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A PRELIMINARY STUDY

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Responsibility for all views expressed in the paper is of course attributable solely to the authors; in particular no opinions purport to represent those of the Reserve Bank of New Zealand.
INFLATIONARY EXPECTATIONS IN NEW ZEALAND:
A PRELIMINARY STUDY

Since the late 1960's, the rate of inflation in most Western economies has been rapid and accelerating. Concurrent with this phenomenon, there has been considerable attention given to the part inflationary expectations could have played in such a process. For example, Turnovskky [27] has recently placed in perspective much of the more important literature on inflationary expectations and examined the role of inflationary expectations in a simple short-run macroeconomic model; more directly within the field of price and wage determination, Parkin has claimed in a world context that an "excess demand plus expectations" framework is able to provide an 80-90% explanation for inflation; while for New Zealand, Hall has surveyed the literature available on inflation and concluded that "...expectations have recently been given an important but uncharted role."

Any investigation into a potential quantitative role for inflationary expectations can proceed in three easily definable steps. The first is to obtain or construct time series data which represent the expected rate of inflation, the second is to research how such inflationary expectations could have been formed, and the third is to examine the extent to which the expected rate of inflation can explain the actual rate of inflation.

Early econometric research focussed on the third step, and in so doing had to make do with indirectly measured expected rate of inflation variables. That is, the expectational time series data were generated from some assumed hypothesis expressing expected prices in terms of previous actual prices. This approach clearly had the disadvantage of forcing on the generated expectations series a predetermined idea of how the decision-maker's expectations were formed, meant that step two above was imposed by assumption rather than established by testing, and resulted from researchers' failure to come up with an independent direct measure of inflationary expectations.

Work directed towards overcoming this fundamental problem followed. A promising start was made when Turnovskky [25] found and
utilized for the United States directly measured expectational data in percentage change form, but unfortunately data of this same type has not been found readily available for other countries. So, researchers have now turned to the relatively more common qualitative survey data collected in situations where an individual is invited to reply whether he or she thinks prices will go higher, lower, or remain about the same; they have also had to produce methods suitable for converting the qualitative data into some quantitative form. A method recently developed by Carlson and Parkin [4] is capable of producing from qualitative data an inflationary expectations series in percentage change form. Basically this method has been applied to Gallup Poll data for the United Kingdom by Carlson and Parkin, to Michigan Survey Research Centre data for the United States by de Menil and Bhalla [16], to Commission of the European Community data for Germany by Knobl [12], and to Australian Chamber of Manufacturers/Bank of New South Wales Survey of Industrial Trends data by Danes [7]. An alternative, less recent, and often used method is that based on the Balance statistic. It can be found outlined in Theil [24], but does not produce a series in percentage change form.

For New Zealand, very little quantitative work has been done involving expectations. The only significant reference to expectational variables appears in the work of Ledingham, who reported that "...some tests have been carried out using price expectations, particularly for the rent, home ownership, and services (consumer price) indices....However, the measures used are primitive and have not been noticeably successful." In seeming confirmation of these disappointing results, in the latest version of the Reserve Bank of New Zealand (RBNZ) model [20], a price expectations variable appears as an explanatory variable in only one equation; to assist in explaining the variable "private sector's (non-bank non-financial institutions) holdings of government securities." Like the variable used in Ledingham's analysis, the RBNZ expectations variable is an indirect measure of inflationary expectations.

This paper is therefore advanced as an initial contribution towards further understanding of a quantitative role for expectations in New Zealand's inflationary process. It reports preliminary results from work undertaken on both the direct measurement and explanation of inflationary expectations. The construction of directly measured inflationary expectations series has been possible through the availability of raw historical data from the New Zealand Institute of Economic Research's Quarterly Survey of Business Opinion. Thus,
like the previously cited work done for the United Kingdom and Australia, this paper tackles only steps one and two referred to above. 10

More particularly, in section I we outline both the Carlson-Parkin and Balance statistic methods used to construct directly measured inflationary expectations series for each of the Distribution, and Manufacturers and Builders Sectors. In section II principal results from the testing of alternative expectations formation hypotheses for each of the four series are presented. Major conclusions are summarized in section III.

I. THE DIRECT MEASUREMENT OF INFLATIONARY EXPECTATIONS

Our introductory comments have indicated that directly measured inflationary expectations series constructed by two methods were used for the econometric testing reported in section II. Accordingly, after briefly covering the relevant question in the Quarterly Survey from which the raw data were drawn, this section outlines the two methods. Most attention is given to explaining how the series in quarterly percentage change form are constructed and to problems associated with that method. It has actually been adapted somewhat from that originally presented by Carlson and Parkin [10], and reflects the mean percentage changes for average selling prices. Then we briefly define the other method; that based on the considerably simpler Balance statistic.

1. The Survey Question

Amongst others, the following two questions are asked in each survey of the Distribution Sector and Manufacturers and Builders Sector:

(i) "Excluding seasonal variations, what has been your firm's experience over the past three months in respect of average selling prices?"

(ii) "Excluding seasonal variations, what changes does your firm expect over the next three months in respect of average selling prices?"

The respondents are asked to answer either "up", "down", "same" or "n/a": those not answering the particular question under consideration but who answered other questions are counted into the "n/a" category. The responses are aggregated and the percentage of replies in each category is calculated to the nearest whole percentage and published.
We shall denote the proportions of the total response in quarter \( t \) for each of the categories: "up", "down", "same", and "n/a" by \( A_t \), \( B_t \), \( C_t \), and \( D_t \) respectively.

2. The "n/a" Response

In the survey "n/a" can be taken to mean either "no answer" or "not applicable". Obviously all merchants, manufacturers and builders must sell something in order to recover their costs so, on the surface, an answer of "not applicable" does not seem logical. Let us consider some possible explanations for an answer of "n/a".

(i) It is possible that there is some misunderstanding between the survey and the respondent. For example, a builder may be unsure whether his average selling price should be his average tender price (whether the tender is accepted or not) or his average accepted tender price, in which case he may either leave the question blank or answer "n/a". If the question is left blank then the answer is classified as "n/a".

(ii) Respondents might purely forget to answer it. For example, they might skip it to answer easier questions first and then forget to return to answer it. Or they may not wish to answer it for some reason.

(iii) A more unlikely occurrence is that the respondent may consider that he will not sell anything in the next quarter, so he may answer with an "n/a". A builder might be such a respondent.

In cases (i), (ii) and (iii) the respondents are not providing any information about their expectations of future price increases, although case (iii) presents some difficulty in interpretation. Unless the business is going to be inoperative or purely building up stocks over the quarter in question it must, in a wide sense, be selling something. It is possible that such "selling" prices may change over the period, perhaps through a cost escalation clause in a contract or some other mechanism. We are getting no information on this point from the respondent in an answer of "n/a".

