

Towards a formal link between inflation perceptions and inflation expectations in South Africa

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Abstract

This paper reports the finding of a survey of inflation perceptions and inflation expectations in South Africa undertaken in 2014. This survey posed questions on perceptions of past inflation (historic inflation) and expectations of future inflation to the same respondents and determined linkages between historic views and future expectations of each respondent. The analysis of the survey data shows that inflation expectations are anchored in inflation perceptions. This research aligns South Africa with other countries and jurisdictions where such surveys are undertaken. This paper shows conclusively, for the first time in South Africa, that there is a feed through from inflation perception to inflation expectations. Therefore, inflation perceptions play a crucial role in the formulation of inflation expectations in South Africa. These results suggest that policy makers are not just charged with containing inflation expectations, but they should also be aware that the confidence in official statistics, as well as the confidence in the SA Reserve Bank and government, impacts inflation perceptions which directly feed into inflation expectations.

Keywords: Inflation perceptions; Inflation expectations; South Africa; Monetary policy.

1. Introduction

Central banks can have any one of a number of monetary policy objectives or mandates. These objectives can include any of (or any combinations of) price stability, price level stability, financial stability, exchange rate stability, economic growth and/or employment. This paper deals with South African data, a country where the central bank has a clear mandate for price stability and financial stability. This paper focuses on the first of these two objectives, namely the achievement of price stability. In the case of South Africa this is defined as keeping the inflation rate between 3 and 6 per cent per annum, the country's inflation target range (Comert and Epstein, 2011: S96).

Research on the banking sector in South Africa, both historically and in recent times, has tended to concentrate on commercial and private banking (see for example Stuart Jones, 1996; Mabwe and Webb, 2010). Research on the South African central bank includes a commissioned special issue to commemorate the 90th anniversary of the South African Reserve Bank which included papers that covered a number of issues on the South African central bank, including its origins and history, its success or failure addressing inflation over time, the merits and limitations of inflation targeting, and the matter of its unique private shareholding system, among others (see Rossouw and Padayachee, 2011). Other research on the topic of inflation and inflation expectations has usually focused on the expectations of economic agents (see Ehlers and Steinbach, 2007; Reid, 2012; and Kabundi, Schaling and Some, 2014). Research into the possible existence of links between inflation perceptions and inflation expectations is virtually non-existent, thus making this paper somewhat unique. Furthermore, by using survey data from individuals, and not economic agents to show that inflation expectations are indeed anchored in inflation perceptions, this paper moves the theoretical and the policy debate about the management of inflation in inflation targeting regimes forward in significant ways.

This paper has five objectives. First, it explores literature on the process of forming inflation perceptions and inflation expectations. Ranyard *et al.* (2008) show how individuals' socio-economic environment impact on their formulation of perceptions and expectations. As described in Bosch *et al.*, 'Inflation expectations are related to expected future changes in price levels, and therefore in inflation (i.e. the rate of change in the price level over time), while inflation perceptions are used to describe backward-looking views on past price-level movements and historic inflation' (2015:1).

It is critical in any inflation targeting regime that the central bank knows something about the existence and the nature of the link between inflation perceptions and inflation expectations. If it can be demonstrated that, indeed, inflation perceptions play a crucial role in the formulation of inflation expectations, policy makers should not just focus on containing inflation expectations, but they should also ensure through their communication mechanisms that the public gains sound knowledge about, and retains confidence in, official price data, in statistics capability, as well as in the institution of the central bank itself and in the government. The centrality of consistent, accurate and effective communication by the monetary authorities, as well as by government, in all matters related to information dissemination both about inflation and prices, and about general economic data cannot be over-emphasized (see Reid and du Plessis, 2011). Therefore this paper addresses the question of the existence or otherwise of the link between inflation perceptions and inflation expectations in the South African case, an exercise that has not been attempted in South Africa before, and which remains under-researched in most other jurisdictions (see Rossouw, Padayachee and Bosch, 2009).

Secondly, this paper disseminates the results of the fourth round of a survey on inflation perceptions and inflation expectations in South Africa, undertaken among consumers. The fourth round builds on the methodology of earlier surveys. The novelty of the results of this fourth round lies in the fact that the same respondents were asked for the first time in South Africa to provide views on the accuracy of historic inflation figures and to provide their expectations of future inflation. This approach is aligned to the methodology followed in a number of other countries, as is explained in the literature review. Earlier research only focused on inflation perceptions.

The use of the terminology ‘consumers’ in the context of this paper can be the subject of some debate. The results of inflation surveys among individual responses are often reported as *household* surveys (see for instance Kershoff and Smit, 2002). However, this is a misnomer, as the views of one member (not necessarily the head) of a household are recorded. These responses can therefore at best be reported as ‘individual responses’ or the views of ‘consumers’, the approach followed in this paper.

Bosch *et al.* (2015, p.6) state that ‘(t)he expectations channel is one channel of the transmission mechanism, so anchoring inflation expectations is one of the ways (albeit an important one) that a central bank can use to maintain price stability’. In a South African context, Smal and De Jager (2001) highlighted

as far back as 2001 the role of inflation expectations in the monetary policy transmission mechanism. Inflation expectations remain one of the factors that the SA Reserve Bank considers in monetary policy decisions. Berk (2000) explains that a central bank lacking credibility in its policy action in a quest to contain inflation within a target range could result in expected inflation exceeding the inflation target. Benford and Driver (2008) observe that inflation expectations are partly formed on the basis of the past values of actual inflation.

This paper reports on the first testing of this observation for South African consumers. Research covering aspects of one element of the research reported in this paper has been done by Kabundi *et al.* (2014). Kabundi *et al.* (2014) assessed inflation expectations for trade unionists, business people and analysts. This paper reports much broader research findings, namely the inflation expectations of a representative sample of the South African population (rather than only certain groups as was used by Kabundi *et al.*, 2014) and their historic inflation perceptions.

Thirdly, this paper assesses the probability of respondents answering (by providing a value) to questions about inflation, rather than to provide a ‘don’t know’ response. Fourthly, the paper highlights differences in inflation perceptions and inflation expectations, for instance differences based on age, gender or income.

Lastly, the paper tests for and confirms feed through from inflation perceptions to inflation expectations among South African consumers.

The paper is organised as follows: Section 2 summarises literature on inflation perception and inflation expectation surveys. Section 3 considers consumers’ understanding of inflation. Section 4 deals with inflation perceptions and inflation expectations. Section 5 concludes.

2. Literature review

2.1. On inflation perceptions and inflation expectation surveys

A review of available literature shows that central banks pay considerable attention to inflation expectations (see for instance Banco Central de Chile, 2008; Berk, 1999; Forsells and Kenny, 2002; Powers, 2005; SA Reserve Bank, 2008; Samuels 1967; or Sveriges Riksbank, 2008). To the contrary, the inflation perceptions of consumers receive less attention. The reason is that containing inflation is by its very nature a forward-looking exercise, i.e. central banks take policy actions that will influence demand and inflation after a lag of some 12 to 24 months.

