Lay people's models of the economy: A study based on surveys of consumer sentiments

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ABSTRACT

The purpose of this paper is to use a large data set comprising individual's responses to survey questions about future economic conditions, unemployment and prices to explore lay people's models of the economy and specifically their understanding of the relationship between unemployment and economic activity and also between unemployment and prices. The data is taken from the questionnaires used to form monthly indexes of consumer sentiments in Australia. We ask if the implied bivariate relationships are rational in the sense used by Muth (1961) and if they are consistent with the good-begets-good heuristic proposed by Leiser and Aroch (2009). We also ask if they are consistent with the actual operation of economic – and especially monetary – policy in Australia. We find that the data does provide some support for these hypotheses and for recent work in behavioural macroeconomics utilising the good-begets-good heuristic.

1. Introduction

In 1946 the Survey Research Centre at the University of Michigan commenced regular monthly surveys of US consumers primarily in order to obtain information about likely consumer spending and saving behaviour for forecasting purposes. The survey instrument and the associated indexes of consumer sentiments were developed by George Katona and cover not only individual consumer's spending intentions but also how they view prospects for a number of macroeconomic variables (especially inflation, unemployment and output) over the near term.[1] Since it was first applied in the USA, Katona's survey has been adopted by many other advanced economies, including Australia.

While considerable attention has been devoted to aggregating survey responses into an index of consumer sentiment and also to researching expectations of some individual variables (inflation expectations especially), little attention has been devoted to exploring the bivariate relationships which are implicit in the respondents' answers to questions about the behaviour of individual macroeconomic variables. There are three reasons why these relationships, as revealed to us by the surveys of consumers, are of interest. First, the democratic or libertarian ideal suggests that we should be interested in lay people's mental maps or models of the economy; the analysis of individual's responses to this questionnaire provides one way to obtain this information. Second, it is of interest to know if lay people's ideas are rational in the 'Muthian sense' in which case their expectations, "since they are informed predictions of future events, are essentially the same as the predictions of the relevant economic theory" (Muth, 1961, p 316) or, more loosely, if lay people's ideas are consistent with the way the economy, and especially monetary policy, operates. Finally, we need to understand why people not trained in economic theory see things the way they do. One attempt to explain this is the good-begets-good heuristic[2] posited by Leiser and Aroch (2009) and which we shall discuss in more detail in the next section of the paper. The consumer's survey responses provide an opportunity to test this hypothesis with a relatively large sample size.

The aim of this paper is to analyse over 200,000 observations of consumer's views about the expected state of the economy (and specifically future economic conditions, unemployment and prices) covering every month for 17 years. The paper is organised as follows. Section 2 presents a brief review of previous research on lay persons' understanding of economic relationships and presents the hypotheses to be tested in this paper. Section 3 gives a brief description of the survey data while section 4 reports the results. Concluding comments and caveats are in Section 5.

2. Previous work on lay people's models of the economy and two hypotheses

As mentioned above, the survey questionnaires which are used as the basis for the computation of a consumer sentiment index include questions about how individuals view prospects for prices, unemployment and the level of economic

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[1] See Curtin (1982) and Wärneryd (1982) for further information on the history of the survey and Katona's role.

[2] Essentially this says that if a number of events (or variables) are judged to be either good or bad that any two items within each group will be thought to be positively related with each other while any two items from different groups will be thought to be negatively or inversely related to each other.

activity over the coming year. Since we have access to each individual's responses to these questions in every month the survey has been operating we are in a position to see whether these variables are thought to be related and, if they are, to see if they are thought to be positively or negatively related. The aim of the paper is to describe the implied connection in lay people's minds between (changes in) unemployment & economic activity and also between (changes in) unemployment & prices.

For some time there has been broad agreement amongst economists as to the 'short-run' relationship between the three variables for which we have information. Textbooks in macroeconomics, even at the most elementary level, cover two doctrines of relevance to our study. The first, is "Okun's Law" which states that there is an inverse relationship between changes in unemployment and in the level of economic activity[3] The second is the "Phillip's Curve" which states that there is an inverse relationship (or 'trade-off') between the rate of unemployment and the rate of inflation in an economy.[4] Since we wish to know if lay people's ideas are rational in the 'Muthian sense' we will test the hypotheses that lay people's views are consistent with Okun's Law and the Phillip's Curve. This means that we will go beyond merely describing the apparent bivariate relationships to perform some basic statistical tests. The survey responses are ordinal and suitable for this purpose. The statistical test adopted in this paper is the well-known Kendall's tau test which is a common non-parametric measure of association.

