HOUSEHOLDERS' INFLATION EXPECTATIONS

Andrea Brischetto and Gordon de Brouwer

Abstract

Inflation expectations have wide-reaching effects on the macroeconomy and are an important part of the transmission of monetary policy. This paper analyses the Melbourne Institute survey of householders' inflation expectations. Householders' average inflation expectations vary with personal characteristics. People with better access to information or more developed information-processing skills – such as professionals, those with more education, or older people – tend to have lower and more accurate inflation expectations. While inflation expectations are not correlated with the structural determinants of inflation (like the output gap, exchange rate movements or wages growth), tighter monetary policy does appear to reduce expected inflation. People also associate 'good times' with strong growth, low unemployment and low inflation. It is shown that householders' inflation expectations do not appear to fully incorporate information about past inflation and exchange rate movements.

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1.   Introduction

Inflation expectations have wide-reaching effects on the macroeconomy. Wage bargaining, price setting, asset allocation and investment, for example, all depend on inflation expectations in one way or another. Accordingly, and particularly in the context of an inflation-targeting regime, understanding how inflation expectations are formed and behave is central to setting monetary policy.

Inflation expectations can be measured in a variety of ways. They can be inferred from financial prices, for example, by taking the difference between nominal and indexed-bond yields. Or different groups of people can be asked directly what they expect to happen to inflation. This paper focuses on the Melbourne Institute survey of householders. The paper has two aims. The first is to examine how householders' expected average inflation varies with particular personal characteristics, such as age, occupation, education and place of residence. The second is to identify the macroeconomic fundamentals that affect householders' expectations of inflation.

Section 2 sets the scene by describing the survey and providing some basic statistics on the overall distribution of inflation expectations. The sample period starts in January 1995 since this is when detailed questions about householders' personal characteristics were first asked. Section 3 examines how average rates of expected inflation vary according to type of householder. People with better access to information or with more developed information-processing skills – for example, people in professional jobs, those who have more education, or those who are older – have inflation expectations which are systematically lower and closer to actual inflation. Inflation expectations of householders with these sorts of characteristics are also more responsive to what is happening with actual inflation.

Section 4 shifts focus to the interaction of inflation expectations with developments in the economy in order to understand the structural foundation of

householders' expectations. We start with a cross-section of individual responses from January 1995 to April 1998. When asked about prospects for the economy and jobs, people associate 'good times' with low inflation and low unemployment. On the face of it, this suggests that people prefer low inflation; high inflation makes people feel worse off and less sure about the future.

In both cross-section analysis of individuals' responses, and time-series analysis of householders' median expected inflation rates, the key direct macroeconomic influences behind inflation expectations are actual inflation and monetary policy. Inflation expectations tend to move with actual inflation and they move inversely with the cash rate, defined in either real or nominal terms. Tighter monetary policy directly reduces inflation expectations, in addition to its indirect effects on inflation expectations through its influence on inflation via the exchange rate and the output gap. Other macroeconomic variables – the output gap, import price inflation, changes in bilateral or multilateral exchange rates, wages growth or changes in unit labour costs – were found to have no systematic effect on households' inflation expectations. These results are robust across specifications and sample periods. Measured inflation expectations are also at variance with economists' notions of 'rationality'.

2. The Distribution of Householders' Inflation Expectations

2.1 The Data

2.1.1 The Melbourne Institute survey of householders

This paper uses unit record data from the Melbourne Institute of Applied Economic and Social Research Surveys of Consumers, hereafter referred to as 'the survey'. While the survey started on a quarterly basis in March 1973, it shifted to a monthly basis in December 1986. It is a stratified random sample of 1 200 respondents,[1] and is conducted in the first half of the month. Respondents are asked a range of questions, including what they expect inflation, unemployment, wages growth and national financial conditions to be over the coming year. Since

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[1] Only about one-quarter of the people contacted agree to be interviewed, so the actual number of people contacted each month is closer to 5 000.

January 1995, respondents have also been asked detailed questions about their personal characteristics, including gender, age, education, income, location, voting preference, type of home ownership and, periodically, whether their wage is determined by an award, enterprise agreement or other method. Data at this disaggregated level allow a more detailed examination of the behaviour and determinants of inflation expectations. Appendix A sets out certain sections of the questionnaire used by interviewers.

Given that a different group of respondents is interviewed each month, unit record analysis is restricted to cross-section techniques, since there is no time dimension in responses. Median inflation expectations, however, are amenable to time-series analysis because this statistic is available through time.

The Melbourne Institute makes some adjustments to the raw data in estimating the median value of expected inflation. The first is to convert qualitative responses into quantitative ones. People are asked what they expect inflation to be in the following way: 'By this time next year, do you think the prices of the things you buy will go up or down? If up, by how much? If down, by how much?'.[2] About 15 to 20 per cent of respondents decline to nominate an actual figure. These qualitative responses are converted to a quantitative form by allocating them according to the distribution of quantitative responses in the same direction in that month, or if there were none, according to the average distribution of the closest months in which there were quantitative responses. While this allocation of qualitative responses requires the assumption that qualitative responses are distributed in the same way as quantitative responses, the adjustment has only a marginal impact on the calculated median inflation expectation.

The second adjustment is to align the survey responses with the relevant census data for gender, age and location in an attempt to correct for possible sampling bias. This reduces sampling variability in the estimate of the median. In this paper, the median measure is adjusted in both of these ways. When we use the unit record data, however, the responses are not subject to either of these adjustments. Statistical analysis of the individual responses is only based on quantitative

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2   Respondents who think prices will go down have only been asked to nominate a specific figure since June 1992. Publication of these quantitative responses in the Melbourne Institute's report on inflation expectations commenced in 1993, but has since ceased.

answers, and these responses are not re-weighted by the census data since the Melbourne Institute's weights are based on all responses, not just the quantitative responses.

2.1.2 *Problems with survey and unit record data*

While surveys can be a rich source of economic information, there are a number of commonly identified problems with using survey data. The first is sampling error (Berk 1997), although some correction is made for this in the analysis of median expected inflation by weighting responses according to census data to obtain a more accurate representation of the population. A further problem is that survey responses can be sensitive to the order and construction of questions. There is, for example, no systematic relation between what householders expect to happen to prices and their wages over the coming year. This result is discussed in Section 4.1.2.

Survey data on expectations may also be unreliable if respondents lack an incentive to report the truth. Moreover, even if they do report what they believe, they may not act on this. Englander and Stone (1989), however, provide evidence for the United States that survey responses are sufficiently acted upon to make their collection useful.

But, more fundamentally, there can also be respondents who provide extreme and what are, on the face of it at least, unreasonable answers to questions in a survey. For example, respondents can indicate numbers for expected inflation which are well out of the bounds of experience, such as saying that inflation will be 50 per cent or 100 per cent over the coming year. One way to deal with this problem is simply to accept that it is what people genuinely think and perform the analysis accordingly. Another way is to limit the influence of extreme observations. The most common method of doing this is to use the median or middle observation, rather than the mean. The median is affected by the number of responses either side of it, but not by their actual values. An imbalance in the number of negative and positive extreme responses, however, implies that extreme responses affect the median inflation expectation.

Another way of dealing with extreme responses is to use trimmed statistics which are calculated by arbitrarily, and not necessarily symmetrically, imposing zero weights on proportions of observations at each end of the distribution. This is, for example, a standard method of estimating underlying inflation (Roger 1997; Kearns 1998). We deal with extreme observations by truncating the distribution to those inflation expectations lying between 0 and 10 per cent. This is arbitrary but it roughly spans the range of inflation experience over the past 15 years, during which underlying inflation has ranged from 1.4 per cent to 9.9 per cent and headline inflation has ranged from -0.3 per cent to 11.1 per cent. This truncation preserves some features of the distribution, such as positive skewness and fat tails, but in a considerably moderated form.

2.2   General Features of Householders' Inflation Expectations

McDonnell (1994) provides a descriptive discussion of the Melbourne Institute survey from 1973 to 1994. Figure 1 shows householders' measured inflation expectations along with headline and underlying inflation from 1976 (which is when the Melbourne Institute started publishing the median). While expectations were fairly inflexible in the second half of the 1970s and in the 1980s, they did respond to the introduction of Medicare in 1984 (McDonnell 1994). Average expected inflation fell in line with the reduction in inflation in the early 1990s, but more slowly than underlying inflation. de Brouwer and Ellis (1998) used Granger-causality tests to show that there is feedback between expected and actual inflation. They also report that this measure of expected inflation moves one-for-one with inflation, but has been 2 per cent higher than inflation on average from 1980 to 1997. An explanation for this positive bias in inflation expectations compared with measured inflation is that people are not making the quality adjustments to their estimates of price changes that are made when calculating published inflation measures, although this alone is unlikely to explain the degree of bias observed in inflation expectations.

