# Consumer financial vulnerability: identifying transmission linkages that could give rise to higher levels of consumer financial vulnerability

B. de Clercq, J.A. van Tonder & C.J. van Aardt

## ABSTRACT

Several macroeconomic indicators point to high consumer financial vulnerability in South Africa. These include, inter alia, a relatively high household debt-to-disposable income ratio, household consumption expenditure outstripping household disposable income and a declining real household net wealth-to-disposable income ratio.

In a 2009 study, the first level of possible predictors of consumer financial vulnerability was identified. However, no study has been conducted in South Africa to establish the transmission path of consumer financial vulnerability. This paper attempts to identify such a transmission path by determining the order in which the four aspects of the consumer financial vulnerability index, namely consumer income, expenditure, savings and debt servicing vulnerability, impact on one another, making consumers more vulnerable. This was done by means of an econometric modelling technique called Vector Autoregression (VAR) using consumer financial vulnerability data series covering the period Q2 2009 to Q2 2012.

The VAR results show that expenditure vulnerability received the highest coefficient of determination score. This indicates that expenditure problems are the Achilles' heel of South African households, which activates the postulated consumer financial vulnerability index (CFVI) transmission path. To determine the extent to which other macroeconomic variables impact on the postulated CFVI transmission path, a consumer price index (CPI) time series was entered exogenously into the existing VAR equation. It appears from the results obtained that the exogenous

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inclusion of CPI in the model made a dramatic difference with respect to income and expenditure vulnerability. By including the prime lending rate variable exogenously in the CFVI transmission path, the strong impact of the prime rate on expenditure vulnerability became evident. Finally, by adding the expanded unemployment variable exogenously to the CFVI transmission path in addition to the CPI and prime rate variables, debt servicing vulnerability was strongly impacted. From the CFVI transmission path findings, it became evident that consumers are not able to afford their required necessities, which leads to their becoming expenditure vulnerable. If consumers cannot generate more income to compensate, they become income vulnerable. They draw on their savings to finance the excess expenditure and become savings vulnerable, and if they cannot afford the necessary credit they require to finance their expenditure and have no savings left, they become debt servicing vulnerable.

**Key words:** consumer financial vulnerability, transmission path, personal finance, vector autoregression, vulnerability measurement

## Introduction

The financial crisis of 2008/2009 plunged millions of consumers across the globe into a murky world of unemployment, over-indebtedness and a savings deficit. Current market turbulence, caused mainly by a 'seeming inability' of world leaders and policy-makers to decisively arrest the after-shocks of depression preventative measures, points towards a lengthy continuation of the consumer predicament. As long as markets remain unconvinced about 'rescue-and-growth' packages for over-indebted European countries such as Greece and also for the United States of America, investment uncertainty will prevail, which in turn will leave millions of fragile consumers struggling to survive financially and to transact in sub-optimal conditions. From various research studies conducted on the causes of consumer financial vulnerability, substantial insights were gained into identifying these factors. In addition, research models allowed for discovering the transmission path through which these factors influence consumer financial vulnerability (Van Aardt, Moshoeu, Risenga, Pohl & Coetzee 2009; ECRI & PFRC 2008; Chaudhuri 2003). This study aims to determine the transmission path of consumer financial vulnerability by means of applying an econometric technique called 'vector autoregression analysis (VAR)' to available consumer financial vulnerability time-series data covering the period Q2 2009 to Q2 2012 (13 quarters). VAR modelling is a very flexible way

to analyse multivariate time series such as the consumer financial vulnerability index (CFVI) time series analysed in this study (Murray 2006) in order to arrive at a detailed understanding of the way in which various variables contemporaneously give rise to changes in one another.

If it proves possible to determine the transmission path of consumer financial vulnerability, financial service-providers, policy-makers and other stakeholders could implement preventive/regulatory measures to address the causes of consumer financial vulnerability, thereby assisting consumers to hedge themselves against these risks. As hinted above, this is currently not possible due to a lack of thorough research on identifying the actual mechanisms through which various factors cause consumers to become financially vulnerable in South Africa.

## Statement of the research problem

On a South African macroeconomic level, several indicators point to high consumer financial vulnerability. These include, inter alia, a relatively high household debt-to-disposable income ratio, which amounted to 75.9% at the end of 2011 (SARB 2012) and household consumption expenditure, which at R1 737 billion (during 2011) exceeded household disposable income of R1 724 billion. These indicators show that households, on average, spent more than they earned and had to borrow money to finance consumption expenditure in 2011 (SARB 2012). In addition, the real household net wealth-to-disposable income ratio declined from about 3.65:1 in mid-2007 to 3.03:1 in early-2012, indicating poor financial planning by households (SARB 2012).

Although some earlier research studies regarding consumer financial vulnerability identified some indicators of consumer financial vulnerability and also hinted at possible reasons for consumers being or becoming financially vulnerable, reviews of possible causes and effects are limited. In this regard, a study conducted in 2009 by FinMark Trust (FinMark) and the Bureau of Market Research (BMR) at Unisa (referred to as the FinMark study) (Van Aardt et al. 2009) identified the first level of possible predictors of consumer financial vulnerability. However, no study has been conducted in South Africa to establish the transmission path of consumer financial vulnerability. This paper will attempt to identify such a transmission path by determining the order in which the four sub-components of the consumer financial vulnerability index, namely consumer incomes, expenditure, savings and debt servicing, impact on one another making consumers more vulnerable (for example, perhaps because of low incomes, consumers have little to save, which leaves them too little money for future expenditures and forces them to obtain very expensive debt).

In the light of the preceding discussion, the purpose of this paper was to identify the consumer financial vulnerability transmission path in South Africa based on available Q2 2009 to Q2 2012 CFVI panel data. By means of VAR analyses of such data, the following three research questions need to be addressed:

- Which variable activates the CFVI transmission path?
- What is the order of endogenous variables in the postulated CFVI transmission path?
- What is the impact of economic variables exogenous to the transmission path on the strength of the endogenous variables in the CFVI transmission path?

These three research questions will be addressed in this paper in order to arrive at an in-depth understanding of consumer financial vulnerability causation in South Africa. Such 'causation' will, however, not be singular variable causation as determined by means of the Granger Causality test, but will be complex interactive causation as postulated in a transmission path (Bannock, Baxter & Davis 2003).

## Literature review

In its report entitled *European trends in consumer financial vulnerability*, the European Credit Research Institute (ECRI) and the Personal Finance Research Centre (ECRI & PFRC 2008) defined consumer financial vulnerability (CFV) as "the personal feeling of being in a financially unstable situation", and indicated that this 'feeling' is an early indicator of financial stress in households. It is important to note that consumer financial vulnerability is not necessarily an actual state of over-indebtedness, but rather the consumer experiencing a sense of financial vulnerability. Consumers may not currently feel financially vulnerable, but could become vulnerable when they become unemployed, unable to service debts or experience financial emergencies.

