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The effects of financial reforms on consumption behaviour in Malawi

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The objective of the paper is to assess whether financial reforms have a statistically significant effect on Malawi consumption behaviour. More specifically, the paper examines the existence of Permanent Income Hypothesis (PIH) and assesses whether the reforms have affected consumption behaviour by reducing liquidity constraints using Instrumental Variable and Two Stage Least Squares (IV-TSLS) approach. The paper finds that the PIH does not hold in Malawi and most consumers are current income consumers. They consume from "hand to mouth" and very little is left to smooth consumption in their life time. Empirical evidence from the thesis shows that the main failure of the PIH hypothesis is due to liquidity constraint which is manifested in the under development of the financial market and unstable macroeconomic conditions in Malawi. Weak financial institutions, both structural and operational have impacted negatively on the accessibility of financial resources for most Malawians despite the reforms. This is a bigger lesson for policy makers to consider in the preparation of future broad based financial reforms.

Key words: Financial liberalisation, permanent income hypothesis, linear spline function, principal component analysis, rule-of-thumb.

INTRODUCTION

Although, Malawi implemented financial reforms starting from 1987 under the structural adjustment programmes supported by the International Monetary Fund (IMF) and the World Bank, empirical work testing the effect of these reforms on aggregate consumption which forms 90% of gross domestic product (GDP) has not been investigated. The only studies well documented in the literature include the effects of financial liberalisation[i]on savings; on the banking industry; other industries and firms; monetary policy and formal and informal financial markets (Chirwa and Mlachila, 2004; Kabango and Paloni, 2010; Ngalawa and Viegi, 2010).

In most of the studies outlined above, the reform measures were expected to affect mobilisation of savings and investment through their effect on availability and allocation of credit. However, these studies demonstrate that savings as percent of GDP and private credit as percent of GDP declined while aggregate household

consumption increased during the liberalisation period. In principal, liberalisation would have increased competition in the formal credit market and eased restrictions on borrowers. This would have expanded liquidity options of households who have the ability to smooth consumption. Hence relaxing the liquidity constraints on borrowers that used to be rationed out of the market may allow consumers to borrow to cover shortfalls in income and enhance the ability to consume wealth at the same time (Qi and Prime, 2009). These researchers conclude that credit will increase leading to increase in aggregate consumption and a decline in aggregate savings. Instead, the country experienced a decline in credit during liberalisation and shows very limited relationship with consumption pattern in Malawi. Therefore, these patterns of consumption and private credit provide motivation for further investigations of behavioural changes in aggregate consumption in Malawi.

Mankiw (2006) argues that if consumption forms a large share of GDP then little disturbances in this component will yield comprehensive effects on the country's aggregate demand. Hence, establishing the type of consumption pattern that exists in Malawi will provide clear indications to understand the formulation of sound fiscal and financial policies. For instance, if this study will show that a significant proportion of consumers are unable to smooth consumption effectively because of liquidity constraints, then movements in current income may be an additional determinant of consumption. This would imply that changes in aggregate consumption expenditure will be more responsive to income changes induced by policy. Thus, government actions could be destabilising if consumption patterns are closer to liquidity constrained consumers (also called 'rule-of-thumb' consumers) than to those who can smooth their consumption overtime following the permanent income hypothesis.

In addition, large composition of aggregate consumption plays an important role in a country's welfare and business fluctuations. Therefore, a large body of literature continues to model how households decide how much to consume, respond to uncertainty over future incomes, movements in interest rates, and expectations of future shifts in taxes and wages, which are key determinants of the impact of government policies. Advanced econometric models such as dynamic stochastic general equilibrium models (DSGE) frequently use the assumption of household consumption behaviour in modelling the effects of fiscal and monetary policies on economic activities. The country is still reforming the financial sector and for instance, the capital account has not been fully deregulated and the sector still remains shallow. Hence, continued empirical investigations about the past performance of the financial sector and having past knowledge about consumption behaviour are crucial in the current on-going reform process.

Studies on the effect of financial liberalisation on consumption behaviour have mainly followed the seminal work of Hall (1978) on the Permanent Income Hypothesis (PIH). The hypothesis based on the representative agent consumption model proposes that aggregate consumption patterns respond to changes in permanent income. However, empirical work done by Campbell and Mankiw (1989) found that apart from responding to permanent income, aggregate consumption also responds to changes in current income. Thus consumers can be categorised as either permanent income consumers or current income consumers. They argue that consumption expenditures seem to respond to predictable changes in income because some consumers encounter binding liquidity constraints in some period. Specifically, the liquidity constrained consumers are unable or unwilling to use financial markets to smooth consumption.

Barrell and Davis (2007) have explained the link between excess sensitivity of current consumption to current income and liberalisation. They observed that liberalisation makes excess sensitivity (liquidity constraints) to decline and enhance consumption to track current income closely. However, in a situation of continued credit market imperfection despite liberalisation, the excess sensitivity of consumption to income may not decline and consumers will be forced to consume entirely out of current income. That is, consumers will be unable to borrow against future income and hence affect the consumption of significant fraction of consumers. Another reason why excess sensitivity may remain high during liberalisation is through rational expectation arguments. For instance, uncertainty about future income can induce consumers engaging in precautionary savings and increasing this uncertainty will increase savings and reduce consumption relative to income (Blundell-Wignall et al., 1991). Most of these arguments are based on the empirical findings from industrialised and emerging economies and very limited country specific studies have been conducted in sub-Saharan Africa. Hence, one of the contributions of this paper is an empirical extension of Campbell and Mankiw's (1989) model on Malawi data and findings add to the empirical literature in Africa.

Attempts have also been made to explore factors behind the rejection of the PIH (Gomes and Paz, 2010). They have found that myopia, liquidity constraints and perverse asymmetry are important factors behind the failure of PIH. For instance, Shea (1995) explains that under myopia, aggregate consumption behaviour tracks current income and consequently consumption should increase and decrease in response to increases and decreases in the expected income, respectively. While under liquidity constraint, consumers are prevented from borrowing when income is temporarily very low.

Accordingly, consumption is more correlated with predictable income increases than declines. Gomes and Paz (2010), in their study on Brazil, have demonstrated that both factors can coexist. On the extreme side, Paz (2006) found that neither liquidity constraints nor myopia contributes to the failure of PIH but consumption is

sensitive only to expected income declines which Shea (1995) called 'perverse asymmetry'.

Ang (2011) has argued further that liberalisation can reduce the response of current consumption to changes in current income in a country with stable macroeconomic background and good financial institutions. However, the current study only explains why liquidity constraints and myopic tendencies remain high despite implementing liberalisation in Malawi. Findings by Malawi Financial Sector Assessment Programme (2007) show that Malawi experienced macroeconomic instability and weak financial institutions during the liberalisation period. They further elaborate that the financial sector is characterised by weak imperfect financial information, lack of proper legal financial systems and supervision, undeveloped credit markets and reliance on collateral requirements which exclude many participants in the formal financial systems. Hence, the formal financial sector may have not changed credit availability which may have impacted negatively on liquidity constraints in Malawi during liberalisation.

Various measures have been deployed to model the direct and interactive effects of financial reforms on economic activities. However, single country empirical studies on the impact of financial liberalisation provide mixed evidence (Barrell and Davis, 2007). The disparities in results partly may also be attributed to differences in the methodological innovations in the measurement of the proxy defining liberalisation indices. Recently, common approaches employed are the principal component analysis (Shrestha and Chwdhury, 2006) and the linear spline function (Aron and Muellbauer, 2000). Thus, another contribution of this study is an attempt to construct the financial reform index for Malawi using the principal component analysis and the linear spline function. Most studies in Malawi use single proxies such as the ratio of private credit to GDP and dummy variables prior and post period of liberalisation. Therefore, constructed indices may help to address issues of comprehensive representation and accommodate the sequential institutional changes due to changes in financial sector policy reforms.

