



WIDER Working Paper 2023/37

Income inequality and household debt

Examining the impact of relative income on formal and informal debt in South Africa

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February 2023

Abstract: How does income inequality impact the propensity for and levels of formal and informal household debt? This paper assesses this question using the two most recent waves of the South African Living Conditions Survey. A range of linear models as well as a zero-inflated Poisson model are employed, and inequality is measured by a household relative deprivation index, comparing households within provinces. The results provide evidence that households with higher relative deprivation (or lower relative incomes) hold higher levels of outstanding debt, and significant proportions of debt are from informal sources. Additionally, the paper provides suggestive evidence that informal borrowing among households with lower relative incomes is not directed towards investment in capital goods but instead reflects both a tunnel effect—through investments in small-scale ventures and household financial security and a keeping-up effect—through hire purchase of furniture and appliances as social capital.

Key words: income inequality, household debt, informal debt, relative income, keeping up with the Joneses

JEL classification: D12, D14, D31, E26

Acknowledgements: Special thanks to Paul Segal and Sunil Kumar for their detailed comments and supervision. This paper has benefited from comments by participants at the UNU-WIDER Development Economics PhD Workshop (2022), held in collaboration with the Helsinki School of Economics and Institute of International Economics Studies, Stockholm University.

Note: As the research is part of the author's PhD thesis, she will hold copyright to facilitate its publication.

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The author has worked on this study as part of the UNU-WIDER Visiting PhD Fellowship Programme. It is published within the project [The impacts of inequality on growth, human development, and governance—@EQUAL](#), supported by the Novo Nordisk Foundation Grant NNF19SA0060072.

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ISSN 1798-7237 ISBN 978-92-9267-345-1

<https://doi.org/10.35188/UNU-WIDER/2023/345-1>

Typescript prepared by Mary Boss.

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1 Introduction

Income inequality has been persistently high in South Africa. The nation's Gini index has trended above 0.6 since 1993, compared to an emerging market average of approximately 0.45.¹ This paper assesses the extent to which high income inequality induces increased borrowing by South African households. The effect of income inequality on individual households is measured by a relative deprivation index, comparing households with others earning higher incomes within their provinces. Household debt is decomposed into formal and informal sources. The results show that households with lower relative incomes—those faced with higher deprivation relative to incomes above them within their own province—take up more debt, as well as hold greater proportions of informal debt.

Interest in the relationship between income inequality and household debt revived following the 2008 financial crisis. Rajan and Lines (2010), Van Treeck (2014), and Cynamon and Fazzari (2015) posit that increasing inequality, by eroding households' real incomes and savings, induced unsustainable debt accumulation, leading to financial instability and an eventual slow recovery from the crisis. Similar arguments are posited by Stockhammer (2015) and Perugini et al. (2015) as well as Kumhof et al. (2015), Cardaci (2018), and Cairo and Sim (2018), who model the mechanisms underlying this inequality–debt relationship using dynamic stochastic general equilibrium (DSGE) and agent-based models. Cardaci (2018) emphasizes the role of 'adaptive expectations' or 'imitative behaviour' in consumption spending, capturing the effect of rising inequality in the form of social and economic pressures on low- and middle-income households.

The theoretical underpinnings for the relationship between income and household debt derive from the life cycle (Ando and Modigliani 1963) and permanent income (Friedman 1957) hypotheses, which imply that, for households, utility maximization is achieved by smoothing consumption over the course of their lifetime, using savings when income is high and borrowing when income is low. Bertrand and Morse (2016), however, argue that the rise in household debt since 1980, particularly in the United States, cannot be explained by the life cycle and permanent income models. They, along with other studies assessing this relationship, therefore apply the relative income hypothesis of Duesenberry (1949), which suggests that households' consumption behaviour can be explained by their position in the income distribution or, more specifically, by their relative standing to higher earning households. Bertrand and Morse (2016) find that when compared to other households in their states or cities, the amount spent on consumption by poorer households is an increasing function of the top incomes that they can observe. They find further that most of this consumption is directed to 'visible goods', in line with the theories of social status seeking such as that posited by Veblen (1899), which emphasizes a 'keeping up with the Joneses' behaviour exhibited by households at the lower end of the income distribution. These findings are in line with the earlier study by Christen and Morgan (2005), who used aggregated US data to assess this relationship.

Georgarakos et al. (2014), one of the first studies using household survey data to assess this relationship between relative income and household debt, find that when perceived incomes of neighbouring households are higher, poorer Dutch households are more likely to take up debt and to hold higher levels of outstanding debt. They emphasize that these results reveal more than a

¹ Sources: World Development indicators; South Africa Staff Report for the 2019 Article IV Consultation. International Monetary Fund, Staff Country Report 2020(33).

simple ‘tunnel effect’²—where households are encouraged by their richer counterparts and use debt for investment purposes—since even when expected future income is controlled for, peer incomes still have a significant effect on a household’s propensity to take up debt. Li (2018) finds the opposite effect for Chinese households. Using data on bank credit applications, Li finds that households who borrow also spend more on human capital investments, indicating a ‘tunnel effect’ for poorer households. Li (2018) is clear, however, that the ‘keeping-up effect’ is not explicitly tested and therefore could also be a catalyst for household borrowing.

Findings of a keeping-up effect are also presented by Berlemann and Salland (2016) who compare German households to others in their residential areas or districts, Brown et al. (2016) who measure the social interaction of British households by their membership in a range of community and national groups and societies, and Agarwal et al. (2020) who use the lottery winnings of Canadian households to estimate whether a significant jump in one neighbour’s income influences the borrowing and bankruptcies of others. Jestl (2019) extends these finds to the broader Euro area using survey data for 15 European countries to assess this inequality–household debt relationship. They find, in line with the previously mentioned literature, that income inequality induces higher consumption-related household borrowing. However, some studies find the opposite relationship. Coibion et al. (2014) uses US household survey data for 2001–12 and ranks households within their local income distributions based on imputed incomes. They find that low-income households borrowed less than their richer counterparts in high-inequality areas relative to low-inequality areas. Similarly, Loschiavo (2021), using Italian survey data, finds the proportion of relatively poorer indebted households falls as inequality rises. They note that these results suggest that supply factors may be more important than demand-side factors in determining the levels of indebtedness along the income distribution.

While this relationship between inequality and household debt has received increased attention more recently, the existing literature is limited to advanced economies, with the exception of Li (2018), who makes this assessment for China. An extension to developing and emerging economies is important since households in these countries are inherently different from those in more advanced economies on several bases including family structure, consumption patterns, earnings opportunities, and consumption-smoothing practices (Wolpin 1982; Musgrove 1979; Alderman 1996; Kelley and Williamson 1968). With regards to consumption smoothing, while households in advanced countries are noted as being able to maintain or increase consumption levels through access to credit, poorer households in developing and emerging economies are often faced with substantial credit constraints (Alderman et al. 2003; Haushofer and Shapiro 2013). As a result of these constraints, developing country households must often find alternative means of smoothing consumption.³ Among these alternatives is informal credit, including loans from moneylenders as well as from friends and family (Kochar 1989; Jodha 1981). While this option of informal credit is briefly assessed in the literature above by inclusion of dummy variables indicating whether households can access loans from informal lenders (Li 2018; Jestl 2019), there is no explicit assessment of the levels and proportions of informal debt taken up and therefore no assessment of the extent to which informal debt acts as a smoothing mechanism or an aid for ‘keeping up with the Joneses’.

² Tunnel effect describes a situation where households have feelings ‘analogous to those felt by an individual who, caught in a traffic jam in a tunnel, sees another lane moving and anticipates that the own line will also move soon’ (Georgarakos et al. 2014; adapted from Hirschmann and Rothschild 1973).

³ These alternatives include precautionary savings (Deaton 1992; Bhalla 1980), risk pooling (Townsend 1994, 1995), and remittances and investment in lumpy physical assets (Alderman 1996).

This paper therefore makes two contributions to the existing literature. It offers an emerging economy perspective by using South Africa as a case study. In this way, it adds to the existing evidence on advanced economies and extends these results to a context of higher inequality, different household structures and constraints, and alternative consumption-smoothing mechanisms. Second, the role of informal debt is explicitly accounted for, in line with the experiences of credit access for households at the lower end of the income distribution. As shown in Figure 1, informal debt accounts for almost all the debt held by the poorest South African households, even as overall debt levels change over time. An assessment of the impact of inequality on this important source of credit is therefore both relevant and necessary.

The rest of the paper is organized as follows: Section 2 describes the relevant data, outlines the main and alternative empirical specifications, and presents some stylized facts. Baseline results and results from alternative specifications are discussed in Section 3. Section 4 discusses the results of various robustness exercises, and Section 5 concludes the paper. Descriptive statistics and additional results are presented in Appendices A and B.

2 Data, stylized facts, and empirical framework

2.1 Data

Cross-sectional data from the two most recent rounds of the South Africa Living Conditions Survey (LCS) are utilized. The first survey round was conducted between 2008 and 2009, and the second was between 2014 and 2015. The surveys include questions on household income, borrowing from formal and informal sources, household savings, and consumption and non-consumption expenditures. Information on the provinces and types of settlements (e.g., urban formal, urban informal, rural, tribal areas) in which households reside was also collected. The survey is nationally representative and includes data from approximately 25,000 households in each round.

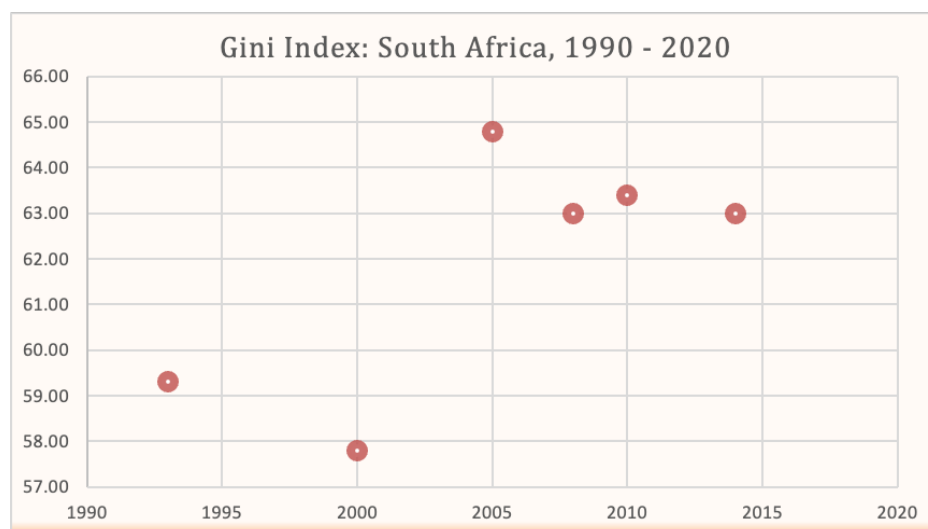
Sample restrictions

To ensure consistency of results, some restrictions are applied to the data. First, the sample is restricted to households with positive income. Second, households whose heads are younger than 18 years are excluded; this limits the sample to households with heads who are classified as adults and are over the working age. Finally, to limit the impact of outliers, the data are trimmed at the 1st and 99th percentiles of income. These restrictions reduce the sample from 48,455 households to 46,653 households.

