BER
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Conducting Inflation Expectation Surveys in South Africa

George Kershoff

Stellenbosch

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1 INTRODUCTION

The Minister of Finance announced a national policy of inflation targeting in his budget speech on 23 February 2000. He also set the target for CPIX inflation (i.e. consumer price inflation excluding the mortgage rate for metropolitan and non-metropolitan areas) as between 3% and 6% during the year 2002. An inflation expectation survey is required to implement such a policy. The Reserve Bank approached the Bureau for Economic Research (BER) to conduct such surveys on behalf of the bank.

2 WHAT ARE INFLATION EXPECTATION SURVEYS?

Changes in demand (e.g. an exogenous rise in household consumption expenditure, which reduces the output gap) and supply conditions (such as a sharp increase in commodity prices) usually are the initial cyclical causes of a rise in inflation. This higher level of inflation, then, is mostly sustained by amongst other, inflation expectations, i.e. expected future values of the inflation rate (Mohr, 1989: 57). Consumers, trade unions, producers etc. build these higher inflation expectations into wage demands, asset prices and selling price.

Nearly all central banks that have adopted inflation targeting monetary policy frameworks consult inflation expectation surveys. Even central banks that have not formally adopted inflation targeting, such as the US Federal Reserve, take the results of inflation expectation surveys into account in their monetary policy decisions.

An analysis of research on the results of inflation expectation surveys and the experience of countries that conduct inflation expectation surveys reveal the following[1]:

- Direct quantitative surveys appear to be a better measure of inflation expectations than qualitative surveys, such as those produced by means of net balance statistics. The expected inflation figures or percentage change in the CPI are therefore required and not only whether inflation is expected to increase or decrease.
- Surveying different societal groups – such as business people, households and financial market participants – is superior to just quizzing society as a whole, as the difference in these groups' expectations reveal important information. Internationally business people and households are the most common groups to be surveyed. Surveys of other groups,

[1] For a detailed discussion, please see Kershoff GJ, Laubscher P & GA Schoombee, 1999. *Measuring Inflation Expectations – the International Experience*. Report compiled by the Bureau for Economic Research for the SA Reserve Bank.

such as professional forecasters, labour unions, private sector economists and financial market participants, are less common. Most central banks make use of at least three surveys.

- The business surveys mostly make use of postal questionnaires, whilst consumer surveys are conducted telephonically. In some cases, other groups are also surveyed per telephone.
- The response rate is generally relatively low – between 25% and 35%. Quarterly surveys are more common than monthly surveys.

A survey of the literature on inflation targeting monetary policy frameworks and the inflation reports of a number of central banks reveal that the results of inflation expectation surveys are mainly used (1) to forecast inflation and (2) to evaluate the credibility of the inflation fighting-policies of the central banks. The credibility of the central bank's policy is of particular importance. If a rise in the inflation-fighting credibility of the central bank leads to a reduction in inflation expectations and consequently actual inflation, the central bank would have been able to reduce inflation without having to resort to restrictive monetary policies, which would have lowered output and employment. A comment of the Governor of the SA Reserve Bank, Mr Tito Mboweni, reflects this challenge: "The success of inflation targeting depends on managing expectations and that will call for a lot of talking and explaining" (Katzenellenbogen & Grawitzky, 2000:2).

The scope and design of the inflation expectation survey described below were set out at a meeting between senior officials of the SA Reserve Bank and the BER in December 1999. The following option to measure inflation expectations in South Africa was favoured:

- a direct quantitative survey;
- the survey must be conducted quarterly;
- four societal groups have to be quizzed, namely households, business people in the non-financial sector, participants in the financial sector (including economists) and representatives of trade unions and employer organisations; and
- using the questionnaire of the New Zealand survey as a guideline.

The design of the survey in the business, financial and labour sector and that of households will be discussed separately, as their methods differ widely.

3 MEASURING INFLATION EXPECTATIONS IN THE BUSINESS, FINANCIAL AND LABOUR SECTORS

The key elements of the development of an inflation expectation survey in the business, financial and labour sector are 1) the building of a panel of participants and 2) formulating the wording of the questions. These elements will be discussed in the following sections.

3.1 CREATING A PANEL OF PARTICIPANTS

To measure inflation expectations, one can either build a new sample every time the survey is conducted or make use of a panel of participants. Panels are ideally suited for longitudinal studies (Mouton & Marais, 1988:41). With a panel, changes in the survey results can be attributed with more certainty to changes in expectations compared to when new samples have to be designed especially when little is known about the composition of the population (universe). In the latter case, one cannot always say with certainty whether the change in results can be attributed to a change in expectations or to a change in the sample. Furthermore, it is rather time consuming, expensive and complicated to design a sample every time a survey needs to be run. Panel based surveys are also the internationally preferred method of conducting inflation expectation surveys.

There are different ways to construct a panel. We have applied so-called convenience non-probability sampling method to design the panels. A probability sample is selected by an objective method (such as drawing names at random from a hat) and each person's chances of selection can be calculated. In the case of a non-probability sample, only those respondents who are willing and available to complete the questionnaire are selected. Non-probability samples include systematic and convenience samples. In the case of systematic non-probability samples, every *n*th (5^{th} or 500^{th}) unit is selected from a list of units. In the case of convenience non-probability sampling, those who are available, meet the criteria for the survey and are willing to complete the questionnaire are selected (Fink A & J Kosecoff, 1998:39-45, Van der Merwe, 1986:73-74).

Panels designed by means of convenience sampling can be biased. For example, those that are willing to participate may be more concerned or better informed about inflation than those that choose not to participate. These participants may also be more aware of changes in inflation than non-participants.

Consequently the following steps were taken to improve the credibility of the results based on convenience sampling:

- Extra care was taken to ensure that the panel renders a fair representation of participants in the South African national economy (see section 3.1.3 below). In this respect we recruited more participants in those sectors of the economy where the numbers were low after the first round of recruitment (see section 3.1.2 below). The panel consists of volunteers from all sectors of the national economy. The results therefore do not only reflect only the views of a small, vocal group. In this respect it is important to keep in mind that we are gauging inflation expectations and not establishing an inflation forecast *per se*. In the latter case, we would have had to identify key price makers in the economy or put differently, those economic actors that have the biggest impact on prices as reflected by the CPI. Furthermore, we would also have had to give a higher weighting to the response of Eskom Power Generation for instance than the little shop on the corner, as the pricing decision of Eskom has a larger impact on overall price increases.
- We have introduced the following measures to increase people's willingness to participate and thereby ensure that such a wide cross-section as possible of the population is included in the panel.
    - People are generally more willing to participate with the BER, which is an independent university based research institute, than organisations that have a stake in or may derive financial benefit out of the results.
    - Confidentiality not only increases participation, but also improves the reliability of the answers. The BER ensures that individual replies are not revealed. For example, representatives of trade unions may be more willing to complete the questionnaire if they know individual responses are not made public. If these responses were to be made public, they would then be accountable. In addition, if individual replies are published, it often encourages consensus building (when wrong, respondents can justify their views by pointing out that the majority had this view) or outliers (respondents know that they will attract more publicity – this often applies to economists – if their views deviate from the majority). Although respondents know the consensus view through the summary of survey results, there is no incentive to either agree or differ with the consensus view.
    - The letter by the Governor of the Reserve Bank and the brochure explaining the purpose of the survey, sent out with the invitation to participate in the survey, also increase the willingness to participate. People would rather participate in a survey where the

national importance and use is clear and from which direct benefit can be derived (in the form of the summary of survey results) than one where the opposite applies.