Henceforth, the purpose of this chapter is to investigate the existence of Permanent Income Hypothesis (PIH) based on Campbell and Mankiw (1989) following the implementation of financial reforms in Malawi in the 1980s and 1990s. More specifically, the study questions whether financial reforms contributed to the promotion of the financial system that is capable of influencing households to use the financial markets to smooth their consumption pattern in time of need. If it happens that PIH exists in Malawi, the chapter continues to explore further whether the failure is due to liquidity constraints or myopia as done by Gomez and Paz (2010) on Brazil. The study further attempts to examine whether the degree of excess sensitivity (liquidity constraint) of consumption declines during financial reforms by simply controlling financial reforms represented by indicators of financial

reforms. Explanations as to why liquidity constraint remains high despite implementing reform in Malawi are also provided. This chapter is unique from the rest in the sense that new constructed time series of financial reform indices based on Aron and Muellbauer (2000) are used. To the best of our knowledge, this is the first study to investigate these questions for a small country like Malawi.

BRIEF OVERVIEW OF FINANCIAL LIBERALISATION IN MALAWI

Financial reforms

In Malawi, liberalisation of the financial sector started during the structural adjustment programmes supported by International Monetary Fund (IMF) and the World Bank (WB) in the 1980s. Liberalisation aimed at reducing direct government intervention while at the same time increasing the competition and efficiency in the operations of the financial sector. Measures of liberalisation included decontrolling interest rates, eliminating credit limits, reforming financial institutions, deregulating the financial sector, and adoption of indirect instruments of monetary policy (Chirwa and Mlachila, 2004). Accordingly, Malawi implemented many policy measures under liberalisation and we concentrate on those related to the study. For more information a brief historical aspect of financial reform is outlined in annex 1[ii].

Liberalisation of the financial sector started with the deregulation of interest rates in July 1987. Prior to that the basic structure of interest rates was directly administered by the Reserve Bank of Malawi (RBM) with an aim of keeping the interest rates low in order to reduce government expenditures and promote private investment. In particular, commercial banks in Malawi were given the freedom to set their own lending interest rates starting in 1987. This was followed by the deregulation of the deposits rates in April 1988. By August 1988, preferential interest rates to the agriculture sector were abolished and full interest decontrol was done in May 1990. The significant objective of interest rate liberalisation was to influence and encourage borrowing and raise the cost of funds to all financial institutions. Consequently, as shown in Figure 1, there were upward trends of various nominal interest rates after the liberalisation but this happened on the background of high inflation and high income growth volatility. In addition, high interest rates in Malawi have generally been due to high levels of government borrowing of funds on the money market. The money market comprised of a high oligopolistic structure with only two banks which accounted for 90% of bank credit in the economy during the liberalisation period.

Malawi removed credit ceilings and rationing in 1989 (Chipeta and Mkandawire, 1991). By elimination of credit
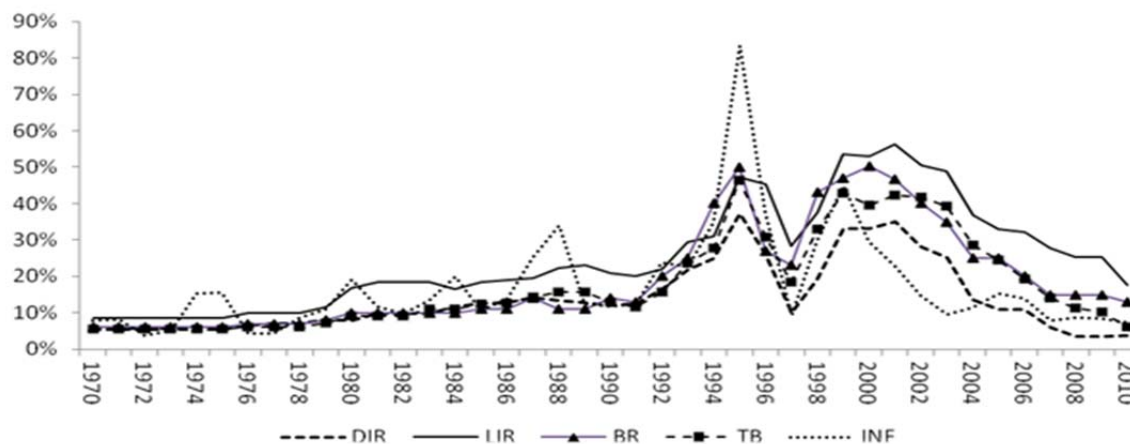
Figure 1. Trend of Various Interest Rates and Inflation. Note: Data obtained from IMF-IFS, World Bank Indicators and RBM Financial and Economic Reports. INF, DIR, LIR, BR and TB stand for inflation, deposit interest rate, lending interest rate, bank rate and Treasury bill, respectively.

control, it was envisaged that further increase in private sector credit will be achieved. The removal of credit controls which constitute a liquidity constraint may imply that excess sensitivity will be reduced during liberalisation. Henceforth, the pattern of Malawi consumption will be smoothed during the liberalisation period and thereafter. However, RBM introduced the liquidity reserve require-ment (LRR) ratio as the major monetary policy instrument in June 1989. RBM started with 10 percent of LRR and thereafter it trended upwards until 2003. As in Chirwa and Mlachila (2001), banks in Malawi reacted to these high LRR by widening the interest rate spread and hence shifting the cost of refinancing requirements to the customers. Thus, the introduction of LRR can be seen as counter-productive as it might have restricted consumer credit absorption as the cost of borrowing increased. Simultaneously, government implemented open market operations (OMO) and the bank rate with Treasury bills, RBM bills, Local registered stock and repurchase agree-ments (repos) as main instruments of monetary policy, due to inherently limited flexibility of the LRR. Despite some of these efforts, Figure 2 shows that private credit declined during the liberalisation period, but started improving in 2004.

Other reform policies involved the amendment of the RBM Act and Banking Act which were completed in 1989. After the revision of the Acts, privatisation and restruc-turing of banks and other financial institutions followed starting from 1990. This resulted in the expansion of banks from two in 1994 to nine in 2008 (Lea and Hanmer, 2009). In the foreign exchange market, Malawi adopted a floating exchange rate regime and removed exchange rate controls except for the capital account in 1994. Due to potential volatility of foreign exchange experienced during the floating regime, Malawi adopted a managed floating exchange rate regime in 1995. The RBM was

allowed to intervene to influence the exchange rate through sales and purchases of foreign currency, hence managing the exchange rate within a limited band. The band was removed later in 1998 in favour of a floating exchange rate regime (Mangani, 2011). The stock exchange officially opened in 1995 and listing of the first company took place in 1996. Despite this, capital markets are not fully developed and activities on the Malawi stock exchange remain limited

The important feature of financial reform on financial markets is the promotion of savings. Reinhart and Tokatlidis (2003) argue that the effect of real interest rates on consumption and savings depends upon the level of permanent income or wealth of the country. They con-tend that households first have to achieve subsistence consumption before other inter-temporal consumption choices are made. Hence, countries having high compo-sition of subsistence consumption, consumption and savings will be insensitive to changes in real interest rates, consumption will decline and savings increase after an increase in real interest rates. From Figure 3, savings and consumption as a percentage of GDP instead declined and increased, respectively during liberalisation period in Malawi. The decline in savings as proportion of GDP was largely experienced in the 1990s and reached negative 3 percent in 1994 from 14 percent in 1991; consumption on the other hand dropped in the 1980s and started increasing in the 1990s and thereafter.