Surprisingly, there has been very little work on these questions. Most authors simply examine lay people's attitudes or opinions on specific economic outcomes (examples include inflation, the global financial crisis) or policy choices (examples include higher taxes, government expenditure on welfare). Occasionally there is a comparison between the responses of lay people and professional economists to survey questions. Compared with our study however these papers do not focus on lay people's understanding of the bivariate relationship between key macroeconomic variables. Having said that, we are aware of three studies which *do* seek to uncover the connections lay people see between macroeconomic variables or ideas. One is the paper by Williamson and Wearing (1996). They asked open-ended questions of 95 lay people in an attempt, inter alia, to reveal those economic concepts the respondents saw as linked and the direction and sign of the relationship. Each interviewee's responses were used to form a highly detailed (and often very complicated) cognitive model of inter-relationships between variables/ideas for that person (examples are presented in the form of diagrams of the respondent's mental maps[5] in the paper). Unfortunately, due to the open ended nature of the questions and the interests of the authors, no information was reported in the published paper on any perceived bivariate

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[3] This is named after the US applied economist Arthur Okun who in 1962 noticed the relationship for US data. He was a Yale Professor of Economics who served on the Council of Economic Advisers during the Kennedy and Johnson presidencies.

[4] This is named after A.W. (Bill) Phillips, a New Zealander who was Tooke Professor of Economic Science and Statistics at the University of London 1958-1967. He published his first paper on the inverse relationship between inflation and unemployment in 1958. Since Phillips published his paper there has been a great deal of work on the nature of the relationship between inflation and unemployment. The hypothesis we consider here is that found in basic economics texts. However, in section 5 of the paper we will argue that the way monetary policy operates in Australia may provide support for the expectation of a positive relationship between inflation and unemployment.

[5] A model may be thought of as a mental or cognitive map of the world or part of the world. For further discussion see Craik (1943), Johnson-Laird (1989) and Jones et al (2011) and the references cited therein.

connections including any connections between the three macroeconomic variables of interest here.

Related to the paper by Williamson and Wearing (1996) is the (unpublished) PhD thesis by Williamson (1992). This contains more information of relevance to our study than the journal article mentioned above. Amongst other things, Williamson administered a questionnaire to the 95 subjects which contained explicit questions about the bivariate relationship between a number of variables. Williamson provides information on only one of the bivariate relationships of interest to us, namely the relationship between unemployment and economic growth. A large majority of the respondents saw unemployment and economic growth as *negatively* related (Williamson, 1992, p 136), consistent with Okuns Law and, as we shall see, with the good-begets-good heuristic of Leiser and Aroch (2009).

A second published paper on this topic is that by Leiser and Aroch (2009) who set out to examine lay people's understanding of the bivariate relationship between various macroeconomic variables. The participants were 42 first-year students in psychology at Ben-Gurion University who responded to a self-paced computer-administered questionnaire in individual booths.[6] The main part of the questionnaire elicited judgments on the causal links between pairs of economic values. The authors selected 19 economic variables, including; 'unemployment rate', 'economy growth rate' and 'rate of inflation'. Each of "the questions followed a fixed format: If variable A increases, how will this affect variable B? For example: If the unemployment rate increases, how will this affect the inflation rate?" (Leiser and Aroch, 2009, p 374). Participants were found to confidently state causal links between variables and to describe a positive or negative relationship between each pair. The authors found (see Table 3 on page 378 of their paper) that the participants saw the rate of economic growth and the rate of unemployment to be *negatively* related (this is consistent with Okun's law) and they saw the rate of unemployment and the rate of inflation to be *positively* related[7] (which is not consistent with most representations of the Phillip's curve).

Most striking to us is the finding in Leiser and Aroch (2009) that lay people see unemployment and inflation as positively related. The authors have a neat and interesting explanation of the participant's categorisations into those which are positively related and those which are negatively related by arguing that "When asked: "Does A influence B (and in what direction)?" participants can answer readily on the basis of a simple heuristic, which we dubbed the good-begets-good (GBG) heuristic: If A and B belong to the same pole, an increase in one will also raise the other; if they belong to opposite poles, a rise in one will cause the other to drop" … "Economic events are classified as good or bad, not as neutral components in a causal system … We submit that naïve participants rely on a simple but powerful heuristic: the economic world functions in either a virtuous or a vicious circle. An increase in one good variable will increase the values of other good variables, and decrease those of

[6] A second group of participants was composed of 18 students in their last year of their bachelor's degree in economics at the same institution. We will focus, as did Leiser and Aroch on the results for the 42 psychology students as they can be regarded as "lay" or, as Leiser and Aroch (2009, p 373) put it, "economically naïve".