- People are also less likely to participate in complicated surveys, that takes a long time to complete and where they have to consult figures. Therefore the questionnaire has been designed in such a manner requiring as little effort as possible for completion. There are only a few questions and the questionnaire can be completed via the internet.

- The responses of regular participants in the inflation expectation surveys may differ from those that have never been quizzed, as the former category may be more concerned and better informed about inflation. This may be the reason why they participated in the first place. To establish whether the views of the panel of respondents deviate from those not surveyed before, we will separate new recruits from current participants when we enrol new participants after a year or so. This will enable us to establish whether the responses of the new group differ from the existing one. If so, we will have to adjust the results.

3.1.1 How Participants were recruited

The first round of recruitment took place in April 2000. Excluding households, each invitation included the following:

- a letter from the Governor of the Reserve Bank,
- a brochure to explain inflation expectation surveys,
- a classification form, and
- the questionnaire.

3.1.1.1 Business people

For the most part, addresses provided by the Bureau for Market Research (BMR) at UNISA were used to recruit business people in the non-financial sector. The BMR's list of addresses of manufacturers, retailers and wholesalers are widely regarded as representative of these sectors in the national economy. Between 60% and 65% of the BMR's addresses are up-to-date and correct.

The BMR has about 13 000 addresses of manufacturers. These addresses are distributed over 24 employment groups. Employment group 01 includes all firms with 1 to 3 employees and group 23 all those with more than 5000 workers. Group 24 includes all head offices. Half of the addresses (i.e. 6 500) falls above employment group 07. We limited the

selection of addresses to the upper half of the employment groups, but included all provinces and economic sectors. We therefore focussed on the larger firms in terms of number of employees. We selected addresses of manufacturers with 31 or more employees, wholesalers with 11 or more employees and retailers with 5 and more employees. 6 443 Manufacturers, 3 297 wholesalers and 18 891 retailers satisfied these criteria.

We limited the number of invitations to retailers, wholesalers and manufacturers during the first round of recruitment to 6 364 to achieve our overall target of about 8 000 invitations in total during the first round. The BMR provided the addresses in the form of pages with 24 printed labels and sorted alphabetically. We chose every 4th page of addresses to arrive at the targeted numbers in the first round of recruitment and every 3rd page of the remaining pages in the second round. Invitations were not sent to addresses outside South Africa.

Table 1 Number of invitations sent to people in the non-financial business and government sector

	Recruitment 1 (April 2000)	Recruitment 2 (July 2000)
Retailers	4 128	2 352
Wholesalers	768	792
Manufacturers	1 468	2 120
Importers	493	
Exporters		252
Hotels and off-sales		565
Educational services		23
Local authorities		619
City councils of provincial capitals	21	
Public corporations	17	
Total	6 895	6 723

The expectations of the above three sectors correspond closely with the price changes that are measured through the CPI (retailers) and PPI (wholesalers and manufacturers). However, to make the panel representative of business people in the non-financial sector as a whole we expanded the coverage to also include other sectors of the economy, in particular the primary and service sector. In the case of importers and exporters, we limited the selection to the following economic sectors: agriculture, forestry and fishing; mining and quarrying; electricity, gas and water; construction; wholesale trade in motor vehicles and accessories;

motor trade and repair services; transport, storage and communication; business services; sanitary services; educational services; medical, dental and veterinary services; and motion picture and other entertainment services. Except for the addresses of public corporations and city councils of provincial governments, the source of all the addresses was the BMR. We included local authorities and public corporations, as their expectations could impact upon administrative prices.

3.1.1.2 Financial sector

We used Profile's Stock Exchange Handbook (Alexander & Oldert, 2000) to obtain the contact details of Stock Brokerage Firms and Bond Exchange Members. These addresses correspond with a list of financial sector firms provided by the BMR. To this we added our own list of addresses of economists.

Table 2 Number of invitations sent to people in the financial sector

	Recruitment 1 (April 2000)	Recruitment 2 (July 2000)
Financial sector	142	98

3.1.1.3 Labour sector

We used the Official SA Trade Unions Directory (1999) to obtain the contact details of representatives of trade unions and employer organisations. In the second round of recruitment, we used the addresses of the affiliated unions supplied on COSATU's and FEDUSA's webpages.

Table 3 Number of invitations sent to the labour sector

	Recruitment 1 (April 2000)	Recruitment 2 (July 2000)
Employer organisations	217	
Trade unions	400	51

3.1.2 RESPONSE TO RECRUITMENT

Except for the financial sector, the response rate to the first round of recruitment was below expectation. On average the BER obtains a response rate of 8% when recruiting new participants for its business surveys. After the first round of recruitment, the number of responses was sufficient to reflect inflation expectations for that particular quarter, but too small to serve as a panel. Internationally the sizes of panels of inflation expectation surveys vary

around 600. We therefore required more participants, as only about 50% of panellists usually respond in a particular survey.

To increase the number of responses, we changed the way in which we conduct the survey and the questionnaire during the second round of recruitment. The changes included the following:

- It appeared that some people were eager to participate, but had no idea what the answers could be. People are less likely to participate in a survey if they are not able to answer any of the questions. It is like asking somebody the distance between Gharies and Vioolsdrif. Many people have heard of these places, but have no idea if they are 200km or 500km apart. If given a starting point, such as between 200km and 300km, more people may dare to express an opinion. Consequently we decided to follow the example of the well-known Livingstone survey conducted by the Federal Reserve Bank of Philadelphia in the USA and provide historic data on the questionnaire (see section 3.2 below).
- In the first trial run, participants could only respond to the questionnaire via fax or internet. However, it seems as though many people still prefer the traditional method, namely regular mail. We therefore provided pre-paid envelopes in the second round of recruitment.