2.2 Stylized facts

Figure 1 shows South Africa's Gini index for the period 1990–2020. In 1993, South Africa's Gini index was 0.593. Inequality has increased over the almost three decades since then, despite briefly falling in the years immediately following the end of Apartheid. In 2005, the Gini index stood at 0.648, and it was 0.63 in 2014, based on the most recent LCS (2014/5), which is used in this paper.

Figure 1: Gini index, South Africa 1990–2020

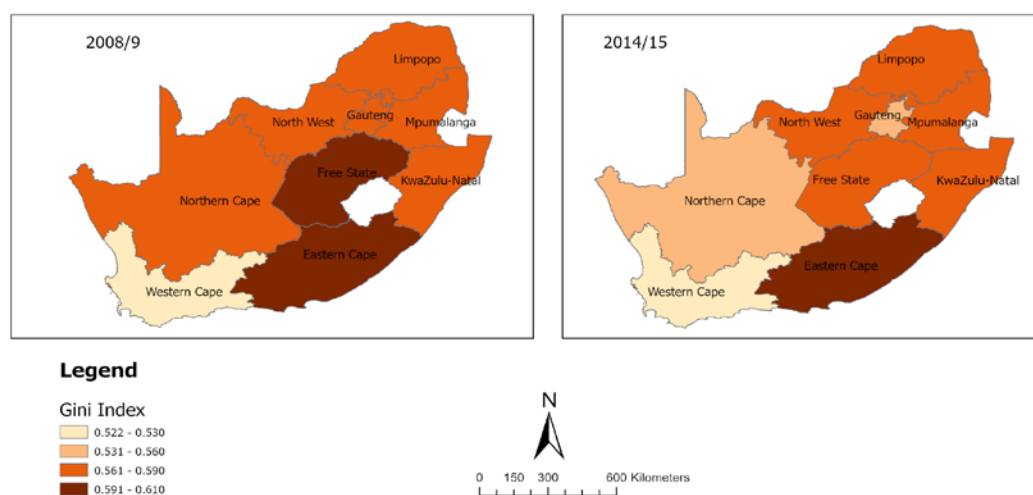


Note: where no tick marks are shown, data are unavailable.

Source: author's illustration based on data from the World Development Indicators database.

The experiences of inequality vary across provinces. As shown in Figure 2, average inequality ranges from 0.52 to 0.61 when measured by province, and inequality changes within provinces between the two cross-sections—increasing in some provinces and decreasing in others. This motivates the decision to estimate relative deprivation at the province level.⁴ As posited by Yitzhaki (1979), the Gini coefficient is ‘a quantification of the theory of relative deprivation’ and is therefore an aggregated measure of individual deprivation relative to those earning higher incomes.

Figure 2: Income inequality across provinces, 2008/9 and 2014/5



Source: author's calculations based on LCS 2008/9 and 2014/5.

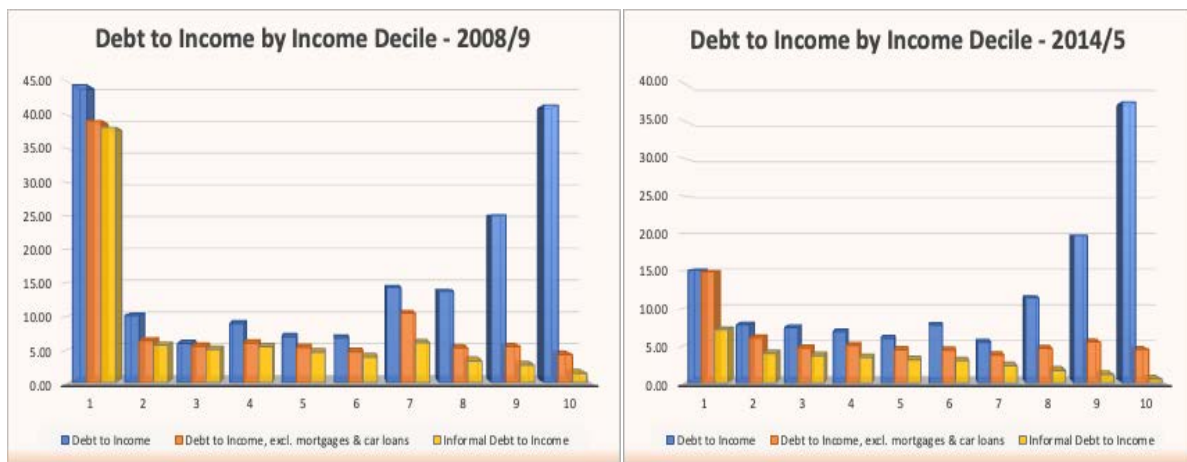
Figure 3 presents debt-to-income percentages for households in each decile, across both cross-sections. A few interesting facts are apparent. First, debt to income is highest in the bottom and top deciles, estimated at over 40 per cent of income for both the 1st and 10th decile in 2008/9.

⁴ Estimations with relative deprivation measured at the **community level** (proxied by the type of settlements within each province) produce the same results as those with relative deprivation measured at the **province level**.

Second, debt to income falls significantly in the second cross-section (2014/5) for households in the bottom decile (by approximately 30 per cent) but remains high for households in the top decile, falling by just 4 per cent. This may reflect lower take-up of debt amongst low-income households following the global financial crisis, as suggested by the strand of literature focused on the impacts of borrowing and deleveraging pre- and post-crisis.⁵

Figure 3 also shows informal debt to income and overall debt to income, excluding borrowing for major capital goods (mortgages and car loans), across the income distribution. Despite similarly high debt to income in both the top and bottom deciles, when mortgages and car loans are excluded, households in the bottom decile hold over four (two) times more debt relative to income in 2008/9 (2014/5) than households in any other decile, and almost all of this is informal debt. Informal debt also accounts for a substantial proportion of the debt taken up by households in the 2nd to 7th deciles. This prevalence of informal debt among lower-income households motivates the decision to separately assess the propensity to borrow informally as well as how informal debt levels are related to relative income.

Figure 3: Debt to income across income deciles, 2008/9 and 2014/5



Source: author's calculations based on LCS 2008/9 and 2014/5.

Importantly, these debt-to-income figures are not driven by unrealistic or mistakenly low recorded incomes at the bottom of the distribution, as illustrated in Appendix Table A2, which provides absolute levels of income, total debt, and informal debt for each decile of the trimmed data.

2.3 Baseline empirical specification

The following baseline specification is estimated:

$$Debt_i = RD_i\gamma + GI_i\delta + X_i\beta + \varepsilon_i \quad (1)$$

where $Debt_i$ represents household i 's decision to hold debt or an outstanding amount of debt. GI_i is the household's absolute gross income,⁶ and X_i is a set of household demographic characteristics and other controls. As a robustness check, household gross income is also proxied by the value of

⁵ See, for example, Eggertsson and Krugman (2012) and Guerrieri and Lorenzoni (2017).

⁶ The inclusion of households' gross income as an explanatory variable allows for the separation of the impact of absolute income versus that of income inequality, as measured by household relative deprivation.

household durables, which is less subject to short-run fluctuations and therefore is less likely to be impacted by current or recent borrowing.

RD_t —the measure of inequality and main variable of interest—is estimated using a variation of the Yitzhaki (1979) relative income deprivation index.⁷ More specifically:

$$RD(y_i, y_j) = \frac{\sum_j (y_j - y_i)}{N} \quad \forall y_j > y_i \quad (2)$$

That is, relative income deprivation (RD) is measured as the average distance between household i 's income and the incomes of households earning above household i , where N is the reference group of households. Provinces are used as reference groups; that is, household incomes are compared with the incomes of other households living in the same province.

Outcome variables

There are four main outcome variables. At the extensive margin, they are: (i) households' decision to borrow, and (ii) households' decision to borrow informally, given that they borrow. At the intensive margin, they are: (iii) total debt outstanding, and (iv) informal debt as a percentage of total debt. Households' decisions to borrow (overall and informally) are binary variables, equal to one if households have outstanding debt and zero otherwise. Overall and informal debt outstanding are the sum of individual debt items. Informal debt includes borrowing from friends and family, borrowing from moneylenders, arrears on municipal fees, and furniture, appliances, and clothing purchased on lay-by. Overall debt includes these informal debt components as well as formal sources of debt—mortgages, car loans, credit card debt, bank overdrafts, and other bank loans.

The expectation, based on the theory presented in the preceding section, is that households' decision to borrow and level of overall debt held will be influenced by relative deprivation, while decisions on the percentage of informal to total debt will be influenced mainly by households' level of gross income, which has implications for the types of credit instruments they are able to access.

Control variables

Household characteristics (X_i) include age, sex, race, and highest educational attainment of the household head, marital status of household head, and the number of adults and children living in the household. In addition to household head demographics and household structure, households' ability to smooth consumption through formal savings as well as a potential strain on income via sickness are proxied. A binary variable is added to control for whether households hold a formal savings account.⁸ The number of sick household members, representing a strain on household income particularly for low-income households (Gertler and Gruber 2002), is calculated as the sum of household members in poor health, who therefore responded 'Poor' to the survey question 'How would you describe your health in general? Would you say it is: (i) Very good (ii) Good (iii) Fair (iv) Poor (v) Not sure'.⁹

⁷ The definition of the relative deprivation index follows Jestl (2019).

⁸ Ownership of a formal savings account is proxied by whether households have deposited into a formal savings account in the previous 12 months.

⁹ Additional control variables—employment intensity and percentage of employed household members—proxied for consumption-smoothing practices through increased labour were experimented with, as done in previous literature

Given that the dependent variables are populated with a large number of zeroes, by virtue of households that have no outstanding debt, an inverse-hyperbolic-sine (ihs) transformation is applied to the dependent variables as well as to the main variables of interest—gross income and relative deprivation. This relationship between relative deprivation and household debt, as outlined above, is then estimated using linear models. First, the households’ decision to borrow (extensive margin) is estimated using a linear probability model. Second, the level of household debt (intensive margin) is estimated using an ordinary least squares (OLS) model.

2.4 Additional specifications

To test the robustness of the baseline results, three additional specifications are estimated. In the first two specifications, equation (1) is adjusted to include squared values of gross income and relative deprivation, respectively. This allows for a determination of whether there is a non-linear relationship between income inequality and either income or relative deprivation. As a third specification, a zero-inflated Poisson (ZIP) model is employed. In addition to modelling a non-linear relationship, the ZIP model assesses households’ decisions to borrow and the level of borrowing simultaneously, executing separate Logit and Poisson regressions. In this way, the ZIP model also explicitly controls for ‘excess zeroes’ in the dependent variable by treating the process, generating the decision to borrow as distinct from the amount borrowed.

3 Results

3.1 Baseline results

Table 1 presents results from the baseline linear probability model (LPM) and OLS estimations. Columns 1 and 2 give the LPM estimates of the impact of relative deprivation on the probability of borrowing— $pr(debt > 0)$ —and borrowing informally— $pr(inf. debt > 0 | debt > 0)$ —respectively, in the first cross-section. Columns 5 and 6 give similar LPM estimates for the second cross-section. In columns 3–4 and 7–8, OLS estimates of the impact of relative deprivation on the level of overall borrowing and proportion of informal debt, in each cross-section, are presented.

