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## Priming in inflation expectations surveys

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### CAMA Working Paper 45/2021 May 2021

**Monique Reid**

Department of Economics, Stellenbosch University

**Hanjo Odendaal**

Department of Economics, Stellenbosch University

**Pierre L. Siklos**

Balsillie School of International Affairs, Wilfrid Laurier University

Stellenbosch University

Centre for Applied Macroeconomic Analysis, ANU

**Stan Du Plessis**

Department of Economics, Stellenbosch University

### Abstract

Since the global financial crisis of 2007/2008, there has been increased attention on inflation expectations and the use of central bank communication as a tool to achieve a central bank's objective for inflation. However, much of this research analyses the survey data with limited consideration of the survey design that generated the data, or the differences across surveys and countries. In this research note, we focus on one element of South Africa's Bureau of Economic Research household inflation expectation survey question – the inclusion of a historical inflation number in the survey question. Using a dataset created by Pienaar (2018), we are able to evaluate the impact of its inclusion on the data created. We find that the inclusion of a historical inflation number into the survey question, distorts survey responses, particularly a group considered to be relatively 'less rational'. We do not investigate whether this bias is caused by anchoring (Tversky & Kahneman (1974), learning (Cavallo, Cruces, & Perez-Truglia, 2017), or any other theory, but we do argue that the observed bias should raise concern about the interpretation of surveys, where the question includes any form of extra information (priming). The impact not only distorts the level of the response, it also leads to changes in the distribution.

## **Keywords**

inflation expectations, survey design, priming

## **JEL Classification**

E51, E58, E71

## **Address for correspondence:**

(E) [cama.admin@anu.edu.au](mailto:cama.admin@anu.edu.au)

**ISSN 2206-0332**

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## **Priming in inflation expectations surveys §**

Monique Reid\*<sup>1</sup>, Hanjo Odendaal \*, Pierre Siklos\*\* and Stan Du Plessis\*

\*Department of Economics, Stellenbosch University, South Africa

\*\*Wilfrid Laurier University, Balsillie School of International Affairs, Waterloo, Canada,  
Research Fellow, Stellenbosch University, South Africa, and Centre for Applied  
Macroeconomic Analysis (CAMA)

*March 2021*

§ We thank Hugo Pienaar of the Bureau for Economic Research, Stellenbosch, for sharing the data he collected as part of his Masters thesis. This data collection was approved by the Research Ethics Committee of Stellenbosch University. Any circulation of the raw data would need to be cleared by this committee. Monique Reid, Stan Du Plessis, and Pierre Siklos gratefully acknowledge financial support for this project from the National Research Foundation (Grant number: 93520).

Conflict of interest statement: We do not believe any of the authors faces a conflict of interest as none of us is involved in the operational activities of the Bureau for Economic Research or the data collection. Three of us do, however, have some affiliation to the BER and so we disclose these individually here. Stan Du Plessis is chair of the governance committee at Stellenbosch University, to which the BER is affiliated. Hanjo Odendaal has completed a PhD for which he received a bursary from the BER. Monique Reid has on two occasions provided consulting services to the BER (she wrote two research notes for the BER).

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<sup>1</sup> c/o Room 505, 5<sup>th</sup> Floor Schumann Building, Bosman Street, Stellenbosch, 7600.

## Abstract

Since the global financial crisis of 2007/2008, there has been increased attention on inflation expectations and the use of central bank communication as a tool to achieve a central bank's objective for inflation. However, much of this research analyses the survey data with limited consideration of the survey design that generated the data, or the differences across surveys and countries. In this research note, we focus on one element of South Africa's Bureau of Economic Research household inflation expectation survey question – the inclusion of a historical inflation number in the survey question. Using a dataset created by Pienaar (2018), we are able to evaluate the impact of its inclusion on the data created. We find that the inclusion of a historical inflation number into the survey question, distorts survey responses, particularly a group considered to be relatively 'less rational'. We do not investigate whether this bias is caused by anchoring (Tversky & Kahneman (1974), learning (Cavallo, Cruces, & Perez-Truglia, 2017), or any other theory, but we do argue that the observed bias should raise concern about the interpretation of surveys, where the question includes any form of extra information (priming). The impact not only distorts the level of the response, it also leads to changes in the distribution.

Monique Reid, [mreid@sun.ac.za](mailto:mreid@sun.ac.za)

Hanjo Odendaal, [hanjo.oden@gmail.com](mailto:hanjo.oden@gmail.com)

Pierre Siklos, [psiklos@wlu.ca](mailto:psiklos@wlu.ca)

Stan Du Plessis, [stan@sun.ac.za](mailto:stan@sun.ac.za)

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## 1. Introduction

Since the global financial crisis of 2007/2008, there has been increased attention focused on inflation expectations and the use of central bank communication as a tool to achieve a central bank's objective for inflation. Two main reasons that inflation expectations deserve this attention is that an independent central bank needs to be held democratically accountable (Blinder, Ehrmann, Fratzscher, Haan, & Jansen, 2008), and monetary policy is more efficient if inflation expectations are well anchored (Woodford, 2005).

Accurate measurement of inflation expectations has therefore become important both for private sector macroeconomic analysis, as well as policy analysis. Inflation expectations are typically measured either using asset price data (reflecting the expectations of financial market decision makers) or survey data (which can sample various different social groups). While the asset price data is useful in that it is easily available and at a high frequency, more recently, surveys are attracting substantial attention. The body of literature focused on forecasting inflation has revealed that surveys (subjective forecasts) are 'hard to beat' (Faust & Wright, 2013: 29). In addition, survey data are typically the only data presently available about the inflation expectations of non-financial experts, about which there is increasing interest. The expectations of non-financial experts are likely to capture the price setting behaviour crucial to aggregate price movements better than financial analysts do alone (Binder (2017), Coibion, Gorodnichenko, & Kamdar (2017)). In summary, surveys have some important advantages as a source of information about price pressures and are relied upon extensively by both the private sector and policy makers.