[7] In their published paper Leiser and Aroch do not give measures of the correlation or any other quantitative measure of association between the variables. However, in a personal communication David Leiser informs us that a large majority (over 4/5) of the 42 respondents saw inflation and unemployment as positively related.

bad variables. This good-begets-good heuristic settles in most cases how to answer. It is not unrelated to the way economic events are commonly described in popular economic discourse, with strong valuation of every change as either positive or negative" (Leiser and Aroch, 2009, p 378).[8] As economists we would express their explanation for the results slightly differently. In the language of economics a 'good' is something where more is preferred to less while a 'bad' is something where less is preferred to more. It would appear from Table 3 of their paper that 'goods' are grouped together and are thought to be positively related to each other while 'bads' are grouped together and are thought to be positively related to each other and negatively related to 'goods'. Thus the participants saw the rate of economic growth and the rate of unemployment to be negatively related (one is a good and one is a bad) while the rate of unemployment and the rate of inflation are thought to be positively related (both are bads).

In this paper we are (inter alia) interested in whether or not the evidence from surveys of consumer sentiments is consistent with the good-begets-good (GBG) heuristic. Given this hypothesis, we would expect to find a *negative* association between expectations of economic activity and unemployment while finding a *positive* association between unemployment and prices. In some ways it is the second of the two relationships which is most interesting from the point of view of testing the GBG heuristic, as the mainstream economist's Phillips curve would suggest unemployment and inflation are inversely related (contrary to the GBG heuristic) while both the economist's model and the GBG heuristic would predict a negative association between unemployment and the level of economic activity.

3. The MIAESR Survey Data Source

The data come from a survey conducted monthly for the Melbourne Institute of Applied Economic and Social Research (MIAESR) which is part of the University of Melbourne. Survey interviews are conducted by telephone using trained interviewers. The surveys are based on 1200 adults aged 18 years and over, across Australia. Telephone numbers and the household respondent are selected at random. The survey data commences in January 1995 and ends in December 2011, covering 204 months in total. The respondents are different each month and so while it is possible to look for patterns across individuals in any one month, it is not possible to track an individual's responses over time. Also, as with the Michigan survey, the questionnaire contains questions designed to elicit information about each individual's expectations about economic conditions in the 12 months from the date of the survey. The relevant questions and our coding are:

Economic Activity: "Thinking of economic conditions in Australia as a whole, during the next 12 months do you expect we'll have: (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". The responses to this question have been scored [1 1 0 -1 -1] respectively after deleting those who chose option 6.

Unemployment: "Now about people being out of work during the coming 12 months, do you think there'll be: (1) more unemployment (2) About the same/Some more some

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[8] Ziv and Leiser (2013, p 820) write that: "in studies of naive economic understanding in adults, participants manifest a striking willingness to answer questions about macroeconomic causation, even when their understanding of these matters, as judged by follow-up questions, is very low".

less (3) Less unemployment (4) Don't Know". The responses to this question have been scored [1 0 -1] respectively after deleting those who chose option 4.

Prices: "Thinking about the prices of things you buy, by this time next year, do you think they'll have gone: (1) up, (2) down or (3) stayed the same?" (4) Don't Know/ Uncertain". The responses to this question have been scored [1 -1 0] respectively after deleting those who chose option 4.[9]

Thus, the data set provide direct evidence about the expected movements in the levels of economic activity, unemployment and prices over the coming year. The statistical analysis is to infer the implied pair-wise correlations from respondents' answers to the questions about their expected views of the direction of change of each variable.

Notice before we proceed that, unlike the studies mentioned in the literature review (Williamson (1992), Williamson & Wearing (1996) and Leiser & Aroch (2009)), we do not have direct evidence of the respondent's views on the connections between each pair of variables. Instead we are inferring the bivariate connections from the respondent's answers to quite separate questions involving their perceptions of likely favourable/unfavourable changes for each individual variable.

4. Results and discussion

Since we know the responses given to these questions by each individual in each month the paired responses data can be arranged in the form of 3×3 contingency tables with the columns and rows recording the number of +1, 0 and -1 for each of our two-variable combinations. In each case we have discarded the 'don't knows' and 'uncertains' and have only included responses which can be matched across at least one pair. Since we can match responses for each month over 17 years, we are able to recover the implicit bivariate relationships for 204 months.

To assist the reader to understand what follows, we show in Table 1 the contingency table for *all* of the observations in our data set taken together.[10]

[TABLE 1 NEAR HERE]

Contingency Table1A refers to paired answers to questions about the level of activity (Y) and unemployment (U) and it is clear that there is not a perfect correlation (whether positive or negative) between the two as many responses lie off the diagonals. However, roughly twice as many respondents lie in cells along the minor (SW-NE) diagonal than lie in cells along the major (NW-SE) diagonal. Along the minor diagonal are the respondents who, when they expected economic activity to rise, expected unemployment to fall and vice-versa.

