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**INFLATION — UNEMPLOYMENT CHOICES IN  
NEW ZEALAND AND THE MEDIAN VOTER THEOREM**

**David J. Smyth and Alan E. Woodfield**

***Discussion Paper***  
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**No. 9008**

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**INFLATION — UNEMPLOYMENT CHOICES IN  
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**INFLATION-UNEMPLOYMENT CHOICES IN NEW ZEALAND AND THE MEDIAN VOTER THEOREM**

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Using survey data we show that, at any unemployment rate, the New Zealand median voter is much less averse to inflation than his counterpart in the United States. This result is consistent with the median voter theorem.

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## 1. Introduction

The post-war behavior of the New Zealand economy has differed greatly from that of the United States and other OECD countries. The New Zealand unemployment rate has been lower and the inflation rate higher and more variable than in the U.S. Until 1978 the rate of unemployment never rose above one percent. Since then it has fluctuated about an upward trend and during 1989 and 1990 unemployment exceeded seven percent. Over approximately a generation, from 1961 to 1990, the consumer price index increased twelve-and-a-half fold. The rate of inflation was extremely variable. While in some years the rate of inflation was low, the annualized quarterly inflation rates peaked in 1976, 1980 and 1987 at between 17 and 19 percent.

According to the median voter theorem, the different inflation-unemployment patterns observed in New Zealand and the United States will reflect the different inflation-unemployment preferences of the median voter. In New Zealand the median voter should prefer a higher inflation-unemployment ratio than in the United States. In the present paper we use survey data to examine the inflation-unemployment preferences of New Zealanders. We estimate the trade-off that the median voter will choose at different unemployment rates, and compare it with the US trade-off. We find that New Zealanders have much less aversion to inflation than people in the United States.

## 2. The Model

In general form the model we estimate is

$$I = f(P, U, K) \quad (1)$$

where

$I$  = an index of the relative seriousness of inflation and unemployment,

$P$  = the rate of inflation over the past four quarters,

$U$  = the rate of unemployment,

$K$  = the peak rate of unemployment.

An increase in the index,  $I$ , means an increase in the relative seriousness of inflation relative to unemployment so we expect  $\partial I / \partial P > 0$  and  $\partial I / \partial U < 0$ .

The unemployment rate has trended upwards. As unemployment reaches rates higher than people have previously experienced it is likely that people will adjust their perceptions and become immured somewhat to the higher rates of unemployment. Accordingly, at any inflation-unemployment combination, unemployment will be viewed less seriously than in the lower unemployment days in the past. Thus there will be a ratchet effect. The higher the level of unemployment that people have experienced, the higher the index of the seriousness of inflation at any unemployment rate. This ratchet effect may be modelled by including the variable  $K$ , the peak value of the unemployment rate. If the current value of unemployment is greater than any previous value, then  $K$  takes the

current value. Otherwise, it takes the previous peak value. We expect  $\partial I/\partial K < 0$ .<sup>1</sup>

The inflation rate is calculated from the New Zealand consumer price index, all items, published quarterly, as the percentage change in the price index over the corresponding quarter of the previous year.

Unemployment rates from surveys that are reasonably comparable to US unemployment rates are available only from the last quarter of 1985. Thus we have to construct an unemployment rate series. We base our estimates on the number of persons registered as unemployed with the New Zealand Department of Labour as a percentage of an estimated labor force series. For several reasons the survey series exceeds our estimated series for the period of overlap. Accordingly, we multiply our estimates by 1.246, the average ratio of the two measures during the overlap. The resulting series is used throughout this paper.<sup>2</sup>

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<sup>1</sup> For the specification and estimation of ratchet models see Jackson and Smyth (1985).

A similar argument applies to the inflation rate. The higher the recent rate of inflation, the more people will have become accustomed to high inflation and the less seriously they will view a particular rate of inflation at any unemployment rate. When we included the peak value of the inflation rate it was insignificant, presumably because peak values of inflation rose very little over the sample period.

<sup>2</sup> Because of possible different cyclical behavior of the two unemployment measures [see Scollay (1988)], we did not attempt to splice the two series but instead used our series (multiplied by 1.246) throughout. Further information on how the registered unemployment and survey unemployment series differ and on how we constructed the series used is available from Alan Woodfield.

We construct the index  $I$  from a summary time series of responses to a question asked by the National Research Bureau Ltd in the Bureau's quarterly opinion surveys. The question is: "What is the single most important problem facing New Zealand right now?" The index is the ratio  $100\text{MSI}/(\text{MSI}+\text{MSU})$  where MSI and MSU are the percentage of respondents giving answers coded as "Inflation" and "Unemployment" respectively.

