

“Modelling Vulnerability to Over-Indebtedness among Urban Indebted Households in South Africa”¹

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ABSTRACT:

This paper models households’ vulnerability to becoming over-indebted by using insights from consumption theory to develop an association between household indebtedness and cashflow. We then estimate levels of vulnerability, evaluate why these households are vulnerable, and try and discern how they cope with vulnerability. Lastly, we evaluate changes in vulnerability over the course of 1995-1999. The findings suggest that the most vulnerable households in 1995 earn an income within the range of R10K-R25K p.a., and >R150K p.a. It was also found that there has been a decrease in the number of vulnerable households over the course of 1995-1999, though not in a Pareto-enhancing manner.

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INTRODUCTION

This paper evaluates the topic of vulnerability among urban indebted households in South Africa. The theoretical basis of the topic lies within consumption theory, and the empirical exercises are conducted on Part Two of the October Household Survey – the Income and Expenditure Survey (Statistics South Africa, 1995) and an adjusted dataset compiled by Wefa Southern Africa (1999).

The primary objective of the paper is to provide a framework for assessing whether or not households are vulnerable to becoming over-indebted due to greater access to finance since the early 1990s – a period generally recognised to have facilitated substantive financial sector deepening. Over-indebtedness is defined as a financial state that imposes restrictions on the household's ability to repay their total outstanding debt. These restrictions are binding enough to induce, if not to force, households to reduce their consumption of consumable goods or liquidate stocks of durable assets in order to service that debt. We therefore construct a model of consumer behaviour based on the life cycle (see Modigliani and Brumberg, 1955) and permanent income (see Friedman, 1957) hypotheses.

The rationale for investigating vulnerability to over-indebtedness in South Africa stems from the fact that concomitant to financial sector deepening was the growth of the micro-finance industry (see DTI, 2000; Daniels, 2001). The implications for the consumer were greater access to finance through a diverse range of new financial instruments that, in many cases, targeted the poor directly. However, unscrupulous lending practices combined with asymmetric information among consumers imply that there is a degree of ambiguity when assessing the welfare implications of financial sector deepening. Consequently, we are also interested in tracking vulnerability over the 1990s, and to assess which category of consumers, if any, gained or lost in the process.

The paper proceeds as follows: firstly, a model is developed for assessing vulnerability to over-indebtedness, whereafter the sources of data and their limitations are discussed. Then, estimates of vulnerability are made before changes over 1995 – 1999 are identified. Finally, the conclusion summarises.

MODELLING VULNERABILITY

This section develops a model of vulnerability to over-indebtedness. We are concerned firstly with the reasoning behind the model, and here we draw on insights from consumption theory – specifically the life cycle and permanent income hypotheses – to incorporate measures of household indebtedness and cashflow into the model. We then proceed to discuss how the model can be applied.

When analysing whether households are vulnerable to over-indebtedness, it is important to situate the discussion within the context of the household's income and expenditure priorities. In doing so we are informed by consumption theory, notably the life cycle hypothesis (LCH) and the permanent income hypothesis (PIH). Despite the differences between the two theories, they share the basic postulate that, in the

short-term, the level of consumption may be higher (or lower) than that indicated by the level of current disposable income relative to expectations concerning future income. Since we are conducting a comparative static exercise, it is important to clarify *a-priori* the expected results as they pertain to indebtedness, which we then use to construct a model of vulnerability.

Central to the life cycle-permanent income hypothesis is the idea that income will equal consumption over the course of the life cycle, assuming no bequest motives or altruistic behaviour on the part of household members. In a static context this means that:

$$YD_t \neq C_t \Rightarrow YD_t = C_t \pm \varepsilon_t \quad (1)$$

Where YD_t is disposable income in the current period, C_t is consumption expenditure in the current period, and ε is either a positive or negative residual in time t that accounts for the inequality in the relationship in a static context. This residual either takes the form of debt or savings, depending on the value of C_t .

In order to make this association meaningful to the analysis of indebtedness however, we need to incorporate it into a framework that allows us to gain further insight into a household's financial status. We do this by creating a proxy for household cashflow from the division of life-cycle disposable income and consumption expenditure, such that:

$$YD_{t+i} = C_{t+i} \Rightarrow \frac{YD_{t+i}}{C_{t+i}} = 1 \quad (2)$$

Where YD/C is a proxy measure for household cashflow² over the life cycle $t+i$ (where $i=1,2,3,\dots,n$). An important property of the YD/C variable is that its range of possible values allows us to make a direct comparison with measures of total outstanding debt to income (as opposed to the computational limitations associated with equation (1)), which we need to do in order to gain an idea of vulnerability to over-indebtedness.

The analytical power of the cashflow measure only gains significance in a static context once it is associated with expectations of future income. In this regard, the first step is to associate life cycle cashflow with static measures of cashflow, and to understand the inequalities generated in doing so, which we exemplify below:

² Note that in financial terms, the YD/C quotient would ordinarily be treated as a measure of the household's liquidity; however, liquidity in economics has a different meaning (*viz.* Hayashi, 1987; Deaton, 1992). Hence, we refer to the quotient as a measure of the household's cashflow.

$$\begin{aligned}
 YD_{t+i}/C_{t+i} = 1 &\Rightarrow YD_t/C_t \neq 1 \\
 \Rightarrow YD_t/C_t &= 1 \pm \varepsilon \\
 \Rightarrow \varepsilon &= 1 - YD_t/C_t
 \end{aligned} \tag{3}$$

The second line of equation (3) is the key here since it enables the cashflow measure to hold in a static context by allowing the residual (ε) to resolve the inequality. The residual itself can either take the form of debt or savings (and hence can be either positive or negative) relative to expectations of future income in the household, which can be derived as follows:

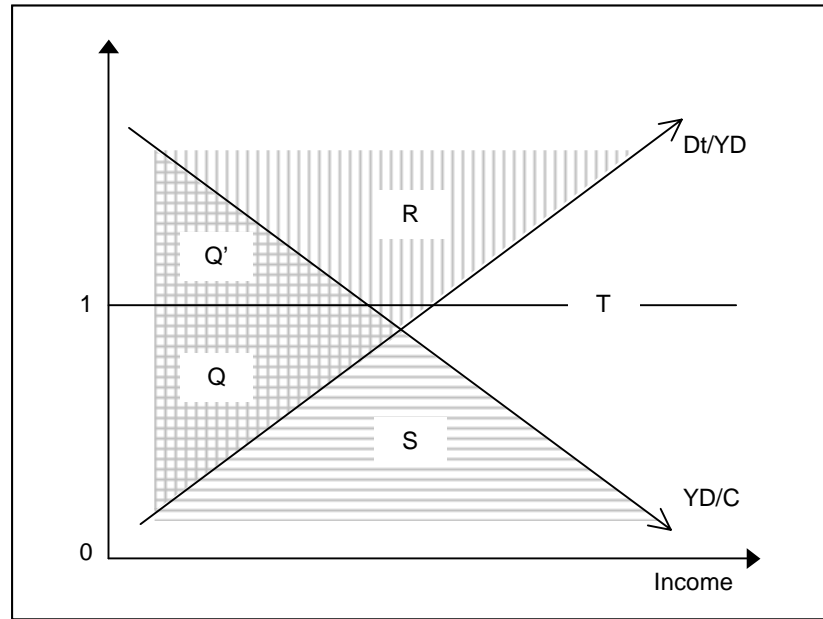
$$\begin{aligned}
 E(Y_{t+1}) = Y_t &\Rightarrow YD_t/C_t = 1 \Rightarrow \varepsilon = 0 \\
 E(Y_{t+1}) > Y_t &\Rightarrow 0 < YD_t/C_t < 1 \Rightarrow \varepsilon > 0 \\
 E(Y_{t+1}) < Y_t &\Rightarrow YD_t/C_t > 1 \Rightarrow \varepsilon < 0
 \end{aligned} \tag{4}$$

The first line in equation (4) is the life cycle identity between disposable income and consumption expenditure in a static context. By implication, it follows then that when future income expectations are optimistic (i.e. $E(Y_{t+1}) > Y_t$), households will have a greater propensity to incur debt, implying that consumption expenditure will exceed disposable income, and the residual (ε) will be positive. When future income expectations are pessimistic (i.e. $E(Y_{t+1}) < Y_t$), households will have a greater propensity to save, implying that disposable income will exceed consumption expenditure, and the residual will be negative.

Using this framework we now need to extend the analysis to account for variation across income levels and the type of insights gleaned from *Engel's Law*. In this regard, we make the further assumption that expectations of future income improve as current income increases, which is not altogether unreasonable if we consider the scarcity of highly skilled workers in South Africa and the implied wage and substitution constraints. Given this, we would then expect YD_t/C_t to be perfectly negatively correlated to income, and therefore, the level of indebtedness to be perfectly positively correlated to income. By extension, we consequently expect a perfectly negative correlation between indebtedness and cashflow as income increases. This can be expressed as follows:

$$\begin{aligned}
 YD/C = f(Y) &= \frac{dYD/C}{dY} < 0 \\
 Dt/YD = g(Y) &= \frac{dDt/YD}{dY} > 0
 \end{aligned} \tag{5}$$

This relationship forms the foundation for modelling vulnerability to over-indebtedness, which we undertake in the figure below.

Figure 1: Vulnerability and the Relationship between Indebtedness and Cashflow


From the diagram we see the negative correlation between indebtedness (Dt/YD – i.e. the ratio between total outstanding debt to disposable income) and cashflow (YD/C) as income increases. The subscript t is dropped from the variables, as it is a one-period model only. Given equation three above, when the range of YD/C values lie between zero and one, we are dealing with households that have positive future income expectations and a consequently greater propensity to incur debt, with the converse applying at values more than one. This relationship implies three regions of vulnerability, denoted Q , R , and S in the figure, and one region of neutrality denoted T . Each region can also be separated relative to the value of the YD/C coefficient (see region Q'), where values between zero and one indicate greater vulnerability and values greater than one indicate less vulnerability.

The model is generated by firstly assuming that all households that have Dt/YD figures greater than the trend (i.e. those in region R) are not as financially stable as those below trend. Similarly, it is assumed that if households have YD/C figures less than the trend (i.e. those in region S), then they too are less financially stable compared to those above it. The intersection of R and S therefore represents the region of greatest vulnerability (denoted Q in figure one), since households here have Dt/YD figures above trend and YD/C figures below trend. These regions are formally defined, relative to the range of YD/C values, in the following way:

$$\begin{aligned}
 Dt/YD < Q < YD/C \Big|_{0 < YD/C < 1} \\
 Dt/YD < Q' < YD/C \Big|_{YD/C > 1} \\
 Dt/YD < R > YD/C \Big|_{YD/C > 0} \\
 Dt/YD > S < YD/C \Big|_{YD/C > 0} \\
 Dt/YD > T > YD/C \Big|_{YD/C > 0}
 \end{aligned} \tag{6}$$

It follows from this that the most vulnerable households will have indebtedness and cashflow figures that lie within region Q (or Q'). Less but still vulnerable households will have indebtedness figures in region R and cashflow figures in region S ³. Households in either region R or S will not be significantly vulnerable, and because $Q \equiv R \cap S | R > Dt/YD, S < YD/C$, households that have *either* indebtedness or cashflow figures in region Q will also not be deemed vulnerable (as they will be equivalent to R and S , respectively). Households completely free from vulnerability will lie in region T .

In a comparative static or dynamic context, the public policy objective (or welfare maximising outcome) in this model is not only to shift the convergence point between cashflow and indebtedness to the left (thereby increasing the size of region T), but also to ensure that households are becoming less vulnerable by moving away from region Q rather than towards it.

Applying the Model

In order to apply the model, we need to translate the observations above into applied tasks. Thus, when defining the indicators that will be used in the analysis, we must take cognisance of the differences between the LCH and PIH in order to allow for the insights that the two provide. Indebtedness variables therefore include:

1. Total outstanding debt as a percentage of disposable income (denoted Dt/YD) (i.e. the LCH definition);
2. Total outstanding debt as a percentage of regular (direct) disposable income (denoted Dt/YRD) (i.e. the PIH definition);

It should be noted that we use two measures of disposable income in this section: total income minus tax, and regular income minus tax, allowing for the different theoretical interpretations as per the LCH and PIH, respectively. Regular income is taken directly from the “Direct Income” variable in the Income and Expenditure Survey (see Statistics South Africa, 1995b). It is derived from the total income variable, which is separated into direct income and indirect income. Direct income is defined as salaries and wages (including bonuses, commissions for Directors fees, and part-time work), net profit from business or professional practices, net income from letting of fixed property, royalties, interest received, dividends received, regular receipts from pensions, disability funds, alimony, and regular allowances received from family living elsewhere. Indirect (or transitory) income is defined as net income from hobbies, income derived from the sale of vehicles or property, payments received from boarders and other members of the household, the value of goods and services received by virtue of your occupation (including housing subsidies, transport subsidies, and pension/provident fund contributions), gratuities, and all other sources of transitory income.