Two important findings are observed from Table 1. First, higher-income households have a greater propensity for borrowing but a lower propensity for informal borrowing given they choose to borrow. These propensities are reflected in the predicted levels of debt—higher-income households hold more overall debt but lower proportions of informal debt. However, as a second observation, when ranked against households within their respective provinces, households faced with higher relative deprivation have a higher propensity for overall borrowing and are also more likely to take up informal debt. These propensities are similarly reflected in the predicted level of overall and informal debt. That is, more relatively deprived households borrow more and also hold greater proportions of informal debt. These results are in line with the relative income hypothesis, applied in much of the aforementioned literature, which suggest that households’ consumption, and thus borrowing behaviour, is dependent on their relative standing in the income distribution.

Household demographics also impact the levels of overall and informal debt taken up. As with incomes, households with more educated heads borrow more but less so from informal sources. African and mixed-race households are more likely to borrow informally, and hold higher

(Jestl 2019; Van Treeck 2014). However, these did not significantly affect the findings on the main variables of interest and are therefore excluded. Results are available from the author upon request.

percentages of informal debt, than their white counterparts. Additionally, across both cross-sections, mixed-race households hold both more overall debt and greater percentages of informal debt than their white counterparts. Households with female heads are more likely to borrow and also hold higher levels of overall and informal debt. However, households with married heads, while holding more overall debt, have a lower propensity to borrow from informal sources and also hold lower proportions of informal debt.

Household structure only has a statistically significant impact on the propensity to borrow and level of borrowing in the later cross-section. More specifically, households with more children are more likely to take up debt and also hold higher levels of debt, consistent with theories of life cycle smoothing, while households with more adults hold lower levels of debt. However, larger households—both those with more adults and more children—are more likely to borrow from informal sources, across both cross-sections, and hold greater proportions of informal debt than smaller households. In terms of constraints on household income, the results show higher borrowing among households with more sick members. Expectedly, borrowing is also significantly higher among households who hold a savings account and are therefore more likely to be able to access formal credit facilities.

The relationship between relative income and debt is further interrogated by excluding borrowing for investment in large capital goods. This is motivated by competing findings of ‘tunnel’ and ‘keeping-up’ effects in the literature. For example, while Bertrand and Morse (2016) find that borrowing by relatively poorer households is spent on ‘visible goods’ and Georgarakos et al. (2014) find an impact of relative income even after accounting for expected future income, Li (2018) finds that a significant proportion of household borrowing is directed to human capital investments. Table 2 therefore presents OLS estimates with debt excluding mortgages and loans (in levels and as a proportion of income) as well as informal debt to income as outcome variables. The results show that even with debt for these large capital goods excluded, households with higher relative deprivation indices continue to hold higher levels of debt. Additionally, in the later cross-section, these households also hold higher overall and informal debt to income. There are two possible implications of these results. First, these results suggest that, among households with lower relative incomes, borrowing is directed towards consumption goods rather than investment in large capital goods; thus, households may be engaging in ‘keeping-up’ behaviour. On the other hand, given generally high inequality in South Africa and higher average inequality within some provinces, the lowest income households may be using debt, particularly informal debt, to smooth their consumption needs.

Table 1: LPM and OLS, probability, and level of overall and informal borrowing

	2008/9				2014/5			
	Borrow	Inf. borrow	Debt outs.	Inf. debt outs. (% of total)	Borrow	Inf. borrow	Debt outs.	Inf. debt outs. (% of total)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Gross income	0.136*** (0.003)	-0.037*** (0.004)	1.444*** (0.032)	-0.337*** (0.027)	0.115*** (0.003)	-0.111*** (0.007)	1.297*** (0.035)	-0.713*** (0.036)
Relative dep.	0.106*** (0.010)	0.048*** (0.010)	0.532*** (0.096)	0.484*** (0.052)	0.070*** (0.010)	0.071*** (0.013)	0.278*** (0.105)	0.324*** (0.056)
Age of HH head	-0.001*** (0.000)	-0.001*** (0.000)	-0.016*** (0.002)	-0.005** (0.002)	-0.001*** (0.000)	0.000 (0.000)	-0.013*** (0.002)	0.002 (0.002)
Primary educ	0.059*** (0.009)	0.003 (0.010)	0.440*** (0.072)	0.090 (0.071)	0.038*** (0.009)	-0.020 (0.017)	0.290*** (0.080)	-0.069 (0.097)
Secondary educ	0.087*** (0.011)	-0.017 (0.012)	0.786*** (0.092)	-0.090 (0.082)	0.054*** (0.011)	-0.116*** (0.021)	0.506*** (0.099)	-0.666*** (0.111)
Post-secondary educ	0.131*** (0.015)	-0.071*** (0.017)	1.555*** (0.144)	-0.544*** (0.102)	0.118*** (0.016)	-0.166*** (0.028)	1.381*** (0.169)	-0.971*** (0.139)
Tertiary educ	0.152*** (0.019)	-0.123*** (0.024)	2.046*** (0.208)	-0.878*** (0.122)	0.182*** (0.019)	-0.197*** (0.029)	2.369*** (0.212)	-1.229*** (0.139)
African/Black	0.040*** (0.014)	0.294*** (0.019)	-0.191 (0.158)	1.554*** (0.085)	0.005 (0.015)	0.253*** (0.019)	-0.427** (0.177)	1.130*** (0.081)
Coloured	0.122*** (0.016)	0.258*** (0.021)	1.037*** (0.181)	1.144*** (0.096)	0.109*** (0.017)	0.182*** (0.022)	0.856*** (0.199)	0.792*** (0.096)
Asian/Indian	-0.004 (0.027)	0.106*** (0.040)	-0.368 (0.291)	0.436** (0.176)	-0.085*** (0.024)	0.030 (0.040)	-1.199*** (0.287)	0.231 (0.180)
Female head	0.040*** (0.007)	0.037*** (0.008)	0.302*** (0.060)	0.221*** (0.049)	0.013** (0.007)	0.041*** (0.014)	0.083 (0.065)	0.230*** (0.069)
Married head	0.050*** (0.007)	-0.028*** (0.008)	0.573*** (0.064)	-0.209*** (0.050)	0.023*** (0.007)	-0.005 (0.014)	0.301*** (0.066)	-0.046 (0.069)
Num. of adults	0.000 (0.003)	0.012*** (0.003)	0.013 (0.024)	0.113*** (0.018)	-0.001 (0.003)	0.016*** (0.005)	-0.044* (0.025)	0.094*** (0.023)
Num. of children	-0.000 (0.002)	0.006*** (0.002)	-0.019 (0.017)	0.020 (0.014)	0.006*** (0.002)	0.021*** (0.003)	0.050*** (0.019)	0.110*** (0.017)
Sick HH members	0.024*** (0.005)	0.008* (0.004)	0.154*** (0.044)	0.027 (0.033)	0.014*** (0.003)	0.004 (0.006)	0.129*** (0.033)	0.030 (0.033)
Savings acct.	0.149*** (0.015)	0.051*** (0.014)	1.311*** (0.154)	0.225*** (0.079)	0.064*** (0.013)	0.003 (0.020)	0.621*** (0.143)	-0.008 (0.094)
_cons	-1.834*** (0.080)	0.765*** (0.093)	- 16.061*** (0.769)	3.405*** (0.520)	-1.543*** (0.083)	1.297*** (0.147)	- 13.854*** (0.891)	8.579*** (0.682)
Observations	23,872	9,395	23,872	9,395	22,781	6,382	22,781	6,382
R-squared	0.127	0.180	0.200	0.237	0.116	0.277	0.168	0.337

Note: base groups: (a) race of HH head—white population group, and (b) education of HH head—no schooling. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: author's calculations based on LCS 2008/9 and 2014/5.

Table 2: OLS, level of overall and informal borrowing, excluding mortgages and car loans

	2008/9			2014/5		
	Debt outs. (excl. mort and car loans)	Debt to income (excl. mort and car loans)	Inf. debt to income	Debt outs. (excl. mort and car loans)	Debt to income (excl. mort and car loans)	Inf. debt to income
	(1)	(2)	(3)	(4)	(5)	(6)
Gross income	1.187*** (0.030)			0.961*** (0.032)		
Relative dep.	1.150*** (0.092)	21.063 (14.322)	37.300 (29.995)	1.021*** (0.105)	4.551*** (1.236)	9.016*** (1.203)
Age of HH head	-0.013*** (0.002)	-0.288 (0.219)	-0.833 (0.734)	-0.008*** (0.002)	-0.045** (0.020)	-0.135** (0.056)
Primary educ	0.514*** (0.070)	6.877* (3.720)	15.863 (10.518)	0.375*** (0.077)	0.863 (0.677)	1.301 (1.812)
Secondary educ	0.775*** (0.088)	-0.905 (4.391)	-13.184 (14.813)	0.466*** (0.094)	2.918*** (0.818)	-4.239** (2.076)
Post-secondary educ	1.051*** (0.132)	1.737 (2.044)	-13.173 (9.091)	0.988*** (0.153)	3.052** (1.351)	-8.774*** (2.117)
Tertiary educ	1.175*** (0.186)	14.317 (8.762)	-4.830* (2.680)	1.334*** (0.188)	7.573*** (1.945)	-8.655*** (2.031)
African/Black	1.050*** (0.135)	-9.637 (7.260)	-5.871 (11.016)	0.417*** (0.148)	-1.103 (1.137)	3.794*** (0.862)
Coloured	1.689*** (0.158)	-14.440 (11.853)	-23.751 (23.941)	1.244*** (0.171)	4.940 (4.367)	0.792 (1.254)
Asian/Indian	0.248 (0.241)	-7.071 (6.494)	-2.303 (2.938)	-0.719*** (0.228)	-3.338*** (1.191)	1.079 (1.175)
Female head	0.358*** (0.057)	-5.756 (6.224)	-20.843 (20.871)	0.155** (0.061)	1.431 (1.184)	1.285 (1.484)
Married head	0.370*** (0.060)	-3.956 (5.081)	-20.393 (17.127)	0.127** (0.061)	-0.287 (0.586)	-4.058*** (1.378)
Num. of adults	0.045** (0.023)	2.559* (1.530)	3.956 (3.491)	0.009 (0.023)	-0.015 (0.261)	-0.716** (0.358)
Num. of children	-0.027* (0.016)	-1.461 (1.311)	-5.079 (4.255)	0.059*** (0.018)	-0.535*** (0.194)	-0.771*** (0.295)
Sick HH members	0.191*** (0.042)	-1.294 (1.404)	-4.787 (4.376)	0.140*** (0.031)	0.458** (0.221)	-0.321 (0.409)
Savings acct.	1.422*** (0.144)	-1.518 (1.456)	-8.491** (3.934)	0.782*** (0.131)	0.856 (1.071)	-3.507*** (0.844)
_cons	-18.560*** (0.740)	-95.970 (63.472)	-136.660 (108.405)	-16.220*** (0.883)	-22.497** (8.855)	- (9.099)
Observations	23,872	23,872	9,395	22,781	22,781	6,382
R-squared	0.123	0.001	0.002	0.087	0.002	0.044

Note: base groups: (a) race of HH head—white population group, and (b) education of HH head—no schooling. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: author's calculations based on LCS 2008/9 and 2014/5.

