RIVAL MACROECONOMIC MODELS AND AUSTRALIAN STYLISED FACTS

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ABSTRACT

This paper reports the stylised facts resulting from the tests of rival macroeconomic models in explaining the Australian business cycle during the sample period 1966(3)-1995(3). The dominant rival paradigms such as the New Classical, Keynesian the Real Business Cycle theories have been tested using both Granger causality and non-nested testing techniques. The time-series data used for modelling the rival paradigms were processed using unit root and cointegration econometrics to guard against possible spurious regression inferences due to nonstationarity in the data. Parsimonious data congruent models for testing the rival paradigms were derived by the application of the general-to-specific methodology. The problem of non-spherical errors created by the use of generated regressors in the specification of business cycle models was tackled by replacing ordinary least squares by generalised least squares estimates. The empirical results supported the conclusion that hybrid macroeconomic paradigms encompassing both demand and supply side shocks provide more plausible explanations of the Australian business cycle than tests narrowly focussed only on demand side shocks. The study results challenges the narrow view that rival macroeconomic theories would have failed to provide meaningful guidelines to Australian policymakers to implement counter-cyclical policies during the study period.

Key-words: New Classical, Keynesian, Real Business Cycle, General-to-Specific, Unit Roots, Cointegration, Granger Causality, Non-nested tests, Generated Regressors, Australia.

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1. INTRODUCTION

Rival macroeconomic paradigms having radically different implications for the effectiveness of stabilisation policy constitute the very essence of modern macroeconomic theorising. As is well known , Keynesian analysis contends that policy matters and supports policy activism for stabilisation purposes, whereas the New Classical paradigm argues that only unanticipated policy can be effective and favours a passive approach to stabilisation policy. Empirical tests of rival paradigms in the United States have supported the New Classical perspective (Barro, 1976,1977), but these findings have long since been overturned (Pesaran, 1982; 1988; Mishkin, 1982; Rush and Waldo, 1988), and the latest phase of the empirical battle favoured the Keynesians (McAleer and McKenzie, 1991). Replication of the Barro-Pesaran paradigm tests for a number of European economies have also supported the Keynesian (Dadkhah and Valbuena, 1985). Similar tests in the Australian context are either ambivalent about the rejection of the policy effectiveness proposition implied by the New Classical framework (Bryant, 1991; Horne and McDonald, 1984) or reject outright New Classical paradigm and its auxiliary rationality and neutrality hypotheses (Siegloff and Groenewold, 1987; Valentine, 1993).

Both the Keynesian and New Classical paradigms focus on demand. Real Business Cycle theory, in contrast, focuses on the supply-side shocks and carries a stark policy message: policy that aims to moderate the business cycle through the manipulation of demand is irrelevant or misconceived. The present paper extends the scope the empirical testing of the rival paradigms by considering the Real Business Cycle theory as well as by subjecting the New Classical and Keynesian paradigms to more rigorous testing has so far been attempted with Australian data.

Specifically the paper contributes to literature on Australian business cycle empirics in the following ways: First, it extends the empirical tests on Australian business cycle by considering the supply side Real Business Cycle theory, in addition to the New Classical and Keynesian demand side theories. Second, it uses an expanded quarterly time-series database.. Third, it uses unit root, cointegration and error correction econometrics to process the time-series thereby overcoming the problems of spurious regression inferences. Fourth, it applies general-to-specific modelling methods to derive data congruent parsimonious policy reaction function and generic business cycle models. Fifth, it tackles the problem of generated regressor bias resulting from the non-spherical errors by using generalised least squares estimation techniques. Sixth, the study presents Granger causality tests to ascertain the causal prowess of each paradigm in explaining the business cycle both on a stand-alone and hybrid or combined paradigm basis. Seventh, the study tests the rival paradigms both individually and in hybrid forms using non-nested testing techniques thereby combining both demand and supply side shocks and furthermore overcoming the theoretical objections to the use of nested Granger causality tests. Finally, the empirical results, based on a extended contemporary dataset, tests the three dominant business cycle paradigms in the Australian context.

