DOES SENTIMENT EXPLAIN CONSUMPTION[♣]?

WDA Bryant* and JE Macri**
Department of Economics
MACQUARIE UNIVERSITY NSW 2109
AUSTRALIA

Abstract

Carroll, Fuhrer and Wilcox (1994) studied the capacity of consumer sentiment to help explain the behaviour of consumption in the US. Their study was important for at least two reasons. Firstly, since household consumption accounts for about 80% of US GDP fluctuations in consumption may result in significant changes in the state of the macroeconomy. It is therefore important to develop models to explain and forecast consumption. In this regard Carroll, Fuhrer and Wilcox (1994) drew attention to the often-neglected variable ‘consumer sentiment’ and its potential role in explaining variations in consumption expenditure. Secondly, their finding that sentiment does indeed have explanatory power for consumption in the US has implications for theories of aggregate consumption, because at least one way of accounting for these findings involves some violation of the simplest certainty equivalence versions of the life-cycle and permanent-income theories.

The results of Carroll, Fuhrer and Wilcox (1994) raise important theoretical and empirical issues that deserve careful study. Our contribution to such study is twofold. Firstly, we develop a model that suggests theoretical reasons why consumer sentiment may influence consumption expenditure. Secondly, we consider empirically the question of an independent influence running from sentiment to consumption in the context of Australia using a carefully specified consumption function as the ‘test-bed’ for the analysis. We are motivated to do this because although the Carroll, Fuhrer and Wilcox (1994) analysis is stimulating, it is based on a relatively *ad hoc* specification of the aggregate consumption function, a specification that arguably suffers from omitted variable bias, something which may seriously weaken their findings. In this paper we find that consumer sentiment does have small independent explanatory power as far as aggregate consumption is concerned even when ‘standard’ macroeconomic variables are allowed to play their full role.

JEL Classification: C51, D24.

[♣]This research was supported by MURG 20523147 and we are very grateful for that support. We would also like to thank Don Harding and Elizabeth Webster at the Institute of Applied Economic and Social Research within the University of Melbourne for helpful comments at the outset of our research and Michael Grady and Lynne Stoddart for research assistance during the course of the project. The usual caveat concerning errors naturally applies. *email: tbryant@efs.mq.edu.au, **email: jmacri@efs.mq.edu.au.

1. Introduction

In an interesting and important study, Carroll, Fuhrer and Wilcox (1994) studied the capacity of an index of consumer sentiment to help explain the behaviour of various categories of consumption in the US. Their study was important for at least two reasons. Firstly, since aggregate household consumption accounts for 80% of US GDP, it follows that fluctuations in consumption may result in significant changes in the state of the macroeconomy, particularly as far as productive activity and employment are concerned[1]. It is therefore important to develop models that explain and forecast consumption, so that policy makers may be prepared to take the appropriate action in the event of likely sharp swings in consumption. In this regard Carroll, Fuhrer and Wilcox (1994) drew attention to the often-neglected variable 'consumer sentiment' and its potential role in explaining variations in consumption expenditure. On the face of it, consumer sentiment would seem to be an 'obvious' variable to include in any model of consumption. However, as Carroll, Fuhrer and Wilcox (1994) note, the inclusion of such a variable in a consumption function is only justified if it can be shown: (i) that there are theoretical reasons to believe that 'sentiment' may influence consumption behaviour, and (ii) that sentiment has empirical explanatory power over and above the explanatory power of the standard macroeconomic variables traditionally suggested by economic theory and regularly incorporated into empirical models of consumption. Secondly, using a relatively *ad hoc* specification of the aggregate consumption function, Carroll, Fuhrer and Wilcox (1994)

[1] As Muellbauer and Lattimore (1995) note, this is not an isolated statistic since household consumption accounts for between 50% and 80% of GDP in most countries of the world. It therefore follows that fluctuations in consumption may result in significant changes in the state of the macroeconomy, particularly as far as productive activity and employment are concerned in many countries.

explore the extent to which consumer sentiment influences consumption expenditures in the US. The authors find that variations in consumer sentiment do seem to be useful in explaining and forecasting fluctuations in various categories of consumption expenditure. This finding that sentiment seems to have empirical explanatory power as far as aggregate consumption is concerned, has implications for theories of consumption. This is so because at least one way of accounting for these findings: "… involve[s] some violation of the simplest certainty equivalence versions of the life-cycle and permanent-income theories; otherwise … sentiment would have no predictive power for future changes in spending." Carroll, Fuhrer and Wilcox (1994; p. 1398)[2].

The empirical results presented by Carroll, Fuhrer and Wilcox (1994) and similar studies[3], along with the implications for consumption theories that these results contain, raise important issues that deserve careful theoretical and empirical study. Our contribution to such a study is twofold. Firstly, we establish that it is possible to establish theoretical reasons why there might be an influence running from consumer sentiment to consumption expenditure. We do this by extending a model of consumer decision-making suggested by Benassy (1986). Secondly, we reconsider the empirical question raised by Carroll, Fuhrer and Wilcox (1994) of whether there is an independent influence running

[2] In light of their findings the authors examine the capacity of one particular model, the Campbell-Mankiw model, to rationalise their results. They find that the Campbell-Mankiw model is unable to make sense of their findings, something that they believe is also true of other leading models of consumption. In particular they argue: "… we believe that at least the simplest versions of other models may also have some difficulty explaining our results." Carroll, Fuhrer and Wilcox (1994; p. 1407).

[3] Other studies which also address this question in the context of the US economy include Mishkin (1978), Throop (1992), Matsusaka and Sbordone (1995), Bram and Ludvigson (1998). In the context of the UK economy the question has been studied by Acemoglu and Scott (1994) for Hong Kong by Fan and Wong (1998), for Canada by Angevine (1974), for Germany by Heilemann and Wenke (1993) and for South Africa by Stuart (1989).

from sentiment to consumption in fact, *once a carefully specified consumption function is developed and used as the 'test-bed' for the analysis*. We are motivated to do this because although the Carroll, Fuhrer and Wilcox (1994) analysis is stimulating, it is based on a relatively *ad hoc* specification of the aggregate consumption function, a specification that arguably suffers from omitted variable bias, something which, in the limit, may invalidate their findings.

In this paper a carefully specified model of aggregate consumption in Australia is used as the baseline against which consumer sentiment is tested for independent explanatory power. We are motivated to undertake this study for Australia because apart from the unpublished study by Ha (1995), there appears to be no systematic study of the question posed by Carroll, Fuhrer and Wilcox (1994) as far as the Australian economy is concerned[4].

In order to achieve our objectives the paper is organised as follows: Section 2 presents some preliminary data on the covariation of sentiment and consumption expenditure. It also provides some theoretical reasons why consumer sentiment and consumption expenditure may be connected. Section 3 discusses our empirical methodology and presents major empirical results. Section 4 presents some brief conclusions and suggestions for future research.

---

[4] The author describes her study as being essentially a replication of Carroll, Fuhrer and Wilcox (1994) when she writes: "I shall adopt a combination of techniques from Acemoglu and Scott (1994) and Carroll, Fuhrer and Wilcox (1994) and apply them to Australian data." Ha (1995; p. 3). In particular Ha (1995) uses essentially the same *ad hoc* specification of the consumption function as that used by Carroll, Fuhrer and Wilcox (1994) and is therefore subject to the same potential weakness as that study. While it is true that the financial press in Australia from time to time carries articles which speculate on the likely direction of consumption expenditure given the apparent state of consumer sentiment, such analyses, while useful, are no substitute for a careful and systematic study of the possible connection between consumer sentiment and consumption expenditure.

2. Some preliminary evidence and theory on sentiment and consumption

Reliable data on consumer sentiment is available in Australia from 1974 to the present. Our study therefore explores the relationship between consumer sentiment and aggregate consumption in Australia over the past twenty-five years. This is an interesting period of Australian economic history, covering as it does episodes of significant structural change and institutional reform along with large changes in inflation rates and unemployment. It is also a period during which both consumer sentiment (as measured by the Westpac-Melbourne Institute index of consumer sentiment) and aggregate real consumption expenditures have displayed considerable variation and apparent close correlation, as illustrated in Figure 1. This is similar to the situation observed by Carroll, Fuhrer and Wilcox (1994; p. 1398) for the US and suggests that a detailed exploration of a possible connection between consumption and sentiment in Australia might be as useful as those authors found it to be in the case of the US.

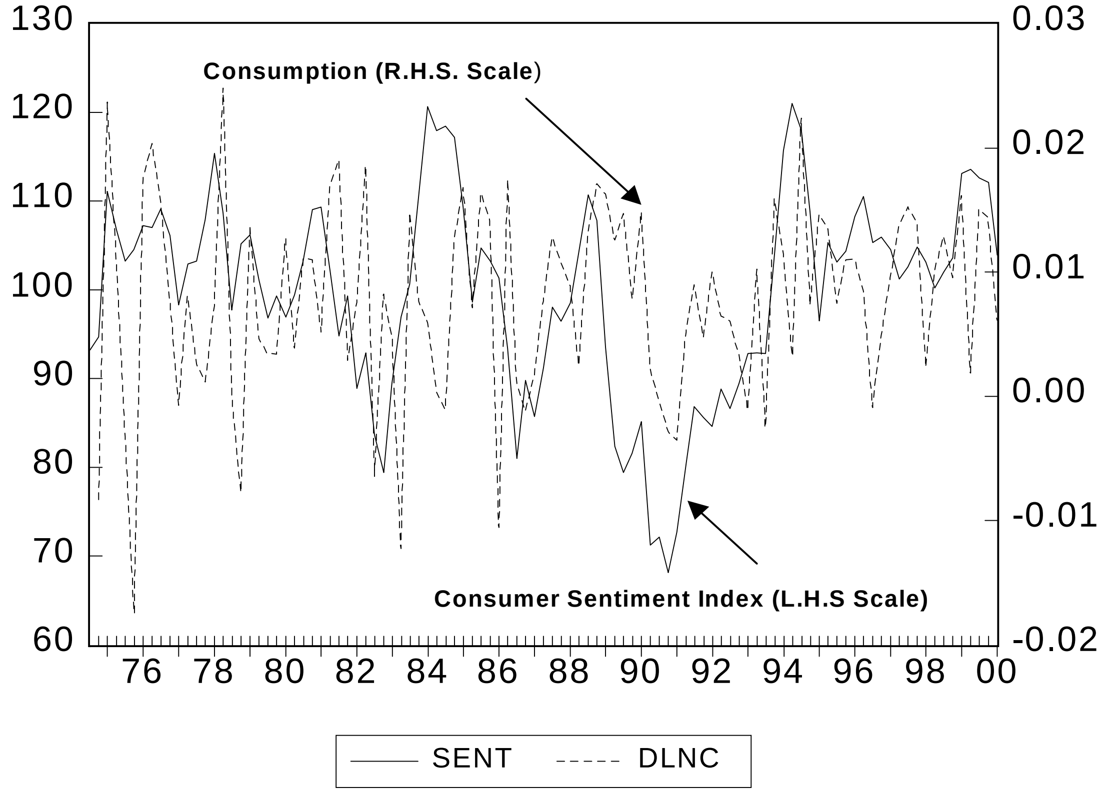


Figure 1: Consumer Sentiment Index and Percentage Changes in Aggregate Consumption

2.1 Sentiment and consumption in theory

In light of the apparent correlation between sentiment and consumption it is reasonable to ask if there are theoretical reasons why sentiment and consumption expenditure should be related. It is important to do this so that we can have some confidence that the picture presented in Figure 1. is not a mere artifact of the data.

One theoretical argument for a connection between sentiment and consumption may be found in the following extension of the macroeconomic model developed by Benassy (1986, pp. 27-29). Consider a consumer who lives for two periods, the 'present' and the ‘future’. Let variables reflecting the future have a superscript ‘e’ and let the unmarked case correspond to the current period. The consumer is endowed with quantities of labour l_0 and l^e_0 and has a utility function over present and future consumption of the form:

$$U(c, c^e) = \alpha \log c + (1 - \alpha) \log c^e \tag{1}$$

Let p^e and w^e be expected price of goods and expected money wages and let $\underline{c}^e$ *and* $\underline{l}^e$ be any quantity constraints which the consumer expects to encounter on the goods and labour markets in the future. Let δ^e be the expected profit distribution in the future. Assume that the consumer has consumed c in the present period and has saved an amount of money m. The optimal plan for future consumption is that plan which maximises utility subject to the price, wage and quantity constraints expected to be encountered in the future. The form of the utility function in (1) implies no disutility from labour. Therefore optimal consumption in the second period is the highest that can be attained while taking into account future constraints.

Thus, c^e is the solution to the following constrained optimisation problem:

$$\text{Max}_{ce}\ \alpha \log c + (1 - \alpha) \log c^e$$

$$\text{s.t. } p^e c^e \leq w^e l^e + \delta^e + m,\ l^e \leq l^e_0,\ l^e \leq \underline{l}^e,\ c^e \leq \underline{c}^e \tag{2}$$

Solving this problem yields the following expression for future planned consumption

$$c^e = \text{Min}\{ \underline{c}^e, [m + \delta^e + w^e \min (l^e_0, \underline{l}^e)]/p^e\} \qquad (3)$$

Substituting (3) into (1) yields the corresponding indirect utility function for this consumer

$$\alpha \log c + (1 - \alpha) \log (\text{Min}\{ \underline{c}^e, [m + \delta^e + w^e \min (l^e_0, \underline{l}^e)]/p^e\}) \qquad (4)$$

Let y^e denote expected future income and noting that $p^e y^e = \delta^e + w^e \min (l^e_0, \underline{l}^e)$, the indirect utility function in (4) can be written as:

$$\alpha \log c + (1 - \alpha) \log (\text{Min}\{ \underline{c}^e, [m/p^e + y^e]\}) \qquad (5)$$

Current consumption demands are obtained by maximising (5) subject to the budget constraint: $pc + m = py + \underline{m}$ and $m \geq 0$, where $\underline{m}$ is the money endowment of the consumer at the beginning of the present period. On the assumption that the consumer does not expect to be constrained in the goods market (a reasonable assumption in most Western economies) and that the $m \geq 0$ constraint is not binding, current consumption is given by:

$$c^* = \alpha (\underline{m}/p + y + p^e y^e/p) \qquad (6)$$

We now extend Benassy's model by incorporating consumer sentiment. To do this we suppose that consumer sentiment will improve if people believe that their economic circumstances, as represented by real income, is likely to rise in the future. This seems like a reasonable assumption considering the questions asked in the survey, which fixes the value of the consumer sentiment index in Australia, the US and other countries[5]. We formalise this idea as:

Assumption (S): Let *s* denote consumer sentiment in the current period. It is assumed that *s* is a monotonically increasing function of expected future income y^e so that $s = f(y^e)$ and $\partial f/\partial y^e > 0$.

Theorem. *If, (i) consumers make consumption decisions on the basis of (1) – (6); (ii) assumption S holds; (iii)* $\alpha > 0$, $p^e/p > 0$*; and (iv) consumers don't expect to be constrained in the goods market, then current consumption is a positive function of consumer sentiment. Further, under the same conditions, planned future consumption is an increasing function of current sentiment and if consumption plans are actually carried out, current consumption will be a function of lagged sentiment.*

Proof: (i) From equation (6), $\partial c^*/\partial y^e = \alpha p^e/p$.

[5] The questions on which the Westpac-IAESR Index of Consumer Sentiment are based are: 1. We are interested in how people are getting along financially these days. Would you say that you (and your family living there are better or worse off financially than a year ago? 2. Now looking ahead - do you think that you (and your family living there) will be better off financially or worse off, or just about the same as now? 3. Now turning to business conditions in the country as a whole - do you think that the next 12 months will have good times financially or bad times or what? 4. Looking ahead, which would you say is more likely - that the country as a whole will have continuous good times during the next five years or so, or that we will have periods of widespread unemployment or depression, or what? 5. About the big things that people buy for their homes - such as furniture, a refrigerator, stove, television and things like that. Generally speaking, do you think now is a good or bad time for people to buy major household items? See Throop (1992; p. 36).

Now $\partial c^*/\partial s = \partial c^*/\partial y^e . \partial y^e/\partial s = (\alpha p^e/p).(1/ f'(y^e))$

Since $\alpha > 0$ and $p^e/p > 0$ then Assumption S guarantees that $\partial c^*/\partial s > 0$.

(ii) From (3), $c^e = min\{\underline{c}^e, y^e\}$.

