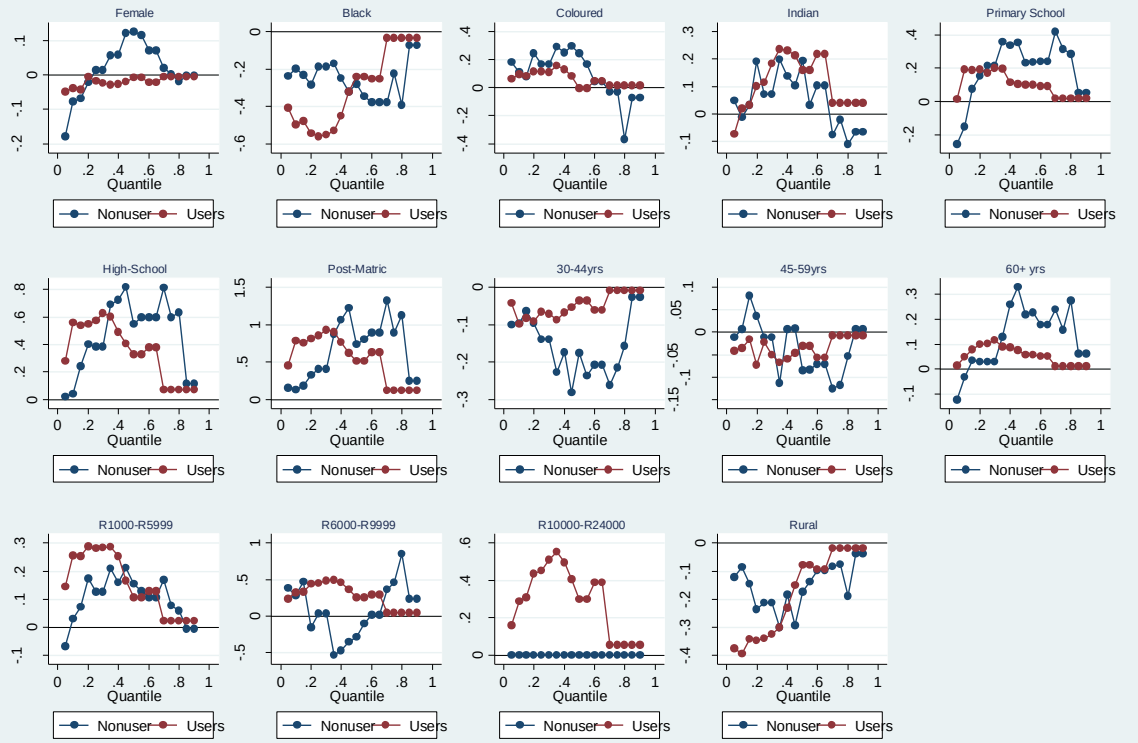
[90] See, for instance Ashraf, Karlan and Yin (2006) on savings accounts in Philippines; Neves, Samson, van Niekerk, Hlatshwayo and du Toit (2009) on the use and effectiveness of Old Age Social Grants in South Africa, and Proyecto capital projects in Peru (http://fundacioncapital.org/inclusive-finance/proyecto-capital/)

Figure 4.5: RIF Regression Coefficients of Welfare

Panel A: RIF Regression Coefficients of Wealth



Panel B: RIF Regression Coefficients of Well-Being



Note: *The figure shows the coefficients the Recentered Influence Function regressions of welfare of users and non-users of financial services, on the individual's observable characteristics. "Users" = formal and semi-formal products while "Non-Users" = informal products usage. The data is weighted to be nationally representative*.

Table 4.5: Unconditional Quantile Regression Coefficients of Welfare

Panel A: Welfare Measure = Wealth

	Non-Users						Users					
	q10	(SE)	q50	(SE)	q90	(SE)	q10	(SE)	q50	(SE)	q90	(SE)
Female	0.031	0.002	0.048	0.015	0.278	0.011	0.068	0.004	0.524	0.000	0.614	0.001
Black	-0.016	0.072	-0.601	0.000	-8.824	0.000	-0.286	0.000	-4.955	0.000	-9.547	0.000
Coloured	0.031	0.004	-0.204	0.000	-7.479	0.000	0.175	0.000	-2.284	0.000	-8.834	0.000
Indian	0.029	0.007	0.003	0.941	-1.500	0.076	0.123	0.000	-0.015	0.915	-7524.000	0.000
Primary Education	0.101	0.001	0.092	0.019	-0.095	0.536	0.149	0.355	0.222	0.412	-0.116	0.675
High School	0.193	0.000	0.424	0.000	0.388	0.024	0.617	0.000	1.807	0.000	-0.298	0.308
Post High School	0.221	0.000	0.809	0.000	4.138	0.000	0.835	0.000	3.614	0.000	1.875	0.000
30-44years	-0.050	0.000	-0.083	0.001	-0.540	0.000	-0.089	0.004	-0.358	0.000	-0.390	0.060
45-59years	-19.000	0.178	0.008	0.803	-0.424	0.017	0.010	0.760	0.138	0.213	-0.006	0.983
60+Years	-0.004	0.847	0.106	0.003	-0.117	0.578	0.092	0.012	0.829	0.000	-0.529	0.128
R1000-5999	0.048	0.000	0.141	0.000	0.005	0.974	0.243	0.000	0.398	0.000	-0.075	0.638
R6000-9999	0.070	0.102	0.051	0.688	1.928	0.360	0.324	0.000	2.520	0.000	2.571	0.000
R10000-24999	0.001	0.936	0.199	0.027	6.916	0.000	0.255	0.000	2.562	0.000	8.288	0.000
R25000+	0.000	0.000	0.000	0.000	0.000	0.000	0.251	0.000	2.533	0.000	15.180	0.000
Rural	-0.140	0.000	-0.708	0.000	-1.018	0.000	-1.107	0.000	-2.132	0.000	-0.158	0.349
Eastern Cape	-0.098	0.000	-0.361	0.000	-0.996	0.001	-0.413	0.000	-1.158	0.000	-0.730	0.082
Free State	0.025	0.053	-0.086	0.051	-0.656	0.030	0.205	0.004	-0.722	0.000	-0.259	0.593
KwaZulu Natal	-0.047	0.003	-0.246	0.000	-0.349	0.260	-0.055	0.442	-0.109	0.492	0.289	0.520
Limpopo	0.016	0.468	-0.227	0.000	-0.586	0.063	0.000	0.000	0.000	0.000	0.000	0.000
Mpumalanga	0.065	0.000	0.071	0.141	-0.362	0.271	0.207	0.006	-0.102	0.566	0.016	0.975
Northern Cape	-0.001	0.960	-0.292	0.000	-1.449	0.000	0.126	0.091	-1.250	0.000	-1.420	0.004
North West	0.055	0.001	-0.049	0.314	-0.495	0.121	0.239	0.002	-0.416	0.020	-0.238	0.592
Western Cape	-0.004	0.745	-0.066	0.152	0.845	0.019	0.001	0.987	-0.133	0.439	1.618	0.001
Constant	0.101	0.002	1.496	0.000	12.339	0.000	0.014	0.936	3.676	0.000	16.445	0.000

Panel B: Welfare Measure = Well-being

	Non-Users						Users					
	q10	(SE)	q50	(SE)	q90	(SE)	q10	(SE)	q50	(SE)	q90	(SE)
Female	0.006	0.312	0.019	0.069	0.010	0.041	-0.010	0.245	-0.001	0.779	-0.001	0.779
Black	0.007	0.730	-0.201	0.000	-0.094	0.000	-0.096	0.000	-0.058	0.000	-0.058	0.000
Coloured	0.028	0.175	-0.125	0.000	-0.062	0.000	-0.008	0.477	-0.027	0.000	-0.027	0.000
Indian	0.044	0.036	0.013	0.717	0.030	0.129	0.000	0.972	-0.010	0.014	-0.010	0.014
Primary Education	-0.004	0.755	0.063	0.005	0.024	0.009	-0.052	0.329	0.019	0.028	0.019	0.028
High School	0.013	0.295	0.169	0.000	0.061	0.000	0.018	0.723	0.047	0.000	0.047	0.000
Post High School	0.011	0.637	0.273	0.000	0.095	0.000	0.060	0.238	0.072	0.000	0.072	0.000
30-44years	0.010	0.173	-0.080	0.000	-0.023	0.000	-0.022	0.059	-0.005	0.067	-0.005	-0.067
45-59years	-0.001	0.887	-0.047	0.004	-0.014	0.057	-0.006	0.649	-0.005	0.107	-0.005	0.107
60+Years	0.019	0.073	0.047	0.018	0.023	0.010	-0.004	0.766	0.009	0.008	0.009	0.008
R1000-5999	0.015	0.024	0.071	0.000	0.026	0.000	0.049	0.000	0.023	0.000	0.023	0.000
R6000-9999	0.029	0.001	-0.012	0.918	-0.005	0.931	0.075	0.000	0.049	0.000	0.049	0.000
R10000-24999	0.032	0.010	0.145	0.023	0.079	0.056	0.050	0.000	0.050	0.000	0.050	0.000
R25000+	0.000	0.000	0.000	0.000	0.000	0.000	0.044	0.002	0.052	0.000	0.052	0.000
Rural	-0.010	0.197	-0.063	0.000	-0.029	0.000	-0.138	0.000	-0.033	0.000	-0.033	0.000
Eastern Cape	-0.024	0.064	-0.132	0.000	-0.043	0.000	-0.370	0.000	-0.043	0.000	-0.043	0.000
Free State	0.010	0.309	0.095	0.000	0.074	0.000	-0.058	0.007	0.011	0.040	0.011	0.040
KwaZulu Natal	-0.038	0.004	-0.110	0.000	-0.021	0.046	-0.092	0.000	-0.006	0.199	-0.006	0.199
Limpopo	0.014	0.266	-0.076	0.004	-0.026	0.023	0.000	0.000	0.000	0.000	0.000	0.000
Mpumalanga	0.008	0.473	-0.001	0.983	0.016	0.171	-0.044	0.040	-0.009	0.069	-0.009	0.069
Northern Cape	0.012	0.214	0.007	0.780	0.030	0.009	-0.067	0.003	0.009	0.104	0.009	0.104
North West	0.012	0.268	-0.100	0.000	-0.027	0.014	-0.036	0.098	-0.002	0.631	-0.002	0.631
Western Cape	-0.010	0.414	-0.013	0.586	0.026	0.026	-0.084	0.000	-0.002	0.650	-0.002	0.650
Constant	1.094	0.000	4.160	0.000	5.149	0.000	2.252	0.000	5.014	0.000	5.109	0.000

Robust standard errors (SE) reported.

Notes: The table reports the coefficients of the Recentered Influence Function regression for selected quantiles of the welfare of users and non-users of financial services, on the individual's observable characteristics The data is weighted to be nationally representative. Weights are aligned with those of Statistics South Africa.

Turning to racial groups, the effect of using formal products is negative for Blacks and is more statistically significant than for non-users, when compared to the base group of Whites. For Coloureds and Asians, however, the effect is positive and increases across quantiles for users of formal financial services, compared to no-effect for non-users. Regardless of the welfare measure used, Blacks do not seem to benefit with increased welfare from using formal financial services, whereas there is a more pronounced effect for Coloureds and Asians when using the well-being measure. These groups were previously excluded from the formal financial sector and these results seem to suggest that, despite the financial access policies pursued by government, this inclusion has not yet translated into significant welfare gains for some racial groups. This result is similar to those of Srinivasan (2006).

Education is one of the previously differentiated services offered in Apartheid South Africa. It is linked to cognitive ability and the skills required to make effective use of financial services (see Lusardi and Mitchell, (2014); Jappelli and Padula (2011)). One would therefore expect education to disproportionately improve welfare in favour of the users of formal products. Indeed, Figure 4.5 shows that the combined effect of financial inclusion and education is a monotonic increase from the 20th quantile for individuals with at least a high school level of education, up to about the 60th quantile. Thereafter it drops to negative territory for individuals with less than a matric level (post high school) of education. But when one considers well-being, the welfare gains are in the lower quantiles and thereafter the gains switch in favour of non-users. Table 4.5 shows, however, that this switch is not statistically significant.

Related to education is the income level of an individual, which represents the reward to skills or education. Results in Figure 4.5 show that the welfare of users increases almost monotonically across quantiles when using the wealth measure. Although the pattern is non-monotonic for the well-being measure, the welfare gains remain in favour of users of formal financial services for most of the distribution, as income increases. It's also easy to see that the gap between these two welfare distributions is widest at the lower end of the income spectrum but it narrows at the upper end of the income spectrum, using the well-being measure. Using the wealth measure however, the gap is wider at the bottom for incomes below R6000 (roughly $400), and wider at the top for incomes above R6000. This result is in line with empirical findings of a higher welfare gain at the bottom of the income spectrum (see Singer, 2014). Notice also that to some extent the education and income within-group effects seem to trend together.

Finally, the rural dummy shows a declining effect for both users and non-users of formal financial services, compared to the base category of urban dwellers. Using both measures of welfare, the effect does not rise high enough to make a positive contribution to the welfare distribution. This result is not consistent with empirical findings on experiments such as the rural banking project of India, where welfare gains followed a financial deepening policy, at least in the short-run, as reported by Burgess and Pande (2005). However, Singer (2014) argues that the structure of the South Africa's banking sector, with high costs, makes access to finance by the poor difficult, and could have negative implications for their welfare.

Table 4.6 reports the combined effect of formal use and individual characteristics on one of the global measures on inequality used in this study, that is, the Gini coefficient. The results show an overall negative effect of covariates on the Gini coefficient across the two groups of users and non-users of formal financial products. For instance, being a woman and a user has the effect of increasing the difference in the Gini on assets, compared to being financially excluded. On the other hand, the effect on well-being is positive for both users and non-users. This result re-affirms the gender bias as far as financial inclusion is concerned.[91]

In terms of population group, the effect of formal products use by Blacks, Coloureds and Asians on the Gini coefficient is negative, compared to non-users. This result is the same for both measures of welfare, with a slight difference for Blacks when one considers well-being. Overall, this result suggests that except for the Black group, formal product use is associated with higher welfare for these previously excluded racial groups, compared to their White counterparts. In the case of Blacks for instance, an increase in formal use by at least one product reduces inequality by 20.8% at the bottom end (50-10 quantile) while it increases inequality by almost 11% at the top-end (90-50 quantile) for the non-users of financial products, when well-being is used as a measure of welfare. There is an increase in inequality for the users of formal products of 3.8% at the 50-10 quantile, and an absolute zero effect at the top end of the distribution.[92]

While these results so far point to a positive contribution of formal use of financial products to welfare, the negative and significant contribution in some quantiles is perplexing, as is the positive and

[91] Recall that these are differences such that a negative coefficient implies that the change in the welfare at the 90th quantile is smaller than that at the 10th quantile

[92] These figures are obtained by multiplying the change in the Gini between the two groups (0.01) by the difference in coefficients at the different quantiles, i.e. (-0.201-0.007=-0.208) and (-0.094+0.201=0.107) for nonusers and; (- 0.058+0.096=0.038) and (-0.058+0.058=0) for users respectively. A similar exercise would yield the inter-quantile effects for other covariates, as in FFL (2007)

significant contribution of being financially excluded at some quantiles of the welfare distribution. Recall that the analysis has been based on a divide between formal and semi-formal financial products and services on the one hand, and informal ones on the other. However, as discussed earlier, South Africa has well developed semi-formal and informal financial sectors, which in some instances offer similar services to the formal financial sector. It is possible that there are welfare gains associated with participating in these non-formal financial sectors so that there is not much difference between users and non-users of products from these financial sectors. This forms the basis for the product-level analysis in section 4.8.5.