However, much of the research using inflation expectations survey data pays limited attention to the survey design that generated the data. Despite the fact that inflation expectations surveys are now common internationally, they differ across a number of dimensions (Coibion, Gorodnichenko, Kumar, & Pedemonte (2020), Reid & Siklos (2019)), including the social group surveyed, the number of survey questions asked, whether the survey questions are qualitative or quantitative, and the exact phrasing of the questions. There is no widely accepted optimal survey questions or approach. While the differences in the population (social group) surveyed is often clearly stated in research, there is typically very limited discussion of the other characteristics of individual surveys when comparing results across surveys or evaluating an individual survey. We argue that some of these choices matter to the reliability and validity of instruments and data, and therefore deserve more consideration.

In this paper, we use South African survey data to explore one such survey design characteristic – the inclusion of historical data at the beginning of the survey question. While this survey characteristic is

not widely adopted by other inflation expectations surveys internationally, other examples of priming are evident in some of the other surveys (Coibion et al., 2020). The results of this research note are of value more generally in that it captures the need to devote renewed attention to the design of these survey questions, which determine the validity of the data created.

In this research note, we ask two specific research questions. Firstly, what is the impact of the inclusion of a historical inflation number in the survey question on household respondents' forecasts of inflation? We find that the inclusion of the historical inflation number in the Oct 2017 survey question posed to households caused 329 (25.8%) respondents<sup>2</sup> to adjust their expectations to within a range of 3-9% (an arbitrary range of roughly 3% either side of the historical inflation figures provided to the survey respondents). This observation is particularly strong for respondents that were originally (when the questions is asked without the inclusion of an historical inflation number) 'less rational', where we define less rational as those respondents that forecast inflation to be above 10% before the inclusion of the historical inflation number into the question.

Our second research question is whether certain socio-economic characteristics (also collected as part of the omnibus survey of AC Nielsen) are related in any way with the likelihood that individuals will adjust their responses when given the historical number. In other words, is the extent to which respondents are influenced by the historical number linked to specific socio-economic characteristics? The degree to which respondents in a group are affected is heterogenous and so the bias introduced also affects the distribution of the data. We find a modest number of economic factors that differentiate groups' responsiveness to the historical inflation number. Demographic characteristics only appear to be relevant in as much as they differentiate the extent to which the respondent is economically active and thereby informed about economic trends.

These observations have a few implications. The data are biased and, given the fact that the bias is likely to have affected members of all groups to varying extents, it is unlikely to be possible to credibly 'adjust' the data for this bias. Moreover, we can only identify modest criteria along which to differentiate the extent of this impact. Consequently, we argue that the historical inflation figure being given to the survey respondents is a 'treatment' or 'intervention' that the full population would not have been given. This may reduce the extent to which these results are generalizable to the full population and may undermine the external validity (Krippendorff, 2013) of the results.

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<sup>2</sup> The number of respondents who changed to within the 3%-9% range was 349 (27.8%) in the sample that used the term 'prices in general' rather than 'inflation'. The impact is very similar.

In this research note, we do not attempt to assess the reliability or validity of the survey data in totality, but focus instead on highlighting the ways in which one element of the survey question of the South African household inflation expectations survey – the inclusion of a historical inflation number in the survey question – may bias the survey data created and reduce its validity.

The literature that focuses on trying to explain the way in which expectations are formed is valuable to the design of policy which aims to influence behaviour. The bias that we observe in this data could be due to anchoring (Tversky & Kahneman (1974), (Kahneman, 2011), learning (Cavallo et al., 2017) or rational inattention (Sims, 2010). We do not try to establish what explains the formation of the expectations. In addition, our study leaves unanswered questions such as whether respondents would respond in the same manner if the information was explicitly from the central bank or some private sector economists, and whether their opinions (as measured by the survey) would match their behaviours.

Our results are valuable for at least two reasons. Firstly, these results can be used as part of a continual, incremental process of improving data collection by the BER and other institutions that use these kinds of surveys. Secondly, in South Africa as in many other countries internationally (Pattanaik, Muduli, & Ray, 2020), Gertler (2017), and others), it is often stated that inflation expectations are backward looking. While this may be the case to some extent, it's not clear the extent to which this conclusion is a product of the question itself.

## 2. The validity of survey data

Well-created data should be both reliable (measurement should ensure consistency<sup>3</sup>) and valid (the instrument should accurately measure the characteristic of interest, the truth). Reliable data should be replicated under various conditions, whereas the validity of the data concerns the extent to which the data accurately measures what it claims to measure (Krippendorff, 2013).

Given that we are focusing in this research note on the household inflation expectations survey of the BER, where a market research firm, AC Nielsen, has conducted the survey<sup>4</sup>, we will assume that reliability of the survey data is of a reasonable level. In pursuit of reliability, A.C. Nielsen needs to ensure that data 'remain constant throughout variations in the measuring process' (Kaplan, A., & Goldsen, 1965). They do so by, for example, using a range of well-trained interviewers and interviewing a large, demographically representative sample of 2500 respondents (Nielsen, 2017).

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<sup>3</sup> The procedures of the research can be trusted; they give similar results when duplicated (Krippendorff, 2013)

<sup>4</sup> For this quarter it was AC Nielsen, but there have been a few occasions on which the quarterly data was collected by Ipsos.

However, the question's phrasing is planned by the client and this has a large influence on the validity of the data and there is substantial variation in wording across surveys internationally.

### 3. Inflation Expectations Surveys

Internationally, surveys of financial experts are most common, followed by that of households. Table 1 in the appendix, from Pienaar (2018), presents the variation in the design and wording of household inflation expectations surveys from a range of countries. There are a much smaller number of firm level surveys conducted and these face some serious challenges, leading (Coibion et al., 2020) to conclude that existing surveys of firms perform quite poorly against a set of guidelines they identify. Some of the challenges (Coibion et al., 2020) identify include using sampling that is not nationally representative, 'priming' of answers, and asking about firm-specific versions of 'inflation' rather than aggregate inflation. Table 2 in the appendix, from Reid, M.B. and Siklos (2021), presents the varying characteristics of firm level surveys systematically to allow comparison.