Since $\underline{c}^e$ is not binding, $\partial c^e/\partial s = \partial c^e/\partial y^e . \partial y^e/\partial s = 1.(1/ f'(y^e)) > 0$.

Remark. The condition that $\alpha > 0$ means that consumption has positive marginal utility (i.e. preferences are non-satiated). The condition that $p^e/p > 0$ means that consumption goods are not expected to be free in the future. Both of these conditions seem to be reasonable. The theorem therefore provides a reasonable theoretical rationalisation of a connection between consumer sentiment and consumption expenditure decisions. We now propose to see whether such a connection is empirically in Australia for the period 1974:Q3 to 2000:Q1.

3. Empirical methodology and results

In an attempt to discover whether variations in consumer sentiment can be used to explain and forecast changes in consumption in Australia we take essentially the same approach as Carroll, Fuhrer and Wilcox (1994) with one important difference, namely, we pay particular attention to obtaining an appropriate 'baseline' consumption function against which the contribution of sentiment to explaining consumption is measured[6].

[6] This step is crucial in any study which attempts to assess the explanatory and forecast capacity of an index of consumer sentiment because if the baseline consumption function is misspecified then the result of any variable addition test, such as that presented by Carroll, Fuhrer and Wilcox (1994), may generate spurious results.

Carroll, Fuhrer and Wilcox (1994, p.1399) begin by observing that a simple way to tell whether an index of consumer sentiment alone has any forecast ability "... is to examine the adjusted R^2's from regressions of the growth of various measures of household spending on lagged values of the [index of consumer sentiment]." To implement this methodology let $C_t \equiv$ aggregate real household consumption expenditure at t and $S_{t-i} \equiv$ the value of the sentiment index in period t-i. Then estimate the equation:

$$\Delta\log (C_t) = \alpha_0 + \sum_i \beta_i S_{t-i} + \varepsilon_t \qquad (7)$$

The results of a similar estimation for Australia are in presented in Table 1. The results in Table 1 indicate that contemporaneous and four lagged values of the sentiment index account for about 2.9% of the one-quarter-ahead variation in the growth of total real household consumption expenditure over the whole sample period. An examination of the data however reveals some very aberrant changes in consumption in the late 1980's and early 1990's, something noticed also by Carroll, Fuhrer and Wilcox (1994) for the US. If the sample is split at about that time, then over the period 1975:3-1990:4 the contemporaneous and four lagged values of the sentiment account for 0.08 per cent of the one-quarter-ahead variation in the growth of total real household consumption expenditure and over the period 1991:2-2001:1, 12 percent of the one-quarter-ahead variation in the growth of total real household consumption expenditure. These results are comparable with those reported by Carroll, Fuhrer and Wilcox (1994; p. 1400 Table 1).

For their whole sample period 1955:1-1992:3 report adjusted-R^2 for an estimate of equation (7) of 0.14 and for the sub-period 1978:1-1992:3 and adjusted-R^2 drops to 0.05.

TABLE 1. ***Reduced form evidence: R(bar)^2's from simple prediction equations of the form:*** $\Delta log\ (C_t) = \alpha_0 + \sum^4_0 \beta_i S_{t-i} + \sum^4_0 \gamma_i \Delta S_{t-i}\ \varepsilon_t$

Dependent Variable		Δlog (C_t)				
α_0	-0.0138	-0.00760	0.00783	0.00770	-0.0138	-0.007
S_t	0.00005					
S_{t-1}	0.00008					
S_{t-2}	0.00004	0.00014				
S_{t-3}	-0.00012	0.00001				
S_{t-4}	0.00015					
ΔS_t			-0.00543		0.00006	
ΔS_{t-1}			0.00174	0.00325	0.00014	
ΔS_{t-2}			0.01308	0.00819	0.00004	0.0001
ΔS_{t-3}			-0.00274		-0.00012	0.0001
ΔS_{t-4}			-0.00274		-0.00016	
			Sample period 1975:3 - 2000:1			
adj-R^2	0.029	0.033	-0.019	-0.019	0.029	0.033
			Sample period 1975:3 – 1990:4			
adj-R^2	0.0008					
			Sample period 1991:2 - 2000:1			
Adj-R^2	0.12					

Our results for the overall period while not as strong as those of Carroll, Fuhrer and Wilcox (1994) for their whole sample, are much better for the sub-periods than those reported by them, and suggest that further examination of the relationship between sentiment and consumption is worthwhile.

In order to do this we follow Carroll, Fuhrer and Wilcox (1994) who note that while it is an interesting to know how much variation in consumption can be explained by variations in sentiment alone, a more interesting question to ask is: "... whether the sentiment index has any predictive ability *once one controls for information contained in other variables* available to economic forecasters." Carroll, Fuhrer and Wilcox (1994; p. 1400, emphasis added). Answering this question provides the major empirical results of their study and is achieved by estimating the equation:

$$\Delta\log (C_t) = \alpha_0 + \sum_i \beta_i S_{t-i} + \gamma Z_{t-1} + \varepsilon_t \qquad (8)$$

In equation (8), C_t and S_{t-i} are as before and Z_t is a vector of 'other variables' which would make (8) a 'properly specified' aggregate consumption function. Commenting on what these 'other variable' might be and the procedure behind their selection, Carroll, Fuhrer and Wilcox (1994) somewhat casually remark that: "[o]f course, the choice of *which other variables to include in the equation is inherently arbitrary*." Carroll, Fuhrer and Wilcox (1994; p. 1400, emphasis added). In the event, Carroll, Fuhrer and Wilcox (1994) included just four lags of the dependent variable along with lags in the growth of real labour income as the other explanatory variable. This selection of control variables, although crucial for the investigation and the validity of their subsequent empirical results, is guided by little or no economic or econometric theory. One of the crucial steps in the Carroll, Fuhrer and Wilcox (1994) is therefore taken in an *ad hoc* manner, a fact that has the potential to significantly weaken their major conclusion which is that: " ...some – but not all - of the information in the [sentiment variable] is held in common with the control variables [and that] sentiment likely has some (though probably not a great deal) of incremental predictive power relative to *at least some* other indicators for the growth of spending …" Carroll, Fuhrer and Wilcox (1994; p. 1401). This conclusion is subject to the important caveat that if the control variables are not carefully selected to give a properly specified consumption function in the first place then the results of a variable addition test of the sort presented by Carroll, Fuhrer and Wilcox (1994) may be misleading. On the other hand, if it is the case that when the controls are carefully specified it is still the case that sentiment has some independent explanatory power, then the results presented by Carroll, Fuhrer and Wilcox (1994) are reinforced and case made by against standard consumption theories, which do not allow for sentiment, is considerably strengthened.

Motivated by this observation, we now attempt to specify an appropriate baseline consumption function for Australia against which to assess the independent significance of sentiment as a variable in determining consumption. We do this in order to arrive at a more secure conclusion about the role of sentiment in determining consumption than is possible using a relatively *ad hoc* and potentially misspecified model of consumption.

3.1 An Australian consumption function

Work on specifying an Australian consumption has a long history starting at least with Arndt and Cameron (1957) and moving through Madden and Rutledge (1974) to Lattimore (1994), Muellbauer and Lattimore (1995), Moosa (1996), Moosa and Kennedy (1998) and The Australian Treasury (1995). Arndt and Cameron (1957), Madden and Rutledge (1974), Lattimore (1994), Muellbauer and Lattimore (1995) are all concerned with selecting the appropriate economic variables to explain aggregate Australian consumption. Summarising this line of work Lattimore (1994) and Muellbauer and Lattimore (1995) argue that the following variables should appear in any fully developed consumption function: real disposable income, forecast of income growth, a measure of income uncertainty, wealth, real interest rates and demographic variables. Moosa (1996) and Moosa and Kennedy (1998) are concerned to get the dynamic specification of the consumption function correct so that a structural stability of consumption relationship is assured. They do this by modeling the stochastic seasonality of Australian consumption and income data and arrive at an equation, which when estimated for the period 1959:3 to 1993:3 yields a structurally stable consumption equation which accounts for about 86% of the variance in consumption over the period. However getting the dynamics right is only a first step in obtaining a properly specified consumption function and as Moosa (1996) remarks it would be interesting to estimate a full-fledged Australian consumption function using the sorts of variables considered by Arndt and Cameron (1957), Madden and Rutledge (1974), Lattimore (1994), Muellbauer and Lattimore (1995).

The econometric concerns of Moosa *et al.* and the theory insights of Lattimore *et al.* have to a large extent been brought together in the recently specified model of aggregate consumption due to the Australian Treasury. The Treasury consumption equation which, will be used as the test-bed consumption function in our study, is:

$$\Delta\log(con_t) = grc_t + (qdemc_t - qdemc_{t-1}) + a_0\{\log(c_0) + \log[(ynz_t/pcon_t) + c_1(vmz_{t-1}/pcon_t)] + \log[qdemc_{t-1}] - grc_t - \log(con_{t-1})\} + a_1(rnu_t - rnu_{t-1}) + a_2\{\log(ynz_t/ynz_{t-1}) - \log[pcon_t/pcon_{t-1}] - grc_t\} \quad (9)$$

where the terms in the equation are defined as follows:

$\Delta\log(con)$ = the log change in real consumption

log(con) = log level of real consumption

qdemc = is a dummy variable to capture demographic effects

ynz = nominal after-tax labour income

vmz = nominal private sector wealth

rnu = the unemployment rate

grc = the long-run (steady state) growth rate of real consumption

a_0, a_1, a_2, c_0 and c_1 are parameters and $a_0\{\log(c_0) + \log[(ynz/pcon) + c_1(vmz_{-1}/pcon)]$ is a long-run error correction term, where c_0 is the long-run propensity to consume out of labour income and wealth and c_1 is the long-run rate of return on wealth.

As Gardner (1995) notes the specification chosen here is consistent with both the Life-Cycle Hypothesis and the Permanent Income Hypothesis. According to both hypotheses consumers choose their consumption in each period in order to maximise their lifetime utility subject to an intertemporal budget constraint. As is well known, the assumption of utility maximisation and perfect capital markets means that under both theories consumption depends on total lifetime resources and income fluctuations in individual periods will not influence consumption. Empirical testing has indicated that naïve versions of the LC-PIH models are generally not successful in the Australian context and that other variables need to be incorporated into models that successfully explain consumption behaviour. This experience plus the desire to ground the consumption equation on a LC-PIH base, lead to the inclusion of the following variables in the TRYM consumption equation: labour income, demographic structure, non-human wealth, inflation, interest rates, transfer payments and unemployment. As Gardner (1995) also observes: “Confidence effects may also affect consumption. This is likely to be particularly important for the purchase of consumer durables … [because] unemployment is often associated with low consumer confidence [TRYM] include[s] a change in unemployment term to capture confidence effects.” Gardner (1995; p.14). In our work we model confidence effects directly through a consumer sentiment index rather than using the unemployment as a proxy for that effect. It is important to note however that unemployment is retained in our estimating equation, since as was noted above we are interested in checking the existence of an *independent* role for sentiment once the traditional influences on consumption have been allowed for.

3.2 Preliminary data analysis

We begin with some preliminary analysis of the data to be used in the estimated equation. We perform tests to determine the stationarity properties of the data, something, which is important in time series analysis, and something not reported by Carroll, Fuhrer and Wilcox (1994) in their study. We also visually display the data (see Appendix 3).

TABLE 2. Augmented Dickey Fuller and Phillips – Perron Unit Root Tests

		Stationary around a Deterministic Trend	Stationary in first differences
Sentiment	ADF	-7.331673	-7.353011
	P-P	-8.558555	-8.566358
Unemploy	ADF	-4.215901	-4.068446
	P-P	-6.280058	-6.159427
Steady state	ADF	-4.298195	-3.785460
Consumption	P-P	-13.81009	-13.58126
Wealth	ADF	-3.892521	-3.701554
	P-P	-7.967623	-7.880248
Income	ADF	-4.930096	-4.492672
	P-P	-12.88279	-12.54621
Consumption	ADF	-4.698778	-4.673209
	P-P	-10.37434	-10.31235
Price index	ADF	-2.613358	-2.016277
	P-P	-5.179289	-4.463541
Demographic	ADF	-2.672160	-1.509402
	P-P	-2.486128	-1.370575

*The critical values for the Augmented Dickey Fuller and the Phillips Perron tests at the 5% level of significance with trend are -3.4548 and –3.4561 respectively and without trend are –2.8925 and –2.8900 respectively.

3.4 Estimating the relationship between consumption and sentiment

Given the stationarity properties of the data it is reasonable to estimate equation (9) for the period 1974:4 to 2000:1 using non-linear least squares yields the parameter estimates and summary statistics in Table 3.

TABLE 3. *Parameter estimates of the baseline consumption equation 1974:4 to 2000:1*

Parameter	Interpretation	Estimate	Standard error	t-ratio
a_0	partial adjustment	0.15310	0.030484	5.0225
c_0	long run constant	0.67094	0.030747	21.822
c_1	return on wealth	0.02234	0.002907	7.6868
a_1	Δ in unemployment	-0.0056	0.001695	-3.2963
a_2	labour income growth	0.11495	0.053771	2.1379

$AR^2 = 0.344$
Durbin-Watson statistic = 2.2062

The summary statistics indicate that this equation is reasonably well determined and considering its foundations in economic theory and econometrics it seems to be an adequate base against which to assess the independent contribution (if any) of sentiment in explaining consumption expenditure. Following the approach in Carroll, Fuhrer and Wilcox (1994) we therefore estimate this consumption function but with the sentiment variable added in. In particular we estimate:

$$\Delta\log(con_t) = grc_t + (qdemc_t - qdemc_{t-1}) + a_0\{\log(c_0) + \log[(ynz_t/pcon_t) + c_1(vmz_{t-1}/pcon_t)] + \log[qdemc_{t-1}] - grc_t - \log(con_{t-1})\} + a_1(rnu_t - rnu_{t-1}) + a_2(\log(ynz_t/ynz_{t-1}) - \log[pcon_t/pcon_{t-1}] - grc_t) + a_3dsent_t + a_4dsent_{t-1} + a_5dsent_{t-2} + a_6dsent_{t-3} \qquad (10)$$

where all the previously defined variables are as before, sent ≡ the Westpac-CAI index of consumer sentiment and $dsent_t = (sent_t - sent_{t-1})$. The results of this estimation are presented in Table 3.[7]

TABLE 4. *Sentiment in an Australian consumption function 1974:4 to 2000:1*

Parameter	Interpretation	Estimate	Standard error	t-ratio
a_0	partial adjustment	0.16185	0.03324	4.8700
c_0	long run constant	0.67762	0.05135	13.196
c_1	return on wealth	0.02235	0.00279	7.9829
a_1	Δ in unemployment	-0.00579	0.00215	-2.6871
a_2	labour income growth	0.09781	0.05635	1.7358
a_3	Δ in sentiment	0.00012	0.00011	1.0225
a_4	Δ in sentiment lagged once	-0.00012	0.00009	-1.3052
a_5	Δ in sentiment lagged twice	0.00017	0.00009	1.9249
a_6	Δ in sentiment lagged thrice	-0.00007	0.00006	-1.0718

$AR^2 = 0.358$
Durbin-Watson statistic = 2.1488

There are at least two interesting things about the results in Table 3. Firstly, the significance of the a_5 coefficient is striking. This is the coefficient on the two-quarter lag in changes in sentiment and its significance and positive sign means that changes in sentiment seem to predict changes in aggregate consumption expenditures. So the answer to the first question asked by Carroll, Fuhrer and Wilcox (1994) is 'yes, for this sample of Australian data, sentiment seems to help forecast consumption'. It is also interesting to note that the statistical significance and positive sign of a_5 is consistent with the

[7] Notice that our specification of the consumption function contains the unemployment rate as an explanatory variable, unlike the function used by Carroll, Fuhrer and Wilcox (1994). As unemployment is often thought to significantly influence sentiment and is often used as a proxy of that variable if we find a contribution of sentiment even in that case we would have a very significant result.

theoretical model developed in Section 2 of this paper, particularly with part (ii) of the theorem proved there. This finding also supports the contention in Carroll, Fuhrer and Wilcox (1994; p. 1398) that aggregate consumption behaviour is not well explained by the simplest certainty equivalent versions of the life-cycle and permanent income theories of consumption. If these theories were true then a_5 would be statistically insignificant.