Other interpretations of vulnerability are evident from research conducted by Klasen and Powel (2013). Through decades of research focusing specifically on the concept of the risks to poverty, they indicated that vulnerability at a household level is concerned not only with the household's current level of well-being, but also with the household's exposure to adverse events, and more specifically the household's capacity to cope with adverse events. Vulnerability has also been defined and conceptualised more specifically with regard to access to low-cost credit, resulting in consumers borrowing at extremely high percentages, which poses a threat to both the consumer and the financial institution granting the credit (Akseli 2012). The term 'financial vulnerability' thus refers to perceived threats to the financial position of either the

individual consumer or the household and the manner in which the person feels able to deal with the potential threat.

The participation of consumers in the economy of a country influences their level of financial vulnerability. This interaction has resulted in the formulation of numerous theories addressing the reasons behind consumers' actions. These theories have been developed by researchers in a variety of disciplines. The literature review in the following section consists of a brief review of some of the more pertinent theories in the fields of economics, personal finance and consumer psychology. This is followed by a discussion of some of the previous studies focusing on consumer financial vulnerability.

Several economists and psychologists have studied consumer behaviour over time, resulting in numerous theories explaining the flow of consumer funds – in other words, the relationship between income, consumption, debt and saving as well as possible reasons behind consumers' actions. Firstly, the Absolute Income Hypothesis was developed by Keynes in 1936 as a theory of consumption, incorporating the marginal propensity to consume. In addition, Keynes identified eight motives why people save, as the marginal propensity to save is the opposite of the marginal propensity to consume (Keynes 2008). It can be deduced from Keynes' Absolute Income Hypotheses that should consumers have a very high propensity to consume, their high spending levels will be facilitative towards economic growth, but could be negative for the personal finances of such consumers if they receive low incomes, giving rise to very low savings levels, or if they fund these high expenditure levels with funds obtained from credit providers on a continual basis.

In contrast to the Absolute Income Hypothesis, Ando and Modigliani developed the Life Cycle Hypothesis in 1963 (Ando & Modigliani 1963). The biggest difference between the two hypotheses is the assumption of the Life Cycle Hypothesis that individuals consume a constant percentage of the present value of their life income, compared with the assumption of the Absolute Income Hypothesis that consumption is based entirely on current income (Bryant & Zick 2006). According to the life cycle income hypothesis, households plan their consumption according to an expected pattern based on the income that they believe they will be earning over their lifetime. Younger people, with lower income, will finance their consumption levels with debt in the expectation that they will be able to service the debt later in life when their income levels have increased. Saving will only happen at a later stage in life when their income levels have increased significantly. Savings and wealth creation are necessary in order to finance the gap between income and consumption later in life, especially at retirement age when income decreases but consumption is still high. Consumption is thus dependant on both income and net asset accumulation.

In terms of the life cycle hypothesis, consumption is therefore smoothed over the life cycle (Fourie & Burger 2010).

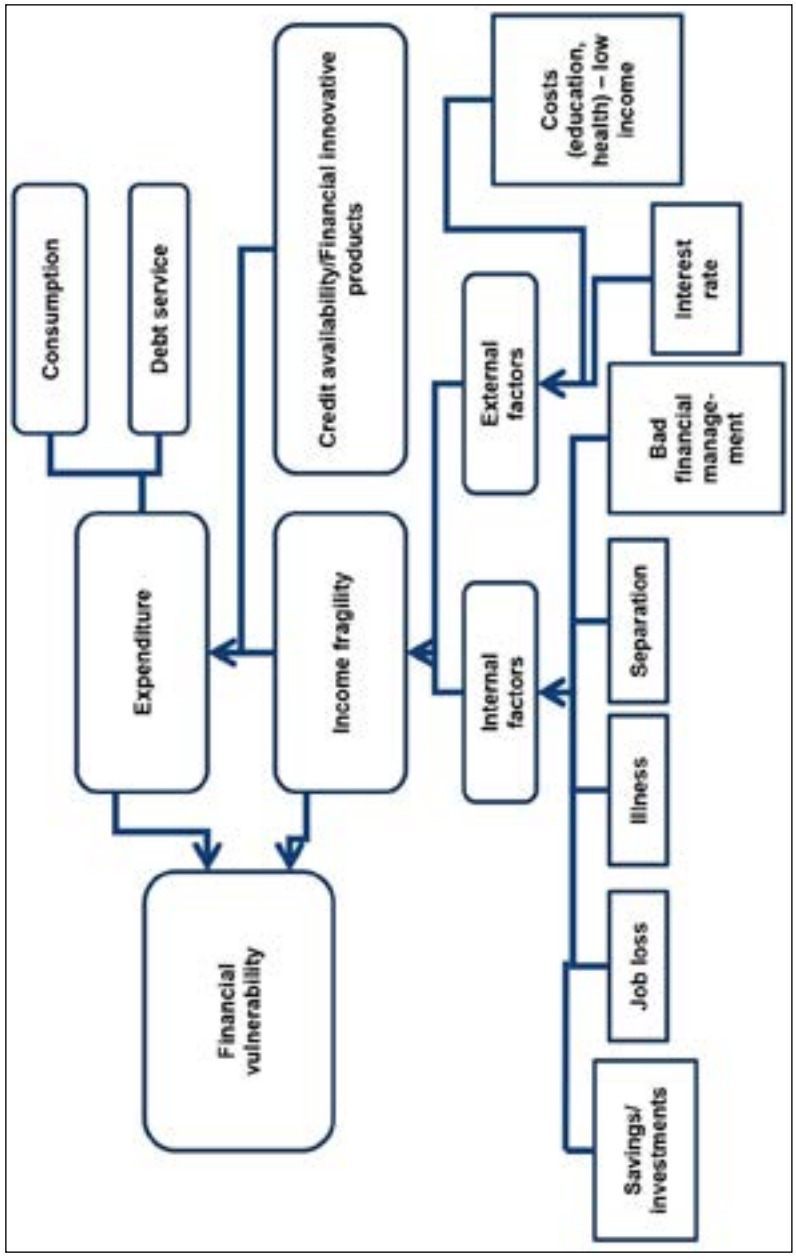
The third theory relating to consumption, income and saving is Friedman's Permanent Income Hypothesis. Friedman (1957) also differed from Keynes, based on the belief that households' consumption depended on the level of 'normal' income that the household expected to earn in future and was not a function of the households' current income levels, thus purporting that people were more concerned about their long-term consumption than their current income.

In an attempt to understand why consumers act in the manner that they do, research in the field of financial behaviour was conducted inter alia by Kahneman and Tversky (1979) who developed the well-known Prospect Theory describing the mechanisms that people use to attain values of potential gains and losses for making decisions in times of uncertainty.

From the theories described, it is evident that consumers' consumption and saving habits are a function of their income and access to credit. Incorporating these theories, the FinMark study (Van Aardt et al. 2009) used the concept of 'consumer financial vulnerability' to refer to the state and/or feeling of being exposed to financial insecurity, or actually experiencing financial insecurity and/or inability to cope financially. The purpose of the FinMark study was firstly to construct a consumer financial vulnerability index for South Africa based on the Genworth model (which will be discussed in more detail), and secondly to provide information regarding the financial vulnerability of South African consumers. For the purposes of constructing the consumer financial vulnerability index, the BMR identified a range of variables that appear to be strong predictors of financial vulnerability. These variables are shown in Figure 1.

