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Just Not What the Doctor Ordered: Poor Health as a Precursor to Consumer Debt Distress in South Africa

Ralph A. Ssebagala

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About the author:

Ralph Ssebagala graduated from the University of Cape Town in 2015, with a PhD on "The Dynamics of Consumer Credit and Household Indebtedness in South Africa". Email: ralphsa@gmail.com

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Abstract

While it is well documented that severe consumer indebtedness can lead to mental and physical health problems, as well as unhealthy coping mechanisms, the pathways from poor health to financial strain is still an understudied area. Using data from the National Income Dynamics Study (NIDS), this study examines the relationship between poor health and debt distress controlling for the possible endogeneity between these two conditions as well as some health-related variables. The results indicate that poor health significantly increases the probability of financial strain. Insofar as poor health is associated with catastrophic healthcare costs and income deprivation, for instance through inability to work, other factors that affect health such as socioeconomic status and insurance might shape the contours of consumers' debt performances in the face of health risk. In the end, health may be creating a vicious circle in which poor health affects the capacity to earn income and accumulate assets, which limits access to quality health care.

1. Introduction

As the consumer credit industry continues its rapid expansion in South Africa, it is likely that household shocks will generate more and more personal debt problems unless the credit regulatory framework evolves accordingly. Health shocks continue to be one of the most important risks of the household sector despite a public healthcare infrastructure that is relatively mature by middle-income country standards. Huge inequalities in access to quality healthcare still exist to the effect that a considerable portion of the population is forced to rely on cripplingly costly private healthcare arrangements (e.g., Harris *et al*., 2011). Health shocks and the cost of accessing healthcare impose huge burdens on families' overall welfare, especially for the poor and rural dwellers for whom health insurance coverage and private savings are often inadequate or non-existent, resulting in the potential for

households to slide into unmanageable indebtedness (see Collins & Leibbrandt, 2007; Knight *et al*., 2015).

A negative health shock is associated with not only the financial cost of treatment (Jacoby & Holman, 2013), but also income deprivation through inability to work or accumulate wealth (Blázquez & Budría, 2015) and the direct effect of health on productivity (Liu, 2014). Such outcomes are likely to force the unfortunate households to employ costly smoothing mechanisms (e.g., Liu, 2014) with further negative knock-on effects on the household's socioeconomic wellbeing. This relationship is further complemented by the importance of other factors that affect health, including socioeconomic status, lifestyle or life-cycle effects such as age. The notion espoused in this regard is that the chances of falling into medical debt increase disproportionately for people with poor socioeconomic status, unhealthy lifestyles and as they age (e.g., Braveman *et al*., 2005). This is because such factors increase the health risk of individuals and/or reduce the capacity to respond to negative health shocks.

Obtaining definitive evidence for these relationships is quite challenging mainly because the direction of causality can theoretically go both ways. Debt-stress might itself have adverse health outcomes, most notably stress and psychological distress (e.g., Brown *et al*., 2005; Bridges & Disney, 2010), and might also expose people to other unhealthy coping behaviours such as smoking, binge drinking or drug use (e.g., Blázquez & Budría, 2015; Meltzer *et al*., 2013). In addition to this, consumption patterns might be influenced by consumers' hidden characteristics (such as attitudes towards borrowing) or by exogenous factors (such as borrower selection criteria). Debt-related problems are also sometimes cumulative.

A sustained inability of households to meet due financial obligations is a socioeconomic problem to the extent that it interferes with their consumption potential and exposes them to other economic hardships including social exclusion (Micklitz & Domurath, 2015). As such, understanding the dynamics through which health and health-related factors interact with consumer debt performance is a compelling social policy issue, especially in South Africa where consumer indebtedness is still an understudied area. This is the principle objective of this paper.

This study employs data from the National Income Dynamics Study (NIDS) to investigate whether, and to what extent, severe consumer indebtedness is driven by poor health outcomes. The primary hypothesis tested is that consumers are more likely to experience severe indebtedness if they experience ill-health given the

possible costs associated with illness and/or inability to work through illness or injury. The study also controls for a number of health-related conditions – that is, negative changes in income, socioeconomic status, body weight and age based upon the assumption that health-friendly conditions are like to reduce the propensity for debt distress and vice versa. It is also assumed that consumers faced with negative health shocks will attempt to smooth their consumption through a number of ways including multiple borrowing (see Meier & Sprenger, 2010) or suspending scheduled payments on their outstanding financial obligations. Such smoothing mechanisms are only likely to exacerbate their debt distress. The paper proceeds as follows: the next section examines the literature on consumer debt distress and health; the third section describes the data and methodology employed, followed by the results, discussion and conclusion. Throughout the paper the terms 'debt distress' and 'over-indebtedness' are mutually interchangeable.