The rest of the paper is organised as follows: Section 2 reviews salient features of the three major rival macroeconomic paradigms of the business cycle: New Classical, Keynesian and the Real Business Cycle theories. Section 3 reports the unit-root and cointegration tests on the time-series database that was used to test these macro economic paradigms in the Australian context. Section 4 presents the parsimonious specifications and diagnostic test results on the policy reaction function and the business cycle model derived from the general-to-specific modelling of the Australian business cycle. Section 5 discusses the Granger causality tests of the rival paradigms based on both stand alone and hybrid demand and supply shock explanations of the business cycle. Section 6 presents the non-nested test results and the model selection criteria of the single and hybrid versions of the rival macroeconomic paradigms. Section 7 summarises the policy insights and conclusions of the study.

2. SALIENT FEATURES OF RIVAL MACROECONOMIC PARADIGMS

The major rival macroeconomic paradigms that purport to explain the effectiveness of macroeconomic policy in stabilising the business cycle can be classified as demand-side models such as the New Classical and Keynesian models and supply-side models such as Real Business Cycle theory. The New Classical paradigm is premised on the assumptions of Muthian rational expectations and Walrasian market clearing, i.e. identifies asymmetric information or agent misperceptions as the primary cause of the business cycle. The testable hypothesis presented by New Classical theory is contained in the proposition that only unanticipated policy matters or has real output or business cycle stabilisation effects (Lucas, 1972, 1975; Barro, 1976). The New Classical paradigm also lends support to the policy ineffectiveness or policy neutrality proposition under the assumptions of rational expectations (Sargent and Wallace, 1975; Barro, 1976). In stark contrast to the New Classical policy insights, the New Keynesian paradigm contends that only anticipated policy matters and attributes this market failure to the downward rigidity of nominal wages, short-run price stickiness, imperfect competition, and other externalities. Thus, New Keynesians advocate activist policies and fine-tuning to stabilise the business cycle and achieve Pareto optimal outcomes (Fischer, 1977; Taylor, 1980; Gordon, 1982; Mankiw, 1985) and reject the passive policy prescriptions favoured by the New Classical theorists. The Real Business Cycle paradigm takes a radically different perspective on policy. It attributes the business cycle to the economy-wide propagation of the impulse-response of intertemporal substitution caused by supply side shocks such as changes in technology or productivity (Plosser, 1989). The Real Business Cycle and New Classical models reaffirm faith in the invisible hand or Walrasian auctioneer and consider interventionist stabilisation policies based on demand management as irrelevant or misconceived because macroeconomic fluctuations have their origins on supply-side shocks. Real Business Cycle theory contends that markets clear rapidly and that the economy is always at the natural rate and any unemployment is voluntary due to the intertemporal substitution of labour for leisure (Kydland and Prescott, 1977;

King and Plosser, 1984). A cross-classification of the major macroeconomic paradigm according to characteristics such as the type of shocks, market equilibrium, and policy stance is summarised in *Table 1*.

***Table 1*: Taxonomy of salient features of rival paradigms**

Paradigm	**Shocks**	**Market**	**Features**	**Policy**
N: New Classical	Demand	Equilibrium	Asymmetric information or misperceptions	Unanticipated policy matters Ineffectiveness
K: Keynesian	Demand	Disequilibrium	Nominal & Real rigidities	Anticipated policy matters Activism and fine-tuning
R: Real Business Cycle	Supply	Continuous Equilibrium	Voluntary Unemployment	Irrelevant and Misconceived

3. UNIT ROOT AND COINTEGRATION TESTS ON THE DATABASE

Quarterly time-series data for the sample period 1959:3-1995:3 was collated from the DX database (Econdata, 1995). The definition of candidate variables, their transformations and data sources are reported at the end of *Table 2*. ADF (Augmented Dickey Fuller, 1979, 1981) unit root tests with appropriate lag lengths chosen on the basis of the minimum AIC (Akaike Information Criterion) to render the residuals white noise indicated that most of the variables were nonstationary or I(1). The ADF test on the first differenced candidate variables showed that they were I(0) or stationary, thus overcoming the problems associated with spurious regressions (Granger and Newbold, 1974).