Furthermore, liberalisation of the credit controls and ceilings indicate that not all households have access to credit. Hence, some consumers are not able to smooth their consumption overtime because they cannot afford to borrow from the formal financial sector. These liquidity constrained consumers from determining their consump-tion and savings based on current income. Therefore, relaxing credit controls and improving credit availability

Figure 2. Economic growth and private credit as % GDP. Source: Data used from IMF-IFS, World Bank Development Indicators and RBM Economic and Financial Review. Private credit is calculated as percentage of GDP and economic growth is percentage changes of real GDP.
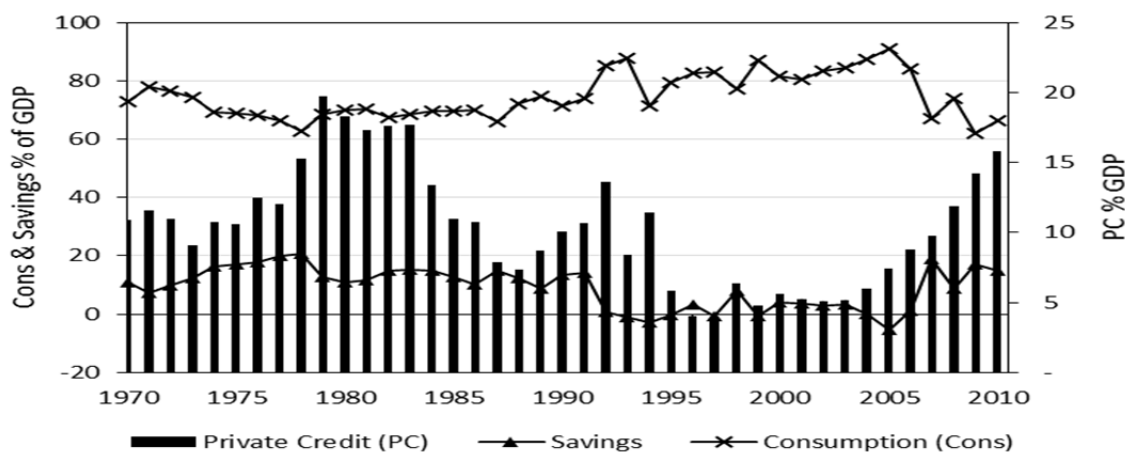

Figure 3. Savings, private credit and consumption as % of GDP. Source: Data used from IMF-IFS, World Bank Development Indicators and RBM Economic and Financial Review.

may lead to consumption increases after the financial reforms (Reinhart and Tokatlidis, 2003). Accordingly, Figure 3 portrays that Malawi experienced an increase in consumption as percent of GDP and a decline in savings as a percent of GDP which according to Bayoumi's (1993) arguments may be attributed to increased liquidity coming from increased credit as a result of liberalisation. Private credit as percent of GDP, however, declined during liberalisation. One important feature in Figures 1, 2 and 3 is the turnaround of the pattern of macroeconomic variables after 2006. In particular, we observe that inflation declined, private credit increased, economic growth increased, savings increased and consumption declined. It would be interesting to investigate what caused the turnaround of economic events after 2006.

Moreover, empirical findings in Malawi generally indicate that liberalisation has little effect on improving credit availability in Malawi. More specifically, the study found that the demand for bank credit was adversely affected by unfavourable economic environment of high budget deficits, large government demands for bank credit, high rates of inflation, high nominal rate of interest rate and a depreciating currency. In addition, low credit has been attributed to structural issues which include unreliable power and water supplies, unsatisfactory state of internal road networks, and high transport costs. Other institutional set up problems observed include the fact that 90 percent of the Malawi population still remain un-banked and 85 percent of households are predominantly rural and employed in the agricultural sector (Malawi

Financial Sector Assessment Programme, 2007). The banking system which forms a large share of the formal financial sector is still fragmented and repressed, mainly situated in urban areas and provide credit mostly to large-scale enterprises (Chipeta and Mkandawire 1991). Even where financial institutions have sufficient resources, lending to small-scale households is seen to be costly and considered a risky credit business.

The Malawi Financial Sector Assessment Programme (2007) has also provided additional factors that led to many Malawians having limited access to formal financial systems. Some of the operational factors include high cost of maintaining bank accounts because many Malawians cannot afford minimum balances due to low income levels, cash based payment systems and delays in loan processing and high cost of banking transfers. Other factors include the higher amount of securities that the banking system imposes on borrowers depending on their perception of risks; weak microfinance sectors; limited export finance; existence of large informal sector and limited primary capital markets; and limited legal and regulatory frameworks. These factors have deprived many Malawians accessibility to formal financial systems and cause most household consumers to remain liquidity constrained even after financial reforms in the 1980s and 1990s.

This section has provided a few explanations as to why liquidity constrained consumers exist in Malawi. It is clear from existing literature that the liquidity constraint situation of consumers in Malawi did not improve during the liberalisation era. As discussed above, liberalisation is a process and cannot be specifically defined. Therefore, the study attempts to construct proxies for liberalisation in order to quantify the true picture of financial reforms in Malawi as discussed below.

Financial liberalisation index

In practice, single indicators of financial reforms such as ratio of liquidity liability (M2) to nominal GDP, ratio of debt to GDP and ratio of domestic private credit to nominal GDP have been used (Beck et al., 2000). However, these indicators are not comprehensive representations of financial sector development and constructing a financial liberalisation measure with various aspects of the deregulatory and the institution-building process of financial development is very difficult. In addition, others have used dummy variables to represent financial reforms but this has been found to be mostly subjective and difficult in assigning arbitrary dummies (Groenewold et al., 2008). Recently, studies have suggested the use of a financial liberalisation index constructed from principal component analysis. However, Aron and Muellbauer (2000) have argued that the principal component technique does not link institutional information with behavioural responses. Therefore, a paper by Aron and Muellbauer has constructed a financial reform index

using a linear spline function accommodating the sequential institutional changes that occur due to changes in the financial sector policy reforms.

Given these considerations, this study attempts to construct a financial reform index for Malawi employing both the principal component and the linear spline function using quarterly data from 1980q1 to 2009q4. The indices are specifically helpful in monitoring the pace of liberalisation and evaluating the impact of the policy on various aspects of the economy. After constructing the two financial liberalisation indices, the study also attempts to estimate the impact of financial liberalisation on consumption behaviour using the constructed indicators of financial liberalisation. Apart from estimating a consumption function with financial liberalisation indices obtained from principal component analysis and the linear spline function, the study will also estimate the consumption function using the ratio of private domestic credit to nominal GDP as an index.

Financial liberalisation index from principal component analysis

Shrestha and Chowdhury (2006) have attempted to construct financial liberalisation indices using the principal component analysis. Specifically, their approaches were based on assigning arbitrary dummies between 0 and 1 to construct a single index of liberalisation depending on the implementation status to each financial liberalisation policy variables. However, Groenewold et al. (2008) have argued that the process of choosing dummies will be plagued by certain arbitrariness in the assignment of numbers to events. Therefore, we depart from this practice and compute the weighted average of the principal components directly from the three standard measures of financial depth which include the ratio of liquidity liabilities (M2) to GDP, the ratio of domestic private credit (PC) to GDP, and ratio of commercial bank assets (CBA) to commercial bank assets plus central bank assets.[iii]

Following Shrestha and Chowdhury (2006) but using indicators of financial depth as discussed above, the composition of financial liberalisation (FLI_t^{PC}) based on the principal component method can be expressed as follows:

$$FLI_t^{PC} = w_1 PC_t + w_2 M2_t + w_3 CBA_t \qquad (1)$$

where w_i is the weight of the component given by the respective eigenvector of the selected principal components. These three standard measures are translated into natural logarithms. After computations, Table 1 reports the eigenvalues of the three possible components as well as the proportion and cumulative proportion of the variation in variables explained by each. The first principle component explains over 65 percent of total variation and

Table 1. Eigenvalue and scores of principal components.