3.2 Results from alternative specifications

In this subsection, I present results from three additional specifications: (i) OLS with income squared as an additional control, (ii) OLS with relative deprivation squared as an additional control, and (iii) ZIP model. These results are presented in Tables 3a, 3b, and 4, respectively.

Table 3a: OLS income squared, level of overall and informal borrowing

	2008/9			2014/5		
	Debt outs. (1)	Debt outs. (exc. mortgages and car loans) (2)	Inf. debt outs. (% of total) (3)	Debt outs. (4)	Debt outs. (exc. mortgages and car loans) (5)	Inf. debt outs. (% of total) (6)
Gross income	-9.031*** (0.378)	-4.999*** (0.355)	3.499*** (0.341)	-9.356*** (0.446)	-4.469*** (0.413)	2.216*** (0.489)
Gross income - squared	0.484*** (0.018)	0.286*** (0.017)	-0.173*** (0.015)	0.470*** (0.020)	0.240*** (0.019)	-0.125*** (0.021)
Relative dep.	1.494*** (0.105)	1.718*** (0.101)	0.159*** (0.055)	1.290*** (0.121)	1.537*** (0.122)	0.089 (0.064)
Age of HH head	-0.013*** (0.002)	-0.011*** (0.002)	-0.005*** (0.002)	-0.009*** (0.002)	-0.006*** (0.002)	0.002 (0.002)
Primary educ	0.458*** (0.071)	0.524*** (0.069)	0.095 (0.071)	0.248*** (0.079)	0.353*** (0.077)	-0.056 (0.096)
Secondary educ	0.743*** (0.091)	0.749*** (0.088)	-0.073 (0.081)	0.414*** (0.098)	0.420*** (0.094)	-0.636*** (0.111)
Post-secondary educ	1.156*** (0.143)	0.815*** (0.133)	-0.426*** (0.102)	0.996*** (0.169)	0.792*** (0.154)	-0.906*** (0.140)
Tertiary educ	1.243*** (0.209)	0.701*** (0.188)	-0.672*** (0.123)	1.619*** (0.216)	0.952*** (0.192)	-1.108*** (0.141)
African/Black	0.573*** (0.158)	1.502*** (0.137)	1.345*** (0.088)	0.123 (0.177)	0.697*** (0.150)	1.039*** (0.084)
Coloured	1.471*** (0.178)	1.945*** (0.158)	1.022*** (0.097)	1.151*** (0.198)	1.394*** (0.171)	0.730*** (0.097)
Asian/Indian	0.287 (0.285)	0.635*** (0.240)	0.261 (0.177)	-0.708** (0.285)	-0.469** (0.230)	0.160 (0.181)
Female head	0.351*** (0.059)	0.387*** (0.057)	0.219*** (0.049)	0.166*** (0.064)	0.198*** (0.060)	0.222*** (0.069)
Married head	0.482*** (0.063)	0.316*** (0.060)	-0.172*** (0.049)	0.313*** (0.065)	0.134** (0.061)	-0.050 (0.069)
Num. of adults	-0.014 (0.023)	0.029 (0.023)	0.117*** (0.018)	-0.071*** (0.025)	-0.004 (0.023)	0.097*** (0.023)
Num. of children	0.004 (0.017)	-0.014 (0.016)	0.015 (0.014)	0.083*** (0.018)	0.076*** (0.018)	0.105*** (0.017)
Num. of sick HH members	0.192*** (0.044)	0.213*** (0.042)	0.012 (0.033)	0.135*** (0.033)	0.143*** (0.031)	0.027 (0.032)
Savings acct	1.159*** (0.153)	1.332*** (0.143)	0.243*** (0.079)	0.499*** (0.142)	0.719*** (0.131)	0.002 (0.093)
_cons	33.424*** (1.884)	10.662*** (1.779)	-15.541*** (1.764)	38.834*** (2.274)	10.640*** (2.072)	-6.779** (2.637)
Observations	23,872	23,872	9,395	22,781	22,781	6,382
R-squared	0.224	0.133	0.248	0.188	0.093	0.341

Note: base groups: (a) race of HH head—white population group, and (b) education of HH head—no schooling. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: author's calculations based on LCS 2008/9 and 2014/5.

Table 3b: OLS RD-squared, level of overall and informal borrowing

	2008/9			2014/5		
	Debt outs. (1)	Debt outs. (exc. mortgages and car loans) (2)	Inf. debt outs. (% of total) (3)	Debt outs. (4)	Debt outs. (exc. mortgages and car loans) (5)	Inf. debt outs. (% of total) (6)
Gross income	1.471*** (0.032)	1.213*** (0.030)	-0.314*** (0.027)	1.335*** (0.034)	1.001*** (0.031)	-0.653*** (0.037)
Relative dep.	-2.930*** (0.647)	-2.313*** (0.548)	-0.622*** (0.173)	-3.041*** (0.641)	-2.406*** (0.517)	-1.228*** (0.222)
Relative dep. - squared	0.328*** (0.057)	0.328*** (0.049)	0.111*** (0.017)	0.304*** (0.054)	0.314*** (0.044)	0.154*** (0.022)
Age of HH head	-0.016*** (0.002)	-0.013*** (0.002)	-0.004** (0.002)	-0.013*** (0.002)	-0.008*** (0.002)	0.002 (0.002)
Primary educ	0.463*** (0.072)	0.537*** (0.070)	0.099 (0.071)	0.297*** (0.080)	0.382*** (0.077)	-0.074 (0.096)
Secondary educ	0.836*** (0.092)	0.825*** (0.088)	-0.068 (0.082)	0.539*** (0.099)	0.500*** (0.094)	-0.643*** (0.111)
Post-secondary educ	1.614*** (0.144)	1.110*** (0.132)	-0.510*** (0.102)	1.409*** (0.169)	1.018*** (0.152)	-0.956*** (0.139)
Tertiary educ	2.049*** (0.208)	1.179*** (0.185)	-0.861*** (0.121)	2.419*** (0.212)	1.386*** (0.187)	-1.177*** (0.139)
African/Black	-0.131 (0.158)	1.111*** (0.135)	1.566*** (0.084)	-0.406** (0.177)	0.439*** (0.148)	1.112*** (0.082)
Coloured	0.995*** (0.180)	1.647*** (0.157)	1.116*** (0.096)	0.788*** (0.200)	1.173*** (0.171)	0.738*** (0.096)
Asian/Indian	-0.233 (0.291)	0.383 (0.242)	0.489*** (0.177)	-1.089*** (0.287)	-0.605*** (0.227)	0.294 (0.180)
Female head	0.300*** (0.060)	0.356*** (0.057)	0.217*** (0.049)	0.082 (0.065)	0.154** (0.061)	0.230*** (0.069)
Married head	0.568*** (0.064)	0.365*** (0.060)	-0.212*** (0.050)	0.294*** (0.066)	0.120** (0.061)	-0.052 (0.069)
Num. of adults	0.014 (0.024)	0.045** (0.023)	0.113*** (0.018)	-0.037 (0.025)	0.017 (0.023)	0.098*** (0.023)
Num. of children	-0.018 (0.017)	-0.027 (0.016)	0.020 (0.014)	0.051*** (0.019)	0.061*** (0.018)	0.111*** (0.017)
Num. of sick HH members	0.153*** (0.044)	0.189*** (0.042)	0.025 (0.033)	0.123*** (0.033)	0.133*** (0.031)	0.027 (0.033)
Savings acct	1.312*** (0.154)	1.423*** (0.143)	0.224*** (0.078)	0.636*** (0.143)	0.797*** (0.132)	0.006 (0.094)
_cons	-7.525*** (1.921)	-10.023*** (1.632)	5.739*** (0.588)	-5.598*** (2.015)	-7.694*** (1.634)	11.450*** (0.741)
Observations	23,872	23,872	9,395	22,781	22,781	6,382
R-squared	0.203	0.126	0.239	0.172	0.091	0.342

Note: base groups: (a) race of HH head—white population group, and (b) education of HH head—no schooling. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

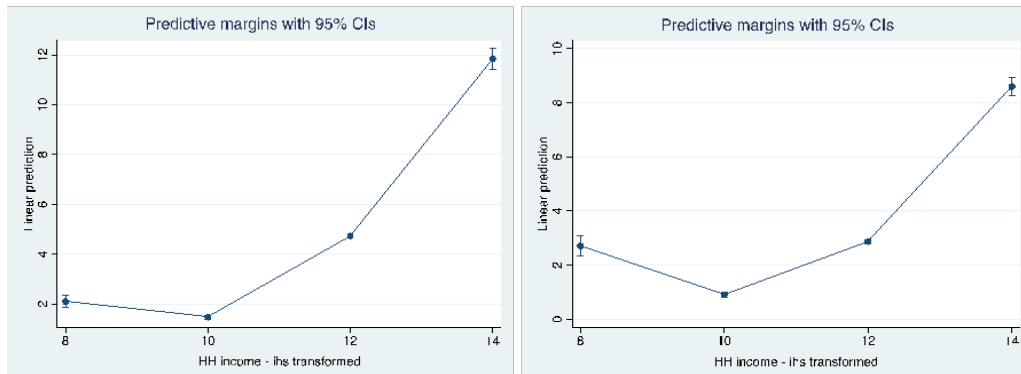
Source: author's calculations based on LCS 2008/9 and 2014/5.

Estimation results in Table 3a confirm the baseline results. The table shows that households with lower levels of gross income take up less overall debt (with and without mortgages and car loans) but take up greater proportions of informal debt. However, at higher levels of income, households take up more overall debt and lower proportions of informal debt. Figure 4 presents these results graphically, showing these opposing relationships of household income with overall and informal debt. Results in Table 3b similarly confirm baseline results. More specifically, the table shows that households facing higher relative deprivation both borrow more and source greater percentages of their debt from informal sources. Figure 5 presents these results graphically showing a U-shaped relationship between relative deprivation and household debt. That is, debt is decreasing in relative deprivation at lower levels, but at higher levels of relative deprivation, the relationship changes and

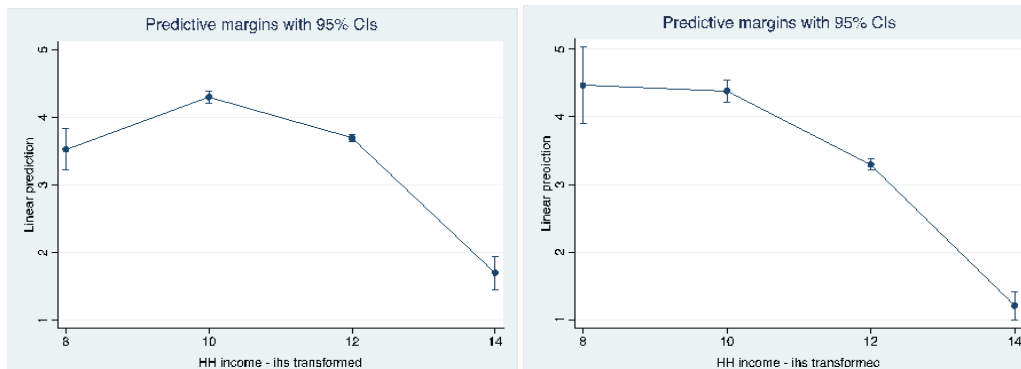
households begin to take up more debt. Results from both estimations emphasize that while higher-income households are able to take up more debt, either because of ease and affordability or for investment in large capital goods, comparisons play a role in the levels of borrowing that households engage in. Where relative incomes are lower or relative deprivation is higher, there is increased borrowing, and a significant proportion of this debt comes from informal sources such as moneylenders, friends and family, and lay-by purchases.

