

Inflation and Inflation Expectations in South Africa: The observed absence of second round effects

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1. Introduction

1.1 Inflation targets and supply side shocks- conventional or not so conventional wisdom

The issue of how best to deal with a supply side shock to prices has long concerned central banks, especially those formally committed to inflation targets. Bernanke and Mishkin, highly authoritative and influential on the theory and practice of inflation targeting, were well aware of the issues posed by significant supply side shocks and how they might best be managed. In their seminal review of inflation targeting, Bernanke and Mishkin were strongly of the view that inflation targeting was not a rule to be followed regardless of economic circumstances but allowed the central bank "constrained discretion" (Bernanke and Mishkin 1997). This restraint in setting interest rates would be particularly appropriate when supply side shocks threaten the targeted inflation band and weaken the growth outlook. They wrote as follows:

[...] Aggregate supply shocks, such as oil price shocks, present a thornier policy problem. If a severe supply shock hits the economy, keeping medium-term inflation close to the long-run target could well be very costly in terms of lost output. However, in practice, a well-implemented inflation-targeting regime need not strongly constrain the ability of the monetary authorities to respond to a supply shock. Remember, the inflation target itself can be and typically is defined to exclude at least the first-round effects of some important supply shocks, such as changes in the prices of food and energy or in value-added taxes; the use of target ranges for inflation gives additional flexibility.

[...] Relative to a purely discretionary approach, the inflation-targeting framework should give the central bank a better chance of convincing the public that the consequences of the supply shock are only a one-time rise in the price level, rather than a permanent increase in inflation (Bernanke and Mishkin 1997).

Such advice would seem unexceptional except for the difficulty some central bankers appear to have had in following it. Their arguments for reacting to higher prices, whatever their cause, with higher interest rates, are based on their fear of so called second round effects of inflation. By this it is meant that higher

prices raise expectations of more inflation to come by businesses and trade unions with price and wage setting powers. They then, it is argued, would raise prices and wages in expectation of more inflation and by so doing, cause more inflation.

According to this view, inflationary expectations can become self fulfilling and so dangerous to the long term health of the economy. This obliges the central bank to resist not only inflation, whatever its underlying cause, excess demands or reduced supplies, but also inflationary expectations with tighter monetary policy almost regardless of the economic circumstances and the potential loss of output their higher interest rates may impose.

Therefore many central banks pay close attention to expectations of inflation. The SA Reserve after the implementation of inflation targeting in 2000 commissioned the Bureau of Economic Research (BER) at the University of Stellenbosch to survey the expectations of inflation held by business, trade unions and participants in financial markets, (Kershoff 2000). The Governor of the Reserve Bank, Mr. T.T. Mboweni paid particular attention to these inflationary expectations.

To quote the Governor:

Although there are no clear signs of second-round effects, the longer the upward trend and volatility of oil prices persist, the more likely the price increases will continue to impact on expectations and feed through to other prices. Monetary policy has to remain vigilant in anticipating such developments.

[...]The latest inflation expectations survey conducted by the Bureau for Economic Research at the University of Stellenbosch indicates that there has been a marginal deterioration in inflation expectations which may be a result of the impact of the higher petrol price [...] If the deterioration in inflation expectations were to continue, it would be a cause for concern given the critical role of expectations in the price and wage formation process (Mboweni 2005).

On another occasion he was reported as follows

Of great concern is the significant deterioration of inflation expectations, which will give further impetus to these inflationary pressures. Over the past year inflation expectations have drifted upwards gradually, but nevertheless appeared to remain anchored within the inflation target range. This picture has changed significantly in the first quarter of this year. We have now observed the biggest increase in inflation expectations since the inception of the inflation expectations survey eight years ago. Reference here is made to the BER inflation expectations survey conducted on behalf of the South African Reserve Bank (SARB). This, together with the possible upward trend in unit labour costs, does not bode well for the inflation outlook going forward (Mboweni 2008).