The literature shows considerable differences in the ways in which central banks assess expectations of future inflation. Rossouw *et al.* (2009) have found that central banks use various combinations of the following to assess inflation expectations:

- Surveys of inflation expectations from groups of respondents (e.g., business people, consumers and/or trade unionists);
- Interest rate differentials between different asset classes (e.g., the yield on conventional bonds compared to the yield on inflation-linked bonds); and
- Inflation forecasts by financial market analysis.

Inflation expectation surveys are undertaken to assess the anchoring (or lack thereof) in the inflation target range of the country where the survey is undertaken. The theory underpinning this approach is that economic agents act according to their expectations. If inflation expectations are well above the inflation target range, the expectation is that expenditure will increase to avert future price increases, thus increasing near-term demand and therefore pressure on prices. For this reason, inflation expectations receive considerable attention in the policy deliberations of central banks in inflation-targeting countries. Inflation expectations of business people, consumers¹ and trade unionists are reported in the monetary policy reviews/inflation reports of central banks (see for instance Bank for International Settlements, 2008; Bank of Iceland, 2003; Blinder, Ehrmann, Fratzscher, de Haan, and Jansen, 2008; Blinder and Wyplosz, 2005; Ehrmann and Fratzscher, 2005; Fracasso, Genberg and Wyplosz., 2003; or Leeper, 2003 on this matter). More recently, Kabundi *et al.* (2014) decomposed the inflation expectations surveyed by the Bureau for Economic Research (BER) into the same three groups to identify which group were responsible for driving inflation expectations.

Bi-ennial representative inflation perception surveys of consumers have been undertaken as a private initiative in South Africa since 2006. These surveys cover a representative sample of the South African population. Bi-ennial surveys, rather than annual or even quarterly surveys are undertaken as these representative surveys are expensive. These surveys cover the views of 3 500 male and female consumers from metropolitan, urban and rural areas and provide views of respondents aged 16 and older. The specifications of the survey

¹ In the case of South Africa the inflation expectations of consumers (called household inflation expectation surveys) are not reported in the Monetary Policy Review of the SA Reserve Bank.

composition provide additional confirmation that the results of these surveys cannot be viewed as ‘household survey data’. These surveys are used to assess the degree in which consumers have confidence that historic inflation figures are an accurate reflection of actual price increases (see for instance Bosch *et al.*, 2015 for a review of such surveys).

In 2014, the South African inflation perception surveys were expanded and posed for the first time to the same South African respondents, questions regarding their perception of past inflation, and what their expectation of future inflation is, thus linking these two aspects. The results are reported in this paper.

Similar surveys are undertaken on behalf of central banks in a number of other countries and jurisdictions, mainly with policy considerations in mind. For instance, Badarinza and Buchmann (2009:5) state that ‘survey data from the European Commission's Business and Consumer Survey ... (is used for) ... the purpose of quantifying disagreement in perceptions and expectations ... (of inflation) ... and constitutes one set of dependent variables being used for sub-sequent econometric analysis’ in the euro area (see also Lindén 2005 on this matter). This data has been collected since 2003 (Biau *et al.*, 2010:1).

Biau *et al.* (2010:1) state that ‘(t)he results indicate that consumers hold very different opinions of inflation: perceptions and expectations of inflation range from high, or in some cases very high, to low and close to the official rate of inflation. For the euro area as a whole, consumers generally tend to overestimate actual inflation developments, particularly in terms of inflation perceptions...’ The survey results from the euro area show that ‘...respondents reveal very different perceptions and predictions of inflation depending on their income, age, education and gender’. (Biau *et al.*, 2010:1). Irrespective of the reasons for inflation perceptions and inflation expectations ranging from low to high or the actual level of these aspects, linkages between the level of perceptions and the level of expectations are important.

Likewise, inflation perception surveys among consumers are undertaken in New Zealand, Sweden and the United Kingdom, also with monetary policy objectives in mind (see for instance Brachinger, 2005; Jonung, 1981; Palmqvist and Stromberg, 2004; Pike *et al.*, 2008 or Reserve Bank of New Zealand, [S.a.]). As in the case of the United Kingdom, survey results in Sweden show that ‘...with respect to the perceived rate ... (of inflation) ...the major difference ... (of 1,7 percentage points) ... was found between men and women. ... The difference between men and women apparently indicates that perceived rates

are influenced by individual expenditure patterns' (Jonung, 1981:968; see also Brachinger, 2005).

The Reserve Bank of India has been using quarterly household inflation surveys since 2005. It is interesting to note that these surveys focus on inflation perceptions and inflation expectations, whereas the inflation surveys of central banks in many other countries focus only on inflation expectations. The Reserve Bank of India reports that '...most recent inflation developments, and particularly those relating to salient items in consumption baskets, tend to influence these expectations...' (Reserve Bank of India, 2016:2). However, the survey of the Reserve Bank of India covers only urban respondents, while the survey results reported in our paper covers urban and rural respondents.

The Bank of Japan also compiles a review of households' inflation expectations. Nishiguchi *et al.* (2014) used this survey, which was first conducted in 1993, to analyse the degree of dispersion and disagreement of inflation expectations. The results show that even if mean or median expectations remain the same, the shape of distribution of inflation expectations may have changed, which provides information about the variability and stability of inflation expectations.

Similar surveys were undertaken among consumers between August 1998 and April 2002 by the Columbus Dispatch in Ohio in the United States of America on behalf of the Federal Reserve Bank of Cleveland (Bryan and Ventaku, 2001b). The survey results confirmed a link between consumers' perceptions of inflation and their demographic characteristics. Respondents with '...high incomes perceive and anticipate much less inflation than people with low incomes, married people less than singles, whites less than nonwhites, and middle-aged people less than young people ... (and) ... men and women hold very different views on the rate at which prices are changing' (Bryan and Ventaku, 2001b). This finding concurs with the findings of Biau *et al.* (2010), Brachinger (2005) and Jonung (1981). Bryan and Venkatu (2001a) point out those consumers' inflation expectations might be indicative of how consumers perceive historic price movements. This paper considers this the findings of Bryan and Ventaku (2001a) in a South African context.

2.2. On consumers' understanding of inflation

Ranyard *et al* (2008) follow Behrend (1977) to show that the understanding of inflation by the general public is limited, and that households are not fully aware of the personal significance of price changes, including the relationship between wages and prices. The level of awareness was further found to be a function of

how active households were in the economy or their relevant education (such as economic students). All groups however showed some degree of understanding that was in line with the expert view, suggesting that even at the basic level individuals construct some form of adaptive decision making.