Secondly, there is the 1.4% increase in adjusted R^2 achieved as a result of the inclusion of the sentiment variable in the Treasury equation for aggregate Australian consumption. While this is not exactly comparable with the 3% increase in the adjusted R^2 reported by Carroll, Fuhrer and Wilcox (1994; Table 1) for the US, because our consumption equation is non-linear while theirs is linear, it is interesting that the results are of similar orders of magnitude. Thus it seems reasonable to conclude with them that: "[e]vidently, some – but not all – of the information in [sentiment] is held in common with the control variables [meaning that] sentiment likely has some (though probably not a great deal) of *incremental* predictive power relative to at least some other indicators for the growth in spending". Carroll, Fuhrer and Wilcox (1994; p. 1401). It is also interesting to note that our results support a conjecture of Keynes that variations in consumer sentiment are unlikely to have a large impact on actual consumption behaviour when he wrote: "… *Changes in expectations of the relation between the present and the future level of income.* We must catalogue this factor for the sake of formal completeness. But, whilst it may affect considerably a particular individual's propensity to consume, it is likely to average out for the community as a whole. Moreover, it is a matter about which there is as a rule, too much uncertainty for it to exert much influence." Keynes (1936; p. 95).

Because we have been somewhat more careful in our specification of the test-bed consumption function and the 'other indicators for growth in spending' than Carroll, Fuhrer and Wilcox (1994) were, we can be more confident in the conclusion that sentiment is likely to have some independent, if small, predictive and explanatory power as far as changes in consumption spending is concerned.

4. Conclusion

The results of our investigation of the connection between sentiment and household consumption expenditure in Australia strengthen and confirm the results presented by Carroll, Fuhrer and Wilcox (1994) of an independent predictive and explanatory role for consumer sentiment in explaining aggregate Australian consumption. As Carroll, Fuhrer and Wilcox (1994) note, these findings, as well as being of empirical and policy interest, also raise important theoretical issues, since permanent income and life-cycle models of consumption are unable to account for the influence of sentiment on consumption. Empirically exploring the sorts of models that are able to account for the influence of sentiment on consumption, such as the model developed in Section 2 of this paper, is obviously one direction for future research. There are many others including the following: What is it that influences sentiment? Do the results found about the sentiment-consumption connection apply also the connection between sentiment and variations in the growth rate of GDP? What is the relative information content of different available indices of consumer sentiment? Does the inclusion of an index of consumer sentiment in a system of demand equations help fit and regularity which is often a problem for such systems?

Whatever the outcome of research on these and other questions it is clear that the Carroll, Fuhrer and Wilcox (1994) study was important and successful in drawing attention to the often overlooked sentiment variable in explaining consumption. Our work has attempted to contribute to the research effort stimulated by them, and by paying particular attention to the specification of a credible set of control variables against which the influence of sentiment can be gauged, our results have reinforced their basic message that changes in sentiment are able to help explain the behaviour of consumption.

REFERENCES

Acemoglu, D. and A. Scott (1994), "Consumer Confidence and Rational Expectations: Are Agents' Beliefs Consistent with the Theory?, *The Economic Journal*, Vol. 104 (422), January, pp. 1-19.

Angevine, G E. (1974), "Forecasting consumption with a Canadian consumer sentiment measure", *Canadian Journal of Economics /Revue canadienne d'Economique*, Vol. VII, No.2. May, pp. 273-289.

Arndt, H. W. and B. D. Cameron (1957), "An Australian consumption function", *Economic Record*, Vol. 33, April, pp. 108-115.

Australian Treasury (1995), *TRYM Model of the Australian Economy*. AGPS: Canberra.

Bram J. and S. Ludvigson (1998), "Does consumer confidence forecast household expenditure? A sentiment index horse race", *Federal Reserve Bank of New York Economic Policy Review Paper,* Vol 4 (2), pp.59-78.

Benassy, J-P. (1986), *Macroeconomics: An introduction to the non-Walrasian approach*, Academic Press, New York.

Carroll, C. D., J. C. Fuhrer and D. W. Wilcox (1994), "Does consumer sentiment forecast household spending? If so, why?", *American Economic Review,* Vol. 84, (5), December, pp. 1397-1408.

Dickey, D.A. and W.A. Fuller (1979), " Distributions of the Estimators for Autoregressive Time Series with a Unit Root", *Journal of the American Statistical Association*, 74, pp.427-431/

Fan, C. S. and P. Wong (1998), "Does consumer sentiment forecast household spending? The case of Hong Kong", *Economics Letters*, 58, pp. 77-84.

Gardner, R., (1995), "Consumption and saving in the TRYM model", paper presented at *24th Conference of Economists, Adelaide S.A., September* pp. *24-27*.

Ha, V. (1995), "Examining the link between Consumer Sentiment and Consumption: An Application to Australia", *Unpublished MEc Thesis, University of Melbourne*.

Heilemann, U. and M. Wenke (1993), "Attitudes and Consumption in a FGR Macroeconometric Model Context", *Konjunkturpolitik*, Vol. 39 (4), pp. 226-250.

Jennings, E. J., and P. McGrath (1994), "Consumer Sentiment and International Conditions", *Journal of Economics*, Vol 20 (2) Fall, pp. 17-21.

Lattimore, R. (1994), "Australian Consumption and Saving", *Oxford Review of Economic Policy*, Vol. 10 (2), Summer, pp. 54-70.

MacKinnon, J.G. (1991) "Critical Values for Cointegration Tests," Chapter 13 in Long-run Economic Relationships: Readings in Cointegration, edited by R.F.Engle and C.W.J. Granger, Oxford University Press.

Matsusaka, J. G. and A. M. Sbordone (1995), "Consumer Confidence and Economic Fluctuations", *Economic Inquiry*, Vol. XXXIII April, pp. 296-318.

Madden, G. M. and D. J. S. Rutledge (1974), "The Australian Short-Run Consumption Function: A Comment", *Economic Record*, Vol. 50 (130) pp. 287-295.

Mishkin, F., (1978), "Consumer Sentiment and Spending on Durable Goods", *Brookings Papers on Economic Activity*, Vol 1, pp. 217-231.

Moosa, I. (1996), "On the specification of the Australian Consumption Function", *Australian Economic Papers*, Vol. 34 (65), pp. 263-276.

Moosa, I. and P. Kennedy (1998), "Modelling Seasonality in the Australian Consumption Function", *Australian Economic Papers*, March, Vol. 37 (1) pp. 88-102.

Muellbauer, J. and R. Lattimore, (1995), "The Consumption Function: A Theoretical and Empirical Overview" in M. H. Pesaran and M. Wickens (eds.) *Handbook of applied Econometrics*, London, Blackwell, pp. 221-311.

Phillips, P. C. B. and P. Perron, (1988), "Testing for a unit root in time series regression", *Biometrika*, 75, pp. 335-346.

Throop, A. W. (1992), "Consumer sentiment: Its causes and effects", *Federal Reserve Bank of San Francisco Economic Review*, Vol 0 (1) pp. 35-59.

APPENDIX 1: DATA DESCRIPTION

The variables used in this study and their definitions are listed below.

Sentiment (sent)

The index used here is the Westpac-Institute of Applied Economic and Social Research measure of consumer sentiment. This data series was downloaded from the Reserve Bank of Australia (RBA) web page (http://www.rba.gov.au/).

Consumption (con)

This variable is Total Private Real Consumption and is equal to net expenditure on goods and services for the purpose of consumption by persons and non-profit organisations serving households. This item excludes the purchase of dwellings and capital expenditure by unincorporated businesses and non-profit organisations and maintenance of dwellings, but includes personal expenditure on motor vehicles and other durable goods and the imputed rent of owner-occupied dwellings. The Australian Bureau of Statistics Catalogue Reference is 5206.0.

Income (ynz)

This variable is Total Labour Income and is calculated as civilian and defence force employment multiplied by average earnings, less income tax, plus personal benefits paid to residents and grants to non-profit institutions, less fees and fines. The Australian Bureau of Statistics (ABS) Catalogue Reference is 5206.0.

Wealth (vmz)

This variable is Private Wealth at Market Value and the five components of wealth are: stock of dwellings; business assets (adjusted for overseas holdings of domestic assets and Australian holdings of foreign assets: non-official holdings of government bonds and non-official holdings of currency. For details of compilation methodology see Reserve Bank of Australia (RDP) Discussion Paper 9109.

Price Deflator (pcon)

This variable is Private Consumption Prices and is calculated as the ratio of the current price to the constant price series for each variable included in the 'con' series. For details of the weighting see The Australian Bureau of Statistics (ABS) Catalogue Reference is 5206.0.

Unemployment rate (rnu)

This variable is unemployment rate and is equal to unemployed persons as a percentage of the workforce. The Australian Bureau of Statistics Catalogue Reference is 6203.0.

Demographic effects (qdemc)

The demographic variable used here is obtained by stratifying the population into four age groups: people between 20 and 34; people between 35 and 44; people between 45 and 64 and people aged over 65. The variable is an index of the relative shares of each group in the total population.

Steady state consumption (grc)

This is calculated by solving the entire model and working out the steady state consumption growth rate on the assumption that the economy was in a steady state at the time.

APPENDIX 2: DATA LISTING:

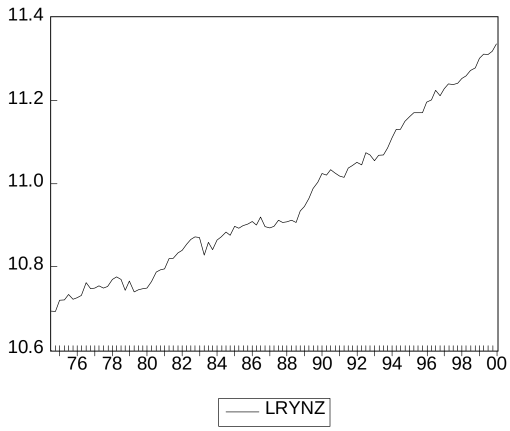
The table below contains a list of the data used in this study organised by year and under the appropriate mnemonic category.

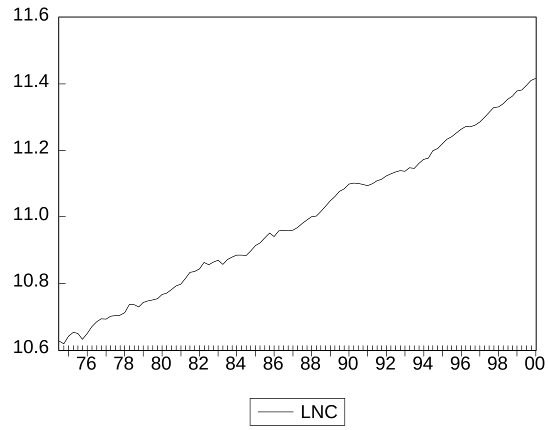
CON	YNZ	VMZ	PCON	RNU	QDEMC	GRC	SENT
41215.00	9493.38	201858.84	0.22	2.78	1.005723	0.003316	93.20
40873.00	9955.38	206020.30	0.23	3.82	1.006059	0.002993	94.70
41852.00	10501.96	218287.84	0.23	4.64	1.006395	0.002313	111.10
42316.00	10893.52	223766.41	0.24	4.94	1.006731	0.002600	106.70
42178.00	11413.07	225432.45	0.25	4.84	1.007105	0.001630	103.20
41447.00	11898.10	238743.50	0.26	5.31	1.007479	0.001303	104.50
42176.00	12283.06	253405.45	0.27	4.71	1.007853	0.001727	107.20
43043.00	12667.17	256941.50	0.28	4.61	1.008227	0.000700	107.00
43720.00	13336.11	265508.69	0.28	4.98	1.008435	0.002239	109.10
44065.00	13586.98	268132.81	0.29	4.87	1.008644	0.000623	106.10
44033.00	13919.59	277452.81	0.30	5.13	1.008853	0.001762	98.30
44390.00	14332.01	284041.81	0.31	5.75	1.009061	0.001785	102.90
44505.00	14579.16	286573.34	0.31	5.88	1.009636	0.001659	103.20
44557.00	15000.17	297938.81	0.32	5.95	1.010211	0.002474	107.90
44883.00	15414.08	308379.75	0.32	6.68	1.010785	0.005378	115.40
46012.00	15862.56	312069.81	0.33	6.22	1.011360	0.004904	108.60
46001.00	16085.99	322582.16	0.34	6.49	1.012268	0.005682	97.70
45646.00	16193.34	331709.69	0.35	6.35	1.013176	0.006210	105.20
46280.00	16826.53	345024.25	0.36	6.29	1.014084	0.005411	106.20
46495.00	16743.34	354896.59	0.36	6.21	1.014992	0.006693	101.10
46654.00	17276.60	367817.00	0.37	6.11	1.015361	0.006011	96.80
46812.00	17702.20	386544.50	0.38	6.06	1.015730	0.007189	99.30
47409.00	18276.64	410698.09	0.39	6.03	1.016099	0.006011	96.90
47593.00	18960.21	424571.00	0.40	6.25	1.016468	0.006559	99.40
48124.00	19864.06	450054.31	0.41	6.17	1.016974	0.007234	103.20
48655.00	20396.29	464735.69	0.42	5.87	1.017480	0.007211	109.00
48906.00	20946.87	491866.00	0.43	5.65	1.017986	0.007961	109.30
49744.00	21878.76	509115.09	0.44	5.59	1.018491	0.008326	101.90
50700.00	22383.30	506490.50	0.45	5.85	1.018585	0.008433	94.80
50847.00	23275.17	517660.09	0.46	6.01	1.018678	0.008455	99.30
51232.00	23945.82	516002.41	0.47	6.36	1.018771	0.009165	88.90
52192.00	24900.74	521295.69	0.48	6.60	1.018865	0.008193	92.90

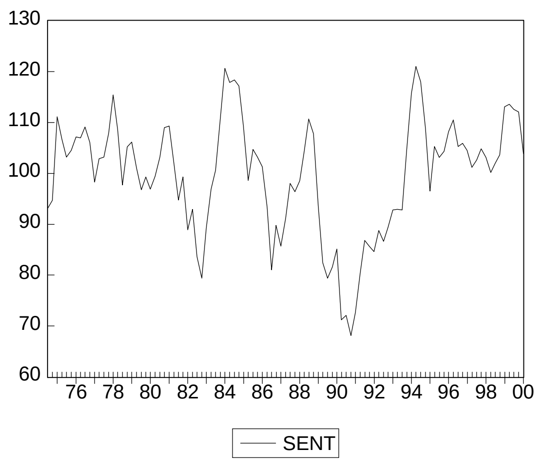
51858.00	26008.07	524933.630.50	7.01	1.019128	0.008419	83.60
52287.00	26863.66	539265.190.51	8.71	1.019392	0.007888	79.40
52535.00	27379.18	552186.380.52	9.71	1.019655	0.007985	89.30
51894.00	26760.39	574564.130.53	10.33	1.019919	0.008063	96.90
52667.00	27963.36	594948.630.54	10.22	1.019822	0.007848	100.60
53070.00	28106.08	623122.130.55	9.68	1.019726	0.007215	110.90
53386.00	29161.88	648660.500.56	9.43	1.019630	0.007707	120.60
53404.00	29754.18	660212.190.56	8.95	1.019534	0.007784	117.90
53347.00	30498.07	686679.130.57	8.84	1.019577	0.008057	118.40
54026.00	30684.35	697722.310.58	8.70	1.019620	0.008242	117.20
54942.00	31750.08	724856.880.59	8.43	1.019662	0.008038	109.30
55335.00	32393.72	743152.690.60	8.39	1.019705	0.008738	98.60
56247.00	33269.27	772339.560.62	8.17	1.019650	0.008666	104.70
57047.00	33900.31	803530.380.62	7.98	1.019595	0.008874	103.20
56448.00	34682.98	828931.630.63	8.05	1.019539	0.009043	101.30
57440.00	34926.56	825663.810.65	7.86	1.019484	0.008816	93.40
57500.00	36555.89	852346.380.66	8.26	1.019220	0.009431	81.00
57432.00	36390.78	912520.380.68	8.34	1.018957	0.010165	89.80
57531.00	37085.23	976310.380.69	8.25	1.018693	0.009639	85.70
57972.00	37938.02	1022922.880.70	8.20	1.018430	0.009772	91.20
58719.00	39291.49	1119173.750.72	8.12	1.018283	0.009220	98.00
59351.00	39805.27	1052404.750.73	7.96	1.018137	0.009173	96.40
59883.00	40733.58	1022102.380.75	7.45	1.017991	0.009630	98.50
60030.00	41604.46	1102009.750.76	7.43	1.017845	0.009298	104.30
60820.00	41836.57	1190095.250.77	7.08	1.017459	0.009633	110.70
61870.00	43651.78	1261798.750.78	6.64	1.017072	0.009593	107.80
62884.00	44861.34	1339829.500.79	6.66	1.016686	0.009614	93.50
63679.00	46438.28	1360447.880.80	6.25	1.016300	0.009260	82.40
64624.00	48040.85	1423791.000.81	5.96	1.015992	0.009139	79.40
65132.00	49331.13	1434107.880.82	5.82	1.015684	0.009055	81.60
66103.00	51006.83	1436652.250.83	6.41	1.015377	0.008817	85.10
66246.00	51865.72	1411976.130.85	6.48	1.015069	0.008786	71.20
66223.00	53353.91	1420008.630.86	7.23	1.014512	0.009056	72.10
66035.00	53933.64	1375522.750.88	7.96	1.013956	0.008539	68.10
65802.00	54100.26	1389245.380.89	8.61	1.013399	0.007660	72.70
66143.00	54047.95	1432541.000.89	9.50	1.012843	0.007786	80.40
66739.00	55791.39	1476876.750.90	9.77	1.012352	0.007259	86.80
67055.00	56527.09	1498942.380.90	10.22	1.011861	0.007285	85.60
67729.00	57007.09	1502935.750.90	10.47	1.011370	0.007096	84.60
68166.00	57081.00	1521560.130.91	10.76	1.010880	0.007063	88.80
68576.00	59096.72	1509542.500.92	10.88	1.010321	0.006857	86.60
68807.00	59079.67	1493366.000.92	11.04	1.009762	0.006375	89.40
68731.00	58893.00	1552341.250.93	11.03	1.009203	0.006520	92.80
69437.00	59796.64	1583068.380.93	10.90	1.008645	0.006260	92.90
69261.00	60261.65	1628718.880.94	11.05	1.008177	0.005966	92.80
70371.00	61508.87	1692404.130.94	10.85	1.007710	0.005968	104.40
71180.00	62979.75	1749148.130.94	10.38	1.007243	0.006563	115.70
71407.00	64501.75	1740016.000.95	9.89	1.006776	0.006066	121.00
73025.00	64477.04	1762674.000.94	9.46	1.006353	0.006308	118.00
73564.00	65853.45	1758614.000.95	9.15	1.005931	0.006266	108.80