Component/variable	Eigenvalue	% of Variance explained	Cumulative % of variance explained	Score principal component 1	Score principal component 2
1	1.939	65	65	0.633	0.329
2	0.777	26	91	0.638	0.291
3	0.284	9	100	-0.438	0.899

Note: variables in chronological order are 1) PC, 2) M2, and 3) CBA.
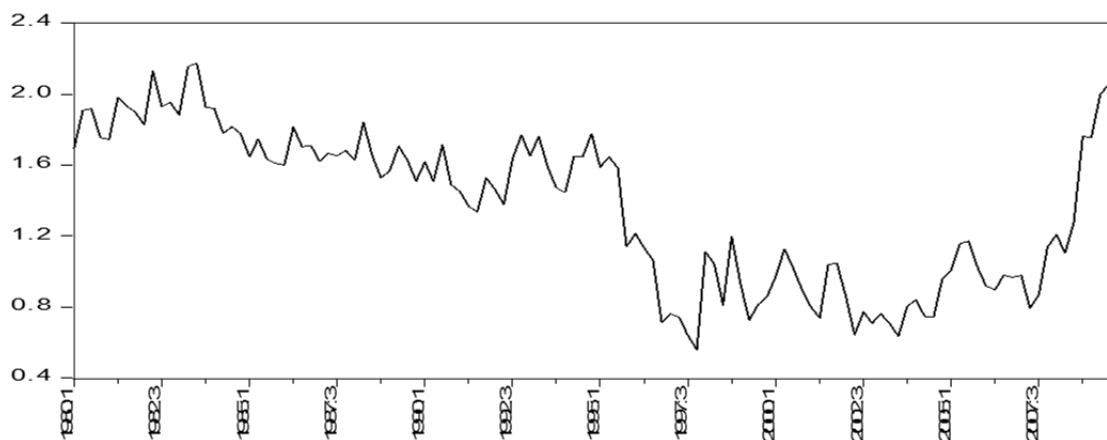
Figure 4. Financial Reform Index Using Principal Component Analysis

the second principal component explains over 26 percent of total variation. Hence, the first financial liberalisation index (FLI_t^{PC}) is estimated using the eigenvectors of principal component 1.

The series are graphed in Figure 4 and it is evident that financial sector development deteriorated starting from 1980 and became slightly stable during the implementation of financial reforms in 1987. Although, interest rates were decontrolled and credit rationing was removed, episodes of ups and downs were observed during the reform period. Some policy measures introduced such as the introduction of liquidity reserve ratio and limited initial conditions of institutional environment were counter-productive to the reform programme. Other factors contributing to unsuccessful financial reform programmes included political change regime in 1992 and 1994, withdrawal of donor funding, fiscal indiscipline and drought during the reform period (Mangani, 2011). Financial reforms showed signs of positive contribution starting from 2005 coinciding with the new government in power.

Financial liberalisation index from linear spline function

Financial reform is also proxied by a linear spline function

as done in Aron and Muellbauer (2000)'s study. To define the linear spline function, its coefficients are first estimated jointly from the consumption function. Theoretically and empirically, a macro-econometric consumption function would include an income term, a wealth term and a real interest rate term (Cappelen et al., 2006). However, the wealth term is excluded because data were not available for Malawi. In addition, Musila (2002) found insignificant impact of wealth and interest rate in describing consumption pattern in Malawi. Hence, the national disposable income is used as income in the household sector adjusted for inflation.

The estimated consumption function is as follows:

$$\Delta c_t = \mu + \lambda \Delta y_t + \alpha \left(y_{t-1} - c_{t-1} \right) + \omega_i d_{it} + \varepsilon_t, \qquad (2)$$

where c_t is the natural logarithm of consumption and y_t is the natural logarithm of income. α is speed of adjustment, ω_i denotes a group of coefficients obtained from a group of dummy variables (d_{it}) at different time period of liberalisation that will be used to construct the index and ε_t is the white noise.

As observed from the review of financial reforms in Malawi, the financial liberalisation process has progressed in many stages and involved many policy reform
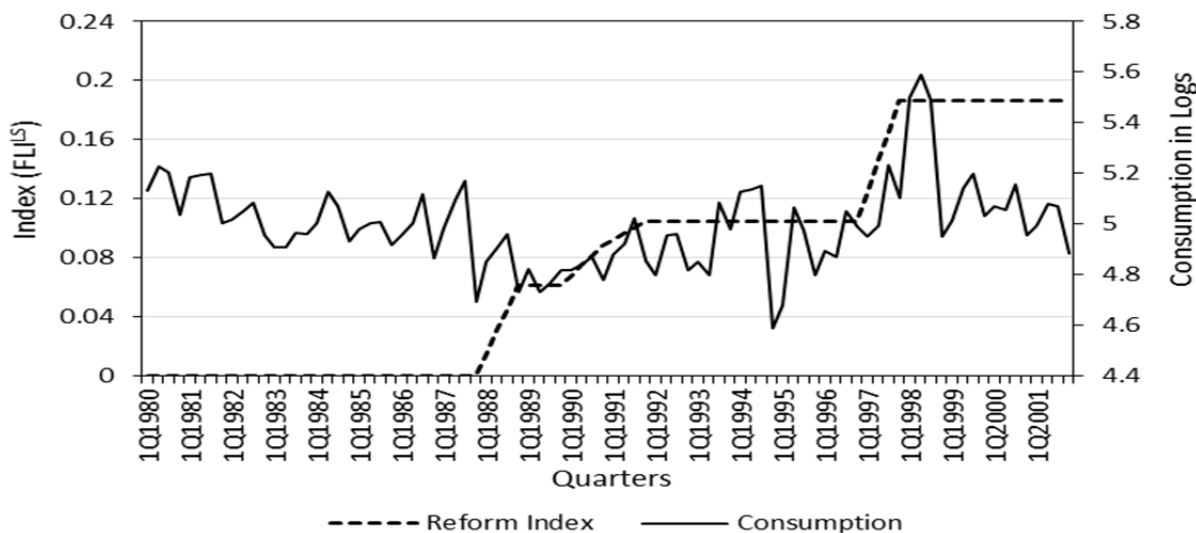
Figure 5. Consumption and Financial Liberalisation Index

measures[iv]. Malawi implemented financial reforms sequentially between 1987 and 1998 and the set of reform measures were introduced at different time period starting with the liberalisation of lending rates in 1987 and then deposit rates in 1988. Other reform measures in the area of credit controls, financial institutions, monetary policy, exchange rate and current and capital account followed in the later years as highlighted in Annex 1. Based on this history of financial reform in Malawi, dummies for the linear spline function are generated as follows. Financial reform started in 1987 and 0 is assigned prior to the liberalisation and 1 thereafter. By use of the quarterly data series, a 4 quarter moving average is created with predetermined moving average of dummies in 1987. d87 is defined as 0 prior to 1987 and 0.25 in the first quarter of 1987, 0.5 in the second quarter, 0.75 in the third quarter and 1 starting from fourth quarter and thereafter. d88 is defined as the 4 quarter lag of dum1987, d89 is the 8 quarter lag of d1987; this continues until we obtain d98 which will be 44 quarter lag of d1987. Then the linear spline function (FLI_t^{LS}) is defined as follows:

$$FLI_t^{LS} = w_1 * d87 + w_2 * d88 + w_3 * d89 + w_4 * d90 + w_5 * d91 + w_6 * d92 + w_7 * d93 + w_8 * d94 + w_9 * d95 + w_{10} * d96 + w_{11} * d97 + w_{12} * d98$$