The data vectors comprising the monetary policy reaction function and the business cycle equations were tested for cointegration using the Johansen and Juselius (1990) maximum eigen value or λ-max and trace statistics. The tests revealed the presence of at most one cointegration vector underpinning both data vectors (See *Table 3*). The existence of cointegration dictated that an error correction mechanism should be incorporated to avoid mis-specification bias in modelling the policy and business cycles for the causality and non-nested tests implemented in this paper.

***Table 2*: ADF Unit Root Tests, Data Sources and Transformations**

Var (log)	ADF	CV	lags	AIC	Sample	Order I
m_t (drift & trend)	0.33	-3.13	10	-7.69	106	I(1)
y_t (drift & trend)	-2.85	-3.13	9	-8.07	107	I(1)
i_t(drift & trend)	-1.79	-2.57	5	-9.50	111	I(1)
g_t (drift & trend)	-1.01	-3.13	7	-6.10	109	I(1)
x_t (drift & trend)	-0.67	-3.13	8	-5.52	108	I(1)
e_t (drift & no trend)	-0.57	-2.57	0	-15.67	116	I(1)
l_t (drift & trend)	-1.91	-3.13	8	-8.85	108	I(1)
k_t (drift & trend)	-0.77	-3.13	5	-15.71	111	I(1)
$\Delta(m/p)_t$ (drift & trend)	-3.72	-3.13	10	-7.64	105	I(0)
Δy_t (drift & trend)	-3.88	-3.13	9	-8.01	106	I(0)
Δi_t (drift & no trend)	-4.28	-2.57	3	-9.47	112	I(0)
Δg_t (drift & trend)	-4.40	-3.13	3	-6.14	112	I(0)
Δx_t (drift & no trend)	-4.69	-3.13	9	-5.51	106	I(0)
Δe_t (drift & no trend)	-3.24	-2.57	7	-15.77	108	I(0)
Δl_t (drift & trend)	-3.28	-3.13	5	-8.18	110	I(0)
Δk_t (drift & trend)	-3.14	-3.13	8	-15.64	107	I(0)

The lower case letters refer to the log transformations of the original variables. The one plus decimal format was used for the log transform of the interest rate and the exchange rate as indicated: $i_t=\log(1+.01*I_t)$; $e_t=\log(1+.01*e_t)$.

Variable definitions and (data sources):
M_t: Money supply (M3) (RBA)
Y_t: GDP (A) (ABS)
I_t: interest rate = 2-year bond rate (NIF).
P_t: Price level = GDP implicit price deflator (RBA).
R_t: Exchange rate = TWI (RBA)
P_f: World consumption deflator (NIF).
G_t: Government Budget Outlays (NIF)
X_t: Exports(fob) (ABS)
E_t: Exchange rate = AUD/USD (RBA)
L_t: Labour hrs. worked (Lab. force-Unemployed) x Av. weekly earnings (NIF)
K_t: Capital stock NIF & Otto & Vos (1996).

Sources: RBA: Reserve Bank of Australia. ABS: Australian Bureau of Statistics. NIF: Treasury NIF Model.

***Table 3*: Johansen cointegration λ-max and trace statistics**

Monetary policy vector: $M_t = (m_t, y_t, i_t)$. Business cycle vector: $B_y = (y_t, x_t, e_t)$

Null (r)	λ-max M_t	λ-max B_t	95%CV	Trace M_t	Trace B_t	95% CV
0	39.29*	24.57*	20.97	50.80*	39.84*	29.68
1	10.33	13.69	14.07	11.51	15.28	15.41
2	1.18	1.59	3.76	1.18	1.59	3.76