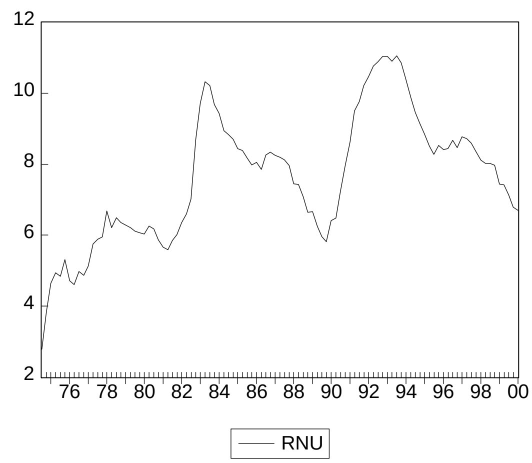
74649.00	66958.66	1783211.25	0.95	8.85	1.005508	0.006310	96.50
75661.00	68205.94	1815354.38	0.96	8.51	1.005086	0.006637	105.30
76227.00	68660.81	1851777.13	0.97	8.28	1.004590	0.006214	103.10
77067.00	68913.30	1871057.88	0.97	8.53	1.004095	0.006513	104.30
77921.00	70820.05	1916225.25	0.97	8.41	1.003599	0.006740	108.20
78582.00	71552.97	1948494.38	0.98	8.44	1.003104	0.006586	110.50
78511.00	73339.08	1972625.50	0.98	8.67	1.002615	0.006384	105.30
78904.00	72902.43	2027687.13	0.99	8.46	1.002127	0.006315	105.90
79656.00	74443.48	2075476.25	0.99	8.77	1.001638	0.006177	104.50
80764.00	75330.19	2143877.50	0.99	8.71	1.001150	0.006236	101.20
82004.00	75584.63	2210954.75	1.00	8.59	1.000690	0.006125	102.60
83158.00	76023.13	2195616.25	1.00	8.35	1.000230	0.006190	104.80
83352.00	77179.27	2275221.25	1.00	8.11	0.999770	0.005984	103.10
84200.00	77964.19	2314883.00	1.01	8.02	0.999310	0.006210	100.20
85290.00	79173.13	2304884.25	1.01	8.02	0.998951	0.006251	102.00
86108.00	79919.33	2335977.50	1.01	7.97	0.998592	0.006224	103.60
87512.00	82074.66	2464403.00	1.01	7.44	0.998232	0.005938	113.10
87678.00	83097.73	2541145.00	1.02	7.42	0.997873	0.005974	113.60
89009.00	83291.53	2591799.25	1.02	7.13	0.997538	0.006063	112.60
90298.00	83928.54	2621132.00	1.02	6.79	0.997203	0.006275	112.10
90850.00	86007.91	2748602.00	1.03	6.70	0.996868	0.006704	103.90

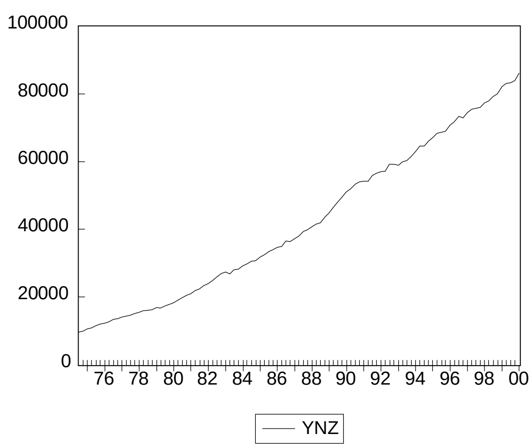
APPENDIX 3. GRAPHS OF THE DATA

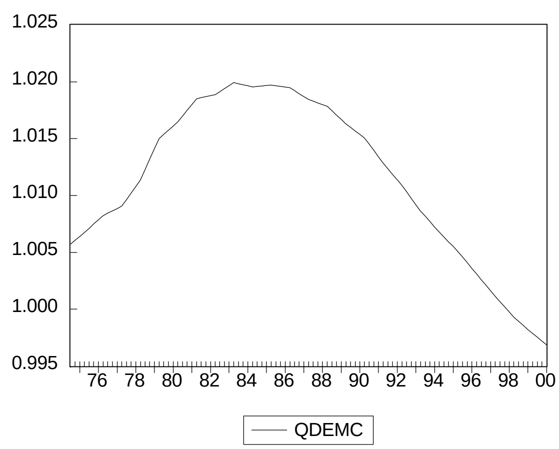


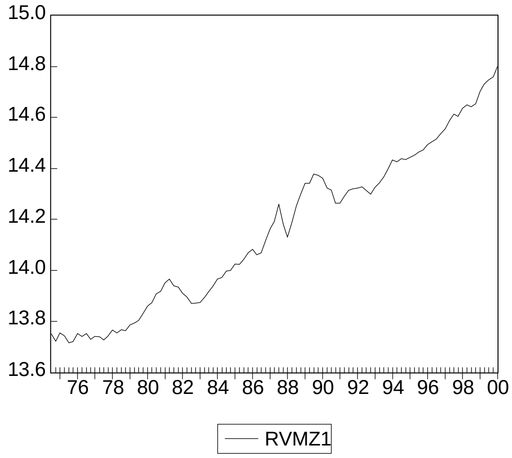


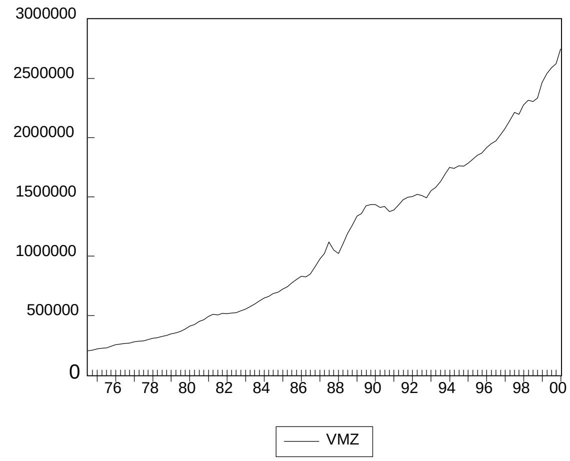


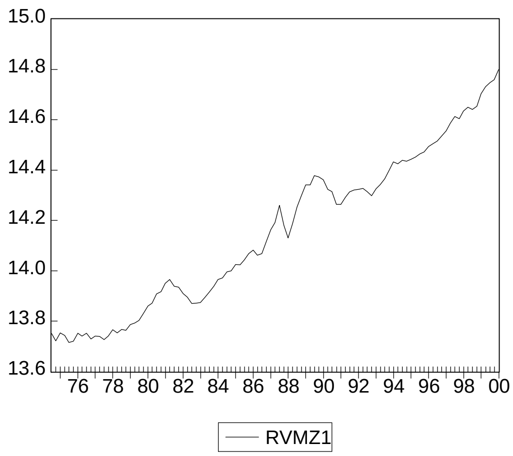




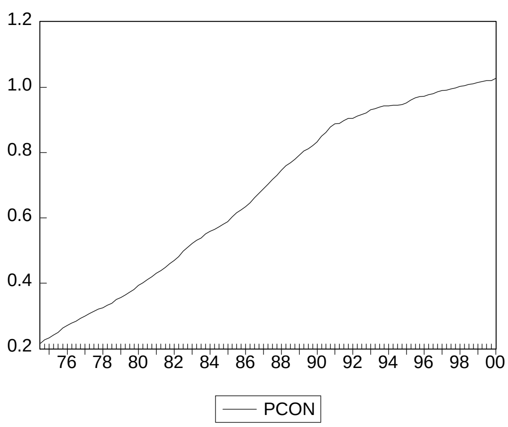



15.0
14.8
14.6
14.4
14.2
14.0
13.8
13.6
76 78 80 82 84 86 88 90 92 94 96 98 00
RVMZ1


3000000
2500000
2000000
1500000
1000000
500000
0
76 78 80 82 84 86 88 90 92 94 96 98 00
VMZ


15.0
14.8
14.6
14.4
14.2
14.0
13.8
13.6
76 78 80 82 84 86 88 90 92 94 96 98 00
RVMZ1


0.012
0.010
0.008
0.006
0.004
0.002
0.000
76 78 80 82 84 86 88 90 92 94 96 98 00
GRC


1.2
1.0
0.8
0.6
0.4
0.2
76 78 80 82 84 86 88 90 92 94 96 98 00
PCON

APPENDIX 4: DETAILS OF UNIT ROOT TESTS

Sentiment:

	-3.125074	1% Critical Value*	-4.0521
		5% Critical Value	-3.4548
		10% Critical Value	-3.1528

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SENT)
Method: Least Squares
Date: 04/28/01 Time: 10:37
Sample(adjusted): 1975:2 2000:1
Included observations: 100 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SENT(-1)	-0.173062	0.055378	-3.125074	0.0024
D(SENT(-1))	0.218401	0.097653	2.236506	0.0277
D(SENT(-2))	0.007914	0.100134	0.079030	0.9372
C	16.91324	5.717119	2.958351	0.0039
@TREND(1974:3)	0.004338	0.019989	0.217012	0.8287

R-squared	0.119650	Mean dependent var	-0.072000
Adjusted R-squared	0.082583	S.D. dependent var	6.003839
S.E. of regression	5.750590	Akaike info criterion	6.385189
Sum squared resid	3141.582	Schwarz criterion	6.515447
Log likelihood	-314.2594	F-statistic	3.227920
Durbin-Watson stat	1.922751	Prob(F-statistic)	0.015708

ADF Test Statistic	-7.331673	1% Critical Value*	-4.0521
		5% Critical Value	-3.4548
		10% Critical Value	-3.1528

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SENT,2)
Method: Least Squares
Date: 04/28/01 Time: 10:41
Sample(adjusted): 1975:2 2000:1
Included observations: 100 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(SENT(-1))	-0.952973	0.129980	-7.331673	0.0000
D(SENT(-1),2)	0.095195	0.098764	0.963862	0.3375
C	-0.559480	1.246874	-0.448706	0.6547
@TREND(1974:3)	0.009166	0.020819	0.440257	0.6607

R-squared	0.454761	Mean dependent var	-0.246000
Adjusted R-squared	0.437723	S.D. dependent var	8.011462
S.E. of regression	6.007408	Akaike info criterion	6.463042
Sum squared resid	3464.539	Schwarz criterion	6.567249
Log likelihood	-319.1521	F-statistic	26.68988
Durbin-Watson stat	1.917975	Prob(F-statistic)	0.000000

PP Test Statistic	-3.031001	1% Critical Value*	-4.0503
		5% Critical Value	-3.4539
		10% Critical Value	-3.1523

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel:1	(Newey-West suggests: 4)	
Residual variance with no correction		34.86391
Residual variance with correction		41.54750

Phillips-Perron Test Equation
Dependent Variable: D(SENT)
Method: Least Squares
Date: 04/28/01 Time: 10:43
Sample(adjusted): 1974:4 2000:1
Included observations: 102 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SENT(-1)	-0.146370	0.052155	-2.806436	0.0060
C	14.86146	5.370052	2.767471	0.0067
@TREND(1974:3)	-0.003522	0.020171	-0.174611	0.8617

R-squared	0.073727	Mean dependent var	0.104902
Adjusted R-squared	0.055014	S.D. dependent var	6.165352
S.E. of regression	5.993362	Akaike info criterion	6.448153
Sum squared resid	3556.118	Schwarz criterion	6.525358
Log likelihood	-325.8558	F-statistic	3.939950
Durbin-Watson stat	1.605427	Prob(F-statistic)	0.022573

PP Test Statistic	-8.558555	1% Critical Value*	-4.0512
		5% Critical Value	-3.4543
		10% Critical Value	-3.1526

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel:1	(Newey-West suggests: 4)	
Residual variance with no correction		37.30088
Residual variance with correction		37.55893

Phillips-Perron Test Equation
Dependent Variable: D(SENT,2)
Method: Least Squares
Date: 04/28/01 Time: 10:44
Sample(adjusted): 1975:1 2000:1
Included observations: 101 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(SENT(-1))	-0.863906	0.101002	-8.553350	0.0000
C	0.115079	1.261525	0.091222	0.9275
@TREND(1974:3)	-0.000951	0.021164	-0.044939	0.9642

R-squared	0.427562	Mean dependent var	-0.096040
Adjusted R-squared	0.415879	S.D. dependent var	8.112520
S.E. of regression	6.200221	Akaike info criterion	6.516300
Sum squared resid	3767.389	Schwarz criterion	6.593977
Log likelihood	-326.0731	F-statistic	36.59872
Durbin-Watson stat	1.899877	Prob(F-statistic)	0.000000

ADF Test Statistic	-3.167029	1% Critical Value*	-3.4965

5% Critical Value	-2.8903
10% Critical Value	-2.5819

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SENT)
Method: Least Squares
Date: 04/28/01   Time: 10:46
Sample(adjusted): 1975:2 2000:1
Included observations: 100 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SENT(-1)	-0.173990	0.054938	-3.167029	0.0021
D(SENT(-1))	0.219198	0.097098	2.257486	0.0262
D(SENT(-2))	0.008813	0.099550	0.088528	0.9296
C	17.23326	5.496180	3.135498	0.0023

R-squared	0.119214	Mean dependent var	-0.072000
Adjusted R-squared	0.091689	S.D. dependent var	6.003839
S.E. of regression	5.721978	Akaike info criterion	6.365684
Sum squared resid	3143.139	Schwarz criterion	6.469891
Log likelihood	-314.2842	F-statistic	4.331188
Durbin-Watson stat	1.921662	Prob(F-statistic)	0.006578

ADF Test Statistic	-7.353011	1% Critical Value*	-3.4965
		5% Critical Value	-2.8903
		10% Critical Value	-2.5819

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SENT,2)
Method: Least Squares
Date: 04/28/01   Time: 11:02
Sample(adjusted): 1975:2 2000:1
Included observations: 100 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(SENT(-1))	-0.951412	0.129391	-7.353011	0.0000
D(SENT(-1),2)	0.094460	0.098339	0.960551	0.3392
C	-0.078565	0.598715	-0.131223	0.8959