South Africa is privileged to have inflation expectations surveys of four social groups, dating back to September 2000. The Bureau of Economic Research (BER) surveys three groups – the financial analysts, the business sector and trade unions, and it commissions a large marketing research company (usually AC Nielsen or Ipsos) to conduct the survey of the fourth group - households. The household survey microdata includes sample weights to allow the sample to be adjusted so that it is representative of the adult, urban and metropolitan population of South Africa.

The BER household survey question is modelled after the international leaders in this regard – such as the University of Michigan survey of consumers (Michigan, 2017) and a number of subject specialists considered the validity of the question at the time of its original design. There is of course no guarantee that they did not overlook a consideration so this could reasonably be reviewed if such a new argument is presented.

When analysing the disaggregated (micro) survey household data in related research (Du Plessis, Reid, & Siklos (2021), Pienaar (2018))<sup>5</sup>, we began to notice some surprising findings. Using 5 quarters (2006Q4, 2008Q4, 2014Q4, 2015Q4, 2016Q4) of micro data from the BER household inflation expectations data, we used cluster analysis to identify groups that form inflation expectations that were similar to each other but different from other groups. We consistently identified two groups, one more anchored and one less anchored. The surprising finding was that when we considered the socio-economic characteristics of the survey respondents, we found that respondents with lower

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<sup>5</sup> Monique Reid was the supervisor of this Masters thesis.



income and wealth were more likely to forecast inflation close to the actual inflation number than respondents with relatively higher wealth and income.

Our study was motivated by the following two hypotheses: (1) does the inclusion of the historical inflation number influence the forecasts of many respondents? And, (2) is the relatively less informed group of respondents (who were originally far from reality) more strongly affected by the inclusion of the historical inflation number than the more informed group?

## 4. Data

In this study we used the dataset of Pienaar (2018). This survey data consists of household respondents, collected by AC Nielsen. Using survey weights, the survey is representative of the population of South Africa living in urban and metropolitan areas. Pienaar (2018) was investigating the impact of using the term 'inflation' instead of 'prices in general' in the survey question, so he divided the sample in half and asked half the sample the survey question using 'inflation' and the other half using 'prices in general'. In both cases, he first asked the question without providing the historical inflation number and then asked the same question with the historical inflation number, as follows:

### **Prices-in-general questions asked to one half of the sample**

- 1.) By about how much do you expect prices in general to increase during the next 12 months?
- 2.) Over the past five years, prices increased by on average 5.4% per year. During 2016, prices increased by 6.3%. By about how much do you expect prices in general to increase during the next 12 months?

### **Inflation questions asked to the other half of the sample**

- 1.) What do you expect the rate of inflation to be during the next 12 months?
- 2.) Over the past five years, the rate of inflation was 5.4% per year. During 2016, the rate of inflation was 6.3%. What do you expect the rate of inflation to be during the next 12 months?

## 5. Analysis

### 5.1 Does the inclusion of the historical inflation number influence respondents' forecasts?

Using the dataset created by Pienaar (2018), we used descriptive statistics to split the survey samples into those respondents that made more realistic forecasts (less than 10%)<sup>6</sup> versus those with less realistic forecasts (greater than 10%) and we compared the extent to which each of these groups adjusted once they were given the historical inflation number. We found that the inclusion of the historical inflation number has a strong effect on the forecasts of many respondents and that it has greater effect on that group that was less realistic to begin with.

If you consider the distribution of the full set of respondents (see figure 1 and table 1), where A4 is the inflation expectations without the provision of a historical number and A5 is that with the provision of the historical number, the inclusion of the number in the survey question appears to have only a limited impact. The mean and standard deviation are reduced a little, but the median is unchanged.

Figure 1

Table 1

However, once the sample is divided into those respondents that were more realistic before the inclusion of the historical inflation and those that were less realistic, the fact that the impact is not uniform becomes quite clear. The responses of the less realistic respondents changes dramatically once the historical number is provided (figure 2 and Table 2). The median inflation expectation adjusts from 25% to 9% (Table 2). The median expected inflation for question A4 was 25 (IQR = 34.2) and 9 (IQR = 8) for question A5. A non-parametric Wilcoxon test was conducted to formally test this difference, and confirmed that the forecasts were significantly different ( $p < 0.01$ ) and the effect size  $r = 0.726$  ( $p < 0.01$  and  $r = 0.765$ ) was moderate.

Figure 2

Table 2

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<sup>6</sup> This group represent 86.2% of the sample. The cut off of 10% to distinguish rational and less rational forecasts was an arbitrary one, based on the fact that inflation has rarely been above 10% since the inception of inflation targeting and when it has it has been brief. The identification of the two groups was not very sensitive to choosing cut off points that are a little higher.

To show the robustness of this change, the data asking about prices in general (questions A1 and A2) for this same less realistic group is also presented below (Figure 2 and Table 2), and it is very similar to the inflation sample. In contrast, the expectations of the more realistic group shows little adjustment after the inclusion of the historical number (Figure 3 and Table 3).

Figure 3

Table 3

## 5.2 Do some characteristics make respondents more susceptible to the inclusion of an anchor number?

We then attempted to classify the two groups (the less realistic versus more realistic) according to the socio-economic characteristics also collected in the survey. A range of socio-economic variables for each respondent are available from the AC Nielsen survey: race, age, gender, work status, marital status, home language, level of educational attainment, household income, personal income, region of the country (province), living standards measure (LSM). A conditional decision tree (Figure 4) was then used to evaluate if any of these characteristics could explain the likelihood of the respondent appearing in a particular group.