(3)

The coefficients (w_i) in equation 3 are estimated from equation 2. Based on Aron and Muellbauer's (2000) arguments, only positive coefficients are used in the estimation of equation 3. They argue that negative coefficients indicate policy reversal in the implementation of financial liberalisation. Positive effects of liberalisation are not realised in economies practicing policy reversal because most households and firms lose trust and

coherence in adopting government policies. After estimations, 5 positive coefficients of dummies out of 12 were used in estimating FLI_t^{LS} in equation 3. The estimated FLI_t^{LS} is plotted together with consumption function as shown in Figure 5. The results show that consumption has moved along with financial reform index except in 1994 at the time of political change regime. It will be interesting to see how the coefficients will behave in a more sophisticated consumption function with wealth variables and interest rates variables. Additionally, joint estimation with household debt function should also be considered in future after obtaining reliable data on domestic debt. This is work in progress to improve on the formulation of the consumption function and debt function that can be jointly estimated to obtain reliable coefficients that can be used to construct a formal financial reform index for Malawi.

We observe different performances between the principal component analysis and the spline function. The principal component shows that the actual implementation of liberalisation policies had negative effects on financial sector development which by implication may have led to non-effects of financial reforms on consumption. In section 2, we observed that some policy measures implemented were counter-productive to the reform programme. In addition, the financial reform programme was implemented under the background of unstable macroeconomic fundamentals such as high inflation, erratic economic growth and change in political regimes. However, we observe different scenario under the spline function. The changes in aggregate consumption pattern moved along with financial reforms. Consumption is trending at the lower level than before liberalisation. But episodes of upward movements in consumption when financial reform improved contradict the permanent

income hypothesis and liquidity constraint. This may imply that changes in consumption pattern arose during liberalisation following changes in the current income.

Nevertheless, in both methodologies, the outcomes after financial liberalisation beginning 2007 show that financial sector development improved. From Figure 3, private credit increased, savings rejuvenated and consumption decreased in line with the theoretical expectations. Several questions can be asked from this. Is this an element of reduction in liquidity constraints? Is this an element of reduction in myopic tendencies of consumers? Did Malawi introduce other policies such as institutional policies apart from financial policies which had positive effects on changing consumption pattern during this period? For instance, government may have implemented policies in agriculture, education and health that likely may have influenced household consumption behaviour. In order to answer such questions, there is need for a more dynamic macroeconomic model which will be an important topic for the next study.

EMPIRICAL SPECIFICATION OF THE MODEL

In this study, we adopt the Euler-equation approach based on the work of Hall (1978) to analyse the development of aggregate consumption function. The model follows the solved-out consumption function set out in Campbell and Mankiw (1989) in which we allow for the presence of liquidity constraints as follows:

$$\Delta c_t = \mu + \lambda \Delta y_t + \theta rlr_t + \varepsilon_t, \tag{4}$$

where Δc_t represents the change of the log of aggregate consumption, Δy_t is the change of the log of aggregate income while μ and ε_t represent the drift and the error term, respectively. θ is the elasticity of substitution parameter and rlr_t is the real lending rate. The parameter λ represents the degree of excess sensitivity. This equation simply states that the change in consumption is a weighted average of the change in current income and the unpredicted changes in permanent income. Hence, the analysis of changes in consumption pattern will be based on the degree of excess sensitivity. Therefore, we test the hypothesis that $\lambda = 0$. If λ is significant and positive, it entails rejection of the permanent income hypothesis, that is consumption behaviour in Malawi follows a rule-of-thumb.

In theory, real interest rates (rlr_t) would also be expected to influence savings, and therefore consumption, with lower interest rates leading to increased consumption. However, actual trends of savings declined during liberalisation in Malawi. The interest rate structure is still non-market determined due to high official oligopolistic

financial structure and high government credit uptake. Hence, interest rate structure is likely to be controlled and consumer credits are likely to be low and lenders continue to use different criteria in credit rationing. Therefore, we assume constant elasticity of substitution but include it in our estimations to testify non-impact of interest rates on consumption in Malawi.

After examining the level of excess sensitivity, it is found that PIH did not exist in Malawi despite implementing financial reforms. We then extend our investigation to test whether this level of sensitivity declined during liberalisation period. We use indices of financial liberalisation constructed because liberalisation involves many policy measures. On the understanding that we can obtain different outcomes using different indices, we allow for up to three separate parameters on the liberalisation indices to access different aspects of the evolution of consumption behaviour following liberalisation. In this context, we modify equation 4 to allow for liquidity constraints and financial liberalisation as follows:[v]

$$\Delta c_t = \mu + \lambda \Delta y_t + \delta FLI_t + \varepsilon_t \tag{5}$$

where FLI_t is a proxy for financial liberalisation. Three proxies are used which include the ratio of private credit to GDP (FLI_t^C), constructed series of financial liberalisation from the principal component (FLI_t^{PC}) and constructed series from the linear spline function (FLI_t^{LS}). It is anticipated that the size of excess sensitivity λ for Malawi will decline during the liberalisation period. As explained in the introduction, one reason for excess sensitivity is the existence of liquidity constraints. Therefore, a significant and reduced λ during the liberalisation period would show that financial liberalisation improved liquidity situation and hence changed the pattern of consumption in Malawi.

The hypothesis that excess sensitivity $\lambda = 0$ may be rejected and may not decline during the liberalisation period has prompted us to explore further factors behind the negative outcomes. Building from the work of Shea (1995) and others, we modify equation 4 further to isolate liquidity constraints effects in Malawi:

$$\Delta c_t = \mu + \lambda_1 DUM1 \Delta y_t + \lambda_2 DUM2 \Delta y_t + \varepsilon_t, \tag{6}$$

where $DUM1$ is a dummy variable for periods in which $\Delta y_t > 0$ and $DUM2$ is a dummy variable for periods in which $\Delta y_t < 0$. Under liquidity constraint λ_1 should be positive, significant and greater than λ_t while under myopia λ_1 and λ_2 should be positive, significant and greater than zero.

However, estimating excess sensitivity λ using ordinary

Table 2. Test for serial correlation.

	M1	Income	Consumption	IIP
M1	1.000			
Income	0.993	1.000		
Consumption	0.954	0.956	1.000	
IIP	0.434	0.438	0.401	1.000

Note: Test for serial correlation so that M1can be used to calibrate the quarterly series of household consumption and national disposable income.

least squares (OLS) in all the models will yield biased and inconsistent coefficient because we are using expected variables in the equations. More specifically, permanent income hypothesis involves predictable components of income growth and real interest rates which are unobservable quantities (Wooldridge, 2009). Such simultaneous and error specifications can bring about the problem of endogeneity. Thus the explanatory variable Δy_t in equation 4 maybe correlated with ε_t. To address such endogeneity problem, the current study uses instrumental variables technique and two-stage least squares (IV –TSLS) employed by Campbell and Mankiw (1989).