Figure 4: Predictive margins from the OLS model (income squared)

Panel A: Overall Debt – 2008/9 & 2014/5



Panel B: Informal Debt – 2008/9 & 2014/5



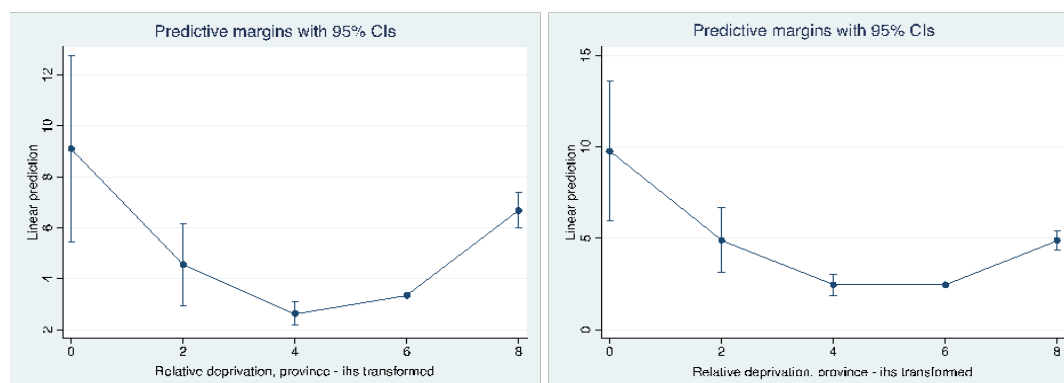
Note: **panel A** shows the predicted relationship between income and **overall debt** in 2008/9 and 2014/5, respectively. **Panel B** shows the predicted relationship between income and **informal debt** in 2008/9 and 2014/5, respectively.

Source: author's calculations based on LCS 2008/9 and 2014/5.

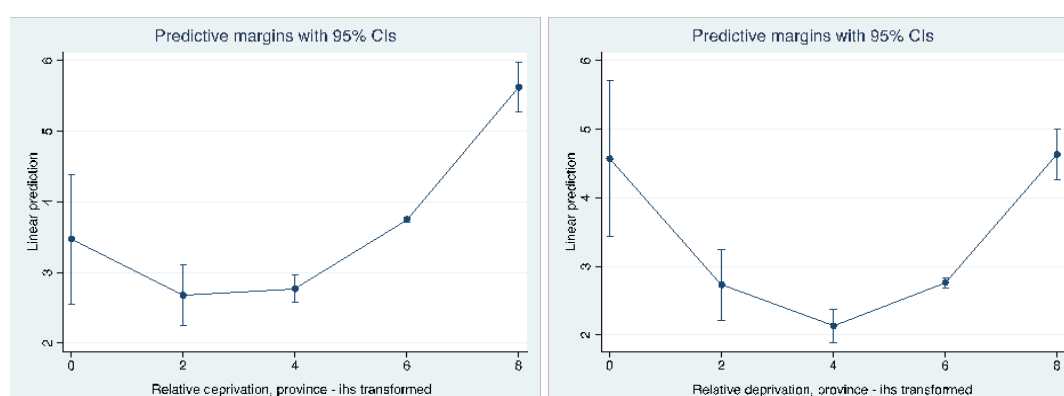
Given these non-linear relationships, a ZIP model is also specified. As noted above, the ZIP model executes two equations simultaneously—a Logit regression that evaluates households' binary decisions to borrow or not borrow and a Poisson regression that evaluates the predicted levels of household debt. Hence, the ZIP model allows for a distinction between the processes generating the decision to borrow and how much is borrowed, given households decide to borrow, thus accounting for 'excess zeroes' in the distribution of household debt. Given this treatment of excess zeroes, the ihs transformation is not applied in these estimations. Instead, the dependent variables (income and relative deprivation) and total debt outstanding are log transformed, allowing coefficients to be interpreted as percentages. No transformation is applied to other outcome variables (informal debt as a percentage of total debt; debt to income; informal debt to income).

Figure 5: Predictive margins from the OLS model (relative deprivation squared)

Panel A: Overall Debt – 2008/9 & 2014/5



Panel B: Informal Debt – 2008/9 & 2014/5



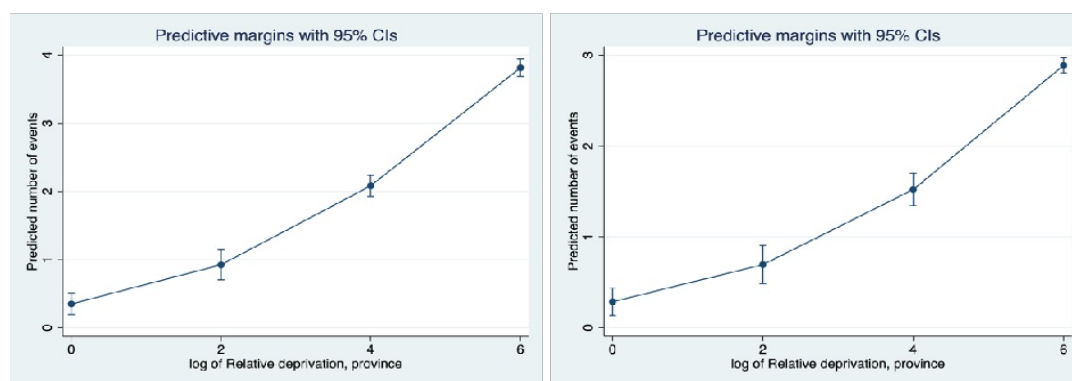
Note: **panel A** shows the predicted relationship between relative deprivation and **overall debt** in 2008/9 and 2014/5, respectively. **Panel B** shows the predicted relationship between relative deprivation and **informal debt** in 2008/9 and 2014/5, respectively.

Source: author's calculations based on LCS 2008/9 and 2014/5.

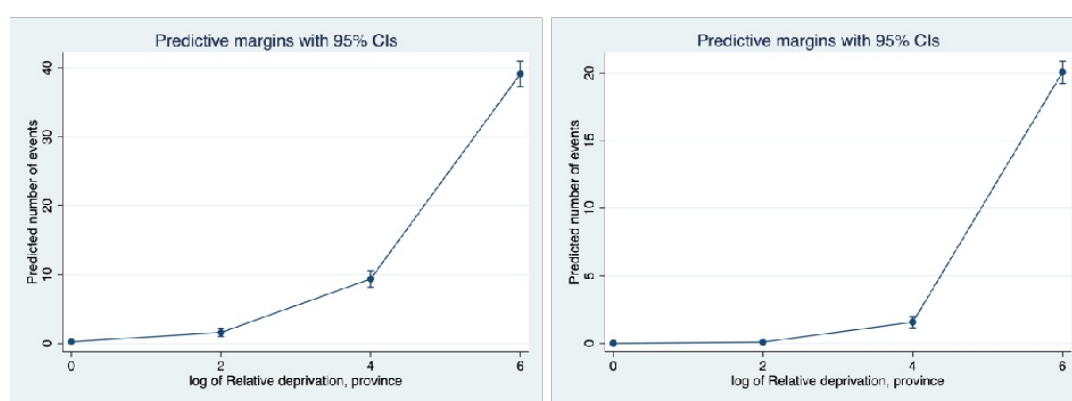
A few key results are produced by the estimated ZIP model, as displayed in Table 4. First, the model predicts that higher-income households and households faced with higher relative deprivation have *lower* propensities for borrowing—both overall and from informal sources. Nonetheless, in line with baseline results, results in Table 4 show that higher-income households hold more overall debt but lower proportions of informal debt. Also in line with baseline results, households with higher relative deprivation (lower relative incomes) hold more overall debt when large capital goods are excluded, take up greater proportions of informal debt, and hold higher proportions of informal debt to income. This is despite no statistically significant relationship between relative deprivation and overall debt. Predicted margins of the relationship between relative deprivation and debt, as estimated by the ZIP model, are presented in Figure 6.

Figure 6: Predictive margins from the ZIP model

Panel A: Overall Debt – 2008/9 & 2014/5



Panel B: Informal Debt – 2008/9 & 2014/5



Note: **panel A** shows the predicted relationship between relative deprivation and **overall debt** in 2008/9 and 2014/5, respectively. **Panel B** shows the predicted relationship between relative deprivation and **informal debt** in 2008/9 and 2014/5, respectively.

Source: author's calculations based on LCS 2008/9 and 2014/5.

Table 4: ZIP, probability, and level of overall and informal borrowing

	2008/9				2014/5			
	Debt outs.	Debt (excl. mort and loan)	Inf. debt outs. (% of total)	Inf. debt to income	Debt outs.	Debt (excl. mort and loan)	Inf. debt outs. (% of total)	Inf. debt to income
Gross income	0.103*** (0.003)	0.075*** (0.003)	-0.117*** (0.005)		0.098*** (0.003)	0.068*** (0.004)	-0.098*** (0.007)	
Relative dep.	0.006 (0.005)	0.044*** (0.006)	0.148*** (0.018)	3.118* (1.723)	0.004 (0.004)	0.028*** (0.007)	0.125*** (0.023)	1.449*** (0.165)
Age of HH head	-0.000** (0.000)	-0.000** (0.000)	0.000 (0.000)	-0.039* (0.024)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	-0.011*** (0.004)
Primary educ	0.039*** (0.008)	0.045*** (0.008)	0.013 (0.009)	0.875* (0.524)	0.009 (0.010)	0.016 (0.010)	0.015 (0.012)	0.109 (0.123)
Secondary educ	0.075*** (0.009)	0.066*** (0.009)	-0.022* (0.013)	-0.352 (0.266)	0.055*** (0.011)	0.048*** (0.011)	-0.038** (0.017)	-0.091 (0.155)
Post-secondary educ	0.121***	0.078***	-0.189***	-0.671***	0.085***	0.061***	-0.165***	-0.626***