Table 4 Response to recruitment

	Recruitment 1 (April 2000)				Recruitment 2 (July 2000)			
	No of invitations sent out	No of incorrect addresses #	No of responses	% *	No of invitations sent out	No of incorrect addresses #	No of responses	% *
Financial	142	4	28	20,3	98	0	12	12,2
Business	6895	543	303	4,8	6723	654	758	12,5
Labour	617	65	23	4,2	51	0	2	3,9
Total	7654	612	354	5,0	6892	654	772	12,4

Only letters returned by the post office are included.
* No of responses as a percentage of correctly addressed invitations

3.1.3 ULTIMATE COMPOSITION OF THE PANEL OF PARTICIPANTS

In all, we are satisfied with the size and composition of the panel of participants after the second round of recruitment (see Table 5). The changes we made in the second round of recruitment have paid off. Furthermore, the relative improvement in general business prospects

at the time may have also contributed to the substantially higher response rate amongst business people during the second round of recruitment. Whereas business conditions deteriorated and uncertainty was high during April 2000, conditions stabilised during July.

Table 5 Composition of total panel

	Number	%
Business	1061	94,2
Financial	40	3,6
Labour	25	2,2
Total	1126	100,0

The number of participants in the financial and labour sectors is much smaller compared to the business sector, as their population (universe) is smaller and relatively homogeneous compared to the business sector.

Table 6 Composition of panel per economic sector

	Number	%
Agriculture & forestry	66	6,2
Mining	11	1,0
Construction	22	2,1
Manufacturing	405	38,2
Transport & public corporations	18	1,7
Wholesale trade	76	7,2
Retail trade	241	22,7
Motor trade	12	1,1
Services	210	19,8
Total business sector	1061	100,0
Banks	11	27,5
Financial brokers & advisors	26	65,0
Insurance companies	3	7,5
Total financial sector	40	100,0
Total labour sector	25	100,0

There is no reliable and up-to-date information available on the size and composition of the business sector in South Africa. It is therefore difficult to judge the extent to which the panel is representative of the population (universe). One indicator is the number of addresses available from the BMR. In 1997, the BMR (Nänny, 1997) had about 50 000 addresses of manufacturers, retailers and wholesalers. According to Future Fact 2000 that quoted the SA Business Survey (1998), the number of formal businesses with annual turnovers exceeding R35 million amounts to 48 000. The size of the sample / panel must be about

1 000 if the size of the population is taken as 50 000[2]. The number of business sector participants therefore satisfies the requirements for the size of a sample for such a universe.

Respondents from all the major economic sectors are included in the panel. Regarding business people, manufacturers, retailers and service providers make up the largest share (see Table 6). In the financial sector, most of the participants are from financial brokerage firms.

The majority of participants are CEOs, managers or owners of companies (see Table 7). In the financial sector, the majority of participants are economists. The total number of participants in the financial sector per position is lower than the total per sector, as four participants are owners of financial sector firms. The majority of participants in the labour sector represent trade union. The total number of participants in the labour sector per position is lower than the totals per sector, as two representatives of employer organisations are also managers of non-financial businesses.

Table 7 Composition of panel per position of participant

	Number	% of total	% of sector
CEO, manager, owner	624	55,4	58,5
Financial manager, accountant	401	35,6	37,6
Senior sales / production manager	42	3,7	3,9
Total business sector	1067		100,0
Economist	28	2,5	77,8
Investment analyst, researcher	5	0,4	13,9
Fund manager	3	0,3	8,3
Total financial sector	36		100,0
Trade union representative	14	1,2	60,9
Employer organisation representative	9	0,8	39,1
Total labour sector	23		100,0
Total	1126	100,0	

The majority of business sector firms employ fewer than 21 people on a full-time basis (see Table 8). In contrast, the majority of financial sector firms have between 21 and 50

[2] If the population is 50 000, then the size of the sample must be $\sqrt{2500} * 20 = 1000$ and the sample ratio 2,0% (Van der Merwe, 1986:76).

full-time employees. The largest number of labour sector participants represent organisations with fewer than 500 registered members.

Table 8 Composition of panel per size of firm / organisation represented

Business			Financial			Labour		
	No *	%		No *	%	In 000's	No #	%
>21	309	29,1	>21	5	12,5	>0.5	12	48,0
21-50	204	19,2	21-50	8	20,0	0.5-2	6	24,0
51-100	160	15,1	51-100	6	15,0	2-5	0	0,0
101-200	147	13,9	101-200	6	15,0	5-10	0	0,0
201-300	61	5,7	201-300	5	12,5	10-20	2	8,0
301-400	41	3,9	301-400	2	5,0	20-40	1	4,0
401-500	32	3,0	401-500	1	2,5	40-70	2	8,0
501-1000	48	4,5	501-1000	1	2,5	70-100	0	0,0
1001+	59	5,6	1001+	6	15,0	100+	2	8,0
Total	1061	100,0	Total	40	100,0	Total	25	100,0

* Number of full-time employees # Number of registered members, in thousands

3.2 DESIGNING THE QUESTIONNAIRE

The wording of the questions is crucial to the credibility of the survey results. The results will be unreliable if participants do not understand the questions or different meanings are attached to the questions. For example, if the questions are ambiguous and participants consequently interpret them differently, then changes in the survey results may reflect changes in interpretation. Smit (1986: 24-51) provided valuable pointers on how to design a questionnaire.

The questions for the different societal groups were selected at the December 1999-meeting between the Reserve Bank and the BER. The inflation expectation survey questionnaire conducted on behalf of the Reserve Bank of New Zealand and the main drivers of inflation in South Africa have directed the choice of questions. In respect of the wording of the questions, we have tried to simplify economic terminology as far as possible. In wording the questions, we asked ourselves "Will regular business people be able to answer this question effortlessly?" and "How will regular business people understand this question?" Furthermore, we decided to survey respondents' expectations for the current and following year except for CPI and CPIX inflation when respondents' expectations for the current and following two years are requested.

Finally, we decided to measure inflation expectations per calendar year and not for a specific month (say March 2001) or moving 12 months (i.e. the twelve months to March 2001, then the twelve months to June 2001 etc.). It is important to note that this wording implies that the forecast period shortens during the year, which could affect respondents' forecast. For example, the forecast period is longer when one has to write down the R/$ exchange rate for the end of 2001 in January 2000 compared to when one has to do the same in October 2000. Respondents have more information available in October than in January.

We added two qualitative questions at the beginning of the questionnaire to put respondents in the right frame of mind. These questions are easy to answer and all respondents will have an opinion. People can get disheartened and not complete the questionnaire at all if they find the first question difficult to answer.

We also considered adding the following question "What is the current CPI inflation rate?" as the results to this question may provide valuable clues to respondents' current level of expectations. However, after careful consideration, we decided against inclusion of this question. This question may scare off certain respondents, as they know that we know the answer and may feel that we are checking up on them. Others, again, may try to find the correct answer, which will increase the time taken to complete the questionnaire.

The questions to the different societal groups are set out in Table 9.