McDonnell also reports that the proportion of quantitative responses has increased substantially over time. The proportion of respondents who say that prices will rise, but do not specify by how much, has fallen from about 35 per cent in the mid 1970s to about 20 per cent in the mid 1990s. This is now closer to 15 per cent. McDonnell attributes this to improvements in communications, information and

education. Alternatively, inflation uncertainty may have been considerably higher in the 1970s because of the substantial price shocks in that decade.

Figure 1: Actual and Expected Inflation
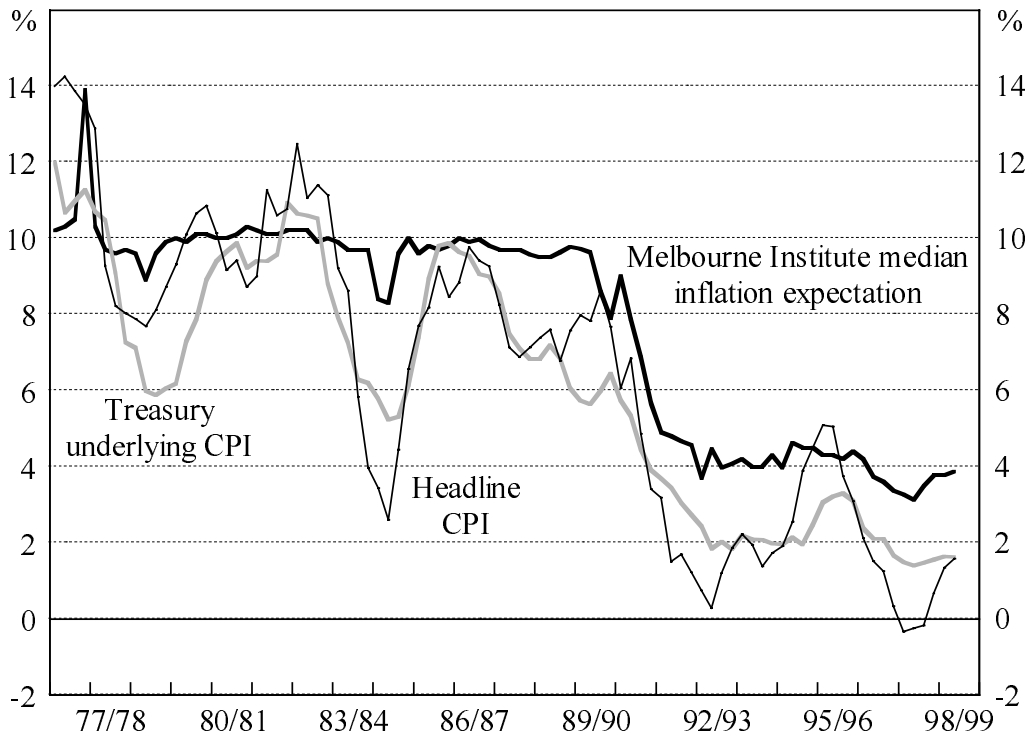
Another feature of the Melbourne Institute inflation expectations series is that responses cluster around key round numbers like 0, 2, 3, 5 and 10, the usual explanation for which is that people nominate round (often decimal) numbers when they are uncertain (Harris and Harding 1998a). The relative preponderance of the numbers 2 and 3 in the past few years is consistent with price movements in recent years and with the Reserve Bank's inflation target of 2 to 3 per cent, on average, over the medium term.

Figure 2 shows the relative frequency distribution of responses for four periods from 1995 to 1998. About 10 per cent of respondents expect no inflation, and around 30 per cent of respondents expect inflation to be 2 or 3 per cent. Approximately a quarter of respondents expect inflation to be 5 per cent, and 10 per cent expect inflation to be 10 per cent. About 10 per cent of respondents expect inflation in excess of 10 per cent, again with round-number decimal clustering at 15, 20, 25 and 50 per cent, and a very small percentage of respondents expect deflation. Over the past four years, consistent with actual

inflation outcomes, the distribution of expectations has shifted downwards, with about 15 per cent of respondents expecting no change in prices in January 1998.

Figure 2: The Relative Frequency of Expected Inflation
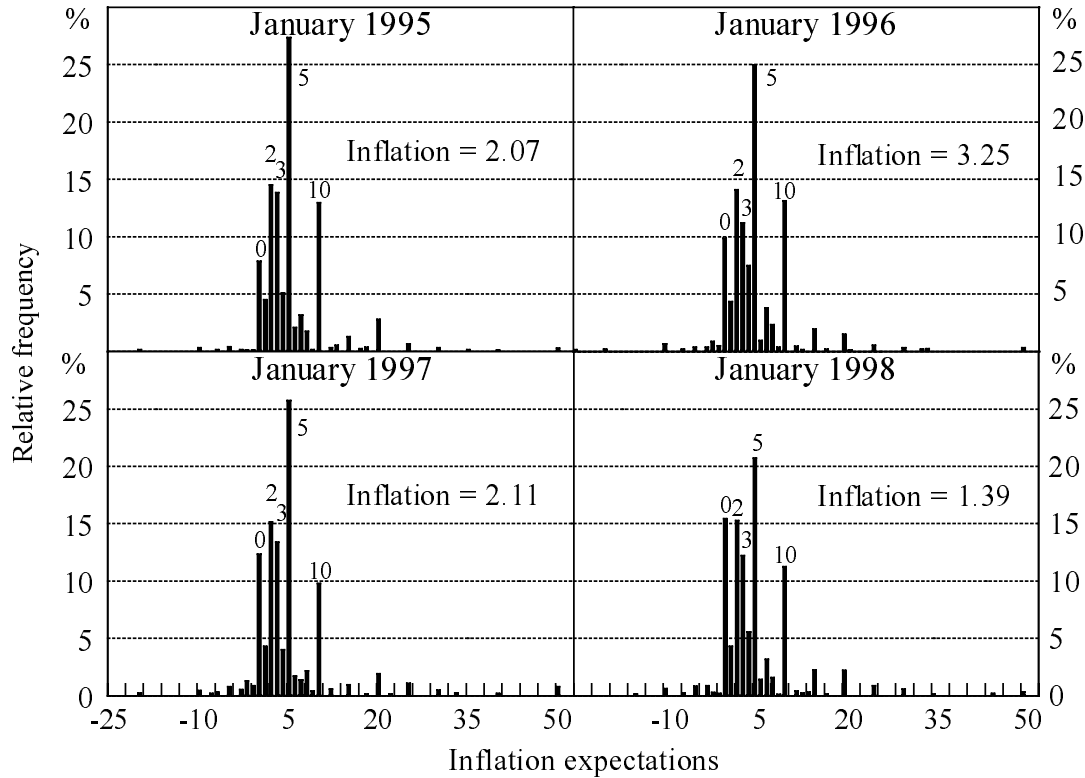
It is clear from Figure 2 that householders' inflation expectations are not normally distributed. The distributions are all skewed to the right and fat tailed, reflecting the relatively high number of people who expect very high inflation over the coming year. Table 1 provides some descriptive statistics for the period January 1995 to December 1998. The statistics are provided for the full sample and for the subgroup of respondents who expect inflation to be between 0 and 10 per cent, which is about 90 per cent of all respondents. The median is lower than the mean of the distribution, although this is less pronounced when the distribution is truncated to exclude extreme observations. In 1990 the full sample mode shifted down from 10 per cent, which it had been since 1973, to 5 per cent, at which it still remains. Figure 3 shows how these statistics have evolved over time for the full sample. While both the mean and median of inflation expectations have fallen over time, there has been no substantial change in the mode, standard

Table 1: Descriptive Statistics on Expected Inflation

	All respondents	Respondents who expect 0–10 per cent inflation
Median	3.90	3.70
Mean	4.97	4.03
Mode	5.00	5.00
Standard deviation	6.91	2.91
Skewness coefficient	4.45	0.67
Kurtosis coefficient	48.79	2.80

Note: Statistics are the monthly average from January 1995 to December 1998.