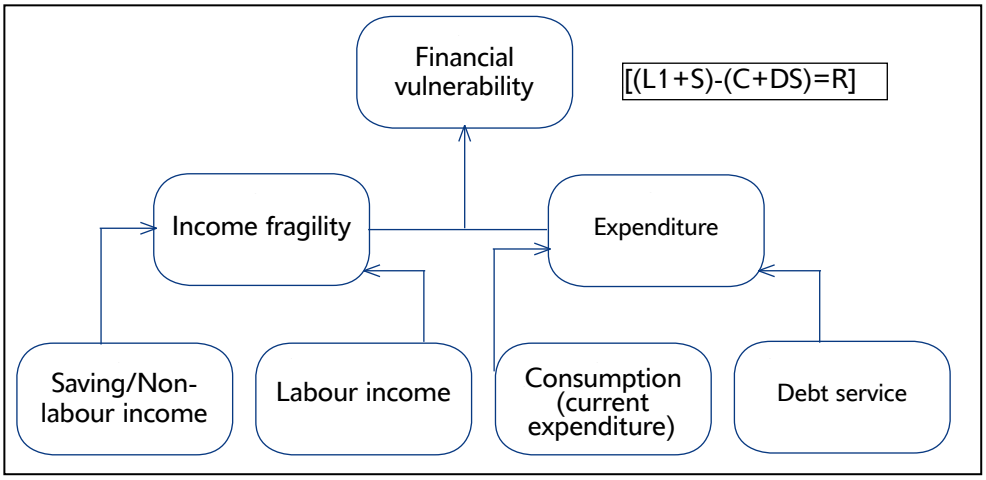
Based on the consumer financial vulnerability cause and effect chain shown in Figure 1, a heuristic consumer financial vulnerability model was developed as a basis for the construction of the consumer financial vulnerability index. This heuristic model is shown in Figure 2.

By means of the heuristic model shown in Figure 2, the cause-and-effect chain (shown in Figure 1) was reduced to its base elements, namely income and expenditure vulnerability as the main drivers of consumer financial vulnerability. Savings and non-labour incomes (i.e. inter-household wealth transfers and social grants) and labour incomes were identified as the main drivers of income vulnerability, while consumption expenditure and debt servicing were identified as the main drivers of expenditure vulnerability. In cases where consumers have limited savings to draw on, no labour income, high consumption expenditure and a high debt-servicing burden, such consumers would experience high levels of financial vulnerability.




Source: Van Aardt et al. (2009)

**Figure 1:** Cause-and-effect chain with regard to financial vulnerability




Source: Van Aardt et al. (2009)

**Figure 2:** Heuristic consumer financial vulnerability model

Conversely, where consumers have ample savings to draw on, have a high labour income, do not experience problems in paying for the things they need and have low debt-servicing burdens, they will be financially secure. This relationship between consumer financial vulnerability, income vulnerability and expenditure (as shown in Figure 2) can be formulated in the following equation:

$$(LI + S) - (C + DS) = R$$

where:

*LI*: Labour income
*S*: Savings/non-labour income
*C*: Consumption expenditure
*DS*: Debt servicing
*R*: Residual

The FinMark study identified a range of variables that appear to be good predictors of consumer financial vulnerability. These factors include, inter alia, over-indebtedness (in situations where consumers have high consumption expenditure as well as high debt-servicing) and income fragility when incomes are insufficient to cover consumption expenditure and debt-servicing. Income fragility, in turn, is brought about by a range of endogenous and exogenous factors. Endogenous factors such as insufficient savings and/or investments, becoming unemployed, ill health, separation/divorce and bad financial management, as well as exogenous factors

such as higher interest rates, price inflation and adverse economic conditions, were identified as possible factors influencing the feeling of being financially vulnerable (Van Aardt et al. 2009).

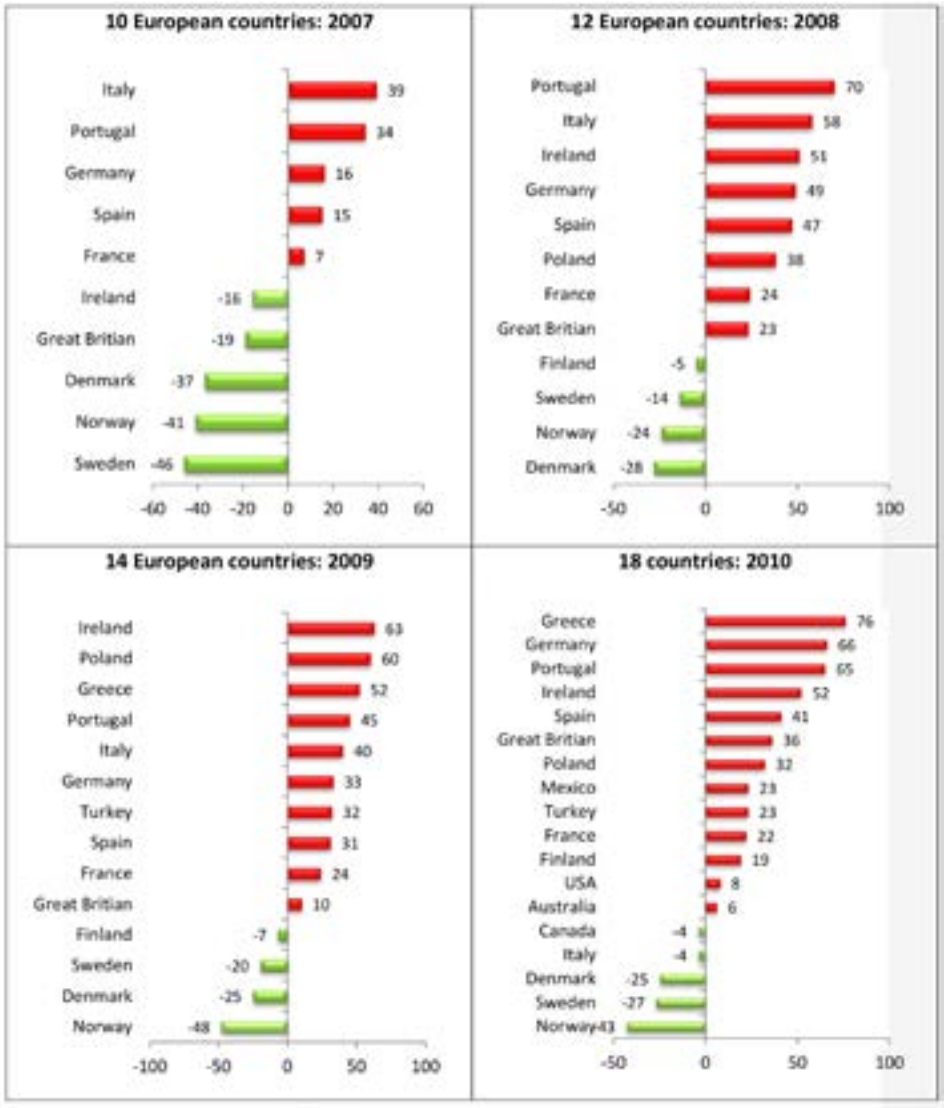
Similar factors were also identified by Disney, Bridges and Gathergood (2008), who reported on a variety of variables that could result in consumers feeling financially vulnerable. For instance, they reported that household indebtedness, income shocks, unemployment, household structures, macroeconomic shocks, interest rates and low savings could all influence the level of consumer financial vulnerability.