Decision trees try to minimize an information measure such as the Gini Coefficient or Entropy, by recursively performing univariate splits of a dependent variable (in this case, the inflation expectations) based on values of covariates (in this case the socio-economic variables) resulting in the partitioning of the population into subgroups. The survey respondents within each subgroup should exhibit similar socio-economic characteristics (within the group) in response to the outcome variable (i.e inflation expectations). In the case of a conditional decision tree, statistical techniques are used to avoid variable selection bias commonly found in decision tree algorithms (Hothorn, T., Hornik, K., & Zeileis, 2015). In this study, the partitioning of the data at each node was highly statistically significant ( $p < 0.001$ ). The terminal node in each case, shows how many respondents fell into each group (where  $n$  is the number of observations in the terminal node). The lighter grey section represents the proportion of the total within the group that changed their reported inflation expectations to within the target of 3-9% after the inclusion of the historical number.

We find that it is difficult to find many strong relationships between socio-economic characteristics and respondents' responsiveness to the inclusion of the historical number. However, our results

indicate that respondents that were more likely to be economically active (those that were employed, pensioners and students) were in a separate group from those that were unemployed. Within the group that is more economically active, the next characteristic that is likely to split the group is the level of income. More economically active respondents changed their expectations less in response to the inclusion of a historical number than those that were more economically active. Without overstating the conclusions that can be drawn from this observation, it may be the case that greater engagement in the economy means that a respondent has more private information coming into the survey (or a greater level of confidence in this information).

Figure 4

Table 4

In addition, we find that for nodes three and six of the conditional tree, the variance within the groups significantly decreased after the individuals were told the historical number<sup>7</sup> (see Table 4). By implication, the priming of survey respondents has a kurtosis effect on the distribution of the expectations, which means it hides the true variance of the global estimate of inflation. This finding has significant implications when the inflation expectation numbers are used in forecasting.

## 6. Conclusions

Inflation expectations surveys are widely used internationally, in the policy arena, academia and the private sector. However, there are considerable variations in the design of these surveys. The original motivation for the design of the survey questions is often not formally available and many studies that use the data do not reflect deliberately on this. The design of the survey questions may mean that the validity of the data created may be unclear, impairing interpretation. Furthermore, variance across countries limits comparison of national experiences – the surveys may simply not be measuring exactly the same thing.

In this research note, we consider the implications of one feature of the BER's household inflation expectations survey in South Africa – the inclusion of a historical inflation number in the question (an example of priming). We find that this influences not just the level of the inflation expectations, but their distribution. Looking to the socio-economic characteristics of the survey respondents using

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<sup>7</sup> This was confirmed statistically by conducting a Levene (1960) test which tests for equality in variances between groups.

decision trees, we find that it is difficult to find many strong relationships between these characteristics and respondents' responsiveness to the inclusion of the historical number. What we did conclude is that those survey respondents that were more economically active were less likely to be influenced by the inclusion of the historical inflation number.

These surveys are already deeply valuable, but we believe there is room to continue to incrementally improve on the inflation expectations surveys conducted internationally. We recommend that inflation expectations survey data should be accompanied by an easily accessible research note that documents the design of the survey question and motivations for the decisions made. This would allow learning between institutions responsible for the surveys, encourage other researchers to comment on the design (thereby improving the data), and finally enable better interpretation of the data that emerges.

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Figure 1: Distribution of responses for full group of respondents (inflation question)

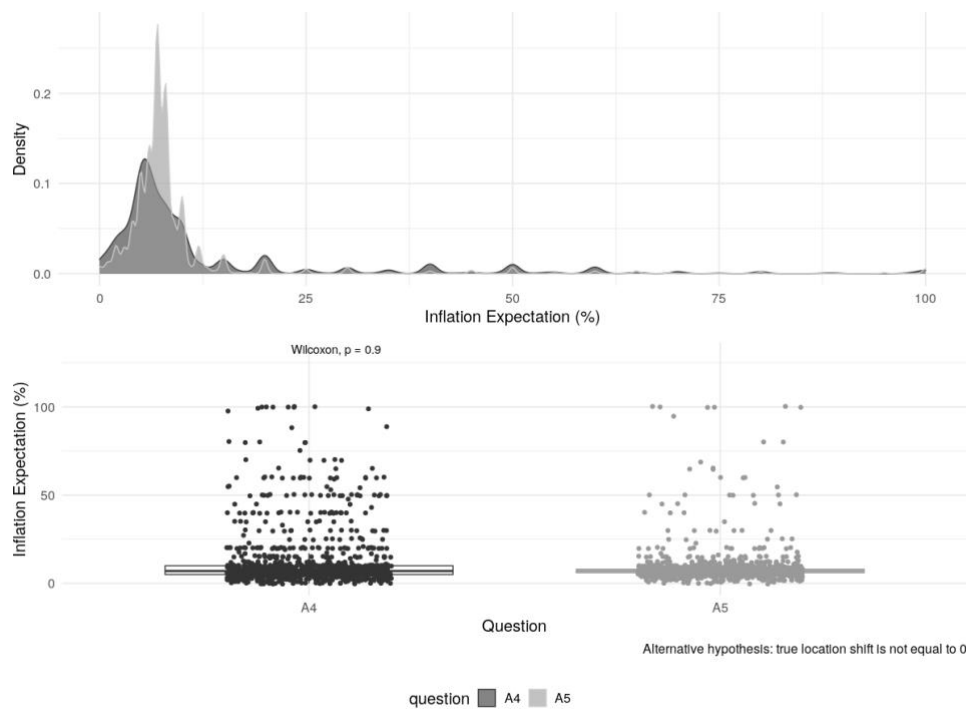


Table 1: Descriptive statistics (All respondents)

Variable	n	Min	q <sub>1</sub>	$\tilde{x}$	$\bar{x}$	q <sub>3</sub>	Max	s	IQR	#NA
A4	1083	0	5	7	12.7	10	100	16.6	5	192
A5	1176	0	6	7	9.0	8	100	10.5	2	99

Table 1: Table of continuous variables.

