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Testing Permanent Income Hypothesis for Fiji

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Hall (1978) has stimulated considerable controversy and empirical work on testing the validity of the permanent income hypothesis (PIH). Much of this work is on the developed countries. In the developing countries incomes show larger fluctuations and for the majority opportunities for inter-temporal substitution are limited. This paper uses the extended framework of Campbell and Mankiw (1989) and finds that current consumption is determined by current income for more than two thirds of the consumers in Fiji.

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1. INTRODUCTION

Consumption expenditure is the largest component of output and the marginal propensity to consume (MPC) determines the size of the multiplier and the dynamic effects of shocks to the economy. Therefore, it is important to have a proper specification and estimation of the consumption function. However, in Fiji it did not get much attention, except in a recent work by It is well known that the Keynesian approach to consumption is atheoretical. Therefore, specifications based on Friedman's (1958) permanent income (PIH) and Modigliani and Brumberg's (1954) life-cycle consumption (LCH) theories are widely used in country studies and for international comparisons. Both theories share a common optimization model and yield similar conclusions. They imply that MPC is much smaller than in the Keynesian specification, since current consumption decisions are based on a long run view of income i.e., the average life-time or permanent income, and optimizing consumers tend to *smooth* consumption expenditure. Therefore, consumption is not *sensitive* to changes in current income.

In this paper we utilize some developments since Hall's (1978) influential paper on testing the consumption equations based on the intertemporal optimization framework. Subsequently, PIH and LCH are treated as synonymous and referred to as PIH and the controversy on PIH and Keynesian functions is also known as *smoothing* versus *sensitivity* controversy. The outline of this paper is as follows. Section 2 reviews Hall's controversy. Section 3 briefly reviews an alternative framework, developed by Campbell and Mankiw (1987) to evaluate *smoothing* and *sensitivity* factors. Section 4 uses this framework to evaluate the relative importance of *smoothing* and *sensitivity* factors in the consumption equation for Fiji. Finally, Section 5 concludes.

2. OVERVIEW OF RECENT DEVELOPMENTS

Like several earlier Keynesian and neo classical debates, the consumption debate generated a large theoretical and empirical literature. A new dimension to this old controversy has been added by Hall (1978) wherein he argued that if expectations of life-time income are rational, PIH implies that the change in consumption should be a random

walk. This can be deduced from the first order condition of the standard inter-temporal utility maximization model, i.e.,[2]

$$E_t[U'(C_{t+1})] = \left[\frac{1+\rho}{1+r}\right]U'(C_t) \tag{1}$$

where E stands for the expectation, C is real consumption, $U'(C)$ is the marginal utility of consumption, ρ is the subjective rate of time preference and r is the real rate of interest at which the representative consumer can lend and borrow. The above result implies that C_t should equal the best forecast of consumption in the next period, except for a constant $[(1+\rho)/(1+r)]$. The simplifying assumptions that the utility function is quadratic and separable in time and $r = \rho$, give the famous Hall equation:

$$\begin{aligned} C_{t+1} &= C_t + \epsilon_t \\ \textit{or} & \\ \Delta C_t &= \epsilon_t \end{aligned} \tag{2}$$

where ϵ is the innovation, meaning that no information is available in period t to improve the prediction of future consumption, C_{t+1}.

Hall's initial tests were favorable to PIH. However, Flavin (1981) and Campbell and Mankiw (1989) have found that either the data do not support or lend only partial support to PIH. The Campbell-Mankiw approach is noteworthy for its wide scope to explain stylized facts and for nesting rival consumption theories viz., PIH and the simple Keynesian approach.[3] The Campbell-Mankiw model is based

[2] Since this is a well known result, and derivations are available in advanced textbooks, e.g., Romer (2001), there is no need for elaboration here.