	(0.011)	(0.011)	(0.027)	(0.190)	(0.013)	(0.013)	(0.039)	(0.197)
Tertiary educ	0.142***	0.091***	-0.396***	-0.761***	0.121***	0.085***	-0.487***	-0.767***
	(0.013)	(0.012)	(0.056)	(0.253)	(0.013)	(0.013)	(0.074)	(0.191)
African/Black	-0.098***	-0.022**	0.406***	0.147	-0.075***	-0.034***	0.454***	0.918***
	(0.008)	(0.009)	(0.056)	(0.403)	(0.008)	(0.009)	(0.106)	(0.188)
Coloured	-0.025***	0.002	0.275***	-1.197	-0.034***	-0.012	0.388***	0.653***
	(0.009)	(0.010)	(0.058)	(1.086)	(0.009)	(0.010)	(0.107)	(0.213)
Asian/Indian	-0.039**	-0.045**	0.165*	-0.299	-0.024	-0.031	0.404***	0.399
	(0.018)	(0.018)	(0.096)	(0.896)	(0.015)	(0.020)	(0.141)	(0.334)
Female head	-0.005	0.003	0.019**	-0.762*	-0.012**	-0.003	0.028**	0.098
	(0.005)	(0.005)	(0.009)	(0.450)	(0.006)	(0.006)	(0.012)	(0.103)
Married head	0.033***	0.021***	-0.053***	-0.785**	0.023***	0.016***	-0.019	-0.319***
	(0.005)	(0.005)	(0.009)	(0.309)	(0.006)	(0.006)	(0.012)	(0.095)
Num. of adults	0.000	0.006***	0.019***	0.188*	-0.007***	0.000	0.015***	-0.047
	(0.002)	(0.002)	(0.003)	(0.111)	(0.002)	(0.002)	(0.004)	(0.033)
Num. of children	-0.003**	-0.004***	0.005**	-0.300	-0.003**	-0.003**	0.004	-0.090***
	(0.002)	(0.002)	(0.002)	(0.190)	(0.001)	(0.002)	(0.003)	(0.025)
Sick HH members	0.004	0.007**	0.005	-0.302	-0.002	-0.001	0.006	-0.026
	(0.004)	(0.004)	(0.005)	(0.256)	(0.003)	(0.003)	(0.004)	(0.038)
Savings acct.	-0.010	-0.004	-0.016	-0.809***	-0.009	-0.003	0.030	-0.276**
	(0.008)	(0.008)	(0.022)	(0.298)	(0.007)	(0.007)	(0.027)	(0.118)
_cons	0.996***	0.973***	4.461***	-11.882	1.124***	1.221***	4.332***	-5.555***
	(0.052)	(0.055)	(0.130)	(8.105)	(0.055)	(0.069)	(0.184)	(1.053)

Decision to borrow:								
Gross income	-0.693***	-0.635***	-0.583***		-0.691***	-0.602***	-0.461***	
	(0.019)	(0.019)	(0.019)		(0.021)	(0.022)	(0.023)	
Relative dep.	-0.555***	-0.555***	-0.821***	0.203	-0.491***	-0.763***	-1.295***	-0.674***
	(0.047)	(0.047)	(0.057)	(0.408)	(0.051)	(0.063)	(0.079)	(0.082)
Age of HH head	0.006***	0.006***	0.005***	-0.005	0.005***	0.003***	-0.001	-0.007***
	(0.001)	(0.001)	(0.001)	(0.009)	(0.001)	(0.001)	(0.001)	(0.001)
Primary educ	-0.295***	-0.295***	-0.329***	-0.292	-0.248***	-0.264***	-0.271***	-0.343***
	(0.047)	(0.047)	(0.048)	(0.187)	(0.060)	(0.060)	(0.063)	(0.063)
Secondary educ	-0.407***	-0.407***	-0.407***	-0.704***	-0.296***	-0.249***	-0.171**	-0.415***
	(0.054)	(0.054)	(0.056)	(0.106)	(0.067)	(0.068)	(0.074)	(0.072)
Post-secondary educ	-0.567***	-0.567***	-0.373***	-1.116***	-0.556***	-0.444***	-0.174*	-0.693***
	(0.070)	(0.070)	(0.072)	(0.192)	(0.085)	(0.086)	(0.100)	(0.097)
Tertiary educ	-0.676***	-0.676***	-0.301***	-1.387***	-0.780***	-0.535***	-0.202*	-0.887***
	(0.091)	(0.091)	(0.092)	(0.318)	(0.093)	(0.096)	(0.114)	(0.111)
African/Black	-0.273***	-0.273***	-1.001***	-	-0.098	-0.341***	-1.318***	-0.968***
	(0.061)	(0.061)	(0.070)	0.521***	(0.065)	(0.071)	(0.120)	(0.128)
Coloured	-0.604***	-0.604***	-1.133***	-1.264***	-0.558***	-0.675***	-1.440***	-1.356***
	(0.073)	(0.073)	(0.079)	(0.359)	(0.076)	(0.080)	(0.127)	(0.134)
Asian/Indian	-0.068	-0.068	-0.468***	-0.232	0.354***	0.361**	-0.286	-0.106
	(0.119)	(0.119)	(0.135)	(0.351)	(0.124)	(0.145)	(0.226)	(0.234)
Female head	-0.200***	-0.200***	-0.253***	-0.237	-0.134***	-0.168***	-0.223***	-0.173***
	(0.033)	(0.033)	(0.033)	(0.175)	(0.038)	(0.038)	(0.042)	(0.041)
Married head	-0.222***	-0.222***	-0.140***	-0.435**	-0.165***	-0.110***	-0.146***	-0.305***
	(0.033)	(0.033)	(0.033)	(0.173)	(0.037)	(0.038)	(0.042)	(0.040)
_cons	11.242***	11.242***	12.440***	1.191	11.738***	12.678***	15.686***	7.325***
	(0.389)	(0.389)	(0.441)	(1.768)	(0.462)	(0.532)	(0.628)	(0.523)
Observations	23,872	23,872	23,872	23,872	22,781	22,781	22,781	22,781

Note: base groups: (a) race of HH head—white population group, and (b) education of HH head—no schooling. Robust standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: author's calculations based on LCS 2008/9 and 2014/5.

Across all outlined specifications, the following are consistent:

- Higher-income households borrow more but hold lower proportions of informal debt.
- Households faced with higher relative deprivation (lower relative incomes) take up higher levels of debt (when debt for large capital goods are excluded) and source greater proportions of this debt from informal sources.

These results therefore emphasize two key relationships. First, relative incomes are an important determinant of the levels of debt held by households. This is in line with the literature on advanced economies (Georgarakos et al. 2014; Berlemann and Salland 2016; Brown et al. 2016) that find a similarly significant role of household comparisons in final borrowing outcomes. As an extension of this finding, and in line with previous literature (Bertrand and Morse 2016; Jestl 2019), the results show that, for households with lower relative incomes, debt is directed to consumption rather than large capital goods such as cars and houses. Second, and key to developing and emerging economies, the results show that a significant proportion of debt taken up by households with lower relative incomes is accessed from informal sources.

4 Additional robustness checks

4.1 Excluding municipal arrears

Informal debt is a sum of four components—loans from family and friends; loans from moneylenders; purchases of furniture, appliances, and clothing on lay-by; and arrears on municipal bills. Given that municipal arrears are not explicit borrowing and still account for a significant portion of informal debt for some households, I exclude it here to ensure robustness of the results. The baseline and ZIP specifications are then re-estimated with this component excluded. Results from both specifications are substantively the same as those discussed above. These results presented are in Appendix B.

4.2 Household durables

Given that contemporaneous income might be subject to temporary shocks, households' gross income is proxied by a measure of permanent income—household durables—which is less susceptible to such shocks. Results using household durables are consistent with the results discussed above and are presented in Appendix B.

5 'Keeping-up' or 'tunnel' effect?

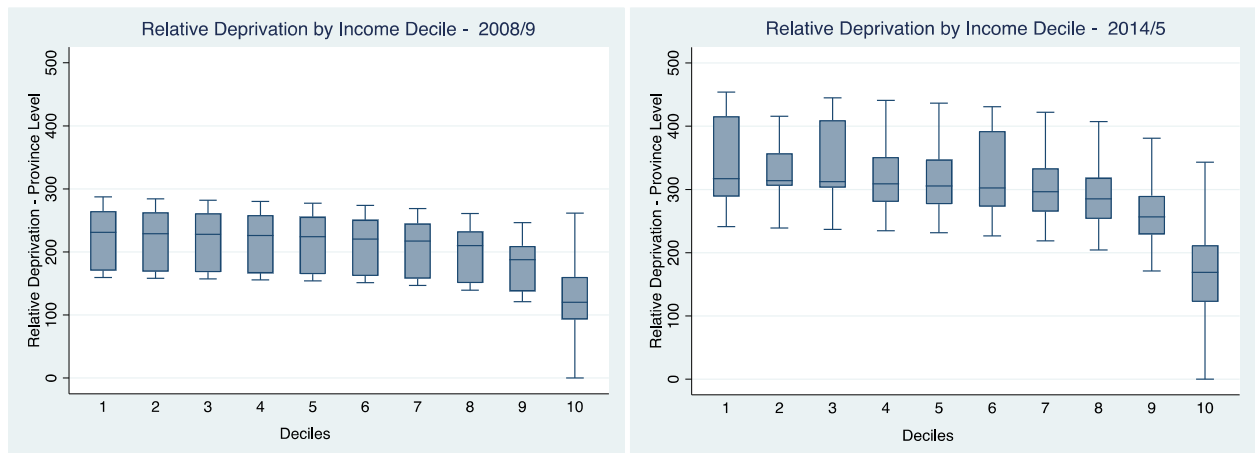
The available data do not allow for identifying whether households with lower relative incomes are borrowing more to 'keep up' with their richer neighbours, to invest in themselves and their futures, or for simple consumption smoothing. Hence, to shed light on these competing possibilities, I briefly engage with the qualitative literature on informal borrowing in South Africa.

As shown in Figure 7, average relative deprivation indices are similar for deciles 1–8 of the income distribution and only begin to decline substantially at the ninth decile. This is true even when

relative deprivation increases across all provinces between 2008/9 and 2014/5, indicating that inequality in South Africa is characterized by very high incomes at the top of the distribution and rather moderate income differences between those at or below the 80th percentile.

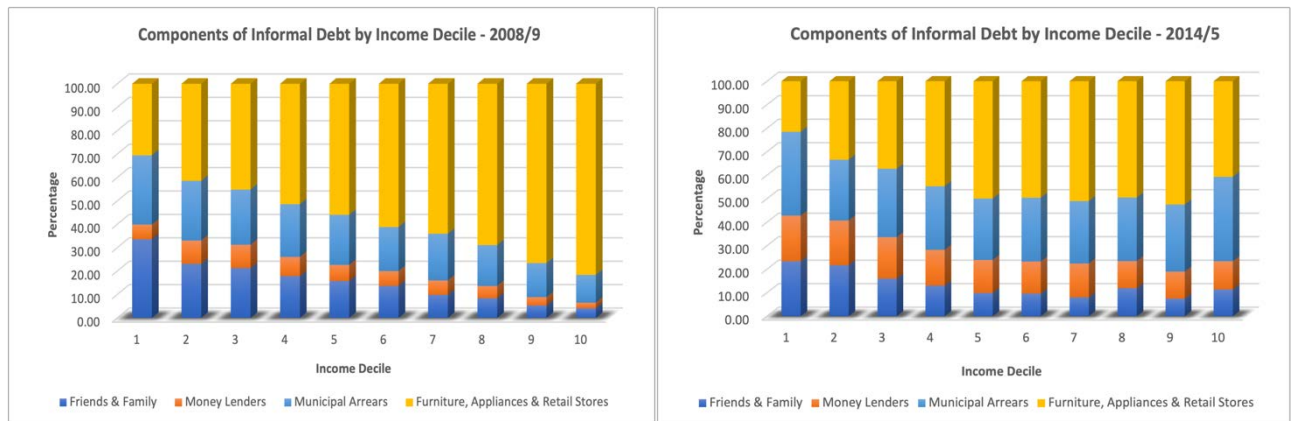
A review of the qualitative literature on informal credit in South Africa, presented alongside this breakdown of relative deprivation as well as the predominant types of informal debt taken up at each income decile, allows for some preliminary conclusions on the major uses of informal debt among South African households at different points of the income distribution. Complementing Figure 3, which shows overall and informal debt-to-income percentages, Figure 8 itemizes the types of informal debt taken up at each decile of the income distribution and the relative proportions of each type for each income decile.