Bastounis *et al.* (2004) examine the role of psychological variables related to general attitudinal orientations and beliefs on the way ‘lay people’ think about economic phenomena, using a large cross sectional sample of peoples of heterogeneous cultures (Austria, France, Israel, Singapore, Turkey, among others). They couple this with the use of an instrument to measure beliefs about the cause of events in economic life. The results showed that participants’ answers regarding the consequences of economic phenomena such as inflation, unemployment, interest rates and taxation policies were only thematically coherent. In general people who felt that they do not control their lives, distrust business and protest against the unfair treatment of workers, a broadly left wing view² of the economy, ‘...see the world as an unjust place, they rather support government intervention in welfare and are not satisfied by the economy on a personal or national level’ Bastounis *et al.* (2004:273). In relation to inflation perceptions, respondents in the sample distrusted supply forces (business) that they see as causing inflation. On the other hand, those people who believed that they had greater control of their destiny, generally expressed satisfaction with the economic system. They tended not to support government intervention such as price control, but support business initiatives and activities as a means to fight inflation. In other words, a more conservative right wing political orientation. In general lay knowledge appeared to consist of fragmentary pieces of information and recollections (remembering) rather than precision about data or theories.

Leiser and Drori (2005) analyse and compare the ‘social representations of inflation’ (2005:3) in four groups of people in Israel who did not have the benefit of a formal education in economics. Such a naïve group’s understanding of economic phenomena is shaped by a number of social and cognitive forces. Mapping the psychology of inflation involves ‘identifying the associations, explanations and causal reasoning utilized by the respondents as a function of their economic position and socialization’ (Leiser and Drori 2005:14). But ‘intra-psychological’ factors matter, too. Identifying the varied cognitive systems that inform naïve understanding is also important. In short: ‘Associations, heuristics, analogies to everyday experience, and understanding of economic phenomena

² Left wing and right wing terminology is used here in the same context as by Bastounis *et al.* (2004).

all have their place in an account of the meaning of inflation to lay persons' (Leiser and Drori 2005:14). By means of summary, these interventions show that respondents' perception is that inflation results in high(er) prices with a lower value of the currency and devaluation. However, the most important result here were the missing concepts by respondents: salaries, industry, unemployment and the government. The results showed that across the four groups the depth of understanding, the concepts and the complexity of the explanations were very different. More than 80 per cent of the explanations for the links offered by the respondents lacked depth or were not well thought through.

Leung (2009) attempts to find explanations for why New Zealand's (1000 strong) household surveys of inflation expectations consistently find over-predictions of inflation. Leung (2009) sets out comparable studies elsewhere including in South Africa, where she references the BER studies (Kershoff, 2000) which found that '(t)he inflation expectations of lower income and younger households are lower, and [that] there was no difference amongst households of different education' (2009:36). Her findings show that (in terms of age) the young have a higher upward inflation bias, that (in terms of ethnicity) respondents of [what she refers to as] non-European ethnicity had a much higher inflation bias relative to [what she refers to as] Europeans, that (in terms of gender) females had a higher inflation bias than males, and that finally (in terms of income) increases in real income reduced inflation bias, as did skill levels. She accepts that some of these variables may reflect differences in the awareness of economic issues, based for example on the 'tone' of media reports, which show that the more highly educated were more responsive to media reports about inflation issues. (2009:38). From a policy perspective this may suggest that the New Zealand central bank could potentially '... bring down the overall inflation bias of households with education efforts targeted towards those groups with the greatest bias in their perceptions' (2009:41).

In a number of papers, Simon Kemp (1987; 1991) has studied the impact of time, dating and remembering on how samples of residents gauge price changes. In a study of 150 German residents Kemp (1991) found that these residents estimated the previous year's prices rather accurately but overestimated those of 15 years previously. In a 1987 study, 271 Christchurch residents underestimated the cost of the previous year but the prices of 15 years were overestimated (Kemp, 1987). These results were consistent for both general and specific items. The conclusion appears to be that past price changes are fairly accurately recalled for the near past but not remembered but estimated in a general way for

dates in the more distant past. Kemp suggests that expectations of future price rises were linked to such general estimations of past price rises. (1987).

Dixon *et al.* (2014) also use a large data set to assess lay people's responses and sentiments in Australia to a number of issues related to the economy, including prices and employment. They infer bivariate relationships from respondents' answers. Their most striking findings are 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 and consistent with the 'good-begets-good heuristic' for the majority of the months in the sample period (2014:9). Leiser and Aroch (2009) explains the 'good-begets-good heuristic'. Leiser and Aroch (2009) opines 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 bad variables. This good-begets-good heuristic settles in most cases how to answer' (2009:381).

It is necessary to point out that the question Dixon *et al.* (2014) ask about prices is about the level rather than the rate of price changes. However, they claim support from the Ranyard *et al.* (2008) study summarised above, where it is concluded that '(t)he 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' (2008:397).

Biau *et al.* (2010) argue that Euro area consumers hold very different opinions of inflation, reporting that '...perceptions and expectations of inflation range from high, or in some cases very high, to low and close to the official rate of inflation' (2010:ii). However, the research has shown that consumers in the European Union generally have the perception that actual price increases exceed the official inflation rate and they tend to do so by more than evidenced in comparable surveys outside the Euro area. No research has been undertaken to date on reasons for this tendency. Respondents reveal different perceptions and expectations depending upon income, age, education and gender. However, there remain questions about the data and the design of the survey questionnaire, which had included open ended questions related to 'consumer prices', and failed to probe unusual/outlier responses.

Issing (2006:211) also highlights the fact that respondents in the Euro area overestimate inflation perceptions and points out that problems with perceived inflation in the European Union have been exacerbated since January 2002, i.e. from the introduction of a single European currency (2006:213). Among the reasons for this perception, Issing (2006:214) states that some consumers still use historic prices at the time of currency conversion as reference for price levels, thus discarding moderate inflation over the ensuing period.

Antonides (2008) analyses data from Eurostat and the EU Business and Consumer Surveys to show that significant correlations were found between perceived inflation and the rate of price changes in the EU as a whole and in a number of member countries (2008:429). Price changes for items including food and drinks, furniture and appliances did not significantly explain inflation perceptions in the selected countries, despite the weight of these categories in the Laspeyres price index, suggesting that consumers' inflation perceptions are based on price changes of some highly selective consumer items, in contrast with the Laspeyres price index weighting price changes by the budget shares of consumers. (2008:430).

Forsells and Kenny (2002) also use the EU Consumer Survey to assess the rationality of inflation expectations in the Euro area, and conclude that consumer expectations provide '...important information on actual future developments in euro area inflation. In particular they provide an unbiased predictor of inflation one year ahead, and most strikingly, correctly anticipated the trend decline in inflation over the 1990s' (2002:5). More generally they find 'growing' rationality in euro area inflation expectations in the 1990s compared with the 1980s. This may be because consumers in the Euro Zone have become better at predicting inflation. But less volatile inflation and greater ECB credibility may also make it easier to predict future inflation.