[3] Methodologically models of synthesis that nest rival paradigms are attractive because the real world may not fully conform with the idealized assumptions (e.g. all markets are perfectly competitive or imperfectly competitive) of the rival paradigms. For example, rightly or wrongly, it is believed that the Keynesian and monetarist approaches can be nested in the well known $ISLM$ and $ADAS$ models. While this may explain their popularity, in it is argued that these models are not suitable for nesting Keynesian and neo classical paradigms. Therefore, in a more suitable framework, within the disequilibrium framework, was developed to nest and test these models for UK and the USA.

on the assumption that while λ proportion of consumers base their consumption decisions on the Keynesian rule of spending current income, the remainder $(1-\lambda)$ proportion use the optimization model. A couple of advantages of their model are that λ can be identified with the standard estimation methods and the variables are likely to be stationary since they are in their first differences. Campbell and Mankiw found that, in the developed countries, between 40% to 50% of consumers base their consumption decisions on the Keynesian rule. In applying their model to a developing country like Fiji, it is to be expected that λ will be much higher than the 40% to 50% estimate for the developed countries. This is a reasonable *a priori* conjecture since opportunities for consumption smoothing in the developing countries are much less. Our subsequent estimates show that about 75% of consumers in Fiji use current income for consumption decisions.

However, it is of interest to note that, an earlier variant of the Campbell-Mankiw approach was used by Patnaik (1997) to estimate, with Indian data (1961-1994), the proportions of the Keynesian and PIH consumers. Her estimated equation, with minor notational changes, is:

$$C_t = \alpha + \beta\ C_{t-1} + (1-\gamma)(YL_t\ -\ \beta YL_{t-1}) \qquad (2a)$$

where YL is post tax labour income. This formulation implies that if $\gamma = 1$, all are forward-looking PIH consumers. Patnaik's point estimate (with LNIV) of $(1-\gamma)$ is 0.547 and highly significant with a $p = 0.000$. She says that her estimate for India is close to the Campbell-Mankiw estimates for the developed countries. However, it is hard to belive that credit constrained consumers in a developing country, with rudimentary consumer credit markets, are as forward looking as consumers in the developed countries. Part of this low estimate for India may be due to the data used for the disposable per capita labour income since it is hard to estimate factor shares and factor incomes from the GDP data of the developing countries. It is also possible that the estimated standard errors are biased since the variables in their levels are non-stationary. Patnaik also estimates, with data on poverty numbers, that this ratio could be as high as 0.7 which is closer to our subsequent estimates for Fiji. It seems that further work, on the lines of Campbell and Mankiw used in our present paper, where there is no need for the estimates

of labour income and the variables are stationary, is necessary on the developing countries to reach firmer conclusions.

3. A CAMPBELL-MANKIW CONSUMPTION FUNCTION FOR FIJI

The Campbell-Mankiw specification assumes that a certain proportion $(1-\lambda)$ of consumers are forward-looking and consume their permanent income (PI) and the remainder (λ) proportion use the rule of thumb of consuming their current income. Furthermore, if we allow for some inter-temporal substitution of consumption with a $CRRA$ utility function:

$$U_t = \frac{C_t^{(1-\theta)}}{1-\theta}$$

the first order condition in equation (1) will be:

$$E_t[U'(C_{t+1})] = \left[\frac{1+\rho}{1+r}\right]^{\sigma} U'(C_t) \tag{3}$$

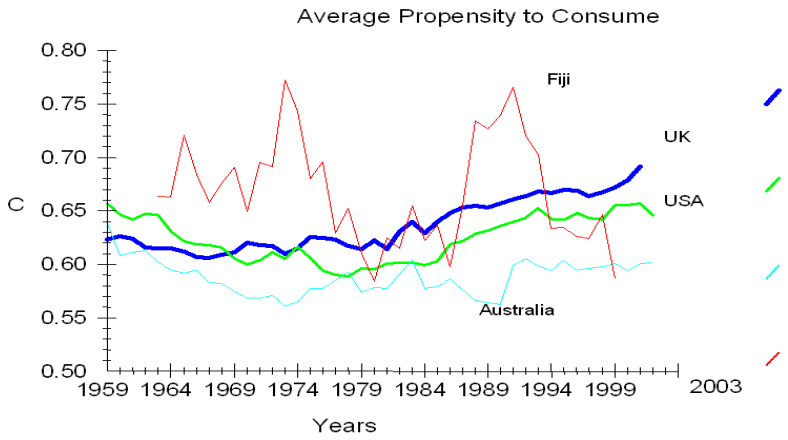
where $\sigma = (1/\theta)$ is the elasticity of inter temporal substitution of consumption and θ is the risk aversion coefficient. The Campbell-Mankiw version of Hall's random walk equation (2) will be:

$$\Delta C_t = \mu + \lambda \Delta Y_t + (1-\lambda)\sigma r_t + \epsilon_t. \tag{4}$$

Equation (4) is a more general specification than the simpler specification that ignores the rate of interest. Originally Hall (1978, 1988) found that σ was insignificant and sometimes became negative. Similarly Hansen and Singleton (1996) have found that σ was negative. In the Campbell and Mankiw estimates σ was also small and insignificant. Hence the justification for the simpler specification. On the other hand Ogaki and Reinhart (1998) have found that σ for the USA is in between 0.32 to 0.45 and significant. Fuse (2004) also found that σ for Japan is significant and is about 4. However, the implications of the size of σ as an indicator of consumer risk aversion and its plausibility do not seem to have received adequate attention in these works. For example, if the utility function is assumed to be the $CRRA$ type, the findings of Hall, Hansen and Singleton and Campbell and Mankiw imply that US

consumers are infinitely risk averse, a rather implausible implication. On the other hand, comparing the Ogaki and Reinhart estimate for the USA with Fuse's estimates for Japan imply that US consumers are about 16 times more risk averse than Japanese consumers. Needless to say these estimates need further refinements and analysis. However, since the magnitude of σ is important to determine the effects of the real rate of interest on consumption and does not affect the validity of PIH, because PIH is based on the basic assumption that consumption smoothing exists, but its implications for the consumer risk aversion needs attention since consumers are unlikely to be infinitely risk averse, as in some earlier studies on the Hall controversy.

Before we use the Campbell-Mankiw approach to Fiji, it would be useful to briefly look at the differences between the behaviour of consumption and output in Fiji and some selected developed countries. Figure-1 and Table-1 compare consumption patterns in Fiji with USA, UK and Australia.



While Fiji's APC is not much higher than in USA and UK, it shows considerable fluctuations. The standard deviation of Fiji's APC is

Table-1*
Consumption and Output
Fiji, Australia, UK and USA 1970–2002

	Fiji	Australia	UK	USA
Mean APC	0.66	0.58	0.62	0.63
STD APC	0.049	0.013	0.020	0.023
Mean growth of Y	2.71	3.32	2.38	3.142
STD of growth in Y	5.18	2.48	2.19	2.18
Mean growth of C	2.7	3.35	2.73	2.87
STD of growth in C	6.6	1.43	2.69	2.22

*** Notes:**

APC is the ratio of consumption to output and STD is the standard deviation. Data Sources: International Financial Statistics (2003), IMF.

more than twice in the developed countries. It is also interesting to note from Figure-1 that, from the early 1980s, APC has shown an upward trend in the three developed countries. Bayoumi (1993) and Miles (1992) suggest that this increase in APC is due to easing of the liquidity constraints in the post deregulation of the financial markets. Muellbauer and Murphy (1990) suggest that this is due to an increase in the wealth effect, caused by the increase in house prices e.g. in the UK. Attanasio and Weber (1994) attribute this effect to improved expectations of permanent income due to the rise in productivity. The implication of these observations is that, for a variety of reasons among which easing of the availability of credit is an important factor, opportunities for consumption smoothing in the developed countries have increased from the early 1980s. Since no such effect is noticeable in Fiji's consumption pattern, it may be said that current income could be a major factor in consumption decisions and the large variations in Fiji's APC could be due to the large variations in the rate of growth of its income. Therefore, modeling consumption in Fiji is a challenging task and may be useful for developing consumptions functions in the other developing countries.

