A Rejoinder:
on the Policy Ineffectiveness Proposition
and a Keynesian Alternative

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On the Policy Ineffectiveness Proposition And a Keynesian Alternative

The new empirical evidence reported by Rush and Waldo (1987) on the relative performance of the "new classical" (NC) and Keynesian type explanations of unemployment is subject to two important limitations:

1. The basis of Rush and Waldo's (RW) results is the introduction of a WAR dummy variable in the DG equation. This is, however, difficult to justify in the context of a rational expectations model under incomplete learning. Wars by their very nature are "unique" events, and it is not clear how the public are supposed to learn the quantitative effects that the ending of three totally different wars may have upon the growth of real government expenditure. The fact that in 1946 the public knew that World War II was over, does not mean that they could also estimate its precise quantitative effect on government expenditure. RW estimate their DG equation using data for the whole of the period 1943-73 (and 1943-85), thus implicitly assuming that all these data were available to the public in 1946 for the computation of the coefficient of the WAR dummy in the DG equation. But, in 1946 the public could not possibly have known about the timing and the intensities of the Korean or the Vietnamese wars. The assumption of complete learning that underlies the rational expectations hypothesis in general, and RW's version of the NC model in particular, is especially troublesome when the model contains dummy variables that correspond to "unique" events.

2. Even if we ignore the learning problem, the conclusion reached by RW is far from being robust. In fact, as will be demonstrated below it is highly sensitive to minor changes in the specification of the Keynesian unemployment equation. In their empirical work RW introduce the WAR dummy in their NC model, albeit indirectly, but exclude it from the Keynesian model. This is difficult to justify on *a priori* grounds. Not unlike the reasoning advanced by RW with respect to the inclusion of the WAR dummy in the DG equation, it can be equally argued that the WAR dummy should also be included in the unemployment equation to capture the temporary effect of the influx of draftees to the labor market on the rate of unemployment at the end of each of the three wars.[1] In view of this I re-estimated my equation (20) (Pesaran, 1982) with RW's WAR dummy as an additional regressor. The following results were obtained for the 1946-73 period:

$$\begin{aligned} UN_t = & \underset{(0.123)}{-2.614} - \underset{(0.774)}{3.515}\, MIL_t - \underset{(0.654)}{1.288}\, MINW_t \\ & \underset{(1.515)}{-2.733}\, DM_t - \underset{(1.251)}{9.323}\, DM_{t-1} - \underset{(0.230)}{0.568}\, DG_t \\ & \underset{(0.005)}{+0.026}t + \underset{(0.039)}{0.114}\, WAR_t + \hat{\epsilon}_{UN}, \end{aligned} \tag{1}$$

$R^2 = 0.8693$, $\bar{R}^2 = 0.8236$, $\hat{\sigma} = 0.1066$, $DW = 2.22$, 1946-73,

$\chi^2_{SC}(1) = 1.00$, $\chi^2_{FF}(1) = 3.51$, $\chi^2_N(2) = 0.71$, $\chi^2_H(1) = 0.74$.

The variables are as defined in RW. The bracketed figures are the standard errors. R, and $\bar{R}$ are respectively the unadjusted and the adjusted multiple correlation coefficients; $\hat{\sigma}$ is the estimated standard error of the regression. DW is the Durbin-Watson statistic. $\chi^2_{SC}(1)$, $\chi^2_{FF}(1)$, $\chi^2_N(2)$,

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[1]Notice that the military variable (MIL) already included in the unemployment equation refers to "selective" draft years and only partially captures the effect of the endings of wars on unemployment [see Barro (1977, pp. 106-07) for details].

$\chi^2_H(1)$, are diagnostic statistics distributed as chi-squared variates (with degrees of freedom in parentheses) for tests of residual serial correlation, functional form misspecification, non-normal errors, and heteroscedasticity, respectively. The details of the computations and algorithms can be found in Pesaran and Pesaran (1987).