Figure 3: Statistics on Expected Inflation

January 1995 to December 1998
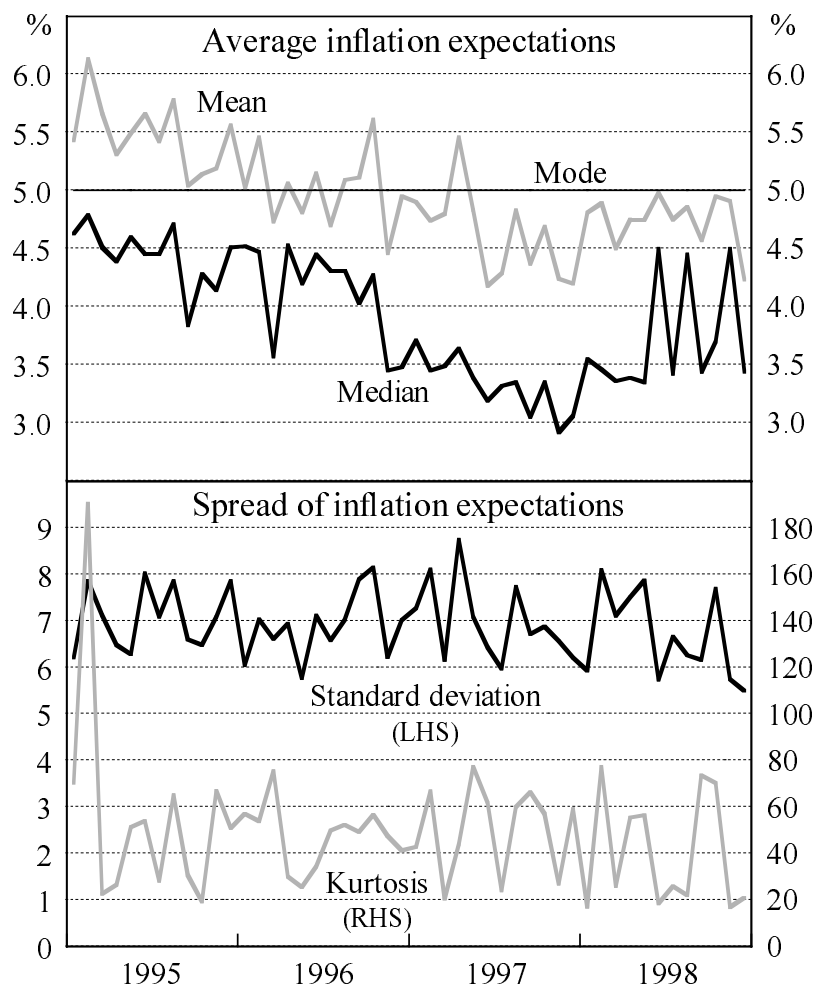
deviation or kurtosis. This indicates that the distribution of inflation expectations has shifted to the left in response to lower inflation, but the shape of the distribution remains essentially the same.

3.   Differences Between Householders

Since 1995, respondents have also been asked a range of questions about particular personal characteristics, including gender, location,[3] income, age, occupation, education, political tendency and home ownership (Appendix A). In general, it would be expected that people with the most accurate inflation expectations would be those with better access to information, those with more developed information-processing skills, or those for whom the benefits of forming an accurate assessment of the prospects for inflation are relatively high. This suggests that occupation characteristics are likely to be important. When people work in areas which directly involve exposure to prices – because they sell goods or services, because they 'set' prices, or because they need information about prices to do their job – they would be expected to have relatively more accurate inflation expectations. Occupation categories would also tend to be correlated with education, income and location. It is more difficult to see, however, how other characteristics, such as gender, political preference or home ownership, impact on inflation expectations.

Using a probit model, Harris and Harding (1998b) have examined how inflation expectations in October 1996 differed according to personal characteristics. They found that people were less likely to give a quantitative answer if they were older or had a lower education, and more likely to give a quantitative answer if they were male or had a higher income. Of the people who answered quantitatively, they found that the young, females, the poor and those in occupations other than managers/administrators and professionals had higher inflation expectations. They also found that people are more likely to answer in relatively large round numbers when they were older, were professionals or labourers, but were less likely to answer this way if they were highly educated or trade union members.

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3   By state or territory, excluding the Northern Territory, and whether urban or rural (although this distinction is not made for the ACT).

The analysis by Harris and Harding (1998b) is restricted to one period and so maybe influenced by that sample draw. In this section, we regress individuals' inflation expectations on personal characteristics to test whether average expected inflation from January 1995 to May 1998 varies with any of these characteristics. The results are reported in Table 2. The analysis is conducted using the sample for all respondents, and then for the two subgroups of respondents whose expectations lie between 0 and 10 per cent inclusive and those whose expectations lie outside this band. The base case is (somewhat arbitrarily) selected to be a group with low average expected inflation in this period.[4] This happens to be males aged 25 to 34 years with a postgraduate degree working as a manager/administrator, earning $81 000–90 000 a year, and who have a home loan, vote Liberal and live in the ACT.

Average expected inflation varies substantially across different categories of respondent and does so largely in the way anticipated. Both average underlying and headline inflation were 2.3 per cent over the sample period. Since almost all groups' average inflation expectations lie above actual inflation, the lower is a particular group's expected inflation, the more accurate are their expectations on average. Consider first, the analysis based on all respondents' inflation expectations. Inflation expectations are higher for respondents who have jobs which involve less exposure to price setting, such as plant and machine operators and drivers, the unemployed or those who perform home duties.[5] People with less education or a lower income also tend to have higher inflation expectations. People with graduate or postgraduate degrees have lower (and thus in this sample, more accurate) inflation expectations, presumably because they have had the opportunity to further develop information-processing skills.

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4   There are sufficiently large numbers of respondents in each category to give reliable regression results.

5   The question asked does not distinguish between the unemployed and those who perform home duties. From here on, we use the term 'unemployed' to refer to both these groups.

Table 2: Individuals' Inflation Expectations by Personal Characteristics

	All respondents (28 077 respondents)			Respondents who expect inflation to lie between 0 and 10 per cent (25 775 respondents)			Others (2 302 respondents)		
	Coefficient	Standard error	(%)**	Coefficient	Standard error	(%)**	Coefficient	Standard error	(%)**
Base case	1.62*	0.39		2.62*	0.18		-5.69*	3.76	
Female	1.45*	0.08	45	0.46*	0.04	45	9.20*	0.77	55
Age									
18–24	0.37*	0.16	9	0.20*	0.07	8	-0.58	1.32	11
35–44	0.31*	0.11	27	0.19	0.05	27	0.34	1.06	26
45–49	0.09	0.14	11	0.11	0.07	11	-0.57	1.42	9
50–54	0.01	0.16	9	-0.03	0.07	9	-0.94	1.44	9
55–64	-0.46*	0.17	11	-0.20*	0.08	11	-2.69	1.53	10
65+	-0.40*	0.21	12	-0.16	0.10	12	-4.29*	1.83	14
Occupation									
Professional	0.21	0.15	16	0.17*	0.07	16	-0.11	1.66	11
Para-professional	0.31	0.18	8	0.13	0.08	8	2.31	1.83	7
Trades	0.62*	0.18	8	0.31*	0.08	8	3.20	1.78	8
Clerical	0.32	0.18	8	0.28*	0.08	8	2.70	1.80	8
Sales	0.31	0.18	7	0.25*	0.09	7	-0.58	1.74	9
Plant	0.61*	0.24	3	0.17	0.11	3	4.39*	2.24	4
Labourer	0.39*	0.22	5	0.26*	0.10	5	3.19	2.15	4
Retired	0.35	0.21	16	0.08	0.09	16	4.25*	1.96	18
Unemployed/ at home	0.63*	0.16	17	0.22*	0.07	17	2.94*	1.54	23
Education									
Primary	1.26*	0.27	4	0.54*	0.12	3	5.07*	2.50	5
To year 10	1.05*	0.18	25	0.54*	0.08	24	3.37	1.97	30
Full secondary	0.88*	0.18	24	0.39*	0.08	24	4.46*	1.96	26
Vocational	0.72*	0.19	15	0.52*	0.09	15	1.88	2.06	14
Tertiary	0.16	0.17	26	0.20*	0.08	27	-0.57	1.91	21
Political view									
Labor	0.20*	0.09	38	0.07	0.04	38	1.01	0.79	40
Democrats	0.02	0.17	6	0.05	0.08	6	-0.04	1.56	6
Nationals	0.30	0.24	3	0.27*	0.11	3	1.65	2.32	3
Greens	0.66*	0.24	3	0.28*	0.11	3	1.93	2.04	3
Independent	0.86*	0.17	6	0.43*	0.08	6	3.19	1.46	7
Income									
≤ $20 000	1.53*	0.24	20	0.59*	0.11	20	6.37*	2.47	29
$21–30 000	1.01*	0.23	15	0.49*	0.11	15	4.56	2.46	17
$31–40 000	0.74*	0.23	15	0.41*	0.10	15	3.80	2.46	15
$41–50 000	0.60*	0.23	13	0.38*	0.10	13	3.09	2.51	11
$51–60 000	0.48*	0.23	11	0.22*	0.11	11	2.75	2.53	9
$61–70 000	0.10	0.25	7	0.00	0.11	7	1.29	2.68	6
$71–80 000	0.05	0.26	5	0.05	0.12	6	0.13	3.02	3
$91–100 000	0.01	0.30	3	-0.13	0.14	3	0.08	3.25	2
> $100 000	0.00	0.25	7	-0.05	0.11	7	-0.14	2.69	6
Location									
Metro NSW	0.61*	0.28	16	0.11	0.13	16	6.45*	2.43	16
Rural NSW	1.01*	0.29	11	0.18	0.14	11	9.54*	2.50	13
Metro Vic	0.23	0.28	16	-0.02	0.13	16	4.61*	2.45	15
Rural Vic	0.30	0.30	8	0.05	0.14	9	6.25*	2.66	7
Metro Qld	0.55	0.30	7	0.18	0.14	7	5.46*	2.66	7
Rural Qld	0.37	0.30	10	0.12	0.14	10	5.07*	2.58	9
Metro SA	0.38	0.30	7	0.05	0.14	7	5.63*	2.64	7
Rural SA	0.67*	0.32	5	0.02	0.15	5	7.69*	2.72	6
Metro WA	0.46	0.30	7	0.00	0.14	7	6.30*	2.64	7
Rural WA	0.51	0.31	6	0.08	0.14	6	6.83*	2.71	6
Metro Tas	0.75*	0.33	4	0.18	0.15	4	7.57*	2.95	4
Rural Tas	2.21*	0.50	1	0.69*	0.23	1	13.67*	3.99	1

Notes: * denotes significance at the 5 per cent level. ** indicates columns listing the percentage of respondents in each category.