In light of these observations equation (4) seems to be in need of modifications for testing the Fiji data. First, the interest rates in de-

veloping countries are subject to various government and central bank controls and are unlikely to be market determined. Second, as a result of such controls, interest rates, including the consumer credit rates, are generally low and lenders may use different criteria (such as social status, employment in the public sector etc.) to evaluate credit risks and ration credit. Therefore, the availability of credit, rather than the interest rate, could be a major constraint on consumption smoothing. Thirdly, as pointed out earlier, estimates of σ for USA were found to be insignificant, but the significance of the availability of credit is not investigated within the PIH framework. It may be said that our proxy variable for the availability of credit, which we shall explain shortly, is somewhat akin to a shadow price of the cost of credit. In that sense our alternative specification, by substituting the availability of credit for the rate of interest in (4), is not altogether arbitrary. Fourthly, in Fiji a large proportion of land titles is not freehold and therefore collateral for loans is highly limited. Finally, with the credit proxy variable, in place of the real rate of interest, it is difficult to interpret σ as the true substitution parameter. It may be treated as a hybrid substitution parameter and its magnitude and significance are an indication of the effects of the credit availability variable. However, we shall also estimate the conventional equations with the real rates of interest in addition to our equations with the availability of credit.

Our credit availability variable is proxied with the difference between the short and long term nominal interest rates. This is a well known proxy and can be derived from the $ISLM$ model. When money supply increases, LM shifts down, causing a decline in the short term nominal rate of interest. However, since more money means higher inflationary expectations, the nominal long term rate of interest increases. The spread between the short and long term interest rates increases and thus it is a reasonable to use this as a proxy for the liquidity and the availability of credit at an aggregate level. Our alternative version of equation (4) is, therefore:

$$\Delta C_t = \mu + \lambda \Delta Y_t + (1 - \lambda)\sigma R_t + \epsilon_t \tag{5}$$

where R is the difference between the nominal short and long term rates of interest. We shall also estimate two variants of equation (5) by replacing R with the real short run interest rate (rr_s) and real long

run rate of interest (rr_l). These equations thus give an indication of the significance of the availability and cost of credit variables in the consumption equations.

4. EMPIRICAL RESULTS

The empirical methodology of estimating the Campbell and Mankiw equations, with the instrument-variable (IV) approach, is well discussed in their paper. Estimates of equation (5), for the period 1974 to 2002, with OLS and four versions of IV are given in row 1 to row 5 of Table-2. As in the Campbell-Mankiw model, our dependent variable is the first difference of the log of real per capita consumption (ΔlnC_t) and the income variable is also in the first differences of the real per capita disposable income (ΔlnY_t).[4] The explanatory variables in the four IV equations are the predicted values, from the first stage regressions, of: ($\Delta ln\widehat{Y}_t$) and ($\widehat{R}_t$). A dummy variable to capture the effects of the introduction of the goods and services tax ($TDUM$) in 1992 is also included and it is 1 in 1992 and 1993 and zero in other periods. Alternative formulation of this dummy variable did not yield satisfactory results. It is unlikely that, since such a consumption tax is on a wide rage of essential goods, its effects will persist for more than a few years after its introduction. Thus, our equation for estimation is:

$$\Delta lnC_t = \mu + \lambda \Delta ln\widehat{Y}_t + (1-\lambda)\sigma_R \widehat{R}_t + \beta TDUM_t + \epsilon_t \qquad (6)$$

A common set of instrument variables, with intercepts, are used in all the first stage regressions. The instrument variables are: $\Delta ln\ Y_{t-3}$, $\Delta ln\ C_{t-3}$, $\Delta ln\ CPI_{t-3}$ which is the rate of inflation, R_{t-3} and a dummy variable for the two political coups in 1987 and 2000. This dummy is 1 during 1987, 1988, 1989, 2000 and 2001 and zero in other periods. Alternative values were also tried but yielded less impressive results. To test