2. Literature Review

Despite the wide-ranging concerns about consumer over-indebtedness, the lack of a uniform definition of the phenomenon across countries and studies (Brix & McKee, 2010; Keese, 2009) is quite surprising. A few studies have relied on the statistical (objective) indicators that quantify and use the gross stock of debt, net household liabilities, and/or debt-to-income ratios to evaluate households' debt sustainability (Lyons & Yilmaze, 2005). In other cases, the individuals' self-assessed difficulties (Betti *et al*., 2007) or levels of sacrifice endured in paying obligations (e.g., Del-Río & Young, 2005; Guérin *et al*., 2009), have been favoured.

While D'Alessio & Lezzi (2013) argue that debt can increase relative to income without necessarily making debt management problems more acute – especially among higher-income households – an earlier study using the British Household Panel Survey by Del-Río & Young (2005) found that in general there is a clear link between the subjective measure of financial distress and the relative indicators of debt affordability. In this regard, the size of the unsecured debt-to-income ratio will shape the contours of households' debt performances with some households reporting their debt to be somewhat of a burden and for others, a heavy burden.

A number of studies have examined the association between financial problems and health. For many, the direction of causality runs from financial hardship to adverse health outcomes especially with regard to mental health problems and depression. For instance, being unable to pay bills appears to be related to mental health and

depression (e.g., Butterworth *et al*., 2012) or even suicidal tendencies (Meltzer *et al*., 2011), while simply being in debt increases the likelihood of sub-health conditions and behaviours such as alcohol and drug abuse (Meltzer *et al*., 2013).

Only a handful of studies have explored the direction of causality running from poor health to severe indebtedness, arrears or bankruptcy, and point to the increasing unaffordability of medical care and inequities in health insurance (e.g., Doty *et al*., 2008; Himmelstein *et al*., 2009; Emami, 2010; Ramsay, 2009). For instance, studies in the United States have found a direct link between accumulation of medical bills and consumer bankruptcies (Himmelstein *et al*., 2009), debt repayment difficulties (Doty *et al*., 2008), or overall increases in consumer financial burdens (Lyons & Yilmazer, 2005) even among those with medical insurance – especially owing to the huge gaps in coverage and the high levels of cost-sharing (Doty *et al*., 2008).

For households in the United Kingdom, a 2009 study by Ramsay (2009) found that general ill-health and/or disability accounted for 5% of households reporting financial difficulties. Similarly, a 2006 study of German debt counseling clients found sickness, accident and addiction to rank fourth among the personal reasons for being over-indebted (Angela, 2008), while Backert *et al*. (2007) reports that psychological problems and other ailments jointly ranked fourth among the reasons German consumers find themselves over-indebted and/or file private bankruptcies.

In the case of South Africa, no contribution in the literature on the direct relationship between ill-health and debt distress has been uncovered thus far. There are, however, two empirical studies that highlight some pathways between health-related shock and household financial fragility. A study by Knight *et al*. (2015) in peri-urban and rural KwaZulu-Natal found health to be the second most reported household shock (30%) including death, injury or serious illness of a household member. Most importantly people confronted with such shocks are less likely to apply asset-based coping strategies (e.g., use of savings and investments or liquidation of assets) because they tend to have few assets of value, a limited market for selling them and negligible savings to draw on (*ibid*: 225). Another study by Collins & Leibbrandt (2007), using the South Africa 'Financial Diaries' data, notes that a major pathway through which HIV/AIDS impacts on household wellbeing is through the socioeconomic impacts of death, including loss of income and funerals, which often cost up to seven months of income. More so, 61% of households are underinsured against the cost of funerals. More poignant yet is the observation that death poses such substantial and lingering burdens that financial provisioning for medical treatment and care seem to take second place to coping

with the costs of death (*ibid*: 76-81). Another study using the same dataset (Collins, 2008) identified that debt-distressed households (those that spend 20% or more of their gross monthly income on debt) do not fit one homogeneous profile, even though the costs associated with surviving a shock and the general lack of income buffers were common factors in most such households. In another early descriptive study of South African urban working class consumers by Hurwitz & Luiz (2007), debt distressed households (i.e., those spending 30% or more of their gross monthly income on debt) were found to be more likely to have a lower socioeconomic status (notably lower per capita income), high dependence, and to have experienced a negative shock (e.g., a recent retrenchment or a recent death in the family).