The variables for household cashflow reflect the extent to which households are able to match annual income with annual expenditure. We proxy cashflow using two additional variables:

³ Regions R and S are also subject to greater or lesser degrees of vulnerability relative to their relationship with the YD/C variable and its proximity to one. However, for brevity, we have not separated them in the figure.

1. Disposable income as a percentage of consumption expenditure (denoted YD/C) (i.e. the life cycle definition);
2. Regular (or direct) disposable income as a percentage of consumption expenditure (denoted YRD/C) (i.e. the permanent income definition);

We then proceed to evaluate changes associated with indebtedness and cashflow between 1995 and 1999. Finally we analyse the proportion of household expenditure devoted to consumer goods on the one hand (which we term consumption schedules), and on the other, the proportion of total outstanding debt devoted to various sub-categories of that debt (which we term debt schedules). The debt schedules evaluate the proportion of total outstanding household debt owed on a bond, car, furniture, overdraft and credit cards, retail, and family loans. This analysis is also extended over the two time points.

DATA

The data for this study is taken from part two of the October Household Survey (OHS): the Income and Expenditure Survey of households in South Africa (Statistics South Africa, 1995 – hereafter IES95). The IES represented the second part of the OHS, and is consistent with it in every way except in the weighting process. The IES95 surveyed 29,579 households that were randomly selected. For 1999 data, a similar survey is used, based on the IES95 but contrived by Wefa Southern Africa from 1999 income and expenditure data. Wefa used the identical sample of households in the IES95, but then revised the income and expenditure estimates by:

1. Re-weighting the population to reflect mid-1999 population totals;
2. Benchmarking total income earned by households on the 1999 estimate of total income in the national accounts;
3. Benchmarking expenditure on Bureau of Market Research estimates of expenditure by product type (from report no. 261, “Household Expenditure in South Africa by Province, Population Group and Product”, 1999).

By comparing the two data sets, we present a comparative static analysis of changes in vulnerability among households in South Africa between 1995 and 1999. All computational work is based on these two surveys, and consequently acknowledgements to either dates implicitly recognises these sources.

Limitations with the Data

The first limitation with the data is that the sections on indebtedness have a considerably smaller sample size than the total IES95 sample. The table below presents these differences.

Table 1: Characteristics of the Data

Section	Sample Size (n households)
Total sample size of IES95	29579 (both urban and rural areas)
Defined sample size for indebtedness study	4436 (urban areas only)

The defined sample for this study is all households that are positively indebted in 1995, which intentionally truncates the sample to deal with indebted households only. These households are exclusively located in urban areas, but do not constitute the full urban sample as Statistics South Africa only included some urban households in the indebtedness question. As a consequence of this, we cannot account for survey design

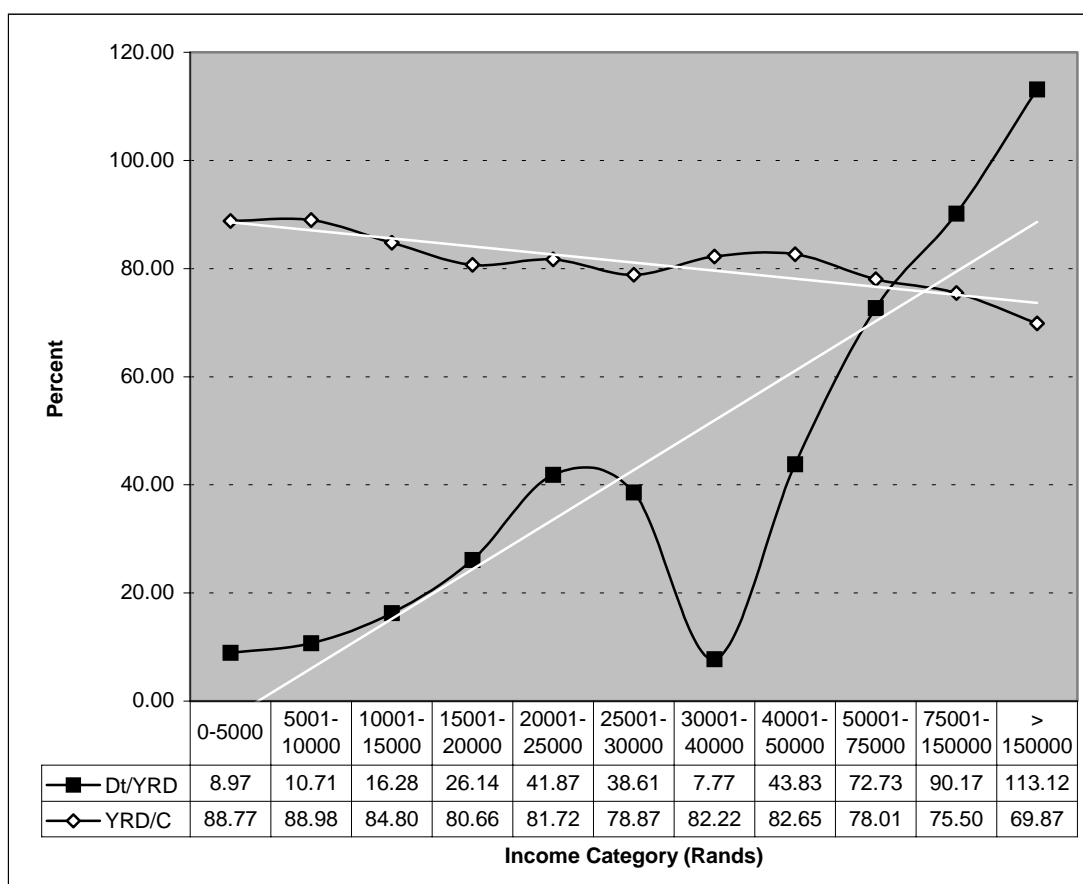
features such as stratification, weighting or clustering. Thus, we lose nationally representative results, and incorporate all of the sample selection bias implicit in Statistics South Africa's treatment of the question. This bias is then directly incorporated into the Wefa (1999) dataset, which, because it has revised estimates of several variables inferred upon Statistics South Africa's sample, also implies that we cannot estimate nationally representative results. The proceeding empirical analysis therefore refers only to positively indebted selected urban households.

A further limitation with the indebtedness data is that it does not reflect debt-servicing costs. Lastly, because we are also unable to evaluate existing assets unaccounted for in a household balance sheet (i.e. the sunk costs associated with a previous investment in fixed assets), we lose information on the degree of liquid wealth available to households and thus limit our understanding of the household's ability to repay debt.