2.3. The South African literature

In a South African context, Rossouw *et al.* (2008) reported the results of a survey of inflation perceptions and the accuracy of past inflation figures among central bank employees, in that case the SA Reserve Bank. South Africa followed at the time of the survey (and still follows) an inflation-targeting monetary policy framework, with the central bank entrusted with the mandate of ensuring that inflation remains within the target range of 3 to 6 per cent per annum. Despite this mandate, the survey among central bank employees showed clearly perceptions that the actual rate of inflation was higher than the rate reported by

the authorities. This showed a lack of credibility at the time of the survey among its own employees in the very policy anchor that the central bank had to use. This raises serious questions about any ability of the general public to perceive the inflation rate as an accurate indicator of price increases.

Monique Reid (2009) has adopted an existing methodology, using market data and not surveys, during the 5 year period immediately after the SA Reserve Bank switched to inflation targeting to measure the sensitivity of South African inflation to macroeconomic surprises. She finds that the degree of sensitivity of local inflation expectations in the period under review is comparable to international standards, i.e. financial markets react less sensitively to macroeconomic surprises. This suggests that the monetary authorities are communicating well with the public in anchoring inflation expectations, but she warns that as credibility is not a one off exercise, continuous efforts are required to promote sound communication with financial markets through transparent and predictable monetary policy.

In a later paper, Reid (2012) analysed the formation of inflation expectations among the general public in South Africa, ‘...who are responsible for the majority of the price setting behaviour in South Africa...’ (2012:4) to assess how the central bank can improve its communication with this group in an attempt to influence their inflation expectations. Reid concludes that ‘...financial analysts adjust their inflation expectations quicker and more accurately than price setters’ (2012:31). This provides evidence of ‘sticky’ inflation expectations, with the general public responding with a lag to central bank communication and information on inflation.

2.4. Summary of literature review

Our survey of a vast and varied international and South African literature suggests that while inflation expectations are indeed anchored in perceptions of price changes (historic prices), these perceptions are themselves impacted upon by a wide range of factors which include both economic phenomena such as income, demographic factors such as age and gender, as well as social and psychological considerations such as trust, justice, and personality. Moreover, ‘reference pricing’ as identified by Issing (2006) can play a role in perceptions, e.g. the date of conversion from one currency to another. However, if central bank officials, who are entrusted the responsibility of exercising the mandate of containing inflation in terms of an inflation targeting monetary policy as is followed in South Africa, report perceptions of actual inflation exceeding official

inflation figures, it really begs the question whether low credibility in historic inflation and prices among the general public should not be viewed as the rule, rather than the exception.

3. Inflation perceptions and inflation expectations

The 2014-survey discussed in this paper followed the same basic design as previous inflation perceptions surveys in South Africa and the BER's inflation expectations surveys in question design. The 2014-survey is a survey of inflation perceptions and inflation expectations undertaken by IPSOS on behalf of the authors of this paper. The inflation perception and inflation expectation survey formed part of a broader Kayabus Survey that covers questions on numerous economic and social aspects. The survey covers 3 500 urban and rural respondents in South Africa, and covers all racial groups in the country. Given its wide coverage and the sample size, the survey results are representative of the views of the South African population. Field work for the survey was done between 16 September 2014 and 24 October 2014.

Respondents were provided with the average inflation rate of the past five years and of the past 12 months before they were asked to give their perception of inflation over the past 12 months and their expectations of future inflation.

Table 1 shows the exact question that was posed to respondents. It was the first time in South Africa that the same respondents were asked to respond on 'both sides' (past perceptions and future expectations) on their views on inflation.

TABLE 1: INFLATION PERCEPTIONS AND EXPECTATIONS QUESTION 2014

Inflation perceptions question QE1	Over the past five years prices increased by on average 5.5% per year. During 2013 prices increased by 5.7%. By about how much do you think prices in general increased during the past 12 months?	Numeric insert 1- 90,99=don't know
Inflation expectations question QE2	By about how much do you expect prices in general to increase during the NEXT 12 months?	Numeric insert 1- 90, 99=don't know

Source: Own research

The perceptions of past inflation of each respondent could therefore be linked to the expectation of future inflation of the same respondent. It is accordingly possible to show the degree in which inflation expectations are linked in inflation perceptions. The survey results indeed show such a link. In South Africa expectations of inflation of respondents (consumers) are linked to their inflation perceptions.

3.1. Analysis of 2014 survey results

Before drawing conclusions on inflation perceptions and expectations, it is imperative to understand respondents' general responses to inflation questions. The results showed that of those that responded to the 2014-survey on inflation perceptions and inflation expectations in South Africa (the first and only such survey), around 37 per cent responded 'don't know' to the questions on their views on inflation in South Africa. Compared to the results of Jonung (1981), who reported a 20 per cent 'don't know' response rate, this is quite high, which, according to Ranyard *et al.* (2008), indicates that a significant proportion of respondents had no or limited knowledge of the inflation rate. In the South African case it also likely suggests that respondents have limited knowledge of inflation or that they don't really follow price changes in their consumer basket.

The incidence of 'don't know' responses to surveys on matters pertaining to inflation is not new in a South African context. Kershoff (2000) pointed out at the time of the first survey on consumers' inflation expectations in South Africa, undertaken in 2000, that 'don't know' responses in that survey amounted to 17,2 per cent of respondents.

The incidence of "don't know" responses in South Africa in general, and in the joint inflation perceptions/inflation expectations survey of 2014 is also evident from other surveys, with large margins of difference in such responses as percentage of the sample size. At the one extreme Kokoszcanski *et al.* (2010) reported on the incidence of 'don't know' responses in inflation perception and inflation expectation surveys undertaken in the period 2001 to 2005 in the Czech Republic, Hungary, Poland and Slovakia. The highest incidence of 'don't know' responses for inflation expectations was reported at 9,9 per cent in the Czech Republic, although it went as low as 3,3 per cent in Slovakia (Kokoszcanski *et al.* 2010:80). For inflation perceptions an even lower incidence of 'don't know' responses was reported, going as low as 1,3 per cent in Hungary (Kokoszcanski *et al.*; 2010:79).

To the contrary, M&G YouGov³ reported high percentages of ‘don’t know’ responses to a question ‘(w)hat annual rate of inflation do you expect 12 months from now?’ (2014:4). They reported these responses as 35,4 per cent in Austria, 56,8 per cent in France, 30,6 per cent in Germany, 17,4 per cent in Hong Kong, 35,4 per cent in Italy, 19,3 per cent in Singapore, 39,9 per cent in Spain, 36,2 per cent in Switzerland and 34,1 per cent in the United Kingdom, (2014:4). They reported even higher rates of ‘don’t know’ responses to the question ‘(w)hat annual rate of inflation do you expect five years from now?’ (M&G YouGov, 2014:4), peaking at 64,3 per cent in France.

No clear trend in ‘don’t know’ responses is discernible from international experiences, but 37 per cent of respondents reporting in the 2014-survey in South Africa that they ‘don’t know’ is aligned to the range of responses reported by M&G YouGov (2014).

A probit model was estimated to determine the likelihood of the respondents responding with a value response, as opposed to ‘don’t know’ to the inflation perception and inflation expectations questions based on their demographic characteristics in Table 2.