These studies illustrate an unmistakably strong correlation between ill-health and consumer debt distress. For most of the studies interrogating the pathway from ill-health to debt distress, it appears that the common denominators are the financial burden associated with the cost of responding to an adverse health condition such as out-of-pocket medical expenses (Emami, 2010), and the costly smoothing mechanisms that consumers employ during or following the health shock (e.g., borrowing more, or discontinuing payments) which, according to Liu (2014) can be mitigated by access to health insurance. This study contributes to this extant literature by empirically analysing this relationship in the South African context and provides a basis for further empirical investigation.

3. Data and Methodology

3.1 The Data

This study uses data from waves one (2008), two (2010) and three (2012) of the National Income Dynamics Study (NIDS) to investigate the relative importance of poor health in consumer debt distress. Conducted by the Southern Africa Labour and Development Research Unit (SALDRU) at the University of Cape Town, the NIDS is a biennial panel study of individuals' income mobility (or lack thereof). The original panel comprised 7305 households.

The NIDS employed a stratified, two-stage cluster sample design in sampling households for the base wave. Initially, 400 Primary Sampling Units (PSUs) were

selected from Statistics South Africa's 2003 Master Sample of 3000 PSUs [1] (Leibbrandt *et al*., 2009: 9). The sample comprised private households in all nine provinces of South Africa excluding some collective living quarters such as student hostels, old age homes, hospitals, prisons and military barracks. Households included in the survey were systematically selected from the 2 (of the 8) non-overlapping samples of dwelling units (clusters) that had been drawn within each PSU but had not been used by Statistics SA. All households living at a selected address/dwelling unit were interviewed and no substitution was permitted for dwelling units found vacant or which no longer existed.

This study takes the unit of analysis as the individual as opposed to the household. The basic assumption behind this choice is that, even in a single household, members will not be pooling resources and/or sharing financial responsibilities equally, especially given the realities of intra-household inequality. Intra-household resource allocation literature affirms that there exists intra-household inequalities experienced across material and non-material dimensions with respect to (among others) investments in education and health, nutrition, ownership of assets, wealth levels and consumption, which if ignored may greatly distort the general level of poverty and inequality (Lise & Seitz, 2011; Malghan & Swaminathan, 2016). This is especially compelling in a context like South Africa, where individuals often belong to more than one household, and move between households to access resources and care, or even to evade responsibility (see Seekings & Nattrass, 2008).

In the NIDS, household-level information was collected using a household questionnaire, while individual-level information (used for the current study) was collected using a separate questionnaire administered to all individuals in these households, who were 15 years and older during wave one. The total number of individuals successfully interviewed in wave one, two and three were 25 371; 21 617; and 22 375 respectively. The sample selection for the current study was narrowed down to individuals successfully interviewed in all the three waves to avoid possible biases in the interpretation of results that might result from non-random attrition (n=18 864).

[1] The Master Sample also used for Statistics SA's Labour Force Surveys and General Household Surveys between 2004 and 2007 and for the 2005/2006 Income and Expenditure Survey).

3.2 Methodology

The current study adopts an objective/relative measure of debt distress (over-indebtedness) where a consumer is over-indebted if he/she spent 25% or more of his/her gross monthly income on consumer (unsecured) debt servicing following, inter alia, D'Alessio & Lezzi (2013) on the definition and measurement of over-indebtedness in Italy as well as Kempson (2002) and DTI-MORI (2005) for the British Department of Trade and Industry commissioned reports on over-indebtedness. These three studies have also espoused a 50% threshold if secured obligations are included, but D'Alessio & Lezzi (2013) note that since the risks associated with secured debt are basically covered by collateral, it makes better sense to restrict the analysis to unsecured payments. In comparison to South African literature, the 25% threshold is also a compromise between Collin's (2008) 20% and Hurwitz & Luiz's (2008) 30% thresholds, both of which are not delimited to a particular debt type.

By assumption, an individual's debt distress is a function of the actual state of health and other factors that affect health. Suppose then that an individual's health is a function of his/her ability to respond to or manage health shocks and to exploit health-friendly technologies and knowledge that are represented by inter alia, his/her socioeconomic status (SES), physical condition and the behaviour of income.

Then,

$$HEALTH_{it} = X_{it} + HE_{it}\left(SES_{it} + Co_{it} + Ys_{it}\right) \quad (1)$$

where (X) is an indicator of previous or existing health conditions (i.e., ill-health) of the individual (i), measured as a binary variable (1/0): if an individual reported being diagnosed with any one of the illnesses cited on the questionnaire (i.e., TB, high blood pressure, diabetes, a stroke, or asthma, heart problems, cancer, other/disability) at any time (t) between 2009 and 2011. (HE) is a vector of health-related effects associated with socioeconomic status (SES) (i.e., income, medical insurance, employment, and education attainment including an interaction term), individual condition (Co) represented by one's position in the life-cycle and body weight (i.e., age and BMI respectively), and the behaviour of income (Ys) – specifically, a reduction in income.