R-squared	0.453660	Mean dependent var	-0.246000
Adjusted R-squared	0.442396	S.D. dependent var	8.011462
S.E. of regression	5.982392	Akaike info criterion	6.445059
Sum squared resid	3471.534	Schwarz criterion	6.523214
Log likelihood	-319.2529	F-statistic	40.27262
Durbin-Watson stat	1.915605	Prob(F-statistic)	0.000000

PP Test Statistic	-3.101523	1% Critical Value*	-3.4952
		5% Critical Value	-2.8897
		10% Critical Value	-2.5816

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel:2	(Newey-West suggests: 4)	
Residual variance with no correction		34.87464
Residual variance with correction		43.52391

Phillips-Perron Test Equation
Dependent Variable: D(SENT)
Method: Least Squares
Date: 04/28/01 Time: 11:03
Sample(adjusted): 1974:4 2000:1
Included observations: 102 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SENT(-1)	-0.146004	0.051860	-2.815361	0.0059
C	14.64360	5.197720	2.817313	0.0058

R-squared	0.073441	Mean dependent var	0.104902
Adjusted R-squared	0.064176	S.D. dependent var	6.165352
S.E. of regression	5.964238	Akaike info criterion	6.428853
Sum squared resid	3557.214	Schwarz criterion	6.480323
Log likelihood	-325.8715	F-statistic	7.926258
Durbin-Watson stat	1.605503	Prob(F-statistic)	0.005869

PP Test Statistic	-8.566358	1% Critical Value*	-3.4959
		5% Critical Value	-2.8900
		10% Critical Value	-2.5818

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel:2	(Newey-West suggests: 4)	
Residual variance with no correction		37.30165
Residual variance with correction		35.53974

Phillips-Perron Test Equation
Dependent Variable: D(SENT,2)
Method: Least Squares
Date: 04/28/01 Time: 11:04
Sample(adjusted): 1975:1 2000:1
Included observations: 101 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(SENT(-1))	-0.863986	0.100476	-8.598882	0.0000
C	0.065637	0.614115	0.106880	0.9151

R-squared	0.427550	Mean dependent var	-0.096040
Adjusted R-squared	0.421767	S.D. dependent var	8.112520
S.E. of regression	6.168891	Akaike info criterion	6.496518
Sum squared resid	3767.466	Schwarz criterion	6.548303
Log likelihood	-326.0742	F-statistic	73.94078
Durbin-Watson stat	1.899708	Prob(F-statistic)	0.000000

Unemployment:

ADF Test Statistic	-2.398563	1% Critical Value*	-4.0540
		5% Critical Value	-3.4557
		10% Critical Value	-3.1534

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RNU)
Method: Least Squares
Date: 04/28/01 Time: 11:11
Sample(adjusted): 1975:4 2000:1
Included observations: 98 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RNU(-1)	-0.062475	0.026047	-2.398563	0.0185
D(RNU(-1))	0.339432	0.096396	3.521233	0.0007
D(RNU(-2))	0.325228	0.102452	3.174455	0.0020
D(RNU(-3))	0.198429	0.103356	1.919870	0.0580
D(RNU(-4))	-0.207862	0.097914	-2.122907	0.0365
C	0.432710	0.157964	2.739299	0.0074
@TREND(1974:3)	0.001111	0.001562	0.711395	0.4787

R-squared	0.392814	Mean dependent var	0.018971
Adjusted R-squared	0.352780	S.D. dependent var	0.378920
S.E. of regression	0.304841	Akaike info criterion	0.530696
Sum squared resid	8.456450	Schwarz criterion	0.715337
Log likelihood	-19.00411	F-statistic	9.811962
Durbin-Watson stat	1.933474	Prob(F-statistic)	0.000000

ADF Test Statistic	-4.215901	1% Critical Value*	-4.0550
		5% Critical Value	-3.4561
		10% Critical Value	-3.1536

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RNU,2)
Method: Least Squares
Date: 04/28/01 Time: 11:13
Sample(adjusted): 1976:1 2000:1
Included observations: 97 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RNU(-1))	-0.518501	0.122987	-4.215901	0.0001
D(RNU(-1),2)	-0.125708	0.124902	-1.006449	0.3169
D(RNU(-2),2)	0.185527	0.121532	1.526574	0.1304
D(RNU(-3),2)	0.325101	0.114067	2.850084	0.0054
D(RNU(-4),2)	0.034428	0.100527	0.342473	0.7328
C	0.078038	0.072074	1.082752	0.2818
@TREND(1974:3)	-0.001281	0.001174	-1.090808	0.2783

R-squared	0.379893	Mean dependent var	-0.005691
Adjusted R-squared	0.338553	S.D. dependent var	0.382511
S.E. of regression	0.311094	Akaike info criterion	0.571984
Sum squared resid	8.710140	Schwarz criterion	0.757788
Log likelihood	-20.74121	F-statistic	9.189382
Durbin-Watson stat	1.890521	Prob(F-statistic)	0.000000

PP Test Statistic	-2.175167	1% Critical Value*	-4.0503
		5% Critical Value	-3.4539

10% Critical Value	-3.1523

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel:4	(Newey-West suggests: 4)	
Residual variance with no correction		0.141078
Residual variance with correction		0.351160

Phillips-Perron Test Equation
Dependent Variable: D(RNU)
Method: Least Squares
Date: 04/28/01 Time: 11:14
Sample(adjusted): 1974:4 2000:1
Included observations: 102 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RNU(-1)	-0.037980	0.027214	-1.395595	0.1660
C	0.422476	0.169809	2.487939	0.0145
@TREND(1974:3)	-0.001838	0.001676	-1.096446	0.2755

R-squared	0.081204	Mean dependent var	0.038385
Adjusted R-squared	0.062642	S.D. dependent var	0.393785
S.E. of regression	0.381252	Akaike info criterion	0.938256
Sum squared resid	14.38992	Schwarz criterion	1.015461
Log likelihood	-44.85105	F-statistic	4.374833
Durbin-Watson stat	0.991130	Prob(F-statistic)	0.015113

PP Test Statistic	-6.280058	1% Critical Value*	-4.0512
		5% Critical Value	-3.4543
		10% Critical Value	-3.1526

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel:4	(Newey-West suggests: 4)	
Residual variance with no correction		0.105951
Residual variance with correction		0.118324

Phillips-Perron Test Equation
Dependent Variable: D(RNU,2)
Method: Least Squares
Date: 04/28/01 Time: 11:14
Sample(adjusted): 1975:1 2000:1
Included observations: 101 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RNU(-1))	-0.529319	0.086272	-6.135460	0.0000
C	0.075481	0.069742	1.082283	0.2818
@TREND(1974:3)	-0.001263	0.001165	-1.084225	0.2809

R-squared	0.278655	Mean dependent var	-0.011154
Adjusted R-squared	0.263934	S.D. dependent var	0.385161
S.E. of regression	0.330446	Akaike info criterion	0.652506
Sum squared resid	10.70106	Schwarz criterion	0.730182
Log likelihood	-29.95153	F-statistic	18.92866
Durbin-Watson stat	2.239482	Prob(F-statistic)	0.000000

ADF Test Statistic	-2.647442	1% Critical Value*	-3.4979
		5% Critical Value	-2.8909
		10% Critical Value	-2.5822

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RNU)
Method: Least Squares
Date: 04/28/01 Time: 11:15
Sample(adjusted): 1975:4 2000:1
Included observations: 98 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RNU(-1)	-0.049655	0.018756	-2.647442	0.0095
D(RNU(-1))	0.335841	0.096005	3.498166	0.0007
D(RNU(-2))	0.318931	0.101794	3.133095	0.0023
D(RNU(-3))	0.186706	0.101759	1.834783	0.0698
D(RNU(-4))	-0.228219	0.093387	-2.443793	0.0164
C	0.394222	0.148011	2.663464	0.0091

R-squared	0.389438	Mean dependent var	0.018971
Adjusted R-squared	0.356255	S.D. dependent var	0.378920
S.E. of regression	0.304022	Akaike info criterion	0.515834
Sum squared resid	8.503479	Schwarz criterion	0.674097
Log likelihood	-19.27586	F-statistic	11.73615
Durbin-Watson stat	1.940924	Prob(F-statistic)	0.000000

ADF Test Statistic	-4.068446	1% Critical Value*	-3.4986
		5% Critical Value	-2.8912
		10% Critical Value	-2.5824

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RNU,2)
Method: Least Squares
Date: 04/28/01 Time: 11:17
Sample(adjusted): 1976:1 2000:1
Included observations: 97 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RNU(-1))	-0.482160	0.118512	-4.068446	0.0001
D(RNU(-1),2)	-0.147027	0.123492	-1.190577	0.2369
D(RNU(-2),2)	0.166333	0.120376	1.381773	0.1704
D(RNU(-3),2)	0.304478	0.112607	2.703906	0.0082
D(RNU(-4),2)	0.018516	0.099566	0.185967	0.8529
C	0.007548	0.031950	0.236254	0.8138

R-squared	0.371695	Mean dependent var	-0.005691
Adjusted R-squared	0.337173	S.D. dependent var	0.382511
S.E. of regression	0.311418	Akaike info criterion	0.564499
Sum squared resid	8.825294	Schwarz criterion	0.723760
Log likelihood	-21.37822	F-statistic	10.76682
Durbin-Watson stat	1.894538	Prob(F-statistic)	0.000000

PP Test Statistic	-2.739640	1% Critical Value*	-3.4952
		5% Critical Value	-2.8897
		10% Critical Value	-2.5816

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel:4	(Newey-West suggests: 4)	
Residual variance with no correction		0.142791
Residual variance with correction		0.363505

Phillips-Perron Test Equation
Dependent Variable: D(RNU)
Method: Least Squares
Date: 04/28/01 Time: 11:18
Sample(adjusted): 1974:4 2000:1
Included observations: 102 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RNU(-1)	-0.057196	0.020840	-2.744493	0.0072
C	0.474296	0.163264	2.905081	0.0045
R-squared	0.070046	Mean dependent var		0.038385
Adjusted R-squared	0.060747	S.D. dependent var		0.393785
S.E. of regression	0.381637	Akaike info criterion		0.930718
Sum squared resid	14.56466	Schwarz criterion		0.982188
Log likelihood	-45.46663	F-statistic		7.532243
Durbin-Watson stat	0.960439	Prob(F-statistic)		0.007185

PP Test Statistic	-6.159427	1% Critical Value*	-3.4959
		5% Critical Value	-2.8900
		10% Critical Value	-2.5818

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel:4	(Newey-West suggests: 4)	
Residual variance with no correction		0.107222
Residual variance with correction		0.117150

Phillips-Perron Test Equation
Dependent Variable: D(RNU,2)
Method: Least Squares
Date: 04/28/01 Time: 11:19
Sample(adjusted): 1975:1 2000:1
Included observations: 101 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RNU(-1))	-0.505969	0.083615	-6.051186	0.0000
C	0.008892	0.033076	0.268846	0.7886
R-squared	0.270002	Mean dependent var		-0.011154
Adjusted R-squared	0.262628	S.D. dependent var		0.385161
S.E. of regression	0.330739	Akaike info criterion		0.644628
Sum squared resid	10.82943	Schwarz criterion		0.696412
Log likelihood	-30.55369	F-statistic		36.61685
Durbin-Watson stat	2.270721	Prob(F-statistic)		0.000000

The Long Rate Steady State Growth rate of real Consumption:

ADF Test Statistic	-2.185469	1% Critical Value*	-4.0540
		5% Critical Value	-3.4557
		10% Critical Value	-3.1534

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GRC)
Method: Least Squares
Date: 04/28/01 Time: 11:25
Sample(adjusted): 1975:4 2000:1
Included observations: 98 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GRC(-1)	-0.056112	0.025675	-2.185469	0.0314
D(GRC(-1))	-0.354962	0.101681	-3.490928	0.0007
D(GRC(-2))	0.209934	0.105368	1.992382	0.0493
D(GRC(-3))	0.270794	0.104700	2.586391	0.0113
D(GRC(-4))	0.030727	0.101063	0.304035	0.7618
C	0.000524	0.000183	2.870407	0.0051
@TREND(1974:3)	-1.70E-06	2.08E-06	-0.821415	0.4136

R-squared	0.272127	Mean dependent var	5.18E-05
Adjusted R-squared	0.224135	S.D. dependent var	0.000588
S.E. of regression	0.000518	Akaike info criterion	-12.22620
Sum squared resid	2.44E-05	Schwarz criterion	-12.04156
Log likelihood	606.0840	F-statistic	5.670290
Durbin-Watson stat	2.033431	Prob(F-statistic)	0.000049

ADF Test Statistic	-4.298195	1% Critical Value*	-4.0550
		5% Critical Value	-3.4561
		10% Critical Value	-3.1536

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GRC,2)
Method: Least Squares
Date: 04/28/01 Time: 11:26
Sample(adjusted): 1976:1 2000:1
Included observations: 97 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GRC(-1))	-1.042530	0.242551	-4.298195	0.0000
D(GRC(-1),2)	-0.353852	0.221010	-1.601072	0.1129
D(GRC(-2),2)	-0.162981	0.205416	-0.793422	0.4296
D(GRC(-3),2)	0.051013	0.171124	0.298104	0.7663
D(GRC(-4),2)	0.020606	0.101442	0.203126	0.8395
C	0.000279	0.000127	2.202030	0.0302
@TREND(1974:3)	-4.04E-06	2.06E-06	-1.958117	0.0533

R-squared	0.727754	Mean dependent var	7.80E-06
Adjusted R-squared	0.709604	S.D. dependent var	0.000977
S.E. of regression	0.000526	Akaike info criterion	-12.19151
Sum squared resid	2.49E-05	Schwarz criterion	-12.00570
Log likelihood	598.2881	F-statistic	40.09718
Durbin-Watson stat	1.972011	Prob(F-statistic)	0.000000

PP Test Statistic	-1.362770	1% Critical Value*	-4.0503
		5% Critical Value	-3.4539
		10% Critical Value	-3.1523

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel:4	(Newey-West suggests: 4)	
Residual variance with no correction		3.35E-07
Residual variance with correction		2.82E-07

Phillips-Perron Test Equation
Dependent Variable: D(GRC)
Method: Least Squares
Date: 04/28/01 Time: 11:26
Sample(adjusted): 1974:4 2000:1
Included observations: 102 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GRC(-1)	-0.040177	0.027389	-1.466905	0.1456
C	0.000346	0.000185	1.864838	0.0652
@TREND(1974:3)	-8.38E-07	2.12E-06	-0.394776	0.6939

R-squared	0.030860	Mean dependent var	3.32E-05
Adjusted R-squared	0.011281	S.D. dependent var	0.000591
S.E. of regression	0.000587	Akaike info criterion	-12.01333
Sum squared resid	3.41E-05	Schwarz criterion	-11.93612
Log likelihood	615.6798	F-statistic	1.576194
Durbin-Watson stat	2.663451	Prob(F-statistic)	0.211905

PP Test Statistic	-13.81009	1% Critical Value*	-4.0512
		5% Critical Value	-3.4543
		10% Critical Value	-3.1526

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel: 4	(Newey-West suggests: 4)	
Residual variance with no correction		2.97E-07
Residual variance with correction		4.32E-07

Phillips-Perron Test Equation
Dependent Variable: D(GRC,2)
Method: Least Squares
Date: 04/28/01 Time: 11:28
Sample(adjusted): 1975:1 2000:1
Included observations: 101 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GRC(-1))	-1.366404	0.094052	-14.52817	0.0000
C	0.000208	0.000113	1.829187	0.0704
@TREND(1974:3)	-3.08E-06	1.90E-06	-1.619189	0.1086

R-squared	0.682917	Mean dependent var	7.45E-06
Adjusted R-squared	0.676446	S.D. dependent var	0.000973
S.E. of regression	0.000553	Akaike info criterion	-12.13159
Sum squared resid	3.00E-05	Schwarz criterion	-12.05392
Log likelihood	615.6455	F-statistic	105.5339
Durbin-Watson stat	1.873066	Prob(F-statistic)	0.000000

ADF Test Statistic	-2.607961	1% Critical Value*	-3.4979
		5% Critical Value	-2.8909
		10% Critical Value	-2.5822