4. GENERAL-TO-SPECIFIC GENERATION OF POLICY AND BUSINESS CYCLE MODELS

The policy reaction function and the business cycle model specified for testing the rival paradigms for the Australian open economy are consistent with the IS-LM-BP or Mundell-Fleming model with perfect capital mobility (Dornbusch and Fischer, 1994: 133-134). The business cycle has been proxied using output or GDP for an open economy taking out of trade and exchange rate effects and therefore differs from the closed economy specification by Barro (1977) who using employment proxy the business cycle. The analysis in this paper is similar to the modelling by Dadkhah and Valbuena (1985) and complements business cycle tests by Chowdhury *et al.* (1994) for the USA. The open economy modelling of the business cycle and the testing of both demand and supply side paradigms are justified on the grounds that the Australian economy shifted increasingly to an open or liberalised trading regime and was exposed to both demand and supply shocks during the study period (Karunaratne, 1996). The algebraic specification of the policy and business cycle models used for testing are presented next.

The monetary policy reaction function:

I. $\mathbf{m_t = Z_t\gamma + \varepsilon_{1t}}$, where $Z_t = (y_t, i_t, rg_t)$ is a vector explaining the money supply process (m_t) proxied by real money balances. (m_t) is explained by transactions demand proxied by income (y_t), the opportunity cost of holding money proxied by the interest rate (i_t), and real government expenditure proxied by the residual from a government expenditure equation (rg_t). The government expenditure proxy replaces the federal government deficit variable ($FEDV_t$) in the Barro specification for the USA.

The generic business cycle model is specified in terms real output or GDP (y_t) and is explained by arguments for real exports (x_t) and the real exchange rate (e_t) to capture the open economy effects as follows:

II. $\mathbf{y_t = W_t\delta + \varepsilon_{2t}}$, where $W_t = (y_t, x_t, e_t, GR_t)$

In model (II) the generated regressors (GR_t) from the monetary policy reaction function could be either the residuals (GR_t=MR_t) proxying unanticipated policy effects of the New Classical model or the fitted values (GR_t=MF_t) proxying anticipated policy effects of the Keynesian model. The generated regressors could also define the Solow residual (GR_t =SR_t) monitoring the technological change or productivity shocks in the neoclassical production function (Solow, 1957) as postulated in the Real Business Cycle theory. The presence of generated regressors violates the classical homoscedasticity assumption due to non-spherical errors and GLS (Generalised Least Squares) estimates facilitates the efficient estimates of parameters and diagnostics. Yet non-rejection of the null using the more efficient GLS procedure does not reverse the finding according to Theorem 8 (Pagan, 1984). It has been demonstrated that more efficient parameter estimates and superior diagnostics could be achieved by using systems methods such as FIML (Full Information Maximum Likelihood) rather than the GLS method (Oxley and McAleer, 1993).

The monetary policy reaction function and the rival business cycle models were estimated using the general-to-specific methodology (Hendry, 1993). General or ADL (autoregressive distributed lag) models of order five for each variable were specified to capture the dynamics underlying DGP (data generation process) which was measured in terms of quarterly time-series data. Common factor (COMFAC) tests were used to jettison non-significant lags, and Lagrange multiplier F and t-tests helped to delete non-significant variables and select a data congruent parsimonious model. The preferred model specifications also passed a battery of diagnostics relating to auto-correlation, heteroscedasticity, normality and functional form mis-specification as well as parameter constancy and forecast stability tests as reported below in *Table 4*.

***Table 4*: Monetary policy reaction function**

Variable(Δm_t)	**Coefficient**	**t-statistic**
Δm_{t-1}	0.9996	19.56
Δm_{t-4}	-0.5800	-6.05
Δm_{t-5}	0.4351	4.76
Δy_{t-1}	0.2238	2.81
Δi_{t-1}	-0.3097	-2.40
Δi_{t-5}	- 0.2799	-2.10
Δrg_t	0.00609	1.44
$ecm1_{t-1}$	-0.0549	-2.22