[4] Consumption expenditure includes expenditure on non-durables and durables. Data on these two components are not available for Fiji and even for some $G7$ countries in the Campbell and Mankiw (1989) study. Similarly data on disposable incomes are also hard to get and therefore Campbell and Mankiw have used per capita incomes in their estimates for the $G7$ countries. These approximations did not make significant difference. However, for Fiji we shall use the avaliable per capita disposable income.

the over-identifying restrictions, the residuals of the first stage equations are regressed on the instruments and $T \times R^2$s are computed. This statistic has a χ^2 distribution with $(k-1)$ degrees of freedom, where T is number of observations and k is the number of instrument variables. The computed χ^2 is a test for the validity of the over-identifying restrictions implied in IV estimates. For the 4 first stage equations of ΔlnY, R, rr_s and rr_l, computed χ^2s are, respectively, 9.8397, 9.8075, 7.2955 and 6.3565. The 5% critical value is 11.1. Therefore, these over-identifying restrictions are not rejected.[5]

To conserve space we only report in Table-2 the OLS and the four second stage estimates with IV. In Table-2 OLS estimates are in row 1 and the IV estimate, without the implied constraints on the coefficients of output and availability of credit, are in row 2. p values are in the parentheses below the coefficient estimates. All the coefficients in these two rows have the correct expected signs and are significant at the conventional 5% or 10% levels of significance. The equation in row 2 implies that for more than 75% consumers, current income is a significant determinant of current consumption. The point estimate of λ at 0.75 is about 50% higher than in the developed countries and lends support to our initial conjecture. Furthermore, R, as a proxy for the availability of credit, seems to be satisfactory and it has a significant positive effect on consumption.

[5] We have also tried lower and higher order lags for the instrument variables and they gave very similar but statistically less significant estimates. It may be noted that the higher is the lag, the less would be the endogenous variable bias.

Table-2*
Estimates of the Campbell-Mankiw Equations for Fiji
1974–2002

	μ	λ	$(1-\lambda)\sigma$	σ	TDUM	SEE
1. OLS	−0.016	0.715	0.008		−0.077	0.060
	(0.08)	(0.06)	(0.00)		(0.00)	
2. IV	−0.068	0.753	0.018		−0.053	0.045
	(0.05)	(0.05)	(0.04)			(0.00)
3. IV-NLLS-a	−0.068	0.753		0.072	−0.053	0.045
	(0.08)	(0.02)		(0.51)	(0.13)	
4. IV-NLLS-b	−0.068	0.753		0.071	−0.053	0.044
	(0.09)	(−)		(0.08)	(0.00)	
5. IV-NLLS-c	0.076	0.9		0.192	−0.054	0.044
	(0.03)	(−)		(0.03)	(0.11)	

*** Notes:**

1. p values in the parantheses are based on estimating the S.E.'s, with the Newey-West equal weights adjustment and a truncation lag of 8 periods due to significant heteroscedasticity in the original estimates. The OLS equation is for the period 1971 to 2002.
2. Dicky-Fuller (DF) and Augmented Dicky-Fuller (ADF) tests are used to test for the stationarity of variables. These test statistics are not significant at the 5% level.
3. Data Sources: International Financial Statistics (2003), IMF.

However, to understand the significance of the effects of R in determining the size of the substitution parameter and the implied risk aversion coefficient, we have reestimated equation (6), by imposing the constraints implied on its coefficients. The constrained equations are estimated with the non-linear-least squares ($NLLS$) and given in rows 3 to 5. It can be seen from the row 3 estimates that this is disappointing since σ turned out to be highly insignificant. Although it seems reasonable to conclude from this that the substitution parameter is small or zero, its implication that the risk aversion coefficient is infinitely large is somewhat implausible. While such high risk aversion coefficients are plausible in the developing countries with political and social instability, it is hard to justify infinitely risk averse behaviour

in the politically more stable developed countries. Perhaps because the elasticity parameter was found to be small or insignificant in many earlier works, following Hall (1978), not much attention is paid to the significance of σ. Using alternative procedures to estimate σ suggested by Ogaki and Reinhart (1994) and Fuse (2004) are outside the scope of our present paper. Furthermore, it is necessary to have data on the expenditure on durables and non-durables and such data are not available for Fiji and many other countries. Therefore, we shall make a somewhat arbitrary attempt to estimate σ to at least rule out that consumers are not infinitely risk averse even in a small developing country with some political instability.