As mentioned earlier, the relatively low response rate to our first round of recruitment can partly be attributed to the fact that many people have no idea what would be realistic answers to some of these questions. For instance, most people know if price increases are up or down, but not the level of price increases. To assist respondents and increase participation, we decided to follow the example of the Livingstone Survey[3] conducted by the Federal Reserve Bank of Philadelphia. In this survey, the most recent official figure on a particular variable is provided to respondents (Croushore, 1997: 2-3; Federal Reserve Bank of Philadelphia: 3).

The benefit of providing historical information is that all respondents have the same information available when completing the questionnaire. To limit any possible influence of the results, we not only include the information for the most recent year, but also the five-year average. Compared to the figure for the most recent year, the five-year average will change

[3] Livingstone, a columnist for the *Philadelphia Inquirer*, began asking business economists at first and later on also academic economists their forecasts for important economic variables since 1946. The Philadelphia Fed took over the survey when Livingstone died in 1990. The Livingstone survey is well known, as it was the only comprehensive set of data on inflation expectations available in the 1970s to test new theories on the formation of expectations.

marginally from year to year. If only the most recent data point is provided, then large variations in this figure from one year to the next may influence the responses. The historic information provides respondents with a benchmark. Although nothing prevents respondents from taking a view that deviates totally from the historical experience, some may provide figures around this benchmark. A comparison of the results of the first (when no historical information was provided) and second survey (when historical information was provided) indicates a decline in the level of CPI inflation expectations, but that that of CPIX inflation remained about the same (see section 3.4 below).

Table 9 Description of questionnaire

	Time horizon	Business	Financial	Labour
Are prevailing business conditions satisfactory or unsatisfactory?	-	x	x	
Compared with the same quarter of a year ago, is your current volume of business up, the same or down?	-	x	x	
What do you expect the …				
average headline inflation rate (as measured by the percentage change in the CPI) to be during the year:	Current + following 2 years	x	x	x
average CPIX inflation rate (i.e. overall inflation excluding the mortgage bond rate) to be during the year:	Current + following 2 years	x	x	x
average economic growth rate (as measured by the percentage change in the real GDP) to be during the year:	Current + following year	x	x	x
prime overdraft rate to be at the end of:	Current + following year	x	x	x
yield on the R153 government bond to be at the end of:	Current + following year		x	
rand / US dollar exchange rate to be at the end of:	Current + following year	x	x	x
average M3 money supply growth rate to be during the year:	Current + following year		x	
average salary and wage increase to be during the year:	Current + following year	x	x	x
average percentage utilisation of production capacity in the manufacturing sector to be during the year:	Current + following year		x	

Time horizon: The number of years ahead respondents have to provide their expectations for; x = question is asked for this group

After the first invitations were sent out in April 2000, we received several telephone calls and e-mails from business people requesting an Afrikaans translation of the questionnaire. Consequently we decided to make an Afrikaans version of the questionnaire available on the internet or by fax to those requesting one.

The questionnaires are mailed to participants three weeks before the date of completion. We also send out an e-mail reminding participants of the due date a week before the date of completion. Respondents have the choice to respond by either returning the questionnaire in the supplied pre-paid envelope or faxing it or completing it on the internet at the following internet address: www.ber.sun.ac.za/inflation.htm. The majority of respondents make use of the pre-paid envelopes. A large number also fax their responses, while a very small group make use of the internet.

3.3 PROCESSING THE RESULTS

Regarding the business, financial and labour surveys, the mean (average) for each question and forecast period is calculated. Each response has the same weighting. The minimum values, maximum values and standard deviations are calculated to assess how widely the values are dispersed from the average value.

Overall inflation expectations are taken as the average of the average expectations of each of the four individual societal groups (business, financial participants, labour and households). Each group has the same weighting.

Of these four groups, labour has the smallest number of responses. In the case of the labour survey, an outlier (i.e. a particularly low or high value that deviates completely from the average) can therefore have a big impact on this group's average and this in turn on the overall average. To handle such outliers, we laid down a set of maximum allowed standard deviations for each societal

Table 10 Maximum allowed standard deviations

	Forecast horizon		
	One year ahead	Two years ahead	Three years ahead
Financial	3,0	3,8	4,5
Business	6,0	7,5	9,0
Labour	1,5	1,9	2,3
Households	6,0	-	-

group and forecast year. When the standard deviation of a particular survey is above the guidelines, we replace the maximum and minimum value with the median and recalculate the average.

The maximum allowed standard deviations were calculated as follows. In the first trial run, the standard deviation for labour was 1,4 for the expected CPI inflation during 2000. Taking 1,5 as maximum allowed standard deviation for labour for forecasts of one year ahead, we have doubled the maximum allowed for the financial sector, as the number of responses is about double that of labour. The maximums for business and households are double that of the financial sector. The societal weightings are therefore: financial (0,5), business (1,0), labour (0,25) and households (1,0). To provide for the fact that the distribution of data becomes wider dispersed the longer the forecast horizon, we have weighted the years as follows: one year ahead (1,0), two years ahead (1,25) and three years ahead (1,50).

3.4 VALIDATING THE RESULTS

There is no objective benchmark for inflation expectations. Are current inflation expectations in South Africa 5% or 10%? The actual inflation rate is only to some extent a guideline for the level of inflation expectations, as inflation expectations and actual inflation can deviate a lot at times, especially when the central bank has not yet gained credibility shortly after the introduction of inflation targeting. Inflation expectations can also be derived from long-term bond yields, but expectations derived in this manner reflect the views of only financial market participants and at times say more about the inflation fighting credibility of the central bank than inflation expectations themselves (Wesso, 2000:73).

After applying the method spelt out above to collect and process the inflation expectations of the four societal groups in South Africa, we need to evaluate whether the results are credible. To judge the validity of the results, we will firstly compare the first set of final results with that of other surveys and secondly evaluate whether the results satisfy basic statistical requirements.

3.4.1 COMPARING THE RESULTS OF DIFFERENT SURVEYS

We can say with more certainty that the results are a fair reflection of inflation expectations in South Africa if they more or less agree with those of studies done independently

from this one. It becomes easy to gauge changes in inflation expectation after the level of expectations has been established.

The first set of final results refers to July 2000 and is summarised in Table 11.