Table 4.6: Unconditional Quantile Regression Coefficients on the Measures of Inequality

	Panel A:RIF Regression of Inequality on Wealth				Panel B: RIF Regression of Inequality on Wellbeing			
	Non-Users: Gini = 0.533		*Users: Gini = 0.542*		*Non-users: Gini = 0.241*		*Users: Gini = 0.151*	
Variable	Gini	(SE)	Gini	(SE)	Gini	(SE)	Gini	(SE)
Female	-0.033	0.001	0.012	0.015	0.001	0.859	0.002	0.613
Black	-0.698	0.000	-0.106	0.000	0.044	0.104	0.079	0.000
Coloured	-0.658	0.000	-0.265	0.000	-0.016	0.581	-0.001	0.919
Indian	-0.190	0.001	-0.234	0.000	-0.064	0.083	-0.017	0.186
Primary Education	-0.036	0.076	0.007	0.712	-0.028	0.033	-0.027	0.102
High School	-0.133	0.000	-0.097	0.000	-0.076	0.000	-0.083	0.000
Post-Matric	0.111	0.004	-0.144	0.000	-0.097	0.000	-0.129	0.000
30-44years	0.020	0.085	0.014	0.015	0.031	0.000	0.014	0.004
45-59 years	-0.024	0.155	-0.003	0.697	0.017	0.111	0.002	0.772
60+	-0.017	0.339	-0.046	0.000	-0.035	0.003	-0.024	0.002
R1000-5999	-0.044	0.001	-0.044	0.000	-0.019	0.033	-0.051	0.000
R6000-9999	0.970	0.000	-0.053	0.000	0.011	0.913	-0.079	0.000
R10000-24999	1.413	0.000	0.078	0.000	-0.102	0.260	-0.080	0.000
R25000+	0.000	---	0.327	0.000	0.000	---	-0.071	0.003
Rural	0.147	0.000	0.146	0.000	0.056	0.000	0.065	0.000
Eastern Cape	0.089	0.000	0.120	0.000	0.053	0.000	0.164	0.000
Free State	-0.047	0.033	0.026	0.018	-0.050	0.000	-0.003	0.784
KwaZulu Natal	0.076	0.000	0.064	0.000	0.044	0.000	0.032	0.000
Limpopo	0.046	0.033	0.041	0.000	-0.045	0.001	-0.033	0.000
Mpumalanga	-0.021	0.338	0.013	0.228	-0.031	0.032	0.001	0.924
Northern Cape	-0.017	0.625	0.071	0.000	0.000	0.989	0.010	0.535
North West	-0.046	0.043	0.005	0.619	-0.001	0.960	-0.006	0.526
Western Cape	0.070	0.007	0.094	0.000	0.001	0.940	0.020	0.016
Constant	1.253	0.000	0.685	0.000	0.265	0.000	0.200	0.000

Robust Standard Errors reported

Notes: The results show the difference in the Gini between the 90th and the 10th quantiles for users and non-users of financial services. Positive values indicate a higher Gini at the top than at the bottom while negative values imply that the Gini at the lower end is bigger and hence there is greater inequality

4.8.4. Decomposition Analysis

To capture the pattern of changes in welfare distribution from 2005 to 2010, changes in 19 welfare quantiles (from the 5th to the 95th) are decomposed. This allows for a systematic tracking of the factors that could have a different effect at different points of the welfare distribution. Table 4.7 shows the overall change in welfare at selected quantiles(Δ_O^τ), decomposed into the composition (Δ_X^τ) and the welfare (Δ_S^τ) effects obtained using the re-weighting procedure. The results are reported for the lower (50-10) and the upper (90-50) gaps of the welfare distribution for convenience. The base category in this decomposition includes men, Whites, those with no formal education, those earning up to R999 in personal income, those 18-29 years of age, and those residing in urban areas.

As shown in Panel A, using the asset index, the overall difference in the welfare of the two groups, the users and non-users, is larger at the top-end than at bottom-end of the welfare distribution, accounted for by the structural/welfare effect. The positive value of the summary measure of inequality (the 90-10 gap) coupled with the overall negative Gini implies that, although there is greater inequality at the top-end of the welfare distribution, overall inequality is greater among non-users and it is accounted for by the observable characteristics of the individuals in the two groups. These results are in line with our expectations that access and use of finance marginally benefits those at the bottom more than at the top of the welfare spectrum.

In terms of the composition effect, all factors have a larger impact at the top-end (90-50) than the bottom-end of the distribution. In other words, the variables used rightly account for the inequality at the top rather than at the bottom. Looking at the welfare effect, except for the demographic factors (gender, age category, race), the rest of the factors-education, personal monthly income and to some extent region, have a larger impact at the bottom-end than at the top-end of the welfare distribution. In other words, the inequality at the bottom-end of the welfare spectrum is accounted for by education and income. It is therefore safe to say that financial access policies should be complimented by policies that improve the education and incomes of individuals, in order for this access to contribute to the reduction of the welfare gap in South Africa. This finding is consistent with earlier findings discussed in in Chapter 3 that education and personal income, which are closely related, were significant variables in explaining access to and use of financial services in South Africa.

This is consistent with empirical findings on the subject, such as those of Cole, et al. (2011) and Lusardi and Mitchell (2014). If education, which facilitates the understanding of financial concepts, is lacking, then the use of financial services that have a higher potential for assisting users to accumulate wealth (like credit or investments products) will be limited. Recall that the descriptives in Table 4.1 reveal that

a large proportion of South Africans report using transaction products than credit or insurance, and even less, the savings and investment products. This pattern does not seem to have changed since empirical work by Ardington and Leibbrandt (2004) and Srinivasan (2006). These find little use of formal products and even less of credit products, especially by Blacks, despite financial access policies. Transaction products are mainly for consumption and do little for wealth accumulation.

Turning to the well-being measure of welfare, Panel B of Table 4.7 shows that welfare disparity is greater at the bottom end than at the top end of the welfare distribution, and this is accounted for by the composition effect. The summary measure of inequality (the 90-10 gap) as well as the change in the Gini are both negative. This implies that there is greater inequality at the bottom of the welfare distribution as well as greater disparity in welfare among the financially excluded. Except for personal income, the composition effect related to other variables - education, demographic and regional factors - contributes more to this welfare disparity. On the other hand, there is no welfare/structural effect whatsoever, of these factors in the top-end of the distribution, and their effect at the bottom-end of the distribution is to reduce the welfare gap. This result implies that the gap at the bottom-end is driven purely by the welfare effect, or the unobservable characteristics of the individuals.

The effect of personal income is to reduce the gap at the bottom-end of the welfare distribution. Notice that at this end of the welfare distribution, the disparity attributed to personal income is greater among non-users than users of financial services. Thus improvements in personal income would lead to reduction in the welfare gap between these two groups in this part of the welfare distribution. This result appears to be in line with findings by Lloyd and Leibbrandt (2013) who find that the South African unemployed (especially the discouraged) were worse-off than the rest of those who are not-economically-active in terms of well-being, as measured by self-reported level of happiness. In keeping with the objectives of the study, however, these results come close to Moller and Saris (2001) who find demographic characteristics to be significant in the determination of the subjective well-being of South Africans.

While it is clear that the overall differences in welfare of the two measures are explained by structural or unobservable characteristics of individuals, welfare disparities at the top-end of the distribution seem to be captured by the asset index and the well-being index seems to be capturing disparities at the bottom-end of the welfare distribution. In both cases, however, the composition effect associated with the factors follows a similar pattern in the bottom-end of the distribution, which provides some form of convergence of the two measures.

Table 4.7: Decomposition of the Welfare Differences

	Panel A: Welfare Measure = Wealth				Panel B: Welfare Measure = Well-Being			
Inequality Measure	90-10	50-10	90-50	Gini	90-10	50-10	90-50	Gini
Total Change	6.275	-0.868	5.407	-0.018	-0.429	0.260	-0.689	-0.095
Composition	2.626	0.367	2.259	0.220	0.050	0.166	-0.117	-0.041
Welfare Structure	3.650	0.502	3.148	-0.239	-0.479	0.093	-0.572	-0.054
Composition Effects								
Demographics'	6.347	0.258	6.088	0.525	0.121	0.181	-0.060	-0.017
Education	2.641	0.381	2.260	0.186	0.102	0.199	-0.097	-0.035
Personal Income	2.022	-0.209	2.230	1.001	-0.161	-0.206	0.045	-0.005
Region	1.129	0.469	0.659	-0.096	0.035	0.130	-0.095	-0.032
Residual	-9.513	-0.532	-8.978	-1.396	-0.047	-0.138	-0324	0.048
Welfare Structure Effects								
Demographics'	2.269	-1.153	3.423	0.525	-0.003	-0.003	0.000	0.003
Education	2.289	4.871	-2.582	0.081	-0.050	-0.050	0.000	0.093
Personal Income	1.437	1.430	0.007	0.048	-0.042	-0.042	0.000	0.034
Region	1.403	1.492	-0.089	0.026	-0.084	-0.084	0.000	0.002
Residual	-3.748	-5.875	2.382	-0.441	0.300	0.277	-0.572	0.078

Note: Demographics include age, gender dummy, race; region includes 9 Provinces, less Gauteng (base category) and rural dummy. The data is weighted to be nationally representative

4.8.5 Product-Sector Level Analysis

The analysis thus far shows that there is a positive contribution of financial inclusion to the welfare of individuals, when looking at aggregate use of financial services. This section investigates whether these results are consistent at product level. Figure 4.6 provides the RIF regression coefficients for formal and semi-formal credit and insurance products as [separate] treatments against informal credit and insurance as the control group. These two products are equally represented in the formal, semi-formal, and informal sectors. Given that the two measures of welfare are complementary, and given that the wealth measure offers results more consistent with available empirical literature, as shown in the preceding section, this section restricts the discussion to the assets index as a measure of welfare.

In terms of the credit products, the gender dummy shows that there are no welfare gains for users, but there is an almost monotonic increase in the welfare of non-users. Similarly for race, the contribution is almost zero for Blacks, Coloured and Asians compared to Whites (base category). Informal credit contributes positively to the welfare of Coloureds and Asians, but negatively to that of Black South Africans. The welfare gap is significant, especially at higher quantiles. This result is consistent with findings of Srinivasan (2006) for an earlier period. In other words, use of formal credit (and semi-formal credit, in this study) does not seem to contribute to the welfare of previously marginalized population groups during 2005-2010, especially that of Blacks. This pattern of near-zero

contribution of formal and semi-formal credit to welfare seems to cut across covariates. Indeed, no positive contribution to welfare is seen for individuals with at least primary school all through to post-high school, and for those with monthly earnings above R1000 per month. Surprisingly, there is no contribution of formal credit to the welfare of rural dwellers, and the contribution of informal credit is even negative across quantiles.

For insurance products, one notices a positive gender effect on formal insurance across quantiles (although there is a slight oscillation after the 70th quantile), positive but non-monotonic for Coloureds and Asians, and negative for Blacks until the 80th quantile. The education contribution is positive and larger for users (formal and semi-formal insurance) and at the lower quantiles compared to non-users (informal insurance). This result is similar to that of the income effect. As is the case for credit products, the rural dummy does not show any positive welfare gains for users.

The above results show that there are welfare gains associated with using informal financial products, particularly credit and insurance products. These gains are more emphatic at lower quantiles, up to the middle of the distribution. Indeed, the summary statistics in Table 4.1 show a high percentage of users of informal insurance products, compared to both formal and semi-formal users. Despite the unpopularity of informal credit, as evidenced by the percentage of users, the associated welfare gains from this form of credit greatly exceed those of users of formal and semi-formal credit, who together account for almost 90% of credit users (formal, semi-formal, and informal).

Figure 4.6A: RIF Regression Coefficients of Wealth for Credit Use

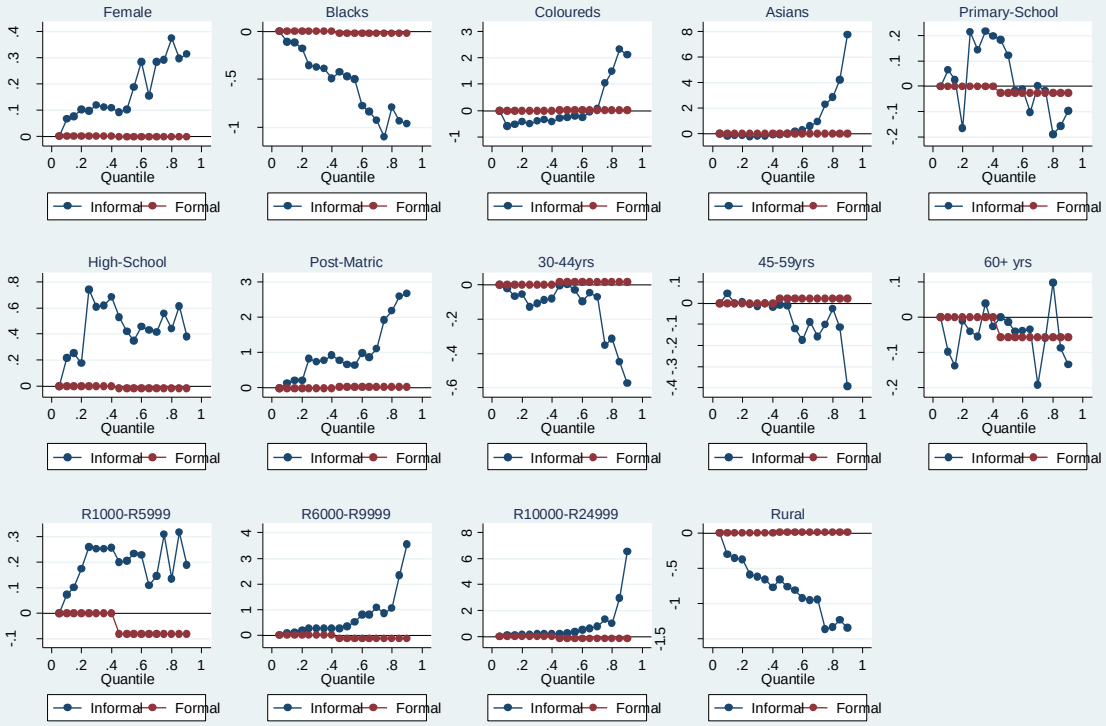
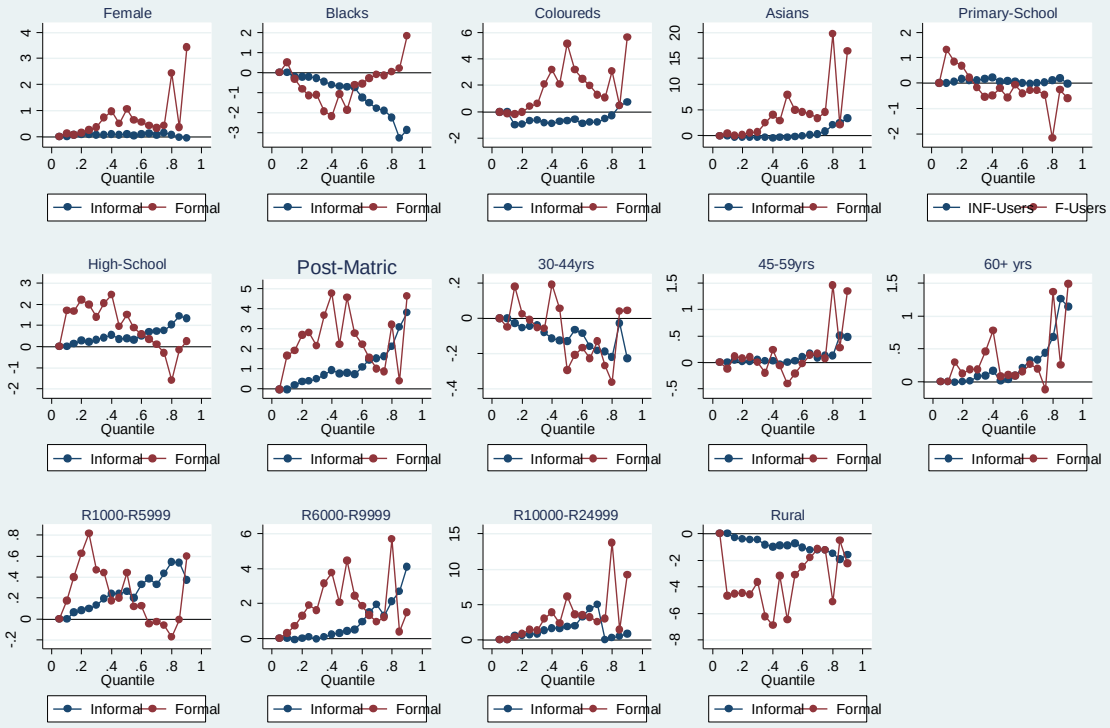


Figure 4.6B: RIF Regression Coefficients of Wealth for Insurance Use



***Notes**: The figure shows Recentered Influence Function coefficients of wealth on credit and insurance products. The formal category is combined with the semi-formal products category to reflect users, while the informal category reflects non-users. The reference category in the regressions comprises males, whites, individuals with no formal education, 18-29 year-olds, those with an income of up to R999, and urban dwellers. The data is weighted to be nationally representative*