In a recent paper, Press and Yang [19] provide a Bayesian approach which could be used to guess the true response in Cases (i), (ii) and (iii). They achieve this by a technique using three sources of information.
(a) subject prior information
(b) \( A_t, B_t \) and \( C_t \) from the survey results, and
(c) the information provided by the disaggregate responses
    to the other questions in the survey: responses of both
    those who answer "h/a" and those who answer "up", "same"
    or "down" to the question being analysed.

The alternative to Press and Yang's method is to ignore the
responses in cases (i), (ii) and (iii) and allow the sample size
to decrease with a possible loss in information. We decided to use the latter
method as in our opinion the Press and Yang technique would provide a very
small increase in information at great computational cost. We calculated
new \( A_t, B_t \) and \( C_t \) values by

\[
A'_t = \frac{A_t}{1 - d_t}
\]
\[
B'_t = \frac{B_t}{1 - d_t}
\]
\[
C'_t = \frac{C_t}{1 - d_t}
\]

where \( d_t \) is the proportion of responses falling into cases (i), (ii), and
(iii).

(iv) A fourth possibility is that respondents might not answer
the question because they have difficulty deciding in which category to
answer i.e. they cannot decide

(a) whether their prices will increase or stay the same; or
(b) whether they will decrease or stay the same.

\( A'_t/(A'_t + B'_t) \) is an obvious prior probability of a respondent belonging to
category (a), given he is unable to decide, and \( B'_t/(A'_t + B'_t) \) is the
consequent probability for category (b). Giving "up" and "same"
equal weightings in category (a) and "same" and "down" equal weightings
in category (b), the new \( A_t, B_t \) and \( C_t \) values should be calculated by

\[
A''_t = A'_t + \frac{1}{2} d'_t \left[ A'_t/(A'_t + B'_t) \right]
\]
\[
B''_t = B'_t + \frac{1}{2} d'_t \left[ B'_t/(A'_t + B'_t) \right]
\]
\[
C''_t = C'_t + \frac{1}{2} d'_t
\]

where \( d'_t \) \((= D_t - d_t)\) is the proportion of respondents in case (iv).
Unfortunately there is no way of distinguishing the proportions \( d_t \) and
\(d_t\) which make up \(D_t\), so we took \(d_t = D_t\) and \(d_t' = 0\). The error of such an approximation was thought to be of the same order of magnitude as that resulting from the rounding of percentages of responses to the nearest whole number.

3. The Modified Carlson-Parkin Method.

Assumptions and Basic Procedure

The following assumptions are an attempt to formulate the logic used by businessmen when answering the survey.

(a1) The respondents suppose they are being asked about the behaviour over the next quarter of the price index of the products they sell. For the \(t^{th}\) quarter and \(i^{th}\) respondent, denote by \(x_{it}\) the percentage change in this index over the next quarter.

(a2) The respondents each form their own subjective probability distribution on \(x_{it}\). Let \(F_{it}(x)\) be the subjective probability distribution function on \(x_{it}\) for the \(i^{th}\) respondent in quarter \(t\).

(a3) Assume there are intervals of \(x_{it}\) in which respondents cannot distinguish the values of \(x_{it}\). This assumption is based on the theory of psychology concerned with the degree of imperceptibility to change. Psychologists have variously referred to the appropriate range as the "difference limen", "difference threshold", or the "just noticeable difference",\(^{11}\) and the "difference limen" has been defined as "the increment in physical stimulus necessary to produce a just noticeable difference in sensation".\(^{12}\) The respondents divide the range of \(x_{it}\) into distinct intervals and with each interval they associate a value (the most convenient round number) contained in that interval.

Hence respondents in effect only identify with discrete points on the range of \(x_{it}\) and \(F_{it}(x)\) is thus a discrete probability distribution on these points. Further, assume that for each respondent the interval \([-\delta_{it}, \delta_{it}]\) is associated with the \(x_{it}\) value of zero.

(a4) The respondents are assumed to estimate future percentage price increases under a Decision Theory Model\(^{13}\) with either a zero-one,\(^{14}\) a linear, or a quadratic loss function. The \(i^{th}\)
respondent's estimate of the future percentage increase in selling prices will be the (largest) mode of $F_{it}(x)$ in the case of him having a zero-one loss function, the median in the case of a linear function or the mean in the case of a quadratic loss function. Denote by $M_{it}$ the $i^{th}$ respondent's estimate of future percentage price changes. Because of his inability to distinguish between values of $x_{it}$ in the interval $[-\delta_{it}, \delta_{it}]$ the $i^{th}$ respondent answers as follows:

"up" if $\delta_{it} < M_{it}$

"down" if $M_{it} < -\delta_{it}$ and

"same" if $-\delta_{it} \leq M_{it} \leq \delta_{it}$.

The variable we shall attempt to estimate is

$$\sum_{i=1}^{n} w_{it} M_{it}$$

where $w_{it}$ is the weight given to respondent $i$ in quarter $t$, such that $\sum_{i=1}^{n} w_{it} = 1$.

i.e. we will attempt to estimate the mean estimated future percentage increase in selling prices.

(a$_5$) Assume each respondent has an equal weighting, i.e. $W_{it} = 1/n$. We are in effect assuming each respondent's actions have equal effects on the economy.$^{15}$

(a$_6$) Assume there exists $\delta_{t}$ such that -

- for $A_{t}$ of the respondents $\delta_{t} < M_{it}$;
- for $B_{t}$ of the respondents $M_{it} < -\delta_{t}$, and
- for $C_{t}$ of the respondents $-\delta_{t} \leq M_{it} \leq \delta_{t}$.

In effect $\delta_{t}$ will be some sort of average of $\delta_{it}$. This assumption is necessary to deal with the aggregation of responses which are formed by slightly different decision criteria.
Under assumption (a7) it is a straightforward exercise to prove that \( A_t \) is the maximum likelihood estimate of the weighted proportion of the total population for whom \( \delta_t < M_{it} \). Similarly for \( B_t \) and \( C_t \).

\[ \text{(a7)} \]

Assume \( M_{it} \) is distributed in quarter \( t \) with probability density function \( g_t \). Let \( M_t \) be the random variable which takes values \( M_{it} \) \( i=1, \ldots, n \) with probability density function (p.d.f.) \( g_t \).

Thus \( A_t = \int_{-\delta}^{\delta} g_t(M_t) \, dM_t \) \hspace{1cm} (1)

\[ B_t = \int_{-\infty}^{-\delta} g_t(M_t) \, dM_t \]

\[ C_t = \int_{\delta}^{\infty} g_t(M_t) \, dM_t \]

Since \( A_t + B_t + C_t = 1 \) we have only two "degrees of freedom" in our data so the distribution represented by the p.d.f., \( g_t \), must have a mean (and standard deviation) which is determined by, at the most, two parameters. Let \( P_t^e \) be the mean (i.e. the mean median future percentage increases in selling prices) and let \( \sigma_t \) be the standard derivation of \( g_t \).