Table 11 First final survey results: July 2000

	Headline CPI Inflation			CPIX Inflation		
	2000	2001	2002	2000	2001	2002
Finance	5,5	6,6	5,4	7,5	6,6	5,7
Business	6,8	7,0	7,2	7,6	7,7	7,8
Labour	6,3	6,3	5,8	7,1	7,0	6,7
Average above	6,2	6,6	6,1	7,4	7,1	6,7

Table 12 A comparison of the responses of people participating in both the April and July 2000 surveys

	Headline CPI Inflation			CPIX Inflation		
	2000	2001	2002	2000	2001	2002
April 2000						
Finance	5,2	6,4	5,1	7,5	6,5	5,7
Business	7,5	8,3	8,6	7,3	8,0	8,4
Labour	7,5	7,9	7,6	7,0	6,7	6,4
Average above	6,7	7,5	7,1	7,3	7,1	6,8
July 2000						
Finance	5,4	6,5	5,0	7,6	6,5	5,7
Business	5,4	6,5	7,2	7,7	7,8	8,0
Labour	6,3	6,3	5,8	7,1	7,0	6,7
Average above	5,7	6,4	6,0	7,5	7,1	6,8

A comparison of the responses of people participating in both the April and July surveys reveals that the change in the wording of the question did not influence the CPIX inflation results (see Table 12). Both the open-ended question of April and the July one with the historical data provided the same CPIX inflation results. However, business and labour lowered their expectations regarding CPI inflation in the July survey compared to the April one. This can partly be attributed to the change in the wording of the question. Given that respondents have not changed their views on CPIX inflation and the prime overdraft rate, to be consistent they should also not have changed their views on CPI inflation. In the case of business, finance and

labour, the provision of historical data in the wording of the question has not influenced the level of CPIX inflation expectations, but may have lowered the level of CPI inflation.

Table 13 Comparing results derived from the dedicated inflation survey panel and one stemming from the BER's regular business survey panel

	BER business surveys panel*	Inflation survey panel **	
	Feb/Mar 2000	April 2000	July 2000
2001			
Manufacturers	7,7	8,0	6,9
Wholesalers	7,7	8,8	7,2
Retailers	8,5	9,3	7,0
Average of above	8,0	8,7	7,0
2002			
Manufacturers	8,3	8,1	7,0
Wholesalers	8,2	9,7	7,4
Retailers	9,3	9,8	7,4
Average of above	8,6	9,2	7,3

* Question: What do you expect the CPI inflation rate to be for the year to March 2001/March 2002?
** Question: What do you expect the average headline inflation rate (as measured by the percentage change in the CPI) to be during the year 2001/2002? In the July survey the 5-year average and 1999s inflation rate was provided, but not in the April survey.

The first set of final results is in line with that of a survey done amongst participants to the BER's regular business surveys during February / March 2000 (see Table 13). One can say with more certainty that the results are a fair reflection of inflation expectations in South Africa since the results of two surveys based on different panels agree. The results of these different surveys are relatively close if cognisance is taken of the differences when the surveys were conducted and the wording of the questions.

3.4.2 STATISTICAL EVALUATION

Internationally the average (mean) is used as descriptive statistic to summarise inflation expectations. However, the average is only an appropriate descriptive statistic if measures of location (such as the median, mode, standard deviations and histograms) for that particular set of data supports the use of the average. In a set of values, the mode is the most frequently occurring value; the median is the middle value; and the mean is the average value. No single measure of central tendency (or location) provides a complete picture of the data. Suppose the

data is clustered in three areas: half around a single low value and half around two large values. Both average and median may return a value in the relatively empty middle and mode may return the dominant low value. Therefore it is important to also present the data as a histogram. A histogram graphically indicates the number of occurrences of a value in a data set. The single most –frequent score is the mode of the data.

Table 14 Descriptive and locational statistics of first final survey results: July 2000

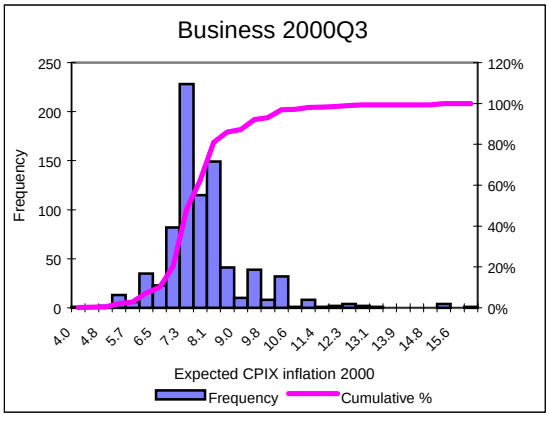
	Headline CPI Inflation			CPIX Inflation		
	2000	2001	2002	2000	2001	2002
Finance						
Count	24	24	22	24	24	22
Average	5,5	6,6	5,4	7,5	6,6	7,5
Standard deviation	0,6	1,1	1,2	0,5	0,8	1,0
Maximum	7,0	8,5	8,0	8,1	8,2	8,0
Minimum	4,4	4,8	3,5	6,0	5,4	4,2
Median	5,5	6,7	5,5	7,6	6,5	5,8
Mode	5,5	7,5	6,5	7,8	8,0	6,5
Business						
Count	825	676	648	809	662	636
Average	6,8	7,0	7,2	7,6	7,7	7,8
Standard deviation	1,5	1,8	2,3	1,3	1,6	2,2
Maximum	16	20	24	16	18	24
Minimum	2,2	1,2	0,5	4,0	3,0	2,5
Median	6,5	7,0	7,0	7,5	7,5	7,5
Mode	6,0	7,0	6,0	7,0	7,0	7,0
Labour						
Count	11	11	11	11	11	11
Average	6,3	6,3	5,8	7,1	7,0	6,7
Standard deviation	1,4	1,8	1,4	1,4	1,6	1,7
Maximum	9,5	11,0	9,0	9,6	9,0	9,5
Minimum	5,1	4,8	4,0	5,0	4,2	4,0
Median	6,0	6,5	5,8	7,2	7,3	6,9
Mode	5,1	4,8	4,5	5,0	4,0	4,2

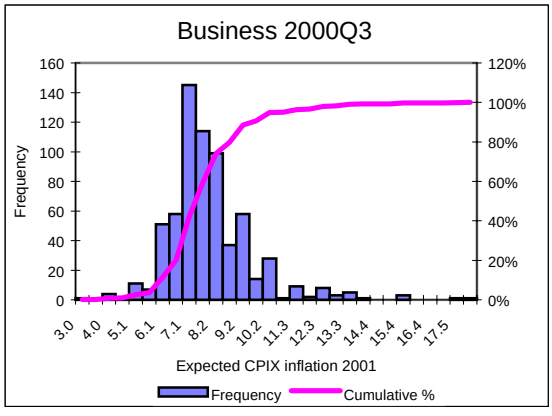
The deviation between the average, median[4] and mode[5] must be relatively small in order to use the average as descriptive statistic. A histogram must also indicate a normal distribution of the data. One would expect the distribution to become flatter as the forecast horizon lengthens. It is to be expected that the data will be more widely dispersed if participants have to provide their expectations three years hence compared to for the following year. Lastly, the standard deviations of the results must fall within the set borders (see Table 10).