This unemployment equation passes the various diagnostic tests and shows a marked improvement over my earlier results. [See equation (20) in Pesaran (1982).] The WAR dummy is highly significant and has the expected sign confirming that the endings of wars tend to have a positive impact on the rate of unemployment. The other estimates are of a similar order of magnitude as before, except for the coefficient of DG which is now estimated to be -0.57 as compared to the figure of -1.07 estimated previously. Despite this the DG variable is still significant at the 5 percent level.

Employing the procedure described by Rush and Waldo, I also obtained the following estimate of their version of the NC model over the period 1946-73:

$$UN_t = \underset{(0.143)}{-3.019} - \underset{(0.778)}{4.059}\, MIL_t + \underset{(0.438)}{0.658}\, MINW_t \tag{2}$$

$$-\underset{(2.005)}{5.328}\, D\tilde{M}R_t - \underset{(1.986)}{11.023}\, D\tilde{M}R_{t-1} - \underset{(1.849)}{2.249}\, D\tilde{M}R_{t-2} + \hat{\xi}_{UN},$$

$R^2 = 0.7765$, $\bar{R}^2 = 0.7257$, $\hat{\sigma} = 0.1329$, $DW = 2.05$, 1946-73,

$\chi^2_{SC}(1) = 0.06$, $\chi^2_{FF}(1) = 4.010$, $\chi^2_N(2) = 1.27$, $\chi^2_H(1) = 1.32$,

where $D\tilde{M}R$ stands for the unanticipated money growth computed under the RW specification when the WAR dummy is included in the DG equation. As to be expected, the above estimate, being based on a better fitting DG equation, is nearer to Barro's preferred unemployment equation (Barro, 1977, p. 108) than equation (23) in my earlier paper (Pesaran, 1982). Nevertheless, in the case of this version, the MINW variable and the second order lag of the unanticipated monetary growth $\tilde{DMR}_{t-2}$, are no longer statistically significant.[2] The model also fails Ramsey's RESET test of functional form misspecification.

Comparing the regression results (1) and (2) it is apparent that even if we take account of Rush and Waldo's argument, the Keynesian alternative still provides a "better" explanation of unemployment over the 1946-73 period. In fact applying the various non-nested hypothesis testing procedures outlined in Godfrey and Pesaran (1983) to models (1) and (2) we obtained:[3]

Test Statistics	Keynesian Versus The NC Model	The NC Versus The Keynesian Model
$\tilde{N}$-test	-0.03	-3.33
W-test	-0.03	-2.42
J-test	0.60	4.49
F-test	F(3,17) = 0.98	F(5,17) = 3.42

In this table the first three statistics are approximately normally distributed, and the last statistic is distributed as an F-variate with the degrees of freedom indicated in the brackets.

All the non-nested tests point to clear evidence against RW's version of the NC model and in favor of our alternative Keynesian explanation. This finding remains intact even if we add the WAR dummy and/or the time trend to

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[2]However, it is important to note that the standard errors of the parameter estimates in (2) are subject to the "generated" regression problem, and their use can lead to misleading conclusions (see, for example, Pagan (1984), and Pesaran (1987, Ch. 7). This issue clearly needs to be addressed and it is unfortunate that Rush and Waldo have chosen to ignore it.

[3]The non-nested test statistics were also computed using Data-FIT.

the regressions of the NC model.[4]

In their paper RW also briefly report on the comparative performance of their NC version and the "Keynesian" model over the extended period 1946-85. In estimating equation (2) over the period 1946-85 I found evidence of more complicated dynamics between changes in the money growth and the rate of unemployment. I also found that the MINW and the DG variables were no longer significant. The regression results for the updated "Keynesian" and RW's version of the NC model are summarized in Tables 1 and 2. The non-nested test statistics relevant to these regressions are given below:

Test Statistics	Keynesian Versus The NC Model	The NC Versus The Keynesian Model
$\tilde{N}$-test	-0.38	-3.88
W-test	-0.37	-2.98
J-test	0.54	4.02
F-test	$F(4,28) = 0.59$	$F(6,28) = 2.74$

These results again provide strong support for the "Keynesian" model. The "Keynesian" equation rejects RW's version of the NC model but can not be rejected by it. Thus contrary to what RW conclude, the "Keynesian" model provides a more satisfactory explanation of unemployment than the NC model once due account is taken of the dynamic adjustments of the unemployment rate to changes in money supply growth and the endings of wars.