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GRC)
Method: Least Squares
Date: 04/28/01 Time: 11:28
Sample(adjusted): 1975:4 2000:1
Included observations: 98 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GRC(-1)	-0.063083	0.024189	-2.607961	0.0106
D(GRC(-1))	-0.341336	0.100141	-3.408536	0.0010
D(GRC(-2))	0.230401	0.102198	2.254451	0.0265
D(GRC(-3))	0.291401	0.101470	2.871800	0.0051
D(GRC(-4))	0.043611	0.099661	0.437592	0.6627
C	0.000479	0.000174	2.755765	0.0071

R-squared	0.266730	Mean dependent var	5.18E-05
Adjusted R-squared	0.226878	S.D. dependent var	0.000588
S.E. of regression	0.000517	Akaike info criterion	-12.23922
Sum squared resid	2.46E-05	Schwarz criterion	-12.08096
Log likelihood	605.7220	F-statistic	6.693068
Durbin-Watson stat	2.032173	Prob(F-statistic)	0.000023

ADF Test Statistic	-3.785460	1% Critical Value*	-3.4986
		5% Critical Value	-2.8912
		10% Critical Value	-2.5824

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GRC,2)
Method: Least Squares
Date: 04/28/01 Time: 11:29
Sample(adjusted): 1976:1 2000:1
Included observations: 97 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GRC(-1))	-0.863884	0.228211	-3.785460	0.0003
D(GRC(-1),2)	-0.494710	0.212204	-2.331290	0.0219
D(GRC(-2),2)	-0.256907	0.202823	-1.266655	0.2085
D(GRC(-3),2)	0.000681	0.171797	0.003966	0.9968
D(GRC(-4),2)	0.002108	0.102562	0.020556	0.9836
C	5.47E-05	5.49E-05	0.995093	0.3223

R-squared	0.716155	Mean dependent var	7.80E-06
Adjusted R-squared	0.700560	S.D. dependent var	0.000977
S.E. of regression	0.000535	Akaike info criterion	-12.17041
Sum squared resid	2.60E-05	Schwarz criterion	-12.01115
Log likelihood	596.2647	F-statistic	45.91959
Durbin-Watson stat	1.966867	Prob(F-statistic)	0.000000

PP Test Statistic	-1.686207	1% Critical Value*	-3.4952
		5% Critical Value	-2.8897
		10% Critical Value	-2.5816

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel:4 (Newey-West suggests: 4)

Residual variance with no correction	3.35E-07
Residual variance with correction	2.93E-07

Phillips-Perron Test Equation
Dependent Variable: D(GRC)
Method: Least Squares
Date: 04/28/01 Time: 11:29
Sample(adjusted): 1974:4 2000:1
Included observations: 102 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GRC(-1)	-0.044130	0.025385	-1.738404	0.0852
C	0.000329	0.000180	1.830557	0.0701

R-squared	0.029334	Mean dependent var	3.32E-05
Adjusted R-squared	0.019627	S.D. dependent var	0.000591
S.E. of regression	0.000585	Akaike info criterion	-12.03136
Sum squared resid	3.42E-05	Schwarz criterion	-11.97989
Log likelihood	615.5996	F-statistic	3.022050
Durbin-Watson stat	2.648627	Prob(F-statistic)	0.085217

PP Test Statistic	-13.58126	1% Critical Value*	-3.4959
		5% Critical Value	-2.8900
		10% Critical Value	-2.5818

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel:4	(Newey-West suggests: 4)	
Residual variance with no correction		3.05E-07
Residual variance with correction		4.74E-07

Phillips-Perron Test Equation
Dependent Variable: D(GRC,2)
Method: Least Squares
Date: 04/28/01 Time: 11:30
Sample(adjusted): 1975:1 2000:1
Included observations: 101 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GRC(-1))	-1.349301	0.094219	-14.32084	0.0000
C	4.70E-05	5.56E-05	0.845127	0.4001

R-squared	0.674435	Mean dependent var	7.45E-06
Adjusted R-squared	0.671146	S.D. dependent var	0.000973
S.E. of regression	0.000558	Akaike info criterion	-12.12499
Sum squared resid	3.08E-05	Schwarz criterion	-12.07321
Log likelihood	614.3122	F-statistic	205.0864
Durbin-Watson stat	1.863681	Prob(F-statistic)	0.000000

Real Nominal Private Sector Wealth:

ADF Test Statistic	-2.706461	1% Critical Value*	-4.0803
		5% Critical Value	-3.4681
		10% Critical Value	-3.1606

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RVMZ1)
Method: Least Squares
Date: 04/28/01 Time: 11:34
Sample(adjusted): 1981:1 2000:1
Included observations: 77 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RVMZ1(-1)	-0.495090	0.182929	-2.706461	0.0093
D(RVMZ1(-1))	0.644995	0.187693	3.436442	0.0012
D(RVMZ1(-2))	0.257868	0.203601	1.266540	0.2113
D(RVMZ1(-3))	0.376424	0.199620	1.885704	0.0653
D(RVMZ1(-4))	0.256143	0.198901	1.287789	0.2039
D(RVMZ1(-5))	0.192739	0.193219	0.997512	0.3234
D(RVMZ1(-6))	0.428957	0.187844	2.283579	0.0268
D(RVMZ1(-7))	0.243382	0.194929	1.248565	0.2178
D(RVMZ1(-8))	0.322450	0.192330	1.676546	0.1000
D(RVMZ1(-9))	0.160290	0.182440	0.878592	0.3839
D(RVMZ1(-10))	0.309375	0.182732	1.693057	0.0968
D(RVMZ1(-11))	0.301152	0.179704	1.675820	0.1001
D(RVMZ1(-12))	0.316113	0.178671	1.769250	0.0831
D(RVMZ1(-13))	0.040627	0.172812	0.235093	0.8151
D(RVMZ1(-14))	0.165380	0.164093	1.007845	0.3185
D(RVMZ1(-15))	0.168795	0.164738	1.024625	0.3106
D(RVMZ1(-16))	0.242259	0.164565	1.472115	0.1474
D(RVMZ1(-17))	0.049332	0.156539	0.315144	0.7540
D(RVMZ1(-18))	0.156811	0.155276	1.009882	0.3175
D(RVMZ1(-19))	0.155458	0.149449	1.040208	0.3033
D(RVMZ1(-20))	0.178958	0.151540	1.180929	0.2433
D(RVMZ1(-21))	0.062267	0.148143	0.420319	0.6761
D(RVMZ1(-22))	0.111801	0.140800	0.794040	0.4310
D(RVMZ1(-23))	0.045974	0.139788	0.328883	0.7436
D(RVMZ1(-24))	0.068094	0.140027	0.486290	0.6289
D(RVMZ1(-25))	0.114202	0.135347	0.843767	0.4029
C	6.680071	2.465313	2.709624	0.0093
@TREND(1974:3)	0.005328	0.001916	2.780926	0.0077

R-squared	0.320986	Mean dependent var	0.011462
Adjusted R-squared	-0.053164	S.D. dependent var	0.025863
S.E. of regression	0.026541	Akaike info criterion	-4.144951
Sum squared resid	0.034517	Schwarz criterion	-3.292658
Log likelihood	187.5806	F-statistic	0.857908
Durbin-Watson stat	1.940608	Prob(F-statistic)	0.660105

PP Test Statistic	-2.517359	1% Critical Value*	-4.0503
		5% Critical Value	-3.4539
		10% Critical Value	-3.1523

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel:8 (Newey-West suggests: 4)
Residual variance with no correction 0.000540

Residual variance with correction	0.000642

Phillips-Perron Test Equation
Dependent Variable: D(RVMZ1)
Method: Least Squares
Date: 04/28/01 Time: 11:35
Sample(adjusted): 1974:4 2000:1
Included observations: 102 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RVMZ1(-1)	-0.100884	0.043182	-2.336227	0.0215
C	1.377086	0.588130	2.341464	0.0212
@TREND(1974:3)	0.001178	0.000452	2.607685	0.0105

R-squared	0.079325	Mean dependent var	0.010286
Adjusted R-squared	0.060725	S.D. dependent var	0.024344
S.E. of regression	0.023593	Akaike info criterion	-4.626729
Sum squared resid	0.055108	Schwarz criterion	-4.549524
Log likelihood	238.9632	F-statistic	4.264881
Durbin-Watson stat	1.507730	Prob(F-statistic)	0.016721

ADF Test Statistic	-3.892521	1% Critical Value*	-4.0591
		5% Critical Value	-3.4581
		10% Critical Value	-3.1548

*MacKinnon critical values for rejection of hypothesis of a unit root.
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RVMZ1,2)
Method: Least Squares
Date: 04/28/01 Time: 11:35
Sample(adjusted): 1977:1 2000:1
Included observations: 93 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RVMZ1(-1))	-1.198269	0.307839	-3.892521	0.0002
D(RVMZ1(-1),2)	0.481071	0.286756	1.677633	0.0972
D(RVMZ1(-2),2)	0.347240	0.262510	1.322771	0.1896
D(RVMZ1(-3),2)	0.344948	0.243510	1.416566	0.1604
D(RVMZ1(-4),2)	0.267774	0.212277	1.261437	0.2107
D(RVMZ1(-5),2)	0.093268	0.186384	0.500407	0.6181
D(RVMZ1(-6),2)	0.206680	0.161672	1.278394	0.2047
D(RVMZ1(-7),2)	0.057317	0.134726	0.425435	0.6716
D(RVMZ1(-8),2)	0.160347	0.106605	1.504115	0.1364
C	0.006990	0.005873	1.190303	0.2374
@TREND(1974:3)	0.000113	9.56E-05	1.177607	0.2424

R-squared	0.434103	Mean dependent var	0.000683
Adjusted R-squared	0.365092	S.D. dependent var	0.029633
S.E. of regression	0.023612	Akaike info criterion	-4.543480
Sum squared resid	0.045716	Schwarz criterion	-4.243925
Log likelihood	222.2718	F-statistic	6.290281
Durbin-Watson stat	1.948436	Prob(F-statistic)	0.000000

PP Test Statistic	-7.967623	1% Critical Value*	-4.0512
		5% Critical Value	-3.4543
		10% Critical Value	-3.1526

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel:8	(Newey-West suggests: 4)	
Residual variance with no correction		0.000542
Residual variance with correction		0.000383

Phillips-Perron Test Equation
Dependent Variable: D(RVMZ1,2)
Method: Least Squares
Date: 04/28/01 Time: 11:36
Sample(adjusted): 1975:1 2000:1
Included observations: 101 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RVMZ1(-1))	-0.801757	0.098545	-8.135950	0.0000
C	0.003763	0.004823	0.780194	0.4372
@TREND(1974:3)	9.49E-05	8.16E-05	1.163021	0.2476

R-squared	0.403159	Mean dependent var	0.000696
Adjusted R-squared	0.390979	S.D. dependent var	0.030296
S.E. of regression	0.023643	Akaike info criterion	-4.622261
Sum squared resid	0.054780	Schwarz criterion	-4.544584
Log likelihood	236.4242	F-statistic	33.09897
Durbin-Watson stat	1.895343	Prob(F-statistic)	0.000000

ADF Test Statistic	0.934832	1% Critical Value*	-3.5153
		5% Critical Value	-2.8986
		10% Critical Value	-2.5863

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RVMZ1)

Method: Least Squares
Date: 04/28/01 Time: 11:36
Sample(adjusted): 1980:4 2000:1
Included observations: 78 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RVMZ1(-1)	0.013065	0.013975	0.934832	0.3542
D(RVMZ1(-1))	0.281940	0.141790	1.988435	0.0520
D(RVMZ1(-2))	-0.153661	0.147009	-1.045248	0.3007
D(RVMZ1(-3))	-0.014360	0.148504	-0.096696	0.9233
D(RVMZ1(-4))	-0.135414	0.147729	-0.916637	0.3636
D(RVMZ1(-5))	-0.165108	0.150545	-1.096737	0.2778
D(RVMZ1(-6))	0.099336	0.152153	0.652869	0.5167
D(RVMZ1(-7))	-0.115239	0.153236	-0.752036	0.4554
D(RVMZ1(-8))	-0.021783	0.151765	-0.143533	0.8864
D(RVMZ1(-9))	-0.141914	0.153149	-0.926638	0.3584
D(RVMZ1(-10))	0.014702	0.154735	0.095014	0.9247
D(RVMZ1(-11))	0.015279	0.154483	0.098901	0.9216
D(RVMZ1(-12))	0.033043	0.151414	0.218227	0.8281
D(RVMZ1(-13))	-0.215190	0.149615	-1.438287	0.1563
D(RVMZ1(-14))	-0.039459	0.153323	-0.257358	0.7979
D(RVMZ1(-15))	-0.037397	0.153670	-0.243362	0.8087
D(RVMZ1(-16))	0.037647	0.150199	0.250648	0.8031
D(RVMZ1(-17))	-0.122321	0.150250	-0.814114	0.4193
D(RVMZ1(-18))	0.002129	0.148852	0.014306	0.9886
D(RVMZ1(-19))	0.028657	0.147009	0.194935	0.8462
D(RVMZ1(-20))	0.019385	0.145535	0.133195	0.8946
D(RVMZ1(-21))	-0.076404	0.142110	-0.537636	0.5931
D(RVMZ1(-22))	0.017502	0.142201	0.123077	0.9025
D(RVMZ1(-23))	-0.048586	0.140521	-0.345760	0.7309
D(RVMZ1(-24))	-0.014056	0.136068	-0.103300	0.9181
C	-0.167183	0.195488	-0.855207	0.3964

R-squared	0.212497	Mean dependent var	0.011440
Adjusted R-squared	-0.166110	S.D. dependent var	0.025695
S.E. of regression	0.027747	Akaike info criterion	-4.070175
Sum squared resid	0.040035	Schwarz criterion	-3.284605
Log likelihood	184.7368	F-statistic	0.561259
Durbin-Watson stat	1.973495	Prob(F-statistic)	0.940996

PP Test Statistic	1.292207	1% Critical Value*	-3.4952
		5% Critical Value	-2.8897
		10% Critical Value	-2.5816

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel:8	(Newey-West suggests: 4)	
Residual variance with no correction		0.000577
Residual variance with correction		0.000570

Phillips-Perron Test Equation

Dependent Variable: D(RVMZ1)
Method: Least Squares
Date: 04/28/01 Time: 11:37
Sample(adjusted): 1974:4 2000:1
Included observations: 102 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RVMZ1(-1)	0.009973	0.007799	1.278638	0.2040
C	-0.130824	0.110386	-1.185154	0.2388

R-squared	0.016086	Mean dependent var	0.010286
Adjusted R-squared	0.006247	S.D. dependent var	0.024344
S.E. of regression	0.024268	Akaike info criterion	-4.579906
Sum squared resid	0.058893	Schwarz criterion	-4.528436
Log likelihood	235.5752	F-statistic	1.634915
Durbin-Watson stat	1.574834	Prob(F-statistic)	0.203984

ADF Test Statistic	-3.701554	1% Critical Value*	-3.5015
		5% Critical Value	-2.8925
		10% Critical Value	-2.5831

*MacKinnon critical values for rejection of hypothesis of a unit root.
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RVMZ1,2)
Method: Least Squares
Date: 04/28/01 Time: 11:38
Sample(adjusted): 1977:1 2000:1
Included observations: 93 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RVMZ1(-1))	-1.090340	0.294563	-3.701554	0.0004
D(RVMZ1(-1),2)	0.386958	0.276035	1.401845	0.1647
D(RVMZ1(-2),2)	0.264596	0.253543	1.043592	0.2997
D(RVMZ1(-3),2)	0.274510	0.236599	1.160235	0.2493
D(RVMZ1(-4),2)	0.209861	0.206982	1.013910	0.3136
D(RVMZ1(-5),2)	0.043377	0.181928	0.238432	0.8121
D(RVMZ1(-6),2)	0.168759	0.158801	1.062706	0.2910
D(RVMZ1(-7),2)	0.032356	0.133358	0.242629	0.8089
D(RVMZ1(-8),2)	0.145994	0.106153	1.375317	0.1727
C	0.012206	0.003865	3.157605	0.0022

R-squared	0.424533	Mean dependent var	0.000683
Adjusted R-squared	0.362133	S.D. dependent var	0.029633
S.E. of regression	0.023667	Akaike info criterion	-4.548215
Sum squared resid	0.046489	Schwarz criterion	-4.275892
Log likelihood	221.4920	F-statistic	6.803415
Durbin-Watson stat	1.945200	Prob(F-statistic)	0.000000