The probability of respondents providing a value answer can be written as:

$$\Pr(Y = 1) = \Phi(\alpha + \beta X_i) \quad (1)$$

where Φ follows a normal cumulative distribution function, and Y is the dependent variable which can take up the value of 0 or 1, where 0 represents don’t know responses and $Y + 1$ if respondents provided a value response. X_i represents a set of independent dummy variables. These include age of the respondents, population group, gender, employment status, education, income, province and marital status. The baseline are those aged 25-34 years old, black population group, male, full time employed, completed matric with an income of R800 to R3999 in Gauteng province who are single.

³ M&G YouGov’s *Inflation Expectations Survey* is a survey undertaken quarterly on behalf of M&G Investments by YouGov, an international market research agency specialising in various sectors of the economy. See M&G YouGov (2014: 8) for more detail.

TABLE 2: INFLUENCE OF DEMOGRAPHIC CHARACTERISTICS ON PROBABILITY OF ANSWERING QUESTIONS

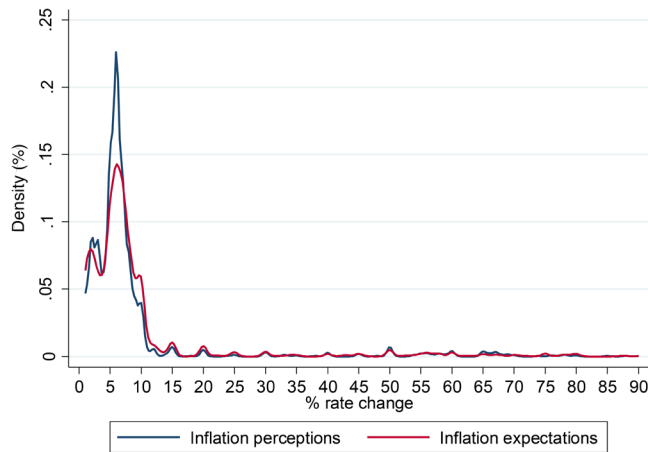
Characteristic	Inflation perception question		Inflation expectation question	
	Coefficient	Z-stat	Coefficient	Z-stat
16-24	0.128	0.990	0.104	0.800
35-49	-0.207	-2.060	-0.164	-1.610
50+	-0.433	-3.260	-0.379	-2.820
White	0.385	2.450	0.443	2.820
Indian	0.324	0.970	0.196	0.610
Coloured	-0.141	-0.980	-0.127	-0.890
Female	-0.073	-0.920	-0.007	-0.090
Part-time employed	0.004	0.030	0.023	0.180
Housewife	0.059	0.250	0.091	0.390
Student	-0.012	-0.060	0.008	0.040
Retired	0.181	1.030	0.275	1.600
Unemployed	0.060	0.510	0.014	0.120
No schooling	-0.273	-1.010	-0.281	-1.030
Technical qualification	0.264	1.960	0.205	1.510
Secretarial	-0.174	-0.300	-0.181	-0.310
Professional	0.486	2.350	0.468	2.460
Student	0.000		0.000	
R1-R799	-0.008	-0.060	-0.108	-0.890
R4000-R7999	0.108	0.990	0.150	1.410
R8000+	0.287	2.020	0.331	2.270
Western Cape	0.566	3.360	0.705	4.430
Eastern Cape	-0.290	-2.580	-0.324	-2.860
Northern Cape	-0.825	-4.160	-0.846	-4.310
Free State	1.288	5.330	1.321	5.390
KZN	-0.245	-2.230	-0.296	-2.710
North West Province	0.533	2.850	0.339	1.860
Mpumalanga	0.273	1.360	0.329	1.620
Limpopo	0.336	2.450	0.348	2.540
Married	0.131	1.160	0.113	1.000
Living together	0.167	1.270	0.107	0.820
Widowed	0.003	0.020	-0.122	-0.610
Divorced	0.194	0.650	-0.047	-0.160
Separated	-0.525	-1.640	-0.400	-1.250
Constant	0.257	2.070	0.198	1.620
Observations	1931		1931	
Pseudo R2	0.12		0.12	

Source: Own research

From the results, those older than the reference group (25-34) were less likely to have an actual value response to both the inflation perception and inflation expectation question. This may be due to older respondents perhaps not making the time to think about the question when asked or that they are not as informed regarding price changes and economic information as their younger counterparts who might still be studying or just entered the labour market. Compared to African respondents, white respondents were more likely to have an actual response to both questions. Interestingly, retired respondents were significantly more likely to give a value response to inflation expectations, compared to full time employed respondents. Because retired respondents most likely live on a retirement pension, they probably keep a closer eye on the goods and the prices of the goods that they purchase. In terms of education, respondents with a technical qualification as well as professionals were more likely to provide an inflation perception and inflation expectations value response. Those in the highest income category (R8000+) were more likely to provide an actual value inflation perception figure, compared to those who earned between R800 – R3999. Both the R4000 – R7999 and the R8000+ group were more likely to provide an inflation expectation figure. Compared to Gauteng, people residing in the Western Cape, Free State, North West province and Limpopo were more likely to give an inflation perception as well as inflation expectation value response, while households residing in the Eastern Cape, Northern Cape and KZN were less likely. This is likely due to Gauteng being an urban economic hub with more people in employment, and when comparing areas which are more rural (Eastern Cape, Northern Cape and KZN), people are less likely to know prices either because they are less informed or because their consumer behaviour differs from that of someone purchasing monthly groceries at a chain store. Lastly, compared to single respondents, separated persons had a lower likelihood of providing an actual value inflation perception response.

The average perceived inflation rate of those who did answer the question in the 2014-survey in South Africa was higher than the official inflation rate at 8,5 per cent, compared to the actual inflation rate of 5,9 per cent. Figure 1 shows the distribution of responses for both the inflation perceptions and inflation expectations questions. From the spike in inflation perceptions, it seems that inflation perceptions are more contained around the 5 to 6 per cent level, compared to inflation expectations.

FIGURE 1: DISTRIBUTION OF INFLATION PERCEPTIONS AND EXPECTATIONS 2014



Male respondents had a higher inflation perception, compared to females. This is contrary to the finding of Jonung (1981), who showed that females perceived inflation to be higher than males and ascribed this finding at the time to the fact that woman were more exposed to food prices and increases in such prices than men. Kemp (1987), however, found that increased familiarity with specific prices tended to result in less accurate estimates of past prices for the item in question.