Contingency Table1B refers to paired answers to questions about prices (P) – and unemployment (U). Looking at this contingency table it is again clear that there is

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[9] This is the most problematic of the three questions given the focus of our research. Strictly speaking the question is asking about prices (ie the price level) rather than inflation (ie the rate of change in the price level). However we note that a recent survey of perceptions and expectations of price changes and inflation concluded that: "The main insight from the review is that while consumers may have a limited ability to store and recall specific prices and even succumb to a number of biases in the way in which they form perceptions and expectations of global price changes, they do seem to have some feel for, and ability to judge and forecast, inflation" (Ranyard et al, 2008 p 397).

[10] The total number of paired responses we can match for each pair of questions over the whole of the sample period is 221,234.

not a perfect correlation (whether positive or negative) between the two variables as, once again we see that many responses lie off the diagonals. However, over twice as many respondents lie in cells along the major (NW-SE) diagonal than lie in cells along the minor (SW-NE) diagonal. The major diagonal show the number of respondents who, when they expected a fall in unemployment, also expected a fall in prices and vice-versa.

While inspection of contingency tables is suggestive of the presence and direction of relationships it is necessary, given the noise and measurement error inherent in such data, to conduct formal tests of our hypothesis. Given the ordinal nature of the data, we use Kendall's tau-b as our measure of the association between each pair of variables. Values of tau-b can range from −1 where there is a perfect negative association (ie all pairs lie along the minor SW-NE diagonal of the table to +1 where there is a perfect positive association (ie all pairs lie along the main NW-SE diagonal of the table).[11] It must also be recognised that aggregating data from all months over the whole of the period 1999-2011 cannot be particularly informative about the presence or absence of bivariate relationships as it brings together individual's expectations formed at very different times, and especially at very different stages of the business cycle (including the period of the global financial crisis) when very different information sets are available to the respondents. Hence, to obtain a better understanding about the relationships (and to better avoid spurious correlations which are purely the result of the aggregation of the data over such a long time period) we carried out our statistical tests using data for each individual month over our sample period.

The values of tau-b for every month of the survey are displayed as a time series in Figure 1. The plot of the correlation coefficients over time show that lay people's perception of the expected change in unemployment and activity and between the expected change in unemployment and prices have been quite stable except for the period 2008-2009, the period when the global financial crisis (GFC) had its greatest impact upon the Australian economy.[12]

[FIGURE 1 NEAR HERE]

The scores for Kendall's tau-b for each month are set out in Table 2.[13] An "ns" after a value of tau-b indicates that it is not significantly different from zero at the 5% level.

The columns headed U and Y assesses the association between the responses to the question dealing with unemployment (U) expectations and the responses to the question dealing with expectations of the level of economic activity (Y). In every

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[11] The test is a non-parametric test and, under the null hypothesis of independence of X and Y, the sampling distribution for large samples is commonly approximated as a normal distribution with mean zero and variance $(2(2n+5))/(9n(n-1))$, where n is the number of (pairs of) observations ie the number of individuals whose responses may be matched across each pair of questions.

[12] Compared with the USA and Europe the Global Financial Crisis had only a minor impact on the Australian economy. The aggregate (seasonally adjusted) unemployment rate for example rose from 4.0% in February 2008 to 5.9% in June 2009 after which it began to fall slowly. The peak value of 5.9% is low compared with the peak unemployment rate in the previous recession (the early 90s) where it reached a peak of 11.2% in December 1992. In short while the Australian economy experienced a brief period of recession, in no way could the term 'great recession' be used to describe the Australian experience.

[13] Each month (a different group of) 1200 persons are surveyed. The smallest sample size (number of responses we can match in any month) is 198 and the largest is 1161.

month we have a significant and negative relationship between the two, indicating that those who responded by saying that economic activity would fall (rise) tended to also respond by saying that unemployment would rise (fall). So for all months our results are consistent with lay people operating 'as if' (to use Milton Friedman's evocative phrase[14]) they are familiar with Okun's Law. The results for this pair of variables are also consistent in every month with Leiser and Aroch's (2009) good-begets-good heuristic.

The columns headed P and U assess the association between the responses to the question dealing with prices (P) and the responses to the question dealing with unemployment. The value of tau-b is not significantly different from zero in just over 60% of the months (127 of the 204). The value of tau-b is significantly different from zero and positive in just under 40% of the months (77 of the 204), indicating that in those months, individuals who are saying that prices would rise (fall) tended to also tended to say that unemployment would also rise (fall).[15] The implied positive relationship between the two is not consistent with lay people operating 'as if' they are familiar with the economists (short-run) Phillip's Curve relation but is consistent with the results in Leiser and Aroch (2009) and are consistent with their good-begets-good heuristic.