Notwithstanding the macroeconomic nature of the above-mentioned factors, however, consumer financial vulnerability also possesses flow-of-money properties. For instance, employment and running a business lead to the receipt of cash, which in turn is used to purchase goods or service debt. The receipt of cash, however, is influenced by the mentioned macroeconomic factors. For example, the probable loss of a job or a business might influence the receipt of cash, which in turn should impact a consumer's expenditure. In essence then, consumer financial vulnerability/security – and its causes – boils down to consumers' sense of probable changes in their cash-flow situation as a result of negative/positive internal and external macro- and microeconomic influences. Consumers who sense deterioration in their cash flow due to the factors determined in the heuristic model may be strong candidates for being financially vulnerable. Conversely, consumers who sense an improvement in cash flow due to positive changes in the mentioned predictors may feel more upbeat about their current and prospective cash-flow situations.

As previously mentioned, the FinMark study (Van Aardt et al. 2009) was constructed after reviewing a financial vulnerability index constructed for Europe by Genworth in conjunction with the Personal Finance Research Centre at the University of Bristol. The Genworth Index in Europe identified several factors that could influence consumer financial vulnerability, based on the evaluation of the consumer financial vulnerability of ten European countries during 2008. The purpose of the Genworth Index was to identify households in financially fragile situations. By being able to identify these households sooner rather than later, they could be assisted before they become overly indebted. Factors identified as influencing households' feelings of financial vulnerability included a darkening economic outlook, expected wage cuts or an increasing risk of unemployment. It is important to note that households' financial decisions are the end result of different economic and/or psychological factors and the way in which these factors relate to one another (ECRI & PFRC 2008).

The Genworth Index has reported consumer financial vulnerability scores from 2007 up to the latest report published in 2010. The original 2007 study of the financial vulnerability of ten European countries revealed that the southern part of Europe

had higher levels of financial vulnerability than the northern part (PFRC 2008a). The study was repeated in September 2008, including Finland and Poland for the first time (PFRC 2008b), and again in September 2009, now extended to Greece and Turkey (PFRC 2009), and at the end of 2010 spanning 18 countries, including three countries outside Europe, namely the USA, Canada and Australia (PFRC 2010). The index scores since inception are reflected in Figure 3.




Source: PFRC (2008a, 2008b, 2009, 2010)

**Figure 3:** Genworth Index score (2007–2010)

The countries with the lowest consumer financial vulnerability index score during 2007 were Ireland (-16), Great Britain (-19), Denmark (-37), Norway (-41) and Sweden (-46). On the other side of the spectrum were France (7), Spain (15), Germany (16), Portugal (34) and Italy (39) (PFRC 2008a) (see Figure 3). It is interesting to note that although Denmark was the country with the lowest consumer financial vulnerability score during the second survey at the end of 2008, Denmark's score declined by 24% from the middle of 2008 to the end of 2008 (PFRC 2008a & 2008b). Denmark's decline was, however, not as severe as the decline in some of the other countries, notably Germany with a decline of 206%, Spain with 243% and Great Britain with 221%. However, the country with the largest decline was Ireland with 419%, clearly indicating the impact of the global recession on the occupants of countries around the world as they became exposed to all the negative news regarding the deteriorating international economic outlook (PFRC 2008a, 2008b).

By the end of 2009, however, consumers had adjusted to the negative global economic outlook, as the differences in the vulnerability scores were not as acute as during the second and fourth quarters of 2008. Norwegian consumers' sentiment improved, resulting in their index score improving from -24 to -48, which illustrated that they were feeling more financially secure than the year before. Residents from Portugal were also feeling less financially vulnerable in 2009 compared to 2008, while residents in Ireland felt the most financially vulnerable at the end of 2009 (see Figure 3) (PFRC 2008b, 2009).

Greece's economic debt problems in 2010 are clear from Figure 3, with Greece being the country with the highest financial vulnerability score of 76 out of 100. This was the highest score any country reported since the inception of the index in 2008. Norway was still the country with the lowest financial vulnerability score of -43 at the end of 2010 (PFRC 2009, 2010). From the analyses conducted by the Personal Finance Research Centre in the United Kingdom, several indicators of consumer financial vulnerability were identified, based on the perceived economic outlook of the residents of the various countries sampled. Consumers digest information on the economic prospects of a country, resulting in their feeling financially vulnerable or financially secure, as reflected in Figure 3.

In a more recent study, Anderloni, Bacchiocchi and Vandone (2012) developed a household financial vulnerability index very similar to the consumer financial vulnerability index in the FinMark study. Their household financial vulnerability index is an indicator of financial vulnerability, which jointly analyses various features of household financial distress and more specifically reflects on expenditure vulnerability, income and saving vulnerability, and commercial and financial loan commitments vulnerability, thus focusing strongly on households in financial distress. They concluded that the determinants of their financial vulnerability index were (1) the level of debt servicing, with the effect thereof being more evident for households with unsecured debt, (2) the higher levels of financial vulnerability

evident for impulsive individuals who adopt impatient, short-sighted behaviour patterns and (3) higher education levels, which play a pertinent role in reducing financial vulnerability (Anderloni et al. 2012).

Indicators that influence the economic outlook applicable to all the countries reviewed included GDP growth rates, income distribution, real disposable income, unemployment rates, inflation and household debt levels, as well as non-economic factors such as the financial attitudes of consumers. The insights gained from the Genworth Index, the Italian financial vulnerability index and the effect of the factors on consumer financial vulnerability were helpful in gauging the possible influence of such factors on the financial vulnerability of South African consumers.

## Methodology

The analyses conducted for the purposes of this article firstly included Pearson Product Moment correlation analyses to test for relationships between macroeconomic variables and the CFVI.

This was followed by Vector Auto Regression (VAR) analysis, which was conducted to test for a possible transmission path with respect to consumer financial vulnerability. Such analysis was applied to available CFVI time series covering the period Q2 2009 to Q2 2012.

As indicated above, VAR is an econometric method that is used to analyse the linear dependencies among various time-series data (income vulnerability, expenditure, debt servicing and savings vulnerability) available from the CFVI Q2 2009 to the Q2 2012 time series. According to Wikipedia (2012), all variables in a VAR are treated symmetrically; in other words, each variable has an equation reflecting its own evolvement derived from its own lags and those of all the other variables in the model.