ESTIMATES OF VULNERABILITY

In this section we analyse household vulnerability by plotting the relationship between indebtedness and cashflow by income category, race of household head and gender of household head. We separate income into eleven different categories that bias the bottom end of the income distribution, and use mean figures per co-variate only in order to derive vulnerability trends. In this way we're better able to evaluate behavioural differences among poor households. As far as regions of vulnerability as per the model in figure one (above) is concerned, the following figure refers.

Figure 2: Vulnerability to Over-Indebtedness: 1995



The figure shows the vulnerability trend using the PIH definition (for a comparison with the LCH definition, consult the Appendix, where different vulnerability trends are present). Here, convergence of the cashflow and indebtedness trends takes place late in the distribution around the R75K-R150K income category. However, no households have cashflow figures that lie above 100 percent in the PIH definition (*c.f.* region Q in figure one).

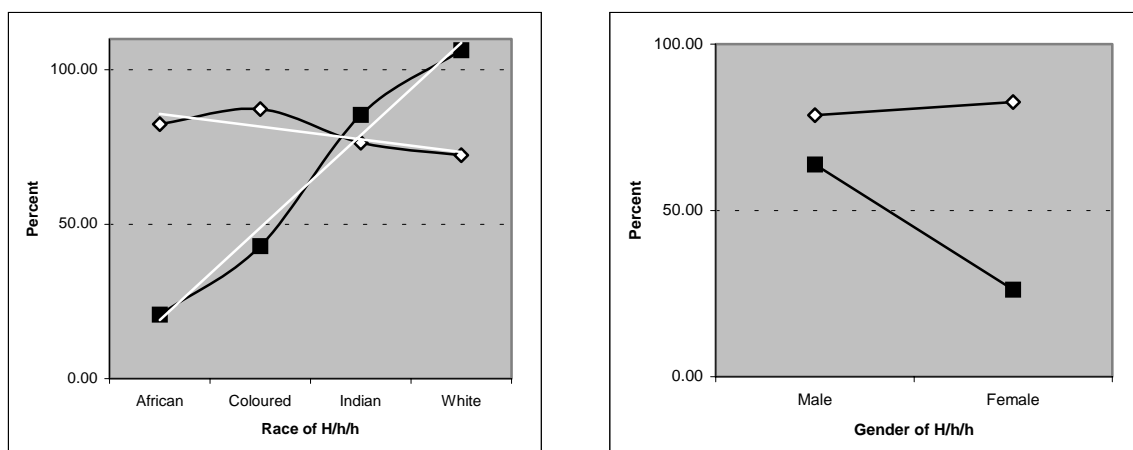
Using this data, the most vulnerable households to over-indebtedness, as per the definition of region Q in our model, lie within the R10K-R15K, R15K-R20K and R20K-R25K income categories.

Households that are moderately vulnerable to over-indebtedness, defined to have indebtedness figures in regions R and cashflow figures in region S , include those in the >R150K income category.

Thus we can see that there are no clear rules concerning vulnerability amongst income groups. Certainly, the most vulnerable households are poor households, but the next most vulnerable households are the wealthiest in the sample, implying that the reasons for households being vulnerable are vastly different. In the former groups, poverty, combined with a lack of access to other sources of income and/or debt, are the main factors constraining households, while in the latter groups, fiscally imprudent consumption patterns are more likely the culprit.

We can extend the analysis of vulnerability to account for demographic variation, specifically for race of household head (H/h/h) and gender of household head figures. In this regard, the figures below refer.

Figure 3: Vulnerability by Race and Gender: 1995



We can see from the race of household head diagram that the most vulnerable population groups are African households (that lie within region Q) followed by Indian households (that lie within our second region of vulnerability). Again, this does not uniformly conform to expectations about vulnerability based on poverty alone, where, because African and Coloured households are also the most impoverished (*viz.* Bhorat et al, 2001), we could expect them to be more vulnerable.

As far as the gender of household head diagram is concerned, we are unable to trend vulnerability here, so instead plot cashflow and indebtedness discretely. We see that males have lower cashflow but higher indebtedness figures than females, suggesting that they are more vulnerable than women.

In order to obtain a more complete picture of consumer expenditure – and hence a different perspective of the constraints that affect vulnerable households – we now turn our attention to disaggregating expenditure and indebtedness.

WHY ARE VULNERABLE HOUSEHOLDS VULNERABLE?

In this section we attempt to understand why the households identified as vulnerable above are in fact so. In order to do this we attempt to identify the constraints that these households face, and therefore analyse the proportion of expenditure that is allocated to consumption and debt. In so doing, we create consumption and debt *schedules*, which simply disaggregate the proportion of households' expenditure according to appropriately defined line items for each of these variables.

The consumption schedules measure the proportion of households' expenditure on basic needs, including (1) food (this item aggregates total expenditure on food, beverages and tobacco), (2) housing⁴, (3) clothing, (4) furniture, (5) health care, (6) transport, (7) education, and (8) other, to total consumption. The category "Other" is defined as the sum of all other items of expenditure, including cash paid to domestic workers; personal care; other household consumer goods; household services; household fuel; computer and telecommunication equipment; household communication; reading matter; recreation, entertainment and sport (including equipment; other goods; licenses and rental); miscellaneous expenditure (including goods; membership fees, donations, gifts; income tax; finance and insurance; other expenditure; net loss from business activities; own production and consumption (including harvest and livestock)).

The debt schedule is not based on expenditure data at all, but rather on the variable "total outstanding debt". Here we measure the proportion of total debt outstanding on a bond, car, furniture, overdraft and credit card, retail stores and family loans, to total outstanding debt (i.e. the sum of the bond, car, furniture, overdraft, retail stores and family loans figures).

When analysing the schedules it is important to note that each one provides us with specific insight into the expenditure patterns of households, and therefore adds an extra dimension to the analysis of both indebtedness and cashflow because they provide insight into the constraints that households face and their consequent demand for debt. Consumption schedules, for example, tell us the contribution of the respective line items to total consumption expenditure. Following the logic of *Engel's Law*, we expect vast differences in consumption patterns as income increases. Similarly, we expect that poorer people would procure loans from different sources to

⁴ NB: No separation is made between housing owned or housing rented in this section, as our aim is simply to evaluate the proportion of household's expenditure on housing, regardless of whether it is owned or rented.

more wealthy households, though the precise differences are not *a-priori* intuitive in a period of financial liberalisation.

Consequently, we expect that the lower end of the income distribution will show clear signs of being more constrained than the upper end. However, the more important analytical task in this section is to identify how these constraints impact upon vulnerability, since we saw in earlier sections that income categories alone do not correspond to greater vulnerability in a uniform manner.

The table below presents the consumption and debt schedules, which display the percentage of each line item to total consumption and debt, respectively. All figures are for annual (mean) percentages. Households previously identified as vulnerable in the above section (that is the R10K-R25K and the >R150K income groups) are shaded in grey.