[TABLE 2 NEAR HERE]

The correlations reveal that the onset and aftermath of the GFC between late 2008 and late 2009 had caused a change in perceptions. There was an especially marked increase in the strength of the implied negative relationship between unemployment and the level of economic activity (U and Y).[16] Inspection of the raw data showed that at this time there was an increase in the number of individual respondents who were expecting both a fall in the level of economic activity and a rise in unemployment. Turning to the relationship between inflation and unemployment (P and U) we see that there was a noticeable change in the relationship between these two variables at the time of the Global Financial Crisis (2008 and 2009). Inspection of the raw data showed that over this period there was an increase in the number of respondents who were expecting both a fall in prices and a rise in unemployment.

How do we explain these results? The Global Financial Crisis triggered by the collapse of the US financial system (and especially associated with the bankruptcy of Lehman Brothers in September 2008) affected Australia directly, in the first instance, through liquidity problems and subsequently via a fall in exports to the US and Europe. While awareness of the crisis and its likely consequences were building up for more than a year prior to the collapse of Lehman Brothers by late 2008, a number of things were happening to markedly increase concern amongst the population. During these months, a number of reports and events heighten awareness of economic conditions and increased considerably the concern amongst the populace. Economic circumstances were noticeably deteriorating with unemployment rising and job vacancies collapsing, and in the last quarter of 2008 the economy was experiencing negative growth in GDP for the first time in many years. House prices and stock prices

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[14] See Friedman (1953), especially pp 18-22.

[15] The value of tau-b is not both significantly different from zero and negative in any of the monthly surveys.

[16] Prior to this date there was much uncertainty as to the effect of overseas events on the Australian economy and we think this explains the weakening of the association between the level of activity and unemployment in late 2007 and early 2008.

were also falling at that time. Much attention was given to these phenomena in the media and there was much speculation as to the likelihood of further deterioration in the economy and especially in household incomes. A number of policy initiatives were also implemented in late 2008 and early 2009 (for example, a government stimulus package which included one-off cash payments to seniors, carers and families; dramatic cuts in interest rates; a guarantee of all deposits in Australian banks; a ban on short-selling in the Australian share market and a time-limited cash grant to first home buyers), all of which had the effect of limiting the depths of the recession but which also served to reinforce the (by now, widespread) notion that the economy was in crisis.

In relation to all of the results for the period of the Global Financial Crisis, extreme pessimism may have been the dominant sentiment where pessimism takes the form of "deterioration of economic conditions". In other words, a pessimistic mind-set prevailed where the level of economic activity, prices and employment were expected to fall (and thus unemployment expected to rise). This is borne out by the data in Table 3 which shows the percentage of all respondents in each year who are predicting particular outcomes: (a) that economic conditions will deteriorate, (b) that unemployment will rise and (c) that prices will rise. A comparison of the entries for 2007 with 2008 and especially 2009 is striking. What this seems to indicate is that in times of crisis households are more influenced by media treatment and by recent outcomes and, in this particular case, 'pessimism' seems to be the dominant sentiment affecting all responses.[17]

[TABLE 3 NEAR HERE]

5. Conclusions and caveats

There are two important caveats to our results. First, the question related to prices asks if prices will be different next year than they are now. Strictly speaking, this is different to asking specifically about the rate of inflation. Secondly, unlike the studies reported in Williamson (1992), Williamson & Wearing (1996) and Leiser & Aroch (2009)), we do not have direct evidence of the connections between variables. Instead, we are inferring bivariate relationships from respondents' answers to separate questions about their expectations of any change in each variable. Having said that, the benefit of the approach adopted here is that we can work with sample sizes far larger than is found elsewhere in the literature on this topic.

The good-begets-good heuristic of Leiser & Aroch (2009) receives some support.[18] The most striking result in this regard is the strong correlation between the survey question dealing with perceptions of unemployment and the responses to the question dealing with expectations of 'future economic conditions'. The association between prices and unemployment expectations is positive, consistent with the good-begets-good heuristic for the majority of months in our sample period. The results for 'strict' Muthian rationality are mixed. Okun's law receives unambiguous support whereas the

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[17] David Leiser has pointed out to us that it may well be that the correlations between inflation and unemployment, are both driven by their negative correlation with the general sentiment towards the economy rather than pair-wise correlations between the two.