2. Measuring second round effects on inflation- the evidence

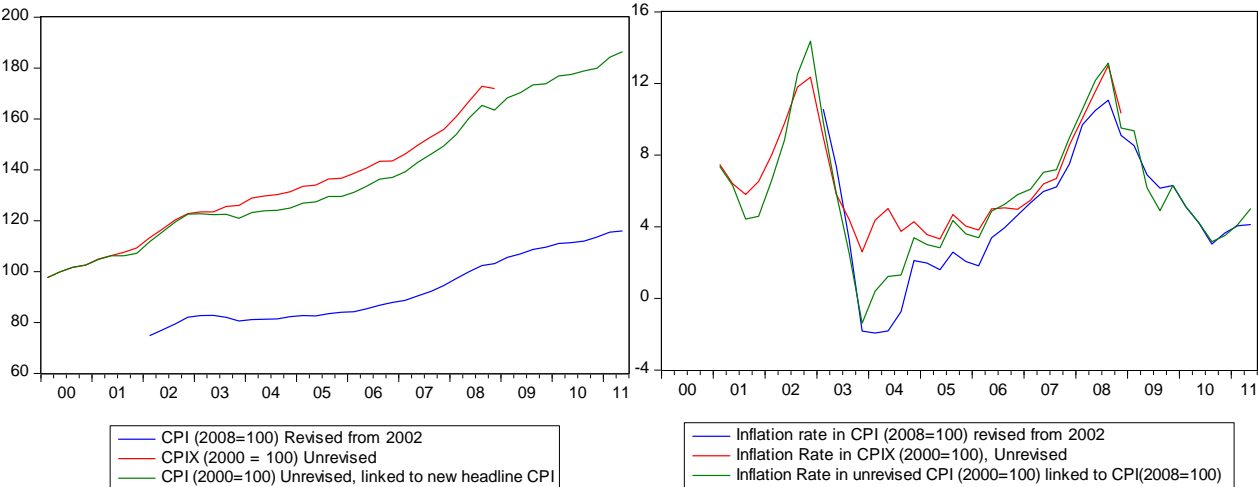
A number of researchers have made attempts to model inflation in South Africa, see for example (Aron and Muellbauer 2004, 2009). It should be clear that the purpose of our paper is much less ambitious. It does not attempt to find a full explanation of inflation in South Africa. Its purpose is to test the relationship between inflation expectations, as measured, on inflation itself, that is test the relevance of the second

round effects of inflationary expectations on inflation. The quarterly surveys of inflation expected, as conducted by the Bureau for Economic Research (BER), published by the S.A. Reserve Bank in their Quarterly Bulletins are utilised to test the proposition that inflation expectations and also *changes* in inflation expected in SA have influenced inflation itself.

There are a few issues to bear in mind when interpreting the analysis. It should be recognised that the South African Consumer Price Index (CPI) has been rebased and reweighted over the period (2003- 2011) under observation. In order to measure the effect of observed inflation on inflation expectations, we have regarded the actual *published* CPI numbers at the time to be important for informing expectations rather than the inflation rates generated ex-post from the revised and presumably improved measures of the CPI that now constitute the published CPI, with the appropriate conversion factors applied to earlier periods to establish the historic record. Therefore to allow for the differences between headline inflation, as once announced and the revised inflation rates that now constitute the historic time series, we have chosen to use in the analysis the two measures of consumer prices that formed the basis for the announcements of Headline Inflation over the time period observed, that is the full CPI (2000=100) and CPIX (2000=100). that is the CPI excluding the weight for mortgage interest rates included in the broader measure of the CPI of the time.. However, in terms of measuring the effect of inflation expectations on realized inflation, we have utilised the revised measure of inflation to represent “true” inflation as it evolved over the period under observation. We use the new Headline CPI (2008=100) for this purpose. For an account of the changes made to the CPI Series see Statistics South Africa (2009a) as well as Statistics South Africa (2009b) for the conversion factor used to link the CPI (2000=100) to the CPI (2008=100).

Figure 1 below displays the three different consumer price indexes (left) and their inflation rates (right). As may be seen CPIX inflation was higher during the period 2003-2005 when mortgage interest rates fell significantly and CPIX excluded any estimate of owners equivalent rent now included in the rebased CPI.

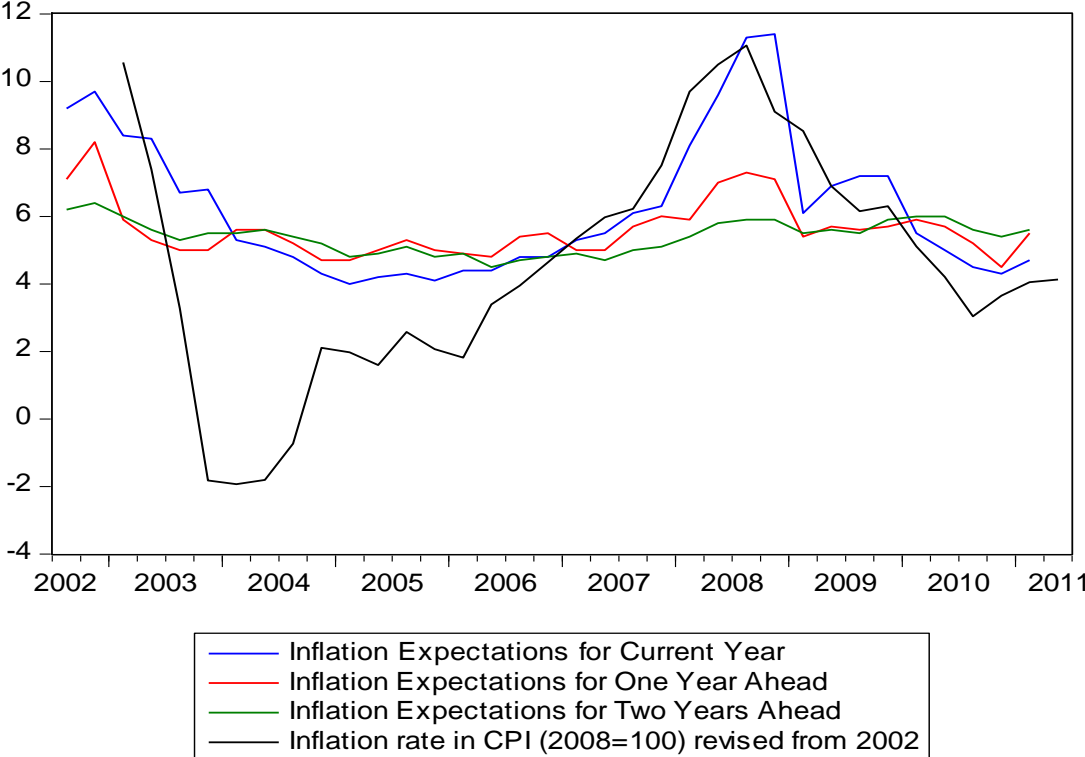
Figure 1: Consumer prices (left) and consumer price inflation (right), as measured by the CPI (2000=100), CPIX (2000=100) and CPI (2008=100).