Note: Variables A4 and A5 refer to the two survey questions that ask respondents to forecast inflation without the historical number (A4) and then with the historical number (A5). n represents the number of observations in each sample, Min and Max are the minimum and maximum forecasts, and q<sub>1</sub> and q<sub>3</sub> the first and third quantiles.  $\tilde{x}$  and  $\bar{x}$  represent the median and mean respectively and are recorded in percentages. s represents the standard deviation, IQR the interquartile range and #NA are the number of respondents that report a 'don't know' response.

Figure 2: Distribution of responses for respondents with expectations >10% (inflation and prices in general samples)

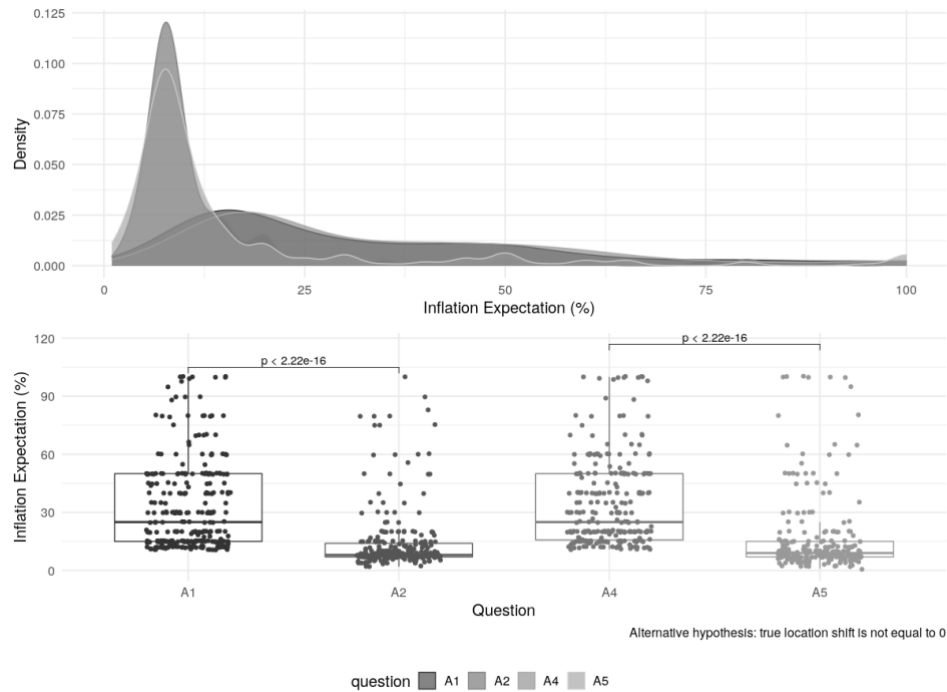


Table 2: Descriptive statistics for sub-sample with expectations >10%

Variable	n	Min	q <sub>1</sub>	$\tilde{x}$	$\bar{x}$	q <sub>3</sub>	Max	s	IQR	#NA
A1	277	11	15.0	25	33.1	50	100	23.2	35.0	0
A2	271	2	7.0	8	14.5	14	100	16.3	7.0	6
A4	256	11	15.8	25	34.7	50	100	22.6	34.2	0
A5	251	1	7.0	9	16.3	15	100	20.0	8.0	5



Figure 3: Distribution of responses for respondents with expectations <10% (Inflation question)

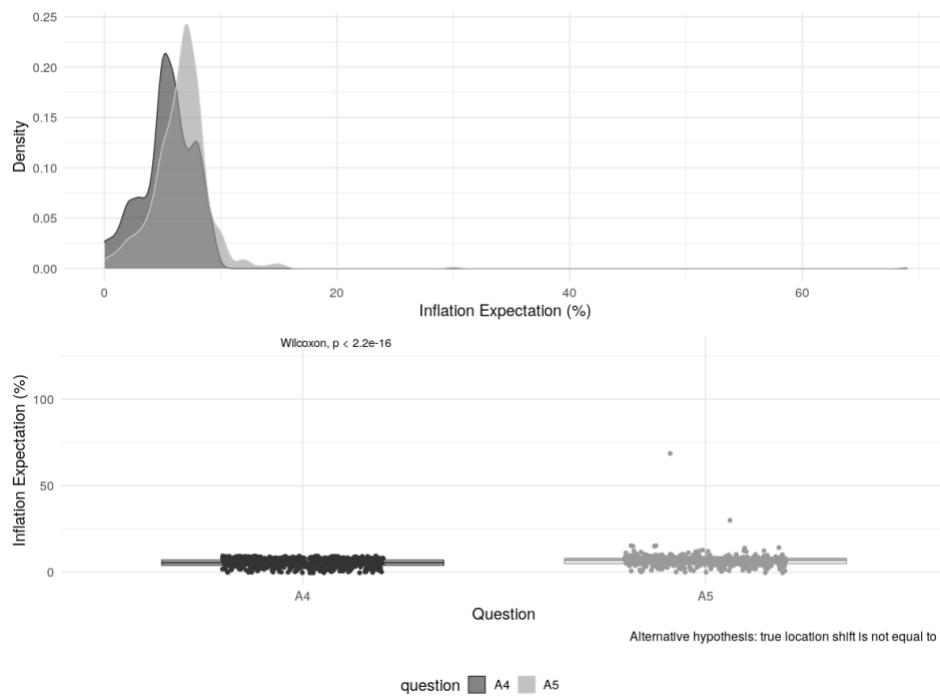


Table 3: Descriptive statistics for sub-sample with expectations <10%

Variable	n	Min	q <sub>1</sub>	$\tilde{x}$	$\bar{x}$	q <sub>3</sub>	Max	s	IQR	#NA
A1	694	0	4	6	5.4	7	9	2.2	3	0
A2	685	0	5	7	6.6	8	70	3.9	3	9
A4	733	0	4	6	5.4	7	9	2.2	3	0
A5	729	0	5	7	6.6	8	69	3.3	3	4