[18] Although the presence (and sign) of the relationship between unemployment and prices (inflation) seems to be time and circumstance dependent, suggesting that there is a need for further research with different data sets.

postulated short-run Phillips relation is decisively rejected. However, it may be argued that a positive association between prices and unemployment is consistent with the actual operation of the economy given the exercise of monetary policy in the form of inflation targeting by the Reserve Bank of Australia (Australia's central bank) since the early 1990s. It is well known that high inflation leads to a policy response in the form of higher interest rates to curb spending which may then dampen growth in employment. In such a world it would be rational to think that higher prices would be associated with higher unemployment. Our work thus provides some support for Gaffeo & Canzian (2011) who, following the logic of the GBG heuristic, use a small macroeconomic model to explore the consequences for monetary policy of the expectation on the part of the public that higher inflation will be associated with higher unemployment and vice-versa. They are especially interested in the possibility that the behaviour of the public, based on the GBG heuristic, might act as a stabilising mechanism and possibly substitute for aggressive interest rate policy. Given this, and given our findings, we are of the view that this is an important area for further research in behavioural macroeconomics.

Acknowledgements

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Table 1.

Contingency Tables (All observations)

Table 1A Responses to questions regarding the change in unemployment and economic activity

		Economic Activity		
		-1	0	+1
Unemployment	-1	6888	7694	18423
	0	25710	27721	42078
	+1	49606	23494	19620

Notes:

1. The qualitative responses to the activity question are recorded as: -1 if economic activity is expected to fall, 0 if it is expected to remain unchanged and +1 if it is expected to rise; while the qualitative responses to the unemployment question are recorded as: -1 if unemployment is expected to fall, 0 if it is expected to remain unchanged and +1 if it is expected to rise.

2. The value of Kendall's tau-b for the data in Table 1A (unemployment and economic activity) is -0.286 with a p-value of 0.000. This is consistent with Okun's Law and is also consistent with the results in Williamson (1992) and in Leiser and Aroch (2009) and with the good-begets-good heuristic.

Table 1B Responses to questions regarding the change in unemployment and prices

		Prices		
		-1	0	+1
Unemployment	-1	1183	4873	26949
	0	2127	13163	80219
	+1	2834	9933	79953

Notes:

1. The qualitative responses to the price question are recorded as: -1 if the price level is expected to fall, 0 if it is expected to remain unchanged and +1 if it is predicted to rise.

2. The value of Kendall's Tau-b for the data in Table 1B (unemployment and inflation) is +0.040 with a p-value of 0.000. This is inconsistent with the economist's Phillips curve but, although the correlation is very low (it is positive and significantly different from zero) consistent with Leiser and Aroch's (2009) good-begets-good heuristic.

Table 2.