Table 2: Vulnerability, Consumption and Debt Schedules: 1995

Co-Variate	INCOME CATEGORY (Rands)										
	0-5000	5001-10000	10001-15000	15001-20000	20001-25000	25001-30000	30001-40000	40001-50000	50001-75000	75001-150000	>150000
Consumption Schedule											
House	9.15	10.50	12.58	14.50	14.50	15.76	16.11	19.87	20.77	24.47	27.63
Food&Bev	56.34	50.35	39.95	34.05	30.45	27.13	25.46	21.13	18.53	13.11	7.95
Clothing	6.82	7.72	7.16	7.07	6.58	6.06	5.98	5.74	4.77	3.40	2.25
Furniture	2.02	4.08	5.95	6.86	7.62	8.03	6.48	5.18	4.24	3.06	2.26
Health	0.91	1.17	1.05	1.77	1.91	2.57	3.61	3.71	4.53	4.36	2.86
Transport	3.88	5.07	4.95	5.70	7.35	6.62	7.55	8.51	9.07	10.23	12.72
Education	0.91	1.03	1.66	1.49	1.64	1.90	1.77	1.64	2.03	2.08	1.66
Other	19.97	20.08	26.70	28.56	29.95	31.92	33.03	34.22	36.05	39.28	42.67
Debt Schedule											
Bond	0.00	0.54	2.55	7.87	10.43	13.71	12.99	21.95	26.18	41.65	44.31
Car	0.00	0.52	1.18	0.63	4.99	6.54	7.14	13.97	21.56	25.23	26.41
Furniture	10.79	16.45	35.71	40.61	46.85	34.53	35.69	28.19	18.88	9.56	3.75
O/D & CC	0.37	0.70	0.50	1.40	1.76	4.22	5.72	5.22	7.94	10.48	15.61
Retail	59.01	56.35	44.37	34.31	25.78	31.89	29.63	24.23	19.09	9.93	6.83
Family loans	29.84	25.45	15.13	14.51	9.79	9.11	8.57	6.44	5.74	2.83	2.89

The first thing that we see from the consumption schedule is the *Engel's Law* conforming consumption patterns as we move across the income distribution; that is, wealthier households consume greater quantities of luxury goods (grouped into "other" in the above table).

Distinguishing what makes vulnerable households vulnerable when evaluating the consumption schedule is fairly tricky. One way is to focus on the differences between those income categories that immediately precede then follow vulnerable categories. Here, the greatest differences between the R5K-R10K and the R10K-R15K income categories, for example, are for "food and beverages" (which decreases by over ten

percent) and “other” (which increases by over six percent). The rate of change in these line items as we move across the income distribution is much less than these percentages; hence it is possible to conclude that these are in fact significant differences that contribute towards making the R10K-R15K income group more vulnerable.

However, if we evaluate the differences between the R20K-25K and R25K-R30K income groups, there are no significant differences between the line items (similarly with respect to the R75K-R150K and >R150K income groups, despite the wider range of income). Thus, from the consumption schedule alone, it is impossible to conclude with certainty what makes these vulnerable groups more vulnerable than others.

As far as the debt schedule is concerned, it is evident that there is a vastly different debt profile as we proceed across the income distribution. At the lower end, debt is primarily sourced from retail institutions, furniture stores and family, while at the top end of the distribution, debt is procured for housing and vehicles primarily, with a growing contribution by overdraft and credit card facilities.

Distinguishing the vulnerable groups in this section is perhaps more clear relative to the consumption schedule, as there are more turning points in the progression of line items. Again, we employ the method of evaluating the income categories that immediately precede and follow our range of vulnerable households.

Commencing with the R10K-R25K vulnerability group, it is evident that the major differences between the R5K-R10K and R10K-R15K groups is a large increase in debt procured from furniture outlets and a significant decrease in debt procured from retail outlets and family. The shift away from retail and towards furniture is reflective of a debt profile that is focused on obtaining durable goods as opposed to consumables, which we would ordinarily expect to bode positively for households since they could sell the goods at some future point. The fact that it doesn't seem to imply that the very act of procuring these goods imposes binding cashflow constraints that negatively affect the household. In other words, procuring goods from furniture stores increases indebtedness while simultaneously decreasing cashflow to such an extent that both figures lie within the most vulnerable region in our model above (i.e. region *Q*).

There are also very interesting changes between the R20K-R25K and R25K-R30K income groups, the most notable of which is the decline in debt procured from furniture stores and the increase in debt procured from retail stores – i.e. a direct reversal of the trends witnessed between the R5K-R10K and R10K-R15K categories. This immediately implies that these vulnerable households procure goods or finance from furniture stores at a level that threatens their financial sustainability. This may be because households are forced to finance goods at interest rates that significantly constrain them, even if those identical interest rates do not constrain more wealthy households.

As far as the >R150K income category is concerned, we see very clear differences between the category immediately preceding it with respect to the amount of debt procured from furniture stores (where a significant, though not the most dramatic, decline took place), overdraft and credit card facilities (where a significant increase

took place), and retail stores (where a significant decrease took place). Hence, greater access to overdraft and credit cards, combined with high levels of outstanding debt devoted to housing (even though this is not significantly different from the previous income group), are perhaps the most important reasons why these households are deemed vulnerable.

COPING WITH VULNERABILITY

In this section we track how households in the two vulnerable groups identified above coped with being vulnerable between 1995 and 1999. By evaluating the percentage change of the respective line items for consumption and debt schedules, we are able to obtain important insights concerning household behaviour and the changes that may have taken place among vulnerable households during the period. In this regard, the following table refers.