4.8.6 Robustness Checks

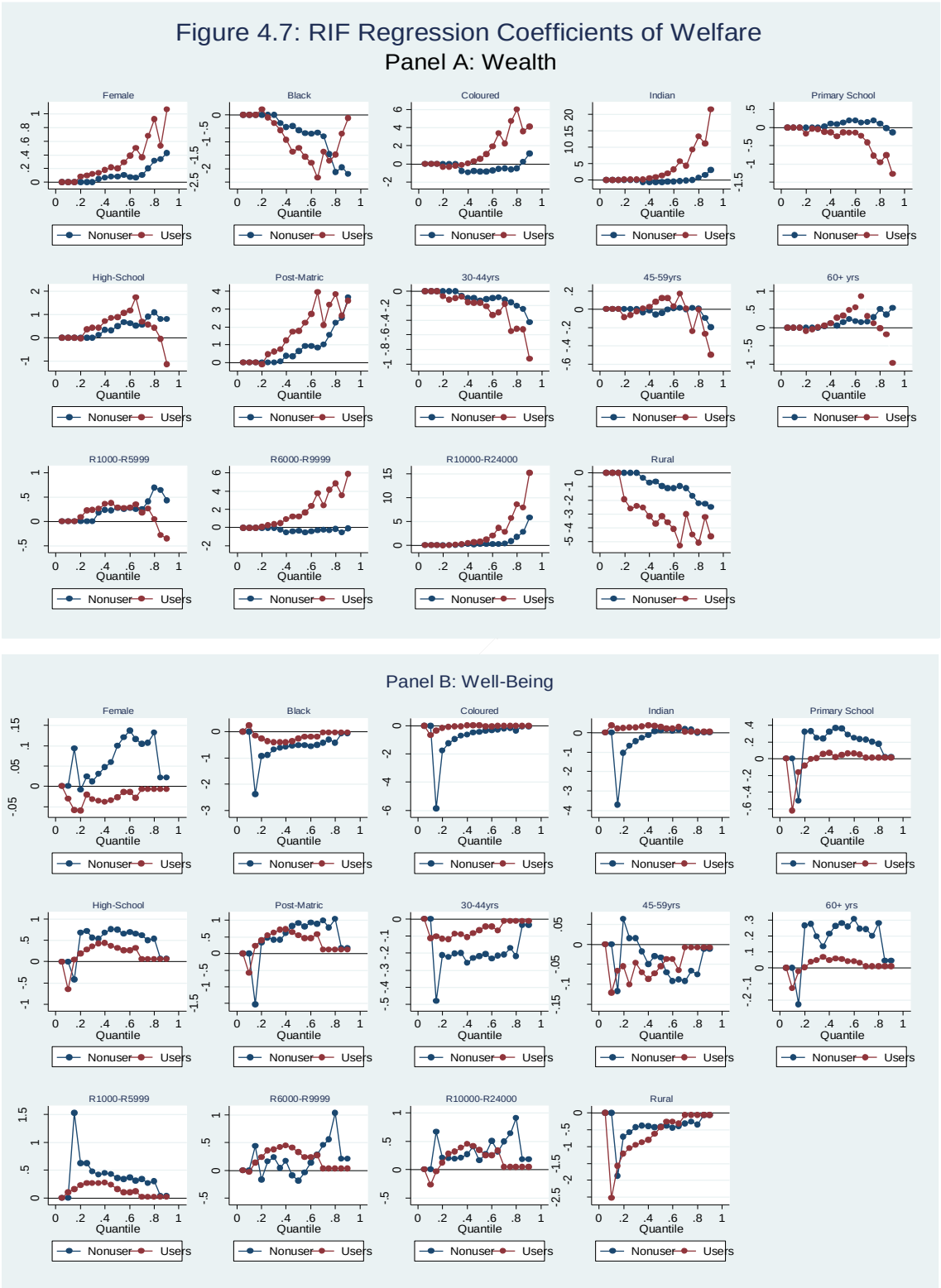
This section investigates whether the exclusion of individuals who do not use any form of financial products leads to sample selection bias. According to Heckman (1979), regression analysis using a sub-sample that is not randomly selected might lead to a specification bias due to missing data. In this study, individuals might voluntarily exclude themselves from using any form of financial products or services for a number of reasons. This is a case of self-selection into the non-users category. Excluding these individuals from the analysis means that the selected subsample is an incomplete sample. This could lead to loss of efficiency if least squares estimation is undertaken.[93]

The identification strategy described in section 4.7.1 accommodates the self-selection bias by estimating the probability of using a product from any one sector, and then using the predicted value as an additional weight to allocate individuals to the treatment, control, and counterfactual groups. To overcome the 'incomplete sample' problem imposed by the analyst in this study, this section combines informal users with the complete non-users to form the 'Non-user' or control group. Combining these two sub-groups is motivated for in Appendix A18, which shows that these two groups are comparable on observables. The new classification of groups for analysis then becomes "User=Formal plus Semi-formal" and "Non-users=Informal plus Not-using".

Figure 4.7 traces out the estimates of the RIF regression of the welfare of these two groups. In Panel A, the wealth measure shows that the patterns are similar to the results obtained when the estimation is done on an incomplete sample. However, there is a slight increase in the magnitude of the coefficients for both the users and the non-users. But this difference in magnitude does not cause a statistical difference in the decomposition of the welfare differences between these two groups. Panel B shows the results when well-being is used as a measure of welfare. The patterns revealed by these plots differ significantly for some covariates, but they remain similar to those in the earlier categorization. For instance, the well-being of women who are non-users is greater than that of users across quantiles and the welfare gap between these two groups is wider than before. There is an improvement in the welfare of Blacks, but this is not statistically significant. However, across the racial groups of Blacks, Coloureds and Asians, the gap in the welfare of the two groups narrows both between and within groups. Similarly, the gap is narrower for the level of income between groups and the welfare of users is greater than that of non-users for most of the distribution. Finally there is an improvement in the results of the rural dwellers, but this too is not statistically significant. Similarly, there is no change in the results of the age variable.

[93] See Heckman (1979) for the mathematical explanation of the related econometric problems

These results seem to suggest that the new categorisation does not add significant value to the analysis of welfare differences between users of different financial products.



Note: *The figure shows coefficients from the Recentered Influence Function regressions of wealth and well-being for users (formal and semi-formal products) and non-users (informal and not-using any products) on selected observable characteristics. The reference categories include males, no formal education, up to R999 level of income, 18-29 years and urban dwellers. The data is weighted to be nationally representative.*

4.9 Summary and Concluding Remarks

This chapter investigates disparities in the welfare of users and non-users of financial products and services in South Africa, using an individual level pooled dataset for the period 2005-2010. To start, two welfare measures are constructed, an asset index and a well-being index. Then, mimicking experimental literature, two groups (treatment (users) and control (non-users)) are identified. Finally, the recentered influence function by Firpo, Fortin and Lemieux (2007; 2009) is used to decompose welfare differences across quantiles, between these two groups in a manner similar to the Oaxaca-Blinder decomposition. The idea is to determine the point at which the welfare gap is significant and what accounts for it.

The results show that for many of the covariates used in the study, the within group welfare disparities are larger for users than for non-users. The between group differences (between users and non-users) is highly non-monotonic across the welfare distribution, depending on the welfare measure used. Overall, the distribution of well-being is highly skewed to the right, while that of assets is highly skewed to the left. Plots of the coefficients of the RIF regressions emphasize the non-monotonic effect, with the welfare distribution of users falling above or below the distribution of non-users across the quantiles. The results point to a better welfare for women who are users than for their non-user counterparts, and no significant welfare gains for Blacks, Coloureds and Asians who are users compared to their non-user counterparts, especially at the top of the welfare distribution. This is consistent with earlier findings by Srinivasan (2006). There is evidence of improved welfare with increasing levels of education and income, especially for earnings of up to R6000. Rural users do not show positive welfare gains when compared to non-users and urban users.

The decomposition results show that the difference between the welfare of users and non-users is larger at the top-end than at bottom of the welfare distribution, using the asset index. The inequality at the top of the distribution is mainly accounted for by the composition effect, specifically by demographics, education, and income, while that at the bottom it is accounted for by the welfare or structural effect. This picture changes slightly when well-being is used as a measure of welfare. This measure seems to capture welfare disparities at the bottom end of the welfare distribution. Overall, welfare difference between the two groups is smaller when using this measure than when using durables. Once again inequality at the top of the welfare distribution is accounted for by the welfare or structural effect. This set of results suggests that these two proxies of welfare, that is, the asset index and the well-being index, can be considered as complementary in analysing welfare disparities during the period of this study.

Disaggregating usage by products shows that there is a positive association between welfare and use of informal credit, compared to formal and semi-formal credit products. On the other hand, formal and semi-formal insurance products are associated with better welfare for users who are women, Coloureds and Asians. The effect is positive and increases with an individual's education and income. However, there is a positive and significant welfare gain (at higher quantiles) from informal insurance for individuals with a high-school level of education and earning less than R6000 per month. Thus, for both these products, the differences in welfare of users of formal and semi-formal credit and insurance products and users of informal credit and insurance is influenced by education and income levels.

These findings are generally in line with empirical findings as far as the effect of use of financial products on welfare is concerned. They differ slightly in that they highlight the positive association of welfare with using certain types of informal products, such as credit and insurance products. In the case of South Africa, this emphasizes the importance of the informal financial sector from where consumers seem to derive utility that improves their welfare. It is therefore imperative to conduct further research to understand the characteristics of non-formal financial services. Such an exercise has both financial sector practice and policy implications. From a practice perspective, informal sector products seem to compete with formal or semi-formal products. From a policy perspective, there is a possibility that upscaling formal financial access could be stifled if individuals do not see significant welfare gains from the use of formal financial mechanisms. This could provide a possible explanation for why there are often individuals that report being 'previously banked' but no longer use formal financial products.

Financial inclusion initiatives often target individuals who are marginalised by society. Such individuals are likely to have little if any education and they often rank at the lower end of the income spectrum. Yet the results of this chapter show that welfare gains are associated with high levels of income and education, and they are minimal for individuals with low levels of education and income, when compared to their non-user counterparts. This pattern seems to hold whether welfare is measured qualitatively (say using a measure of personal well-being) or quantitatively (say using an asset index). Thus financial inclusion interventions could benefit from complementary policies that address education and income inequalities, in order for this inclusion to contribute meaningfully to the reduction of the inequality gap in South Africa. Such a model was often used in the early days of the microfinance movement, whereby microfinance clients would receive financial training on every visit for repayment or receipt of funds.

CHAPTER FIVE

Conclusion

This thesis investigates the relationship between finance and welfare, for South Africa, over the period 2005-2010. The emphasis is on the welfare disparities between users and non-users of financial products and services. Even if these financial products and services are available, in the South African context it is important to recognise that financial access might not lead to better welfare because of lack of financial skills. This possibility is given detailed attention to by examining two issues. These are, firstly, the distribution of financial literacy in South Africa, and secondly, the role of financial literacy in the choice of financial products and services during the period under review.

The thesis highlights the research paradigm followed in the study, discusses the ongoing debate on the three issues addressed in the study, that is, financial literacy, use of finance, and welfare. These issues are complicated socio-economic phenomena, however. They are covered by extensive social sciences literatures, using both qualitative and quantitative methods to understand them individually as well as the links between them. Within this broad corpus, this study contributes to the well-established economics literature, employing a set of quantitative techniques. The motivation of South Africa as a case study is also provided, with a full account of its realities, as well as the relevant South African literature. The South African data used in this study is rich enough to allow for the derivation of an appropriate financial literacy index, and an investigation of the contribution of financial literacy to the use of formal and informal financial services. These exercises make possible an account of the role of both formal and informal financial services in social welfare, which is measured using an asset index as well as consumers' perceptions.

Chapter 2 covers construction of the financial literacy index. The main objective is to establish the extent of financial literacy in South Africa, its distribution, and its determinants. The resulting financial literacy index is a continuous variable, with scores being a composite measure of an individual's financial knowledge and financial capability. These scores are weighted to make the index representative of the South African population. The average scores of this index are used to explore the landscape of financial literacy in the country. Thereafter, individuals' financial literacy scores (together with other personal characteristics) are used to investigate the extent to which financial literacy can explain choice of financial services in a setting where both formal and non-formal financial products are available. This is dealt with in Chapter 3. Finally, Chapter 4 details how two measures of welfare are constructed to examine the differences in welfare of users and non-users of formal financial services. These differences are decomposed along quantiles of welfare to establish the

confounders of the observed welfare gap. The decomposition captures both within-group and between-group differences, some of which were objective (explained) while others were unexplained.

Some interesting insights emerge from this analysis. Firstly, the level of financial literacy in South Africa averages 48.4 out of 100 over the period 2005-2009. Below average levels were more pronounced among Black South Africans, women, youths (including students), the elderly, individuals with lower levels of income, and those with less than matric education attainment. Race, education, and income are shown to be significant determinants of financial literacy. This is a pattern that mimics the race-related education and labour market inequalities that characterise post-Apartheid South Africa.

Secondly, there is a positive relationship between financial literacy and the likelihood of using formal financial products and services, on aggregate. However, disaggregating usage by product category (transactional, credit, insurance and saving/investment) and by source (formal, semi-formal and informal), the effect of financial literacy on choice of product was weakened. Incorporating individuals' risk-attitudes revealed some degree of switching. The probability of using formal services declined with a rise in risk-aversion, while it increased for using non-formal financial products, especially insurance and credit products/services. This is perhaps due to the rich diversity of these products in the formal and non-formal financial sectors, which present consumers with more choices. Interacting financial literacy with the individual's observable characteristics shows that the higher the financial literacy score of Blacks and Coloureds, the more likely they are to use formal products, and less likely to use informal credit. However, the use of formal financial services was dampened as more financial literacy was acquired by older members of society.

Thirdly, there is an overall positive and significant relationship between the use of formal financial services and welfare. However, the disparities in the welfare of users and non-users of formal financial services depend on the measure of welfare used. For instance, using subjective well-being as the measure of welfare, the disparities are small but significant at the bottom-end of the welfare distribution. On the other hand, using the possession of durable items/assets as the measure shows that the disparities are large and significant at the top-end of the welfare distribution. In both instances, the observable characteristics account for these differences. Welfare disparities among users (within-group) and between users and non-users (between-groups) are non-linear. For instance, in some quantiles, the welfare of users is above that of non-users, while it falls below the latter in some quantiles of the welfare distribution. In other words, some users of informal products exhibit better welfare than those individuals who use formal services and products. It remains optimal for these users to use informal financial products in their contemporary environments. Unless there are changes to either the formal or informal financial product markets, or to the socio-economic status of

users, these individuals will not switch to formal financial products. This pattern is evident for use of informal credit and insurance products.

Given the aforementioned, it is safe to argue that financial access is associated with better welfare, and that financial literacy plays a role in the choice of financial products which in turn impacts one's welfare. Education, income, and race are significant determinants of financial literacy, use of financial services, and welfare. This implies that financial inclusion efforts are limited by and would derive indirect benefits from policies that address inequalities associated with these variables. In a South African setting this is not far-fetched, given the history of the country. There are financial literacy and financial access gaps for vulnerable individuals, such as women, the youth, Blacks, individuals with low or unstable incomes, rural dwellers, and the less educated. For instance, demographic variables account for 10% of the variation in financial literacy, while geographic variables (provinces) contribute only 0.7% additional predictive power. Thus attempts to address the provincial financial literacy gap would be limited by these demographic constraints. Moreover, the provincial financial literacy patterns mimic the poverty trends in the country.

Even within these socio-economic constraints, the study suggests the need to create policies to promote financial literacy and the use of formal financial products. The use of formal financial services is shown to be driven more by knowledge of financial concepts and the functioning of the various products. Such concepts should form part of the financial education curriculum. Furthermore, a financial education programme might require that the content is function-specific or product-specific, to target the needs of the different demographic groups, as opposed to a one-size-fits-all curriculum. For instance, targeting Blacks and Coloureds might increase the likelihood of these groups using formal transaction, credit, and insurance products. Such a curriculum would address the specific financial literacy gaps for these groups. A curriculum that targets all racial groups would most likely be ineffective because of the differing financial literacy deficiencies. Also, the results suggest that the introduction of low-cost formal insurance products could increase the likelihood of uptake by low-income groups who are currently using informal insurance products.

From a global perspective, this study contributes to the ongoing debate on the welfare benefits of access to finance by emphasizing that, indeed, the welfare benefits of access to finance vary across financial product and also depend on one's position on the welfare spectrum. The study further highlights the importance of the informal financial sector in meeting the needs of low-income individuals, with implications for their welfare. This study thus provides a starting point for similar analyses, especially in countries that have product diversity in the non-formal financial sector. This study also emphasises the positive association between financial literacy and a number of financial

outcomes, even though causality cannot be claimed. Peculiarities with regard to the role of financial literacy in the choice of financial services are not unique to South Africa. The main challenges relate to the attainment of equilibrium between what the market has to offer and what consumers demand in order to maximise their welfare. As shown by this study, given the constraints that consumers face, they might express this by choosing non-formal products in categories where such variety exists. This should not to be interpreted as consumers behaving irrationally. Finally, the pattern of financial literacy observed in South Africa resonates with global findings in middle-high income economies. This study shows that the role of financial literacy in financial outcomes justifies the pursuit of a financial education strategy and that this strategy should be conducted in line with the demographic and economic characteristics of each country.