We have concentrated our statistical evaluation on respondents' expectations of CPIX inflation, as the SA Reserve Bank specified this as its target. However, CPIX was not as widely known a measure of inflation as regular headline CPI inflation when the first survey was conducted during July 2000. This explains why fewer respondents were able to provide their expectations on CPIX inflation compared to headline CPI inflation. More respondents will form an expectation on CPIX inflation, as this measure of inflation becomes better known. Similarly, their expectations on CPIX inflation will also become more sophisticated in time.

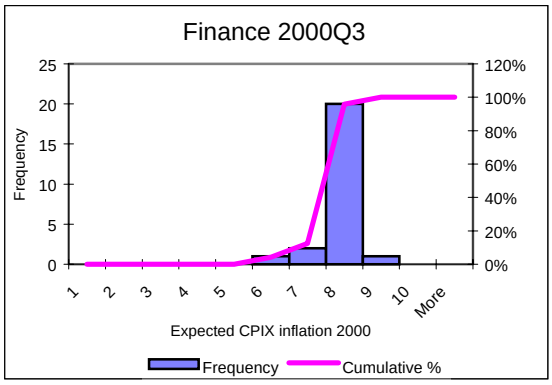
The numbers of responses per question vary, as some respondents left out questions or did not know the answer. Please note that all statistical calculations are based on only the actual responses. All "don't know" responses are ignored.

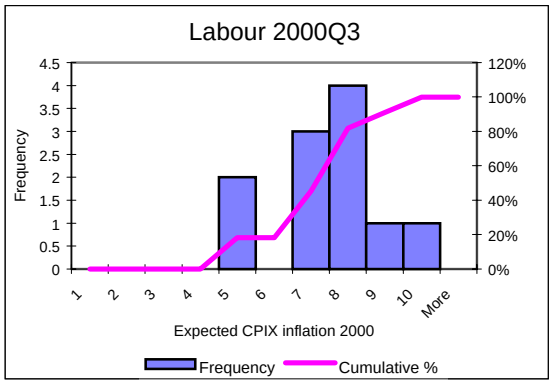
Table 14 reveals that the average is an appropriate descriptive statistic of expected CPI and CPIX inflation of business, finance and labour in South Africa, as the mean, median and mode vary by a small margin and the standard deviation falls within set borders. The histograms also reveal a normal distribution of data.





[4] The median is the number in the middle of a set of numbers, i.e. half of the numbers have values that are greater than the median and half have values that are less.
[5] The mode is the most frequently occurring, or repetitive, value in a range of data.





4 MEASURING HOUSEHOLDS' INFLATION EXPECTATIONS

4.1 SAMPLE

Postal surveys cannot be effectively used in South Africa to quiz households due to the high illiteracy rate. The unequal distribution of telephones also renders this means of survey undesirable in South Africa. Personal at-home interviews provide the best results. However, this technique also has its limitations, namely that it is rather expensive, a long time passes between the start of the field work and the release of the final results and it is often difficult to get access to people's houses. Regarding the latter, in the past certain areas could not be surveyed due to political turmoil. This problem largely disappeared after the 1994-elections, but it has become increasingly difficult to interview people in certain areas, as they do not want to speak to strangers due to security concerns. The time of day that the interviews takes place can have an impact on the results. For example, if the interviews only take place during the day, more unemployed and retired people will be included. The working population will only be at home during the evening.

AC Nielsen MRA, a Johannesburg based company specialising in market research, conducts the personal interviews. The BER has a long relationship with this institution and their work is above reproach. For every survey AC Nielsen MRA compiles an area-stratified probability sample of 2 500 households. The sample is drawn disproportionately by race and within race, proportionately within community size within province. Weighting is applied across and within a number of demographic cells in order to correct the sampling proportions to gross up to the population as a whole. The weighting is based on estimates of the population (universe) derived from AMPS.

Table 15 Composition of household sample vs. population – June 2000

	Household sample	Population according to AMPS
Black	44,1	61,0
Coloured	11,6	8,5
Indian	11,1	3,8
White	33,1	26,7
Total	100,0	100,0
R8000+	17,1	13,8
R4000-R7999	24,3	21,0
R800-R3999	45,2	47,6
R1-R799	13,4	17,6
Total	100,0	100,0
Metro	65,3	60,2
Other urban	34,7	39,8
Total	100,0	100,0
Up to primary school	15,7	19,0
Some high school	40,6	40,5
High school completed	29,8	27,7
Post matric / university	13,9	12,8
Total	100,0	100,0

Source: AC Nielsen MRA

The samples cover blacks and whites in metropolitan areas, cities, towns and villages throughout South Africa. Coloured and Indian coverage include the major metropolitan areas. Half of the sample is male and half female. The total coverage represents 92% of the urban adult population and 53% of the total adult population. The representativeness of their samples has been verified.

To ensure credibility, the address and informant within each household is selected at random. Fixed rules apply for call-backs and substitution. A trained, experienced fieldworker uses a structured questionnaire and conducts the interview in the home language of the respondent. A minimum 20% validation check is carried out personally or telephonically on the work of each interviewer.

The details of the June 2000 household sample are set out in Table 15.

4.2 QUESTION

One cannot directly ask households what they expect inflation to be, as few would know what you are asking. In other countries, households' expectations on price increases are therefore quizzed.

We have considered using the questions of the Survey Research Centre at the University of Michigan at Ann Arbor or the Conference Board in New York.

> Survey Research Centre: "By about what percent do you expect prices to go up / down on the average during the next 12 months?"
>
> Conference Board: By how much do you expect prices in general to rise in 2001?

☐ 0%	☐ 5-6%	☐ 11-12%
☐ 1-2%	☐ 7-8%	☐ 13-14%
☐ 3-4%	☐ 9-10%	☐ 15%+

MRA/ AC Nielsen recommended using an open-ended question. In the first trial run in January / February 2000, we used the following question: "By what percentage do you expect prices in general to rise on average during the next 12 months?" However, these results pointed out a number of problems (see section 4.3 below). We therefore decided to supply historic information in the question.

Table 16 Example of timing of surveys

	Q3	Q4	Q1	Q2
Household survey				
Question refers to	2000	2000	2001	2001
Fieldwork starts	Jun 2000	Sep 2000	Nov 2000	Mar 2001
Results available at end of	Jul 2000	Oct 2000	Jan 2001	Apr 2001
Other surveys *				
Conducted during 2nd half of	Jul 2000	Oct 2000	Jan 2001	Apr 2001
Questions refer to **	2000 & 2001	2000 & 2001	2001 & 2002	2001 & 2002
All results available for MPC meeting in middle	Aug 2000	Nov 2000	Feb 2001	May 2001

* Survey amongst business people, financial market participants and representatives of labour and employers.
** In the case of CPI and CPIX, the data refers to the current and next two years.

In the second trial run in June 2000, we used the following wording: "Over the past five years prices increased by on average 7% per year. Last year prices increased by 5%. By about how much do you expect prices in general to increase in 2000?"