Economic theory does not provide us with much guidance for the particular functional form of the general relationship in (1). Inspection indicates that the relationship between the ratio  $I$  and the independent variables is clearly not linear. A simple specification that works well is a semi-log one of the form

$$\ln(I) = a_0 + a_1P + a_2U + a_3U^2 + a_4K + \epsilon \quad (2)$$

where  $\epsilon$  is the disturbance term. This is the equation we estimate. The estimation period is 1978, first quarter, to 1990, second quarter.

Because  $I$  is a ratio bounded by zero and 100, we expect heteroskedasticity of the residuals. Accordingly, we estimated (2) using OLS with a heteroskedastic-consistent covariance matrix.<sup>3</sup> The resulting estimates are reported in Table 1. The model fits well. All the  $t$ -statistics are highly significant. The  $m$ -statistic does not indicate serial correlation. When the fitted values of  $I$  are calculated from the fitted values of  $\ln(I)$ , all fall within the range zero to 100.

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<sup>3</sup> The estimates were made using the HETCOV option in SHAZAM6.2 [White (1990)]. This uses White's (1980) heteroskedasticity-consistent covariance matrix estimator.

The position of the median voter may be represented by a ratio of  $I = 50$ . If  $I = 50$ , there are as many respondents saying that inflation is the most serious problems as there are saying that unemployment is the most serious problem. Substituting  $\ln(50) = 3.912$  for  $\ln(I)$  enables us to solve for the combinations of inflation and unemployment that generate  $I = 50$  for any particular value of  $K$ . This yields

$$\hat{P} = 6.638 + 9.075U - 0.379U^2 - 2.201K \quad (3)$$

where  $\hat{P}$  is the predicted value of inflation.

Table 2 gives the values of  $\hat{P}$  generated by equation (3) for alternative values of  $K$  and  $U$ . The gaps in the table arise because of the constraint that the only feasible values of  $U$  are those that are equal to or greater than  $K$ . The table clearly shows that as peak unemployment has increased over time, the rate of inflation accepted by the median voter at any unemployment rate has decreased markedly. Even so, the inflation rates that New Zealanders are prepared to accept are very high. To date the peak unemployment rate attained is 7.8 percent. The current unemployment rate is of the order of seven percent. So presently the median voter would not view inflation as more serious than unemployment unless the inflation rate were in excess of 36 percent. Even if the unemployment rate were to fall two percentage points to five percent, unemployment would still be viewed as more serious than inflation as long as the inflation rate were below 25.4 percent.

The last column in Table 2 gives estimates for the United States. Even at high unemployment rates, citizens in the United

States are still concerned about inflation. The results for the two countries are consistent with the median voter theorem. New Zealand voters are much less concerned about inflation relative to unemployment than United States' voters and New Zealand politicians have given them much higher inflation-unemployment ratios.

Our results suggest that a more detailed study of New Zealanders' social preference function between inflation and the implications that this poses for the implementation of macroeconomic policy is likely to be worthwhile. Such an analysis is underway.

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Table 1

Estimates of equation (2), 1978 (quarter 1) to 1990 (quarter 2).

Variable	Coefficient	t-statistic*
Constant	3.2515	15.43
P	0.0995	9.17
U	-0.903	-5.89
U <sup>2</sup>	0.0377	3.21
K	0.219	2.54
$\bar{R}^2$	0.923	
m-statistic	0.278	

\*Based on White's heteroskedasticity-consistent estimate of the covariance matrix.

Table 2

Rates of inflation acceptable to the median voter at alternative unemployment and peak unemployment rates

U	NEW ZEALAND (K = 1...7.8)								USA
	1	2	3	4	5	6	7	7.8	
1.0	13.2	11.0	8.8	6.6	4.4	2.2	0	-1.9	0
1.5		15.0	12.8	10.6	8.4	6.2	4.0	2.2	0.2
2.0		18.9	16.7	14.5	12.3	10.1	7.9	6.1	0.4
2.5			20.4	18.2	16.0	13.8	11.6	9.8	0.8
3.0			23.9	21.7	19.5	17.3	15.1	13.3	1.2
3.5				25.0	22.8	20.6	18.4	16.6	1.6
4.0				28.1	25.9	23.7	21.5	19.7	2.1
4.5					28.8	26.6	24.4	22.6	2.6
5.0					31.6	29.4	27.2	25.4	3.1
5.5						31.9	29.7	27.9	3.7
6.0						34.3	32.1	30.3	4.2
6.5							34.2	32.4	4.9
7.0							36.2	34.4	5.4
7.5								36.2	6.1
7.8								37.2	6.4

Source: New Zealand, equation 3; U.S.A., Smyth and Dua (1986, equation 6).

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