Diagnostics
Sample 1970(4) to 1995(3)
R^2 =0.88899 σ=0.0215 DW=1.69
RSS=0.0396 for 8 variables and 94 observations.
AR 1-5F(5,84)=1.5089
ARCH 4F(4,78)=0.2596
Normality $Chi^2(2)=37.987^{**}$
$Xi^2 = F(16,69)=2.2768^{**}$
$Xi*Xj=F(44,41)=2.8102^{**}$
RESET F(1,85)=2.8102
Forecast $Chi^2(10)$=16.4830
Chow(10,76)=1.0672

The real government expenditure variable (Δrg_t) in the above monetary policy reaction function was estimated from a specific version of the government expenditure equation derived from a more general or ADL(5) model: $\Delta g_t = f(\Delta g_{t-1}, \Delta g_{t-4}, g_{t-5})$.

The parsimonious specification of data congruent generic business cycle model and relevant diagnostics are presented in *Table 5* below:

***Table 5*: The generic business cycle model**

Variable Δy_t	Coefficient	t-statistic
Δy_{t-1}	0.8138	13.65
Δy_{t-4}	-0.3954	-4.36
Δy_{t-5}	0.3454	-2..37
Δx_t	0.0641	2.81
Δx_{t-4}	0.0581	2.46
Δe_t	7.2938	1.76
Δe_{t-1}	-0.0727	-1.69
Δe_{t-4}	0.6948	1.86
Δe_{t-5}	-10.23	-2.58
$ecm2_{t-1}$	0.05	1.67

Diagnostics
Sample 1970(4) to 1995(3)
R^2 = 0.8479 σ=0.0167
RSS=0.00304 for 8 variables and 108 observations.
AR 1-5F(5,93)=1.6916
ARCH 4F(4,90)=1.09639

Normality $Chi^2(2)=1.0032$
$Xi^2 = F(20,77)=1.0777$
$Xi*Xj=F(63,34)=0.8258$
RESET $F(1,97)=2.9528$
Test for parameter constancy 1990(4)- 1995(3)
Forecast $Chi^2(20) =11.23$
Chow $F(20,70) =0.5101$

The above parsimonious business cycle model was estimated using GLS methods with the generated regressors to specify the rival macroeconomic paradigms. The residuals (MR_t) from the monetary policy reaction function proxied unanticipated money in the New Classical model, while the fitted values (MF_t) proxied anticipated money in the Keynesian paradigm. The Solow residuals (SR_t) obtained from the neoclassical production function proxied the fluctuations induced by real shocks as foreshadowed in Real Business Cycle theory. These generated regressors provided the empirical basis to test the rival paradigms using Granger causality and non-nested testing procedures.

4. GRANGER CAUSALITY TESTS ON RIVAL PARADIGMS

The Granger causality tests examined whether the proxies representing the rival paradigms gave better predictions of the business cycle than predictions based merely on the past history of the business cycle as captured by the lagged values of log real GDP (y_t). The cointegration of the business cycle variables according to the Johansen tests reported in *Table 3*, required the incorporation of an error correction mechanism ($ecm2_t$) to avoid biased causality tests (Granger, 1988). The Granger causality test of each paradigm based on the joint F-test on the generated regressors proved significant (Col. 2, *Table 6*). This warrants the conclusion that the divergent macro paradigms when considered individually gave meaningful policy guidelines for the stabilisation of the business cycle during the study period. The Granger causality tests on hybrid or combined paradigms support the inference that hybrid paradigms provide stronger explanations of the business cycle than paradigms when considered individually. The hybrid paradigms combining the New Classical and Keynesian (N&K), Keynesian and Real Business Cycle (K&R) and New Classical and Real Business Cycle (N&R) seem to have Granger caused the business cycle more strongly (Col. 4, *Table 6*) than any of the single paradigms considered individually. The causality empirics from the hybrid paradigms support the conclusion that both demand-side and supply -side shocks were active in causing the business cycle during the study period.

The Granger causality tests whilst failing to reject any single paradigm as providing valid explanations of the business cycle indicate that hybrid paradigms combining both demand and supply side shocks provide more cogent explanations of the macroeconomic fluctuations during the study period than explanations based exclusively on a single macroeconomic paradigm.