Define the random variable \( Y_t \) by

\[ Y_t = (M_t - P_t^e)/\sigma_t \] \hspace{1cm} (3)

so that \( Y_t \) is a standard \((0,1)\) random variable with p.d.f. \( h_t(Y_t) \). We can define \( a_t \) and \( b_t \) such that

\[ A_t = \int_{a_t}^{\infty} h_t(Y_t) \, dY_t \] \hspace{1cm} (4)

\[ B_t = \int_{-\infty}^{b_t} h_t(Y_t) \, dY_t \] \hspace{1cm} (5)

From equations (1) and (4) we see that when \( M_t = \delta_t \), \( Y_t = a_t \).
and similarly from equations (2) and (5), when \( \lambda_t = -\delta_t, Y_t = b_t \).

Thus from equation (3)

\[
\sigma_t a_t = \delta_t - P_t^e \quad \text{and} \quad (6)
\]

\[
\sigma_t b_t = -\delta_t - P_t^e \quad \text{(7)}
\]

Solving equations (6) and (7) for \( \sigma_t \) and \( P_t^e \) gives

\[
\sigma_t = \frac{2\delta_t}{(a_t - b_t)} \quad \text{and} \quad (8)
\]

\[
P_t^e = \delta_t(1 - 2a_t / (a_t - b_t)) \quad \text{(9)}
\]

In order to compute \( P_t^e \) from equation (9) we must have a p.d.f. \( g_t \) and a value of \( \delta_t \) for each quarter.

**The Problem of \( g_t \)**

The main prerequisite required of the p.d.f., \( g_t \), is that it has a mean and variance which together determine the parameters of the distribution, while an important practical consideration is that the distribution be computationally easy to handle. For this preliminary study, we made the convenient obvious choice of using the normal distribution\(^{16} \) (following Carlson and Parkin [4], and Danes [7]). We argue that expectations are formed by a number of economic influences, each influence affecting some businessman's expectations more than those of others, the net effect being a unimodal distribution around a mean value which can be approximated by a normal distribution.

Unfortunately there are some computational problems when \( g_t \) is taken to be the p.d.f. of a normal distribution. The problem results from approximating a discrete distribution which almost certainly has a finite range, with a continuous distribution with an infinite range. When \( A_t \) takes the value zero there is no finite value of \( a_t \) which satisfies equation (4). Similarly (more likely in times of rapid inflation) when \( B_t = 0, b_t \) has no finite value in equation (5). The non-finite value of \( P_t^e \) that results is clearly absurd, so Carlson and Parkin's ad-hoc solution\(^{17} \) was to assume that in these cases \( a_t \) was equal to \( \sigma_{t-1} \) or \( \sigma_{t+1} \) whichever was larger. They argued that the variance of
the distribution would be at least as large as that for the quarters before and after the survey which has $B_t$ (or $A_t$) taking the value zero. However, we felt that $B_t = 0$ (or $A_t = 0$) could also mean there was more agreement between respondents and hence that $g_t$ has a lower variance so we compromised with the ad hoc procedure of setting $a_t$ equal to the mean of $a_{t-1}$ and $a_{t+1}$. At no time was $A_t = 0$ but on the odd occasions when $B_t = 0$, $P_t^e$ was calculated (from equation (6)) by

$$P_t^e = \delta - a_t g_t$$

The Problem of $\delta_t$

Two decisions must be made concerning $\delta_t$. The first is whether to treat $\delta_t$ as a constant and the second is which numerical value or values to use for it. With respect to the former, Carlson and Parkin assume $\delta_t$ to be constant over time. As support, they cite\textsuperscript{18} Weber's Law that "The fraction by which a stimulus must be increased (or decreased) in order for the change to be just perceptible is constant regardless of the absolute magnitude of the stimulus." The law thus implies that the absolute price change that is just perceptible to a respondent is proportional to the actual price level, or alternatively that the percentage perceptible price level is a constant, $\delta$. Intuitively, one would expect different observers to have different values of $\delta_t$ and for $\delta_t$ to change over time as the observer becomes more experienced and sensitive to change. Such apparently reasonable objections to treating $\delta_t$ as constant over time may eventually turn out to be well-founded, but empirical evidence so far available\textsuperscript{19} tends to suggest the opposite. Accordingly, for this study, we have used the Carlson and Parkin assumption that $\delta_t$ is constant over time.

The question of what numerical value $\delta$ should take is not particularly crucial\textsuperscript{20} for the type of testing we report in section II, as from equations (8) and (9) it can be seen that $\delta$ is merely a scaling factor of $g_t$ and $P_t^e$. The procedure adopted by Carlson and Parkin was to take $\delta$ as the sample period ratio of $(1 - 2a_t/(a_t - b_t))$ to the percentage change in the most appropriate price index ($P_t^a$) available. This was criticised by Danes\textsuperscript{21} on the grounds that the sample period ratio could well have some trend component built into it and thus be biased. So, because the Survey available to him had questions of the form (i) and (ii) above he was able to use the more acceptable procedure of using the series relating to the reported past behaviour of prices ($P_t^r$) constructed from question (1) as the numerator in the ratio. The Danes procedure would
clearly be available to us, as for the Distribution series the most appropriate price index would be the All Groups' Consumer Price Index and for the Manufacturers and Builders Series perhaps the G.N.P. deflator. However, the simpler procedure of setting $\delta = 1$ (and thus obtaining an index for $P_t^e$ which is directly proportional to the mean of the estimated expected price changes) was followed instead. This was partly because it was simpler, partly because regressing the equation

$$P_t^r = \alpha + \beta P_t^a + \epsilon$$

did not enable us to reject the hypothesis that $\alpha = 0$, and finally because Danes' subsequent work has shown the exact value for $\delta$ may not be important for the purposes of this paper.

4. The Balance Statistic Method

A very simple statistic able to reflect qualitative business opinion survey results is the Balance statistic, defined as

$$\text{Balance} = A_t - B_t$$

i.e., the proportion of respondents answering "up" minus the proportion of those answering "down".

O. Anderson, Jr. [1] put forward the following intuitive argument in support of this estimator. As the percentage of firms expecting a rise in prices increases one would predict that the expected price increases should become larger and as the percentage of firms expecting a fall in prices increases the expected price increase intuitively should become smaller.