Following these assumptions, a binary logistic regression model is estimated of the general form:

$$\ln\left(\frac{P_{it}}{P-1_{it}}\right) = \alpha_0 + \alpha_1 X_{it} + \alpha_2 HE_{it} + \alpha_3 Ct_{it} + \varepsilon_{it} \quad (2)$$

where *P* is an indicator of whether an individual *i* was experiencing debt distress or not, at the time *t*, and (*Ct*) is the covariate for possible smoothing effects represented by the number of debt commitments held[2] while, (α_1, α_2, α_3) are the parameters estimated with a constant (α_0) and (ε) is the idiosyncratic error. Expanding the above equation yields:

$$\log(y_{it+1} = 1) + \alpha_0 + \alpha_1 X_{it-1} + \alpha_2 SES_{it-1} + \alpha_3 Co_{it-1} + \alpha_4 Ys_{it-1} + \alpha_5 Ct_{it-1} + \varepsilon_{it} \quad (3)$$

Because severe indebtedness can emerge simultaneously with an adverse health event, and the above studies have shown that indebtedness can be both a cause and a consequence of adverse health/SES, this kind of endogeneity is avoided by employing a dynamic specification where the predictors (*X*, *SES*, *Co*, *Ys*, and *Ct*) are measured in the year/wave (*t-1* to *t*) prior to the year/wave the debt distress was observed *t+1* (2012). This also suggests that the movement from poor health to financial strain will develop over time.

To avoid possible multi-colinearity, especially given the assumptions behind the health function (equation 1), a pairwise correlation test was conducted for all the variables of interest and only variables with a correlation not exceeding .50 were included (Appendix A). Table 1 presents the detailed definitions of the variables of interest. The values of income, outstanding debt and BMI were restricted to within the 1st and 99th percentiles – to eliminate extreme outliers that might otherwise influence estimates of interest and consequently result in wrong inferences (see, Osborne & Overbay, 2004). Monetary values are adjusted for inflation and expressed in 2012 South African Rand.

[2] Multiple borrowing may represent a greater need to bridge consumption in times of financial strain (Liu, 2014) and consumers may be forced to borrow small amounts from multiple sources if their financial strain renders them less creditworthy and therefore less able to borrow their desired amounts from a single source.

Table 1: Variable definition

Variable	Measurement
Debt service ratio	Continuous: Ratio of total monthly debt repayment to gross monthly income (ds/y)*100.
Over-indebted	Dummy: 1 if wave 3 debt-service ratio is equal or greater than 25%, 0 otherwise.
Income	Continuous: Total gross monthly income in wave 2.
Outstanding debt	Continuous: Total consumer debt outstanding in wave 3.
Ill-health	Dummy: 1 if the individual was diagnosed with a serious illness between 2009 and 2011, 0 otherwise.
Commitments	Continuous: Number of consumer debt commitments held in wave 2
Medical aid	Dummy: 1 if the individual is covered by medical aid, 0 otherwise.
Employed	Dummy: 1 if the individual had a regular employment in wave 2, 0 otherwise.
Income shock	Dummy: 1 if wave 3 gross income is less than wave 2 gross income, 0 otherwise.
Age	Continuous: Age of the respondent in wave 3 (between 20 and 70)
BMI	Continuous: Body Mass index (BMI=weight (kg)/height $(m)^2$): wave 2 and/or wave 3.
Education	Highest formal educational level attained: 7 categories, from 0 (no education) to 6 (University).
Income X employed	Continuous: Interaction of Income and employment.

4. Results

4.1 Descriptive Results

The contrast in this study is between the 'types' of consumers for whom health risk is likely to be a source of financial distress (being individuals who spend 25% or more of their gross monthly income on monthly consumer debt servicing). Nonetheless, it is also useful to note that without information on the borrower's

self-assessment of distress or actual delinquency, it is difficult to determine at what point one's debt service ratio becomes a genuine problem. Considering that all forms of borrowing are secured by lenders' trust in the viability of borrowers' future earnings (Ssebagala, 2015), any threat to post-consumption earnings is a threat to the consumer's debt sustainability.