Therefore, to get some insights into the significance of σ and the implied risk aversion coefficient for Fiji, we have imposed a further constraint that λ equals its estimate in the equation of row 3 and the reestimated equation is given in row 4. This procedure gave a plausible estimate (significant at 8% level) of σ of 0.071 implying that consumers in Fiji are highly but not infinitely risk averse. To further investigate the sensitivity of the magnitude of σ, we assumed different values for λ in the range of 0.753 ± 0.2. The best results are obtained when λ was assumed to equal 0.9 and the results are given in row 5. It may be noted that both the magnitude and significance of σ have increased considerably. It is now significant at less than 5% level and implies a risk aversion coefficient of about 5. Although it is hard to place too much confidence in this estimate and conclude, for example, that in Fiji consumers are 50 times more risk averse than say in Japan, this is a useful insight because, compared to some previous estimates of σ for the advanced countries, our finding at least suggests that consumers are unlikely to infinitely risk averse even in a developing country like Fiji.

We have also estimated variants of equation (6) by replacing $\widehat{R}$ with the predicted values of the real short term rate of interest, $\widehat{r}s$, and real long term interest rate, $\widehat{r}l$. These equations are:

$$\Delta lnC_t = \mu + \lambda \Delta ln\widehat{Y}_t + (1-\lambda)\sigma_{rs}\widehat{r}s_t + \beta TDUM_t + \epsilon_t \qquad (7)$$

$$\Delta lnC_t = \mu + \lambda \Delta ln\widehat{Y}_t + (1-\lambda)\sigma_{rl}\widehat{r}l_t + \beta TDUM_t + \epsilon_t \qquad (8)$$

Estimates of equations (7) and (8), based on the procedures used

in Table-2, are given in rows of Table-3. While the equations with the short run interest rate performed well, equations with the long run rates gave highly insignificant estimates of the coefficients. It is noteworthy that estimates of λ and σ, in Table-3, are similar but smaller than in the corresponding equations in Table-2. Estimates of λ with the real short term rate of interest, in row 2, based on the unconstrained IV, imply that for about 63% of the Fiji consumers, current income is a constraint on current consumption. The estimate of the elasticity parameter σ_{rs}, although has the correct sign, is highly insignificant and became significant only in row 5 when λ is set to equal 0.9. However, its magnitude is far less than the corresponding estimate with R in Table-2, because, unlike R, rs does not capture the effects of credit availability. Estimates with the real long term rate are disappointing although λ is significant.

Equations in Table-2 with the availability of the credit variable seem to be preferable and on the basis of these results, it may be said that for about 75% to 90% of consumers in Fiji current income is a significant constraint on current consumption.

It is hard to decide which equation is the best because the differences in their SEEs are very small. However, the equations with rl, in rows 6 to 10 in Table-3, do not have much to commend. In the remaining equations, the equations with the smallest SEE are the last two in rows 4 and 5 of Table-2. However, the coefficients of the equation in row 5, with the constraint that $\lambda = 0.9$, are marginally more significant and its estimate of σ is higher, implying reasonable inference of the risk aversion coefficient. Therefore, it is our preferred equation.