Anderson supported this intuitive argument with a correlation of .998 between the Balance statistic for industrial producers' reported price increases recorded by the Munich Business Test and changes in the official price index for the Industrial sector over a 26 month period. Correlations of a similar magnitude were obtained by Anderson for the reported prices of the wholesale sector and the retail sector.

Theil [24] provides an alternative approach to the Balance statistic, his approach yielding a measure of dispersion of the Balance statistic which he calls the disconformity index $d_t$:

$$d = A_t + B_t - [A_t - B_t]^2$$
The Balance statistic clearly has the advantage of simplicity of calculation but since it can be shown to be equivalent to the Carlson-Parkin estimator under very restrictive assumptions\textsuperscript{24}, the Carlson-Parkin estimator must remain potentially the best estimator.

We used a scaling factor of 50 on the Balance statistic in order that the resulting index would have a range of 100 units; i.e. we used $50(A_t - B_t)$.

II. THE TESTING OF INFLATIONARY EXPECTATIONS FORMATION HYPOTHESES

In Section I, we outlined the two methods used to construct directly measured inflationary expectations series for each of the Distribution and Manufacturing and Building Sectors. Now, we report the results of our investigations into how such expectations could have been formed. The investigations proceeded in two stages: First, we tested some common traditional expectations formation hypotheses expressing current inflationary expectations as some function of previous actual price changes and previous inflationary expectations; then we examined whether certain selected important economic and political events in New Zealand during the sample period had been additionally significant.

Series reflecting previous actual price changes were obtained from the information on reported price movements provided by Survey question (1). This meant that we were able (like Danes, but unlike Carlson and Parkin) to construct series for reported price movements by the same two methods used for the inflationary expectations series, and to test the expectations formation hypotheses with consistently based price series.

All regression equations used 39 quarterly observations for each dependent variable, the observations commencing for the first quarter of calendar year 1964 (i.e. 1964(1)) and ending with the third quarter of calendar year 1973 (i.e. 1973(3)).\textsuperscript{25} Lack of space prevents us from presenting detailed empirical results for all four expectations series, so only those for the Carlson-Parkin constructed Distribution Sector series are presented in this paper.\textsuperscript{26} However, where any of the other series yielded markedly different conclusions this will also be indicated. A major reason for presenting the Distribution rather than the Manufacturing and Building Sector results here is that the coverage of the Distribution Sector series is probably much closer to that of the All Groups Consumers Price Index (CPI). The point is an important one for carrying out work on the relationship between the expected and actual rates of inflation.
Conversely, though, if we were primarily interested in step three in the influence of inflationary expectations on a Gross National Product (GNP) deflator series, then the Manufacturers and Builders series would probably have been the more appropriate to present detailed results for. A third option for step three would be to utilise some appropriately weighted average of the Distribution and Manufacturers and Builders (and Services) series. 27

1. Some Traditional Expectations Formation Hypotheses

Traditional expectations formation hypotheses tested by us were:

The Static Expectations Hypothesis

This is the simplest form of hypothesis and assumes that a person's expectations about the rate of inflation for the next period are directly proportional to the current reported rate of inflation, i.e.

\[ \hat{p}_t^e = a_1 \hat{p}_t \]  \hspace{1cm} (10)

where \( \hat{p}_t^e \) = expectation formed during period \( t \) about the rate of inflation for period \( t + 1 \),

\( \hat{p}_t \) = rate of inflation reported for period \( t \).

The Extrapolative/Regressive Expectations Hypothesis

This hypothesis assumes that the expected rate of inflation is equal to the current reported rate of inflation plus (for the extrapolative case) or minus (for the regressive case) some constant proportion of the difference between the current and previous reported rates. The hypothesis can be presented in first order, second order, or more general form; the equation reflecting the first order hypothesis is

\[ \hat{p}_t^e = p_t + \beta_1 (\hat{p}_t - \hat{p}_{t-1}) \]  \hspace{1cm} (11)

If \( \beta_1 > 0 \), equation (11) reflects the extrapolative system and any inflationary trend would be assumed to continue; if \( \beta_1 < 0 \), the regressive system is represented and any inflationary trend would be expected to be reversed.

The Error Learning (or Adaptive) Hypothesis

This hypothesis too is able to be expressed in either first order, second order, or more general form, and as the name suggests rests on the basic premise that people are able to build into their expectations formation behaviour a correction for error made in the previous period or periods. More particularly, the first order scheme assumes the current
expected rate of inflation is dependent on the expectation formed during the previous period plus some constant proportion of last period's error, i.e.

\[ \hat{p}_t^e = \hat{p}_{t-1}^e + \chi_1 (\hat{p}_t - \hat{p}_{t-1}^e) \] (12)

The second order scheme takes the expectations formation behaviour as being a little more sophisticated still, as the person is able to correct not only for the previous error but also for the error before that. This is equivalent to taking account of both the size and rate of change of the previous error, i.e.

\[ \hat{p}_t^e = \hat{p}_{t-1}^e + \epsilon_1 (\hat{p}_t - \hat{p}_{t-1}^e) + \epsilon_2 (\hat{p}_{t-1} - \hat{p}_{t-2}^e) \] (13)

Equations (10) to (13) were estimated as expressed and in unrestricted form for all four expectations series. In each case, the significance of the restrictions was tested using the standard F test on the restricted and unrestricted residual sums of squares (RSS). Estimates obtained for the Carlson-Parkin Distribution Sector series appear in Table I, and summary conclusions from the results for all series are:

(i) the static expectations hypothesis cannot be rejected at the 5% level of significance for the two Distribution Sector series. At this level of significance, though, the hypothesis cannot be accepted for either Manufacturers and Builders Sector series.

(ii) the first order extrapolative/regressive hypothesis cannot be accepted for any series at the 1% level of significance. The regressive hypothesis is rejected because the coefficient \( \beta_1 \) is positive for all four series, and the extrapolative hypothesis is rejected because the restrictions inherent in equation (11) could not be accepted at the 1% level.

(iii) the first order error learning hypothesis could not be rejected for any series at the 1% level of significance, and only for the Carlson-Parkin Distribution Sector series could the restrictions not be accepted at the 5% level.