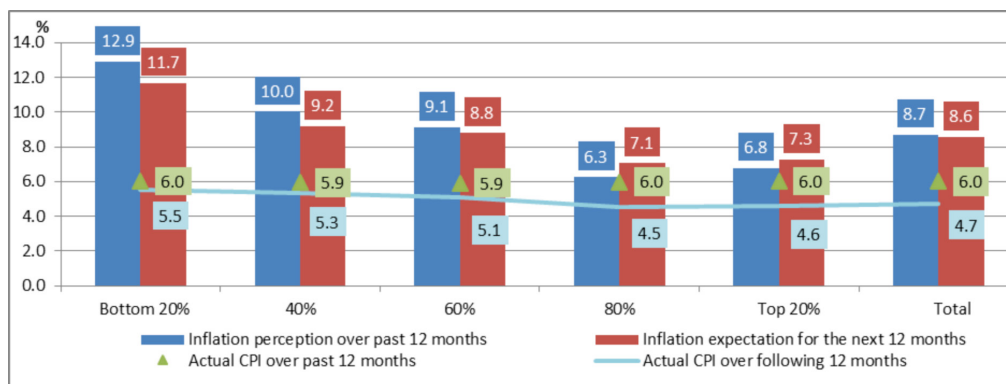
Ranyard *et al.* (2008) state that the inflation experience of low-income households (i.e. the actual price increases experienced) may not reflect price increases measured by CPI. The CPI is biased towards the consumption spending patterns of middle- and high-income households, as these households account for the bulk of consumption expenditure in any economy, compared to consumption expenditure by low-income households. Inflation rates for different products vary considerably, so lower income households may purchase more food items which could have a lower weight in the overall CPI basket as it measures the average expenditure on food (as opposed to the share of income spent on the item). These lower income households therefore may have a tendency to overestimate their own inflation compared to the overall rate of inflation in a jurisdiction, which includes price increases for all income groups.

From a comparison of current price data of food and groceries with price data of 2006, Rossouw (2015) found some evidence for higher inflation perceptions by low income groups in South Africa. Rossouw (2015) assessed the accuracy of South African inflation data since 1922 by adjusting historic prices recorded for selected food items, household consumables and clothing since 1922, 1974

and 2006 for inflation and comparing the adjusted prices to the current prices of the same items. Prices increased broadly in accordance with the inflation rate since 1922 and 1974. To the contrary, the rate of inflation broadly underreports price increases since 2006 for most items in all classes of goods compared. As the prices used in the comparison (in the main food and clothing prices) have a comparatively higher weight in the expenditure basket of the low income group, Rossouw (2015) concludes that the poor suffers as a consequence of sustained and underreported inflation. Moreover, the analysis provides grounds for perceptions that historic price increases exceed price increases reported by the inflation rate.

Figure 2 shows that respondents in the highest income quintile perceived and expect lower inflation, compared to those in the lower income categories. These results mirror results found by Bryan and Ventaku (2001b). According to official price statistics however, respondents in the lower income groups had similar actual CPI inflation as compared to those in the higher income groups over this period, suggesting that respondents in the lower income quintile likely experienced higher levels of actual in-the-store inflation, as represented by their higher average inflation perceptions and expectations.

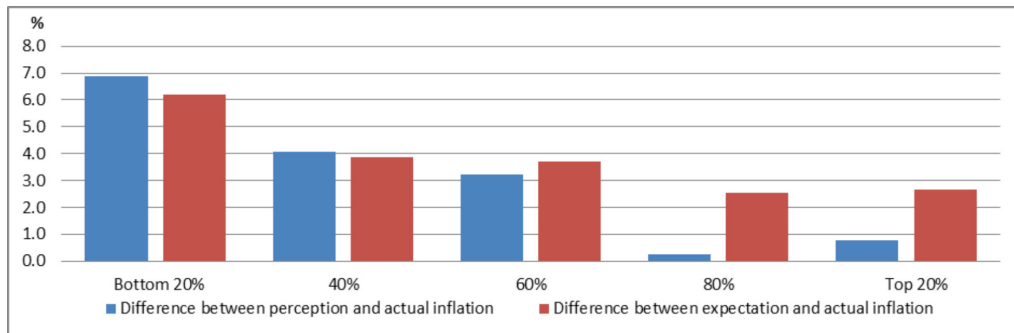
FIGURE 2: INFLATION PERCEPTIONS AND EXPECTATIONS BY HOUSEHOLD INCOME QUINTILES VS ACTUAL INFLATION OUTCOMES



Source: Statistics South Africa and own research

Figure 3 illustrates the differences between inflation perceptions and actual income-quintile-specific inflation rates. It is evident that both the perception and expectations bias is higher amongst the lower income quintiles. This result was also found by Leung (2009). Interestingly, at the top two quintiles, inflation expectations bias is much larger than inflation perception bias, while in the bottom quintiles, the biases are more similar.

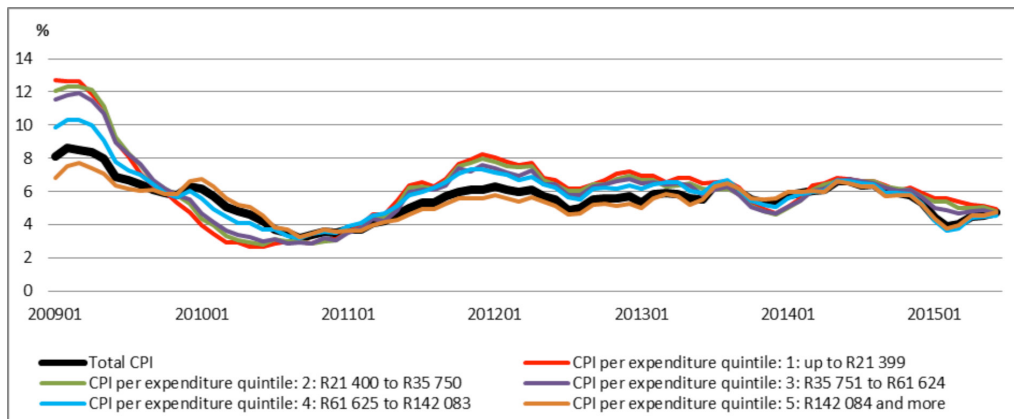
FIGURE 3: DIFFERENCES BETWEEN INFLATION PERCEPTIONS AND ACTUAL HISTORIC INFLATION AND EXPECTATIONS AND ACTUAL INFLATION OUTCOMES BY HOUSEHOLD INCOME QUINTILES



Source: Own research

This could be that lower income respondents experience higher prices, and therefore their perception bias is higher than their expectation, while higher income respondents do not experience higher prices than inflation, however, they have more information available to them and can price inflation expectations in to their environment (see Figure 4 and Table 3 for CPI price data).

FIGURE 4: HISTORIC INFLATION BY EXPENDITURE (INCOME) QUINTILES



Source: Own research

TABLE 3: AVERAGE ANNUAL CPI INFLATION FOR INCOME QUINTILES AND TOTAL

	CPI per expenditure quintile 1: up to R21 399	CPI per expenditure quintile 2: R21 400 to R35 750	CPI per expenditure quintile 3: R35 751 to R61 624	CPI per expenditure quintile 4: R61 625 to R142 083	CPI per expenditure quintile 5: R142 084 and more	Total CPI
2009	9.0	9.1	8.9	8.0	6.6	7.1
2010	3.1	3.2	3.4	4.0	4.6	4.3
2011	6.0	5.8	5.6	5.7	4.7	5.0
2012	7.0	6.8	6.6	6.4	5.3	5.7
2013	6.3	6.0	5.9	6.1	5.7	5.8
2014	6.2	6.1	6.1	6.0	6.0	6.1

Source: Statistics South Africa (2009-2014).