It is important to take note of the 2-month time lag between the start of the fieldwork and the final release of the results. To make provision for this time lag, we apply the time schedule set out in Table 16.

4.3 PROCESSING THE RESULTS

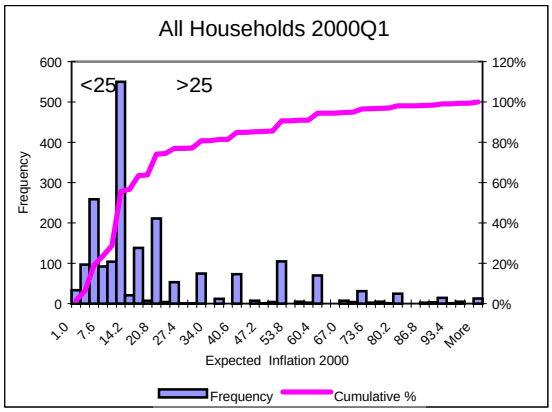
In the first trial run in January/February 2000, we tested an open-ended question, namely: "By what percentage do you expect prices in general to rise on average during the next 12 months?" Excluding the "don't know" responses, the average inflation expectation of households was 22% (see Table 17). However, the data did not have a normal distribution, but had a long tail to the right (see histograms below). The median of households' expectations was 10%, i.e. half of the respondents expected inflation rates higher than 10% and half expected rates lower than 10%. The modus was 10%, in other words, the inflation rate expected by the largest majority of respondents was 10%. About 23% of respondents expected an inflation rate of 10%. An inflation rate of 5% was the second most frequent expectation. Twelve percent of respondents expected an inflation rate of 5%. The average (mean), modus and median are about the same in the case of a normal distribution of data. However, in this case most of the data is dispersed around 10%, but the maximum goes up to 100%. Consequently the average is significantly higher than the median. The average is therefore not an appropriate descriptive statistic of this data.

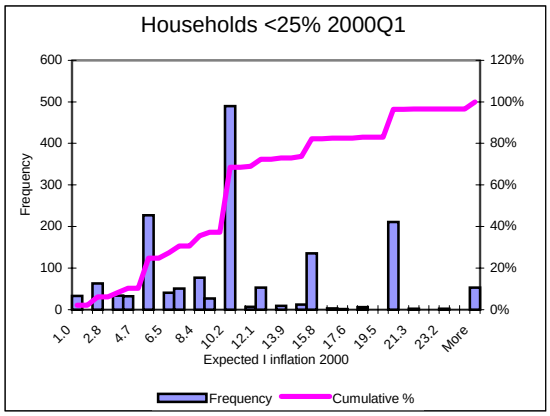
Table 17 Descriptive and locational statistics of first trial run: Jan/Feb 2000*

Count	2469
Average	22,0
Standard deviation	22,2
Maximum	100
Minimum	1
Median	10
Mode	10

* All respondents excluding "don't know" responses.

However, it is important to be able to calculate average household expectations. We cannot use the median as descriptive statistic in the case of households and average in the case of business, finance and labour if we want to calculate an overall average inflation expectation for South Africa.





We have considered other options to enable us to calculate average household inflation expectations[6].

- Trimmed averages did not deliver better results. For example, the 5%-trimmed average amounted to 19,1%. To calculate a 5%-trimmed average, the data was sorted from the lowest to the highest value and the bottom and top 5% of the values were discarded. The 10%-trimmed average amounted to 15,8%, 15%-trimmed average to 15,2% and the 20%-trimmed average to 14,1%.
- Another possibility was to only make use of the bottom 75% of the data. Seventy five per cent of respondents expected inflation rates of 25% and less. The average of the bottom 75% of the values amounted to 10,3%.
- Another possibility would have been to stratify the data according to some criteria, such as taking into account only the expectations of people with certain income levels, education levels, age, whether they have access to a TV or where they live. The inflation expectations (calculated as the average excluding the "don't know" responses) of people with higher incomes and education levels were generally lower than those of people at the other end of the spectrum, but even their expectations were still significantly higher than the officially measured CPI inflation rate (see Table 18). One would expect people having access to a TV and those who watch a lot of TV (i.e. more than 3 hours per day) to be better informed about inflation and their expectations to therefore be lower. However, the first set of results does not support this hypothesis. The inflation expectations of people living in metro areas are slightly lower compared to those living in other urban areas. There is no difference in the inflation expectations of different age groups. Excluding certain groups of people would have been controversial, as the results would not have been representative of the population as a whole. Furthermore, one also would not want to exclude the low income

[6] Prof. Willie Conradie of the Department of Statistics, University of Stellenbosch, provided valuable inputs.

group, as studies done in the USA revealed a higher correlation between low income earners' inflation expectations and the officially measured rate compared to that of the high income earners and the official rate.

Table 18 Inflation expectations for different stratifications of households – Trial run Jan/Feb 2000

	Average excl. "don't know"		Average excl. "don't know"
Race		Community size	
Blacks	26,4	Metro	17,0
Coloureds	16,5	Other urban	20,0
Indians	15,4	Access to TV	
Whites	14,3	Yes	17,6
Monthly Household Income		No	21,8
R8000+	12,6	TV Viewing	
R4000-R7999	17,3	Light	16,3
R800-R3999	25,4	Medium	18,4
R1-R799	25,9	Heavy	18,9
Age		Education	
16-24	22,9	Up to primary school	20,0
25-34	21,6	Some high school	19,9
35-49	20,9	High school completed	17,7
50+	22,8	Post matric / university	12,8

Given the low levels of literacy in South Africa in general and economic literacy in particular, households' unsophisticated view of inflation is to be expected. The results of the first trial run reveal that many respondents have chosen round numbers, such as 5%, 10%, 15%, 20%, 50% and 100%. We therefore had to find another way to measure the level of inflation expectations. Households, even more so than people in business, finance and labour, most likely do not quantify their price expectations. Many people just do not have a clue as to what the rate of increase in prices is. Consequently we rephrased the wording of the question for the second trial run. As in the surveys in the business, financial and labour sectors we provided historic data in the question. The wording of the question used in the second trial run was as follows: "Over the past five years prices increased by on average 7% per year. Last year prices increased by 5%. By about how much do you expect prices in general to increase in 2000?"

In the second trial run (that eventually became the first final run), we only took values of up to and including 25% into account and disregarded all "don't know" responses. Only 2,6% of the values exceeded 25% and therefore had to be discarded. The average amounted to 7,5%.