Table 2: Distribution of consumer debt (n=18 864)

	Mean	Standard deviation
Debt outstanding	R11 006	R24 838
Debt service ratio (DSR)	39%	109%
If DSR>=25% (*n* = 920)	74%	160%

For the subsample successfully interviewed in all the three waves (n=18 864), only 2139 individuals held consumer (non-housing) debt in 2012, which represents 11% of these individuals and 18% of those who responded to the question. For these, the average consumer debt outstanding was R11 006, while the mean debt service ratio was 39%. The relatively larger standard deviations of R24 838 and 109% respectively (Table 2) are intuitive, and suggest that the overall distribution of consumer debt among the population is so asymmetrical that the normal distribution assumption does not hold up. Naturally, the credit market will impose borrowing limits on individual borrowers consistent with their ability to pay – such that, even in the same household, some members might report no debt at all, although other household members might be heavily indebted and/or facing high or very high debt service ratios. This might also be reflected in the intra-household resource inequalities. For the entire subsample successfully interview in all three waves, 4% spent 25% or more of their gross income on monthly debt servicing (and therefore were considered to be over-indebted) while 43% of those who reported being in debt were considered to be over-indebted based on this criteria.

Table 3: Consumer debt performance in 2012 against selected variables

		Debt outstanding			Over-indebted		
		Mean	Corr	P*	Mean	Corr	P*
Ill-health	(=1)	R10083	-0.035	0.154	.51	0.075	0.001
(=0)		R12199			.42		
Medical aid	(=1)	R27382	0.343	0.000	.34	-0.123	0.000
	(=0)	R6619			.48		
Income shock	(=1)	R14403	0.035	0.242	.55	0.104	0.000
	(=0)	R12195			.42		
Employed	(=1)	R15262	0.196	0.000	.38	-0.216	0.000
	(=0)	R4601			.62		
Quintiles of gross income			0.432	0.000		-0.123	0.000
1st quintile		R4788			.55		
2nd quintile		R4099			.56		
3rd quintile		R2858			.48		
4th quintile		R5792			.47		
5th quintile		R21064			.37		
Commitments 1		R5754	0.459	0.000	.38	0.197	0.000
2		R16777			.57		
3		R39199			.63		
4		R74609			.74		
Age.	20-30 years	R7179	0.085	0.000	.39	0.060	0.018
	31-40 years	R11043			.47		
	41-50 years	R16068			.44		
	51-65 years	R14061			.46		
	66-70 years	R9902			.57		
Education			0.285	0.000		-0.109	0.000
No education		R3531			.51		
Grade R - 11		R6096			.49		
Grade 12/Matric		R12105			.42		
NTC 1-3		R22402			.58		
Certificate		R15367			.43		
Diploma		R22542			.31		
Degree		R33765			.34		
BMI quintiles			0.064	0.003		-0.028	0.226
1st quintile		R8255			.41		
2nd quintile		R10834			.43		
3rd quintile		R10911			.39		
4th quintile		R13486			.42		
5th quintile		R13592			.46		

Notes: Corr refers to bivariate correlation coefficients while P* refers to their significance levels.

Table 3 presents the distribution of consumer debt outstanding among the different consumer subgroups and identifies which subgroups are likely to be debt-distressed based on the 25% debt-service ratio threshold.

As hypothesised, debt distress can be a function of poor health, conditional on other personal attributes that affect health (e.g., medical insurance or lack thereof, stability of employment, and experiences of income shock, income, and age). Thus, healthcare costs and/or the inadequacy of resources to pay for healthcare may impose a significant strain on personal finances. This means that unhealthy people with inadequate resources might substitute health-seeking behaviours in favour of consumption smoothing. It is clearly elucidated in Table 3 that individuals diagnosed with a major illness are on average more likely to be among those with severe indebtedness. This situation is likely to be compounded by the concurrence of shocks to income.

As such, a significant positive relationship is also observed for income shock. Conversely, access to medical insurance, income or being in regular employment are factors that are likely to mitigate the situation. In this case, if they should suffer illness or injury, debtors may not have to be subjected to huge out-of-pocket bills, they would likely be in better positions to afford deductibles or out-of-pocket bills (in the absence of insurance). Additionally, such (health-friendly) situations reduce the overall risk of poor health. Hence, access to medical insurance, being in regular employment, and income were negatively related to debt distress and this relationship was statistically significant. Education attainment had a significantly negative relationship with the debt-service burden and this relationship can be explained by the positive relationship between education and income and the assumption that education increases awareness of health dynamics. However, no statistically significant results are observed for age and body weight (BMI).

There is not much of a difference observed in the size of debt outstanding with regards to experiences of ill-health or income shock versus not experiencing either, which might be intuitive given that both conditions are likely to impinge on the individual's creditworthiness. On the other hand, robust statistical differences can be observed between the level of outstanding debt held and income, as well as other income-related effects (i.e., medical insurance, work status, wealth). The amount of outstanding consumer debt is significantly higher for consumers with stable employment and those with higher educational attainment (both of which can provide some information on the viability of future resources that support repayment) as well as medical insurance – itself a positive correlate of employment

stability. It is also observed that the size of outstanding debt increases with the number of debt commitments, while it appears that the debt load increases with age peaking at the 41-50 age bracket, then falling as consumers move towards retirement.