Notwithstanding the aforementioned, it is appropriate to conclude by mentioning some limitations in the data and approach that has been used to identify further studies that would add value in honing policy implications. Firstly, the dataset used was collected for a different purpose, albeit one closely related to this study. This has consequences for ideal variable construction. For example, numerical abilities related to financial literacy were not directly tested. Rather, the analysis relies on self-reported responses about this knowledge. Further, there is no information on the cost of using different products, for example product fees, in the formal and non-formal financial sectors. Use of a more direct cost measure, such as product costs in the two financial sectors would allow for an assessment of the magnitude of the cross-elasticity of product usage, especially between the formal and informal financial sectors.

The possibility of learning on the job could also not be investigated even though financial concepts and skills can be learnt as a result of using financial products, especially where usage is mandatory. For example, an employer might require that an employee has a bank account to receive a salary, or where social welfare support is paid through a formal financial structure (such as the SASSA account in South Africa). Financial literacy can also be acquired through the services of a financial planner, although this is probably only available to high income earners. Thus the question of 'does financial literacy lead to use of financial services or does use of financial services lead to becoming financially literate' could not be answered explicitly in this study except to confirm that there is a positive association between these two aspects of finance.

The study has had to assume a certain degree of homogeneity of financial services and products. Although usage was disaggregated by product categories (transaction, credit, insurance, savings, and investment), products in each of these categories still differ. For instance, a consumer loan operates

differently from a mortgage or vehicle finance loan, or revolving credit. Similarly, a basic savings account operates differently from a fixed deposit account, or the exchange traded funds on the stock market. There are varying levels of sophistication of products, requiring different levels of financial skills. Such skills cannot easily be equated to simply scoring below or above the national average financial literacy score. Indeed, results of the brief analysis of financial sophistication attempted in this study suggest that deeper analysis could yield further interesting and policy relevant results. There are potentially different welfare implications of using each of these products, even within the same category.[94]

Indices are constructed in this study. While each was useful, it would not be true to say that they are ideal. The financial literacy index was constructed as a measure of financial skills. However, the use of such an index, which is a continuous variable, in a regression analysis, makes it difficult for policy recommendation. This is because an increase or decrease on the scale does not easily translate into a clear policy action[95]. Results of the brief analysis conducted by disaggregating the index into its components presents evidence of the need for a comprehensive instrument for measuring financial literacy in a manner that can aid policy actions more directly. Second, while the asset index was meant to capture the metric aspect of welfare, the lack of data on the durable items used to construct this index impeded the establishment of the net value of such assets, given that it is possible for individuals to acquire items on credit.

Further, the literature argues that the benefits of finance for welfare are non-linear. While the quantile regression can capture some elements of non-linearity, it does not capture the dynamic nature of access to finance that is time related. For instance, an individual might be better off in the short term following access to a credit line or an asset acquired on credit, but later suffer due to stress from the debt obligation. Similarly, an individual who opts to save or invest foregoes immediate consumption. It would therefore be interesting to track an individual's welfare at different times of financial access, and the type of products they use. Such an analysis would require repeated panel data, which was not available for this study. A possible extension of this research could therefore consider the construction of a pseudo-panel from the available cross-sectional data, to investigate such welfare dynamics. The possible question to be addressed in such an analysis relates to whether the benefits of financial access accrue in the short-run or in the long-run, and how this relationship differs across product types, controlling for socio-economic and demographic characteristics of individuals.

[94] See Karlan and Zinman (2010) where a different categorisation of loans yielded different welfare results.
[95] See Lubotsky and Wittenberg (2001) for a detailed discussion

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APPENDIX

Appendix A1: Conceptual definitions of financial literacy

Source	Conceptual definition
Hilgert, Hogarth, & Beverley (2003)	Financial *knowledge*
FINRA (2003)	"The *understanding* ordinary investors have of market principles, instruments, organizations and regulations" (p. 2)
Moore (2003)	"Individuals are considered financially literate if they are competent and can demonstrate they *have used knowledge* they have learned. Financial literacy cannot be measured directly so proxies must be used. Literacy is obtained through practical *experience* and active *integration of knowledge*. As people become more literate they become increasingly more financially sophisticated and it is conjectured that this may also mean that an individual may be more competent" (p.29).
National Council on Economic Education (NCEE) (2005)	"*Familiarity* with basic economic principles, knowledge about the U.S. economy, and *understanding* of some key economic terms" (p. 3).
Mandell (2007)	"The *ability* to evaluate the new and complex financial instruments and *make informed judgments* in both choice of instruments and extent of use that would be in their own best long-run interests" (pp. 163-164).
Lusardi and Mitchell (2007c)	[*Familiarity*] with "the most basic economic concepts needed to make sensible saving and investment decisions" (p. 36).
Lusardi and Tufano (2008)	Focus on debt literacy, a component of financial literacy, defining it as "the *ability to make simple decisions* regarding debt contracts, in particular how one *applies basic knowledge* about interest compounding, measured in the context of everyday financial choices" (p. 1).
ANZ Bank (2008), drawn from Schagen (2007)	"The *ability* to *make informed judgements* and to take effective decisions regarding the use and management of money" (p. 1).
Lusardi (2008a, 2008b)	"*Knowledge* of basic financial concepts, such as the working of interest compounding, the difference between nominal and real values, and the basics of risk diversification" (p. 2).
Jump$tart Coalition: http://www.jumpstart.org/guide.html	The ability to use knowledge and skills to manage one's financial resources effectively for a lifetime of financial well-being
OECD (2005) *(Financial Education)*	"The process by which financial consumers/investors improve their understanding of financial products and concepts and, through information, instruction and/or objective advice, develop the skills and confidence to become more aware of financial risks and opportunities, to make informed choices, to know where to go for help, and to take other effective actions to improve their financial well-being" (p. 4).

***Source**: Hung et al. (2011) and Author's Compilations*

Appendix A2: Financial literacy survey results for selected countries using the same questions

COUNTRY (YEAR OF SURVEY)	*Q1. COMPOUND INTEREST**	*Q2. INFLATION**	*Q3. RISK DIVERSIFICATION**	*SURVEY SAMPLE*	*SOURCE*
High-income					
United States (2009)	65%	64%	52%	1,488	Lusardi and Mitchell (2011b)
Italy (2006)	40%	60%	45%**	3,992	Fornero and Monticone (2011)
Germany (2009)	82%	78%	62%	1,059	Bucher-Koenen and Lusardi (2011)
Sweden (2010)	35%	60%	68%	1,302	Almenberg and Säve-Söderbergh (2011)
Japan (2010)	71%	59%	40%	5,268	Sekita (2011)
New Zealand (2009)	86%	81%	27%	850	Crossan et al. (2011)
Netherlands (2010)	85%	77%	52%	1,324	Alessie et al. (2011)
Upper-middle-income					
Russia (2009)	36%	51%	13%	1,366	Klapper and Panos (2011)
Romania (2010)	24%	43%	--	2,048	World Bank CPFL program
Azerbaijan (2009)	46%	46%	--	1,207	World Bank CPFL program
Chile (2006)	2%	26%	46%	13,054	Behrman et al. (2010)
Lower-middle-income					
Indonesia (2007)	78%	61%	28%	3,360	Cole et al. (2010)
India (2006)	59%	25%	31%	1,496	Cole et al. (2010)
West Bank & Gaza (2011)	51%	64%	--	2,022	World Bank CPFL program

Note: *The conceptual definition adopted in these studies is 'the possession of financial knowledge on interest rates, inflation, and risk diversifications, and numeracy skills'. Although the wording of the questions used was slightly adjusted depending on the country, the general phrasing is provided in Box 1 below. In each case the sample was profiled against the percentage of correct answers.*

Source: *Lisa Xu & Bilal Zia, (2011)*

Box 1: Sample Financial Literacy Survey Questions

1) Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?

More than $102
Exactly $102
Less than $102
Do not know
Refuse to answer

2) Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?

More than today
Exactly the same
Less than today
Do not know
Refuse to answer

3) Please tell me whether this statement is true or false. —Buying a single company's stock usually provides a safer return than a stock mutual fund.

True
False
Do not know
Refuse to answer

Note: Correct answers in bold.

Appendix A3: Financial Literacy Sample Measurement Strategies

Publication	Operational Definition
Volpe, Chen and Pavlicko (1996)	Percent correct on 10 multiple-choice items
Chen and Volpe (1998)	Percent correct on 36 multiple-choice items
Volpe, Kotek and Chen (2002)	Correct responses on 10 multiple-choice items
Hilgert, Hogarth and Beverley (2003)	Percent correct on a knowledge index
FINRA (2003)	Correct responses to 10 true/false items
Moore (2003)	Financial knowledge: Number of correct responses to 12 binary-choice items. Financial experiences: Report having financial experiences across 14 items. Financial behaviour: Report engaging in positive and negative behaviours across 15 items. Debt confidence: Responding "completely" or "very confident" regarding debt considerations
Mandell (2004)	Percent correct on a 31-item knowledge test
Agnew and Szykman (2005)	Number of correct responses to 10 multiple choice and true/false items. Also, self-rated investment knowledge relative to others on 1-10 scale.
National Council on Economic Education (NCEE) (2005)	Percent correct on 24-item knowledge test
Lusardi and Mitchell (2006, 2008); Mexican version in Hastings and Tejeda-Ashton (2008)	Correct responses to 3 multiple-choice and true/false items
Lusardi and Mitchell (2007a)	Correct responses to 3 computational items
Lusardi and Mitchell (2007b)	A single weighted average of correct/incorrect responses (based on factor analysis) of 5 multiple-choice basic financial literacy items and 8 multiple choice sophisticated financial literacy items. Separately considered a 7-point item on perceived knowledge
Mandell (2007)	Percent correct on a knowledge test
van Rooij, Lusardi and Alessie (2007)	Two weighted averages of correct/incorrect responses (based on factor analyses) for (a) 5 multiple-choice basic financial literacy items and (b) 11 multiple-choice sophisticated financial literacy items. Separately considered a 7-point item on perceived knowledge.
Lusardi and Tufano, (2008)	Correct responses to 3 individual multiple-choice items
ANZ Bank (2008)	Mean score, based on target responses to 26 questions derived from an operational framework

Source: *Hung et al. (2009)*

Appendix A4: Framework for Modelling Financial Literacy

Domain	Focus Area(s)	Analytical Approach
Financial Capability Managing money	• Making ends meet • Involvement of money management • Presence of a budget • Attitude towards spending and saving	Financial Capability sub-index constructed from the weighted responses using principle components analysis
Keeping track		Simple summing of correct responses and the average score decomposed by the socio-demographic characteristics of South Africans
Financial Planning	• Recent saving behavior • Planning for financial management • Attitude to planning ahead	
• Staying informed/getting help	• Understanding where to get information and help • Sources of products information	
Choosing Financial Products	• Awareness of financial products (14 common products in the South African financial industry) • Products holding and purchase • Decision making and product choice •	Excluded from Index construction in this study in light of the policy that was instituted to include a low-cost transactions account on the financial products menu i.e. the Mzansi account
Financial Knowledge Knowledge and Understanding of financial concepts and terminologies	• Basic arithmetic • Inflation • Interest rate (interest paid, interest received and compounding) • Understanding investment risk and returns	Financial knowledge sub-index constructed from by weighting responses using principle components analysis Simple summing of correct responses and average score of correct responses cross-tabulated by the socio-demographic characteristics of the population

Source: Adopted from Atkinson et al. (2007) and customised to the study according to the OECD (2009) definition for financial education

Appendix A5: Summary Statistics for the Data (2005-2009)

Variable		2005 N=3568	2006 N=3643	2007 N=3675	2008 N=3329	2009 N=3575	Pooled N=18694
Gender	Male	47.6	48.8	46.8	47.0	47.6	47.9
	Female	52.4	51.2	53.2	53.0	52.4	52.1
Race	Black	76.7	76.0	76.7	72.7	75.4	79.6
	Coloured	9.1	9.6	8.6	10.6	9.6	9.4
	Indian	2.7	2.7	2.9	3.4	3.1	2.8
	White	11.5	11.7	11.7	13.4	11.9	9.1
Education	No Formal Education	2.8	5.9	3.8	1.3	2.3	3.5
	Primary School	17.1	16.7	12.1	10.7	10.7	6.5
	High School	67.1	64.8	70.1	72.0	72.2	70.7
	Post High School	13.0	12.6	13.9	16.0	14.8	40.8
Age Category	18 - 29 years	37.9	34.8	38.4	37.2	39.0	38.1
	30 - 44 years	31.8	34.6	38.4	40.1	37.9	35.7
	45 - 59 years	17.9	19.0	11.4	11.9	11.9	14.2
	60+ years	12.3	11.6	11.8	10.8	11.3	12.0
Province	Eastern Cape	14.1	13.9	12.3	13.0	12.6	13.5
	Free State	6.6	6.8	5.6	5.1	5.7	6.0
	Gauteng	21.8	21.9	24.6	23.6	22.1	22.1
	KwaZulu Natal	19.2	19.0	20.6	20.4	19.3	19.9
	Limpopo	10.9	10.3	9.4	8.5	9.4	10.2
	Mpumalanga	6.7	7.0	7.5	6.9	7.2	6.9
	Northern Cape	1.9	2.1	2.1	2.3	2.3	2.1
	North West	8.4	8.1	6.9	7.5	9.3	8.1
	Western Cape	10.4	10.9	10.9	12.8	12.0	11.2
Geo-Area	Urban	53.1	61.2	63.4	66.3	64.9	57.0
Marital Status	Single	47.3	48.7	51.1	57.0	58.5	53.2
	Divorced	2.4	2.8	1.8	2.5	1.7	2.1
	Widowed	8.7	7.1	6.2	5.4	5.7	6.8
	Married	41.6	41.4	40.9	35.2	34.1	37.8
Source of Money	Formal	11.4	21.6	28.1	35.9	29.8	23.9
	Informal	21.0	39.3	34.4	33.4	36.4	32.9
	Grant	8.3	19.9	19.5	16.1	15.1	16.6
Personal Monthly Income	Up to R999	67.3	65.4	61.0	50.0	49.0	60.7
	1000-5999 Rands	25.9	27.6	32.9	40.6	41.9	32.2
	6000-9999 Rands	3.5	4.1	3.4	5.7	5.6	4.1
	10000-24999 Rands	2.9	2.7	2.5	3.3	3.2	2.7
	R25000+	0.3	0.3	0.2	0.4	0.4	0.3
Employment Status	Pensioner	13.5	12.2	10.9	9.6	10.6	11.8
	Formal Employee	25.5	26.7	28.4	35.5	30.2	27.7
	Housewife	4.1	3.7	3.5	3.6	3.8	3.7
	Student	9.3	6.7	8.7	8.7	8.6	8.7
	Informally Employed	3.9	8.9	8.5	11.4	8.8	8.2
	Self Employed	31.3	7.3	8.3	6.7	7.1	11.8
	Unemployed	11.1	33.8	30.3	24.1	30.6	27.3

Note: The table shows the structure of the cross-sections and the pooled dataset, weighted to be nationally representative. Wilk's lambda: 0.4235, F(176.0, 62397.7)= 85.23, Prob>F=0.0000a

Appendix A6: Average Scores in the Financial Knowledge Domain (Pooled Data)