For this study, the following CFVI model was used in the VAR:

$$Y_t = I_1 y_{t-1} + E_1 y_{t-1} + S_1 y_{t-1} + D_1 y_{t-1} + \prod$$

where:

- $Y$ : VAR outcome equation for each variable was included in the VAR based on endogenous CFVI variables
- $t$ : Time
- $I$ : Income vulnerability
- $E$ : Expenditure vulnerability
- $S$ : Savings vulnerability
- $D$ : Debt-servicing vulnerability
- $\prod$ : Error term

To optimise the model identification of the CFVI transmission path, four exogenous variables were entered in the VAR equation shown above, namely unemployment, household liabilities, price inflation and the prime rate. With these exogenous variables included, the full VAR model used in this study was as follows:

$$Y_t = I_1 y_{t-1} + E_1 y_{t-1} + S_1 y_{t-1} + D_1 y_{t-1} + U_1 y_{t-1} + L_1 y_{t-1} + C_1 y_{t-1} + P_1 y_{t-1} + \prod$$

where:

- $Y$ : VAR outcome equation for each variable in the VAR based on both endogenous CFVI variables as well as exogenous economic variables included in the model for optimisation purposes
- $t$ : Time
- $I$ : Income vulnerability
- $E$ : Expenditure vulnerability
- $S$ : Savings vulnerability
- $D$ : Debt servicing vulnerability
- $U$ : Unemployment rate (exogenous)
- $L$ : Household liabilities (exogenous)
- $C$ : Consumer price index (exogenous)
- $P$ : Prime rate (exogenous)
- $\prod$ : Error term

For modelling purposes (see Ford 1986), the equation including endogenous CFVI as well as exogenous economic variables can be reduced to the following dynamic equation:

$$Y_t = \sum_{j=0}^{m=1} D_j^m + \pi_t^m$$

where:

- $Y$ : VAR outcome equation for each endogenous and exogenous variable
- $t$ : Time
- $m$ : Number of lags
- $J$ : Number of variables
- $D_j^m$: Interacting matrices of endogenous and exogenous variables
- $\pi_t^m$: Dynamic error term

It is imperative that all variables in the VAR should be at the same order of integration, namely:

- Option 1: *All* the variables are I(0) stationary;

- Option 2: *All* the variables are I(d) non-stationary and cointegrated, thus giving rise to a restricted VAR; or
- Option 3: *All* the variables are I(d) non-stationary and not cointegrated, which means that such variables should first be differenced *d* times, and the VAR will therefore be a difference-based VAR.

To determine the quality of the time-series data used in this study, unit root and cointegration tests were conducted on the endogenous CFVI and the exogenous economic variables shown in the expanded VAR model. This was done to assess the level of stationarity and cointegration of the endogenous CFVI and exogenous economic variables before the required VAR analyses were conducted. It appears from the unit root tests that all four CFVI variables endogenous to the transmission path are I(d) non-stationary, while an Engle-Granger cointegration test revealed that these variables are cointegrated. It can therefore be concluded that the endogenous CFVI variables in the VAR share the same order of integration in terms of option 2 above.

## Analysis and discussion

As already explained, the South African consumer financial vulnerability index (CFVI) was constructed from the four sub-indices as identified by the above-mentioned heuristic model. A summary of the CFVI and its sub-indices since inception is depicted in Table 1. A low index score is synonymous with higher vulnerability, while a high score will depict financial security.

**Table 1:** CFVI and its sub-indices over time

| Period | Savings | Expenditure | Debt servicing | Income | Overall CFVI |
|---|---|---|---|---|---|
| Q2 2009 | 42.6 | 44.6 | 56.3 | 43.6 | 48.4 |
| Q3 2009 | 41.0 | 45.5 | 52.4 | 39.7 | 45.6 |
| Q4 2009 | 46.0 | 47.4 | 54.9 | 41.9 | 48.3 |
| Q1 2010 | 54.0 | 47.3 | 54.9 | 51.2 | 52.8 |
| Q2 2010 | 58.1 | 45.3 | 56.6 | 53.3 | 54.6 |
| Q3 2010 | 50.7 | 53.1 | 56.8 | 47.3 | 52.1 |
| Q4 2010 | 49.1 | 56.2 | 64.7 | 53.8 | 57.7 |
| Q1 2011 | 52.2 | 50.6 | 56.3 | 58.4 | 56.1 |
| Q2 2011 | 46.7 | 54.2 | 58.8 | 54.8 | 55.4 |
| Q3 2011 | 47.7 | 55.6 | 61.4 | 52.4 | 55.8 |
| Q4 2011 | 51.1 | 57.3 | 61.9 | 52.8 | 56.7 |
| Q1 2012 | 58.8 | 60.1 | 56.6 | 57.6 | 58.9 |
| Q2 2012 | 47.5 | 53.8 | 47.8 | 44.8 | 48.6 |

Table 1 shows that consumers experienced financially exposed conditions during Q2 2009, which reflected recessionary conditions. The situation worsened in Q3 2009, with the income sub-index plummeting through the financially exposed barrier to financially vulnerable. However, as the economy resumed growth, the vulnerability of consumers also receded somewhat. Consumers started to experience mildly exposed conditions from Q1 2010, thus moving out of a very exposed financial situation. However, consumers remained in mildly exposed circumstances and drifted back into a very exposed situation in Q2 2012.

Exhibit 1 provides an explanation of how index scores should be interpreted, followed by definitions of each category of vulnerability.

**Exhibit 1:** Measurement of the CFVI

| **Financially vulnerable (%)** | | **Financially exposed (%)** | | **Financially secure (%)** | |
|---|---|---|---|---|---|
| 0–20 | 20–39.9 | 40–49.9 | 50–59.9 | 60–79.9 | 80–100 |
| Financially very vulnerable | Financially vulnerable | Financially very exposed | Financially mildly exposed | Financially secure | Financially very secure |

Financially vulnerable:

- consumer cash flow being affected to such extent;
- that it creates an actual experience and/or sense;
- of being financially insecure and/or an inability to cope financially.

Financially exposed:

- cash flow position affected to such extent;
- that it creates a high risk;
- of becoming financially vulnerable.

Financially secure:

- cash flow position is under control;
- with little threat;
- of becoming financially exposed or vulnerable.

Following from the insights gained from the Genworth Index as to the drivers of consumer financial vulnerability, correlation tests were performed in order to determine whether there is a relationship between some of the Genworth-identified macroeconomic variables and the CVFI (and some of its sub-indices). The correlation results are as follows:

- 0.90 between real seasonally adjusted and annualised quarterly gross domestic product and the overall CFVI;
- 0.80 between real seasonally adjusted and annualised quarterly disposable income of households and the consumer income vulnerability sub-index;

- 0.92 between nominal seasonally adjusted and annualised quarterly household consumption expenditure and the consumer expenditure vulnerability sub-index; and
- 0.70 between debt service as a percentage of household disposable income (nominal quarterly amount seasonally adjusted and annualised) and the debt service sub-index.