Table 3: Percent Change in Consumption and Debt: 1995-1999

Co-Variate	INCOME CATEGORY (Rands)										
	0-5000	5001-10000	10001-15000	15001-20000	20001-25000	25001-30000	30001-40000	40001-50000	50001-75000	75001-150000	>150000
Consumption Schedule											
House	-4.6	20.98	22.26	23.09	38.21	11.79	21.11	2.27	7.35	6.11	-21.25
Food&Bev	5.1	6.05	19.2	15.55	20.24	25.52	20.48	32.4	28.01	34.94	51.68
Clothing	-39.55	-26.91	-16.29	-26.76	-16.78	-10.51	-21.29	-14.88	-6.48	-5.75	0.22
Furniture	-42.57	-49.35	-42.28	-35.12	-36.1	-30.04	-14.91	-8.1	-10.81	-8.1	-5.07
Health	-27.47	9.66	13.4	-34.36	-16.63	-11.49	-28.05	9.19	-1.77	14.53	41.78
Transport	-14.49	-3.66	5.93	-5.79	-24.03	-0.18	-5.09	-9.74	-9.22	-8.97	-11.04
Education	20.97	3.09	-44.21	28.45	-13.82	-12.39	-2.41	24.67	-16.43	-3.16	31.51
Other	8.66	-5.56	-24.31	-13.41	-18.49	-16.26	-14.95	-17.36	-13.04	-13.45	3.65
Debt Schedule											
Bond	0	-44.78	-31.89	-74.74	-11.26	-52.94	5.82	-41.83	-14.22	-19.17	4.31
Car	0	-47.05	-36.24	90.03	-91.52	-56.15	-6.97	-51.19	-28.19	-0.36	-4.81
Furniture	13.77	-16.29	-41.83	1.56	-14.68	44.98	3.04	30.19	43.11	36	31.27
O/D & CC	219.56	-92.87	67.34	-49.64	-6.12	-72.5	-28.34	7.87	-27.19	-11.52	-9
Retail	-18.45	4.8	24.56	14.43	34.59	-8.8	-2.38	26.3	21.03	44.77	2.11
Family loans	28.81	4.44	36.47	7.63	43.07	13.91	14.46	16.29	7.15	61.11	-11.75

We can see from the changes to the consumption schedule that there were important substitution shifts that took place among households in the R10K-R25K income categories. Most notable was the increase in consumption expenditure devoted to housing and food and beverages, though this is a more general trend across the entire income distribution with the exception of the first and last income category. These increases in consumption expenditure were accompanied by a decrease in clothing and furniture, though again, this direction of change is entirely consistent with all other income categories barring the highest. The balance of the line items for the identified vulnerable groups has no consistently different trends relative to the rest of the income distribution.

As far as the >R150K income category is concerned, here we see some markedly different trends, including a substantial decrease in housing expenditure unique to this income group and the poorest. A substantial increase in food expenditure is also witnessed, coupled with large increases in health and education expenditure. The magnitude of the rise in food expenditure is somewhat surprising given the relatively small share that food and beverages contribute to total consumption expenditure (see table two above).

Using the logic of *Engel's Law*, these substitution shifts (particularly the increase in food expenditure) imply that households were exposed to adverse economic conditions between 1995 and 1999, and were forced to engage in precautionary behaviour regardless of how wealthy there were. Thus, we may conclude that any changes that may have taken place among the identified vulnerable groups were not unique to them.

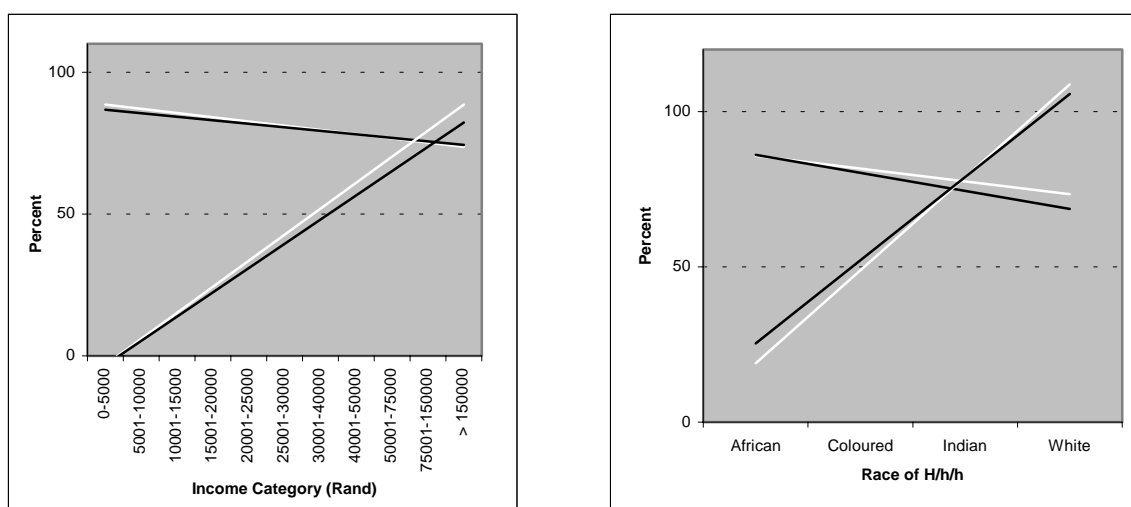
As far as the debt schedules are concerned, we see more compelling evidence of change for our identified vulnerable groups. For those households between R10K-R25K, the reduction in outstanding debt procured from furniture stores accompanied by an increase in debt procured from retail stores is notable (though there was no reduction in furniture store debt for the R15K-R20K income category). These shifts are further evidence of precautionary behaviour among this group of households (c.f table two above).

For the >R150K income category, the most striking change is the rise in debt procured from furniture stores, which, from our above treatment of this source of finance, implies that household have not engaged in fiscally prudent behaviour.

CHANGES IN VULNERABILITY: 1995-1999

In this section we evaluate changes in vulnerability over the course of 1995-1999, which amounts to tracking the movement of region *T* in the above model (see figure one above). A pictorial summary of these changes is presented in the diagrams below.