***Table 6*: Granger causality test results**

(1) Causality: Single paradigm	(2) F(6,77) α=.05	(3) Causality: Hybrid paradigms	(4) F(11,77)
N $MR_{t-i} \rightarrow y_t$ i=1,2,3 4	2.68*	N&K Mrt1MFt→> y_t i=1,2,3,4	3.53**
K $MF_{t-i} \rightarrow y_t$ i=1,2,3 4	2.87*	$MR_t 1SR_t$→>y_t i=1,2,3,4	8.61**
R $SR_{t-i} \rightarrow y_t$ i=1,2,3,4	10.84**	$MF_t 1SR_t$ ->y_t	8.96**
Critical value $F_{.05}$	2.25		1.99

N: New Classical; K: Keynesian; R: Real Business Cycle
MR_t: Unanticipated money (residual from the policy reaction function).
MF_t: Anticipated money (fitted value from the policy reaction function).
SR_t: Solow residual from then Neoclassical production function.

6. NON-NESTED TESTING OF RIVAL BUSINESS CYCLE PARADIGMS

A conceptual deficiency of the nested Granger causality tests based on the nested hypothesis testing is that when the null is rejected it favours the alternative even though the alternative hypothesis may be flawed from a theoretical standpoint. The non-nested test procedure claims to overcome this deficiency of nested testing by formulating null and alternative hypotheses that do not share common explanatory variables. This implies that null and alternative hypotheses are not linear combinations of each other or are non-nested. Despite the conceptual affinity of non-nested tests to encompassing tests they are different. If a given model explains the behaviour of a rival model in terms of characteristics such as error variances or forecasts then the given model is presumed to encompass the rival model for the specified characteristics (Mizon and Richard, 1986).

A widely used large sample or asymptotic non-nested test is the J-test (Davidson and MacKinnon, 1981). In the J-test the predicted or fitted values from the alternative or rival model could be regressed as an explanatory variable in the model being studied under the maintained or null hypothesis. The rival model could be deemed to provide a better explanation of the behaviour of the model referred in the null hypothesis, in terms of variance, if the asymptotic t-test on the predicted value regressed in the null model is significant.

Thus the rival model provides a superior explanation of the fluctuations of the variable under focus if the fitted value regressed in the null model proves to be significant. The J test was used to determine the superiority of contending macroeconomic paradigms either singly or in combined forms.

The non-nested J-tests were performed by selecting each model in turn as the maintained or null hypothesis and then regarding the remaining two models as the alternative or rival models. The J-test results enabled the three rival paradigms to be compared in terms of their potency as explanations of the variations of macroeconomic activity or business cycle during the study period. The J-test results reported in (*Table 7*, rows 1-3) indicate that the Real Business Cycle (R) theory performed better than the New Classical (N) theory and the latter performed better than the New Keynesian (K) theory in explaining the business cycle during the study period. The finding that the Real Business Cycle theory provides the most cogent explanation of the Australian business cycle during the study period indicates the dominance of supply-side shocks in generating macroeconomic fluctuations. The finding that new Keynesian (K) paradigm provides a better explanation than the New Classical (N) paradigm accords with the results reported in other studies on the Australian business cycle empirics (Horne and McDonald, 1984; Siegloff and Groenewold, 1987).

The J-testing of the hybrid or combined paradigms against the single model alternatives indicate that the hybrid paradigms gave better explanations of the Australian business cycle than the single or stand-alone paradigms. Overall the hybrid N and K models outperformed the stand-alone R model, the hybrid N and R model outperformed the K model, and the hybrid R and K model outperformed the N model in explaining the Australian business cycle (*Table 7*, rows 4-6). The non-nested test empirics concur with the Granger causality empirics in underscoring that rival paradigms combining both demand and supply side shocks provide superior explanations of the Australian business cycle than models focussing solely on demand side shocks.