Based on these bivariate relationships, one line of thinking holds to a larger extent, and this is that there is an inverse relationship between the absolute size of debt held and the debt service-burden. Where statistically significant (except in the case of age and number of debt commitments), the positive correlates of a high debt service ratio are negatively related to the debt outstanding and vice versa. This is hardly surprising given that the level of borrowing is a function of visible characteristics of consumers with which lenders can verify creditworthiness. Borrowers with a higher likelihood for debt distress will therefore only qualify for smaller amounts or none at all. It has also been observed in international studies that even though the absolute amounts of borrowing by consumers in precarious socioeconomic situations is generally relatively small, such consumers tend to have the highest debt ratios and are more likely to report debt as being a major burden (e.g., Debelle, 2004; Brown & Taylor, 2008; Barba & Pivetti, 2009). These bivariate correlations are, to a larger extent, intuitive and indeed show that a heavier debt service burden is positively correlated with poor health and other factors that affect health. Positive and negative health-effects have a diametrical relationship with financial distress, which is dissimilar to how these effects influence health status itself.

4.2 Estimation Results

By design, health interacts with debt performance through medical care costs or the inability to afford these costs, controlling for other factors that affect individual wellbeing such as income and wealth, employment, and education. Table 4 presents the estimation results of the interaction between debt performance and ill-health controlling for both the dual endogeneity between debt and health, and other variables that affect health. Thus, the probability of having a consumer (unsecured) debt service ratio equal to or in excess of 25% or being over-indebted (coefficients, odd ratios, marginal effects and their standard errors). The results are broadly consistent with those observed in other South African studies (e.g., Hurwitz & Luiz, 2007; Collins, 2008; FinScope SA, 2013). While it might appear that some predictors might have a close relationship with one another: for instance body

weight (BMI) might be expected to have a close relationship with ill-health, but multi-collinearity was not detected in the model.

The multivariate logistic regression results suggest that debtors who were diagnosed with a serious illness between 2009 and 2011 were more likely to be over-indebted in 2012. Thus, controlling for other health-related factors (i.e., medical aid, income shock, employment, income, education, age and body weight) and the number of debt commitments held. Because these health-related variables are either likely to influence the consumer's ability to manage his/her indebtedness in the face of a health risk, or directly influence their health status, their relationship with debt distress is conditional on their interaction with health. For instance, the relationship between ill-health and the debt-service burden is likely to change according to the different conditions of income or knowledge of debt management and health dynamics, which can result from education attainment. As such, conditional on health status, the probability of being over-indebted in 2012 increased with experiences of income shock. Contrariwise, through their interaction with health status, characteristics that are suggestive of positive socioeconomic status (i.e., medical insurance, stable employment, education attainment and income) show a significantly negative relationship with debt distress and the opposite is expected for consumers without these characteristics. Additionally, controlling for health status revealed that the probability of over-indebtedness increased with the number of consumer debt commitments held, but personal conditions (as represented by age and body weight) show no statistical significance. The interaction term for income and employment was also statistically significant but counter-intuitively positively related to debt distress.

Much as the interaction of health status and indebtedness is affected by other health-related factors. The explanatory power of ill-health on the probability of being debt-distressed is presumed to vary based on the combination and the values of the other explanatory variables in the logistic model. It then makes sense to illustrate their individual effects using conditional marginal effects. These are presented in the third column of Table 4 and show that for an average individual (with mean values for the other predictors in model), the probability of having a debt service ratio equal to or in excess of 25% increases by 7 percentage points if the individual had been diagnosed with a serious medical condition versus one without a medical condition. Also conditional on other individual characteristics, having medical insurance is likely to reduce the probability that an average consumer will experience debt distress by 17 percentage points compared to having no medical insurance. With regard to experiencing an income shock, depending on other predictors in the model, the probability of debt distress increases by 30%,

while education attainment is likely to reduce the probability of having a debt service burden equal to or higher than 25% by 2.5 percentage points with each level of education one attains.