5. CONCLUSIONS AND LIMITATIONS

This paper extended the Campbell-Mankiw framework to test the significance of PIH and simple Keynesian consumption hypotheses for a developing country. Our prefered equation implies that for about 90% in Fiji, current income is the main determinant of current consumption coraborating our initial conjecture that this proportion should be higher than the 50% estimate by Campbell and Mankiw for the USA and the $G7$ countries. Therefore, our paper lends additional support and wider applicability of the Campbell-Mankiw approach. We have also found that availability of credit pperformed better than the cost of

Table-3*

Estimates of the Campbell-Mankiw Equations for Fiji
1974–2002

	μ	λ	$(1-\lambda)\sigma$	σ_{rs}	TDUM	SEE
Estimates with the short run real rate of interest: Equation-7						
1. OLS	0.017	0.632	−0.002		−0.064	0.061
	(0.15)	(0.10)	(0.34)		(0.10)	
2. IV	0.021	0.631	0.004		−0.057	0.048
	(0.49)	(0.06)	(0.42)		(0.12)	
3. IV-NLLS[a]	-0.021	0.631		0.011	-0.057	0.048
	(0.71)	(0.06)		(0.57)	(0.12)	
4. IV-NLLS[b]	0.021	0.631		0.011	−0.057	0.047
	(0.44)			(0.38)	(0.11)	
5. IV-NLLS[c]	0.031	0.9		0.056	-0.059	0.047
	(0.03)			(0.04)	(0.00)	
Estimates with the long run real rate of interest: Equation-8						
	μ	λ	$(1-\lambda)\sigma$	σ_{rl}	TDUM	SEE
6. OLS	0.013	0.633	−0.003		−0.060	0.060
	(0.21)	(0.09)	(0.20)		(0.00)	
7. IV	0.004	0.530	−0.001		−0.058	0.048
	(0.79)	(0.10)	(0.87)		(0.12)	
8. IV-NLLS[a]	0.004	0.530		−0.002	-0.058	0.048
	(0.79)	(0.10)		(0.87)	(0.12)	
9. IV-NLLS[b]	- 0.004	0.530		−0.002	−0.062	0.047
	(0.77)			(0.87)	(0.11)	
10. IV-NLLS[c]	0.001	0.9		0.003	−0.062	0.049
	(0.937)			(0.96)	(0.09)	

*** Notes:**See the notes in Table-2.

credit in explaining consumption. Consumption taxes, like the GST, seem to have a significant but temporary negative effect on consumption expenditure.

Based on our work, we draw a few more catious conclusions. Simple Keynesian consumption equations, with appropriate modifications and

perhaps based on the time series methods of estimation, may be adequate to explain consumption in the developing countries like Fiji; see for example. Policies to change consumption expenditure by changing the direct tax rates are likely to be more effective than changes in the rates of the goods and services taxes, because the former changes current disposable income and the latter tax has only a transitory effect. Availability of credit seems to be more important as a monetary policy tool than changes in the cost of credit, brought through changes in the rate of interest. Therefore, targeting money supply may be more useful if the demand for money is not highly unstable in the developing countries.

It is hoped that our results will encourage further work in two directions. First, it will encourage, hopefully, further work on other developing countries to confirm or refute our finding that the proportion of the PI consumers, in a developing country, is much smaller than in the developed countries. Second, and equally hopefully, perhaps some attempts will be made to bring into the existing optimization models the role of the availability of credit, its and consequences for consumption smoothing patterns and estimates of more plausible consumer risk aversion coefficients.

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Data Appendix

C = Real per capita consumption deflated with CPI (1995 = 100).

Y = Real per capita disposable income, computed as $(1-t)GDP$ where tax rate t is computed as the proportion of the tax on labor and capital income. CPI is used as deflator.

rs = Short term rate of interest is the maximum commercial bank lending rate for short-to-medium term private sector borrowing.

rl = Long term rate of interest is 5 year government bond yields.

Real rates of interests are computed by deducting from nominal rates the rate of change in CPI.

TDUM = 1 in 1992 and 1993 and zero in other periods.

COUP = 1 during $1987, 1988, 1989, 2000$ and 2001 and zero in other periods.

Sources: International Financial Statistics (2003), IMF.

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