Kendall's tau-b values for each month

Month	U and Y	P and U	Month	U and Y	P and U	Month	U and Y	P and U	Month	U and Y	P and U	Month	U and Y	P and U
1995M01	-0.292	0.037ns	1997M01	-0.302	0.020ns	1999M01	-0.290	0.080	2001M01	-0.275	0.117	2003M01	-0.237	-0.025ns
1995M02	-0.257	0.056ns	1997M02	-0.256	0.049ns	1999M02	-0.258	0.097	2001M02	-0.226	0.068	2003M02	-0.189	0.051ns
1995M03	-0.259	0.070	1997M03	-0.265	0.036ns	1999M03	-0.290	0.109	2001M03	-0.235	0.065	2003M03	-0.210	0.111
1995M04	-0.305	0.100	1997M04	-0.293	0.067	1999M04	-0.331	0.157	2001M04	-0.219	0.091	2003M04	-0.305	0.041ns
1995M05	-0.294	0.073	1997M05	-0.291	0.003ns	1999M05	-0.256	0.109	2001M05	-0.288	0.077	2003M05	-0.227	0.015ns
1995M06	-0.292	0.062	1997M06	-0.250	0.030ns	1999M06	-0.254	0.149	2001M06	-0.306	0.104	2003M06	-0.264	0.053ns
1995M07	-0.241	0.046ns	1997M07	-0.296	0.039ns	1999M07	-0.289	0.109	2001M07	-0.242	0.086	2003M07	-0.280	0.043ns
1995M08	-0.251	0.072	1997M08	-0.297	0.030ns	1999M08	-0.310	0.135	2001M08	-0.316	0.085	2003M08	-0.291	0.060
1995M09	-0.214	0.043ns	1997M09	-0.299	0.064	1999M09	-0.265	0.123	2001M09	-0.317	0.097	2003M09	-0.196	0.066
1995M10	-0.322	0.062	1997M10	-0.268	0.096	1999M10	-0.300	0.122	2001M10	-0.225	0.031ns	2003M10	-0.302	0.148
1995M11	-0.271	0.102	1997M11	-0.259	0.128	1999M11	-0.255	0.138	2001M11	-0.242	0.065	2003M11	-0.205	0.068
1995M12	-0.236	0.054ns	1997M12	-0.233	0.127	1999M12	-0.297	0.088	2001M12	-0.307	0.072	2003M12	-0.229	0.059
1996M01	-0.234	0.002ns	1998M01	-0.297	0.075	2000M01	-0.279	0.083	2002M01	-0.266	0.062	2004M01	-0.234	0.089
1996M02	-0.288	0.045ns	1998M02	-0.238	0.082	2000M02	-0.253	0.170	2002M02	-0.262	0.058ns	2004M02	-0.267	0.065
1996M03	-0.296	0.123	1998M03	-0.217	0.035ns	2000M03	-0.278	0.154	2002M03	-0.340	0.092	2004M03	-0.253	0.118
1996M04	-0.302	0.083	1998M04	-0.261	0.085	2000M04	-0.258	0.134	2002M04	-0.272	0.087	2004M04	-0.243	0.101
1996M05	-0.260	0.018ns	1998M05	-0.304	0.106	2000M05	-0.223	0.171	2002M05	-0.267	0.076	2004M05	-0.197	0.078
1996M06	-0.278	0.076	1998M06	-0.257	0.076	2000M06	-0.197	0.148	2002M06	-0.247	0.042ns	2004M06	-0.211	0.142
1996M07	-0.292	0.041ns	1998M07	-0.266	0.089	2000M07	-0.284	0.129	2002M07	-0.267	0.092	2004M07	-0.234	0.068
1996M08	-0.300	0.027ns	1998M08	-0.218	0.114	2000M08	-0.284	0.092	2002M08	-0.346	0.045ns	2004M08	-0.212	0.080
1996M09	-0.332	0.027ns	1998M09	-0.201	0.071	2000M09	-0.225	0.074	2002M09	-0.216	0.066	2004M09	-0.242	0.094
1996M10	-0.244	0.031ns	1998M10	-0.349	0.094	2000M10	-0.267	0.095	2002M10	-0.259	0.077	2004M10	-0.314	0.100
1996M11	-0.293	0.089	1998M11	-0.269	0.063	2000M11	-0.209	0.121	2002M11	-0.278	0.122	2004M11	-0.279	0.083
1996M12	-0.261	0.001ns	1998M12	-0.249	0.068	2000M12	-0.277	0.124	2002M12	-0.240	0.072	2004M12	-0.240	0.086

Table 2 (cont.)

Month	U and Y	P and U	Month	U and Y	P and U	Month	U and Y	P and U	Month	U and Y	P and U
2005M01	-0.242	0.111	2007M01	-0.284	0.072	2009M01	-0.231	-0.053ns	2011M01	-0.229	0.007ns
2005M02	-0.213	0.045ns	2007M02	-0.222	0.038ns	2009M02	-0.171	-0.006ns	2011M02	-0.210	0.037ns
2005M03	-0.235	0.042ns	2007M03	-0.257	0.033ns	2009M03	-0.224	0.008ns	2011M03	-0.321	0.058
2005M04	-0.210	0.073	2007M04	-0.203	0.085	2009M04	-0.212	0.013ns	2011M04	-0.274	0.047ns
2005M05	-0.254	0.033ns	2007M05	-0.181	0.083	2009M05	-0.250	0.022ns	2011M05	-0.277	0.113
2005M06	-0.275	0.042ns	2007M06	-0.171	0.032ns	2009M06	-0.232	0.042ns	2011M06	-0.293	0.063
2005M07	-0.240	0.098	2007M07	-0.211	0.090	2009M07	-0.277	0.037ns	2011M07	-0.308	0.085
2005M08	-0.251	0.023ns	2007M08	-0.198	0.050ns	2009M08	-0.263	0.024ns	2011M08	-0.301	0.040ns
2005M09	-0.235	0.009ns	2007M09	-0.145	-0.008ns	2009M09	-0.291	0.071	2011M09	-0.283	0.088
2005M10	-0.243	0.090	2007M10	-0.224	0.044ns	2009M10	-0.293	0.016ns	2011M10	-0.246	0.113
2005M11	-0.287	0.114	2007M11	-0.247	0.035ns	2009M11	-0.258	0.051ns	2011M11	-0.309	0.063
2005M12	-0.278	0.114	2007M12	-0.258	0.041ns	2009M12	-0.289	0.076	2011M12	-0.305	0.035ns
2006M01	-0.272	0.094	2008M01	-0.135	0.063	2010M01	-0.304	0.046ns			
2006M02	-0.235	0.062	2008M02	-0.219	0.019ns	2010M02	-0.339	0.052ns			
2006M03	-0.272	0.024ns	2008M03	-0.196	0.066	2010M03	-0.290	0.036ns			
2006M04	-0.301	0.116	2008M04	-0.086	0.041ns	2010M04	-0.310	0.075			
2006M05	-0.230	0.059	2008M05	-0.195	0.083	2010M05	-0.359	0.072			
2006M06	-0.270	0.032ns	2008M06	-0.150	0.067	2010M06	-0.329	0.016ns			
2006M07	-0.264	0.084	2008M07	-0.204	0.021ns	2010M07	-0.291	0.077			
2006M08	-0.290	0.012ns	2008M08	-0.245	0.021ns	2010M08	-0.303	0.087			
2006M09	-0.187	0.035ns	2008M09	-0.214	0.092	2010M09	-0.340	0.107			
2006M10	-0.292	0.027ns	2008M10	-0.209	-0.031ns	2010M10	-0.286	0.060			
2006M11	-0.224	0.128	2008M11	-0.199	0.057ns	2010M11	-0.329	0.071			
2006M12	-0.262	0.095	2008M12	-0.240	-0.041ns	2010M12	-0.296	0.038ns			