The above results show that the same macroeconomic variables that impact consumer vulnerability in Europe also influence consumer financial vulnerability in South Africa. With this in mind, the question was asked regarding which of the four CFVI variables activated people becoming more financially vulnerable within the above-mentioned macroeconomic context. By means of the VAR model discussed earlier, it appears from the results of such modelling shown in Table 2 that expenditure

**Table 2:** Vector autoregression (VAR) results with respect to the endogenous CFVI variables

| | **Income vulnerability** | **Expenditure vulnerability** | **Debt servicing vulnerability** | **Savings vulnerability** |
|---|---|---|---|---|
| Income vulnerability (-1) | 0.219757 | 0.096392 | -0.059987 | -0.543733 |
| | (0.45933) | (0.34548) | (0.49154) | (0.42411) |
| | [0.47843] | [0.27900] | [-0.12204] | [-1.28205] |
| Expenditure vulnerability (-1) | 0.044003 | 0.451194 | -0.264146 | 0.027545 |
| | (0.44841) | (0.33727) | (0.47986) | (0.41403) |
| | [0.09813] | [1.33776] | [ -0.55047] | [0.06653] |
| Debt servicing vulnerability (-1) | 0.676838 | 0.338555 | 1.162088 | 0.735798 |
| | (0.38125) | (0.28676) | (0.40799) | (0.35202) |
| | [1.77531] | [1.18063] | [2.84835] | [2.09021] |
| Savings vulnerability (-1) | -0.033665 | 0.091977 | 0.129741 | 0.680754 |
| | (0.37824) | (0.28449) | (0.40476) | (0.34924) |
| | [-0.08901] | [0.32330] | [0.32054] | [1.94926] |
| R-squared | 0.435627 | 0.528007 | -0.146063 | 0.337788 |
| Adjusted R-squared | 0.223987 | 0.351010 | -0.575836 | 0.089458 |
| Sum squared residuals | 221.4750 | 125.2952 | 253.6265 | 188.8160 |
| S.E. equation | 5.261594 | 3.957512 | 5.630570 | 4.858189 |
| F-statistic | 2.058342 | 2.983138 | -0.339860 | 1.360241 |
| Log likelihood | -34.51968 | - 31.10186 | -35.33300 | -33.56246 |
| Akaike AIC | 6.419947 | 5.850310 | 6.555500 | 6.260410 |
| Schwarz SC | 6.581582 | 6.011945 | 6.717136 | 6.422046 |
| Mean dependent | 50.66667 | 52.20000 | 56.92500 | 50.24167 |
| S.D. dependent | 5.972868 | 4.912507 | 4.485355 | 5.091251 |

vulnerability received the highest coefficient of determination (R-squared) score of 0.52 compared to 0.44 with respect to income vulnerability, -0.15 with respect to debt servicing vulnerability and 0.34 with respect to savings vulnerability. It is evident from this finding that expenditure problems appear to be the Achilles' heel of South African households, which activates the postulated CFVI transmission path. It is imperative to note that the R-squared coefficient of determination, rather than the adjusted R-squared coefficient of determination, was used due to the absence of intercept and trend assumptions in the VAR model.

Although expenditure vulnerability was by far the most strongly cointegrated of all four of the CFVI variables, the question can now be asked as to what macroeconomic variable creates the necessary context for the CFVI transmission path to be activated.

Because of the assumption that rapid price growth could put severe expenditure pressure on South African households, a consumer price index (CPI) time series was entered exogenously into the existing VAR equation, as previously described. The results obtained by means of including CPI exogenously in the existing VAR model are shown in Table 3.

It appears from the adjusted R-squared results shown in Table 3 that the exogenous inclusion of CPI in the model made a dramatic difference with respect to the total variance explained by the interaction between the CFVI and one exogenous (CPI) variable in the model. Through the inclusion of the CPI variable, the total variance explained (adjusted R-square) of the four endogenous CFVI variables increased as follows:

- Income vulnerability: Adjusted R-squared increased from 0.24 to 0.76;
- Expenditure vulnerability: Adjusted R-squared increased from 0.35 to 0.58;
- Debt servicing vulnerability: Adjusted R-squared increased from -0.57 to 0.11; and
- Savings vulnerability: Adjusted R-squared increased from 0.09 to 0.28.

The results in Table 4 were obtained by adding the prime rate variable exogenously to the CFVI transmission path, as previously shown. By also including the prime rate variable in addition to the CPI variable exogenously in the transmission path, the following results were obtained:

- Income vulnerability: R-squared increased from 0.86 to 0.89;
- Expenditure vulnerability: R-squared increased from 0.75 to 0.92;
- Debt servicing vulnerability: R-squared increased from 0.46 to 0.49; and
- Savings vulnerability: R-squared increased from 0.34 to 0.58.

**Table 3:** VAR results for the four endogenous CFVI variables with CPI being entered exogenously

| | **Income vulnerability** | **Expenditure vulnerability** | **Debt servicing vulnerability** | **Savings vulnerability** |
|---|---|---|---|---|
| Income vulnerability (-1) | 0.004558 | 0.027829 | -0.190234 | -0.665413 |
| | (0.25853) | (0.29594) | (0.30345) | (0.39560) |
| | [0.01763] | [0.09403] | [-0.62689] | [-1.68203] |
| Expenditure vulnerability (-1) | 1.348867 | 0.891897 | 0.567877 | 0.778170 |
| | (0.38301) | (0.43844) | (0.44957) | (0.58609) |
| | [3.52175] | [2.03424] | [1.26315] | [1.32774] |
| Debt servicing vulnerability (-1) | -0.302017 | -0.657789 | -0.589119 | -0.168896 |
| | (0.43447) | (0.49735) | (0.50998) | (0.66483) |
| | [-0.69514] | [-1.32259] | [-1.15519] | [-0.25404] |
| Savings vulnerability (-1) | 0.576702 | 0.169002 | 0.300343 | 0.965616 |
| | (0.26129) | (0.29910) | (0.30669) | (0.39982) |
| | [2.20717] | [0.56504] | [0.97930] | [2.41511] |
| CPI | -0.247083 | 0.308609 | 0.506176 | 0.059037 |
| | (0.20869) | (0.23890) | (0.24496) | (0.31935) |
| | [-1.18395] | [1.29181] | [2.06636] | [0.18487] |
| R-squared | 0.856920 | 0.746688 | 0.463791 | 0.570666 |
| Adjusted R-squared | 0.761534 | 0.577813 | 0.106319 | 0.284443 |
| Sum squared residuals | 50.77614 | 66.53683 | 69.95766 | 118.8951 |
| S.E. equation | 2.909070 | 3.330086 | 3.414617 | 4.451499 |
| F-statistic | 8.983665 | 4.421547 | 1.297419 | 1.993783 |
| Log likelihood | -24.02075 | -25.50756 | -25.78330 | -28.70023 |
| Akaike AIC | 5.276499 | 5.546828 | .596963 | 6.127314 |
| Schwarz SC | 5.457361 | 5.727690 | 5.777824 | 6.308176 |
| Mean dependent | 51.20000 | 52.05455 | 57.75455 | 50.49091 |
| S.D. dependent | 5.957181 | 5.125108 | 3.612025 | 5.262405 |