Variable		Mean	Std. Dev.	Valid N
Sample		5.14	2.07	18717
Gender	Male	5.22	2.07	9319
	Female	5.07	2.06	9398
Race	Black	4.74	1.94	10333
	Coloured	5.68	1.86	3507
	Indian	6.38	1.91	1397
	White	7.09	1.74	3457
Education	No formal education	4.56	1.73	558
	Some primary education	4.36	2.03	1145
	Primary school completed	4.62	1.86	1370
	Some high	4.80	1.99	7099
	Matriculated	5.41	2.04	5545
	Some university	6.02	1.95	653
	University completed	6.78	1.77	1192
	Any other post-matric qualification	6.42	1.93	1155
Age Category	18-29 years	4.81	2.01	5851
	30-44 years	5.22	2.06	6490
	45-59 years	5.52	2.02	3970
	60+ years	5.49	2.15	2352
Province	Eastern Cape	5.06	1.96	2274
	Free State	4.83	2.08	1724
	Gauteng	5.57	2.02	3042
	KwaZulu Natal	5.10	2.04	2815
	Mpumalanga	4.49	2.10	1611
	Northern Province/Limpopo	4.48	2.05	1581
	Northern Cape	5.24	1.96	1476
	North West	4.77	1.93	1740
	Western Cape	5.89	2.03	2454
Area	Rural	4.78	2.00	6346
	Urban	5.41	2.07	12371
Marital Status	Single	4.80	2.00	8177
	Divorced	5.84	1.97	568
	Widowed	5.24	2.06	1493
	Married/living with partner	5.56	2.08	8479
Source of Money	Formal	5.91	1.98	5374
	Informal	4.80	2.03	5839
	Grant	4.71	2.00	2658
	Other	6.12	2.21	1200
	None	4.41	2.05	1799
Personal Income	Up to R99	4.72	1.91	8407
	1000-5999	5.18	2.03	5509
	6000-9999	6.56	1.76	1014
	10000-249	7.23	1.59	730
	R25000+	7.53	1.65	81
Occupation	Pensioner	5.46	2.12	2469
	Formal Employee	5.78	1.96	5946
	Housewife	5.50	2.16	945
	Student	4.68	1.98	1252
	Informally Employed	4.76	1.97	1546
	Self Employed	5.33	1.82	2094
	Unemployed	4.48	2.04	4287
Bank Status	Currently Banked	5.60	2.03	12226
	Previously Banked	4.92	1.84	1728
	Not Banked	4.35	1.95	4763

Note: The table shows the average number of questions answered in the affirmative in the financial knowledge domain, decomposed by the socio-economic and demographic characteristics of the respondents, using the pooled dataset. The data is weighted and thus the responses are nationally representative

Appendix A7: Average Scores in the Financial Capability Domain (Pooled Data)

Variable		Mean	Valid N
Sample		3.05	18717
Gender	Male	3.09	9319
	Female	3.01	9398
Population Group	Black	2.95	10333
	Colored	2.97	3507
	Indian	3.64	1397
	White	3.65	3457
Education	No formal education	2.46	558
	Some primary education	2.61	1145
	Primary school completed	2.62	1370
	Some high education	2.85	7099
	Matriculated	3.27	5545
	Some university	3.87	653
	University completed	4.02	1192
	Any other post-metric qualification	3.64	1155
Age Category	18-29 years	2.99	5851
	30-44 years	3.11	6490
	45-59 years	3.12	3970
	60+ years	3.00	2352
Province	Eastern Cape	2.53	2274
	Free State	3.08	1724
	Gauteng	3.37	3042
	KwaZulu Natal	3.03	2815
	Mpumalanga	3.18	1611
	Limpopo	2.96	1581
	Northern Cape	2.96	1476
	North West	2.92	1740
	Western Cape	3.22	2454
Area	Rural	2.89	6346
	Urban	3.18	12371
Marital Status	Single	2.94	8177
	Divorced	3.03	568
	Widowed	2.87	1493
	Married/living with partner	3.25	8479
Sources of	Formal	3.60	5374
Money	Informal	2.99	5839
	Grant	2.75	2658
	None	2.47	1799
Personal monthly	Up to R999	2.64	8407
Income	R1000-5999	3.43	5509
	R6000-9999	3.84	1014
	R10000-24999	3.77	730
	R25000+	4.32	81
Occupation	Pensioner	2.97	2469
	Formal Employed	3.58	5946
	Housewife	2.93	945
	Student	2.90	1252
	Informally Employed	3.02	1546
	Self Employed	2.97	2094
	Unemployed	2.67	4287
Banking History	Currently	3.49	12226
	Previously banked	2.53	1728
	Not banked	2.42	4763

Note: The table shows pooled weighted responses by respondents to the questions in the capability domain. The weights used are in line with those used by statistics South Africa for the period under review and, as such, they results are nationally representative

Appendix A8: Decomposition of Average Scores of Financial Literacy

Variable		Mean	Valid N
SA Average		48.42	18717
Gender	Male	49.02	9319
	Female	47.87	9398
Population group	Black	46.19	10333
	Coloured	49.19	3507
	Indian	55.83	1397
	White	60.86	3457
Education	No formal education	45.71	558
	Some primary	42.40	1145
	Primary school	44.33	1370
	Some high school	45.20	7099
	Matriculated	50.47	5545
	Some university	57.46	653
	Any other post-matric qualification	58.73	1155
	University	63.02	1192
Age Category	18-29 years	45.79	5851
	30-44 years	49.45	6490
	45-59 years	51.39	3970
	60+ years	50.02	2352
Province	Eastern Cape	43.12	2274
	Northern Cape	45.58	1476
	North West	45.63	1740
	Free State	46.19	1724
	Mpumalanga	46.21	1611
	Limpopo	46.86	1581
	KwaZulu Natal	48.93	2815
	Gauteng	52.45	3042
	Western Cape	52.46	2454
Area	Rural	46.24	6346
	Urban	50.07	12371
Marital Status	Single	45.36	8166
	Divorced	52.69	568
	Widowed	48.62	1493
	Married	52.45	8467
Source of Money	Formal	56.34	5374
	Informal	45.65	5839
	Grant	45.03	2658
Personal Monthly income	Up to R999	43.64	8407
	R1000-5999	51.11	5509
	R6000-9999	60.61	1014
	R10000-24999	64.02	730
	R25000+	68.40	81
Occupation	Unemployed	41.74	4287
	Student	43.29	1252
	Informally Employed	46.66	1546
	Housewife	48.32	945
	Pensioner	49.72	2469
	Self Employed	50.57	2094
	Formal Employee	55.73	5946
Banking History	Currently	54.06	12211
	Previously Banked	42.99	1723
	Never banked	39.70	4760

Notes: The table shows the decomposition of the average financial literacy score by socio-demographic characteristics of South Africans. The data is weighted to be nationally representative. Weights are benchmarked to Statistics South Africa.

Appendix A9: Correlates of Financial Literacy in South Africa

Variable		(1)	(2)	(3)	(4)
Gender	Female	-0.123	-0.0469	-0.116	-0.103
(Male)		(0.444)	(0.445)	(0.444)	(0.440)
Race	Coloured	0.873	0.719	0.903	0.906
(Blacks)		(0.607)	(0.545)	(0.605)	(0.604)
	Asian/Indian	2.653***	4.057***	2.764***	2.789***
		(0.899)	(0.827)	(0.898)	(0.890)
	White	4.467***	4.525***	4.517***	4.488***
		(0.903)	(0.906)	(0.903)	(0.874)
Education	Some Primary School	-3.855***	-3.857***	-3.803***	-3.690***
(No Education)		(1.244)	(1.232)	(1.244)	(1.245)
	Primary school	-2.748**	-2.872**	-2.696**	-2.371**
		(1.212)	(1.206)	(1.211)	(1.209)
	Some high school	-2.090*	-2.094*	-2.031*	-1.900*
		(1.094)	(1.082)	(1.093)	(1.090)
	Matriculated	-1.205	-1.077	-1.139	-0.936
		(1.202)	(1.188)	(1.200)	(1.195)
	Some university	3.739**	3.476**	3.822**	4.192**
		(1.687)	(1.681)	(1.684)	(1.690)
	University completed	4.810***	5.032***	4.914***	5.081***
		(1.534)	(1.526)	(1.530)	(1.530)
	Other post matric	3.380**	3.425**	3.454**	3.926***
		(1.503)	(1.486)	(1.503)	(1.498)
Province	Eastern Cape	-4.045***		-4.162***	-4.177***
(Western Cape)		(0.761)		(0.764)	(0.762)
	Northern Cape	-2.706***		-2.722***	-2.736***
		(0.810)		(0.809)	(0.813)
	Free State	-0.227		-0.240	-0.245
		(0.858)		(0.857)	(0.861)
	KwaZulu Natal	1.229		1.142	1.094
		(0.786)		(0.789)	(0.790)
	North West	-1.460*		-1.566*	-1.508*
		(0.880)		(0.879)	(0.882)
	Gauteng	-0.590		-0.566	-0.558
		(0.743)		(0.743)	(0.743)
	Mpumalanga	-1.587*		-1.670*	-1.736*
		(0.923)		(0.922)	(0.928)
	Limpopo	1.105		0.919	0.874
		(0.916)		(0.913)	(0.914)
Marital	Divorced	4.236***	4.123***	4.244***	4.514***
Status		(1.413)	(1.418)	(1.411)	(1.409)
(Single)	Widowed	2.535***	2.602***	2.539***	2.835***
		(0.950)	(0.954)	(0.949)	(0.951)
	Married/Living with partner	2.838***	2.874***	2.831***	2.979***
		(0.569)	(0.572)	(0.569)	(0.568)
Age Category	30-44 years	0.0692	-0.255	0.0653	0.0362
(18-29 years)		(0.605)	(0.610)	(0.605)	(0.604)
	45-59 years	0.744	0.373	0.746	0.824
		(0.772)	(0.775)	(0.772)	(0.771)
	60+ years	0.202	0.0105	0.214	0.0588
		(1.296)	(1.289)	(1.297)	(1.295)
Geo-Area (Urban)	Rural	0.442	0.484		
		(0.440)	(0.448)		
Personal	R1000-5999	-1.228*	-1.251*	-1.243*	-1.434**
Monthly		(0.706)	(0.702)	(0.706)	(0.687)
Income	R6000-9999	2.177*	2.119*	2.182*	2.137*
(Up to R999)		(1.122)	(1.114)	(1.122)	(1.101)

Appendix A9: Correlates of Financial Literacy in South Africa.....**continued**

Variable		(1)	(2)	(3)	(4)
Personal Income	R10000-24999	2.077	2.197	2.040	2.040
		(1.365)	(1.364)	(1.363)	(1.358)
	R25000+	5.294**	5.696**	5.256**	5.322**
		(2.424)	(2.454)	(2.425)	(2.448)
Source of Money (Formal)	Informal	-1.709**	-1.607**	-1.746**	
		(0.780)	(0.784)	(0.777)	
	Grant	-0.814	-0.974	-0.867	
		(1.044)	(1.045)	(1.040)	
	Other	-2.072*	-1.923	-2.125*	
		(1.250)	(1.258)	(1.246)	
Occupation (Pensioner)	Formal employee	1.745	1.882	1.755	2.275**
		(1.291)	(1.291)	(1.291)	(1.157)
	Housewife	-1.725	-1.712	-1.699	-2.242
		(1.435)	(1.442)	(1.434)	(1.401)
	Student	-1.624	-1.637	-1.600	-2.339*
		(1.397)	(1.396)	(1.397)	(1.318)
	Informal employee	-1.367	-1.318	-1.379	-1.897
		(1.347)	(1.348)	(1.348)	(1.259)
	Self employed	2.050*	2.150*	2.073*	2.746**
		(1.208)	(1.205)	(1.208)	(1.148)
	Unemployed	-2.860**	-2.810**	-2.852**	-3.899***
		(1.155)	(1.157)	(1.154)	(1.105)
Banking History (Currently Banked)	Previously Banked	-7.389***	-7.178***	-7.409***	-7.462***
		(0.747)	(0.757)	(0.747)	(0.746)
	Never Banked	-9.490***	-9.429***	-9.516***	-9.436***
		(0.607)	(0.606)	(0.607)	(0.601)
Constant		52.56***	51.85***	52.85***	52.22***
		(1.924)	(1.830)	(1.900)	(1.710)
Mean VIF		2.75	2.75	2.75	2.75
Observations		15,692	15,692	15,692	15,692
R-squared		0.164	0.157	0.164	0.157

*Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.*

Note: Table reports OLS estimates of financial literacy based on the theoretical model specification. Base category in bold parentheses. Pairwise correlation test between income/education and education/occupation detected no collinearity

Appendix A10: Characteristics of Two Sub-groups Based on Income

	Low income quintile (N=10250)		High income quintile (N=5367)	
Variable	Mean	SD	Mean	SD
Male	0.439	0.496	0.553	0.497
Female	0.561	0.496	0.447	0.497
Blacks	0.862	0.345	0.654	0.476
Colored	0.088	0.283	0.101	0.301
Indian	0.019	0.137	0.040	0.196
White	0.031	0.173	0.205	0.404
No formal education	0.050	0.218	0.006	0.080
Some primary school	0.089	0.285	0.020	0.140
Primary school completed	0.104	0.306	0.030	0.170
Some high school	0.484	0.500	0.290	0.454
Matriculated	0.221	0.415	0.406	0.491
Some university	0.022	0.146	0.051	0.221
University completed	0.009	0.0956	0.099	0.299
Any other post matric qualification	0.021	0.143	0.098	0.297
18-29 years	0.445	0.497	0.286	0.452
30-44 years	0.301	0.459	0.475	0.499
45-59 years	0.122	0.327	0.162	0.369
60+	0.132	0.338	0.077	0.267
Western Cape	0.086	0.281	0.136	0.343
Eastern Cape	0.163	0.369	0.104	0.305
Northern Cape	0.023	0.149	0.016	0.126
Free State	0.068	0.252	0.042	0.200
Kwa-Zulu Natal	0.217	0.412	0.181	0.385
North West	0.093	0.290	0.063	0.242
Gauteng	0.152	0.359	0.355	0.478
Mpumalanga	0.075	0.263	0.058	0.233
Limpopo	0.123	0.328	0.046	0.210
Rural	0.508	0.500	0.300	0.458
Urban	0.492	0.500	0.700	0.458
Single	0.597	0.491	0.454	0.498
Divorced	0.016	0.126	0.029	0.167
Widowed	0.079	0.270	0.052	0.223
Married/living with partner	0.308	0.462	0.465	0.499
Source of money				
Formal	0.056	0.229	0.605	0.489
Informal	0.383	0.486	0.226	0.418
Grant	0.233	0.423	0.038	0.191
None	0.184	0.387	0.006	0.079
Pensioner	0.139	0.345	0.065	0.246
Formal Employee	0.088	0.283	0.676	0.468
Housewife	0.045	0.208	0.014	0.117
Student	0.125	0.331	0.012	0.108
Informally employed	0.075	0.264	0.100	0.300
Self Employed	0.131	0.337	0.084	0.277
Unemployed	0.387	0.487	0.044	0.206
Currently banked	0.396	0.489	0.935	0.246
Previously banked	0.144	0.351	0.025	0.156
Never banked	0.460	0.498	0.040	0.195

Notes: The table shows two sub-groups of the South African population constructed from personal monthly income to form income quintiles. The lowest three quintiles form the 'low-income group' while quintiles four and five form the 'high-income group' the data is weighted to be nationally representative.
Source: Author's calculations from the Finscope surveys 2005-2009

Appendix A11: Results of the Chow Test for Structural Difference Between the Income Quintiles

VARIABLES	(1) OLS Low-Income	(2) OLS High-Income	(3) OLS Restricted	(4) OLS Unrestricted
Female	-0.120	-0.619	-0.543	-0.166
	(0.518)	(0.816)	(0.462)	(0.380)
Coloured	1.001	0.776	1.816***	1.149**
	(0.710)	(1.155)	(0.649)	(0.508)
Indian	1.864	3.725***	3.540***	4.115***
	(1.189)	(1.312)	(1.094)	(0.870)
White	3.456***	4.924***	6.188***	5.733***
	(1.273)	(1.042)	(0.801)	(0.822)
Some primary school	-3.973***	-2.242	-4.367***	-3.275***
	(1.300)	(5.875)	(1.263)	(1.024)
Primary school completed	-2.671**	-0.898	-2.616**	-3.186***
	(1.268)	(5.569)	(1.231)	(1.010)
High high-school	-2.135*	0.149	-2.020*	-1.828**
	(1.159)	(5.190)	(1.102)	(0.926)
Matriculated	-1.914	4.174	-0.928	-0.871
	(1.296)	(5.248)	(1.206)	(1.011)
Some university	2.122	9.837*	3.971**	2.097
	(2.149)	(5.482)	(1.893)	(1.577)
University completed	1.831	11.17**	7.413***	1.847
	(2.441)	(5.322)	(1.534)	(2.116)
Any other post-matric	3.783*	8.987*	4.003**	4.355***
	(2.140)	(5.342)	(1.607)	(1.566)
Divorced	5.771***	3.557*	3.876**	2.752**
	(1.822)	(2.052)	(1.540)	(1.290)
Widowed	3.397***	2.120	3.269***	3.597***
	(1.105)	(1.917)	(1.014)	(0.814)
Married/living with partner	2.929***	4.026***	3.517***	2.523***
	(0.682)	(0.982)	(0.614)	(0.486)
30-44 years	0.544	-1.290	0.636	0.557
	(0.698)	(1.138)	(0.636)	(0.498)
45-59 years	1.726*	-0.530	2.032**	0.454
	(0.900)	(1.393)	(0.794)	(0.641)
60+ years	0.981	0.441	1.222	-0.451
	(1.142)	(1.825)	(0.988)	(0.779)
Urban	0.0859	-0.242	-0.365	-1.925***
	(0.504)	(0.875)	(0.464)	(0.385)
Eastern Cape	-3.705***	-5.909***	-4.770***	-4.378***
	(0.916)	(1.534)	(0.799)	(0.754)
Northern Cape	-3.426***	-0.334	-4.311***	-2.621***
	(0.974)	(1.539)	(0.855)	(0.832)
Free State	-0.823	2.078	-2.237**	-0.615
	(1.051)	(1.573)	(0.923)	(0.811)
KwaZulu Natal	1.635*	0.185	0.187	0.687
	(0.985)	(1.360)	(0.841)	(0.771)
North West	-1.162	-2.136	-2.501***	-1.005
	(1.073)	(1.732)	(0.942)	(0.829)
Gauteng	-0.931	-0.0879	-1.534*	-1.273
	(1.020)	(1.115)	(0.810)	(0.788)
Mpumalanga	-2.373**	0.252	-2.831***	-1.492*
	(1.151)	(1.588)	(1.005)	(0.860)
Limpopo	1.365	-0.467	0.0701	0.600
	(1.059)	(2.339)	(0.933)	(0.856)
Previously banked	-7.213***	-10.38***	-7.853***	-7.122***
	(0.762)	(2.638)	(0.724)	(0.564)