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[4]Recall that the WAR dummy variable enters RW's version of the NC model indirectly via the $D\tilde{M}R$ variable.

Table 1

'Keynesian' unemployment equation estimated over 1946-1985 period

Dependent variable is UN
40 observations used for estimation from 1946 to 1985

Regressor	Coefficient	Standard Error	T-Ratio
INPT	-1.6141	.3291	-4.9051
T	.0217	.0039447	5.5007
WAR	.1864	.0312	5.9785
MIL	-2.6347	1.0814	-2.4364
UN(-1)	.4759	.1085	4.3877
DM	-5.1988	1.4842	-3.5029
DM(-1)	-6.8651	1.4864	-4.6187
DM(-2)	2.8065	1.2590	2.2292
R-Squared	.8759	F-statistic F(7, 32)	32.2789
R-Bar-Squared	.8488	S.E. of Regression	.1318
Residual Sum of Squares	.5559	Mean of Dependent Variable	-2.9197
S.D. of Dependent Variable	.3390	Maximum of Log-likelihood	28.7627
DW-statistic	1.9703	Durbin's h-statistic	.1289

Diagnostic Tests

Test Statistics	LM Version	F Version
A:Serial Correlation	CHI-SQ(1)= .0080123	F(1, 31)= .0062108
B:Functional Form	CHI-SQ(1)= 2.5196	F(1, 31)= 2.0840
C:Normality	CHI-SQ(2)= 1.4117	Not applicable
D:Heteroscedasticity	CHI-SQ(1)= .6852	F(1, 38)= .6623

A:Lagrange multiplier test of residual serial correlation
B:Ramsey's RESET test using the square of the fitted values
C:Based on a test of skewness and kurtosis of residuals
D:Based on the regression of squared residuals on squared fitted values

Table 2

Rush and Waldo's version of the New Classical unemployemtn equation
(1946 - 1985)

Dependent variable is UN
40 observations used for estimation from 1946 to 1985

Regressor	Coefficient	Standard Error	T-Ratio
INPT	-3.0501	.1532	-19.9068
MIL	-5.0148	.7266	-6.9013
MINW	1.0637	.3863	2.7537
DMRH85	-5.9070	1.8251	-3.2365
DMRH85(-1)	-10.2825	1.7868	-5.7548
DMRH85(-2)	-3.5574	1.7668	-2.0134

R-Squared	.8184	F-statistic F(5, 34)	30.6459
R-Bar-Squared	.7917	S.E. of Regression	.1547
Residual Sum of Squares	.8138	Mean of Dependent Variable	-2.9197
S.D. of Dependent Variable	.3390	Maximum of Log-likelihood	21.1415
DW-statistic	1.4735		

Diagnostic Tests

Test Statistics	LM Version		F Version	
A:Serial Correlation	CHI-SQ(1)=	2.6152	F(1, 33)=	2.3084
B:Functional Form	CHI-SQ(1)=	1.0593	F(1, 33)=	.8977
C:Normality	CHI-SQ(2)=	5.6515	Not applicable	
D:Heteroscedasticity	CHI-SQ(1)=	.0582	F(1, 38)=	.0554

A:Lagrange multiplier test of residual serial correlation
B:Ramsey's RESET test using the square of the fitted values
C:Based on a test of skewness and kurtosis of residuals
D:Based on the regression of squared residuals on squared fitted values

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