**Table 4:** VAR results with respect to the four CFVI variables, with CPI and prime rate entered exogenously

| | **Income vulnerability** | **Expenditure vulnerability** | **Debt servicing vulnerability** | **Savings vulnerability** |
|---|---|---|---|---|
| Income vulnerability (-1) | 0.327668 | -0.622568 | -0.021422 | -0.474938 |
| | (0.36675) | (0.26407) | (0.47775) | (0.62645) |
| | [0.89343] | [-2.35754] | [-0.04484] | [-0.75814] |
| Expenditure vulnerability (-1) | 2.083801 | -0.587476 | 0.951852 | 1.211419 |
| | (0.71452) | (0.51448) | (0.93077) | (1.22046) |
| | [2.91637] | [-1.14189] | [1.02265] | [0.99259] |
| Debt servicing vulnerability (-1) | -0.673696 | 0.090374 | -0.783306 | -0.388003 |
| | (0.52095) | (0.37510) | (0.67862) | (0.88984) |
| | [-1.29320] | [0.24093] | [-1.15426] | [-0.43604] |
| Savings vulnerability (-1) | 0.565629 | 0.191292 | 0.294558 | 0.959088 |
| | (0.25228) | (0.18165) | (0.32864) | (0.43093) |
| | [2.24203] | [1.05306] | [0.89629] | [2.22565] |
| CPI | -0.775707 | 1.372692 | 0.229991 | -0.252590 |
| | (0.48376) | (0.34832) | (0.63017) | (0.82630) |
| | [-1.60351] | [3.94088] | [0.36497] | [-0.30569] |
| Prime rate | 3.049852 | -6.139143 | 1.593429 | 1.797907 |
| | (2.53770) | (1.82723) | (3.30575) | (4.33462) |
| | [1.20182] | [-3.35981] | [0.48202] | [0.41478] |
| R-squared | 0.888989 | 0.922241 | 0.487602 | 0.584947 |
| Adjusted R-squared | 0.777977 | 0.844483 | -0.024797 | 0.169894 |
| Sum squared residuals | 39.39573 | 20.42467 | 66.85120 | 114.9402 |
| S.E. equation | 2.806982 | 2.021122 | 3.656534 | 4.794584 |
| F-statistic | 8.008082 | 11.86029 | 0.951607 | 1.409332 |
| Log likelihood | -22.62502 | -19.01199 | -25.53348 | -28.51417 |
| Akaike AIC | 5.204548 | 4.547635 | 5.733360 | 6.275303 |
| Schwarz SC | 5.421582 | 4.764668 | 5.950394 | 6.492337 |
| Mean dependent | 51.20000 | 52.05455 | 57.75455 | 50.49091 |
| S.D. dependent | 5.957181 | 5.125108 | 3.612025 | 5.262405 |

The results in Table 5 were obtained by adding the expanded unemployment variable exogenously to the CFVI transmission path in addition to the CPI and prime rate variables. By including the expanded unemployment variable exogenously, the following increases and decreases in identified variance of the endogenous (transmission path) variables were obtained:

- Income vulnerability: R-squared increased from 0.89 to 0.90;
- Expenditure vulnerability: R-squared decreased from 0.92 to 0.90;
- Debt servicing vulnerability: R-squared increased from 0.49 to 0.88; and
- Savings vulnerability: R-squared decreased from 0.58 to 0.57.

**Table 5:** VAR results with respect to the four CFVI variables with CPI, prime rate and unemployment (expanded definition) entered exogenously

| | **Income vulnerability** | **Expenditure vulnerability** | **Debt servicing vulnerability** | **Savings vulnerability** |
|---|---|---|---|---|
| Income vulnerability (-1) | 0.239868 | -0.665688 | -0.397143 | -0.106842 |
| | (0.47090) | (0.38390) | (0.33491) | (0.79747) |
| | [0.50938] | [-1.73399] | [-1.18583] | [-0.13398] |
| Expenditure vulnerability (-1) | 1.744186 | -0.668451 | 0.812243 | 1.612705 |
| | (0.89859) | (0.73257) | (0.63908) | (1.52175) |
| | [1.94103] | [-0.91247] | [1.27096] | [1.05977] |
| Debt servicing vulnerability (-1) | -0.656247 | 0.101663 | -0.667014 | -0.493554 |
| | (0.59089) | (0.48173) | (0.42024) | (1.00067) |
| | [-1.11060] | [0.21104] | [-1.58720] | [-0.49322] |
| Savings vulnerability (-1) | 0.228631 | 0.132922 | 0.492511 | 1.095374 |
| | (0.45129) | (0.36791) | (0.32096) | (0.76425) |
| | [0.50662] | [0.36128] | [1.53450] | [1.43326] |
| CPI | -0.951971 | 1.365953 | 0.697733 | -0.464789 |
| | (0.59598) | (0.48587) | (0.42386) | (1.00928) |
| | [-1.59733] | [2.81136] | [1.64615] | [-0.46052] |
| Prime rate | 0.714784 | -6.769158 | -0.487919 | 5.429896 |
| | (4.15506) | (3.38741) | (2.95508) | (7.03653) |
| | [0.17203] | [-1.99833] | [-0.16511] | [0.77167] |
| Expanded unemployment rate | 2.278963 | 0.438360 | -0.670808 | -1.441476 |
| | (2.41276) | (1.96700) | (1.71596) | (4.08598) |
| | [0.94455] | [0.22286] | [-0.39092] | [-0.35279] |
| R-squared | 0.902960 | 0.895634 | 0.882115 | 0.570990 |
| Adjusted R-squared | 0.708880 | 0.686903 | 0.646346 | -0.287031 |
| Sum squared residuals | 30.06533 | 19.98237 | 15.20724 | 86.22421 |
| S.E. equation | 3.165719 | 2.580851 | 2.251462 | 5.361101 |
| F-statistic | 4.652512 | 4.290847 | 3.741434 | 0.665473 |
| Log likelihood | -19.69332 | -17.65071 | -16.28532 | -24.96121 |
| Akaike AIC | 5.338665 | 4.930143 | 4.657063 | 6.392243 |
| Schwarz SC | 5.550474 | 5.141952 | 4.868873 | 6.604053 |
| Mean dependent | 50.56000 | 51.25000 | 57.87000 | 49.66000 |
| S.D. dependent | 5.867273 | 4.612363 | 3.785954 | 4.725628 |

The results in Table 6 were obtained by adding the household liabilities variable exogenously to the CFVI transmission path in addition to the CPI, prime rate and unemployment variables. By including the household liabilities variable exogenously, the following increases and decreases in identified variance of the endogenous (transmission path) variables were obtained:

- Income vulnerability: R-squared increased from 0.90 to 0.91;
- Expenditure vulnerability: Adjusted R-squared increased from 0.90 to 0.92;
- Debt servicing vulnerability: Adjusted R-squared remained the same at 0.88; and
- Savings vulnerability: Adjusted R-squared increased from 0.57 to 0.62.