(iv) for the second order error learning hypothesis, the restrictions could not be accepted for any series at the 5% level of significance but at the 1% level they could not be accepted only for the Balance statistic Distribution Sector series.
<table>
<thead>
<tr>
<th>Equation (10)</th>
<th>$\dot{p}_t^e = .879 \dot{p}_t$</th>
<th>SEE</th>
<th>RSS</th>
<th>D-W</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>.373</td>
<td>5.288</td>
<td>1.45</td>
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<tr>
<td>Equation (10) unrestricted</td>
<td>$\dot{p}_t^e = .108 + .812 \dot{p}_t$</td>
<td>.376</td>
<td>5.220</td>
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<td></td>
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<td>[.70]</td>
<td>[7.80]</td>
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<tr>
<td>Equation (11)</td>
<td>$\dot{p}_t^e = \dot{p}_t + .173 (\dot{p}<em>t - \dot{p}</em>{t-1})$</td>
<td>.409</td>
<td>6.363</td>
<td>1.58</td>
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<td></td>
<td>[1.21]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equation (11) unrestricted</td>
<td>$\dot{p}_t^e = .214 + 1.08 \dot{p}<em>t - .358 \dot{p}</em>{t-1}$</td>
<td>.352</td>
<td>4.455</td>
<td>1.74</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[1.40]</td>
<td>[7.43]</td>
<td>[2.49]</td>
</tr>
<tr>
<td>Equation (12)</td>
<td>$\dot{p}<em>t^e = \dot{p}</em>{t-1} + .806 (\dot{p}<em>t - \dot{p}</em>{t-1})$</td>
<td>.408</td>
<td>6.317</td>
<td>1.63</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[1.93]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equation (12) unrestricted</td>
<td>$\dot{p}_t^e = .111 + .857 \dot{p}<em>t - .054 \dot{p}</em>{t-1}$</td>
<td>.380</td>
<td>5.206</td>
<td>1.37</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[.70]</td>
<td>[4.86]</td>
<td>[3.2]</td>
</tr>
<tr>
<td>Equation (13)</td>
<td>$\dot{p}<em>t^e = \dot{p}</em>{t-1} + .822 (\dot{p}<em>t - \dot{p}</em>{t-1}) - .263 (\dot{p}<em>{t-1} - \dot{p}</em>{t-2})$</td>
<td>.398</td>
<td>5.855</td>
<td>1.63</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[5.46]</td>
<td>[1.73]</td>
<td></td>
</tr>
<tr>
<td>Equation (13) unrestricted</td>
<td>$\dot{p}<em>t^e = .228 + .988 \dot{p}<em>t - .455 \dot{p}</em>{t-1} + .181 \dot{p}</em>{t-1} + .024 \dot{p}_{t-2}$</td>
<td>.357</td>
<td>4.335</td>
<td>1.98</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[1.47]</td>
<td>[5.61]</td>
<td>[2.12]</td>
</tr>
</tbody>
</table>

[ ] = "t" ratio
SEE = equation standard error of estimate
RSS = residual sum of squares
D-W = Durbin-Watson statistic. The Durbin-Watson test procedure is not applicable for those equations where a constant term is not estimated.
(v) There are no apparently different results (in terms of acceptance and rejection of expectations formation hypotheses) for series constructed by the Carlson-Parkin and Balance statistic methods, apart from two minor results mentioned in (iii) and (iv).

(vi) there is a more important distinction between results for the Distribution Sector and Manufacturers and Builders Sector with respect to acceptance and rejection of the static expectations hypothesis.

Hence, after rejecting outright the first order extrapolative/regressive hypothesis and rejecting the static expectations hypothesis for both Manufacturers and Builders Sector series, we are left with three traditional expectations formation hypotheses consistent with our data. The static expectations hypothesis cannot be rejected at the 5% level for Distribution Sector data, the first order error learning hypothesis cannot be rejected at the 1% level for any series, and the second order error learning hypothesis cannot be rejected for either Carlson-Parkin series or for the Balance statistic Manufacturers and Builders series.

Table 2 presents the equation standard error of estimate (SEE) for each hypothesis not rejected.

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Distribution Sector Series</th>
<th>Manufacturers and Builders Sector Series</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Carlson-Parkin</td>
<td>Balance</td>
</tr>
<tr>
<td>Static expectations</td>
<td>.373</td>
<td>5.000</td>
</tr>
<tr>
<td>First order error learning</td>
<td>.408</td>
<td>6.329</td>
</tr>
<tr>
<td>Second order error learning</td>
<td>.398</td>
<td>Hypothesis Rejected</td>
</tr>
</tbody>
</table>

On the basis of the SEE criterion, the static expectations hypothesis must be preferred for both Distribution Sector series. This accords with Rutledge's conclusion for Australian manufacturers that "...the static expectations specification appears to be the most satisfactory."28. For the Distribution Sector series constructed by the modified
Carlson-Parkin method, our conclusion is further not at variance with that reached by Carlson and Parkin [4]. This is because Carlson and Parkin could not reject either the first order or second order error learning mechanisms, found the second order hypothesis preferable to the first order one, and did not test a static expectations hypothesis. The second order error learning hypothesis is preferred for both Manufacturers and Builders Sector series. This result is also consistent with the work by Carlson and Parkin, but differs from Danes' recent conclusion for Australian manufacturers that "...although past values of expectations are taken into account when expectations are formed this does not take place in the way suggested by the traditional (extrapolative/regressive and error learning) hypotheses about expectations formation."  

From the results presented in this section, we conclude that inflationary expectations in New Zealand can be explained satisfactorily in terms of recent actual and recent expected rates of inflation. Whether these explanations are sufficient in themselves will be seen in the next section. Each of the hypotheses for which SEE figures appear in Table 2 was retained for the expectations - augmenting work.

2. Some Expectations - augmenting Estimates

It is quite conceivable that after individuals have taken into account recent actual and expected rates of inflation in forming their current inflationary expectations, certain specific important economic and political events may further independently influence their final judgement. Accordingly, we have tested for the significance of a selected number of such events which took place in New Zealand during our sample period. Events considered related to external sector activity, political influences, general wage orders, wage controls and price controls.

In some cases we were able to represent the influences by time series, but more often we had to utilise the econometric technique most relevant for testing individual economic events, i.e. the technique of dummy variables.  

It should be emphasised that we consider the use of the dummy variable technique a relatively blunt weapon.

The major variables tested are listed in the Appendix. Complications which arose in the course of testing the significance of individual events were that during some quarters more than one important
event occurred, and further that sometimes the different events would have been expected to influence inflationary expectations in opposite directions. This more complex type of influence appears in the Appendix under the heading "Mixed Influences."

Initially, each variable was tested as an influence individually augmenting the relevant expectations formation hypotheses; then multiple influences were considered. In the commentary which now follows, variables should be read as augmenting the static expectations hypothesis for Distribution Sector series, and as augmenting the first order error learning mechanism for Manufacturers and Builders Sector series. The reasons for this are first that the S.E.E.'s of the static expectations augmented equations were always less than those of the first order error learning augmented equations, thus reinforcing the pattern established in Table 2; secondly because in all cases when variables were significant in augmenting the second order learning mechanism, the coefficient of the variable \( \hat{p}_{t-1} - \hat{p}_{t-2} \) failed to be significant at the 5% level of significance.