PP Test Statistic	-7.880248	1% Critical Value*	-3.4959
		5% Critical Value	-2.8900
		10% Critical Value	-2.5818

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel:8	(Newey-West suggests: 4)	
Residual variance with no correction		0.000550
Residual variance with correction		0.000422

Phillips-Perron Test Equation
Dependent Variable: D(RVMZ1,2)
Method: Least Squares
Date: 04/28/01 Time: 11:39
Sample(adjusted): 1975:1 2000:1
Included observations: 101 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RVMZ1(-1))	-0.784465	0.097590	-8.038356	0.0000
C	0.008527	0.002550	3.343603	0.0012

R-squared	0.394922	Mean dependent var	0.000696
Adjusted R-squared	0.388810	S.D. dependent var	0.030296
S.E. of regression	0.023685	Akaike info criterion	-4.628355
Sum squared resid	0.055536	Schwarz criterion	-4.576570
Log likelihood	235.7319	F-statistic	64.61517
Durbin-Watson stat	1.900381	Prob(F-statistic)	0.000000

Nominal After Tax Labour Income:

ADF Test Statistic	-1.638143	1% Critical Value*	-4.0540
		5% Critical Value	-3.4557
		10% Critical Value	-3.1534

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LRYNZ)
Method: Least Squares
Date: 04/28/01 Time: 11:42
Sample(adjusted): 1975:4 2000:1
Included observations: 98 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LRYNZ(-1)	-0.067037	0.040923	-1.638143	0.1048
D(LRYNZ(-1))	-0.198209	0.105979	-1.870258	0.0647
D(LRYNZ(-2))	0.127335	0.107863	1.180532	0.2409
D(LRYNZ(-3))	0.014252	0.108582	0.131254	0.8959
D(LRYNZ(-4))	0.063017	0.104545	0.602772	0.5482
C	0.714830	0.435106	1.642889	0.1039
@TREND(1974:3)	0.000492	0.000248	1.983328	0.0503

R-squared	0.140275	Mean dependent var	0.006156
Adjusted R-squared	0.083590	S.D. dependent var	0.013413
S.E. of regression	0.012840	Akaike info criterion	-5.803726
Sum squared resid	0.015003	Schwarz criterion	-5.619085
Log likelihood	291.3826	F-statistic	2.474629
Durbin-Watson stat	1.961925	Prob(F-statistic)	0.029080

ADF Test Statistic	-4.930096	1% Critical Value*	-4.0540
		5% Critical Value	-3.4557
		10% Critical Value	-3.1534

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LRYNZ,2)
Method: Least Squares
Date: 04/28/01 Time: 11:42
Sample(adjusted): 1975:4 2000:1

Included observations: 98 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LRYNZ(-1))	-1.150011	0.233263	-4.930096	0.0000
D(LRYNZ(-1),2)	-0.086275	0.200330	-0.430666	0.6677
D(LRYNZ(-2),2)	0.008989	0.163351	0.055028	0.9562
D(LRYNZ(-3),2)	-0.024591	0.102808	-0.239196	0.8115
C	0.002080	0.002857	0.728028	0.4684
@TREND(1974:3)	9.35E-05	4.91E-05	1.905721	0.0598

R-squared	0.641287	Mean dependent var	6.03E-05
Adjusted R-squared	0.621792	S.D. dependent var	0.021069
S.E. of regression	0.012957	Akaike info criterion	-5.795071
Sum squared resid	0.015446	Schwarz criterion	-5.636808
Log likelihood	289.9585	F-statistic	32.89450
Durbin-Watson stat	1.972434	Prob(F-statistic)	0.000000

PP Test Statistic	-1.330481	1% Critical Value*	-4.0503
		5% Critical Value	-3.4539
		10% Critical Value	-3.1523

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel:3	(Newey-West suggests: 4)	
Residual variance with no correction		0.000169
Residual variance with correction		0.000138

Phillips-Perron Test Equation
Dependent Variable: D(LRYNZ)
Method: Least Squares
Date: 04/28/01 Time: 11:43
Sample(adjusted): 1974:4 2000:1
Included observations: 102 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LRYNZ(-1)	-0.057532	0.037194	-1.546814	0.1251
C	0.615374	0.395975	1.554074	0.1234
@TREND(1974:3)	0.000411	0.000227	1.808012	0.0736

R-squared	0.044491	Mean dependent var	0.006291
Adjusted R-squared	0.025188	S.D. dependent var	0.013366
S.E. of regression	0.013197	Akaike info criterion	-5.788699
Sum squared resid	0.017242	Schwarz criterion	-5.711494
Log likelihood	298.2236	F-statistic	2.304848
Durbin-Watson stat	2.451996	Prob(F-statistic)	0.105105

PP Test Statistic	-12.88279	1% Critical Value*	-4.0512
		5% Critical Value	-3.4543
		10% Critical Value	-3.1526

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel:3	(Newey-West suggests: 4)	
Residual variance with no correction		0.000162
Residual variance with correction		0.000183

Phillips-Perron Test Equation
Dependent Variable: D(LRYNZ,2)

Method: Least Squares
Date: 04/28/01 Time: 11:44
Sample(adjusted): 1975:1 2000:1
Included observations: 101 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LRYNZ(-1))	-1.272154	0.097338	-13.06944	0.0000
C	0.003914	0.002642	1.481371	0.1417
@TREND(1974:3)	7.96E-05	4.45E-05	1.791685	0.0763

R-squared	0.635433	Mean dependent var	0.000200
Adjusted R-squared	0.627993	S.D. dependent var	0.021163
S.E. of regression	0.012908	Akaike info criterion	-5.832697
Sum squared resid	0.016328	Schwarz criterion	-5.755020
Log likelihood	297.5512	F-statistic	85.40610
Durbin-Watson stat	1.885498	Prob(F-statistic)	0.000000

ADF Test Statistic	1.540291	1% Critical Value*	-3.4979
		5% Critical Value	-2.8909
		10% Critical Value	-2.5822

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LRYNZ)
Method: Least Squares
Date: 04/28/01 Time: 11:46
Sample(adjusted): 1975:4 2000:1
Included observations: 98 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LRYNZ(-1)	0.012551	0.008149	1.540291	0.1269
D(LRYNZ(-1))	-0.236214	0.105882	-2.230927	0.0281
D(LRYNZ(-2))	0.097833	0.108522	0.901503	0.3697
D(LRYNZ(-3))	-0.034909	0.107387	-0.325072	0.7459
D(LRYNZ(-4))	0.023833	0.104285	0.228539	0.8197
C	-0.130540	0.088778	-1.470401	0.1449

R-squared	0.103112	Mean dependent var	0.006156
Adjusted R-squared	0.054368	S.D. dependent var	0.013413
S.E. of regression	0.013043	Akaike info criterion	-5.781816
Sum squared resid	0.015652	Schwarz criterion	-5.623552
Log likelihood	289.3090	F-statistic	2.115384
Durbin-Watson stat	1.971652	Prob(F-statistic)	0.070490

ADF Test Statistic	-4.492672	1% Critical Value*	-3.4979
		5% Critical Value	-2.8909
		10% Critical Value	-2.5822

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LRYNZ,2)
Method: Least Squares
Date: 04/28/01 Time: 11:47
Sample(adjusted): 1975:4 2000:1
Included observations: 98 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.

D(LRYNZ(-1))	-1.002415	0.223122	-4.492672	0.0000
D(LRYNZ(-1),2)	-0.198248	0.194210	-1.020789	0.3100
D(LRYNZ(-2),2)	-0.060576	0.161457	-0.375181	0.7084
D(LRYNZ(-3),2)	-0.056429	0.102866	-0.548570	0.5846
C	0.006174	0.001911	3.231133	0.0017

R-squared	0.627127	Mean dependent var	6.03E-05
Adjusted R-squared	0.611089	S.D. dependent var	0.021069
S.E. of regression	0.013139	Akaike info criterion	-5.776763
Sum squared resid	0.016055	Schwarz criterion	-5.644877
Log likelihood	288.0614	F-statistic	39.10361
Durbin-Watson stat	1.958753	Prob(F-statistic)	0.000000

PP Test Statistic	1.460676	1% Critical Value*	-3.4952
		5% Critical Value	-2.8897
		10% Critical Value	-2.5816

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel:4	(Newey-West suggests: 4)	
Residual variance with no correction		0.000175
Residual variance with correction		0.000127

Phillips-Perron Test Equation
Dependent Variable: D(LRYNZ)
Method: Least Squares
Date: 04/28/01 Time: 11:47
Sample(adjusted): 1974:4 2000:1
Included observations: 102 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LRYNZ(-1)	0.008418	0.007352	1.145008	0.2549
C	-0.085921	0.080545	-1.066744	0.2887

R-squared	0.012941	Mean dependent var	0.006291
Adjusted R-squared	0.003070	S.D. dependent var	0.013366
S.E. of regression	0.013346	Akaike info criterion	-5.775821
Sum squared resid	0.017811	Schwarz criterion	-5.724351
Log likelihood	296.5669	F-statistic	1.311043
Durbin-Watson stat	2.535965	Prob(F-statistic)	0.254939

PP Test Statistic	-12.54621	1% Critical Value*	-3.4959
		5% Critical Value	-2.8900
		10% Critical Value	-2.5818

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel:4	(Newey-West suggests: 4)	
Residual variance with no correction		0.000167
Residual variance with correction		0.000208

Phillips-Perron Test Equation
Dependent Variable: D(LRYNZ,2)
Method: Least Squares
Date: 04/28/01 Time: 11:49

Sample(adjusted): 1975:1 2000:1
Included observations: 101 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LRYNZ(-1))	-1.248821	0.097534	-12.80399	0.0000
C	0.007912	0.001432	5.527021	0.0000

R-squared	0.623491	Mean dependent var	0.000200
Adjusted R-squared	0.619688	S.D. dependent var	0.021163
S.E. of regression	0.013051	Akaike info criterion	-5.820267
Sum squared resid	0.016863	Schwarz criterion	-5.768483
Log likelihood	295.9235	F-statistic	163.9421
Durbin-Watson stat	1.876886	Prob(F-statistic)	0.000000

Consumption:

ADF Test Statistic	-1.836624	1% Critical Value*	-4.0540
		5% Critical Value	-3.4557
		10% Critical Value	-3.1534

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNC)
Method: Least Squares
Date: 04/28/01 Time: 12:01
Sample(adjusted): 1975:4 2000:1
Included observations: 98 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNC(-1)	-0.111083	0.060482	-1.836624	0.0695
D(LNC(-1))	0.091322	0.109140	0.836741	0.4049
D(LNC(-2))	-0.053726	0.109572	-0.490326	0.6251
D(LNC(-3))	0.107480	0.105080	1.022841	0.3091
D(LNC(-4))	-0.016388	0.104261	-0.157177	0.8755
C	1.182202	0.640001	1.847188	0.0680
@TREND(1974:3)	0.000874	0.000455	1.919740	0.0580

R-squared	0.072378	Mean dependent var	0.007830
Adjusted R-squared	0.011216	S.D. dependent var	0.007634
S.E. of regression	0.007591	Akaike info criterion	-6.855028
Sum squared resid	0.005243	Schwarz criterion	-6.670388
Log likelihood	342.8964	F-statistic	1.183390
Durbin-Watson stat	1.934270	Prob(F-statistic)	0.322219

ADF Test Statistic	-4.698778	1% Critical Value*	-4.0550
		5% Critical Value	-3.4561
		10% Critical Value	-3.1536

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNC,2)
Method: Least Squares
Date: 04/28/01 Time: 12:02
Sample(adjusted): 1976:1 2000:1
Included observations: 97 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNC(-1))	-1.083648	0.230623	-4.698778	0.0000
D(LNC(-1),2)	0.078046	0.202391	0.385618	0.7007

D(LNC(-2),2)	-0.035849	0.174073	-0.205941	0.8373
D(LNC(-3),2)	0.094108	0.134653	0.698893	0.4864
D(LNC(-4),2)	-0.045757	0.094885	-0.482239	0.6308
C	0.007607	0.002106	3.612185	0.0005
@TREND(1974:3)	2.15E-05	2.74E-05	0.785608	0.4342

R-squared	0.566232	Mean dependent var	0.000243
Adjusted R-squared	0.537314	S.D. dependent var	0.010650
S.E. of regression	0.007244	Akaike info criterion	-6.947832
Sum squared resid	0.004723	Schwarz criterion	-6.762028
Log likelihood	343.9699	F-statistic	19.58066
Durbin-Watson stat	1.825259	Prob(F-statistic)	0.000000

PP Test Statistic	-2.128473	1% Critical Value*	-4.0503
		5% Critical Value	-3.4539
		10% Critical Value	-3.1523

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel:4	(Newey-West suggests: 4)	
Residual variance with no correction		5.81E-05
Residual variance with correction		5.99E-05

Phillips-Perron Test Equation
Dependent Variable: D(LNC)
Method: Least Squares
Date: 04/28/01 Time: 12:03
Sample(adjusted): 1974:4 2000:1
Included observations: 102 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNC(-1)	-0.102544	0.049142	-2.086669	0.0395
C	1.092798	0.520852	2.098098	0.0384
@TREND(1974:3)	0.000809	0.000372	2.175044	0.0320

R-squared	0.058400	Mean dependent var	0.007749
Adjusted R-squared	0.039378	S.D. dependent var	0.007896
S.E. of regression	0.007739	Akaike info criterion	-6.856086
Sum squared resid	0.005930	Schwarz criterion	-6.778881
Log likelihood	352.6604	F-statistic	3.070109
Durbin-Watson stat	1.896214	Prob(F-statistic)	0.050861

PP Test Statistic	-10.37434	1% Critical Value*	-4.0512
		5% Critical Value	-3.4543
		10% Critical Value	-3.1526

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel:4	(Newey-West suggests: 4)	
Residual variance with no correction		5.91E-05
Residual variance with correction		5.23E-05

Phillips-Perron Test Equation
Dependent Variable: D(LNC,2)
Method: Least Squares
Date: 04/29/01 Time: 09:17
Sample(adjusted): 1975:1 2000:1

Included observations: 101 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNC(-1))	-1.025706	0.099322	-10.32712	0.0000
C	0.006693	0.001691	3.956864	0.0001
@TREND(1974:3)	2.72E-05	2.69E-05	1.012035	0.3140

R-squared	0.521498	Mean dependent var	0.000143
Adjusted R-squared	0.511733	S.D. dependent var	0.011172
S.E. of regression	0.007807	Akaike info criterion	-6.838384
Sum squared resid	0.005973	Schwarz criterion	-6.760707
Log likelihood	348.3384	F-statistic	53.40290
Durbin-Watson stat	1.876006	Prob(F-statistic)	0.000000

ADF Test Statistic	1.272083	1% Critical Value*	-3.4979
		5% Critical Value	-2.8909
		10% Critical Value	-2.5822

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNC)
Method: Least Squares
Date: 04/29/01 Time: 09:25
Sample(adjusted): 1975:4 2000:1
Included observations: 98 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNC(-1)	0.004807	0.003779	1.272083	0.2065
D(LNC(-1))	0.020209	0.104149	0.194036	0.8466
D(LNC(-2))	-0.128019	0.103996	-1.230998	0.2215
D(LNC(-3))	0.045243	0.101402	0.446170	0.6565
D(LNC(-4))	-0.079491	0.100378	-0.791922	0.4304
C	-0.043966	0.041126	-1.069067	0.2878

R-squared	0.034811	Mean dependent var	0.007830
Adjusted R-squared	-0.017645	S.D. dependent var	0.007634
S.E. of regression	0.007701	Akaike info criterion	-6.835736
Sum squared resid	0.005456	Schwarz criterion	-6.677473
Log likelihood	340.9511	F-statistic	0.663617
Durbin-Watson stat	1.941339	Prob(F-statistic)	0.651958

ADF Test Statistic	-4.673209	1% Critical Value*	-3.4986
		5% Critical Value	-2.8912
		10% Critical Value	-2.5824

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNC,2)
Method: Least Squares
Date: 04/29/01 Time: 09:26
Sample(adjusted): 1976:1 2000:1
Included observations: 97 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNC(-1))	-1.033550	0.221165	-4.673209	0.0000
D(LNC(-1),2)	0.039190	0.195841	0.200113	0.8418
D(LNC(-2),2)	-0.063907	0.170011	-0.375899	0.7079