Appendix A11: Results of the Chow Test for Structural Difference Between the Income Quintiles.....**continued**

VARIABLES	(1) OLS Low-Income	(2) OLS High-Income	(3) OLS Restricted	(4) OLS Unrestricted
Never banked	-9.535***	-9.668***	-9.837***	-9.074***
	(0.598)	(2.219)	(0.566)	(0.427)
s2				2.458
				(2.668)
s2Male			1.704	0.571
			(3.875)	(0.638)
s2Female			1.629	
			(3.928)	
s2Black			1.264	0.484
			(1.314)	(1.049)
s2Coloured			0.224	0.382
			(1.596)	(1.222)
s2Indian			1.449	1.227
			(1.919)	(1.487)
s2White			0	0
			(0)	(0)
s2No formal education			-4.984	-2.376
			(5.572)	(4.112)
s2Some primary school			-2.859	-3.469
			(3.718)	(2.554)
s2Primary school completed			-3.266	-4.179*
			(3.103)	(2.171)
s2Some high school			-2.816	-2.322
			(1.939)	(1.582)
s2Matriculated			0.117	1.458
			(1.792)	(1.564)
s2some university			0.881	2.303
			(2.711)	(2.205)
s2University completed			-1.231	4.974**
			(2.158)	(2.503)
s2Any other post-matric			0	0
			(0)	(0)
s2Single			-0.509	-1.543*
			(1.157)	(0.794)
s2Divorced			-0.828	-1.151
			(2.452)	(1.810)
s2Widowed			-1.658	-2.685**
			(1.969)	(1.343)
s2Married			0	0
			(0)	(0)
s2(18-29) years			0.781	-1.768
			(2.073)	(1.350)
s2(30-44) years			-1.145	-1.587
			(1.727)	(1.209)
s2(45-59) years			-1.780	-1.321
			(1.671)	(1.211)
s2(60+) years			0	0
			(0)	(0)
s2Urban			0.124	0.494
			(0.990)	(0.706)
s2Western Cape			0.537	-0.405
			(2.516)	(1.540)
s2Eastern Cape			-0.602	-0.348
			(2.703)	(1.523)
s2Northern Cape			4.513	3.397**
			(2.811)	(1.716)

Appendix A11: Results of the Chow Test for Structural Difference Between the Income Quintiles.....**continued**

	(1)	(2)	(3)	(4)
VARIABLES	OLS Low-Income	OLS High-Income	OLS Restricted	OLS Unrestricted
s2Free State			4.851*	2.828*
			(2.724)	(1.631)
s2Kwa-Zulu Natal			0.534	-0.0628
			(2.598)	(1.465)
s2North West			0.902	0.588
			(2.792)	(1.590)
s2Gauteng			1.982	1.022
			(2.431)	(1.439)
s2Mpumalanga			3.620	3.381**
			(2.741)	(1.602)
s2Limpopo			0	0
			(0)	(0)
s2Currently banked			-0.168	2.023
			(2.288)	(1.383)
s2Previously banked			-2.700	-0.355
			(3.314)	(2.173)
s2Never banked			0	0
			(0)	(0)
Constant	50.26***	50.13***	51.51***	51.68***
	(1.573)	(5.370)	(1.441)	(1.217)
Observations	10,235	5,349	18,640	15,584
R-squared	0.085	0.111	0.166	0.175

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Note: We need to compare results in Column (1) with the corresponding coefficients of the interaction term of the pooled regression in Column 4. H_0=coefficient on the interaction term should be zero, or at least not statistically significant

Appendix A12: Financial Products Classification in South Africa

Transactional	Credit	Insurance	Savings and Investment	Retirement Planning
Formal Use				
• ATM card • Debit card • Current/cheque account • Garage card • Mzansi account • Transactions account • Postbank account	• Credit card • Overdraft • Home loan or bond • Vehicle finance • Personal loan from bank (includes micro-lenders like African Bank)	• Funeral policy company • Household contents • Life cover for debt • Disability cover • Cover for dreaded diseases • Medical insurance and hospital plans	• Money market • Savings account • Fixed deposit account • Unit trusts • Postbank savings book	• Pension Fund • Retirement Annuity • Provident Fund • Life assurance • Endowment policies • Education policy
Semi-formal Use				
• Store card cash back (e.g. pick n pay, Woolworths, clicks) • Loyalty cash back (cell phone companies, airlines)	• Store cards • Government • Employer • Retail stores	• Cell phone companies • Funeral cover from employer • Disability cover from employer	• n/a	• Life cover from employer or trade unions
Informal Use				
• n/a	• vehicle loan, home loan, personal loan from family, mashonisas, friends , Stokvel, Local spaza	• Funeral policy with an undertaker or burial society	• Savings with Stokvels or family and friends	• n/a

Notes: The table shows the categorisation of financial products and services in the South African context. Formal financial use refers to services from the banks, insurance companies, and micro-lenders such as smaller banks like African bank and Capitec. Retirement planning in this study is combined with savings in the investment category

Appendix A13: Multinomial Logit Estimates of Use of Financial Services by Sector

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
		Base Model			Risk= '*in life, one must take risks*'			Risk= '*you hate owing money*'		
Variable	Informal	Semi-formal	Formal	Informal	Semi-formal	Formal	Informal	Semi-formal	Formal	Ologit Estimates
Access (<15minutes)										
15-45 minutes	1.248**	1.053	1.049	1.254**	1.058	1.057	1.257**	1.072	1.055	0.047
	(0.133)	(0.220)	(0.085)	(0.134)	(0.221)	(0.086)	(0.134)	(0.224)	(0.086)	(0.066)
> 45 minutes	1.500***	0.452*	1.057	1.525***	0.462*	1.086	1.531***	0.460*	1.095	0.064
	(0.233)	(0.185)	(0.138)	(0.238)	(0.189)	(0.142)	(0.239)	(0.189)	(0.143)	(0.102)
Financial Literacy	0.996*	1.015***	1.024***	0.993	1.034**	1.020***	0.993	1.035**	1.019***	0.0200***
	(0.002)	(0.004)	(0.002)	(0.007)	(0.014)	(0.006)	(0.007)	(0.014)	(0.006)	(0.002)
(Risk Neutral) Risk-Averse				1.125	2.643	1.338	1.124	2.819	1.337	
				(0.395)	(2.049)	(0.467)	(0.395)	(2.192)	(0.469)	
Risk-Loving				1.150	2.965	1.703*	1.150	3.111	1.711*	
				(0.374)	(2.142)	(0.545)	(0.374)	(2.263)	(0.549)	
Risk-Averse*				1.001	0.976	1.005	1.001	0.975*	1.005	
Financial Literacy				(0.008)	(0.015)	(0.007)	(0.008)	(0.015)	(0.007)	
Risk-Loving*				1.005	0.981	1.004	1.004	0.980	1.004	
Financial Literacy				(0.007)	(0.014)	(0.007)	(0.007)	(0.014)	(0.007)	
(Male) Female	1.542***	3.373***	1.482***	1.549***	3.404***	1.497***	1.554***	3.422***	1.493***	0.319***
	(0.150)	(0.770)	(0.110)	(0.152)	(0.781)	(0.112)	(0.152)	(0.785)	(0.112)	(0.0605)
(Black) Coloured	0.900	1.464	0.731***	0.882	1.429	0.714***	1.147	0.758	0.745*	-0.251***
	(0.121)	(0.347)	(0.0770)	(0.118)	(0.340)	(0.0758)	(0.267)	(0.323)	(0.127)	(0.0835)
Indian	0.444*	1.448	1.020	0.439*	1.445	1.003	0.120***	1.300	0.660	0.139
	(0.191)	(0.691)	(0.183)	(0.188)	(0.691)	(0.181)	(0.0682)	(0.993)	(0.205)	(0.176)
White	0.454*	2.172*	2.464***	0.451*	2.092*	2.479***	1.223	3.361**	1.975*	0.997***
	(0.214)	(0.907)	(0.511)	(0.212)	(0.881)	(0.511)	(0.716)	(1.928)	(0.699)	(0.180)
(No Formal Education)										
Primary School	0.877	4.555*	1.963***	0.846	4.614*	1.836***	0.835	4.848*	1.733***	0.336***
	(0.164)	(3.626)	(0.415)	(0.158)	(3.652)	(0.383)	(0.157)	(3.927)	(0.362)	(0.126)
High-School	0.789	4.623*	4.003***	0.747	4.595*	3.609***	0.741	4.978**	3.341***	0.872***
	(0.147)	(3.648)	(0.828)	(0.140)	(3.601)	(0.740)	(0.139)	(4.006)	(0.688)	(0.127)
Post-Matric	0.470*	4.724	15.33***	0.439**	4.569	13.74***	0.440**	5.007*	12.90***	2.310***
	(0.192)	(4.482)	(4.186)	(0.180)	(4.322)	(3.773)	(0.182)	(4.814)	(3.557)	(0.213)
(Up to R999)										
R1000-5999	1.771***	2.988***	14.58***	1.756***	2.990***	14.50***	1.745***	2.924***	14.71***	2.369***
	(0.258)	(0.704)	(1.482)	(0.259)	(0.705)	(1.475)	(0.256)	(0.690)	(1.499)	(0.080)
R6000-9999	1.293	0.499	30.11***	1.251	0.495	29.13***	1.283	0.514	30.04***	3.452***
	(1.444)	(0.561)	(14.36)	(1.399)	(0.557)	(13.91)	(1.435)	(0.579)	(14.38)	(0.433)
R10000-24999	0.000***	2.149	18.91***	0.000***	2.122	17.98***	0.000***	2.413	18.97***	3.160***
	(0.000)	(2.407)	(9.218)	(0.000)	(2.372)	(8.730)	(0.000)	(2.647)	(8.993)	(0.450)

Appendix A13: Multinomial Logit Estimates of Use of Financial Services by Sector .....**continued**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
		Base Model			Risk= '*in life, one must take risks*'			Risk= '*you hate owing money*'		
Variable	Informal	Semi-formal	Formal	Informal	Semi-formal	Formal	Informal	Semi-formal	Formal	Ologit Estimates
R25000+	1.409	0.901	4.705e+06***	1.381	1.039	4.731e+06***	1.427	1.044	4.752e+07***	15.10***
	(0.562)	(0.447)	(2.225e+06)	(0.527)	(0.552)	(2.408e+06)	(0.574)	(0.580)	(2.565e+07)	(0.476)
(18-29 years)										
30-44 years	1.668***	1.361	1.447***	1.660***	1.354	1.433***	1.722***	1.195	1.427***	0.352***
	(0.203)	(0.347)	(0.135)	(0.203)	(0.348)	(0.134)	(0.222)	(0.362)	(0.143)	(0.077)
45-59 years	1.623***	1.127	1.381**	1.632***	1.139	1.386**	1.685***	0.964	1.395**	0.305***
	(0.258)	(0.337)	(0.176)	(0.260)	(0.341)	(0.177)	(0.291)	(0.383)	(0.200)	(0.102)
60+ years	4.058***	2.119*	2.420***	4.063***	2.158*	2.418***	4.026***	2.542*	1.917***	0.646***
	(0.813)	(0.824)	(0.420)	(0.821)	(0.850)	(0.424)	(0.878)	(1.270)	(0.382)	(0.124)
(Eastern Cape)										
Free State	1.132	1.027	0.551***	1.105	0.999	0.529***	1.110	1.009	0.517***	-0.421***
	(0.204)	(0.381)	(0.076)	(0.199)	(0.371)	(0.073)	(0.201)	(0.376)	(0.072)	(0.112)
Gauteng	1.792***	1.274	1.348**	1.760***	1.267	1.294*	1.761***	1.258	1.291*	0.282**
	(0.350)	(0.519)	(0.184)	(0.344)	(0.522)	(0.177)	(0.345)	(0.520)	(0.177)	(0.114)
Kwa-Zulu Natal	0.713*	0.736	0.677***	0.704*	0.738	0.662***	0.707*	0.732	0.657***	-0.337***
	(0.139)	(0.290)	(0.089)	(0.138)	(0.292)	(0.088)	(0.139)	(0.289)	(0.087)	(0.115)
Limpopo	3.399***	1.066	1.064	3.562***	1.129	1.133	3.596***	1.119	1.119	0.092
	(0.590)	(0.495)	(0.154)	(0.627)	(0.533)	(0.168)	(0.635)	(0.533)	(0.166)	(0.111)
Mpumalanga	1.409*	1.317	1.035	1.375	1.281	0.989	1.384	1.296	0.979	0.057
	(0.286)	(0.586)	(0.155)	(0.280)	(0.571)	(0.148)	(0.283)	(0.583)	(0.147)	(0.125)
Northern Cape	1.220	1.698	0.728**	1.221	1.674	0.721**	1.230	1.753	0.716**	-0.231*
	(0.239)	(0.651)	(0.105)	(0.239)	(0.645)	(0.105)	(0.241)	(0.677)	(0.105)	(0.119)
North West	2.359***	1.309	1.199	2.334***	1.309	1.159	2.343***	1.315	1.156	0.179*
	(0.425)	(0.550)	(0.168)	(0.422)	(0.550)	(0.164)	(0.424)	(0.554)	(0.164)	(0.108)
Western cape	2.222***	3.382***	1.343**	2.168***	3.264***	1.293*	2.188***	3.351***	1.271*	0.195*
	(0.387)	(1.138)	(0.181)	(0.379)	(1.104)	(0.175)	(0.382)	(1.137)	(0.173)	(0.107)
(Rural)										
Urban	1.029	1.200	1.481***	1.032	1.201	1.481***	1.029	1.197	1.487***	0.313***
	(0.096)	(0.235)	(0.110)	(0.096)	(0.234)	(0.111)	(0.096)	(0.235)	(0.112)	(0.060)
(Single)										
Divorced	1.543	1.405	0.871	1.557	1.454	0.864	1.567	1.429	0.899	-0.089
	(0.545)	(0.723)	(0.265)	(0.547)	(0.739)	(0.262)	(0.553)	(0.720)	(0.272)	(0.236)
Widowed	1.764***	0.839	1.414*	1.789***	0.845	1.431**	1.787***	0.818	1.458**	0.209
	(0.369)	(0.366)	(0.257)	(0.375)	(0.371)	(0.261)	(0.375)	(0.363)	(0.267)	(0.132)
Married/Living with partner	1.539***	1.349	1.385***	1.551***	1.360	1.394***	1.553***	1.311	1.409***	0.265***
	(0.183)	(0.305)	(0.130)	(0.185)	(0.309)	(0.131)	(0.187)	(0.297)	(0.133)	(0.074)

Appendix A13: Multinomial Logit Estimates of Use of Financial Services by Sector .....**continued**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
		Base Model			**Risk= '*in life, one must take risks*'**			**Risk= '*you hate owing money*'**		
Variable	Informal	Semi-formal	Formal	Informal	Semi-formal	Formal	Informal	Semi-formal	Formal	Ologit Estimates
(Black with Primary school) Coloured with Primary school							0.655	2.079	0.802	
							(0.217)	(1.096)	(0.184)	
Indian with Primary School							8.142**	2.583	1.203	
							(7.762)	(2.420)	(0.490)	
White with Primary School							0.096**	0.761	1.426	
							(0.114)	(0.690)	(0.652)	
(Black with High School) Indian with High school							0.736	3.250*	0.789	
							(0.244)	(1.969)	(0.211)	
Indian with High School							6.421**	0.071**	1.573	
							(4.683)	(0.092)	(0.653)	
White with High School							0.242	0.103*	0.785	
							(0.267)	(0.128)	(0.374)	
(Black with Post Matric) Coloured with Post Matric							0.883	1.624	1.705	
							(0.339)	(1.179)	(0.573)	
Indian with Post Matric							2.272	0.141	4.123***	
							(1.826)	(0.177)	(2.014)	
White with Post matric							0.118	1.110	7.255**	
							(0.160)	(1.562)	(6.030)	
Cut 1										2.124***
										(0.183)
Cut 2										2.933***
										(0.184)
Cut 3										3.039***
										(0.184)
Constant	0.138***	0.001***	0.033***	0.131***	0.001***	0.025***	0.128***	0.001***	0.028***	
				(0.050)	(0.001)	(0.010)	(0.049)	(0.001)	(0.011)	
Observations	12,117	12,117	12,117	12,117	12,117	12,117	12,117	12,117	12,117	12,117

Standard Errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Notes:

i. The table shows the log-odds of multinomial logit estimates for five models of use of financial services by sector, that is, the base model, two models incorporating risk, and one model incorporating interaction terms in the demographic variables.

ii. The ordered logit model was incorporated to check the significance of the sectors.

iii. The data is weighted to be nationally representative, with weights benchmarked to Statistics South Africa.