Location also matters, with people who live in the country tending to have inflation expectations higher than those living in urban areas. People who are older, however, tend to have lower inflation expectations, which is consistent with the view that experience matters in developing information-processing skills and understanding how the economy works.

When the analysis is confined to subgroups, these outcomes largely remain intact, with only a slight modification. For those people with inflation expectations between 0 and 10 per cent, location is far less important as a distinguishing characteristic than it is for those with more extreme inflation expectations. People who live in areas which are relatively isolated from urban centres, tend to report more extreme inflation expectations. Also, people who are outside the workforce tend to report higher, less accurate, inflation expectations than most people in the workforce. It is also notable that people who have more extreme inflation expectations tend to have fewer distinguishing characteristics than those who expect inflation to lie between 0 and 10 per cent: a few people will report extreme numbers regardless of who they are.

But some of the results are difficult to explain. Even after controlling for income, occupation and education, for example, average inflation expectations vary with respondents' political preferences. It is difficult to meaningfully interpret this result. Similarly, for all three groupings of respondent, average inflation expectations are higher, and thus less accurate, for females than for males. Given that the regression controls for occupation (and implicitly, different participation rates between males and females) and education, this result is odd. Females' inflation expectations are 1.45 per cent higher, on average, than males' expectations in the full sample, 0.46 per cent higher in the 0 to 10 per cent subsample and 9.2 per cent higher in the extreme subsample. Thus, it is females with inflation expectations exceeding 10 per cent whose expectations substantially exceed those of males.

Batchelor and Jonung (1986) explain differences between male and female inflation expectations in Sweden with a survey that finds that women spend up to twice as much time food shopping as men do. They argue that women's inflation expectations are likely to be particularly influenced by food price inflation. Similar tendencies in Australia could help explain females' higher average inflation expectations. The food component of the CPI has risen by 0.8 per cent more than

the total CPI, on average, over the past four years. This difference is more than sufficient to explain the gender difference for our 0 to 10 per cent sample, though it clearly cannot explain the results for the 'outlier' sample. In principle, the inflation expectations of other groups may also differ from the average because these groups also focus on the price changes of particular components of the CPI.

The analysis above provides a perspective on people's average inflation expectations over the past four years. Further insight can be gained by looking at the distribution of expectations more generally and how it has evolved in the past four years. While there are many characteristics which have a bearing on people's average inflation expectations, we focus here on the responses of different occupation groupings. Table 3 sets out measures of central tendency and dispersion for 10 occupation categories from January 1995 to December 1998. Detailed occupation groupings are not available before this period.

| **Table 3: Descriptive Statistics by Occupation**					
	Mean	Median	Mode	Standard deviation	Skewness	Kurtosis
Manager	4.0 (3.7)	3.4 (3.4)	3.8 (3.8)	5.2 (2.7)	2.6 (0.7)	21.1 (3.1)
Professional	3.9 (3.6)	3.3 (3.3)	3.6 (3.6)	4.6 (2.7)	2.2 (0.8)	20.4 (3.3)
Para-professional	4.7 (4.0)	3.7 (3.6)	4.0 (4.0)	5.5 (2.8)	2.3 (0.7)	14.4 (3.0)
Trades	4.8 (4.1)	4.1 (3.9)	4.5 (4.5)	6.0 (2.8)	1.9 (0.6)	14.6 (2.8)
Clerical	5.1 (4.3)	4.2 (4.0)	4.8 (4.8)	5.9 (2.9)	2.5 (0.6)	16.0 (2.8)
Sales	5.2 (4.2)	4.0 (3.8)	4.6 (4.6)	6.5 (2.9)	2.5 (0.6)	16.7 (2.8)
Plant	5.2 (4.0)	4.0 (3.7)	4.6 (4.6)	6.2 (2.8)	1.6 (0.6)	8.1 (2.9)
Labourer	5.3 (4.2)	4.1 (3.9)	4.4 (4.6)	6.5 (2.9)	2.4 (0.7)	15.1 (2.9)
Retired	5.3 (4.1)	4.1 (3.9)	4.7 (4.7)	7.4 (3.0)	3.3 (0.6)	24.4 (2.7)
Unemployed / at home	5.8 (4.3)	4.4 (4.1)	5.1 (5.1)	8.2 (3.0)	3.5 (0.6)	29.4 (2.6)

Note: Figures in brackets are statistics for respondents whose inflation expectation lies between 0 and 10 per cent.

Managers/administrators and professionals have the lowest average means, medians, modes and standard deviations over this period, whereas people who are unemployed or engaged in home duties have the highest averages of these statistics. Not only are managers/administrators' and professionals' inflation expectations lower, and hence, closer to actual inflation than for other groups, but their lower within-group variability suggests that this group may have more homogenous views about how the economy works.

Figure 4 provides a view on how these statistics have evolved over the past four years for professionals, labourers and the unemployed. These three categories capture three broad types of respondent. The top panel of Figure 4 shows median inflation expectations. The expectations of professionals have been consistently lower than those of labourers and the unemployed and they responded more quickly to the easing in inflationary pressure in 1996.

The middle panel of Figure 4 shows the modal inflation expectation for these three groups. The mode for the unemployed has remained stable at 5 per cent, with the exception of October and November 1998 when it rose to 10 per cent. In contrast, since September 1996, professionals' modal expectations have been much less stable, oscillating between 0 and 5 per cent, reflecting the fall in inflation over 1996 and 1997. For professionals at least, the distribution of inflation expectations is fluid and reacts to the current inflation environment. The bottom panel of Figure 4 shows that there is generally greater similarity in the inflation expectations of professionals than in other groups.

In August, October and November 1997, and in February and May 1998, respondents were also asked about how their rates of pay are determined, whether by individual contract, enterprise agreement, award, or some other mechanism. It might be expected that people whose pay is determined according to an individual contract have more of an incentive to be aware of inflationary circumstances than those who have no direct input into how their wage is set. While the results are not reported, respondents' inflation expectations do not differ according to the way their wage is determined (in a regression which controls for occupation). This is the case for all respondents and for the sub-set of respondents whose inflation expectations lie between 0 and 10 per cent.

Figure 4: Some Descriptive Statistics on Expected Inflation for Subgroups
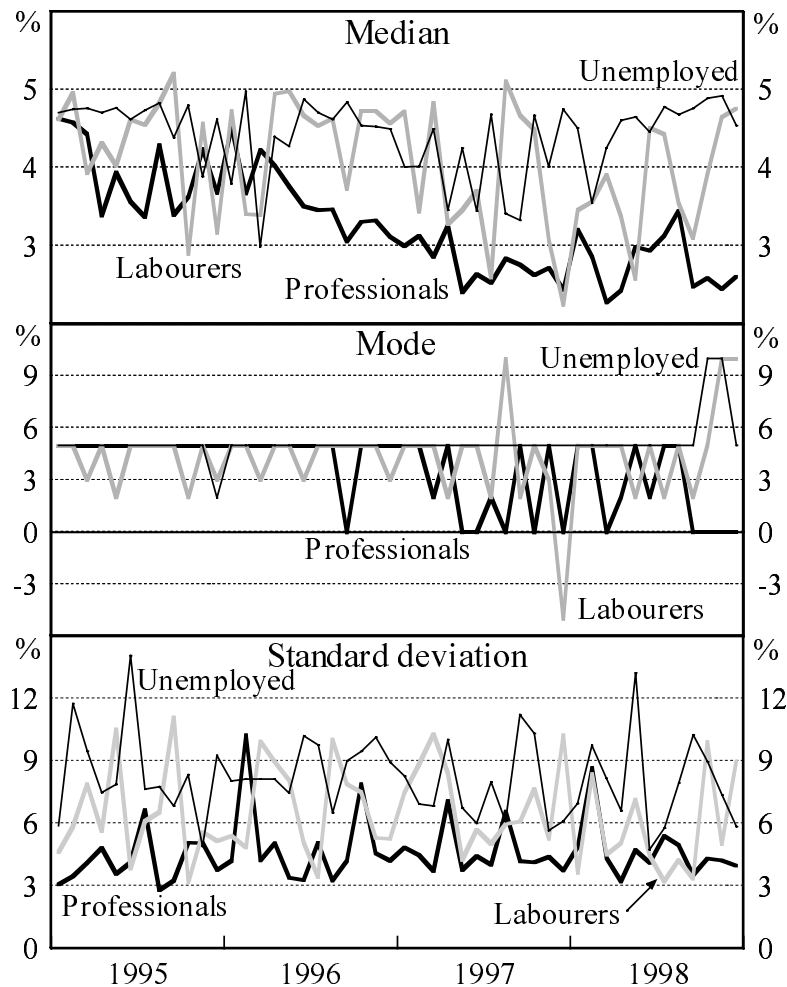
4. The Structural Foundation of Inflation Expectations