**Table 6:** VAR results with respect to the four CFVI variables with CPI, prime rate, unemployment (expanded definition) and household liabilities entered exogenously

| | **Income vulnerability** | **Expenditure vulnerability** | **Debt servicing vulnerability** | **Savings vulnerability** |
|---|---|---|---|---|
| Income vulnerability(-1) | 0.177898 | -0.575080 | -0.398236 | -0.245749 |
| | (0.57941) | (0.43195) | (0.42702) | (0.95357) |
| | [0.30703] | [-1.33136] | [-0.93258] | [-0.25771] |
| Expenditure vulnerability (-1) | 1.744925 | -0.669531 | 0.812256 | 1.614360 |
| | (1.06200) | (0.79171) | (0.78269) | (1.74780) |
| | [1.64306] | [-0.84567] | [1.03778] | [0.92366] |
| Debt servicing vulnerability (-1) | -0.441373 | -0.212510 | -0.663225 | -0.011909 |
| | (0.89447) | (0.66682) | (0.65922) | (1.47208) |
| | [-0.49345] | [-0.31869] | [-1.00608] | [-0.00809] |
| Savings vulnerability (-1) | 0.317250 | 0.003350 | 0.494074 | 1.294015 |
| | (0.58104) | (0.43316) | (0.42822) | (0.95625) |
| | [0.54601] | [0.00773] | [1.15378] | [1.35322] |
| CPI | 0.783052 | -1.170872 | 0.728331 | 3.424310 |
| | (4.56760) | (3.40512) | (3.36631) | (7.51717) |
| | [0.17144] | [-0.34386] | [0.21636] | [0.45553] |
| Prime rate | -1.544813 | -3.465338 | -0.527768 | 0.364950 |
| | (7.65891) | (5.70967) | (5.64459) | (12.6047) |
| | [-0.20170] | [-0.60692] | [-0.09350] | [0.02895] |
| Expanded unemployment rate | 1.520373 | 1.547515 | -0.684185 | -3.141875 |
| | (3.46765) | (2.58511) | (2.55565) | (5.70692) |
| | [0.43844] | [0.59863] | [-0.26772] | [-0.55054] |
| Household liabilities | -0.000129 | 0.000189 | -2.28E-06 | -0.000290 |
| | (0.00034) | (0.00025) | (0.00025) | (0.00055) |
| | [-0.38445] | [0.75402] | [-0.00920] | [-0.52363] |
| R-squared | 0.909638 | 0.918736 | 0.882120 | 0.622713 |
| Adjusted R-squared | 0.593371 | 0.634311 | 0.469542 | -0.697793 |
| Sum squared residuals | 27.99635 | 15.55926 | 15.20659 | 75.82872 |
| S.E. equation | 3.741413 | 2.789199 | 2.757408 | 6.157464 |
| F-statistic | 2.876167 | 3.230152 | 2.138065 | 0.471571 |
| Log likelihood | -19.33683 | -16.39974 | -16.28511 | -24.31885 |
| Akaike AIC | 5.467366 | 4.879948 | 4.857021 | 6.463769 |
| Schwarz SC | 5.709434 | 5.122016 | 5.099089 | 6.705837 |
| Mean dependent | 50.56000 | 51.25000 | 57.87000 | 49.66000 |
| S.D. dependent | 5.867273 | 4.612363 | 3.785954 | 4.725628 |

The chain process in general takes the following form:

- Consumers are not able to afford their required necessities and become expenditure vulnerable;
- If they cannot generate more income to compensate, they become income vulnerable;
- They draw on their savings to finance the excess expenditure and become savings vulnerable; and
- If they cannot afford the credit they used to finance their expenditure and have no savings left, they become debt servicing vulnerable.

It is important to note, however, that the described linear chain is not equally applicable to all consumers, as different factors affect consumers differently at different times. Nevertheless, these factors work conjointly in influencing the vulnerability level of consumers. Table 7 shows how factors such as price increases, the prime interest rate, unemployment, consumer liabilities and consumer assets combine to affect consumers' vulnerability. It should be borne in mind that the percentages added by the five factors are not individual contributions but contributions in conjunction with the other variables.

**Table 7:** Impact of factors explaining consumer cash flow vulnerability

| | **Income vulnerability (%)** | **Expenditure vulnerability (%)** | **Debt servicing vulnerability (%)** | **Savings vulnerability (%)** |
|---|---|---|---|---|
| Inability to generate sufficient income, expenditure pressures, struggling to service debts and inability to save (VAR results) | 43.5 | 52.8 | -14.6 | 33.8 |
| *Price increases* | 42.2 | 21.8 | 61.0 | 23.3 |
| *Prime interest rate* | 3.2 | 17.6 | 2.4 | 1.4 |
| *Unemployment* | 1.4 | -2.6 | 39.4 | -1.4 |
| *Liabilities* | 0.7 | 2.3 | 0 | 5.2 |
| **Total variance explained** | **91.0** | **91.9** | **88.2** | **62.3** |

Based on the VAR results obtained in this study, it was possible, in relative terms, to identify the winners and losers in times of increasing pressures/risks on consumers' cash flow. This is portrayed by Exhibit 2. However, it is important to note that consumers can be classified as 'cash flow winners' only if they possess

all the attributes outlined in Table 1. For instance, high income group consumers (winners) can become vulnerable if they have unaffordable debt (losers).

**Exhibit 2:** Winners and losers in times of increasing pressure on consumer finances

| | |
|---|---|
| **WINNERS** | • Higher income groups<br>• Consumers paying low interest rates and with a low debt ratio<br>• The higher skilled and civil servants<br>• Consumers with an affordable debt-to-disposable income ratio<br>• Consumers with a high solvency ratio<br>• The employed<br>• Consumers with personal financial skills |
| **LOSERS** | • Lower income groups<br>• Consumers paying high interest rates and with a high debt ratio<br>• The lower skilled and private sector employees<br>• Consumers with a high debt-to-disposable income ratio<br>• Consumers with a low solvency ratio<br>• The unemployed<br>• Those with little knowledge in managing own finances |

Much can be done by the authorities in order to create more cash flow winners, and thus a more sustainable economic growth path. The following extensive but far from complete policy interventions should go a long way towards improving consumers' handling of their finances:

- Teaching people to manage their finances (distribute knowledge)
- Ensuring that people have labour market and entrepreneurial skills
- Ensuring efficient and effective wealth transfer systems
- Incentivising saving and discouraging dissaving
- Ensuring comprehensive price and debt management systems
- Addressing unemployment head-on: Mass re-education, flexible labour market, demand-supply linkages and Foras Àiseamma Saothai (FAS)/Singapore Development Board (SDB) arrangements
- Ensuring life-long asset growth through compulsory saving schemes
- Providing high-level financial education and investment platforms
- Making more efficient use of fiscal resources plus lower tax burdens
- Implementing effective and efficient governance (no ineptocracy).

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