In the IV-TSLS, we use the predetermined variables as instruments. Specifically, the lagged values of Δy_t are usually considered in the literature because the lagged variables are likely to be correlated with their current variables but not with the error term, since they were generated at an earlier point in time. In addition, instrumental variables are used to control for the possibility that changes in current income might signal changes in permanent income. The first lags are not used in this study because consumption and income data are time averaging and may induce serial correlation between the variable and its first lag (Campbell and Mankiw, 1989). Instead, we use lags starting from the second lag period in order to circumvent this problem. The only problem is that the degree of predictability is somehow lost in the first stage of regression (Agell and Berg, 1996).

Data and description statistics

The study uses quarterly data for the period 1987:1 to 2009:4 which were collected from International Financial Statistics (IFS) of IMF. Missing data were filled and consolidated from various in-country publications of the RBM, National Statistics Office (NSO) and from the Ministry of Development Planning and Cooperation (MDPC). Data series include real per capita national disposable income (total domestic consumption plus total national savings), real per capita household consumption, and bank lending interest rate. Real interest rates are calculated according to the formula $1+r_t = (1+i_t)/(1+\pi_t)$,

where r_t is real interest rate, i_t is nominal interest rate and π_t is inflation (Paz and Gomes, 2010). Household consumption (consumption) and national disposable income (income) are collected annually with monetary aggregates (M1) in Malawi (Table 2). According to Denton (1971) approach, indices of industrial production (IIP) as related series would have been appropriate data to interpolate the quarterly GDP but IIP was not correlated with consumption and income. In this regard, the series were interpolated using annual data to obtain quarterly series estimated using indices of seasonally adjusted money series (M1). In particular, we calculated quarterly changes of M1 and use these changes to interpolate the annual consumption and income into quarterly series as done in Denton (1971).

Consumption and income variables were converted into natural logarithms. This makes the model estimated as the log-linear approximation to the true model. As shown in Table 3, consumption and income series were tested using the Augmented Dickey-Fuller test for stationarity and the Johanseen procedure for cointegration. The series were not stationary in levels and became stationary at first difference, that is they are integrated of order one I (1).

Using Johansen procedure, the series are not cointegrated at the 5% critical value; hence the null hypothesis of non-cointegration cannot be rejected. Thus the model is proven to be properly specified and can model the series in difference without losing important information in the estimated equation. It is also observed that estimations should use consumption data of non-durables and services and total disposable income or disposable labour income but Campbell and Mankiw (1990) found that the distinction is not very important. They obtained similar results empirically.

EMPIRICAL ANALYSIS

The estimated model on whether permanent income hypothesis exists in Malawi is represented in Table 4. First, we tested the quality of the instruments used in our estimations and results are reported in the first stage regressions. The test results show that each set of

Table 3. Testing for stationarity and cointegration.

Testing for stationarity		Testing for Cointegration – Johansen Procedure		
Variables	Dickey-Fuller Test	Null hypothesis	Trace test	p-value
c_t	-1.197 (0.673)	r=0.v r=1	10.712	(0.230)
Δc_t	-6.133 (0.000)	r=1.v r=2	1.881	(0.170)
y_t	-0.907 (0.782)	Null hypothesis	Max-Eigen test	p-value
Δy_t	-4.957 (0.000)	r=0.v r=1	8.831	(0.301)
		r=1.v r=2	1.881	(0.170)

Note: The testing null hypothesis is that the variable has a unit root I (1). The figures in parenthesis are p-values. In terms of cointegration, r is the number of cointegrating vector. Number of lags used is 1 in both cases.

Table 4. Estimate of λ model for Malawi 1987Q1 – 2009Q4.

	First Stage Regressions			
Instrument	Δc_t **equation**	Δy_t **equation**	λ **estimate (s.e.)**	**Test of restrictions**
Model 1 (OLS)			0.922^{***} (0.066)	
Model 2 (IV)	0.182 (0.001)	0.227 (0.000)	0.870^{***} (0.170)	-0.025 (0.855)
Model 3 (IV)	0.199 (0.000)	0.262 (0.000)	0.815^{***} (0.120)	-0.030 (0.942)
Model 4 (IV)	0.222 (0.000)	0.187 (0.000)	1.125^{***} (0.158)	-0.033 (0.996)
Model 5 (IV)	0.180 (0.001)	0.247 (0.000)	0.914^{***} (0.098)	-0.040 (0.830)
Model 6 (IV)	0.278 (0.000)	0.280 (0.006)	0.983^{***} (0.110)	0.008 (0.428)

Notes: Three asterisks indicate 1% significance level and the figures in brackets are standard errors.

instruments has strong predicting power for both income growth and consumption changes. One noticing feature is that the absolute R^2 for consumption are smaller than R^2 for income, except when real interest rate is used as instrument. This provides evidence against the permanent income hypothesis in Malawi. Campbell and Mankiw (1990) have argued that such result is sometimes obtained because of the error in the measurement of the income growth. However, obtaining uncorrelated measurement error will not bias the IV estimates of λ but will reduce the predictability of income growth.

Second, we tested the validity of the instruments using the over-identifying restriction tests of the instruments and this method is equivalent to the Sargan test. The test is conducted across all models. The adjusted R^2 for a

regression of IV residual on the instruments with p-values in brackets for a Wald test that all the coefficients are zero are reported in the last column of Table 4. In all the models, the test results show that there is no evidence against the restrictions in the models used for estimations. Hence, we can argue that the models are well specified.

Third, attempts have been made to address the issues of heteroskedasticity, serial correlation, stability of parameters, and testing for restriction in the use of instrumental variables to address the issue of over-identification in Tables 5 and 6. Most of these tests show that all the standard errors and test statistics are heteroskedasticity, autocorrelation, and stability consistent.

Empirical results represented in Table 4 show that predictable movements in real income growth do exhibit significant explanatory power over consumption growth,

Table 5. Estimated results of $\Delta c_t = \mu + \lambda \Delta y_t + \delta FLI_t^i + \varepsilon_t$.

	Model 1 OLS	Model2: IV	Model 2: IV - FLI_t^{PC}	Model 3: IV - FLI_t^{PC}	Model 4: IV - FLI_t^{LS}
μ	-0.003	0.003	-0.037	-0.029	0.039
	(0.008)	(0.008)	(0.065)	(0.045)	(0.058)
λ	0.933***	0.918***	0.932***	0.937***	0.927***
	(0.067)	(0.100)	(0.097)	(0.098)	(0.104)
δ			0.018	0.020	-0.307
			(0.034)	(0.036)	(0.425)
$\bar{R}^2$	0.795	0.794	0.786	0.787	0.786
D.W.	1.856	1.860	1.822	1.827	1.809
LM(1)	0.001	0.003	0.007	0.002	0.091
	(0.970)	(0.957)	(0.933)	(0.963)	(0.763)
ARCH (1)	0.0314	0.312	0.315	0.314	0.329
	(0.575)	(0.596)	(0.575)	(0.580)	(0.566)
Ramsey's RESET	0.108	0.025	0.063	0.087	0.151
	(0.915)	(0.980)	(0.950)	(0.931)	(0.881)
Test of Restriction	-	-0.040	-0.045	0.046	-0.053
		(0.273)	(0.878)	(0.886)	(0.933)

Note: Three (two) asterisks indicate 1% (5%) significance level and the figures in brackets of λ and δ are t-statistics. LM (1) test for serial correlation and ARCH (1) test for heteroskedasticity coefficients are observed R-squared and in brackets are p-values. . $H_0: \lambda = 0; H_a: \lambda \neq 0$.

evidence against the PIH in Malawi.That is, the excess sensitivity is much higher than what is generally observed in industrial countries as well as other less developed countries (Paz and Gomes, 2010). These findings show that almost 90% of households in Malawi are associated with liquidity constraints and cannot smooth their consumption pattern over time. Specifically, it implies that consumers in Malawi depend on current income for their current consumption.   The strong effects of current income are consistent with how the economic system prevailed in Malawi. As observed in the literature, the country experienced low liquidity options such as credit unavailability and low savings and most Malawians were unable to use savings and borrowing to smooth the path of consumption.