External Influences

The two principal influences of external nature were devaluation of the New Zealand dollar by 20% during the fourth quarter of 1967, and the two revaluations which took place during the third quarter of 1973. As is evident from the definition of the variable Z.E.E. in the Appendix, however, the revaluations influence cannot be taken as independent of the 30 day price freeze and the 8.5% (with restrictions) wage order taking place during that same quarter. The price freeze would be expected to work in the same direction as the revaluations, but the wage order not so.

Initial and all subsequent empirical results indicated that the devaluation variable Z.E.E. was a correctly signed and significant additional influence on all inflationary expectations series. In no case, though, was the variable Z.E.E. significant. This could be because revaluation (plus the accompanying price freeze) is not as powerful an influence on inflationary expectations as devaluation, because the extent of the revaluations was not sufficient to register as important, or because the combined influence of the revaluations and price freeze was roughly outweighed by the 8.5% wage order component of that quarter's stabilisation package.
Political Influences

No significant additional influence was able to be detected for any quarter in which a general election was held, nor did the fact that a Labour or a National Government held office seem important. The variable ZPPL representing this latter influence was consistently of correct (positive) sign but never of significance at the 1% level. The correctness of sign we interpret as being attributable to the Labour Government's decision in 1972 (4) to abolish the Remuneration Authority rather than because respondents expected a Labour administration to take a softer line on prices than a National Party administration.

Wage Orders

The handing down of General Wage Order decisions formerly held a very central role in the wage determination process, and a similarly strong influence has since been played by the granting of Cost of Living Orders. We tested for the influence of these in two distinct ways: One method was to use an updated version of the subjective index constructed by Ledingham [13], and since utilised with some success in Ledingham [14], and RBNZ [20]; the other was to test for each Order individually with dummy variables.

For no equation could the Wage Orders Index ZWI be found of correct sign and significance at the 5% level, and in almost all cases the individual General Wage Order and Cost of Living Order variables also provided no significant additional influence. The variable ZWOP, reflecting joint influence of the nil General Wage Order decision and the announcement of a two months price freeze during 1968(2), was consistently with negative coefficient, but also in no case significant at the 5% level. The variable ZWO5, defined as incorporating the 1972(4) Cost of Living Order of 4.2% and the Labour Government's decision to abolish the Remuneration Authority, had coefficients consistently of correct sign, but at no stage was it significant at the 5% level either. It has already been referred to under Political Influences.

The one Wage Order influence significant for all series is the General Wage Order increase of 6% handed down in the third quarter of 1964, i.e. the variable ZWOL. The SEE of the third equation in Table 3 is higher than that of the second equation, though, and is illustrative that
<table>
<thead>
<tr>
<th>( t )</th>
<th>( P_t )</th>
<th>ZDE</th>
<th>ZWO1</th>
<th>ZPC2</th>
<th>SEE</th>
<th>RSS</th>
<th>D-W</th>
<th>( \rho )</th>
</tr>
</thead>
<tbody>
<tr>
<td>.872</td>
<td>.872</td>
<td>.384</td>
<td>5.302</td>
<td>1.94</td>
<td>.28</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[16.1]</td>
<td>[16.1]</td>
<td>[1.70]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>.859</td>
<td>.859</td>
<td>.311</td>
<td>3.387</td>
<td>1.97</td>
<td>.39</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[16.4]</td>
<td>[3.99]</td>
<td>[2.42]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>.857</td>
<td>.857</td>
<td>.321</td>
<td>3.603</td>
<td>1.89</td>
<td>.42</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[14.9]</td>
<td>[3.65]</td>
<td>[2.67]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>.841</td>
<td>.841</td>
<td>.236</td>
<td>1.887</td>
<td>1.84</td>
<td>.62</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[14.7]</td>
<td>[5.80]</td>
<td>[14.71]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>.824</td>
<td>.824</td>
<td>.230</td>
<td>1.738</td>
<td>1.86</td>
<td>.67</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[13.2]</td>
<td>[6.09]</td>
<td>[5.78]</td>
<td>[1.71]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**

** All equations have been corrected for 1st order serial correlation, using the theoretical method developed by Pagan [17] = autocorrelation coefficient

** Result for Distribution Sector series constructed by the Balance Statistic method.
the partial augmenting influence of ZWO1 is not as great as that of ZDE. The fourth equation indicates the two variables retain significant coefficients when considered together.

Price Controls

Here too, testing was done with both a subjectively constructed series based on that presented in Ledingham [15] and individual dummy variables.

The price controls series variable ZPC was at no stage significant; nor was the variable ZPCW, representing the two months price freeze and 5% General Wage Order of 1970(4), although it was consistently of negative sign. The variable ZPC1, representing the prices freeze and prices justification measures of 1970(4) and 1971(1), was another variable to maintain its negative sign consistently and yet fail to be significant at the 5% level of significance.

Results for the variable ZPC2, representing the 1972(1) price freeze, were rather more interesting. For each series, the coefficient of ZPC2 had the expected negative sign. However, whereas the coefficients were not significant for either Manufacturers and Builders series, a coefficient significant at the 10% level was obtained for the Carlson-Parkin Distribution case, and a coefficient significant at the 1% level for the Balance statistic Distribution case. These latter two results are presented as the fifth and sixth equations in Table 3. Thus although ZPC2 is significant at somewhat significant levels for the Carlson-Parkin and Balance statistic Distribution series, these results suggest it is not inconceivable that the price control measures of 1972(1) affected the inflationary expectations of Distributors and of Manufacturers and Builders differently.

Wage Controls

No individual dummy variables were used to test for the influence of wage controls on inflationary expectations; a wage controls series was tested instead, with the particular series again being one drawn substantially from the work of Ledingham [15]. In regressions utilising the two Manufacturers and Builders series, our wage controls variable ZWC was at no stage significant; for the Distribution sector series, we obtained coefficients consistently negative but not significant at the
5% level of significance. Because the latter coefficients were not sufficiently significant, again we cannot draw a definite distinction between the behaviour towards controls of Distributors, and Manufacturers and Builders. The results are, however, not inconsistent with those reported above for the price control variable ZPC2.

In summary, with respect to the expectations -- augmenting variables tested, it can be concluded:

(i) for all four of the inflationary expectations series, only the 1967(4) devaluation32 and the 1964(3) 6% General Wage Order were significant influences over and above either a static expectations or a first order error learning mechanism.

(ii) influences found not significant across the board at the 5% level of significance were:-

(a) the stabilisation package of 1973(3),
(b) all political influences,
(c) all Wage Orders except that for 1964(3), and the joint influence in 1968(2) of the nil General Wage Order decision and the two month price freeze,
(d) all price controls and wage controls, except for the price freeze imposed in February 1972.

(iii) the price freeze of February 1972 had no significant influence on the inflationary expectations of Manufacturers and Builders, but may have had some influence on the expectations of Distributors.