From Section 3, it is clear that there is a range of inflation expectations and that this range depends somewhat on the particular characteristics of the individuals involved. In this section, we explore the structural foundation underlying inflation expectations. Economists, of course, have their favoured models of the inflation process. The public, however, may have different ideas, and may systematise information in different ways to economists.

A 1996 study by Shiller comparing US, German and Brazilian survey data on the perceived costs of inflation confirms the differences in thinking between economists and the wider public. The public view the main problem with inflation as being the lowering of living standards because they do not perceive any compensating increase in nominal wages. The indirect costs of inflation commonly

cited by economists, such as 'shoe-leather' and 'menu' costs and the uncertainty created by inflation, are generally not mentioned by non-economists. The general population is also concerned with psychological effects of inflation, believing that it is detrimental to national morale. In addition, the public often take little interest in the details of economic conditions. On average only about 3 per cent of respondents to the Melbourne Institute survey report being aware of inflationary developments, and just under one half of respondents cannot specify what type, if any, of economic news they have heard in the last few months.

In Section 4.1, we examine the responsiveness of individuals' inflation expectations to what the individuals themselves think will happen to some key macroeconomic variables and to the actual outcomes for a wider set of macroeconomic variables. In Section 4.2, we model the Melbourne Institute's published median of householders' inflation expectations.

4.1   A Cross-section Analysis

This section examines the structural foundation of householders' inflation expectations by examining the interaction of individuals' expectations with a range of economic information. Section 4.1.1 relates individuals' expected inflation to their expectations about the economy and the labour market, and to a series of general macroeconomic variables. The macroeconomic variables considered include past inflation, import price inflation, exchange rate movements, the output gap, the unemployment rate and interest rates. Section 4.1.2 looks at the interaction between individuals' wage and price expectations. The aim of this exercise is to see what sort of relationships people perceive between these variables.

The individual unit records on inflation expectations are analysed using cross-section techniques. This provides a data set of 28 356 observations in the full sample, and 23 370 in the 0 to 10 per cent sub-sample. (Respondents who have not answered all relevant questions have been excluded.) Since the respondents to the survey change each month, there is no continuity in respondents.

4.1.1 Responsiveness of inflation expectations to individuals' assessment of economic developments and actual macroeconomic outcomes

In this section, we examine how individuals' inflation expectations respond to expected and actual macroeconomic outcomes using unit record data from January 1995 to April 1998. Analysis is restricted to respondents whose inflation expectations are in the realistic range of 0 to 10 per cent, although the results are qualitatively similar when all responses are considered. Individuals' inflation expectations are regressed on individual characteristic dummies, dummies for individuals' expectations about unemployment and economic conditions in general, and macroeconomic variables commonly included in mark-up models of inflation. The regression results are presented in Table 4. Individual characteristic dummies relating to gender, age, occupation, education, political view, income and location are included in this regression but are not reported here. The results for individual characteristics are much the same as those presented in Table 2, where inflation expectations are regressed on individuals' characteristics only.

The first shaded and unshaded blocks in Table 4 present the coefficients and standard errors for the dummies for respondents' opinions about economic and employment prospects respectively. Respondents are asked: 'Thinking of economic conditions in Australia as a whole, during the next 12 months, do you expect we will have good times financially, or bad times, or what?'. They are then asked to provide an answer according to the scale: 'good times', 'good times with qualifications', 'some good, some bad', 'bad times with qualifications' and 'bad times'. Respondents are also asked about employment conditions: 'Now, about people being out of work during the coming 12 months. Do you think there will be more unemployment than now, about the same, or less?'. Respondents can answer according to the scale: 'more unemployment', 'about the same or some more or some less' and 'less unemployment'.

The base case for expected economic conditions is 'bad times' and the base case for expected employment prospects is 'less unemployment'. The coefficients on expected economic conditions are significant and negative, and the coefficients on expected unemployment are significant and positive. The better economic conditions are expected to be, the lower is inflation expected to be. The lower is expected unemployment, the lower is inflation expected to be. While not reported, the coefficients do not vary significantly by occupation grouping.

Table 4: Expected and Actual Macroeconomic Developments
Respondents with inflation expectations between 0 and 10 per cent

	Coefficient	Standard error
Constant	-0.07	3.19
Expected economic conditions:		
Good	-0.52*	0.06
Qualified good	-0.59*	0.06
Some good, some bad	-0.34*	0.05
Qualified bad	-0.20*	0.06
Exclusion of expected economic conditions	$F_{4,23\,296} = 33.43*$	
Expected unemployment:		
More unemployment	0.69*	0.05
Same unemployment	0.28*	0.05
Exclusion of expected unemployment	$F_{2,23\,296} = 95.11*$	
Four-quarter-ended underlying inflation$_{t-1}$	1.83*	0.38
Unemployment$_{t-1}$	-0.26	0.17
Unemployment$_{t-3}$	0.61*	0.18
Unemployment$_{t-6}$	-0.05	0.19
Unemployment$_{t-9}$	-0.39*	0.18
Unemployment$_{t-12}$	0.33	0.20
Exclusion of lagged unemployment	$F_{5,23\,296} = 283.21*$	
ΔUS dollar$_{t-1}$	-0.03	0.02
ΔUS dollar$_{t-3}$	-0.04	0.03
ΔUS dollar$_{t-6}$	-0.05	0.03
ΔUS dollar$_{t-9}$	-0.02	0.03
ΔUS dollar$_{t-12}$	-0.01	0.03
Exclusion of lagged three-month changes in US dollar exchange rate	$F_{5,23\,296} = 0.59$	
Real cash rate$_{t-1}$	0.14	0.16
Real cash rate$_{t-3}$	-0.10	0.11
Real cash rate$_{t-6}$	-0.06	0.10
Real cash rate$_{t-9}$	-0.23*	0.10
Real cash rate$_{t-12}$	-0.05	0.14
Real cash rate$_{t-18}$	-0.11	0.08
Real cash rate$_{t-24}$	0.01	0.06
Exclusion of lagged real cash rate	$F_{7,23\,296} = 2.25*$	

Notes: * denotes significance at the 5 per cent level. The Wald F-statistic is presented for joint exclusion tests.

The relationship found between economic prospects and inflation has a straightforward explanation. The public associate 'good times' in the future with high output, low unemployment and low inflation, while 'bad times' are the opposite.[6] On the face of it, this suggests that people in fact expect to derive a direct benefit from price stability. This is consistent with Shiller's (1996) survey finding that the public views inflation as costly, both in economic terms and to national morale.

The rest of Table 4 shows how inflation expectations respond, on average, to aggregate macroeconomic variables. A straightforward way to model inflation is as a mark-up over unit labour costs and import prices in domestic currency, with the mark-up varying over the course of the cycle (de Brouwer and Ericsson 1998). This suggests that the matrix of key macroeconomic variables which are possible 'fundamental' explanators of inflation expectations includes past inflation, wages growth, import price inflation, exchange rate movements, the output gap (defined here as the deviation of output from a Hodrick–Prescott trend from 1980 to 1997) and the unemployment rate. We also include the real cash rate (calculated as the nominal cash rate less inflation over the past year) in order to capture direct effects of monetary policy changes on inflation expectations. Quarterly data are interpolated on a monthly basis where necessary.[7]

Table 4 provides some indicative results, with lags of the real cash rate, the unemployment rate and the three-month change in the Australian/US dollar exchange rate included as explanatory variables.[8] There are three main results. The first is that most of the key macroeconomic variables do not explain householders' inflation expectations. Inflation expectations do not systematically respond to exchange rate movements, import price changes, wages growth or the output gap at any lag length. While lags of the unemployment rate are jointly, and sometimes individually, significant, the sum of the coefficients on these lags is positive. The second result is that past inflation is an important explanator of

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[6] This result is robust to the exclusion of the macro variables in the regression.