4.4 VALIDATING THE RESULTS

As in the case of business, finance and labour, there is no benchmark for the level of households' inflation expectations. The officially measured inflation rate is not a good benchmark, as expectations may be higher. Based on our contact with the public, we know on the one hand that many people believe inflation is in actual fact higher than the one officially measured. We need to measure these expectations, as households base their decisions on these beliefs irrespective of their relatively unsophisticated formation. On the other hand, just any figure is not acceptable. The first trial run reveals that many people are just picking a round number at random. Ideally we need to discard these responses, but how can we identify them. How can we identify a respondent that really expects prices to increase by 50% and one who randomly guessed 50%? To overcome this problem, we have taken the following steps: Firstly, we changed the wording of the question. We provided historical figures. Secondly, we decided to only take into account answers up to and including 25%.

Table 19 A comparison between the response rates and averages of the Jan/Feb and June surveys

	No of respondents	% of respondents	Average expected inflation
Jan/Feb 2000 *			
Total	2469	100,0	18,2
Excl "don't know"	2038	82,5	22,0
Excl "don't know" and responses >25%	1569	63,5	10,5
June 2000			
Total	2456	100,0	7,2
Excl "don't know"	2020	82,2	8,9
Excl "don't know" and responses >25%	1957	79,7	7,5

* No historical data provided in the wording of the question.

The first measure reduced inflation expectations across the board. The percentage of responses above 25% declined significantly from 19% to 2,6%, whilst the share of "don't

know" responses remained about the same (17,5% compared to 17,8%). The addition of historical figures in the wording of the question therefore did influence the measured level of inflation expectation.

Table 20 A comparison between the Jan/Feb and June 2000 results for different stratifications of households

	Average excl. "don't know" and >25%			Average excl. "don't know" and >25%	
	Jan/ Feb	June		Jan/ Feb	June
Race			Community size		
Blacks	10,2	6,4	Metro	10,2	7,5
Coloureds	10,1	7,4	Other urban	10,9	7,3
Indians	11,0	9,2	Access to TV		
Whites	10,8	9,1	Yes	10,4	7,6
Monthly Income *			No	10,8	6,3
R8000+	10,2	9,5	TV Viewing		
R4000-R7999	10,3	7,9	Light	10,3	6,9
R800-R3999	10,6	6,8	Medium	10,1	7,8
R1-R799	10,7	6,3	Heavy	10,7	7,4
Age			Education		
16-24	9,9	7,0	Up to primary school	11,0	6,4
25-34	10,2	7,2	Some high school	10,9	7,1
35-49	10,7	7,7	High school completed	9,9	8,0
50+	11,2	8,0	Post matric / university	10,2	8,2

* Monthly household income

The level of inflation also declined for the respective stratifications of the population (see Table 20). The historical figures lowered the expectations of especially blacks, low-income earners (R1-R799), younger people (16-24 years of age) and those with little formal education. The percentage of responses exceeding 25% declined relatively more in the case of these groups. For instance, in the Jan/Feb survey 29,4% of blacks expected inflation to exceed 25% compared to 3,1% in June. The corresponding figures for whites were 7,9% and 2,5%. Similarly, in the case of low-income earners, the percentage dropped from 27,1% to 3,7%. In the case of high-income earners it declined from 4,7% to 2,9%. Furthermore, it is interesting to note that the inflation expectations of whites, higher income earners, older people and the better educated are slightly higher compared to those of people on the other end of the spectrum.

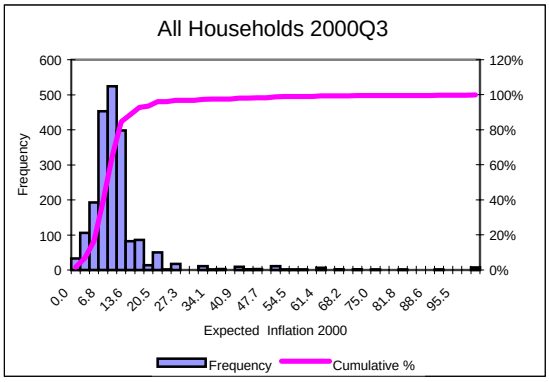
The June results satisfy basic statistical requirements. The mean, median and mode of the results excluding "don't know" and responses exceeding 25% are close to one another. The standard deviation falls within the set borders.

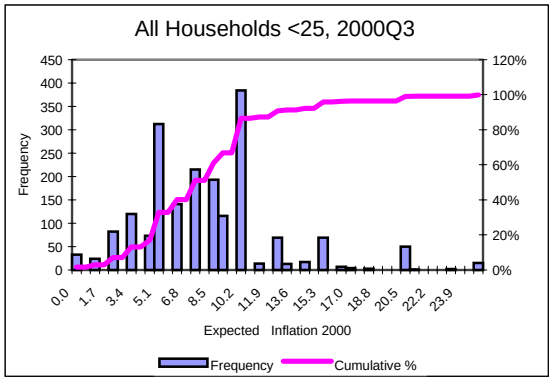
The histograms below indicate that the majority of responses are less than 26% and that the distribution of results excluding "don't know" and responses exceeding 25 approaches a normal one.

Table 21 Descriptive and locational statistics of first final results: June 2000 *

Count	2456
Average	7,5
Standard deviation	4,2
Maximum	100
Minimum	0
Median	7
Mode	10

* All respondents excluding "don't know" responses and expectations exceeding 25%.





5 MEASURING OVERALL INFLATION EXPECTATIONS

The survey results obtained by way of the manner set out above, allow us to calculate two measures of overall inflation expectations. Firstly, overall inflation expectations can be calculated as the unweighted average of the respective average expectations for CPI and CPIX inflation for the current and subsequent two years of business, labour and finance. Secondly, overall inflation expectations can also be calculated as the unweighted average of the respective average expectations for CPI inflation for the current year of households, business, labour and finance. In this case, the price expectations of households are taken to agree with the CPI inflation forecasts of business, labour and finance.

Table 22 Inflation expectations – 3rd Quarter 2000

	Headline CPI inflation			CPIX inflation		
	2000	2001	2002	2000	2001	2002
Finance	5,5	6,6	5,4	7,5	6,6	5,7
Business	6,8	7,0	7,2	7,6	7,7	7,8
Labour	6,3	6,3	5,8	7,1	7,0	6,7
Average above	6,2	6,6	6,1	7,4	7,1	6,7
Households	7,5	-	-	-	-	-
Grand average	6,5	-	-	-	-	-

6 THE WAY FORWARD

Maintaining a high response rate is crucial to maintain credibility. Many respondents in the business, labour and financial sector will be more likely to continue participating if the results are quoted in the media and the SA Reserve Bank makes use of it in its analysis of inflationary conditions. It is therefore important that the survey results gain a high profile. It may become necessary to recruit new participants after some time when the response rate declines to below 50%. It will be interesting to investigate whether the expectations of these new recruits deviate from those of the existing ones. Such an examination may reveal whether the summary of survey results sent to all respondents influence their expectations and whether people participating regularly change their expectations as they become more aware of inflation compared to people that do not participate. Another research topic will be to compare the inflationary expectations of say retailers, manufacturers and service providers.

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