Sources: Stats SA and the SA Reserve Bank

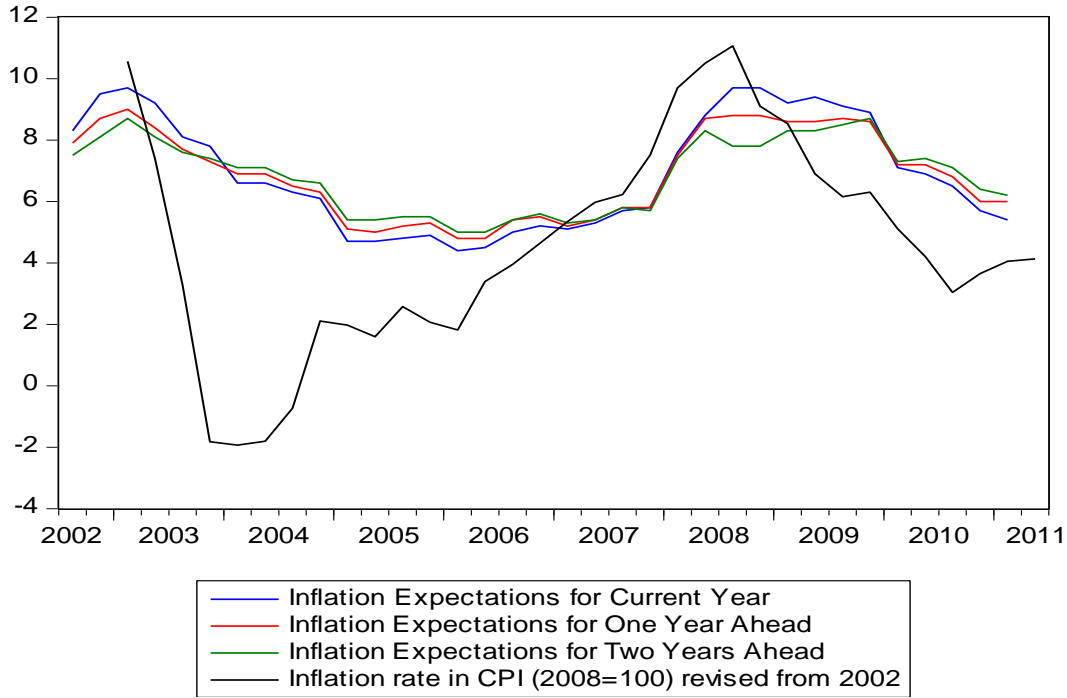
The figures below show the expectations of inflation for the current year (left) and two years ahead (right), as surveyed by the BER of the financial, trades union and business sectors respectively since 2003. Notice that the current-year expectations refer to the respondents' expectations of inflation rates for the respective calendar year during which the survey was conducted (Kershoff 2000). The expectations are plotted with the recorded actual year on year inflation in the respective quarters. Headline inflation is measured conventionally as the year on year percentage change in the CPI.

Figure 2: Expectations of inflation in the Financial Sector plotted with inflation in CPI (2008=100)