Figure 7: Relative deprivation by income decile



Source: author's calculations based on LCS 2008/9 and 2014/5.

Figure 8: Proportions of informal debt types by income decile



Source: author's calculations based on LCS 2008/9 and 2014/5.

A few key observations emerge. First, excluding arrears on municipal debt, borrowing from friends and family is the informal credit type with the highest percentage at the bottom of the income distribution and decreases in subsequent deciles. Fatoki (2014) finds that among the most prevalent sources of credit for small immigrant businesses is debt from family and friends, preceded only by personal savings. They note further that, as businesses grow, this dependence on family debt diminishes, indicating that this is a primary source of business funding for low-income, low-

collateral households, with limited alternatives for credit. In line with Fatoki (2014), Siyongwana (2004) finds that even for individuals who establish moneylending businesses, the main capital sources tend to be personal savings (55 per cent) and debt from family and friends (20 per cent), adding that the ‘ability to borrow from family and friends signifies spirit of Ubuntu in African culture’.

Second, borrowing from moneylenders represents the smallest percentage across all deciles, particularly in 2008/9. These percentages increase in the second cross-section, 2014/5, but still represent the lowest proportion of informal debt among lower-income households, where overall informal debt is highest. This limited borrowing from moneylenders may reflect harsh moneylending practices, such as exorbitant interest rates and confiscating borrowers’ ATM and identification cards to guarantee payments, which have become increasingly entrenched in the South African credit landscape since Apartheid (James 2018; Siyongwana 2004). Collins (2008), however, cautions that, given that loans from moneylenders are often small and repaid within short periods such as a few weeks or a month, survey evidence might not capture the full dynamics of these types of loans as surveys only capture a ‘snapshot’. Nonetheless, in line with Figure 8, Collins posits that informal debt dynamics are characterized by a ‘growing portion from family and friends’ at the lower end of the income distribution.

Other authors emphasize more broadly that informal credit represents the main credit source for small to medium-sized businesses and small farmholders, particularly in rural areas (Chisasa 2014) and among female entrepreneurs who tend to be more ‘need-based’ and have severely less access to credit than their male counterparts (Kongolo 2007; Chappelle 2012). Hence, whether obtained from friends and family or community moneylenders, a major use of informal credit, particularly for households at the lower end of the income distribution, seems to be investment in small-scale businesses and farms. Such investments are noted to positively impact job creation, living standards, and future income security, especially for women, reflecting a potential tunnel effect (Kongolo 2007).

A third observation is that goods on lay-by or hire purchase account for larger percentages of debt as we move up the income distribution. James (2014) posits that this method of purchasing furniture and appliances ‘involves aspirations to sophistication and modernity’, particularly for Black and Coloured households that have traditionally been excluded from property ownership and formal sector credit, owing to Apartheid. This practice of fulfilling social requirements, as James calls it, often leaves households ‘deeper in a hole’ as a result of exorbitant interest rates and harsh penalties for default or late repayment. James notes further, however, that a significant percentage of individuals take up informal credit simply to ‘procure household stability’—by sending money to the village to build a house, paying for children’s school fees, buying household supplies, or paying lobola in preparation for marriage. Similarly, James (2018) adds that households engaging in lay-by purchases also do so as a way of securing future stability. Parents, for example, may buy furniture or household items on hire purchase as part of their daughter’s ‘trousseau’ as she marries, thereby allowing her to start her marriage on ‘the right foot’ and eventually securing a better life for her immediate and extended families. Hence, this increasing proportion of retail credit moving up the income distribution, where households still experience high relative deprivation, potentially reflects two factors—for some households, a desire to ‘keep up’ with higher earning neighbours by looking the part, but for other households, a ‘tunnel view’ investment in their futures.

6 Concluding remarks

Using South African household survey data, this paper assesses the role of income inequality, measured as a household relative deprivation index, in determining the propensity for and take-up of formal and informal debt. Linear models and a ZIP model are employed. The analysis provides evidence that higher-income households engage in higher borrowing but source lower percentages of debt from informal sources. Additionally, households with higher relative deprivation (or lower relative incomes) hold higher levels of outstanding debt, highlighting the importance of relative incomes in borrowing decisions for developing country households. The results further show that even with debt for large capital goods such as mortgages and car loans excluded, households with lower relative incomes continue to hold higher levels of debt, suggesting that credit is directed towards other purposes. Moreover, a significant proportion of outstanding debt comes from informal sources. While the available data do not allow for identification of the specific uses of informal household debt, a review of the qualitative literature suggests that lower-income households borrow predominantly to invest in small-scale business ventures, reflecting a tunnel effect of credit, while households positioned higher in the income distribution borrow both to keep up with their richer neighbours and to invest in the future financial stability of their families. Through this assessment of the propensity for and levels of informal credit, this paper therefore makes a key contribution to the literature on the role of relative incomes in determining levels of household debt and adds important insights particularly relevant to developing economies.

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Appendix A

Table A1: Descriptive statistics

Variable	Obs	Mean	Std. dev.	Min	Max
Annual gross household income	46,653	82,314.11	117,308.30	1,265	908,013.20
Total debt outstanding	46,653	21,426.04	130,943.70	0	6,721,280.00
Total debt to income	46,653	15.20	286.73	0	57,946.82
Total debt outstanding (excl. mortgages and car loans)	46,653	4,078.64	36,600.19	0	4,994,800.00
Total debt to income excl. mortgages and car loans)	46,653	7.52	276.86	0	57,946.82
Formal debt outstanding	46,653	19,850.16	130,094.9	0	6,721,280.00
Informal debt outstanding	46,653	1,575.88	12,961.44	0	1,528,200.00
Informal debt to income	46,653	5.33	270.43	0	57,946.82
Informal debt to total debt	46,653	20.25	39.47	0	100
Informal debt to income (excl. municipal arrears)	46,653	1.80	9.56	0	492.23
Informal debt to total debt (excl. municipal arrears)	46,653	15.60	35.21	0	100
Age of HH head	46,653	48.66	16.00	18	103
Married HH head	46,653	0.42	0.49	0	1
Female HH head	46,653	0.45	0.50	0	1
Household size	46,653	3.88	2.51	1	27
Number of adults in household	46,653	2.39	1.36	1	15
Number of children in household	46,653	1.49	1.66	0	16
Number of household members with poor health	46,653	0.34	0.77	0	13
Employment percentage	46,653	35.23	35.67	0	100
Employment intensity	46,653	0.86	7.34	0	100
Savings account	46,653	0.05	0.22	0	1

Note: income and debt variables are denominated in South African Rand.

Source: author's calculations based on LCS 2008/9 and 2014/5.

Table A2: Absolute debt across income deciles, 2008/9 and 2014/5

Panel A: 2008/9										
Income decile	1	2	3	4	5	6	7	8	9	10
Gross income	4,915	10,772	14,235	19,409	25,540	34,260	47,658	70,034	116,418	280,604
Total debt	1,391	1,064	843	1,689	1,770	2,323	6,605	9,688	30,042	124,395
Total debt (excl. mortgages and car loans)	1,081	654	781	1,144	1,344	1,593	4,726	3,678	6,267	11,647
Total informal debt	1,030	582	714	1,034	1,170	1,307	2,746	2,283	2,963	3,657
Panel B: 2014/5										
Income decile	1	2	3	4	5	6	7	8	9	10
Gross income	8,382	17,362	24,218	32,855	42,669	56,545	79,157	117,755	198,797	454,504
Total debt	1,069	1,364	1,862	2,267	2,509	4,413	4,326	13,698	40,242	178,690
Total debt (excl. mortgages and car loans)	1,056	1,028	1,143	1,660	1,865	2,472	2,985	5,470	11,081	20,288
Total informal debt	519	693	888	1,128	1,313	1,661	1,822	1,909	2,149	1,873

Note: income and debt variables are denominated in South African Rand.

Source: author's calculations based on LCS 2008/9 and 2014/5.

Appendix B

Table B1: OLS model—informal debt, excluding municipal arrears

	2008/9		2014/5	
	Inf. debt outs. (% of total)	Inf. debt to income	Inf. debt outs. (% of total)	Inf. debt to income
	(1)	(2)	(3)	(4)
Gross income	-0.144*** (0.031)	-0.565*** (0.039)		
Relative dep.	0.353*** (0.053)	0.007 (0.048)	2.832*** (0.324)	2.667*** (0.378)
Age of HH head	-0.013*** (0.002)	-0.009*** (0.003)	-0.059*** (0.013)	-0.063*** (0.015)
Primary educ	-0.080 (0.086)	-0.306** (0.127)	0.918* (0.529)	-0.373 (0.975)
Secondary educ	-0.188* (0.097)	-0.903*** (0.139)	0.519 (0.602)	-3.104*** (0.939)
Post-secondary educ	-0.570*** (0.115)	-1.100*** (0.160)	-0.782 (0.666)	-4.626*** (0.966)
Tertiary educ	-0.931*** (0.131)	-1.421*** (0.156)	-0.989 (0.698)	-4.916*** (0.940)
African/Black	1.406*** (0.085)	0.877*** (0.074)	1.336** (0.599)	2.031*** (0.272)
Coloured	0.966*** (0.100)	0.552*** (0.092)	0.478 (0.679)	0.127 (0.398)
Asian/Indian	0.420** (0.175)	0.277 (0.171)	-0.555 (0.815)	0.487 (0.430)
Female head	0.245*** (0.057)	0.233*** (0.078)	0.865** (0.371)	0.978* (0.547)
Married head	-0.078 (0.056)	0.179** (0.077)	-0.068 (0.393)	0.039 (0.509)
Num. of adults	0.070*** (0.021)	0.024 (0.026)	-0.062 (0.124)	-0.564*** (0.165)
Num. of children	0.061*** (0.016)	0.127*** (0.020)	-0.063 (0.105)	0.199 (0.157)
Sick HH members	0.038 (0.040)	-0.021 (0.034)	0.380* (0.224)	-0.102 (0.218)
Savings acct.	0.209** (0.087)	0.017 (0.094)	-0.630 (0.656)	-0.533 (0.544)
_cons	2.003*** (0.563)	9.054*** (0.679)	-10.047*** (1.874)	-7.097** (2.790)
Observations	9,395	6,382	9,395	6,382
R-squared	0.119	0.192	0.021	0.034

Note: base groups: (a) race of HH head—white population group, and (b) education of HH head—no schooling. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: author's calculations based on LCS 2008/9 and 2014/5.