[7] Using quarterly data gives qualitatively similar results.

[8] Including lags of variables as regressors does not necessarily imply that expectations are backward looking. Just as economists use past information to forecast variables into the future, forward-looking individuals may similarly use past information to form their expectations.

expected inflation, with a coefficient of 1.83.[9] When insignificant variables are excluded, the coefficient on past inflation is numerically very close to 1.0 and not significantly different from it.

The third result is that monetary policy has a systematic and robust effect on inflation expectations. The interest rate is defined as the real cash rate – the nominal cash rate less inflation over the past year – but the outcome is qualitatively similar when the nominal cash rate or the nominal or real mortgage interest rate is used. The cash rate at the end of the previous month has a positive impact on inflation expectations, but other lags, up to 18 months out, have a negative effect on inflation expectations. The net direct effect of a rise in the real cash rate is negative, with the sum of the coefficients being -0.4. While only the nine-month lag of the real cash rate is individually significant, all lags are jointly significant. The individual significance of lags increases when other insignificant variables are excluded.

4.1.2   The interaction of expected changes in wages and prices

The Melbourne Institute periodically asks householders additional questions. One such question, asked since March 1997, has been about respondents' expected wage increases over the coming year. Interviewers ask respondents: 'Turning now to the wage or salary you expect to receive for your job. Do you think that your average hourly rate of pay is likely to increase, decrease or stay the same over the coming 12 months?'. While people would anticipate that their wages may rise for a number of reasons, the desire to at least maintain real wages should mean that, in general, people tend to expect their wages to rise at least as much as they expect prices to rise.

We find, however, that there is no systematic relationship between what an individual expects to happen to their wages growth and inflation, even after

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[9]   In the regressions presented above, inflation refers to the growth in the Treasury underlying CPI. Given that respondents are asked what they expect to happen to the prices of things they buy, other measures of inflation may be more relevant. Changes in the CPI excluding interest and volatile items, or excluding interest and consumer credit charges, may be closer approximations to what people have in mind when thinking about changes in prices of the things they buy. These measures of past inflation also have significant and positive effects on inflation expectations.

controlling for method of wage determination. While we do not report the results of the regressions (which show a negative but insignificant correlation), Figure 5 is a three-dimensional graph showing expected inflation, expected wages growth and the relative frequency of these responses as at May 1998. The sample is restricted to respondents who expect rises in both of these variables to be between 0 and 10 per cent. The range of expected wage changes does not match the range of inflation expectations. Most people whose inflation and wage change expectations lie between 0 and 10 per cent expect no change in their wages, regardless of their inflation expectations.

This result accords with Shiller's (1996) survey finding that the general public does not believe that inflation is matched by compensating increases in nominal wages. People may believe that it takes some time for price rises to be reflected in wages, or alternatively, they may think that there are other factors which are more important in determining wages.

Figure 5: Expected Changes in Wages and Prices
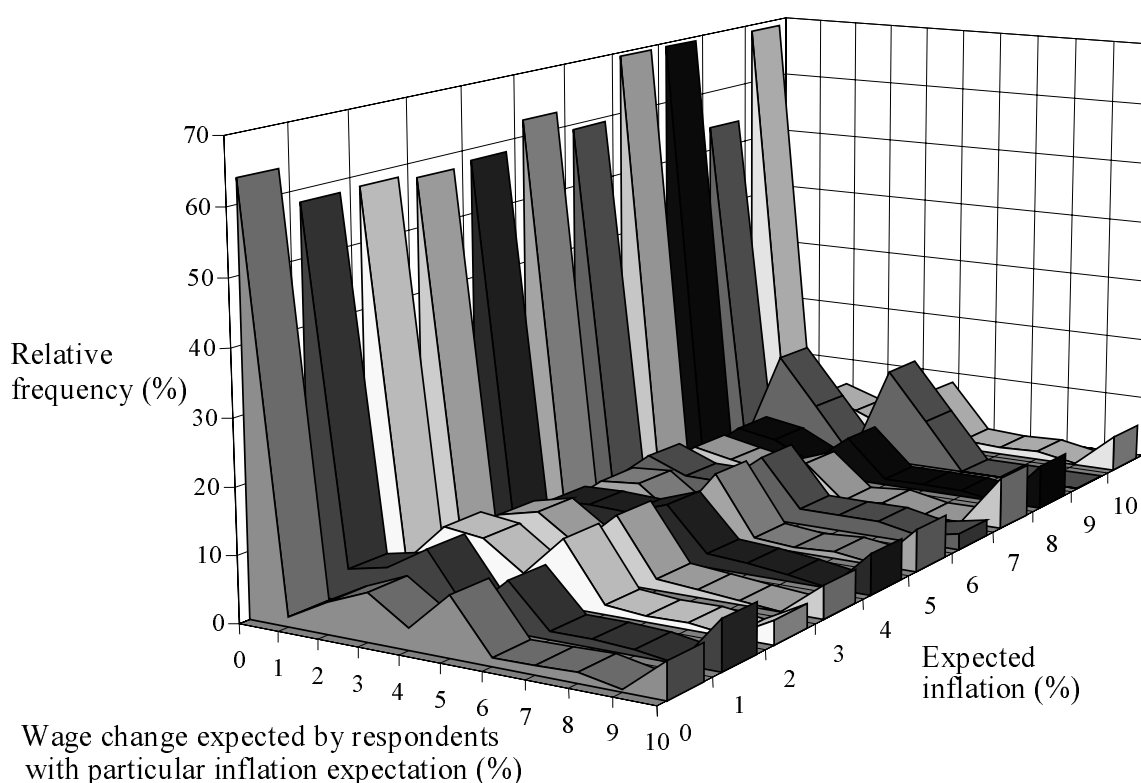
4.1.3   Summary of cross-section analysis

The cross-section analysis of individuals' answers to the survey on inflation expectations provides two broad insights. First, and unsurprisingly, the public's view of economic relationships differs materially from that of economists. For example, they associate good economic conditions with low unemployment and low inflation, rather than anticipating higher inflation when the economy is growing more strongly and facing greater supply constraints. Similarly, they do not systematically expect exchange rate or wages movements to affect inflation. At least from the results here, it appears that people do not expect their wages to grow in line with what they expect to happen to prices.

The second interesting result is that inflation expectations move with recent inflation and respond to monetary policy. While a tightening of monetary policy is initially associated with a rise in inflation expectations (perhaps because the tightening is a strong signal of higher future inflation), the overall impact of a policy tightening is to lower inflation expectations. This is a robust result. There is a direct, negative, significant and lagged effect of monetary policy on inflation expectations.

4.2   Explaining Householders' Median Inflation Expectations

Data on householders' median inflation expectations are considerably more accessible and easier to use than those on individual householders' inflation expectations. In this section, we carry the analysis conducted in Section 4.1 on individuals' expectations over to householders' median inflation expectations, examining how median expectations are influenced by a range of macroeconomic variables.

In the unit record analysis in Section 4.1, cross-sectional regression was conducted. When the focus is on the median, however, the cross-sectional aspect is lost but the time dimension is gained. Using time-series techniques introduces three challenges. First, there is the issue of non-stationarity in inflation expectations. As is clear from Figure 1, there has been a mean change in both inflation and inflation expectations from the 1980s to the 1990s. The series may be non-stationary, with the attendant econometric problems. One way to deal with this is to restrict the statistical analysis to the new 'regime', basically from 1992;

another is to use cointegration techniques. Second, in the cross-section analysis there was a surfeit of degrees of freedom but this is not the case in the time domain, especially if the sample period is truncated to the low-inflation period of the 1990s. This means that parameter estimates are less precise. Third, given that the dependent variable is inflation expected over the coming year, monthly or quarterly regression analysis of this variable will induce a moving-average process in the residuals. This is corrected using the procedure outlined in Newey and West (1985) (using the robusterrors option in RATS).

Presuming that inflation is a possibly time-varying mark-up over costs, variables relevant in explaining inflation expectations would include unit labour costs, wages, import prices, exchange rates (either multilateral TWI indices or bilateral with the US dollar), the output gap and the unemployment rate. As it turned out, consistent with the unit record analysis in the previous section, none of these macroeconomic variables were found to have a systematic – or indeed any – effect on the median inflation expectation. This was examined over a number of sample periods. We started regression analysis from January 1992, a period over which inflation and inflation expectations are mean reverting. An error-correction specification was also used to examine the relationship between inflation expectations and macroeconomic variables in periods extending back to the 1980s. We tried starting the estimation from January 1987, the time when the survey went monthly. Quarterly observations back to 1980 were also experimented with.[10] None of these forays into the data revealed a systematic effect of macroeconomic variables on householders' median inflation expectations. The results are not reported here, but are available on request.