(iv) some of the price control and wage control results imply the possibility of differing behaviour patterns by Distributors and Manufacturers and Builders.

(v) series constructed by the Carlson-Parkin and Balance statistic methods have again not led to significantly different conclusions, apart from the one minor case where the price control variable ZPC2 was significant at different levels of significance.

Hence, in light of the conclusions reached in this section, the preferred equations for each of the four inflationary expectations
series are presented in Table 4.

III. Concluding Comments

We have constructed by two different methods satisfactory directly measured inflationary expectations series for both the Distribution and Manufacturers and Builders Sectors of the New Zealand economy. Our paper has emphasised that the basic Carlson-Parkin method is theoretically more attractive than the simple Balance Statistic method, and that there is the possibility of obtaining from some future versions of the Carlson-Parkin method correctly scaled inflationary expectations series in percentage change form. However, our hypothesis testing to date has revealed results that show very little sensitivity to the method used.

We also conclude that the procedure adopted in the very early inflationary expectations work is likely to result in considerable misspecification of how a decision maker's expectations could have been formed. This is because our testing of some common traditional expectations formation hypotheses showed that our data was not consistent with expectations formed in a regressive or extrapolative fashion, and that it was variously consistent with the static, first order error learning, and second order error learning mechanisms. We chose from amongst the latter three hypotheses using the SEE criterion, and preferred a static expectations formation hypothesis for Distribution Sector data and a first order error learning expectations formation hypothesis for Manufacturers and Builders Sector data.

From results presented in the second part of Section II, we conclude that neither preferred traditional expectations formation hypothesis on its own could provide a sufficient explanation of inflationary expectations. A devaluation variable and one General Wage Order variable were significant additional influences in all work. We were further able to find no evidence to suggest either price controls or wage controls had any significant additional effect
<table>
<thead>
<tr>
<th>Series</th>
<th>$\ddot{p}_t$</th>
<th>$\ddot{p}_t - \ddot{p}_t^{e}$</th>
<th>ZDE</th>
<th>ZWO1</th>
<th>ZPC2</th>
<th>SEE</th>
<th>RSS</th>
<th>D-W</th>
<th>$\rho$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carlson-Parkin</td>
<td>.841</td>
<td></td>
<td>1.16</td>
<td>1.11</td>
<td></td>
<td>.236</td>
<td>1.887</td>
<td>1.84</td>
<td>.62</td>
</tr>
<tr>
<td>Distribution Sector</td>
<td></td>
<td></td>
<td>[5.00]</td>
<td>[5.50]</td>
<td></td>
<td></td>
<td></td>
<td>[4.40]</td>
<td></td>
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<tr>
<td>Balance Statistic</td>
<td>.920</td>
<td>17.8</td>
<td>14.8</td>
<td>-10.8</td>
<td></td>
<td>3.980</td>
<td>522.9</td>
<td>1.92</td>
<td>.64</td>
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<tr>
<td>Distribution Sector</td>
<td></td>
<td></td>
<td>[5.27]</td>
<td>[4.33]</td>
<td>[3.22]</td>
<td></td>
<td></td>
<td>[4.57]</td>
<td></td>
</tr>
<tr>
<td>Carlson-Parkin</td>
<td>1.14</td>
<td>.719</td>
<td>.547</td>
<td></td>
<td></td>
<td>.134</td>
<td>1.151</td>
<td>1.94</td>
<td>.47</td>
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<td>M &amp; B Sector</td>
<td></td>
<td></td>
<td>[6.30]</td>
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<td>[3.12]</td>
<td></td>
<td></td>
<td>[2.95]</td>
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<td>Balance Statistic</td>
<td>1.15</td>
<td>15.6</td>
<td>12.4</td>
<td></td>
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<td>4.329</td>
<td>657.3</td>
<td>1.86</td>
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<td>[3.75]</td>
<td>[3.10]</td>
<td></td>
<td></td>
<td>[3.62]</td>
<td></td>
</tr>
</tbody>
</table>

All equations have been corrected for 1st order serial correlation
on the expectations of that group of firms classified by the N.Z.I.E.R. as Manufacturers and Builders. There is the possibility that Distributors' expectations could have been sensitive to some price control measures.

Clearly, the results obtained from this preliminary study are not unpromising. To construct an exact percentage change measure of inflationary expectations from qualitative data will require considerable further development work on the Carlson-Parkin method, but already research along these lines has appeared as Carlson and Ryder [5], Danes [8], and Carlson [3]. Until this further development work has been completed and as the Carlson-Parkin and Balance Statistic results of this paper are not significantly different, it is now worthwhile proceeding with examining the extent to which our expectations series can explain and forecast the actual rate of inflation.
FOOTNOTES

1. Parkin [18], p. 5.
3. Hall [10], p. 10
4. For example, Solow [23]
5. For a number of alternative hypotheses, see Turnovsky [26] pp. 4-5 or Turnovsky and Wachter [28], pp. 48-49.
6. A direct measure is taken by de Menil and Bhalla [16] p. 169, to be one constructed from a sample survey in which individuals are asked to state their expectations explicitly.
7. Qualitative surveys of this type may be classified into two distinct classes. The first can be termed popular opinion surveys, and in the pricing area would ask respondents of their expectations about price changes in the economy as a whole. The response may perhaps be interpreted as an attempt to predict future movements in some well publicised official price index. The second category may be referred to as business opinion surveys, and would ask agents (generally businessmen) who supply goods and services to predict future movements in their own selling prices. Depending on the breadth of coverage of the sample and the business' range of products, the price index envisaged here may or may not be particularly broad in coverage.
8. Ledingham [14], p. 19
9. We are grateful to the Institute for permission to utilise and refer to data from the Quarterly Survey. The Survey has been conducted since 1961 and from its inception two major sectors have been questioned; the Distribution Sector, and the Manufacturers and Builders Sector. Since the March quarter of 1968 the survey has also covered the Service Sector, but the lack of a sufficient number of time series observations has precluded using this for testing purposes.
10. The third step, that of establishing links between directly measured expectations variables and the actual rate of inflation, is left to a later stage. Results in this area for Australia have, however, been reported in Carmichael [6].
11. Carlson and Ryder [5], p. 4.
12. Some possible empirical evidence of this inability to distinguish between values of $x_{it}$ in an interval may be found in the response to a survey of top New Zealand executives conducted by W.R. Scott and Company, Management Consultants of Auckland. The following is the response to the question: "What is New Zealand's inflation rate likely to be in 1975?"