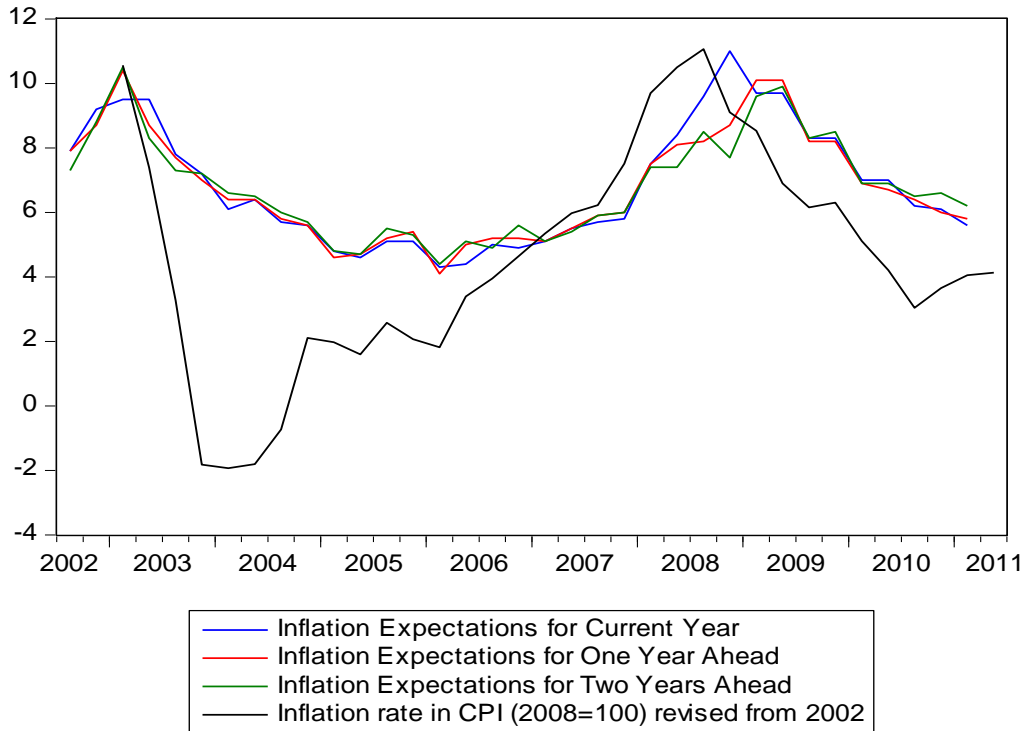
Sources: Stats SA and the SA Reserve Bank

Figure 3: Expectations of inflation in the Business Sector plotted with inflation in CPI (2008=100)



Sources: Stats SA and the SA Reserve Bank

Figure 4: Expectations of inflation in the Business Sector plotted with inflation in CPI (2008=100)



Sources: Stats SA and the SA Reserve Bank

Upon inspection one can immediately notice the tendency of inflation expectations to follow realized inflation with a lag and with markedly less volatility. As may be seen, trade unions display the most "naive" behavior as their expectations of inflation follow current inflation rates quite closely. The financial sector is almost unaffected by the observed inflation rates and appear to have extremely stable inflation expectations for one and two years ahead. Expectations for the current year refer to the calendar year during which the survey is taken. Hence, this measure will always be highly correlated with observed inflation, as the respondents in the fourth quarter will have information on actual inflation rates for the two first quarters of the calendar year.

Table 1 below provides a brief summary of statistics on the different measures of inflation as well as the average inflation expectations across the different sectors. We notice that the three different measures of inflation display fairly similar characteristics, while the inflation expected in general displays considerably less volatility and a much narrower span between the maximum and minimum values. We also notice that the mean of inflation expected is consistently higher than the mean of actual inflation (and in fact above the SARB's target range of 3-6 %).