Figure 4: Changes in Vulnerability by Income and Population Group: 1995-1999

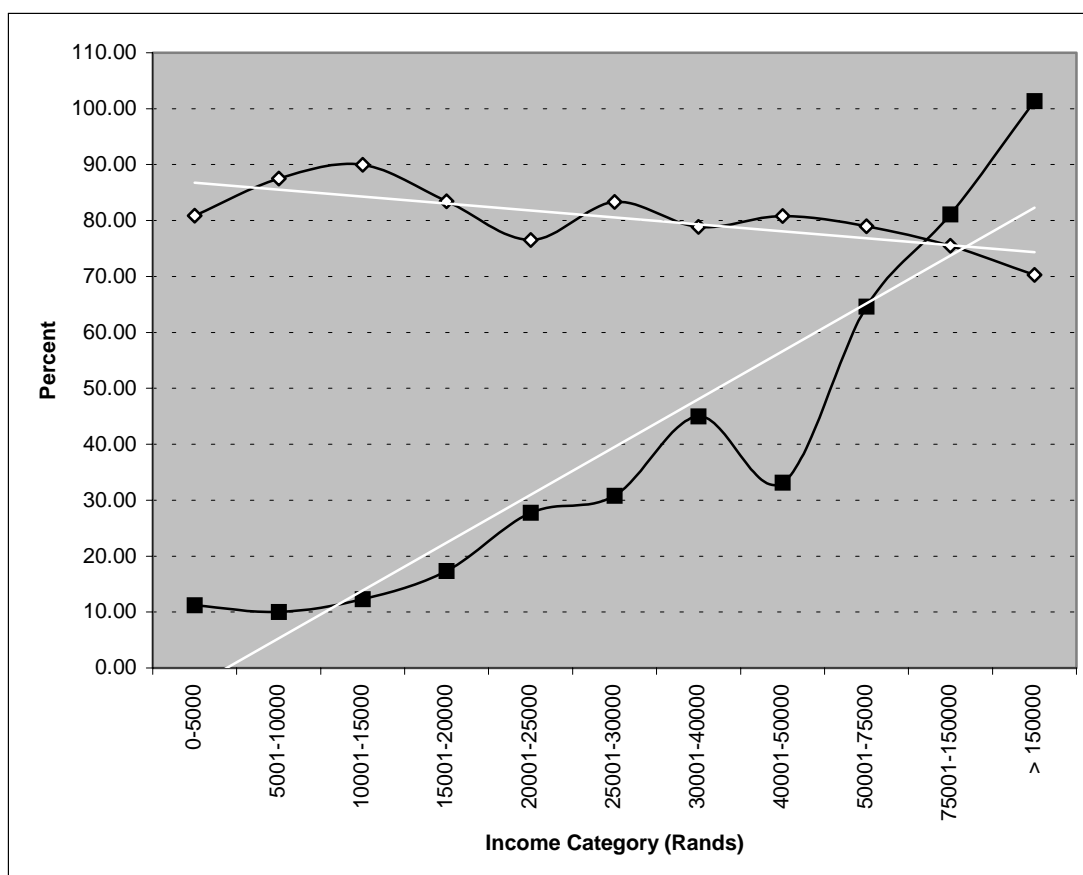


In each of the above diagrams, the white lines represent the 1995 trends and the black lines the 1999 trends. As was mentioned when the model was constructed, the public policy objective is to decrease vulnerability by increasing the number of households that fall within region *T* in the model, which translates into shifting the convergence point between cashflow and indebtedness to the left if figure one.

We can see from both figures that the vulnerability regions have shifted between 1995 and 1999. In the income category figure, vulnerability has become more acute, amounting to a decrease in the size of region *T* in figure one (above) and a movement of the convergence point to the right. However, in the population group figure, vulnerability has become less acute, amounting to an increase in the size of region *T* in our model and a movement of the convergence point to the left. This suggests that the behaviour of households within the same income category but across different population groups was possibly very different

In the diagram below we investigate vulnerability to over-indebtedness in 1999 by income category again, although this time we pay attention to specific regions of vulnerability as per the model in figure one above, and attempt to discern any changes between the categorisation of vulnerable groups relative to 1995 data.

Figure 5: Vulnerability to Over-Indebtedness: 1999



We can see from the figure that despite the fact that the convergence point between cashflow and indebtedness has shifted to the right since 1995 and thereby increased

vulnerability (as seen in figure four above), there has actually been a decrease in the number of income groups in the most vulnerable region of the model (i.e. region Q in figure one above) from three income groups (R10K-R25K) to one (R0-R5K). At the same time, the next most vulnerable category has remained constant at the >R150K income group.

This implies that the previously most vulnerable income groups (i.e. R10K-R25K) were perfectly capable of reducing their financial exposure over time. Perhaps the more worrying trend, however, is the new most vulnerable income group – the R0-R5K category. The fact that they have moved into region Q in the model implies that financial liberalisation has negatively affected households within the poorest income group in South Africa, and it can be reasonably conjectured that this was due to the fact that finance was made available to these individuals for the first time. Given asymmetric information on the part of these ‘new entrants’, it is entirely understandable that they have become over-indebted. However, it points to the primacy of public policy efforts to educate the public and regulate possibly unscrupulous lenders.

CONCLUSION

We have shown in this paper that it is possible to model the comparative statics of households’ vulnerability to becoming over-indebted by locating the analysis within consumption theory. This then allowed us to formulate the foundation of the model, which was the perfectly negative correlation between cashflow and indebtedness as income increased.

We then applied the model to data from the IES95 and Wefa99, where vulnerable groups were identified by trending cashflow and indebtedness and measuring the degree of variation of data points within each income category from the trend. By associating these differences with regions of vulnerability identified in the model, we were able to evaluate the status of households within each income category and population group. We then were able to answer the question *why are vulnerable groups vulnerable?* by evaluating their consumption and indebtedness patterns.

The findings suggested that the most vulnerable households in 1995 were those in the R10K-R25K income groups, who were marked by a large proportion of outstanding debt procured from furniture stores combined with the binding constraints imposed by having a large proportion of total consumption devoted to basic needs expenditure. The next most vulnerable households were those in the >R150K income group, though these households were deemed vulnerable primarily because they had large levels of outstanding debt devoted to housing combined with greater relative exposure to overdraft and credit card facilities. Thus, both the patterns of consumption and the type of debt play important roles in determining whether households are vulnerable or not.

We then were able to evaluate how households coped with being vulnerable by tracking the changes in consumption and debt schedules between 1995 and 1999. As far as debt was concerned, we saw clear evidence of a reduction in loans outstanding from furniture stores and a shift towards retail institutions. In the consumption

schedule, however, there was equally clear evidence that all households faced adverse economic conditions during the period, inducing negative substitution shifts in the consumption schedules (e.g. a rise in food expenditure). Given that our most vulnerable groups also reduced their vulnerability over the same period, we can conjecture that households must have either experienced significant income growth or liquidated durable goods over this period in order to reduce their vulnerability while simultaneously experiencing the aforementioned substitution shifts.