As in the previous section, interest rates were also included in the analysis, and the cash rate, either nominal or real, repeatedly emerged with a significant and negative sign.[11] The six-month lag of the real cash rate emerges as the key explanator (which is the second lag when the equation is estimated on a quarterly basis). The real rate is calculated as the nominal rate less the Melbourne Institute measure of expected inflation, although the results are qualitatively similar when the real rate is calculated as the nominal rate less actual inflation over the past

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[10] Within this period we also tested for the effect of large exchange rate movements, defined as a 5 or 10 per cent change, on the median expectation.

[11] We use the target cash rate from 1990 onwards and the unofficial cash rate before then.

year. A similar story emerges when the models include the nominal cash rate, since changes in nominal cash rates are dominated by changes in the real rate.

We provide a few representative examples in Table 5. Model 1 states that expected inflation depends on past actual[12] and expected inflation, and falls as monetary policy is tightened. This estimate suggests that inflation expectations

Table 5: Median Expected Inflation and Monetary Policy

	Model 1 Dependent variable: inflation expectations $\pi_t^e = \alpha_0 + \alpha_1 \pi_{t-1}^e + \alpha_2 \pi_{t-1} + \alpha_3 r_{t-6}$		Model 2 Dependent variable: change in inflation expectations $\Delta \pi_t^e = \beta_0 + \beta_1 \pi_{t-1}^e + \beta_2 \pi_{t-1} + \beta_3 r_{t-6}$		Model 3 Dependent variable: change in inflation expectations $\Delta \pi_t^e = \beta_0 + \beta_1 \pi_{t-1}^e + \beta_2 \pi_{t-1} + \beta_3 r_{t-2}$	
	Monthly January 1992 – May 1998		Monthly January 1987 – May 1998		Quarterly March 1980 – June 1998	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Constant	1.07*	0.14	0.23	0.12	0.25*	0.12
π_{t-1}^e	0.56*	0.05	-0.13*	0.05	-0.10	0.06
π_{t-1}	0.44*	0.05	0.16*	0.06	0.10	0.06
Real rate $_{t-6}$	-0.11*	0.04	-0.04*	0.01	–	–
Real rate $_{t-2}$	–	–	–	–	-0.03*	-0.01
$\overline{R}^2$	0.56		0.09		0.06	
$\alpha_1 + \alpha_2 = 1$	$\chi^2(1) = 2.05$		–		–	
$\beta_1 = \beta_2$	–		$\chi^2(1) = 4.01*$		$\chi^2(1) = 0.51$	

Notes: * denotes significance at the 5 per cent level. When estimating from 1987 and 1992, degrees of freedom problems require monthly observations to be used, thus CPI figures must be interpolated. When estimating from 1980, the sample period is sufficiently long to allow quarterly observations to be used. The restriction that expected inflation is a homogeneous linear function of actual and expected inflation is not rejected at the 5 per cent level and is imposed. The restriction that actual and expected inflation move one-for-one in the long run is not rejected at the 5 per cent level when the sample period starts in 1980 and is imposed. This restriction is rejected when estimating from 1987 onwards. When the real cash rate is alternatively defined as the nominal cash rate less actual inflation over the past year, however, this restriction is not rejected and its imposition yields results similar to those presented above.

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[12] In the results presented in Table 6, actual inflation is measured using the Treasury Underlying CPI. The CPI excluding interest and volatile items, which may better reflect the prices of things people buy, gives qualitatively similar results. The CPI excluding interest and consumer credit charges has no significant effect on inflation expectations.

directly fall by 0.1 per cent for a 1 per cent tightening of monetary policy six months earlier, with a long-run direct effect of ¼ per cent. Models 2 and 3, which are in error-correction format, model expected inflation over progressively longer sample periods, and indicate that inflation expectations fall by up to 0.4 per cent for a sustained 1 per cent tightening in policy. These estimates relate only to the direct effect of policy changes on inflation expectations; changes in policy also affect inflation, directly through the exchange rate and indirectly through the output gap. Changes in inflation in turn affect expected inflation, implying that the total effect is greater. It may seem somewhat puzzling that people's inflation expectations respond several months after policy changes. However, we find this result both in the regressions explaining individuals' inflation expectations, reported in Section 4.1, and in the regressions explaining median inflation expectations.

4.3 Rationality of Expectations

The finding that householders' inflation expectations do not take into account variables included in structural models of inflation may suggest that expectations are not formed rationally. In this section we test whether expectations are unbiased and whether they are efficient in the sense that they use all available information. The standard test for bias is whether α equals zero and β equals 1 in Equation (1):

$$\pi_{t+4} = \alpha + \beta \pi_t^e + \varepsilon_t. \tag{1}$$

The results from estimating this equation for quarterly Australian data, starting from March 1980 and March 1992, are presented in columns 1 and 2 of Table 6. The dependent variable is the inflation rate four-quarters ahead so that actual and expected inflation refer to the same period. The joint hypothesis that α and β equal 0 and 1 respectively is rejected for both sample periods. In accordance with findings in de Brouwer and Ellis (1998), the restriction that β equals 1 cannot be rejected on its own when the sample period starts in 1980. Although inflation expectations are biased, they move one-for-one with actual inflation over this sample period.

In economists' jargon, the rationality of expectations implies that people use all available information to form their expectations. Columns 3 and 4 of Table 6, however, indicate that, at least in the simple framework of Equation (1), householders do not systematically use all available information: by using available information about inflation and the exchange rate, they could improve their inflation forecasts. In other words, the error term in Equation (1) is supposed to be a white noise process, but in fact, it exhibits systematic behaviour related to past inflation and the six-month change in the exchange rate.

Table 6: Rationality of Median Inflation Expectations
Dependent variable: inflation four-quarters ahead

	Estimated equation $\pi_{t+4} = \alpha + \beta \pi_t^e$				Estimated equation $\pi_{t+4} = \alpha + \beta_1 \pi_t^e + \beta_2 \pi_{t-1} + \beta_3 u_{t-1} + \beta_4 \Delta USD_t$			
	March (Q) 1980 – June (Q) 1997		March (Q) 1992 – June (Q) 1997		March (Q) 1980 – June (Q) 1997		March (Q) 1992 – June (Q) 1997	
	Coeff.	Std error	Coeff.	Std error	Coeff.	Std error	Coeff.	Std error
Constant	-2.27*	0.62	-1.02	1.58	0.16	3.00	0.12	1.14
π_t^e	1.01*	0.12	0.76	0.41	0.84*	0.30	1.09*	0.33
π_{t-1}	–	–	–	–	0.08	0.28	-0.69*	0.21
Unemp$_{t-1}$	–	–	–	–	-0.20	0.27	-0.08	0.08
ΔUS dollar$_t$	–	–	–	–	-0.06*	0.03	0.01	0.01
$\overline{R}^2$	0.77		0.19		0.78		0.45	
β=1	$\chi^2(1)$=0.02		$\chi^2(1)$=0.33		–		–	
(α,β)=(0,1)	$\chi^2(2)$=86.37*		$\chi^2(2)$=175.03*		–		–	

Notes: * denotes significance at the 5 per cent level. π indicates annual rate of inflation.

5.   Conclusion

While inflation expectations play a central role in the economic process, less is known about the nature of expectations and how they are formed. In this paper, we examined the properties of inflation expectations as measured by the Melbourne Institute survey of householders. Three key results emerge from the analysis.

The first is that householders' average inflation expectations vary according to individual characteristics. People with better access to information or with more developed information-processing skills – for example, people in professional

jobs, those who have more education or those who are older – have, over the past four years, had inflation expectations which were systematically lower and closer to actual inflation. Inflation expectations of householders with these characteristics have also been more responsive to what is happening with actual inflation.

Second, when asked about prospects for the economy and jobs, people associate 'good times' with low inflation and low unemployment. On the face of it, people prefer low inflation; high inflation makes people feel worse off.

Third, there is little evidence that people form their expectations about future inflation on the basis of the sort of economic relationships highlighted by economists. Inflation expectations do not systematically respond to key macroeconomic variables such as the output gap, import price inflation, changes in bilateral or multilateral exchange rates, wages growth or changes in unit labour costs. Only the unemployment rate affects inflation expectations, but contrary to economic intuition, it has a positive effect. Accordingly, inflation expectations fail standard tests of rationality, with evidence of a bias in expectations and of householders not using all available information, such as past inflation and exchange rate movements, in forming their expectations.

But while householders' views about economic relationships differ from those of economists, their inflation expectations do appear to be directly affected by monetary policy. Inflation expectations systematically fall a few months after the cash rate rises. People may not be sure of the mechanism by which monetary policy affects inflation, but they do think that it will have an effect.