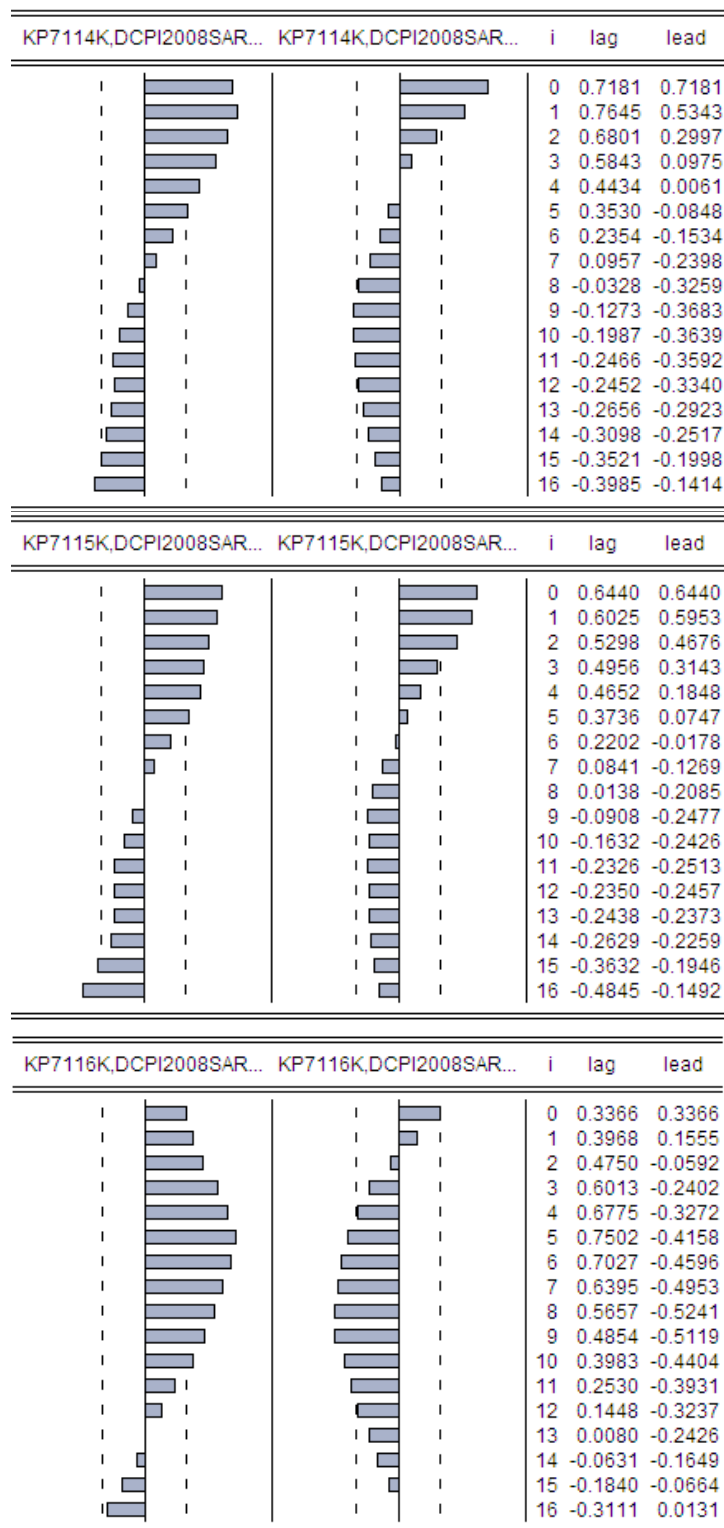
Table 1: Summary Statistics

	CPIX (2000=100) Inflation	CPI (2000=100) Inflation	CPI (2008=100) Inflation	Avg. Current Year Expectations	Avg. One Year Ahead Expectations	Avg. Two Years Ahead Expectations
Mean	5.54	5.83	4.60	6.67	6.41	6.353
Std. Dev.	3.17	3.71	3.51	1.85	1.22	1.03
Max	13.02	14.37	11.06	10.7	8.60	8.4
Min	2.61	-1.39	-1.93	4.4	4.60	4.8

2.1 Cross Correlations of Inflation and Inflation Expected

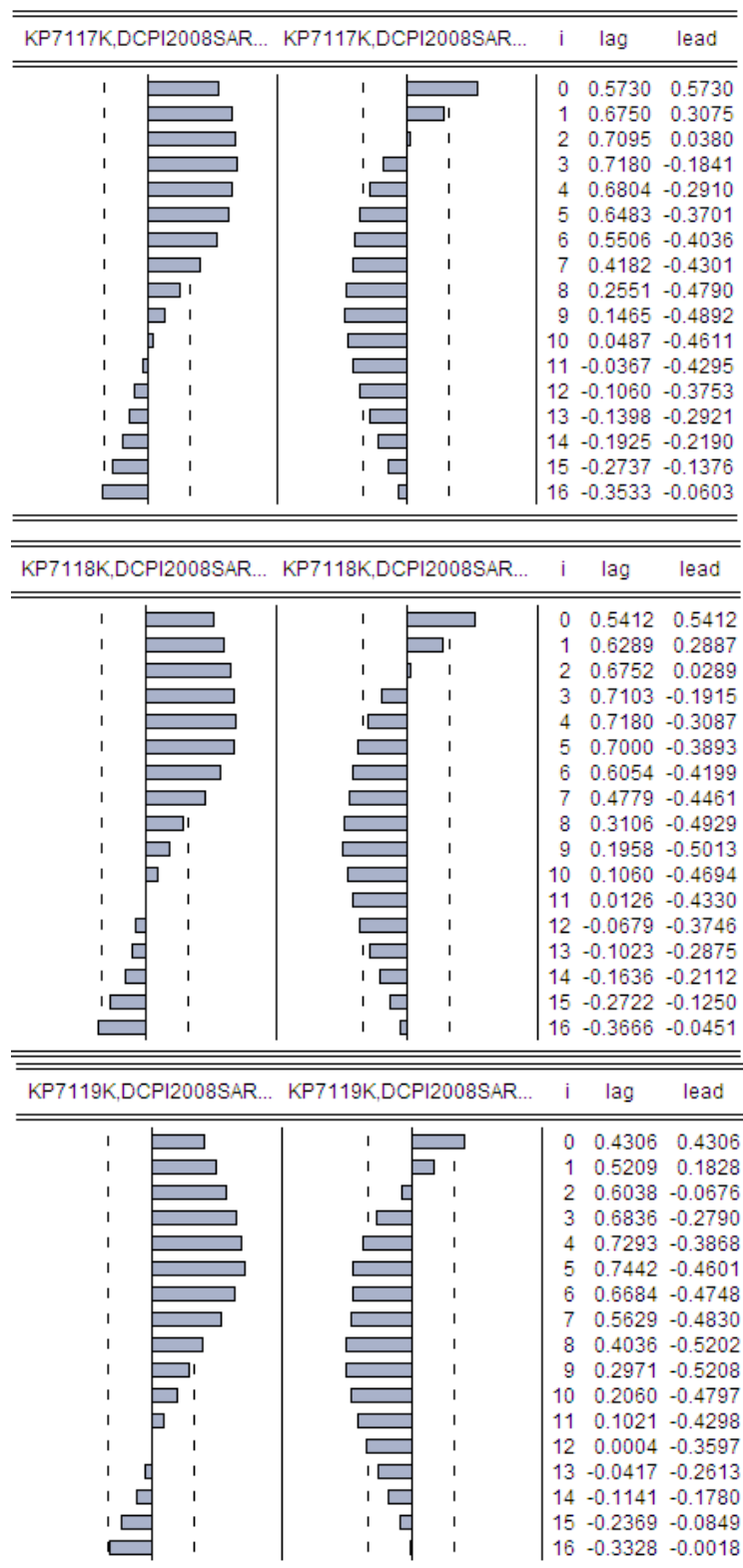
In the figures below we present the cross correlations between quarterly leads and lags of inflation and inflation expectations for the current year, one year ahead and two years ahead in each of the three sectors surveyed by the BER. It is clear that in all cases there are relatively strong positive correlations between inflation (lagged) and expected inflation that follows. As may also be seen when inflation expected is treated as the lagging variable, the correlations between current expectations of inflation and inflation that follows are much weaker and soon turn negative (typically after 3 quarters and sometimes only after two quarters).