Figure 4: Conditional Decision Tree

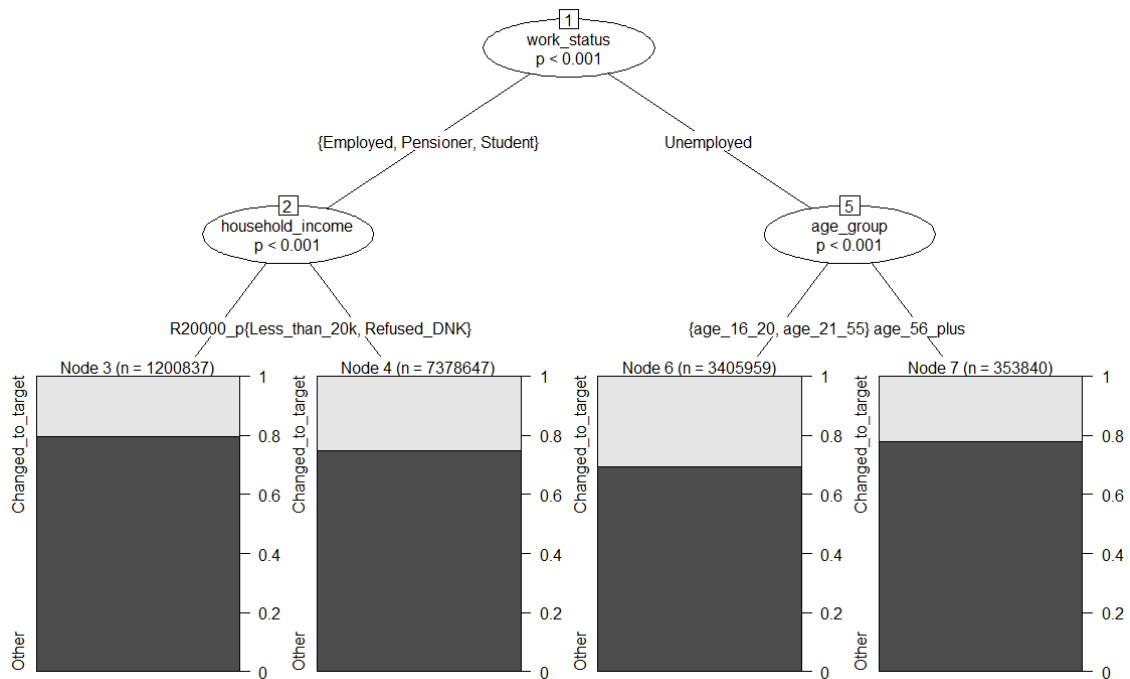


Table 4: Statistics at Decision Tree Nodes

Node	Mean (A4)	Mean (A5)	Median (A4)	Median (A5)	Sd (A4)	Sd (A5)	Levene Test (p.val)
3	13	9	7	7	17	12	<0.001
4	9	8	6	7	12	6	0.0054
6	14	9	8	7	18	9	<0.001
7	10	9	7	7	10	8	0.4903

## Appendix

**Table 1: Phrasing of the household inflation expectation question in selected countries**

Country/region	Institution	Question	Justification for survey wording
Canada	Bank of Canada	What do you think the rate of inflation/deflation will be over the next 12 months?	Based on the New York Federal Reserve Bank survey; seen as 'cutting edge in survey design'.
Europe (done in a number of countries)	European Commission	<p><u>Qualitative</u>: By comparison with the past 12 months, how do you expect that consumer prices will develop in the next 12 months? The following options are provided: Increase more rapidly, increase at the same rate, increase at a slower rate, stay about the same, fall, don't know.</p> <p><u>Quantitative</u>: By how much percent do you expect consumer prices to go up/down in the next 12 months? (Please give a single figure estimate): Consumer prices will increase by....% / decrease by.....%</p>	
UK	Bank of England/TNS	How much would you expect prices in the shops generally to change over the next twelve months?	
Australia	Melbourne Institute of Applied Economic and Social Research	<u>Qualitative</u> : Thinking about the prices of things you buy, by this time next year, do you think they'll have gone up or down?	Decided against using 'inflation' in the survey question because it could mean different things to different people. In some cases, the term may not be familiar to an individual.

		<u>Quantitative</u> : By what percentage do you think prices will have gone up/down by this time next year?	
Japan	Bank of Japan	<u>Qualitative</u> : What is your outlook for prices of overall goods and services you purchase one year from now?  <u>Quantitative</u> : By what percent do you think prices will change one year from now?	

Country/region	Institution	Question	Justification for survey wording
New Zealand	Reserve Bank/UMR Research	<p><u>Qualitative:</u> In 12 months' time, do you expect the inflation figure to be higher, lower or the same?</p> <p><u>Quantitative:</u> What do you think the actual (inflation) figure will be in 12 months' time?</p>	<p>The questions are only asked to respondents who are able to define the term 'inflation'. Before the expectation questions, respondents are asked: 'What is your understanding of the term inflation?' At this stage, respondents who respond with 'unsure' or 'no comment' are filtered out from the remaining inflation expectation questions. So at this stage of filtering, respondents are allowed to continue with the survey if they provide any response which is not 'unsure' or 'no comment'.</p> <p>In the second stage of filtering, all the comments made by respondents who have said something about their understanding of inflation are scrutinised. Respondents whose comments are irrelevant to the question are then filtered out again.</p>
Sweden	National Institute of Economic Research	<p><u>Qualitative:</u> Compared to the situation today, do you think that in the next 12 months prices in general will... increase faster, increase at same rate, increase at slower rate, stay same, fall, don't know</p>	