Table B2: ZIP model—informal debt, excluding municipal arrears

	2008/9			2014/5		
	Informal debt outs. (log)	Inf. debt outs. (% of total)	Inf. debt to income	Informal debt outs. (log)	Inf. debt outs. (% of total)	Inf. debt to income
	(1)	(2)	(3)	(4)	(5)	(6)
Relative dep.	0.061*** (0.006)	0.098*** (0.022)	0.788*** (0.082)	0.082*** (0.010)	0.027 (0.029)	1.286*** (0.170)
Gross income	0.080*** (0.003)	-0.136*** (0.007)		0.068*** (0.004)	-0.104*** (0.009)	

Age of HH head	-0.001*** (0.000)	-0.000 (0.000)	-0.006*** (0.002)	-0.000 (0.000)	-0.001 (0.001)	-0.006** (0.003)
Primary educ	0.031*** (0.008)	-0.033** (0.015)	0.178* (0.094)	0.014 (0.011)	-0.010 (0.019)	0.045 (0.138)
Secondary educ	0.052*** (0.009)	-0.049** (0.020)	0.149 (0.108)	0.025** (0.012)	-0.077*** (0.025)	-0.082 (0.144)
Post-secondary educ	0.052*** (0.011)	-0.200*** (0.034)	-0.076 (0.139)	0.034** (0.015)	-0.153*** (0.046)	-0.301 (0.185)
Tertiary educ	0.051*** (0.013)	-0.390*** (0.061)	-0.177 (0.182)	0.048*** (0.017)	-0.425*** (0.086)	-0.403** (0.195)
African/Black	0.029** (0.011)	0.331*** (0.060)	-0.017 (0.212)	0.004 (0.017)	0.480*** (0.130)	0.621*** (0.201)
Coloured	0.048*** (0.012)	0.211*** (0.063)	-0.188 (0.224)	0.004 (0.018)	0.397*** (0.132)	0.276 (0.216)
Asian/Indian	-0.029 (0.021)	0.133 (0.103)	-0.293 (0.359)	0.023 (0.027)	0.439*** (0.165)	0.423 (0.342)
Female head	0.012** (0.005)	0.009 (0.013)	0.073 (0.060)	0.011 (0.007)	0.014 (0.017)	0.076 (0.096)
Married head	0.020*** (0.005)	-0.044*** (0.013)	-0.036 (0.065)	0.021*** (0.007)	0.001 (0.017)	-0.056 (0.086)
Num. of adults	0.006*** (0.002)	0.010* (0.005)	-0.027 (0.023)	0.001 (0.003)	0.011* (0.006)	-0.074** (0.032)
Num. of children	0.000 (0.002)	0.008** (0.003)	-0.026 (0.018)	0.000 (0.002)	0.006 (0.004)	-0.006 (0.027)
Sick HH members	0.008** (0.004)	-0.008 (0.008)	0.059* (0.034)	-0.001 (0.003)	0.005 (0.006)	-0.026 (0.042)
Savings acct.	-0.010 (0.008)	-0.048* (0.029)	-0.230 (0.150)	0.022** (0.010)	0.044 (0.033)	-0.004 (0.149)
_cons	0.743*** (0.056)	4.995*** (0.160)	-1.824*** (0.456)	0.810*** (0.089)	4.972*** (0.241)	-5.135*** (1.044)
Decision to borrow:						
Relative dep.	-0.706*** (0.057)	-0.707*** (0.057)	0.006 (0.050)	-0.980*** (0.078)	-0.980*** (0.078)	-0.424*** (0.083)
Gross income	-0.616*** (0.020)	-0.617*** (0.020)		-0.403*** (0.025)	-0.403*** (0.025)	
Age of HH head	0.008*** (0.001)	0.008*** (0.001)	0.002** (0.001)	0.004*** (0.001)	0.004*** (0.001)	-0.001 (0.001)
Primary educ	-0.255*** (0.050)	-0.255*** (0.050)	-0.313*** (0.050)	-0.145** (0.070)	-0.146** (0.070)	-0.213*** (0.069)
Secondary educ	-0.328*** (0.058)	-0.329*** (0.058)	-0.606*** (0.057)	0.023 (0.080)	0.023 (0.080)	-0.199** (0.078)
Post-secondary educ	-0.309*** (0.074)	-0.309*** (0.074)	-0.934*** (0.071)	0.010 (0.110)	0.010 (0.110)	-0.446*** (0.105)
Tertiary educ	-0.216** (0.094)	-0.216** (0.094)	-1.014*** (0.094)	0.159 (0.128)	0.158 (0.128)	-0.428*** (0.124)
African/Black	-0.988*** (0.071)	-0.988*** (0.071)	-0.584*** (0.073)	-1.206*** (0.134)	-1.206*** (0.134)	-0.922*** (0.139)
Coloured	-1.062*** (0.081)	-1.062*** (0.081)	-1.070*** (0.083)	-1.317*** (0.141)	-1.317*** (0.141)	-1.275*** (0.146)
Asian/Indian	-0.443*** (0.139)	-0.443*** (0.139)	-0.251* (0.143)	-0.320 (0.245)	-0.320 (0.245)	-0.164 (0.249)
Female head	-0.276*** (0.034)	-0.276*** (0.034)	-0.168*** (0.033)	-0.246*** (0.046)	-0.246*** (0.046)	-0.200*** (0.045)
Married head	-0.181*** (0.035)	-0.182*** (0.035)	-0.378*** (0.033)	-0.225*** (0.046)	-0.225*** (0.046)	-0.361*** (0.045)
_cons	12.167*** (0.448)	12.177*** (0.448)	2.117*** (0.292)	13.098*** (0.634)	13.103*** (0.634)	5.754*** (0.531)
Observations	23,872	23,872	23,872	22,781	22,781	22,781

Note: base groups: (a) race of HH head—white population group, and (b) education of HH head—no schooling. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: author's calculations based on LCS 2008/9 and 2014/5.

Table B3: Household durables as a proxy for gross income

	2008/9		2014/5		2008/9		2014/5		Debt outs. (exc. mortgages and car loans)	Inf. debt outs. (% of total)	Debt outs. (exc. mortgages and car loans)	Inf. debt outs. (% of total)
	borrow	Inf borrow	borrow	Inf borrow	Debt outs.	Debt outs.	Debt outs.	Debt outs.				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)		
Household durables	0.042*** (0.001)	-0.003 (0.002)	0.018*** (0.001)	-0.012*** (0.002)	0.433*** (0.012)	0.346*** (0.011)	-0.057*** (0.012)	0.196*** (0.010)	0.146*** (0.009)	-0.071*** (0.009)		
Relative dep.	-0.003 (0.008)	0.077*** (0.010)	-0.021** (0.009)	0.155*** (0.014)	-0.628*** (0.091)	0.194** (0.082)	0.735*** (0.053)	-0.748*** (0.099)	0.261*** (0.093)	0.867*** (0.067)		
Age of HH head	-0.001*** (0.000)	-0.001*** (0.000)	0.000 (0.000)	-0.001 (0.000)	-0.012*** (0.002)	-0.010*** (0.002)	-0.006*** (0.002)	-0.001 (0.002)	0.001 (0.002)	-0.004* (0.002)		
Primary educ	0.046*** (0.009)	0.001 (0.010)	0.047*** (0.009)	-0.043** (0.018)	0.314*** (0.073)	0.417*** (0.071)	0.088 (0.071)	0.401*** (0.081)	0.456*** (0.078)	-0.217** (0.098)		
Secondary educ	0.099*** (0.011)	-0.034*** (0.012)	0.101*** (0.011)	-0.183*** (0.021)	0.929*** (0.094)	0.906*** (0.090)	-0.206** (0.082)	1.043*** (0.100)	0.864*** (0.095)	-1.098*** (0.111)		
Post-secondary educ	0.186*** (0.015)	-0.105*** (0.017)	0.220*** (0.016)	-0.281*** (0.027)	2.166*** (0.146)	1.574*** (0.133)	-0.798*** (0.100)	2.545*** (0.170)	1.850*** (0.152)	-1.713*** (0.136)		
Tertiary educ	0.228*** (0.019)	-0.163*** (0.024)	0.309*** (0.018)	-0.328*** (0.028)	2.886*** (0.208)	1.890*** (0.187)	-1.176*** (0.119)	3.809*** (0.210)	2.400*** (0.184)	-2.074*** (0.135)		
African/Black	-0.012 (0.014)	0.316*** (0.019)	-0.063*** (0.015)	0.304*** (0.019)	-0.754*** (0.160)	0.576*** (0.136)	1.717*** (0.084)	-1.188*** (0.179)	-0.147 (0.148)	1.461*** (0.083)		
Coloured	0.134*** (0.017)	0.261*** (0.022)	0.103*** (0.017)	0.189*** (0.023)	1.161*** (0.185)	1.784*** (0.160)	1.144*** (0.098)	0.777*** (0.204)	1.185*** (0.173)	0.836*** (0.101)		
Asian/Indian	-0.049* (0.027)	0.119*** (0.041)	-0.107*** (0.025)	0.056 (0.040)	-0.856*** (0.296)	-0.155 (0.244)	0.552*** (0.181)	-1.444*** (0.288)	-0.900*** (0.228)	0.400** (0.186)		
Female head	0.018*** (0.007)	0.042*** (0.008)	0.001 (0.007)	0.054*** (0.014)	0.068 (0.061)	0.166*** (0.058)	0.267*** (0.049)	-0.055 (0.066)	0.053 (0.061)	0.314*** (0.071)		
Married head	0.060*** (0.007)	-0.035*** (0.008)	0.045*** (0.007)	-0.027** (0.014)	0.682*** (0.064)	0.466*** (0.061)	-0.260*** (0.050)	0.543*** (0.067)	0.306*** (0.062)	-0.189*** (0.070)		
Num. of adults	0.016*** (0.003)	0.006** (0.003)	0.017*** (0.002)	-0.001 (0.005)	0.179*** (0.024)	0.183*** (0.023)	0.065*** (0.018)	0.157*** (0.025)	0.158*** (0.023)	-0.013 (0.023)		
Num. of children	0.001 (0.002)	0.006*** (0.002)	0.006*** (0.002)	0.023*** (0.003)	-0.007 (0.017)	-0.017 (0.017)	0.018 (0.014)	0.042** (0.019)	0.054*** (0.018)	0.121*** (0.018)		
Sick HH members	0.027*** (0.005)	0.010** (0.004)	0.013*** (0.003)	0.009 (0.006)	0.180*** (0.044)	0.210*** (0.042)	0.041 (0.033)	0.110*** (0.033)	0.125*** (0.032)	0.057* (0.033)		

Savings acct.	0.179*** (0.016)	0.039*** (0.014)	0.091*** (0.013)	-0.018 (0.020)	1.641*** (0.158)	1.701*** (0.147)	0.134* (0.079)	0.942*** (0.145)	1.018*** (0.133)	-0.150 (0.097)
_cons	-0.069 (0.054)	0.208*** (0.068)	0.124** (0.060)	-0.348*** (0.103)	2.824*** (0.587)	-2.958*** (0.532)	-1.261*** (0.365)	5.049*** (0.691)	-2.213*** (0.643)	-2.044*** (0.491)
Observations	23,872	9,395	22,781	6,382	23,872	23,872	9,395	22,781	22,781	6,382
R-squared	0.108	0.173	0.087	0.252	0.174	0.099	0.225	0.133	0.062	0.299

Note: base groups: (a) race of HH head—white population group, and (b) education of HH head—no schooling. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: author's calculations based on LCS 2008/9 and 2014/5.