Figure 5: Cross Correlations of inflation (CPI 2008=100) and inflation expectations in current year (KP7114K) (top), one year ahead (KP7115K) (middle) and two years ahead (KP7116K) (bottom) in the Financial Sector



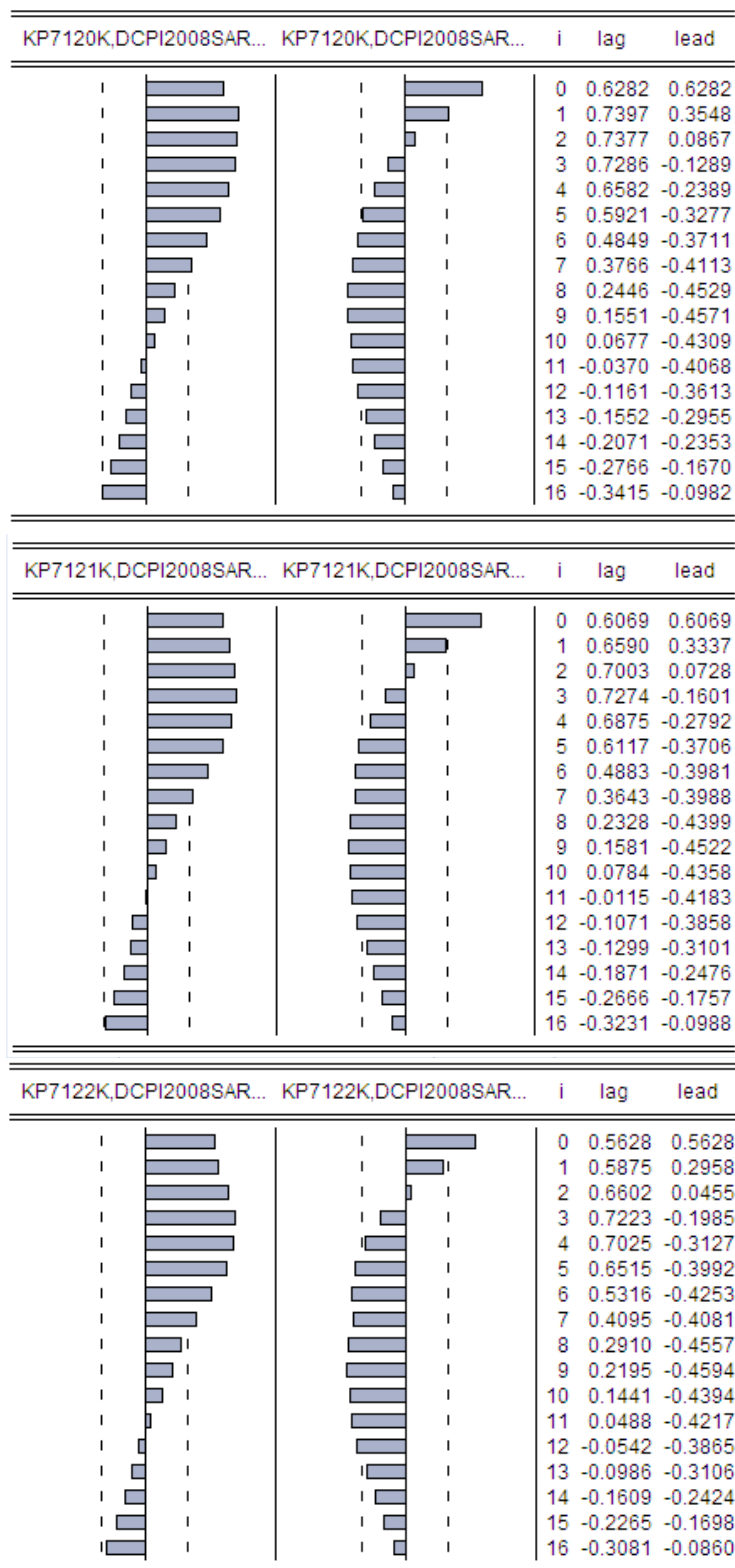
Source: The SA Reserve Bank

Figure 6: Cross Correlogram of inflation and inflation expectations in current year (KP7117K) (top), one year ahead (KP7118K) (middle) and two years ahead (KP7119K) (bottom) by business representatives