Appendix A14: Multinomial Logit Estimates of Use of Financial Services by Product Categories (Base Model)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Transaction			Credit & Loan			Insurance		Saving/Investing	
VARIABLES	Semi-formal	Formal	Informal	Semi-formal	Formal	Informal	Semi-formal	Formal	Informal	Formal
Access (<15 minutes)										
15-45 minutes	1.048	0.961	1.141	1.079	0.866	1.161	0.934	1.281**	0.857**	0.946
	(0.500)	(0.052)	(0.105)	(0.076)	(0.081)	(0.128)	(0.249)	(0.123)	(0.063)	(0.072)
>45 minutes	0.550	0.609***	1.167	0.537***	0.323***	0.670**	0.865	0.695**	1.045	0.923
	(0.480)	(0.059)	(0.161)	(0.077)	(0.080)	(0.123)	(0.385)	(0.128)	(0.117)	(0.129)
Financial Literacy	1.004	1.031***	0.990***	1.023***	1.019***	1.021***	0.998	1.022***	0.998	1.026***
	(0.011)	(0.001)	(0.002)	(0.002)	(0.002)	(0.003)	(0.006)	(0.002)	(0.002)	(0.002)
Female	2.812*	0.928	1.213**	1.613***	0.987	1.411***	1.784**	0.944	1.800***	1.280***
	(1.522)	(0.046)	(0.096)	(0.105)	(0.088)	(0.141)	(0.453)	(0.082)	(0.122)	(0.090)
(Black)										
Coloured	0.906	0.892	0.328***	1.040	1.703***	1.333	1.702	0.852	0.597***	0.713**
	(0.816)	(0.092)	(0.064)	(0.130)	(0.275)	(0.243)	(0.753)	(0.154)	(0.089)	(0.104)
Indian	0.171	1.203	0.767	0.979	1.450*	0.230**	0.194	1.180	0.298***	0.810
	(0.508)	(0.173)	(0.230)	(0.190)	(0.309)	(0.147)	(0.249)	(0.268)	(0.0866)	(0.146)
White	8.908***	1.249**	1.070	0.597***	1.614***	0.097***	0.344*	1.367**	0.325***	0.688***
	(5.538)	(0.115)	(0.189)	(0.075)	(0.207)	(0.055)	(0.215)	(0.184)	(0.056)	(0.079)
(No Formal Education)										
Primary School	2.055	2.094***	1.100	1.750*	0.839	3.081***	6.090	113.7**	1.162	3.314***
	(4.584)	(0.378)	(0.255)	(0.531)	(0.444)	(0.740)	(2.274)	(253.6)	(0.229)	(1.102)
High School	2.374	2.893***	1.008	3.275***	2.510*	2.165***	4.959	244.1**	1.396*	4.102***
	(5.296)	(0.509)	(0.230)	(0.960)	(1.245)	(0.532)	(1.852)	(544.0)	(0.270)	(1.340)
Post Matric	2.148	4.026***	0.646	4.735***	5.230***	0.884	5.788	425.9***	0.670*	6.006***
	(4.792)	(0.761)	(0.182)	(1.444)	(2.639)	(0.327)	(2.161)	(950.0)	(0.157)	(2.023)
(18-29 years)										
30-44 years	0.577	0.971	1.426***	1.073	1.855***	1.634***	1.187	1.453***	1.406***	1.744***
	(0.315)	(0.061)	(0.135)	(0.084)	(0.221)	(0.223)	(0.381)	(0.171)	(0.113)	(0.159)
45-59 years	0.790	1.475***	1.191	1.013	1.672***	1.986***	1.258	1.935***	1.031	1.709***
	(0.516)	(0.122)	(0.169)	(0.110)	(0.245)	(0.340)	(0.519)	(0.277)	(0.124)	(0.201)
60+ years	0.002	0.873	0.771	0.655***	0.480***	3.044***	1.321	2.200***	1.306*	2.995***
	(0.012)	(0.091)	(0.142)	(0.094)	(0.096)	(0.561)	(0.669)	(0.376)	(0.190)	(0.410)
(Up to R999)										
R1000-5999	0.157***	2.366***	1.985***	3.888***	8.072***	0.769**	3.050***	5.325***	2.630***	3.803***
	(0.104)	(0.128)	(0.168)	(0.272)	(1.057)	(0.087)	(0.810)	(0.588)	(0.186)	(0.317)
R6000-9999	0.000	2.152***	1.691**	4.819***	22.80***	0.369**	0.0840	7.074***	3.643***	9.908***
	(0.000)	(0.241)	(0.446)	(0.700)	(3.887)	(0.171)	(0.239)	(1.192)	(0.659)	(1.300)
R10000-24999	0.000	1.783***	1.413	3.390***	34.32***	0.252	5.849***	8.120***	3.448***	11.49***
	(0.000)	(0.258)	(0.600)	(0.798)	(7.100)	(0.265)	(3.987)	(1.610)	(0.961)	(1.912)
R25000+	0.000	1.635	0.000	2.261	22.85***	0.000	0.000	5.369***	0.000	15.46***
	(0.000)	(0.610)	(0.004)	(1.664)	(10.33)	(0.003)	(0.006)	(2.409)	(0.001)	(6.079)
(Eastern Cape)										
Free State	0.000	0.742**	0.955	0.749*	0.579**	0.909	2.795	0.905	0.619***	0.747
	(0.000)	(0.089)	(0.191)	(0.115)	(0.147)	(0.190)	(2.140)	(0.199)	(0.115)	(0.135)
Gauteng	0.838	0.930	1.572***	1.087	1.360**	0.840	3.120*	1.493***	1.368***	1.016
	(0.492)	(0.076)	(0.220)	(0.112)	(0.209)	(0.139)	(1.929)	(0.206)	(0.155)	(0.120)

Appendix A14: Multinomial Logit Estimates of Use of Financial Services by Product Categories (Base Model).....**continued**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Transaction			Credit & Loan			Insurance		Saving/Investing	
VARIABLES	Semi-formal	Formal	Informal	Semi-formal	Formal	Informal	Semi-formal	Formal	Informal	Formal
KwaZulu Natal	0.630	0.624***	1.091	0.517***	0.899	0.408***	3.697**	0.834	1.159	1.078
	(0.364)	(0.053)	(0.154)	(0.060)	(0.155)	(0.075)	(2.281)	(0.127)	(0.133)	(0.134)
Limpopo	0.016	0.598***	0.492***	0.504***	0.399***	1.343*	6.390***	0.702*	1.470***	0.932
	(0.044)	(0.063)	(0.104)	(0.075)	(0.108)	(0.228)	(4.079)	(0.140)	(0.192)	(0.156)
Mpumalanga	0.036	0.981	1.323	0.766*	0.811	0.614**	3.035	0.663*	1.233	0.824
	(0.080)	(0.104)	(0.227)	(0.110)	(0.184)	(0.135)	(2.173)	(0.142)	(0.177)	(0.140)
Northern cape	1.22e-07	0.702*	1.917**	0.679	0.815	0.680	1.461	1.170	0.701	0.817
	(0.000)	(0.140)	(0.547)	(0.177)	(0.282)	(0.234)	(1.720)	(0.398)	(0.213)	(0.235)
North West	0.216	0.801**	1.993***	0.808	0.867	1.176	1.170	0.935	0.950	0.972
	(0.231)	(0.084)	(0.300)	(0.113)	(0.200)	(0.206)	(1.054)	(0.180)	(0.137)	(0.156)
Western Cape	0.972	0.852	2.568***	1.031	1.383*	0.915	4.387**	1.263	1.286*	1.003
	(0.736)	(0.092)	(0.441)	(0.140)	(0.257)	(0.189)	(2.927)	(0.232)	(0.196)	(0.152)
(Rural) Urban	0.089***	0.542***	1.237***	1.167**	1.523***	0.730***	0.902	0.189***	1.229***	1.946***
	(0.047)	(0.027)	(0.102)	(0.077)	(0.144)	(0.072)	(0.234)	(0.017)	(0.084)	(0.146)
(Single) Divorced	16.39***	1.370**	0.893	1.258	1.486	1.296	1.835	2.304***	1.065	0.920
	(14.34)	(0.219)	(0.252)	(0.258)	(0.401)	(0.433)	(1.329)	(0.555)	(0.234)	(0.207)
Widowed	5.180*	1.629***	0.629**	1.302*	3.758***	1.510**	1.670	3.188***	1.115	1.138
	(4.781)	(0.180)	(0.131)	(0.201)	(0.743)	(0.285)	(0.873)	(0.557)	(0.163)	(0.173)
Married/	2.055	1.221***	0.861	1.557***	2.814***	1.682***	1.898**	1.821***	1.052	1.283***
Co-habiting	(1.102)	(0.075)	(0.084)	(0.119)	(0.304)	(0.204)	(0.567)	(0.196)	(0.084)	(0.108)
Constant	0.000	0.024***	0.062***	0.006***	0.001***	0.005***	0.000	0.000***	0.038***	0.001***
	(0.000)	(0.005)	(0.017)	(0.002)	(0.001)	(0.002)	(0.000)	(0.000)	(0.009)	(0.000)
Observations	12,117	12,117	12,117	12,117	12,117	12,117	12,117	12,117	12,117	12,117

Standard Errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Notes:

i. The table shows the log-odds of multinomial logit estimates for four models of use of financial services by product categories and their sources.

ii. The reference category in all models is 'Non-Use' of financial products, while for the rest of the covariates it is provided in brackets.

iii. The models exclude individual's risk attitudes.

iv. The data is weighted to be nationally representative, with weights benchmarked to Statistics South Africa.

Appendix A15: Multinomial Logit Estimates of Use of Financial Services and Use of Financial Services by Product Categories

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
		Transactional			Credit & Loans			Insurance		Savings/Investment	
Variables		Semiformal	Formal	Informal	Semiformal	Formal	Informal	Semiformal	Formal	Informal	Formal
Access											
(<15minutes)	15 - 45minutes	0.957	0.964	1.146	1.088	0.894	1.167	0.928	1.269**	0.858**	0.947
		(0.468)	(0.052)	(0.105)	(0.076)	(0.084)	(0.128)	(0.247)	(0.122)	(0.063)	(0.072)
	>45minutes	0.447	0.616***	1.190	0.548***	0.338***	0.676**	0.853	0.684**	1.053	0.929
		(0.407)	(0.060)	(0.165)	(0.079)	(0.084)	(0.124)	(0.380)	(0.126)	(0.118)	(0.131)
	financial Literacy	0.950**	1.046***	0.975***	1.046***	1.044***	1.028***	1.002	1.025**	0.994	1.047***
		(0.023)	(0.006)	(0.006)	(0.008)	(0.015)	(0.009)	(0.021)	(0.012)	(0.005)	(0.009)
(Neutral)	risk-averse	0.048**	1.971**	0.589*	4.425***	7.674**	2.153	1.928	2.610	0.940	2.174
		(0.069)	(0.668)	(0.179)	(2.052)	(6.616)	(1.114)	(2.159)	(1.802)	(0.258)	(1.127)
	risk-loving	0.015***	3.665***	0.926	5.186***	9.533***	1.487	1.359	2.283	1.101	4.219***
		(0.019)	(1.150)	(0.248)	(2.276)	(7.855)	(0.732)	(1.477)	(1.518)	(0.276)	(2.035)
	financial literacy*	1.069**	0.991	1.020***	0.977***	0.973*	0.988	0.996	0.997	1.006	0.986
	risk-averse	(0.035)	(0.006)	(0.008)	(0.008)	(0.015)	(0.010)	(0.024)	(0.013)	(0.006)	(0.009)
	financial literacy*	1.080***	0.982***	1.014**	0.976***	0.974*	0.994	0.997	0.996	1.004	0.976***
	risk-loving	(0.031)	(0.006)	(0.007)	(0.008)	(0.014)	(0.009)	(0.023)	(0.012)	(0.006)	(0.008)
(Male)	Female	2.738*	0.932	1.223**	1.616***	1.001	1.411***	1.780**	0.941	1.807***	1.280***
		(1.492)	(0.046)	(0.097)	(0.105)	(0.089)	(0.141)	(0.452)	(0.082)	(0.122)	(0.090)
(Black)	Coloured	1.155	0.885	0.326***	1.030	1.678***	1.333	1.705	0.861	0.596***	0.714**
		(1.068)	(0.091)	(0.064)	(0.129)	(0.271)	(0.243)	(0.756)	(0.156)	(0.089)	(0.104)
	Indian	0.165	1.193	0.748	0.981	1.464*	0.232**	0.193	1.146	0.295***	0.810
		(0.492)	(0.172)	(0.224)	(0.191)	(0.313)	(0.148)	(0.248)	(0.261)	(0.086)	(0.146)
	White	9.784***	1.253**	1.078	0.601***	1.652***	0.097***	0.342*	1.385**	0.325***	0.689***
		(6.245)	(0.115)	(0.191)	(0.0756)	(0.212)	(0.055)	(0.214)	(0.187)	(0.056)	(0.080)
(No Formal Education)	Primary School	1.223e+06	2.022***	1.054	1.703*	0.779	3.082***	599,228	101.2**	1.123	3.308***
		(2.038e+09)	(0.367)	(0.245)	(0.519)	(0.414)	(0.743)	(2.235e+08)	(225.7)	(0.222)	(1.105)
	High School	1.339e+06	2.738***	0.940	3.134***	2.261	2.158***	484,100	215.0**	1.333	4.025***
		(2.233e+09)	(0.485)	(0.215)	(0.923)	(1.129)	(0.533)	(1.806e+08)	(479.0)	(0.259)	(1.323)
	Post Matric	1.259e+07	3.807***	0.597*	4.500***	4.704***	0.880	574,259	379.3***	0.638*	5.922***
		(2.098e+10)	(0.724)	(0.169)	(1.378)	(2.389)	(0.327)	(2.142e+08)	(846.1)	(0.150)	(2.005)
(18-29 years)	30-44 years	0.612	0.968	1.411***	1.070	1.853***	1.626***	1.185	1.441***	1.398***	1.749***
		(0.344)	(0.060)	(0.134)	(0.084)	(0.221)	(0.222)	(0.380)	(0.170)	(0.113)	(0.160)
	45-59 years	0.754	1.474***	1.187	1.009	1.675***	1.975***	1.230	1.903***	1.028	1.703***
		(0.510)	(0.122)	(0.168)	(0.110)	(0.246)	(0.338)	(0.508)	(0.273)	(0.123)	(0.201)
	60+ years	0.002	0.878	0.771	0.654***	0.487***	3.004***	1.282	2.137***	1.300*	3.032***
		(0.012)	(0.092)	(0.142)	(0.094)	(0.098)	(0.555)	(0.652)	(0.366)	(0.189)	(0.416)
(Up to R999)	R1000-5999	0.161***	2.337***	1.966***	3.841***	7.901***	0.764**	3.051***	5.255***	2.614***	3.777***
		(0.108)	(0.127)	(0.167)	(0.269)	(1.035)	(0.087)	(0.815)	(0.583)	(0.186)	(0.315)
	R6000-9999	0.000	2.122***	1.657*	4.707***	21.85***	0.366**	0.0835	6.859***	3.604***	9.834***
		(0.000)	(0.238)	(0.437)	(0.684)	(3.731)	(0.170)	(0.237)	(1.159)	(0.654)	(1.292)