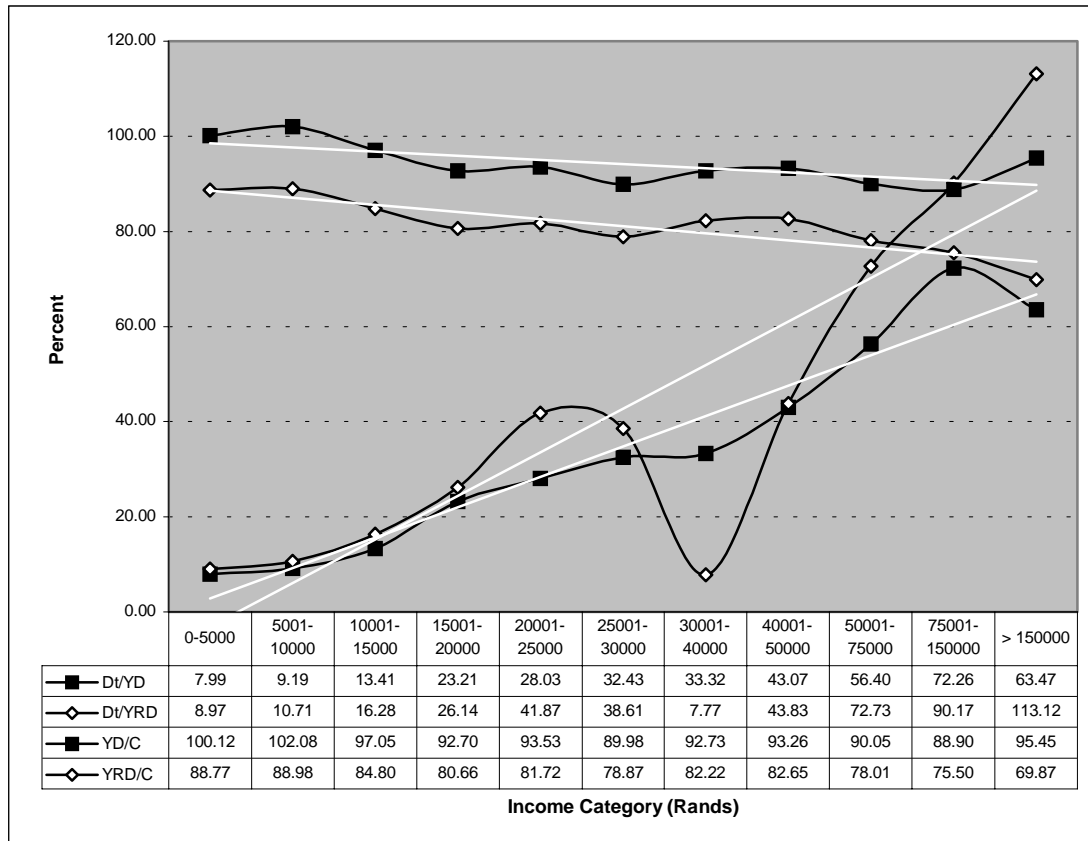
Finally, while it is unambiguously positive that vulnerable households in 1995 were able to become less so by 1999 (with the exception of the >R150K income category), it is worrying that the lowest income category has now become the most vulnerable. Thus we can conclude that greater access to finance – the result of financial sector deepening over the course of the 1990s – has not affected societal welfare in an altogether negative way, but by the same token, we cannot say that it led to Pareto gains. With this in mind, it is imperative that targeted public policy intervention, including outreach programs and regulations against predatory lending, be given appropriately high priority.

REFERENCES

- Bhorat H, Leibbrandt M, Maziya M, Vd Berg S, Woolard I, 2001: *“Fighting Poverty: Labour Markets and Inequality in South Africa”*, University of Cape Town Press, Cape Town
- Daniels RC, 2001: *“Financial Intermediation and the Micro-Finance Sector”*, Forthcoming Trade and Industrial Policy Secretariat (TIPS) Working Paper, TIPS, Johannesburg
- Deaton A, 1992: *“Understanding Consumption”*, Clarendon Press, Oxford, UK
- Department of Trade and Industry (DTI), 2000: *“DTI Interest Rate Study”*, DTI, Pretoria (available through the Micro Finance Regulatory Council’s website: www.mfrc.co.za)
- Friedman M, 1957: *“A Theory of the Consumption Function”*, Princeton University Press, Princeton, USA
- Hayashi F, 1987: “Tests for Liquidity Constraints: A Critical Survey and Some New Observations”, in Bewley T, ed: *Advances in Econometrics, Vol 2*, Cambridge University Press
- Modigliani and Brumberg, 1955: “Utility analysis and the consumption function: an interpretation of cross-section data,” in Kurihara KK (ed.), *Post Keynesian Economics*, George Allen & Unwin, London, UK
- Statistics South Africa, 1995: *“Income and Expenditure Survey”*, Statistics South Africa, Pretoria
- Statistics South Africa, 1995b: *“Income and Expenditure Survey: Questionnaire”*, Statistics South Africa, Pretoria
- Wefa Southern Africa, 1999: *“Income and Expenditure Dataset”*, Wefa Southern Africa, Pretoria

APPENDICES

Vulnerability Under Life-Cycle and Permanent Income Definitions: 1995



Disaggregated Indebtedness and Cashflow Changes: 1995-1999

Co-Variate	Cashflow (Mean %)			Indebtedness (Mean %)			
	Y / C	YRD / C	YI / C	Dt / Y	Dt / YD	Dt / YRD	Dt / Ex
0-5000	-0.21	-8.92	68.10	23.59	23.58	24.97	26.65
5001-10000	-4.47	-1.64	-19.36	-4.02	-5.10	-6.62	-8.68
10001-15000	2.35	6.12	4.36	-17.91	-21.60	-24.45	-17.74
15001-20000	-0.91	3.43	-19.87	-34.25	-38.61	-33.70	-30.47
20001-25000	-5.95	-6.35	4.46	-15.23	-10.11	-33.74	-26.42
25001-30000	2.54	5.62	5.62	-22.38	-27.72	-20.23	-24.11
30001-40000	-5.51	-4.09	1.67	11.01	0.92	478.37	-4.81
40001-50000	-3.59	-2.21	-0.61	-27.55	-27.82	-24.35	-34.74
50001-75000	-1.49	1.27	-1.94	-14.13	-14.26	-11.18	-18.25
75001-150000	-4.40	-0.03	-13.30	-6.93	-9.25	-10.04	-14.36
> 150000	0.45	0.59	0.36	10.94	10.18	-10.39	3.06
African	1.70	2.00	17.14	2.87	1.23	36.73	0.68
Coloured	-5.24	-4.58	-12.60	3.35	2.42	2.14	-3.94
Indian	-3.33	-2.79	-16.23	2.96	1.32	1.12	-1.71
White	-5.43	-6.25	15.13	3.13	1.52	-2.77	-4.59
Male	-2.34	-2.46	4.66	3.17	1.59	5.49	-3.14
Female	0.01	0.73	-0.33	2.38	1.13	6.57	-1.86

Aggregation of Indebtedness, Cashflow and Schedule Data: 1999

Cashflow (Aggregated)			Indebtedness (Aggregated)				
YD/C	YRD/C	YI/C	Dt/YD	Dt/YRD			
-0.87	-1.57	3.25	1.51	5.62			
Consumption Schedule (Aggregated)							
House	Food	Clothes	Furniture	Health	Transport	Education	Other
10.85	8.65	-20.88	-25.29	12.01	-2.16	2.94	-6.59
Debt Schedule (Aggregated)							
House	Car	Furniture	Overdraft & CC	Retail	Family Loans		
0.34	0.34	0.34	0.34	0.26	0.37		