<table>
<thead>
<tr>
<th>Inflation Rate</th>
<th>% Response</th>
<th>Inflation Rate</th>
<th>% Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 5</td>
<td>1</td>
<td>13</td>
<td>5</td>
</tr>
<tr>
<td>6 - 8</td>
<td>7</td>
<td>14</td>
<td>6</td>
</tr>
<tr>
<td>9</td>
<td>6</td>
<td>15</td>
<td>22</td>
</tr>
<tr>
<td>10</td>
<td>13</td>
<td>16 - 20</td>
<td>8</td>
</tr>
<tr>
<td>11</td>
<td>4</td>
<td>20+</td>
<td>3</td>
</tr>
<tr>
<td>12</td>
<td>25</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The most striking feature is the three peaks in the responses at inflation rates of 10 per cent, 12 per cent and 15 per cent. This would tend to indicate that a large proportion of respondents could distinguish between future inflation rates of 10 per cent, 12 per cent and 15 per cent but not intermediate values.

13. For the theory behind such a model see De Groot [9].

14. In the case of the zero-one loss function, we assume that the range of percentage price changes is divided up into intervals, each containing points which are indistinguishable to the respondent, the interval containing the true future rate of inflation having a loss of zero associated with it, the others having a loss of one.

15. This could well be an area for further investigation, when data with each respondent's reply weighted by the number of employees (as a proxy for real volume of production) in the firm becomes available.

16. The appropriateness of assuming a normal distribution for United States survey data has recently been tested by Carlson [3].

17. For two more rigorous procedures which have no difficulty in handling the case where \( \beta = 0 \), see the paper by Carlson and Ryder [5] which includes an examination of some undesirable properties of the Carlson-Parkin method.

18. Carlson and Parkin [4], p. 129.

19. Danes [8] pp. 30-32 has investigated two alternative assumptions as to how \( \gamma \) could behave over time; one calculating a separate \( \gamma \) for each period, the other incorporating the learning process objection and taking each period's \( \gamma \) as an average of \( \gamma \) for all preceding periods. It was concluded by Danes that for regression work of the type which we report in section II, "results...based on the alternative deltas display the same general pattern".

20. It would be crucial if we wished to obtain a correctly scaled index reflecting quarterly percentage price changes.


22. See footnote 19.

23. It would appear that the Balance statistic was first used in 1950 by the Ifo-Institute for Economic Research, Munich when they first began publishing results of "a new Business Test Method" which has become known as the Munich Business Test.

24. Carlson and Ryder [5], pp. 7, 8 and 24.

25. In case the very early information was unreliable due to the lack of familiarity of respondents with the Survey, we initially also ran regressions using 35 observations for the period 1965 (1) to 1973 (3). No significant differences were detected, so 39 observations were then retained throughout.
26. Fuller results may be requested from either author.

27. Ideally, series far closer in coverage to the CPI and GNP deflator series would be preferred for step three. This ideal will not be realised in the foreseeable future, as even the revised question included in the National Research Bureau's Consumer Attitude Survey will be unsatisfactory for our purposes. This is because the Survey is conducted every two months and because the question asks "Compared with the present, do you think that inflation in 12 months time will be more serious or less serious?"


29. Danes [7], p. 84.

30. For example, Johnston [11], Chapter, 6.1.

31. See comments on the variable ZW05 in the next paragraph.

32. Carlson and Parkin [4], p. 135 concluded that a dummy variable representing the United Kingdom devaluation of November 1967 was the only variable to have a significant impact additional to a second order error learning mechanism, on the expected rate of inflation.
REFERENCES


## APPENDIX

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>External</strong></td>
<td></td>
</tr>
<tr>
<td>ZDE</td>
<td>Devaluation of $NZ by 20% in November 1967. Has value 1 for 1967 (4) and 0 elsewhere.</td>
</tr>
<tr>
<td><strong>Political</strong></td>
<td></td>
</tr>
<tr>
<td>ZEL66</td>
<td>General election in November 1966. Has value 1 for 1966 (4) and 0 elsewhere.</td>
</tr>
<tr>
<td>ZEL69</td>
<td>General election in November 1969. Has value 1 for 1969 (4) and 0 elsewhere.</td>
</tr>
<tr>
<td>ZEL72</td>
<td>General election in November 1972. Has value 1 for 1972 (4) and 0 elsewhere.</td>
</tr>
<tr>
<td>ZPPL</td>
<td>Dummy reflecting Labour or National Government in office. Has value 1 for 1972 (4), 1973 (1) 1973 (2) and 1973 (3); and 0 elsewhere.</td>
</tr>
<tr>
<td><strong>Wage Orders</strong></td>
<td></td>
</tr>
<tr>
<td>ZWI</td>
<td>Wage Orders Index as per Ledingham [13].</td>
</tr>
<tr>
<td>ZWO1</td>
<td>General Wage Order (GWO) increase of 6% without limit in September 1964. Has value 1 for 1964 (3), 0 elsewhere.</td>
</tr>
<tr>
<td>ZWO2</td>
<td>GWO increase of 2.5% without limit in December 1966. Has value 1 for 1966 (4), 0 elsewhere.</td>
</tr>
<tr>
<td>ZWO3</td>
<td>GWO increase of 5% (with restrictions) in August 1968. Has value 1 for 1968 (3), 0 elsewhere.</td>
</tr>
<tr>
<td>ZWO4</td>
<td>Remuneration Authority Cost-of-Living increase of 4.8% (with restrictions) in July 1971. Has value 1 for 1971 (3), 0 elsewhere.</td>
</tr>
<tr>
<td>ZWO5</td>
<td>Cost-of-Living Order increase of 4.2% in October 1972, plus election of Labour Government to power in November 1972 meaning abolition of Remuneration Authority. Has value 1 for 1972 (4), 0 elsewhere.</td>
</tr>
<tr>
<td><strong>Price Controls</strong></td>
<td></td>
</tr>
<tr>
<td>ZPC</td>
<td>Price Controls Index adapted from that outlined in Ledingham [15].</td>
</tr>
<tr>
<td>ZPC1</td>
<td>Two months price freeze imposed in November 1970, plus replacement by price justification scheme in February 1971. Has value 1 in 1970 (4) and 1971(1), 0 elsewhere.</td>
</tr>
<tr>
<td><strong>Wage Controls</strong></td>
<td></td>
</tr>
<tr>
<td>ZWC</td>
<td>Wage Controls Index in percentage change form. Adapted from that outlined in Ledingham [15].</td>
</tr>
</tbody>
</table>
Mixed Influences

ZRE  Revaluation of $NZ by 3% in July 1973 and by 10% in September 1973, plus 30 day price freeze and 8.5% (with restrictions) wage rise in August 1973. Has value 1 in 1973 (3), 0 elsewhere.

ZWOP Nil GWO, plus 2 months price freeze in June 1968. Has value 1 in 1968 (2), 0 elsewhere.