Appendix A: Selected Questions from the Melbourne Institute of Applied Economic and Social Research Surveys of Consumers

Introduction

'Good... my name is (Q0IV) from OZ INFO a market research company in Melbourne and we are conducting a survey of people 18 years and over on their opinions of the current economic climate. We would like you to participate in this survey which will take approximately 10 minutes.' (Ask to speak to someone in the household whose birthday is closest to today's date.)

Q1: Respondent gender

'Now just a couple of questions about yourself for analysis purposes.' (Record respondent sex.)
1. Male
2. Female

Q2: Respondent age group

'Could you please tell me into which age group do you fall?' (Read out age groups.)
1. 18–24 years
2. 25–34 years
3. 35–44 years
4. 45–49 years
5. 50–54 years
6. 55–64 years
7. 65+ years
8. Refused

Q3: Respondent occupation (if 2 in Q99EMPL)

'Are you working?'
'What is your current occupation?'

The Occupation was (Q3), please code this as shown.
1. Managers and administrators
2. Professionals
3. Para-professionals
4. Tradespersons
5. Clerks
6. Salespersons and personal service workers
7. Plant and machine operators and drivers
8. Labourers and related workers
9. Retired
10. Unemployed/home duties
11. Refused

Q4: Respondent education level

'And what level of education did/have you achieved?' (Read out if necessary.)
1. Primary
2. Secondary up to year 10
3. Full secondary
4.&5. Non trade certificate & trade certificate
6.&7. Part & full university or tertiary degree, diploma or certificate
8. Post graduate degree
9. Refused/not applicable

Q5: Voting intention

'If a federal election was held today could you please tell me which party you personally would vote for?' (Read out.)
1. Liberal Party
2. Australian Labor Party
3. Australian Democrats
4. The National Party
5. Greens
6. Independents/other
7. None/don't know

Q7: Home ownership

'And about your home, is your home...?' (Read out.)
1. Rented
2. Owned, but with a mortgage or loan
3. Owned outright
4. Or some other type (specify)
5. Refused/don't know

Q11: Household income

'Could you please tell me what the combined household pre-tax income is?' (Read out ranges.)
1. Up to $20 000
2. $21 000–$30 000
3. $31 000–$40 000
4. $41 000–$50 000
5. $51 000–$60 000
6. $61 000–$70 000
7. $71 000–$80 000
8. $81 000–$90 000
9. $91 000–$100 000
10. More than $100 000
11. Refused

Q13: Postcode

'And finally, could you please tell me your postcode?'

1.	100	NSW - metro males
2.	65	NSW - rural males
3.	100	VIC - metro males
4.	50	VIC - rural males
5.	40	QLD - metro males
6.	60	QLD - rural males
7.	45	SA - metro males
8.	30	SA - rural males
9.	40	WA - metro males
10.	35	WA - rural males
11.	20	TAS - metro males
12.	5	TAS - rural males
13.	100	NSW - metro females
14.	65	NSW - rural females
15.	100	VIC - metro females
16.	50	VIC - rural females
17.	40	QLD - metro females
18.	60	QLD - rural females
19.	45	SA - metro females
20.	30	SA - rural females
21.	40	WA - metro females
22.	35	WA - rural females
23.	20	TAS - metro females
24.	5	TAS - rural females
25.	10	ACT - males
26.	10	ACT - females

Use Q0loc if 1 in Q99SEX and 1–12 in Q0LOC
Use Q0loc+12 if 2 in Q99SEX and 1–12 in Q0LOC
Use Q99SEX+24 if 13 in Q0LOC

Section A: Consumer sentiment index/inflationary expectations

Q3A: Future economic conditions

'Thinking of economic conditions in Australia as a whole. During the next 12 months, do you expect we'll have good times financially, or bad times, or what?'
1.   Good times
2.   Good with qualifications
3.   Some good, some bad
4.   Bad with qualifications
5.   Bad times
6.   Uncertain/don't know/it depends

Q6A: News items

'Now, about news items. During the last few months, have you read or heard any news of changes in economic conditions?'
1.   Yes
2.   No
3.   Don't know

Q7A1: First mentioned news item

'What in particular, were they about?' (Record first mentioned then go to next question for next item)

Q7AA1: First mentioned news item

'First mentioned news item was...' (The codes below list examples of answers to Q7A. If respondent has heard one thing is causing another e.g. government is causing inflation, circle for both government and inflation.)
1.   Politicians (Labor Party, Liberal Party, Australian Democrats, etc.)
2.   Government (Medicare, budget, spending, etc.)
3.   Taxation (flat tax, capital gains, consumption tax, superannuation tax)
4.   Wages (claims, indexation, Arbitration Court, wage cases)
5.   Inflation (rising costs, groceries, price increases, CPI, etc.)

6. Unemployment (no jobs about, more jobs available, etc.)
7. Money (credit squeeze, banks, interest rates, housing loans/mortgage etc.)
8. Change in Australian dollar (exchange rates etc.)
9. Business (going broke, company profits/losses, share fall/rise etc.)
10. Economic conditions (shortages, recessions, boom, etc.)
11. Farming (rural slump, drought, floods, beef, wheat, superphosphate etc.)
12. Overseas influences (exports, imports, foreign capital, trade deficits etc.)
13. Unions power (strikes, pressure on wages etc.)
14. Other answer (use only if no suitable code above)
15. Don't know/none

Q9A: Next year employment conditions

'Now about people being out of work during the coming 12 months. Do you think there'll be more unemployment than now, about the same, or less?'
1. More unemployment
2. About the same/some more/some less
3. Less unemployment
4. Don't know

Q10A: Next year price changes

'I'd like to find out what you think will happen to prices. Thinking about the prices of things you buy, (pause) by this time next year, do you think they'll have gone up or down?'
1. Up (go Q11A1)
2. Down (go Q11A2)
3. The same (go Q99NX1)
4. Don't know/uncertain (go Q99NX1)

Q11A1: Price rise percentage

'By what percentage do you think prices will have gone up by this time next year?' (Type a whole percentage number only.)
Go Q99NX1

Question 11A2: Price fall percentage

'By what percentage do you think prices will have gone down by this time next year?' (Type a whole percentage number only.)
See Q11A1

Section E

Q2E: Rate of pay

'I would now like to ask you a few questions about how your pay is determined and how it has changed over the past year. Is your rate of pay currently determined by'
1.   An individual contract
2.   An agreement across your enterprise
3.   The safety net, that is, your wages are determined solely by an award
4.   Other (specify)
5.   Don't know

Q12A: Next year wage changes

'Turning now to the wage or salary you expect to receive for your job. Do you think that your average hourly rate of pay is likely to increase, decrease or stay the same over the coming 12 months?'
1.   Increase
2.   Decrease
3.   Same
4.   Don't know

Q13A1: Percentage increase/decrease

'By what percentage do you expect that your rate of pay will (Q12A)?

Appendix B: Data Definitions

1.   Survey Data

Inflation expectations, expectations about various other economic variables and respondent characteristics are all obtained from the Melbourne Institute of Applied Economic and Social Research Surveys of Consumers. Specific questions are listed in Appendix A.

Median inflation expectations are constructed from the frequency distribution of individual responses using the following formula.

$$median = lb + \left[\frac{\left(\frac{n}{2} - F \right)}{f} \right] w$$

lb = lower bound of range

n = number of observations

f = frequency of median class

F = cumulative frequency of observations below median class

W = width of median class

Responses are weighted to reflect the gender, age and location distribution of the population and qualitative responses are distributed according to quantitative responses. These adjustments are explained in more detail in Section 2.1.1 in the text.

2.   Underlying Inflation

Rate of change in the Treasury underlying CPI. Australian Bureau of Statistics, *Consumer Price Index*, ABS Cat. No. 6401.0.

3. Import Prices

Tariff adjusted import prices. *Import Price Index*, ABS Cat. No. 6414.0.

4. Unit Labour Costs

Nominal unit labour costs, Reserve Bank of Australia.

5. AWOTE

Private sector AWOTE, (sa), ABS Cat. No. 6302.0, Table 2.

6. Output Gap

Hodrick Prescott output gap estimated with real GDP(A) from 1980 to 1997, with $\lambda = 1\,600$. See de Brouwer (1998).

7. Unemployment Rate

Total unemployed persons as a proportion of the labour force. ABS Cat. No. 6202.03, Table 2.

8. Cash Rate

From 1990 onwards, the target cash rate. Prior to 1990, the unofficial 11am call cash rate. Reserve Bank of Australia *Bulletin*, Table F.1.

9. Exchange Rates

The $US/$A and TWI exchange rate measures, May 1970 = 100. Reserve Bank of Australia *Bulletin*, Table F.9.

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