Note: 'ns' indicates that the measure is not significantly different from zero at the 5% level.

Table 3

The percentage of all respondents in each year who are predicting particular outcomes: (a) that economic conditions will deteriorate, (b) that unemployment will rise and (c) that prices will rise.

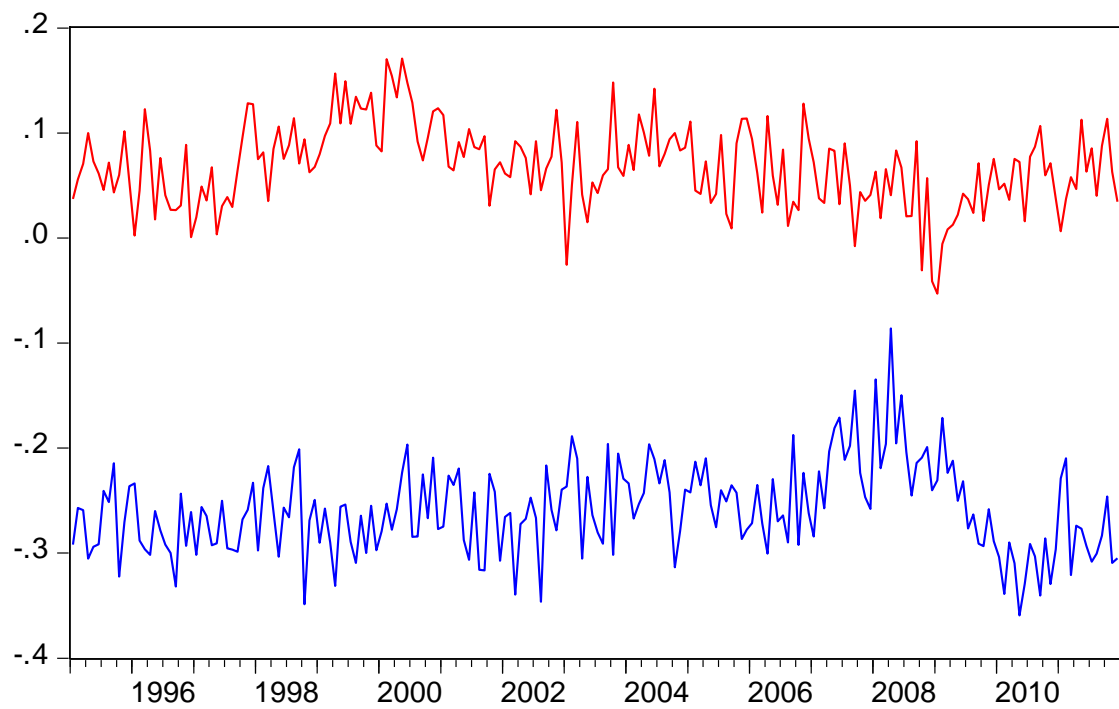| Year	Percentage of respondents who:		
	Say there will be bad economic conditions) in the coming 12 months	Say there will be more unemployment in the coming 12 months	Say that the prices of things they buy will be higher next year
1995	43	36	91
1996	39	47	86
1997	43	49	82
1998	50	50	81
1999	31	36	82
2000	44	45	84
2001	46	58	81
2002	36	46	87
2003	33	38	85
2004	24	29	85
2005	32	31	86
2006	34	37	89
2007	23	23	90
2008	48	52	87
2009	41	65	76
2010	25	28	85
2011	40	41	84

Figure 1. Monthly values of Kendall's tau-b for the relationship between unemployment and economic activity - blue (lower) line - and between unemployment and prices - red (upper) line: 1995:01-2011:12