In the first column of the table, model 1 is estimated using OLS while models 2 to 6 are estimated using two stage least squares. Model 2 uses three lags of income growth as instruments and model 3 uses three lags of consumption growth as instruments. Model 4 instruments are three lags of real interest rate. Model 5 instruments are three lags of income growth, consumption growth and error correction model for consumption and income. Model 6 instruments are three lags of income growth, consumption growth, real interest rate and error correction model for consumption and income. In the first stage

regression, we report the adjusted R^2 statistics for the OLS regression of change in consumption and change in income on the instruments with p-values in brackets for the Wald test of the hypothesis that all coefficients are zero except the intercept.

The inter-temporal substitution of consumption with respect to the real interest rate has also been estimated and the results have not been included in Table 4. The coefficients found were very small and insignificant in all models. We also found that when using lagged real interest rate as instruments, the estimated coefficient λ is greater than 1 but significant. This may imply that model 4 suffers from specification problems. Thus, the predictive power of interest rates on consumption growth or income growth is not clear in Malawi. This confirms the explanation provided in the model specification in section 4.

The results in Table 5 show that the coefficients of the excess sensitivity remained high under all cases of financial liberalisation. In addition, the estimated co-efficients under the three liberalisation proxies are insignificant, indicating that there has been very little contribution from financial liberalisation on the consumption behaviour in Malawi. The failure to find any evidence of financial market liberalisation in Malawi is also in keeping with prior expectations. Despite libera-lising interest rates and removing credit controls, financial

Table 6. Estimated Results of $\Delta c_t = \mu + \lambda_1 DUM1_t \Delta y_t + \lambda_t DUM2_t \Delta y_t + \varepsilon_t$.

	Model 1 (OLS)	Model 2 (IV)	Model 3 (IV)	Model 4 ((IV)	Model 5 (IV)
μ	-0.009	-0.030	-0.018	-0.017	-0.030
	(0.013)	(0.113)	(0.020)	(0.018)	(0.023)
λ_1	0.999***	1.302	1.115***	1.105***	1.343***
	(0.106)	(1.488)	(0.258)	(0.243)	(0.292)
λ_2	0.892***	0.850*	0.861***	0.867***	0.0897***
	(0.121)	(0.469)	(0.167)	(0.167)	(0.158)
$\bar{R}^2$	0.793	0.774	0.791	0.791	0.765
D.W.	1.870	1.932	1.891	1.888	1.941
LM(2)	0.006	0.058	0.018	0.016	0.070
	(0.938)	(0.810)	(0.894)	(0.901)	(0.792)
ARCH (1)	0.325	0.503	0.367	0.362	0.550
	(0.569)	(0.478)	(0.545)	(0.548)	(0.458)
Ramsey's RESET	1.623	0.108	0.807	0.675	0.035
	(0.108)	(0.914)	(0.422)	(0.501)	(0.972)
Test of Restriction	-	-0.142	0.002	-0.039	-0.015
		(0.631)	(0.149)	(0.361)	(0.281)
F-Statistics $H_0: \lambda_1 = \lambda_2$	0.309	0.054	0.437	0.401	0.377
	(0.580)	(0.817)	(0.510)	(0.528)	(0.244)

Note: One, two, and three asterisks indicate 10%, 5%, and 1% significance level, respectively and the figures in brackets alongside the coefficients are t-statistics. In the diagnostic part, the figures in brackets are p-values. Other diagnostic estimates were conducted as included in the table. Under myopia, $H_0: \lambda_1 = \lambda_2$ and $\lambda_1 > 0, \lambda_2 > 0$ while under liquidity constraint $H_0: \lambda_1 > \lambda_2$ and $\lambda_1 > 0$.

regulation concerning the authorisation of various financial activities was not fully implemented. This can partly be seen in the oligopolistic tendencies that banks practice in Malawi and the high participation of government in credit uptake. In addition, financial reforms could not work in isolation with unstable macroeconomic environment and weak financial institutions. Therefore, the case of liquidity constraints remained strong despite efforts to decontrol interest rates and abolish credit allocations.

Test for parameter stability was done using Ramsey's RESET test and in testing for over-identification restrictions the adjusted R^2 for a regression of IV residual on the instruments with p-values in brackets for a Wald test that all the coefficients are zero was also conducted. Instruments for models 2 to 6 are lagged variables of consumption, lagged variables of income, and an error correction model.

Following the rejection of permanent income hypothesis even during the liberalisation period, we estimated equation 6 in an attempt to clarify the sources of this rejection. The results in Table 6 show that both liquidity constraints and myopic tendencies are important factors behind the rejection of the PIH in Malawi. One possible reason for existence of liquidity constraints is non-effect of significant structural changes in the formal financial sector (particularly on the banking sector) which failed to

improve on making credit available to most households. As explained in section 2.1, the financial sector was characterised by limited presence in rural areas and high cost of financial intermediation. In addition, apart from government taking up a lion's share of credit, the monetary authority implemented counter-productive monetary policy instruments such as the liquidity reserve requirement which controlled the accessibility of liquidity in the economy. This may have possibly hindered accessibility of finance for those household consumers capable of smoothing consumption. Malawians are also myopic in nature because they depend on current income for their daily living. A large population is located in the rural areas and characterised with low savings, very limited non-human assets and low income. This is the first time the estimation of such nature is found on Malawi though similar to what has been found by Gomes and Paz (2010) on Brazil. It is now evident that the reason for the failure of PIH in Malawi is either liquidity constraint or myopia.

In summary, a closer look at our data reveals drastic changes in some macroeconomic variables starting especially from 2005. The years after 2006 dramatically changed in the economic variables with persistent high increase in economic growth, credit resurgence and decrease in aggregate consumption. Hence, it is quite

conceivable that there were other uncertainties or factors that affected consumption apart from financial policy measures implemented during liberalisation. Following the new political dispensation in 2004, Malawi may have implemented other institutional policies apart from financial reforms. For instance, Malawi introduced the fertiliser subsidy programme which on record has contributed to bumper crop harvest in agriculture leading to high economic growth. Therefore, the households in Malawi may have responded to increased uncertainty or other factors which may have increased precautionary savings and hence reduced the level of current consumption in the economy and increased future consumption later. It would be interesting to analyse all these relationships using a dynamic macroeconomic model.

Conclusion

The study has found that PIH of aggregate consumption behaviour does not exist in Malawi. Most consumers are current income consumers (rule-of-thumb). They consume from "hand to mouth" and very little is left to smooth consumption in their life time. The magnitude of 90% of excess sensitivity implies that most consumers in Malawi are current income consumers and is much higher than what was found in US and UK but even higher than what was found in other less-developed countries like Fiji. Despite Malawi implementing financial reforms in the 1980s and 1990s, households in Malawi seem to link consumption to current income. It is further observed that there was no shift between the current income consumers and permanent income consumers. The excess sensitivity still remains high during the liberalisation period. The empirical findings have further argued that the main reason for the failure of the PIH is due to liquidity constraint which is manifested in the under development of the financial market and unstable macroeconomic conditions in Malawi. Weak financial institutions, both structural and operational have impacted negatively on the accessibility of financial resources for most Malawians. This is a bigger lesson for policy makers to consider in the preparation of the broad based financial reforms in future.