The fact that the J-test is a large sample or asymptotic tests has prompted several modifications of the Cox likelihood ratio tests to capture more effectively the small sample properties of the non-nested tests (e.g. N, NT and Wald-W test) (Pesaran, 1974; Godfrey and Pesaran, 1984). However, the sample in this study is large enough to render the J-test adequate.

Model selection criteria, such as the adjusted R^2 and the log-likelihood (LL) values provide additional information for the ranking of the performance of contending paradigms in order of their explanatory power of the business cycle. The ranking of the rival macroeconomic paradigms according to the various model selection criteria are consistent with the ranking obtained and confirm the preferred ranking order of R,N and K explanations of the Australian business cycle as obtained on the basis of non-nested tests. In the case of the hybrid models the model selection criteria indicate that the hybrid N and K paradigms provide a better explanation than the stand-alone Real Business Cycle or R paradigm which in turn offered the better explanation that the single N and K paradigms based on demand shocks.

***Table 7*: Non-nested J-tests and model selection criteria**
N: New Classical; K; Keynesian; R: Real Business Cycle

(1) (Row) Paradigm	(2) t-statistic	(3) R_2 Adj.	(4) log Likelihood	(5) Conclusion
(1) N v. K	FK=1.83*	0.74	293.73	K>N
(2) N v. R	FR=4.58**	0.78	303.09	R>N
(3) K v. R	FR=5.78**	0.81	310.43	R>K
CV	$t_{.05}$=1.96	R>K>N	R>K>N	R>K>N
(4) N v. K1R	FKR=5.93**	0.84	311.17	K1R>N
(5) K v. N1R	FNR=6.03**	0.84	311.69	N1R>K
(6) R v. N1K	FNK=3.92**	0.87	321.25	N1K>R
Critical value	$t_{\alpha=.01}$ =1.96			

J-test: Asymptotic t-statistics for non-nested hypotheses
H_o: $\mu=0^*$, $Y_t = (1-\mu)X_t\beta' + \mu Z_t + \varepsilon_t$ where X_t = (variables relating to null theory and Z_t = (variables relating to alternative paradigm, where $\beta' = (ZZ)^{-1}ZY$

7. CONCLUSIONS

Both Granger causality and non-nested tests of rival paradigms indicate that the hybrid tests combining both demand and supply shocks provide better explanations of the Australian business cycle than explanations based exclusively in terms of demand side shocks. The non-nested tests of rival paradigms have been performed taking into account the time-series properties of the data through the application of unit root and cointegration econometrics. Furthermore, the inefficiency or parameter estimation caused by the use of generated regressors has been tackled through the use of generalised least squares estimation procedures.

The findings of this study do not refute the claims of earlier researchers that the Keynesian model offers a more plausible explanation of the stabilisation effects on the Australian business cycle than the rival New Classical model. Rather, these findings supplement their claims by indicating that the hybrid paradigms that encompass both demand and supply side shocks. provide better explanations of the Australian business cycle than tests focussed exclusively on a single paradigm or macroeconomic theory.

The empirical results of the study dispel some of the scepticism about the relevance of dominant macroeconomic theories in explaining the Australian business cycle. The results do not lend support to assertions that macroeconomic policy has failed or that policy interventions,, have exacerbated the Australian business cycle rather than stabilised it (White, 1994). Furthermore, the empirical insights from the study support the proposition that the dominant rival macroeconomic paradigms that figure in leading macroeconomic theory text-books play a useful role in providing insights into the behaviour of the business cycle and therefore provide guidelines for the formulation of macroeconomic policies for stabilisation policies. Overall, the empirical results for the various nested and non-nested tests are supportive of the conclusion that combinations of rival macroeconomic paradigm, rather than a single macroeconomic paradigms focussing on either demand or supply shocks, provide superior explanations of the effectiveness of stabilisation policies. The empirics of this study seem to support the old adage that two heads, or two theories in this instance, are better than one in explaining that macroeconomic fluctuations that occurred in Australia during the period under study.

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