Appendix A15: Multinomial Logit Estimates of Use of Financial Services and Use of Financial Services by Product Categories.....**continued**

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
		Transactional			Credit & Loans			Insurance		Savings/Investment	
Variables		Semiformal	Formal	Informal	Semiformal	Formal	Informal	Semiformal	Formal	Informal	Formal
	R10000-24999	0.000	1.770***	1.379	3.347***	33.19***	0.247	5.957***	8.006***	3.428***	11.48***
		(0.000)	(0.255)	(0.586)	(0.788)	(6.870)	(0.259)	(4.086)	(1.593)	(0.957)	(1.913)
	R25000+	0.000	1.611	0.000	2.191	21.78***	0.000	0.000	5.208***	0.000	15.44***
		(0.000)	(0.601)	(0.006)	(1.613)	(9.852)	(0.003	(0.006)	(2.342)	(0.001)	(6.073)
(Eastern Cape)	Free State	0.000	0.734***	0.939	0.740*	0.579**	0.900	2.741	0.884	0.611***	0.746
		(0.000)	(0.088)	(0.188)	(0.114)	(0.147)	(0.188)	(2.098)	(0.195)	(0.114)	(0.135)
	Gauteng	1.116	0.913	1.530***	1.065	1.319*	0.833	3.058*	1.434***	1.349***	1.004
		(0.699)	(0.075)	(0.214)	(0.110)	(0.203)	(0.138)	(1.892)	(0.199)	(0.153)	(0.119)
	KwaZulu Natal	0.784	0.624***	1.096	0.511***	0.874	0.403***	3.602**	0.817	1.156	1.083
		(0.475)	(0.0535)	(0.156)	(0.0597)	(0.151)	(0.0743)	(2.223)	(0.125)	(0.133)	(0.135)
	Limpopo	0.0157	0.616***	0.513***	0.514***	0.408***	1.333*	5.991***	0.677*	1.489***	0.947
		(0.04)	(0.066)	(0.109)	(0.077)	(0.111)	(0.228)	(3.845)	(0.136)	(0.196)	(0.159)
	Mpumalanga	0.0521	0.952	1.278	0.747**	0.770	0.613**	3.029	0.644**	1.211	0.812
		(0.117)	(0.101)	(0.221)	(0.107)	(0.175)	(0.134)	(2.170)	(0.138)	(0.174)	(0.138)
	Northern cape	0.000	0.696*	1.915**	0.670	0.804	0.679	1.437	1.133	0.697	0.804
		(0.000)	(0.139)	(0.547)	(0.175)	(0.278)	(0.234)	(1.692)	(0.387)	(0.212)	(0.232)
	North West	0.237	0.784**	1.969***	0.796	0.841	1.165	1.126	0.884	0.936	0.960
		(0.257)	(0.0830)	(0.298)	(0.112)	(0.195)	(0.205)	(1.015)	(0.171)	(0.136)	(0.154)
	Western Cape	1.140	0.842	2.518***	1.017	1.350	0.909	4.347**	1.231	1.274	0.995
		(0.912)	(0.091)	(0.433)	(0.138)	(0.250)	(0.188)	(2.902)	(0.226)	(0.195)	(0.151)
(Rural)	Urban	0.085***	0.539***	1.232**	1.166**	1.536***	0.734***	0.906	0.190***	1.229***	1.933***
		(0.046)	(0.027)	(0.102)	(0.077)	(0.146)	(0.072)	(0.235)	(0.017)	(0.084)	(0.145)
(Single)	Divorced	18.85***	1.364*	0.889	1.260	1.514	1.303	1.823	2.302***	1.058	0.919
		(16.82)	(0.218)	(0.251)	(0.259)	(0.407)	(0.435)	(1.320)	(0.554)	(0.232)	(0.206)
	Widowed	4.955*	1.646***	0.636**	1.316*	3.913***	1.516**	1.678	3.247***	1.118	1.143
		(4.687)	(0.182)	(0.132)	(0.203)	(0.773)	(0.286)	(0.879)	(0.570)	(0.164)	(0.174)
	Married/Cohabiting	2.138	1.224***	0.866	1.566***	2.843***	1.682***	1.896**	1.820***	1.054	1.284***
		(1.204)	(0.075)	(0.084)	(0.120)	(0.307)	(0.204)	(0.566)	(0.196)	(0.0839)	(0.108)
Constant		0.000	0.009***	0.082***	0.002***	0.000***	0.003***	0.000	0.000***	0.039***	0.000***
		(0.000)	(0.003)	(0.029)	(0.001)	(0.000)	(0.002)	(0.000)	(0.000)	(0.01)	(0.000)
Observations		12,117	12,117	12,117	12,117	12,117	12,117	12,117	12,117	12,117	12,117

Robust Standard Errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Notes:

i. The table shows the log-odds of multinomial logit estimates for four models of use of financial services, one for each product category, incorporating the risk-attitudes of individuals and key covariates.

ii. The base category in all models is 'non-use' while the base category for the risk variable is 'risk-neutral'. The risk measure used is the response to the statement 'in life, one must take risks', and it is coded as 'yes=risk-loving', 'no=risk-averse' and 'don't know=neutral'.

iii. The results are weights to be nationally representative, with weights benchmarked to Statistics South Africa

Appendix A16: Use of Financial Services Excluding the Choice-specific Characteristics

		Logit Estimates		Multinomial Logit Estimate for Use by sector		
		(1)	(2)	(3)	(4)	(5)
Variables		Logit Est1	Logit Est2	Informal	Semiformal	Formal
	Financial Literacy	0.017***	0.021***	0.991	1.035***	1.025***
'in life, one must take risks'		(0.007)	(0.004)	(0.006)	(0.014)	(0.006)
	Risk-Averse		0.113	1.334	1.135	2.647***
			(0.225)	(0.565)	(0.605)	(1.310)
	Risk-Loving		0.345*			
			(0.205)			
	Financial Literacy* Risk-Averse		0.008*			
			(0.005)			
	Financial Literacy*Risk-Loving		0.005			
'hate owing money'			(0.004)			
	Risk-Loving	0.089		1.028	2.449	1.599
		(0.329)		(0.327)	(1.783)	(0.53)
	Risk-Averse	0.534		1.148	3.529*	2.177**
		(0.377)		(0.338)	(2.422)	(0.661)
	Financial Literacy* Risk-Loving	0.012*		1.003	0.978	1.001
		(0.007)		(0.007)	(0.015)	(0.007)
	Financial Literacy* Risk-Averse	-0.0025		1.005	0.978	0.999
		(0.008)		(0.007)	(0.014)	(0.006)
	Female	0.224***	0.246***	1.618***	3.433***	1.543***
		(0.049)	(0.049)	(0.153)	(0.775)	(0.113)
	(Black) Coloured	-0.191***	-0.197***	0.860	1.416	0.716***
		(0.065)	(0.065)	(0.111)	(0.329)	(0.077)
	Indian	-0.048	-0.042	0.368**	1.549	0.997
		(0.112)	(0.111)	(0.155)	(0.728)	(0.178)

Appendix A16: Use of Financial Services Excluding the Choice-specific Characteristics .....**continued**

		Logit Estimates		Multinomial Logit Estimate for Use by sector		
		(1)	(2)	(3)	(4)	(5)
Variables		Logit Est1	Logit Est2	Informal	Semiformal	Formal
	White	0.959***	0.978***	0.346**	1.905	2.221***
		(0.12)	(0.12)	(0.161)	(0.787)	(0.424)
(No Formal Education) Primary school		0.701***	0.660***	0.801	4.639*	1.717***`
		(0.144)	(0.144)	(0.143)	(3.632)	(0.345)
	High School	1.553***	1.488***	0.703**	5.023**	3.572***
		(0.141)	(0.141)	(0.125)	(3.903)	(0.704)
	Post-Matric	2.743***	2.689***	0.394**	4.804*	13.15***
		(0.181)	(0.182)	(0.156)	(4.508)	(3.488)
	30-44 years	0.157**	0.152**	1.664***	1.305	1.430***
		(0.063)	(0.063)	(0.198)	(0.334)	(0.132)
	45-59 years	0.303***	0.297***	1.582***	1.198	1.377**
		(0.0815)	(0.082)	(0.243)	(0.344)	(0.172)
	60+ years	0.594***	0.613***	4.377***	1.848	2.364***
		(0.105)	(0.105)	(0.843)	(0.744)	(0.402)
(Eastern Cape)	Free State	-0.741***	-0.756***	1.077	0.907	0.554***
		(0.097)	(0.097)	(0.186)	(0.33)	(0.075)
	Gauteng	-0.010	-0.023	1.740***	1.138	1.358**
		(0.091)	(0.091)	(0.319)	(0.452)	(0.180)
	KwaZulu Natal	-0.393***	-0.407***	0.711*	0.581	0.646***
		(0.088)	(0.088)	(0.131)	(0.225)	(0.082)
	Limpopo	-0.556***	-0.498***	3.527***	0.932	1.187
		(0.102)	(0.103)	(0.588)	(0.43)	(0.169)
	Mpumalanga	0.011	-0.015	1.340	1.158	1.040
		(0.104)	(0.103)	(0.261)	(0.511)	(0.152)

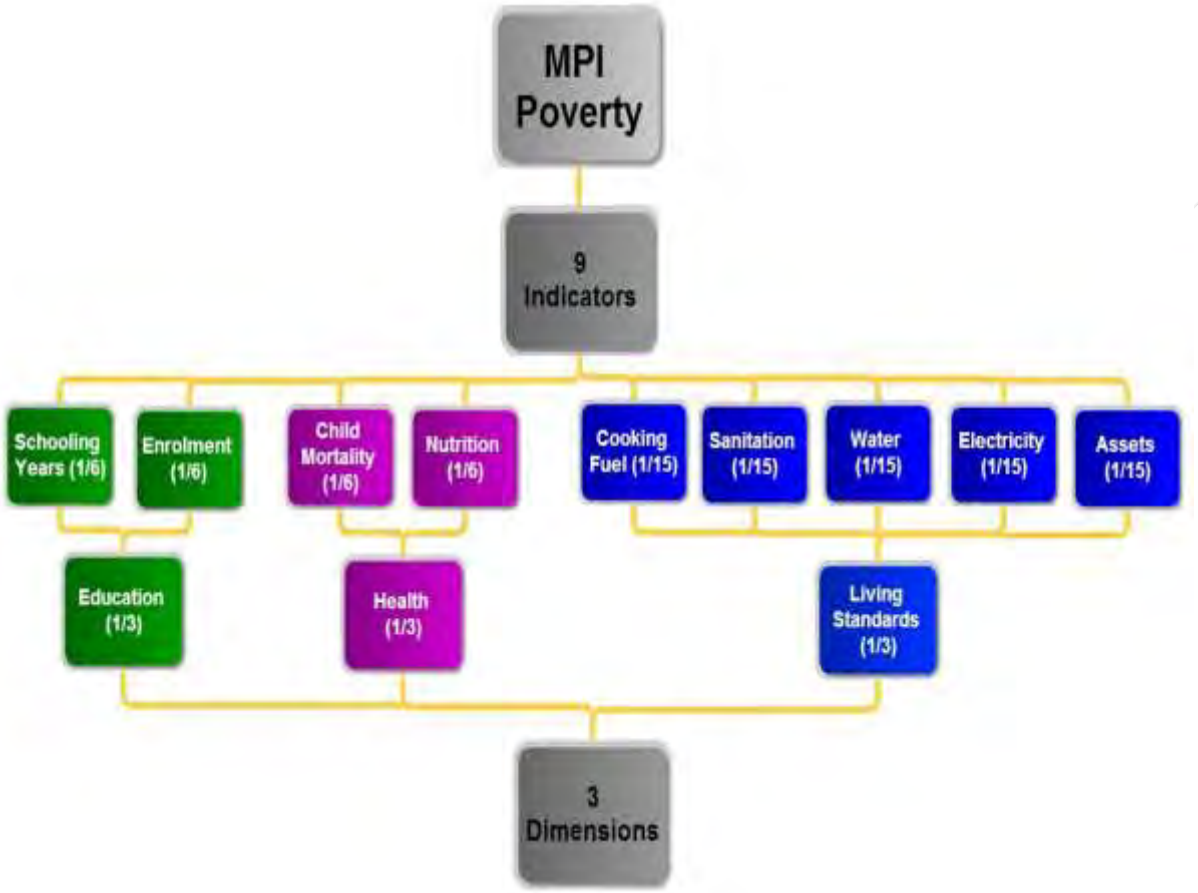
Appendix A16: Use of Financial Services Excluding the Choice-specific Characteristics .....**continued**

		Logit Estimates		Multinomial Logit Estimate for Use by sector		
		(1)	(2)	(3)	(4)	(5)
Variables		Logit Est1	Logit Est2	Informal	Semiformal	Formal
	Northern cape	-0.568***	-0.554***	1.232	1.472	0.765*
		(0.104)	(0.105)	(0.233)	(0.55)	(0.11)
	North West	-0.264***	-0.271***	2.342***	1.126	1.262*
		(0.097)	(0.097	(0.405)	(0.469)	(0.175)
	Western Cape	-0.215**	-0.228**	2.133***	3.005***	1.325**
		(0.093)	(0.093)	(0.353)	(0.952)	(0.177)
	(Rural) Urban	0.450***	0.447***	1.028	1.265	1.516***
		(0.049)	(0.049)	(0.092)	(0.246)	(0.111)
	(Single) Divorced	0.179	0.199	1.539	1.566	0.916
		(0.171)	(0.172)	(0.534)	(0.796)	(0.278)
	Widowed	0.190*	0.196*	1.700***	1.098	1.397*
		(0.109)	(0.110)	(0.339)	(0.464)	(0.245)
	Married/Cohabiting	0.171***	0.167***	1.546***	1.381	1.407***
		(0.062)	(0.062)	(0.177)	(0.311)	(0.13)
(Up to R999)	R1000-5999	2.184***	2.182***	1.932***	2.918***	14.72***
		(0.056)	(0.056)	(0.269)	(0.671)	(1.441)
	R6000-9999	3.681***	3.681***	1.302	0.529	31.19***
		(0.327)	(0.327)	(1.459)	(0.594)	(14.9)
	R10000-24999	2.789***	2.792***	0.000***	2.288	19.38***
		(0.336)	(0.335)	(0.000)	(2.56)	(9.399)
Constant		-3.665***	-3.695***	0.175***	0.000***	0.019***
		(0.352)	(0.244)	(0.058)	(0.000)	(0.007)
Observations		12,489	12,489	12,548	12,548	12,548

Robust standard errors in parentheses (eform) in columns 3-5: *** p<0.01, ** p<0.05, * p<0.1

Note: The table shows logit and multinomial logit estimates of five models, excluding the choice-specific variables, that is, access to financial services measured in time. The base category in all models is 'non-use'. Base categories for the covariates are provided in brackets. The multinomial results are reported in log-odds.

Appendix A17: Conceptual Framework for Measuring Deprivation



Source: Finn, Leibbrandt and Woolard (2013)

Appendix A18:Sample Means of the Users and Non-Users of Financial Services and Products

Variable	Formal/Semiformal Products Users N=13810	Informal Products Users N = 4271	Not-Using Financial Products N = 1591	Min	Max
Male	0.489	0.505	0.400	0	1
Female	0.511	0.495	0.600	0	1
Black	0.691	0.883	0.881	0	1
Coloured	0.105	0.063	0.084	0	1
Asian/Indian	0.041	0.036	0.029	0	1
White	0.163	0.018	0.006	0	1
No Formal Education	0.015	0.048	0.116	0	1
Primary School Education	0.082	0.202	0.273	0	1
High School Education	0.684	0.724	0.594	0	1
Post Matric/Post High School	0.22	0.026	0.017	0	1
18-29 years	0.324	0.535	0.310	0	1
30-44 years	0.416	0.277	0.321	0	1
45-59 years	0.148	0.112	0.139	0	1
60+ years	0.112	0.077	0.230	0	1
Up to R999	0.36	0.925	0.879	0	1
R1000-5999	0.498	0.073	0.120	0	1
R6000-9999	0.081	0.001	0.002	0	1
R10000-24999	0.054	0.001	0	0	0
R25000+	0.007	0	0	0	0
Rural	0.307	0.541	0.561	0	1
Urban	0.693	0.459	0.439	0	1

Notes:
i. The table shows the mean of users and non-users of financial products and services from the various financial sectors in South Africa.
ii. The data is weighted to be nationally representative