Table 4: Estimation results

	Dependent variable: 1 if debt service ratio >=25% 0 if debt service ratio<25%		
	Coefficients	Odds Ratios	Marginal Effects
Ill-health	0.292*	1.339*	0.072*
	(0.157)	(0.210)	(0.039)
Medical aid	-0.685***	0.504***	-0.168***
	(0.206)	(0.104)	(0.051)
Income shock	1.198***	3.314***	0.294***
	(0.169)	(0.558)	(0.041)
Employed	-3.393**	0.034**	-0.833**
	(1.477)	(0.050)	(0.363)
Log income	-0.782***	0.458***	-0.192***
	(0.208)	(0.095)	(0.051)
Education	-0.100**	0.905**	-0.025**
	(0.046)	(0.042)	(0.011)
Age	0.008	1.008	0.002
	(0.006)	(0.006)	(0.002)
Commitments	1.388***	4.006***	0.341***
	(0.125)	(0.501)	(0.031)
BMI	-0.005	0.995	-0.001
	(0.009)	(0.009)	(0.002)
IncomeXemployed	0.391*	1.478*	0.096*
	(0.216)	(0.319)	(0.053)
Intercept	3.874***	48.116***	
	(1.388)	(66.786)	
N	1,222	1,222	1,222
Pseudo R^2	0.156		
Ll	-708.90		
Chi Square	195.37		

Notes: Robust standard errors in parentheses
*** $p<0.01$; ** $p<0.05$; * $p<0.10$

Overall, the estimation results show that poor health is likely to have a negative effect on consumers' capacity to manage their indebtedness. It appears, however, that this effect is either attenuated or amplified by other individual characteristics, either through a direct effect on income or indirectly through individuals' capacity to maintain positive health, deal appropriately with health risks and reduce the propensity for costly smoothing mechanisms. One might be tempted to argue that the pathway in this regard is from health to expenditure (especially on medical care) and income disruption to debt distress. However, the data did not provide enough information to map this pathway with certainty. Nonetheless, the negative conditional relationship between medical insurance and debt distress could be a major source of heterogeneity between debtors who experience poor health, especially with regard to health-related expenditures.

5. Discussion

The main issue of contention is whether poor health can be an important cause of consumer debt distress or whether both are independent conditions that afflict individuals. Available studies have mostly interrogated the effect of debt distress or debt on health and concluded that indeed severe indebtedness or debt, per se, have serious effects on health. The outcomes mostly cited include depression, stress, mental disorders and other negative health-inducing behaviours such as drinking and drug abuse. But a few of these studies have invariably hinted (often mundanely) at a possibility the causality may also run in the opposite direction where severe indebtedness might result from poor health and/or poor health attributes. It is from this seemingly mundane supposition that the current study took its cue.

If suboptimal conditions of life (such as low socioeconomic status, unhealthy conditions, sedentary lifestyles and negative shocks) can induce poor health and vice versa, and if poor health can obstruct productivity, wealth accumulation and can increase demands on available resources, then consumers in poor health are likely to find their debt performance deteriorating. They may be forced to borrow beyond their means, or renege on existing financial obligations. In the end, they may not be able to adhere to health-seeking behaviours as smoothing consumption becomes the overriding concern, which might also become harder to do as they are likely to be excluded from future borrowing. The presence of medical insurance can have an important mitigating effect and may reduce the propensity for costly smoothing strategies.

Using an indicator of debt distress with a threshold defined as spending 25% or more of monthly income on monthly consumer debt payment in a dynamic specification that attempts to control for the assumption that debt distress can be both a cause and a consequence of poor health, the study found that consumers were significantly more likely to experience debt distress if they were diagnosed with an adverse health condition. It also appears that, for these consumers, the variance in the probability of debt distress can be affected by other factors such as experiences of income shock, income levels, medical insurance, education and employment. In the logistic regression model, experiences of income shock and the number of debt commitments held had a significantly positive relationship with debt distress, while medical insurance, employment, income and education attainment were significantly negatively related to debt distress.

Depending on one's health status, it appears that these characteristics may be the difference between a consumer experiencing, avoiding or ameliorating financial distress. These factors also determine how severe one's financial strain may turn out. For instance, negative health attributes like income shocks, reduce the ability to manage health shocks and will have a direct effect on ability to manage debt repayments. Positive health attributes like insurance, employment or education, on the other hand, will not only provide tools for responding to health needs, managing health shocks and reducing the consumers' sensitivity to such shocks, but will also have a direct effect on the ability to maintain debt payment.

Take medical aid as an example. Consumers with medical insurance (almost always the preserve of individuals who are employed or who have higher-incomes) are for the most part insulated against huge out-of-pocket bills. They may not resort to unmanageable borrowing or debt delinquency in the event of a health shock and the opposite is likely to be true for the uninsured – often individuals with a low-income or who are in unstable employment. Similarly, education attainment may affect health outcomes (and ultimately debt sustainability) both through its relationship with income and by making it easier to use and benefit from health information and health-friendly technologies. Furthermore, higher-income individuals will have less trouble paying medical bills or deductibles than those who fall into the low-income bracket.