As reviewed in the literature, further research would be more interesting to investigate the turnaround of economic events after 2006. We have observed dramatic changes in the economic variables with persistent high increase in economic growth, credit resurgence, decrease in aggregate consumption and increase in savings. It would be interesting to model what uncertainties or factors that affected consumption and savings apart from failed financial liberalisation. In addition, it would be interesting to investigate if the established high level of liquidity constrained consumers (rule-of-thumb) in Malawi is included in the small macroeconomic dynamic model (sticky price) for Malawi. As reiterated in the literature, government action could be destabilising if consumption patterns are closer to the rule-of-thumb than permanent income hypothesis. In particular, it will be informative to investigate the impact of monetary policy or fiscal policy on current income consumers who do not borrow or save but follow a simple rule-of-thumb in Malawi using advanced econometric methodologies.

Conflict of Interests

The author has not declared any conflict of interests.

REFERENCES

Agell J, Berg L (1996). Does Financial Deregulation Cause a Ang JB (2011). Finance and Consumption Volatility: Evidence from India. J. Int. Money Finance. 30(6):947-964.

Aron J, Muellbauer J (2000). Financial Liberalisation, Consumption and Debt in South Africa.Working Paper Series 22. Oxford, England: Centre for the Study of African Economics, Oxford University.

Barrell R, Davis E (2007). Financial liberalisation, consumption and wealth effects in seven OECD countries.Scottish J. Polit. Econ. 54(2):254-267.

Bayoumi T (1993). Financial Deregulation and Consumption in the United Kingdom. Review of Economics and Statistics, 75:536-539.

Beck T, Demirguc-Kunt A, Levine R (2000). A New Database on the Structure and Development of the Financial Sector. World Bank Economic Review, 14(3):597-605.

Campbell JY, Mankiw NG (1989). Consumption, Income, and Interest Rates: Reinterpreting the time series evidence. NBER Macroeconomics Annual, pp.185-216.

Campbell JY, Mankiw NG (1990). Permanent Income, Current Income, and Consumption. J. Bus. Econ. Stat. 8(3):265-279.

Cappelen A, Choudhury R, Harding T (2006). A Small Macroeconomic Model for Malawi. Statistics Norway Research Department.

Chipeta C, Mkandawire MLC (1991). The Informal Financial Sector and Macroeconomic Adjustment in Malawi. African Economic Research Consortium, Research Paper No. 4:1-58.

Chirwa EW, Mlachila M (2004). Financial Reforms and Interest Rates Spread in the Commercial Banking System in Malawi, IMF Working Paper, WP/02/6.

Consumption Boom? The Scandinavian J. Econ. 98(4):579-601.

Denton FT (1971). Adjustment of Monthly or Quarterly Series to Annual Totals: An Approach Based on Quadratice Minimization. J. Am. Stat. Assoc. 66:99-102.

Gomes FAR, Paz LS (2010). Consumption in South America: Myopia or Liquidity Constraints? Econ. Aplicada 14(2):129-145.

Groenewold N, Peng J, Li G, Fan X (2008). Financial Liberalisation or Financial Development? Test Using Delphi-Based Index of Liberalisation. Int. J. Bank. Finance 6(1), Article 6.

Hall RE (1978). Stochastic Implications of the Life Cycle-Permanent Income Hypothesis: Theory and Evidence. J. Polit. Econ. 86(6):971-987.

Kabango G, Paloni A (2010). Financial Liberalisation and Industrial Development in Malawi.Business School-Economics, University of Glasgow, Working Paper Series No. 8.

Lea N, Hanmer L (2009). Constraints to Growth in Malawi. Working Paper No. WPS 5097, World Bank.

Malawi Financial Sector Assessment Programme (2007). Financial Sector Assessment Program Malawi Banking Sector: The Path to a Deeper and More Inclusive System.International Monetary Fund.

Mangani R (2011). The Effects of Monetary Policy on Prices in Malawi. African Economic Research Consortium (AERC).

Mankiw NG (2006). Macroeconomics 5th Edition, Thompson Southern – Western Publishers.

Musila JW (2002). An Econometric Model of the Malawian Economy. Econ. Model. 19:295-330.

Ngalawa H, Viegi N (2010). Interaction of Formal and Informal Financial Markets in Quasi-Emerging Market Economies. University of Cape Town.

Paz LS (2006). Consumption in Brazil: Myopia or Liquidity Constraints? A Simple Test Using Quarterly Data. Appl. Econ. Letters 13(15):961-964.

Qi L, Prime PB (2009). Market Reforms and Consumption Puzzles in China. China Econ. Rev. 20:388-401.

Reinhart CM, Tokatlidis I (2003). Financial Liberalisation: The African Experience. J. Afr. Econ. 12(2):53-88.

Shea J (1995). Myopia, Liquidity Constraints, and Aggregate Consumption: A Simple Test. J. Money Credit Bank. 27(3):798-805.

Shrestha B, Chowdhury K (2006). Financial Liberalisation Index for Natal. Int. J. Appl. Econom. Quantit. Stud. 3(1):41-54.

Wooldridge JM (2009). Introductory Econometrics: A Modern Approach. 4th Edition Mason Oh; South-Western.

Annex 1. Financial Liberalisation in Malawi 1987-1998.

Period	Policy Measures
	1. Liberalisation of Interest Rates
July 1987	Commercial banks started setting their own lending interest rates
April 1988	Deposit rates were deregulated
August 1988	Preferential interest rates to the agricultural sector were abolished
May 1990	All interest rates became fully liberalised
	2. Directed credit
1988	Credit ceilings and credit rationing were removed
1990	Preferential lending to Ministry of Agriculture was abolished
	3. Cash Reserves and Liquid Assets Requirements
June 1989	LRR ratio introduced at 10% of commercial bank liabilities with commercial banks earning interest rates on reserves
December 1990	LRR ceased to earn interest rates
1997	LRR was changed from daily to monthly average and RBM started paying interest rate on reserves
August 1998	LRR changed back to daily observance by commercial banks and RBM ceased to paying interest rates on reserves
	4. Competition in the financial markets
1989	Review of RBM Act and Bank Act leading to deregulation of entry into the banking sector
March 1998	Entry and incorporation of continental discount house and introduction of interbank market lending among commercial banks
	5. Open Market Operations
1991	Treasury bills introduced
1990	RBM bills introduced
	6. Exchange Rate Liberalisation
January 1971	British pound/Malawi pound par value system
February 1971	Malawi Kwacha introduced and pegged to the pound at two to one
November 1973	Peg to a weighted average of the pound and the US Dollar
June 1975	Peg to the SDR
January 1984	Peg to a weighted basket of seven currencies
1990	Complete liberalisation of foreign exchange allocation
February 1994	Free floating (with intervals of managed float)
	7. Liberalisation of capital account
February 1995	Malawi stock exchange established (limited liberalisation of capital markets)

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[i]Financial liberalization, financial reforms and financial deregulation mean the same in this study and are used interchangeably.

[ii]Full details of financial liberalization in Malawi are documented by Chirwa and Mlachila, 2004.

[iii]The choice of these ratios was done based on the availability data and the level of development of the financial sector in Malawi. For instance, the stock market is still in infancy stage hence we could not include it to represents financial liberalization

[iv]A list of reform measures were summarized from Chirwa and Mlachila (2004) and these are included in Table 1 of chapter 1.

[v]This formulation will require further improvements to allow the coefficient of indicators of financial reforms to vary with the excess sensitivity as done in Bayoumi (2000).