Source: The SA Reserve Bank

Figure 7: Cross Correlogram of inflation and inflation expectations in current year (KP7120K) (top), one year ahead (KP7121K) (middle) and two years ahead (KP7122K) (bottom) in Trade Unions



Source: The SA Reserve Bank

It has been shown that inflation expected displays a negative rather than a positive correlation with inflation that follows after four quarters. In some cases the relationship turns negative after only two quarters. In other words, currently high expectations of inflation are associated with subsequently lower not higher inflation. Inflation expectations in trade unions and the business sector show a particularly strong positive correlation with *lagged* inflation but also a stronger *negative* correlation of inflation expected with subsequent inflation. These statistical regularities indicate how unsuitable inflation expectations have been as an indicator of inflation to come. They suggest that higher inflation rates in South Africa have indeed been a highly temporary response to supply side shocks that did not call for interest rate responses by the Reserve Bank.

2.1 Estimating the relationship between inflation and inflation expected

The question of the causal direction between inflation and expectations cannot perhaps be answered by looking at the cross correlations alone. We therefore estimated two different models on 27 different combinations of data (measures of expectations explained by measures of inflation, and the other way around) that are summarized in *Table 2, 3 and 4* below. In Models 1-9 we have estimated the effect of CPIX (2000=100) inflation on changes in inflation expectations, while in Models 10-18 we have estimated the effect of a change in CPI (2000=100) inflation on a change in inflation expectations. Following the model estimations, we have performed a Granger causality test on each measure of inflation expectations with each measure of inflation; CPI(2000=100), CPI(2008=100) and CPIX(2000=100).

All regressions are conducted on the differences in inflation and expectations to avoid spurious regressions, as we could not reject a unit root in headline inflation or inflation expected. The first eight regressions explain quarterly *changes* in expectations of inflation with quarterly *changes* in year on year inflation as measured by the unrevised CPIX (2000=100) and by the unrevised CPI (2000=100) linked to the new headline CPI (2008-100) after 2008. We found that for most measures of expectations there is a statistically significant positive coefficient for inflation lagged by one or two quarters. These coefficients are typically between 0.2 and 0.3, which indicates that inflation expectations are in fact shaped by lagged inflation, but only to a modest degree.

Table 2: Change in expectations explained by change in inflation (CPIX 2000=100)

Sector	FINANCIAL SECTOR			BUSINESS REPRESENTATIVES			TRADE UNIONS		
	2002Q4 to 2011Q1			2002Q4 to 2011Q1			2002Q4 to 2011Q1		
Model:	1	2	3	4	5	6	7	8	9
Explained Variable:	Exp 0	Exp 1	Exp 2	Exp 0	Exp 1	Exp 2	Exp 0	Exp 1	Exp 2
C	0.049	0.024	-0.009	-0.067	-0.068	-0.080	-0.020	-0.083	-0.118
<i>P-Value</i>	0.679	0.745	0.860	0.569	0.532	0.509	0.859	0.489	0.362
Δ Inflation CPIX	0.26**	0.25***	0.071	0.242**	0.255**	0.194	0.117	0.211*	0.305**
<i>P-Value</i>	0.039	0.002	0.162	0.045	0.024	0.109	0.286	0.080	0.023
Δ Inflation CPIX (-1)	0.297**	0.019	0.032	0.268**	0.201*	0.146	0.43***	0.261**	0.172
<i>P-Value</i>	0.014	0.775	0.499	0.022	0.054	0.194	0.001	0.026	0.154
Δ Inflation CPIX (-2)	0.142	0.064	0.043	0.091	0.049	0.028	0.012	-0.039	-0.039
<i>P-Value</i>	0.171	0.306	0.325	0.366	0.596	0.785	0.897	0.696	0.722
Δ Inflation CPIX (-3)	-0.031	-0.2***	-0.071	-0.024	-0.074	-0.079	0.135	0.071	0.026
<i>P-Value</i>	0.766	0.008	0.123	0.812	0.429	0.451	0.174	0.489	0.815
Δ Inflation CPIX (-4)	0.219**	0.156**	0.031	0.139	0.132	0.100	0.051	0.074	0.047
<i>P-Value</i>	0.046	0.023	0.483	0.182	0.170	0.343	0.598	0.473	0.675

*Significant at the 10% level, ** Significant at the 5% level, *** Significant at the 1% level