D(LNC(-3),2)	0.077252	0.132653	0.582359	0.5618
D(LNC(-4),2)	-0.055165	0.093928	-0.587319	0.5584
C	0.008381	0.001857	4.512539	0.0000

R-squared	0.563257	Mean dependent var	0.000243
Adjusted R-squared	0.539260	S.D. dependent var	0.010650
S.E. of regression	0.007229	Akaike info criterion	-6.961617
Sum squared resid	0.004755	Schwarz criterion	-6.802356
Log likelihood	343.6384	F-statistic	23.47210
Durbin-Watson stat	1.831903	Prob(F-statistic)	0.000000

PP Test Statistic	1.330137	1% Critical Value*	-3.4952
		5% Critical Value	-2.8897
		10% Critical Value	-2.5816

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel:4	(Newey-West suggests: 4)	
Residual variance with no correction		6.09E-05
Residual variance with correction		4.95E-05

Phillips-Perron Test Equation
Dependent Variable: D(LNC)
Method: Least Squares
Date: 04/29/01 Time: 09:26
Sample(adjusted): 1974:4 2000:1
Included observations: 102 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNC(-1)	0.004081	0.003501	1.165637	0.2465
C	-0.037093	0.038478	-0.964008	0.3374

R-squared	0.013405	Mean dependent var	0.007749
Adjusted R-squared	0.003539	S.D. dependent var	0.007896
S.E. of regression	0.007882	Akaike info criterion	-6.829014
Sum squared resid	0.006213	Schwarz criterion	-6.777544
Log likelihood	350.2797	F-statistic	1.358710
Durbin-Watson stat	2.017678	Prob(F-statistic)	0.246534

PP Test Statistic	-10.31235	1% Critical Value*	-3.4959
		5% Critical Value	-2.8900
		10% Critical Value	-2.5818

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel:4	(Newey-West suggests: 4)	
Residual variance with no correction		5.98E-05
Residual variance with correction		5.48E-05

Phillips-Perron Test Equation
Dependent Variable: D(LNC,2)
Method: Least Squares
Date: 04/29/01 Time: 09:28
Sample(adjusted): 1975:1 2000:1
Included observations: 101 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNC(-1))	-1.012042	0.098412	-10.28376	0.0000
C	0.008002	0.001090	7.342672	0.0000

R-squared	0.516497	Mean dependent var	0.000143
Adjusted R-squared	0.511613	S.D. dependent var	0.011172
S.E. of regression	0.007808	Akaike info criterion	-6.847789
Sum squared resid	0.006035	Schwarz criterion	-6.796005
Log likelihood	347.8134	F-statistic	105.7557
Durbin-Watson stat	1.878660	Prob(F-statistic)	0.000000

Price Deflator:

ADF Test Statistic	-0.316116	1% Critical Value*	-4.0540
		5% Critical Value	-3.4557
		10% Critical Value	-3.1534

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(PCON)
Method: Least Squares
Date: 04/29/01 Time: 09:32
Sample(adjusted): 1975:4 2000:1
Included observations: 98 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PCON(-1)	-0.002939	0.009297	-0.316116	0.7526
D(PCON(-1))	0.365098	0.106616	3.424429	0.0009
D(PCON(-2))	0.211137	0.113707	1.856849	0.0666
D(PCON(-3))	0.147453	0.113540	1.298686	0.1973
D(PCON(-4))	0.036224	0.108997	0.332335	0.7404
C	0.003552	0.001809	1.962904	0.0527
@TREND(1974:3)	6.10E-06	8.78E-05	0.069473	0.9448

R-squared	0.525135	Mean dependent var	0.007937
Adjusted R-squared	0.493826	S.D. dependent var	0.004287
S.E. of regression	0.003050	Akaike info criterion	-8.678669
Sum squared resid	0.000846	Schwarz criterion	-8.494028
Log likelihood	432.2548	F-statistic	16.77226
Durbin-Watson stat	1.959013	Prob(F-statistic)	0.000000

PP Test Statistic	1.347274	1% Critical Value*	-4.0503
		5% Critical Value	-3.4539
		10% Critical Value	-3.1523

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel: 4	(Newey-West suggests: 4)	
Residual variance with no correction		1.29E-05
Residual variance with correction		3.59E-05

Phillips-Perron Test Equation
Dependent Variable: D(PCON)
Method: Least Squares
Date: 06/01/01 Time: 17:34
Sample(adjusted): 1974:4 2000:1
Included observations: 102 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PCON(-1)	0.028210	0.009176	3.074323	0.0027
C	0.005207	0.002090	2.491716	0.0144
@TREND(1974:3)	-0.000315	8.26E-05	-3.809431	0.0002

R-squared	0.268692	Mean dependent var	0.007957
Adjusted R-squared	0.253918	S.D. dependent var	0.004217
S.E. of regression	0.003643	Akaike info criterion	-8.363183
Sum squared resid	0.001314	Schwarz criterion	-8.285978
Log likelihood	429.5223	F-statistic	18.18691
Durbin-Watson stat	0.962410	Prob(F-statistic)	0.000000

ADF Test Statistic	-2.613358	1% Critical Value*	-4.0540
		5% Critical Value	-3.4557
		10% Critical Value	-3.1534

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(PCON,2)
Method: Least Squares
Date: 06/01/01 Time: 17:32
Sample(adjusted): 1975:4 2000:1
Included observations: 98 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PCON(-1))	-0.261371	0.100013	-2.613358	0.0105
D(PCON(-1),2)	-0.376985	0.124600	-3.025554	0.0032
D(PCON(-2),2)	-0.169409	0.122828	-1.379233	0.1712
D(PCON(-3),2)	-0.027535	0.104957	-0.262344	0.7936
C	0.003163	0.001322	2.393119	0.0187
@TREND(1974:3)	-2.14E-05	1.26E-05	-1.693283	0.0938

R-squared	0.291427	Mean dependent var	-1.87E-05
Adjusted R-squared	0.252918	S.D. dependent var	0.003511
S.E. of regression	0.003035	Akaike info criterion	-8.697979
Sum squared resid	0.000847	Schwarz criterion	-8.539716
Log likelihood	432.2010	F-statistic	7.567694
Durbin-Watson stat	1.953144	Prob(F-statistic)	0.000005

PP Test Statistic	-5.179289	1% Critical Value*	-4.0512
		5% Critical Value	-3.4543
		10% Critical Value	-3.1526

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel: 4	(Newey-West suggests: 4)	
Residual variance with no correction		9.57E-06
Residual variance with correction		9.79E-06

Phillips-Perron Test Equation
Dependent Variable: D(PCON,2)
Method: Least Squares
Date: 06/01/01 Time: 17:35
Sample(adjusted): 1975:1 2000:1
Included observations: 101 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PCON(-1))	-0.426387	0.082898	-5.143504	0.0000
C	0.004737	0.001136	4.169264	0.0001
@TREND(1974:3)	-2.66E-05	1.20E-05	-2.217614	0.0289

R-squared	0.212625	Mean dependent var	-4.32E-05
Adjusted R-squared	0.196557	S.D. dependent var	0.003504
S.E. of regression	0.003141	Akaike info criterion	-8.659405
Sum squared resid	0.000967	Schwarz criterion	-8.581728
Log likelihood	440.2999	F-statistic	13.23213
Durbin-Watson stat	2.257928	Prob(F-statistic)	0.000008

ADF Test Statistic	-2.016277	1% Critical Value*	-3.4979
		5% Critical Value	-2.8909
		10% Critical Value	-2.5822

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(PCON,2)
Method: Least Squares
Date: 06/01/01 Time: 17:39
Sample(adjusted): 1975:4 2000:1
Included observations: 98 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PCON(-1))	-0.175652	0.087117	-2.016277	0.0467
D(PCON(-1),2)	-0.428314	0.122064	-3.508937	0.0007
D(PCON(-2),2)	-0.199711	0.122732	-1.627219	0.1071
D(PCON(-3),2)	-0.044897	0.105499	-0.425564	0.6714
C	0.001332	0.000768	1.735187	0.0860

R-squared	0.269344	Mean dependent var	-1.87E-05
Adjusted R-squared	0.237918	S.D. dependent var	0.003511
S.E. of regression	0.003065	Akaike info criterion	-8.687698
Sum squared resid	0.000874	Schwarz criterion	-8.555812
Log likelihood	430.6972	F-statistic	8.570737
Durbin-Watson stat	1.966296	Prob(F-statistic)	0.000006

PP Test Statistic	-4.463541	1% Critical Value*	-3.4959
		5% Critical Value	-2.8900
		10% Critical Value	-2.5818

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel: 4	(Newey-West suggests: 4)	
Residual variance with no correction		1.01E-05
Residual variance with correction		9.46E-06

Phillips-Perron Test Equation
Dependent Variable: D(PCON,2)
Method: Least Squares
Date: 06/01/01 Time: 17:40
Sample(adjusted): 1975:1 2000:1
Included observations: 101 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.

D(PCON(-1))	-0.344157	0.075595	-4.552607	0.0000
C	0.002700	0.000682	3.961029	0.0001

R-squared	0.173114	Mean dependent var	-4.32E-05
Adjusted R-squared	0.164761	S.D. dependent var	0.003504
S.E. of regression	0.003202	Akaike info criterion	-8.630244
Sum squared resid	0.001015	Schwarz criterion	-8.578459
Log likelihood	437.8273	F-statistic	20.72623
Durbin-Watson stat	2.350797	Prob(F-statistic)	0.000015

Demographic Effects:

ADF Test Statistic	-2.495110	1% Critical Value*	-4.0540
		5% Critical Value	-3.4557
		10% Critical Value	-3.1534

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(QDEMC)
Method: Least Squares
Date: 06/01/01 Time: 17:50
Sample(adjusted): 1975:4 2000:1
Included observations: 98 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
QDEMC(-1)	-0.005191	0.002081	-2.495110	0.0144
D(QDEMC(-1))	0.861053	0.103985	8.280572	0.0000
D(QDEMC(-2))	0.000935	0.137650	0.006790	0.9946
D(QDEMC(-3))	2.26E-05	0.137673	0.000164	0.9999
D(QDEMC(-4))	-0.071830	0.102660	-0.699694	0.4859
C	0.005401	0.002132	2.532814	0.0130
@TREND(1974:3)	-3.25E-06	9.97E-07	-3.259542	0.0016

R-squared	0.937896	Mean dependent var	-0.000104
Adjusted R-squared	0.933802	S.D. dependent var	0.000407
S.E. of regression	0.000105	Akaike info criterion	-15.42033
Sum squared resid	9.99E-07	Schwarz criterion	-15.23569
Log likelihood	762.5961	F-statistic	229.0488
Durbin-Watson stat	1.935086	Prob(F-statistic)	0.000000

PP Test Statistic	-2.047564	1% Critical Value*	-4.0503
		5% Critical Value	-3.4539
		10% Critical Value	-3.1523

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel: 4	(Newey-West suggests: 4)	
Residual variance with no correction		3.77E-08
Residual variance with correction		1.37E-07

Phillips-Perron Test Equation
Dependent Variable: D(QDEMC)
Method: Least Squares
Date: 06/01/01 Time: 17:51
Sample(adjusted): 1974:4 2000:1
Included observations: 102 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
QDEMC(-1)	-0.011499	0.003313	-3.471006	0.0008
C	0.012230	0.003372	3.627088	0.0005
@TREND(1974:3)	-1.33E-05	7.68E-07	-17.27659	0.0000

R-squared	0.772358	Mean dependent var	-8.68E-05
Adjusted R-squared	0.767760	S.D. dependent var	0.000409
S.E. of regression	0.000197	Akaike info criterion	-14.19811
Sum squared resid	3.84E-06	Schwarz criterion	-14.12091
Log likelihood	727.1038	F-statistic	167.9470
Durbin-Watson stat	0.298238	Prob(F-statistic)	0.000000

ADF Test Statistic	-2.672160	1% Critical Value*	-4.0540
		5% Critical Value	-3.4557
		10% Critical Value	-3.1534

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(QDEMC,2)
Method: Least Squares
Date: 06/01/01 Time: 17:58
Sample(adjusted): 1975:4 2000:1
Included observations: 98 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(QDEMC(-1))	-0.164230	0.061460	-2.672160	0.0089
D(QDEMC(-1),2)	0.084814	0.105872	0.801096	0.4251
D(QDEMC(-2),2)	0.083926	0.105723	0.793835	0.4293
D(QDEMC(-3),2)	0.081654	0.105457	0.774283	0.4407
C	8.14E-05	4.31E-05	1.887000	0.0623
@TREND(1974:3)	-1.92E-06	8.67E-07	-2.218540	0.0290

R-squared	0.073530	Mean dependent var	-7.23E-06
Adjusted R-squared	0.023179	S.D. dependent var	0.000109
S.E. of regression	0.000108	Akaike info criterion	-15.37456
Sum squared resid	1.07E-06	Schwarz criterion	-15.21630
Log likelihood	759.3536	F-statistic	1.460340
Durbin-Watson stat	1.927706	Prob(F-statistic)	0.210468

PP Test Statistic	-2.486128	1% Critical Value*	-4.0512
		5% Critical Value	-3.4543
		10% Critical Value	-3.1526

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel:4	(Newey-West suggests: 4)	
Residual variance with no correction		1.08E-08
Residual variance with correction		1.10E-08

Phillips-Perron Test Equation
Dependent Variable: D(QDEMC,2)
Method: Least Squares
Date: 06/01/01 Time: 17:58
Sample(adjusted): 1975:1 2000:1
Included observations: 101 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(QDEMC(-1))	-0.126489	0.051522	-2.455047	0.0158
C	5.71E-05	3.54E-05	1.613387	0.1099
@TREND(1974:3)	-1.43E-06	7.21E-07	-1.984353	0.0500

R-squared	0.058692	Mean dependent var	-6.64E-06
Adjusted R-squared	0.039482	S.D. dependent var	0.000107
S.E. of regression	0.000105	Akaike info criterion	-15.45004
Sum squared resid	1.09E-06	Schwarz criterion	-15.37237
Log likelihood	783.2271	F-statistic	3.055251
Durbin-Watson stat	1.880473	Prob(F-statistic)	0.051623

ADF Test Statistic	-1.509402	1% Critical Value*	-3.4979
		5% Critical Value	-2.8909
		10% Critical Value	-2.5822

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(QDEMC,2)
Method: Least Squares
Date: 06/01/01 Time: 18:02
Sample(adjusted): 1975:4 2000:1
Included observations: 98 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(QDEMC(-1))	-0.042076	0.027876	-1.509402	0.1346
D(QDEMC(-1),2)	0.014473	0.103121	0.140352	0.8887
D(QDEMC(-2),2)	0.014700	0.103121	0.142551	0.8870
D(QDEMC(-3),2)	0.014882	0.103180	0.144231	0.8856
C	-1.10E-05	1.14E-05	-0.962954	0.3381

R-squared	0.023965	Mean dependent var	-7.23E-06
Adjusted R-squared	-0.018015	S.D. dependent var	0.000109
S.E. of regression	0.000110	Akaike info criterion	-15.34285
Sum squared resid	1.12E-06	Schwarz criterion	-15.21097
Log likelihood	756.7998	F-statistic	0.570871
Durbin-Watson stat	1.988452	Prob(F-statistic)	0.684416

PP Test Statistic	-1.370575	1% Critical Value*	-3.4959
		5% Critical Value	-2.8900
		10% Critical Value	-2.5818

*MacKinnon critical values for rejection of hypothesis of a unit root.

Lag truncation for Bartlett kernel: 4	(Newey-West suggests: 4)	
Residual variance with no correction		1.12E-08
Residual variance with correction		9.64E-09

Phillips-Perron Test Equation
Dependent Variable: D(QDEMC,2)
Method: Least Squares
Date: 06/01/01 Time: 18:04
Sample(adjusted): 1975:1 2000:1
Included observations: 101 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(QDEMC(-1))	-0.037863	0.026064	-1.452662	0.1495

C	-9.84E-06	1.09E-05	-0.905895	0.3672

R-squared	0.020871	Mean dependent var	-6.64E-06
Adjusted R-squared	0.010980	S.D. dependent var	0.000107
S.E. of regression	0.000107	Akaike info criterion	-15.43045
Sum squared resid	1.13E-06	Schwarz criterion	-15.37867
Log likelihood	781.2377	F-statistic	2.110226
Durbin-Watson stat	1.974697	Prob(F-statistic)	0.149480