Ranyard *et al.* (2008) also argue that incomes impacts on inflation perceptions, as a respondent may perceive to be less affected by a price increase if the person has also had an increase in income. Fisher (1986) conceptualised this as if prices are perceived to increase faster than income, people will experience a decrease in their well-being. Gärling and Gamble (2006) showed that when the average inflation was increasing, the respondents felt that products were getting more expensive, unless income increased at the same time.

Table 4 contains a summary of inflation perceptions and expectations by various demographic characteristics of the respondents. According to Bryan and Venkatu (2001a) and Leung (2009) whites [or European ethnicity] perceived and anticipated lower inflation compared to non-whites [or non-European ethnicity]. Our results show that White and Black respondents had similar inflation perceptions, which were higher than those who were Indian or coloured. However in terms of inflation expectations, Black respondents had the lowest average inflation expectations.

Our results differ largely from Bryan and Venkatu (2001a) and Leung (2009)'s when analysing inflation perceptions and expectations by age groups and marital status. Our findings show that middle-aged respondents perceive and anticipate higher inflation than young respondents. Furthermore, married respondents perceived and expected higher inflation, compared to single respondents. Interestingly, divorced respondents reported a much higher average inflation expectations rate than the other respondents. In practice divorced respondents could have more incentive to have a higher view of inflation, as price increases usually form part of legal financial settlements.

TABLE 4: MEAN INFLATION PERCEPTIONS AND EXPECTATIONS BY DEMOGRAPHIC CHARACTERISTICS

	Perceptions	Expectations
Average	8.60	8.98
Male	9.00	9.46
Female	8.19	8.49
White	8.89	9.12
Black	8.78	8.84
Indian / Asian	6.66	9.97
Coloured	7.48	9.57
16 - 24	7.98	8.36
25 - 34	8.37	8.57
35 - 49	9.48	9.93
50+	8.62	8.97
Bottom 20%	13.19	11.73
40%	10.23	9.19
60%	9.38	8.89
80%	6.28	7.15
Top 20%	6.82	7.22
Working full-time	9.37	9.96
Working part-time	8.03	8.03
Not Working - Housewife	7.85	7.86
Not Working - Student	8.42	8.52
Not Working - Retired	8.08	8.92
Unemployed - looking for work	8.83	9.09
Unemployed - not looking for work	5.78	6.42
Single	8.32	8.65
Married	9.01	9.49
Living together	7.95	8.38
Widowed	9.93	9.43
Divorced	9.51	13.03
Separated	4.97	4.73
Western Cape	6.9	8.5
Eastern Cape	6.9	7.1
Northern Cape	11.1	9.4
Free State	23.9	21.6
KwaZulu Natal	6.0	6.4
North West	5.1	5.1
Gauteng	8.4	10.3
Mpumalanga	13.9	9.4
Limpopo	4.9	5.8

Source: Own research

When looking at respondents' responses by highest level of education (or in other words skill levels), those who completed only matric as their highest level of education had the highest perceptions and expectations. Interestingly, students had the lowest perceptions and expectations. This could be due to perhaps a lack of inflation experience or relying on someone else to make purchases for them.

3.2. Inflation perception and expectation bias calculated from the 2014 survey

To determine the magnitude of the difference between respondents' perception (expectations) of inflation over the past twelve months (next twelve months) and the actual outcome of inflation over the same period, an inflation perception (inflation expectations) bias can be defined as:

$$P_e^p = P_{t-1}^p - P_{t-1} \quad (2)$$

where P_e^p is the inflation perception bias and P_{t-1}^p is the inflation perception of respondents over the past twelve months, starting in October 2014 (when the survey was conducted), while P_{t-1} is the actual inflation rate over the same twelve months. $t - 1$ refers to the average over the past 12 months. Similarly the inflation expectations bias can be constructed as:

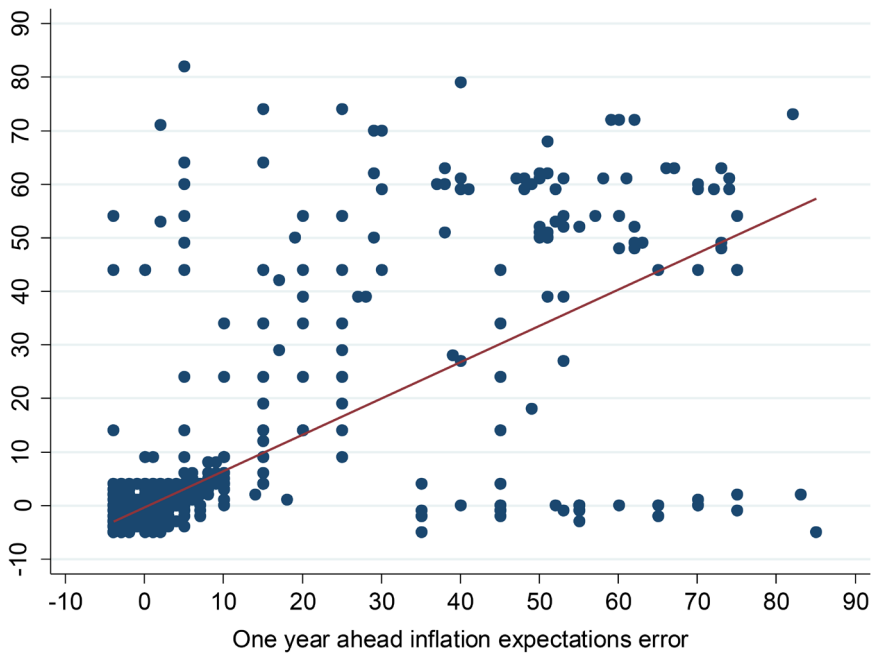
$$P_e^e = P_{t+1}^e - P_{t+1} \quad (3)$$

where P_e^e is the inflation expectations bias and P_{t+1}^e is the inflation expectations of respondents for the next twelve months, while P_{t+1} is the actual outcome of inflation over the same twelve months. $t + 1$ refers to the average over the next 12 months.

Figure 5 plots each respondent's perception error on one axis against the respondent's expectations error on the other. It shows that there is a relatively strong correlation between the two errors at lower values of the errors. The average ratio between the two were below one, indicating that the degree of bias in estimating current inflation is less than that of estimating one year ahead inflation. Leung (2009) suggests that this is most likely due to people having more information on current inflation than future inflation.

There seems to be a recognisable difference between household income quintiles and person income quintiles. However, it should be noted that of the person income question, there were 46 per cent non-responses or no income, while for the household income question there were only 29,3 per cent non-responses or no income responses.