		<p><u>Quantitative</u>: By how much percent do you think prices will rise/fall (i.e. what the rate of inflation/deflation will be) over the next 12 months?</p>	
India	Reserve Bank of India	<p><u>Qualitative</u>: What is your expectation for general prices in the next year? Increase more than current rate, similar, less, no change, decline</p> <p><u>Quantitative</u>: Inflation (defined as annual rate of the price change) rate after one year. Number of options, stretching from &lt;1% to &gt;16%</p>	

Country/region	Institution	Question	Justification for survey wording
Indonesia	Bank of Indonesia	What do you expect on prices for goods/services in general for the next 6 months compared to today? Increase (give %), remain unchanged, decrease (give %)	
US	University of Michigan	<u>Qualitative</u> : During the next 12 months, do you think that prices in general will go up, or go down, or stay where they are now?  <u>Quantitative</u> : By about what percent do you expect prices to go (up/down) on the average, during the next 12 months?	Curtin (2017): 'We devised ways to ask questions using the terms most understood by most people. When we use the economist jargon, a few understand but many simple say they don't know. The true test of wording is how well the results line up with the actual subsequent data.'
US	Conference Board	By how much do you expect prices in general to rise in 2018?	
US	New York Federal Reserve Bank	What do you expect the rate of inflation/deflation to be over the next 12 months?	Informed by research done by Bruine de Bruin et al. (2010) that found asking directly about inflation as opposed to 'prices in general' led to less respondent confusion on what was actually meant by the question.
SA	Bureau for Economic Research	Over the past five years, prices increased by on average 5.4 per cent per year. During 2016, prices increased by 6.3 per cent. By about how much do you expect prices in general to increase during the next 12 months?	Informed by the Michigan survey. Kershoff (2000) argues that it was not feasible to ask households directly what they expected inflation would be in future, as too few respondents would understand what was meant by inflation. When

			the BER survey was started, CPIX (headline CPI excluding mortgage costs) was the SARB's target inflation measure. It was argued that this would be a difficult concept for the general public to grasp.
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Sources: Pienaar (2018)



**Table 2 Studies of Firms' Expectations: A Survey of International Evidence**

<b>AUTHOR(S)</b>	<b>YEAR</b>	<b>SAMPLE</b>	<b>GEOGRAPHY</b>	<b>VARIABLES OF INTEREST</b>	<b>DATA STRUCTURE</b>	<b>KEY FINDINGS - REMARKS</b>
Coibion et. al. <sup>2</sup>	2018	2017-18	NZL	Inflation+1	Panel	Pro noisy information theory.
Kumar et. al. <sup>2</sup>	2015	2013-15	NZL	Inflation+10	Panel	Inflation expectations of firms not well-anchored and are similar to household expectations, not professional forecasters.
Coibion et. al. <sup>2</sup>	2020	Varies	INTL	Inflation+1	Panel	Household and firm expectations deviate systematically from professional forecasts. Firm surveys are deficient.
Frache-Lluber <sup>9</sup>	2019a,b	2010-17	URY	Inflation+1	Panel	Suggest a hybrid between the sticky price and rational inattention hypotheses works best. Confirm 2019a result of few revisions in expectations.
Borraz-Zacheo <sup>18</sup>	2018	2009-17	URY	Inflation+2	Panel	Favourable to the rational inattention hypothesis. Observed inflation moves expected inflation and "mood" also impacts expectations.

Conflitti-Zizza <sup>15</sup>	2018	2009-17	ITA	Inflation+1, 18 m, 2	Panel	Wages, contract timing, raw materials prices drive expectations
Bartirolo et.al. <sup>1</sup>	2017	2012-17	ITA	Inflation+1,2,3,5	Panel	Inflation expectations increasingly de-anchored. Firm heterogeneity not dominant. Expectations updating is done by half the firms. Forecast disagreement linked to the ECB's price stability objective.
Dovern et. al. <sup>3</sup>	2020	2018-19	DEU	Growth+1	Panel	Supports rational inattention view. Local information matters greatly. Expectations are frequently revised.
D'Acunto et. al.	2020	2000-2016	DEU, GBR, SWE	Inflation, consumption	Panel	Unconventional fiscal policy (i.e., surprise cons. Tax change) has greater impact than forward guidance. Only 'experts' react to FG.
Vellekoop-Wiederholt	2017	1993-2016	NED	Inflation & assets	Panel (longitudinal)	Expectations are AR1 like with higher inflation expectations consistent with lower wealth and income
Kukuvec-Oberhofer <sup>4</sup>	2020	2005-15	EU	Inflation+1	Panel*	Spillovers across firms, within country, across sectors, and countries. Supply chains matter in forecasts.

Botsis et. al. <sup>8</sup>	2020	1998-2015	GRC	Sales	Panel*	Persistence in forecast errors due mainly to tail-like behaviour in expectations.
Bryan et. al. <sup>7</sup>	2015	2011-14	USA	Inflation+1	Panel *	Firms' expectations driven by unit costs, behave similarly to professional forecasts but forecast concept is critical.
Richard-Verstraete <sup>6</sup>	2016	2001-15	CAN	Inflation+2	Panel*	Expectations behave somewhere between rational expectations and adaptive expectations. Oil prices and wage costs drive expectations, but they remain mostly in the 1-3% target range
Kaihatsu-Shiraki <sup>5</sup>	2016	2004-16	JPN	Inflation+5	Panel	Results are consistent with sticky information or rational inattention. UMP (i.e., QQE) raised inflation expectations.
Boneva et. al. <sup>10</sup>	2016	2008-14	GBR	Inflation+1	Panel*	UMP raised inflation expectations by 0.2pct. forecast errors are centered around zero but there is wide dispersion.
Flodén <sup>11</sup>	2012	1997-2012	SWE	Inflation+1	Panel	Forecasts match outturns quite well. Forecasts are useful for forecasting wage growth expectations.
Martin <sup>16</sup>	2020	2011-18	SRB,POL,CZE,HUN	Inflation+2	Panel*	Inflation Expectations appear well anchored.