It appears, then, that the odds are stacked against the poor. They are less likely to be insured both against income fluctuations and health risk, and have limited to no means to cater for huge health-related costs, yet are more exposed to health risks than their richer counterparts. Often, the impoverished may not be able to borrow their desired amounts due to poor credit ratings. They are risky customers because

they will have trouble paying back even the little that they are able to borrow due to the myriad other risks arising from their low socioeconomic status. Ultimately, low incomes and wealth affect consumers' capacity to borrow just as poor health affects their capacity to earn income and gain wealth, which compounds their financial strain and affects their ability to afford quality health care and ultimately leading to an overall decrease in quality of life.

Admittedly, even with the lenders' intrinsic profit motive and loss-aversion, there will always be spillages in the credit evaluation system, which allows debtors to qualify for more debt than they can reasonably afford. Nonetheless, controlling for possible confounders, negative shocks and their associated costs are likely to be more binding in consumers' debt distress than borrowers' or lenders' behaviours. This is also supported in other available studies (e.g., Ssebagala, 2016; Keese, 2008; Getter, 2004).

6. Conclusion and implications

This paper presents evidence on the role of poor health in increasing the propensity for consumer debt distress among South African consumers. It supports previous research (e.g., Lyon & Yilmazer, 2005) that shows that the direction of causality is primarily from health to financial distress, rather than from financial distress to health. By controlling for health-related characteristics, which are represented by the three parameters of negative changes in income, socioeconomic status and personal condition, as well as the number of commitments, it appears that those most likely to be affected are the low-income consumers with little means to pay medical expenses or insure themselves against health risk.

The results demonstrate that debtors who experience negative health or those exposed to poor socioeconomic conditions are most likely to wind up in financial distress, even though these are less likely to be heavily indebted in absolute terms. Given their precarious situations, they might desire to borrow more, but they are less likely to qualify for more. As such, they may be prevented from improving their socioeconomic positions, accessing quality healthcare or improving their overall quality of life. Such a vicious circle may not bode well for economic equality and financial independence.

These findings have implications for assessing the diffusion of social safety nets as it appears that there are pockets of vulnerability in the South African household

sector with regard to indebtedness resulting from the gap in health care accessibility. Providing households with more affordable health care services and other social service options through which the poor can smooth out shocks may result in improved health outcomes and ultimately help to protect personal incomes. The whole spectrum of welfare arrangements should be improved, including a comprehensive and balanced healthcare coverage. The possibility of creating social insurance schemes, with a special focus on the low-income bracket, should be explored to assist those who experience unstable employment, as well as those who come from rural households.

Additionally, if households faced with expensive health conditions were able to draw on their savings, liquidate some assets, or withdraw home equity, they would be able to sustain their ongoing subsistence and debt positions. Unfortunately, the majority of South Africans are not in that position and that is something consumer protection and education efforts need to take into perspective. Furthermore, since severe indebtedness can be a consequence of consumers being surprised by adverse events such as illness or injury, a comprehensive debt discharge mechanism that is mindful of the perils of leaving consumers without viable resources in a perpetual state of debt distress might be a more optimal safety net than restrictions on lending.

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Appendix A

Table 5: Pairwise correlation matrix

	Ill-health	Medical Aid	Income shock	Employed	Income	Education	Age	Commitments	BMI
Ill-health	1 (16229)								
Medical Aid	-0.0063 (14261)	1 (14396)							
Income shock	-0.0250 (6071)	0.0303 (5627)	1 (6142)						
Employed	-0.0459 (15564)	0.2367 (14395)	0.1998 (6067)	1 (17149)					
Income	-0.0058 (7132)	0.4833 (6537)	0.3107 (6056)	0.4999 (7787)	1 (7931)				
Education	-0.1010 (16177)	0.4067 (14370)	0.0675 (6121)	0.2973 (15726)	0.3856 (7200)	1 (16403)			
Age	0.2665 (12562)	0.0763 (11152)	-0.0115 (5187)	-0.0247 (12259)	0.1714 (6125)	-0.1661 (12715)	1 (12759)		
Commitments	-0.0169 (2658)	0.3310 (2690)	-0.0079 (1507)	0.2673 (2692)	0.3806 (1596)	0.2615 (2690)	0.0202 (2605)	1 (2692)	
BMI	0.1107 (14948)	0.1011 (14002)	0.0198 (5839)	0.0952 (16212)	0.0541 (7373)	0.0765 (15104)	0.2489 (11809)	0.0803 (2618)	1 (16226)

Note: Number of observations in parenthesis.