FIGURE 5: ESTIMATION ERROR ON CURRENT INFLATION AND ESTIMATION ERROR ON EXPECTED INFLATION



Source: Own research

Controlling for selected individual characteristics, we define an OLS regression to determine the effect that inflation perception bias has on inflation expectations as follows:

$$P_{e,i}^e = \alpha + \beta X_i + \gamma P_{e,i}^p + \varepsilon_i \quad (4)$$

where i indicates individual responses and X_h is a vector of demographic characteristics. ε_h is a random error term.

The results in Table 5 show that the coefficient for inflation perception bias is significant and positive; indicating that around 70 per cent of changes in inflation expectations bias can be explained by changes in inflation perception bias when controlling for demographic characteristics.

This means that respondents who had a positive perception bias also had a positive expectations bias. Furthermore, compared to those between 24 and 34 (the base), respondents between 16 and 24 years had a significantly higher inflation expectations bias. Similarly, compared to full time employed, part-time employed and students had a lower inflation expectations bias. Compared to those with some schooling, respondents with a technical qualification, professionals

and students had a lower inflation expectations bias. This shows that education and skill levels play an important role in how respondents derive their inflation perceptions. Interestingly, here was no significant difference between income groups. North West province and Mpumalanga had a significant lower inflation expectations bias, compared to respondents in Gauteng. As Gauteng is more of an urban economic hub prices might be higher in general. We can also look at Gauteng's inflation rate to substantiate this. Compared to single respondents, married respondents had a higher inflation expectations bias, while respondents with children younger than 15 years old in their household, had a significantly higher inflation expectation bias, compared to other respondents, likely because they have a very different consumer basket and therefore might experience higher price inflation in these goods.

TABLE 5: IMPACT OF PERCEPTION BIAS ON INFLATION EXPECTATIONS BIAS

Characteristic	Expectations bias	
	Coefficient	T-stat
Inflation perception bias	0.697	13.000***
16-24	1.027	1.750*
35-49	0.107	0.190
50+	-0.129	-0.220
White	0.113	0.150
Indian	2.571	1.040
Coloured	-0.614	-0.790
Female	-0.385	-1.020
Part-time employed	-0.300	-0.410
Housewife	-0.612	-0.830
Student	-1.923	-2.940***
Retired	-0.504	-0.600
Unemployed	-1.304	-2.150**
No schooling	0.273	0.360
Technical qualification	-1.016	-2.270**
Secretarial	-1.268	-1.280
Professional	-1.106	-1.770*
Student	-3.821	-3.580***
R1-R799	0.000	0.000
R4000-R7999	0.103	0.130
R8000+	-0.213	-0.290
Western Cape	0.152	0.300
Eastern Cape	-0.550	-0.660
Northern Cape	-1.227	-1.440
Free State	1.320	1.110
KZN	-0.083	-0.120
North West Province	-1.548	-2.430**
Mpumalanga	-2.289	-2.350**
Limpopo	-0.256	-0.510
Married	1.188	1.940*
Living together	0.207	0.300
Widowed	0.607	0.660
Divorced	0.429	0.600
Separated	0.456	0.290
Children younger than 15 in household	0.860	2.000**
Constant	1.709	2.300

*p<0.1; ** p<0.05 and *** p<0.01

Source: Own research

3.3 Inflation perception feed through to inflation expectations shown by the 2014 survey results

Jonung (1981) found a significant positive correlation coefficient between perceived and expected inflation of about 0,5. A similar result was reported by van der Klaauw *et al.* (2008) for the US. We found a positive and significant correlation coefficient of 0,76 when using the Spearman's rank correlation test, where the H_0 states that the variables do not have a rank-order relationship. At the one per cent level we reject the H_0 , and we conclude that higher inflation perceptions do lead to higher inflation expectations.

Table 6 shows that consumers' inflation expectations matched their inflation perceptions. Consumers who reported below 5,5 per cent inflation perceptions, mostly also reported below 5,5 per cent inflation perceptions. Consumers who had higher inflation perceptions, mostly also had similar high inflation expectations.

TABLE 6: INFLATION PERCEPTIONS AND EXPECTATIONS - COMPARATIVE SHARES

Perceptions categories	Expectations categories					Total
	1%-5,5 %	5,6%-10%	11%-15%	16%-20%	21% plus	
1%-5,5 %	78.7	20.0	0.2	0.0	1.2	100.0
5,6%-10%	12.5	80.2	4.8	0.8	1.7	100.0
11%-15%	2.7	15.0	60.4	8.9	13.0	100.0
16%-20%	6.0	10.1	0.0	17.7	66.2	100.0
21% plus	1.9	5.5	4.7	9.3	78.5	100.0
Total	40.2	48.2	3.8	1.2	6.7	100.0

Source: Own research

4. Conclusions

This paper evaluates information on South African consumer inflation perceptions and expectations, against the backdrop of the SA Reserve Bank's inflation targeting regime with price stability as the main objective. The first goal which was addressed in our review of the literature was to explore the process of forming perceptions and expectations. Studies revealed that this process is a complex one informed both by economic factors as well as a range of social, psychological and political considerations. Universally, studies also found that the understanding of inflation by the general public was limited, and that inflation perceptions and

expectations were closely linked to respondents' direct environment such as their feelings about their country's political regime, their exposure to economic decision making, their ability to accurately recall prices, as well as their economic position in society. Lower income earners tend to experience higher price increases as the weights of goods in their consumer basket is very different from the weights in the average consumer price index basket.

Our second goal was to introduce the results of the fourth round of a survey on inflation perceptions and inflation expectations in South Africa. This was the first round where the same consumers were asked about their views on historic prices, as well as their expectations of future price increases. It is of some significance to point out that this was also the very first time that this has been done in South Africa.

Thirdly, our findings show that those who were older than the middle-aged had a lower probability of responding to the inflation questions. White respondents were more likely to provide a response to the inflation questions, while retired consumers were more likely than full-time employed to give a response to inflation expectations. The probability of a response was also higher for respondents with a technical or professional qualification and for those in the higher income groups.

Fourthly, we show that the bottom income quintile likely experience higher prices than the official CPI, as they had much higher inflation perception and inflation expectations than the average CPI over the period (also when taking the CPI for each quintile).

Last, the paper shows, again for the first time, that there is indeed a feed through from inflation perception to inflation expectations in South Africa. Therefore, inflation perceptions play a crucial role in the formulation of inflation expectations in South Africa. These results suggest that policy makers are not just charged with containing inflation expectations, but that they should also be vigilant that the confidence in official statistics, as well as the confidence in the SA Reserve Bank and government, impacts inflation perceptions which in turn directly feed into inflation expectations. The centrality of consistent, accurate and effective communication by the monetary authorities, as well as by government, in all matters related to information dissemination both about inflation and prices, and about general economic data cannot be over-emphasised. Innovative means of communication to reach low income earners with such information have to be developed, and we believe the results of succeeding in this latter objective may be very significant.

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