Sousa-Yetman <sup>19</sup>	2016	1999-2015	INTL	Inflation+1	Time Series*	In many countries (CZE, HUN, ISR) forecasts are biased and/or inefficient.
Golstein-Zilberfarb <sup>12</sup>	2018	1980-2009	ISR	Inflation+1	Panel	Information rigidities are state-dependent (i.e., recession versus expansion). Rare case where inflation expectations are volatile in the sample.
Moiseiva <sup>13</sup>	2018	2011-16	UKR	Inflation+1	Panel	Expectations are not rational; exchange rates help drive expectations
Hunziker et. al. <sup>14</sup>	2018	2014-17	CHE	Inflation+5	Panel*	Emphasis on longer term inflation expectations. Short- and long-term expectations are related to each other. Large shocks (e.g., exchange rates) help move expectations.
Ozer-Mutluer <sup>17</sup>	2005	1999-2005	TUR	Inflation+1	Panel	Focus on the distributional properties of inflation expectations. Expectations are skewed and display excess kurtosis. Expectations of exporting firms less than ones of non-exporting firms
Meyer et. al.	2020	2011-19	USA	Unit costs+1	Panel	Firms expectations differ substantively from households' expectations of the same variable. Question wording is critical. Firms' expectations covary with professional forecasts. Framing is not a significant issue.

Reid-Siklos <sup>20</sup>	2020	2000-2018	ZAR	Inflation+1,2,5	Panel	See Empirical Results section
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Source: Reid and Siklos (2021)

Notes: \* Not a continuous sample of data (e.g., interruptions over time in the survey). Country codes are as follows: NZL (New Zeland), INTL (international data set), URY (Uruguay), ITA (Italy), DEU (Germany), EU (European Union), GBR (United Kingdom), GRC (Greece), USA (United States), CAN (Canada), JPN (Japan), GBR (Great Britain), SWE (Sweden), SRB (Serbia), CZE (Czech R.), HUN (Hungary), ISR (Israel), UKR (Ukraine), CHE (Switzerland), TUR (Turkey), ZAR (South Africa).

1. sample is 1000 manufacturing and service sectors. “What do you think consumer price inflation, measured by the 12-month change in the harmonized index of consumer prices, will be [in six months], [1 year], [2years], [on average between 3-5 years]?”
2. 20% response rate to a survey of around 15000 firms. Around 3553 firms responded. No. of firms in the sample declines sharply with every wave (5 of them). Weights used to adjust for size and industrial composition. “During the next twelve months, by how much do you think overall prices in the economy will change?”
3. Sample is roughly 5500 firms in manufacturing, trade, and services (excludes construction). “According to your assessment, by how much will the real gross domestic product in Germany change in the year 2018 relative to the previous year?”
4. Sample of 135000 firms. “How do you expect the prices you would charge to change over the next twelve months?”
5. “How much higher or lower the average purchase price for manufacturing and selling the main product or service of your company ...will be one year from now?” Ranges are given (20%+, 10-20%, 5-10%, 0-5%, 0%, 0 to -5%, -5 to -10%, -10 to -20%, -20% or more. 2972 medium-sized SME are surveyed.
6. About 100 firms. “Over the next two years, what do you expect the annual rate of inflation to be, based on the consumer price index?”
7. “Projecting ahead, to the best of your ability, please assign a percentage likelihood to the following changes to unit costs over the next 12 months.” (6 potential outcomes; probabilistic means is used). Survey of the 6<sup>th</sup> district, 300 panellists.
8. Sample of 799 manufacturing firms. “During the next three months, you expect your aggregate sales to increase/remain the same/ decrease?”
9. Around 500 firms sampled, 50+ employees. “What do you believe is going to be the change in the CPI?”
10. Manufacturing sector only. Sample consists of 400 firms that are considered homogeneous. “What has been the percentage change over the past twelve months in the general level of output prices in UK markets..., and what is expected to occur over the next twelve months?”
11. Sample consists 7000 firms with 100+ employees. Data weighted by firm size. “How much do you think that prices will go up/down in the next 12 months?”
12. Eleven sectors of the economy sampled. Forecasts are for CPI inflation.

13. 1000 firms sampled from “different sectors and of different sizes”. What is “expected changes in the prices in Ukraine in the next twelve months?” (decrease, 0-5%, 5-10%, 10-15%, 15-20%, 20-25%, 25-30%, above 30%). The main sectors surveyed include manufacturing, mining, utilities, construction, wholesale, retail, and transportation.
14. Up to 240 companies across the economy except the public sector and agriculture. “Where do you expect inflation – as measured by the CPI – to be in the next six to twelve months [3-5 years]?”
15. What do you think consumer price in Italy, measured by the 12-month change in the harmonized index of consumer prices, will be in 6, 12 and 24 months?
16. POLAND: „In ... [month, for which the latest data is available] of the current year, the CPI (inflation) was equal to x% in annual terms. In the enterprise’s opinion, during the next 12 months prices: (1) will rise faster than by x%; (2) will rise at the rate of x%; (3) will rise more slowly than by x%; (4) will remain unchanged; (5) will fall; (6) don’t know”. CZECH R.: What year-on-year consumer price change in per cent do you expect in the next 12 months? What year-on-year consumer price change in per cent do you expect in the period of 36 months? HUNGARY: How do you expect consumer prices will develop in the next 12 months? Will they decrease, increase or remain the same? In your opinion, by what percentage will prices increase / decrease? In respect of long-term expectations, the survey uses the following question: What annual rate of inflation do you expect five years from now? SERBIA: “...expectations for the y-o-y price growth one year ahead and also in the medium-term, i.e. two-years ahead.
17. Categorical question for up to 2 months ahead. Numerical expectation (%), expected inflation by the end of the year and over the next 12 months.
18. Precise question not provided but is likely the same as Frache and Lluberas (2019).
19. A large number of different surveys.
20. See data description section and Reid and Siklos (2020b).