Table 3: Change in expectations explained by change in inflation (CPI 2000=100)

Sector	FINANCIAL SECTOR			BUSINESS REPRESENTATIVES			TRADE UNIONS		
	2002Q4 to 2011Q1			2002Q4 to 2011Q1			2002Q4 to 2011Q1		
Model:	10	11	12	13	14	15	16	17	18
Explained Variable:	Exp 0	Exp 1	Exp 2	Exp 0	Exp 1	Exp 2	Exp 0	Exp 1	Exp 2
C	-0.056	-0.003	-0.003	-0.060	-0.043	-0.041	-0.043	-0.032	-0.026
<i>P-Value</i>	0.792	0.976	0.947	0.624	0.688	0.705	0.720	0.787	0.845
Δ Inflation CPI	0.049	0.092	0.023	0.113	0.138	0.115	0.055	0.150	0.215*
<i>P-Value</i>	0.774	0.229	0.532	0.251	0.114	0.188	0.570	0.126	0.051
Δ Inflation CPI (-1)	0.4***	0.124**	0.039	0.109	0.044	-0.031	0.26***	0.046	-0.053
<i>P-Value</i>	0.005	0.043	0.179	0.161	0.512	0.643	0.002	0.540	0.526
Δ Inflation CPI (-2)	-0.055	-0.071	-0.016	0.037	0.018	0.022	0.003	-0.013	-0.011
<i>P-Value</i>	0.663	0.209	0.550	0.610	0.782	0.731	0.967	0.859	0.889
Δ Inflation CPI (-3)	-0.044	-0.074	-0.024	0.052	0.016	0.030	0.096	0.163**	0.143*
<i>P-Value</i>	0.723	0.184	0.368	0.464	0.791	0.628	0.179	0.026	0.072
Δ Inflation CPI (-4)	0.057	0.047	0.000	0.055	0.058	0.038	0.006	0.035	0.051
<i>P-Value</i>	0.667	0.423	0.998	0.472	0.384	0.572	0.941	0.638	0.538

*Significant at the 10% level, ** Significant at the 5% level, *** Significant at the 1% level

The remaining 9 models (Models 19 – 27 in Table 4, below) estimate the reverse relationship: that is changes in inflation measured by the new headline CPI (2008=100) revised to 2002 as the dependent variable explained by changes in inflation expectations. Interestingly, we find most lagged variables to be insignificant, and of those that do appear to be statistically different from zero, we find all coefficients except for one to have a *negative* sign. That would indicate that the faster the public increases its inflation expectations, the slower the inflation rates will increase. This is unlikely to be a causal relationship, and is more likely a consequence of the temporary nature of the observed inflation rate cycles. It appears that on average, higher inflation expectations indicate that the inflation cycle has already peaked and inflation should be expected to come down in the near future. Again, this is a consequence of backward looking naïve inflation expectations combined with temporary inflation cycles. Unless this temporary cycle is in fact controlled by the Reserve Bank’s monetary policy, the findings strongly suggest that interest rate increases should not be encouraged by higher inflation expectations. Given the delayed effect of interest rates on

inflation rates one should be particularly careful about not basing the interest rates on a lagged function of actual inflation. This could, with bad luck, lead to a pro-cyclical monetary policy that exaggerates rather than dampens the inflation cycles.

Table 4: Change in inflation (CPI 2008=100) explained by change in expectations

Sector	FINANCIAL SECTOR			BUSINESS REPRESENTATIVES			TRADE UNIONS		
	2002Q4 to 2011Q1			2002Q4 to 2011Q1			2002Q4 to 2011Q1		
Data	19	20	21	22	23	24	25	26	27
Model:	Exp 0	Exp 1	Exp 2	Exp 0	Exp 1	Exp 2	Exp 0	Exp 1	Exp 2
Explanatory:	Exp 0	Exp 1	Exp 2	Exp 0	Exp 1	Exp 2	Exp 0	Exp 1	Exp 2
Explained:	Δ Inf CPI	Δ Inf CPI	Δ Inf CPI	Δ Inf CPI	Δ Inf CPI	Δ Inf CPI	Δ Inf CPI	Δ Inf CPI	Δ Inf CPI
C	0.078	0.122	0.044	0.078	0.077	0.080	0.063	0.083	0.078
<i>P-Value</i>	0.777	0.613	0.879	0.725	0.737	0.737	0.795	0.725	0.739
Δ Exp 0/1/2	0.185	0.543	-0.016	0.720*	0.929**	0.880*	0.579	0.740**	0.495
<i>P-Value</i>	0.412	0.265	0.990	0.052	0.036	0.055	0.119	0.032	0.132
Δ Exp 0/1/2 (-1)	0.381*	0.598	1.054	0.493	0.337	0.429	0.509	0.014	0.248
<i>P-Value</i>	0.089	0.241	0.441	0.173	0.443	0.333	0.141	0.965	0.416
Δ Exp 0/1/2 (-2)	0.049	0.281	0.528	0.206	0.365	0.276	-0.071	0.453	0.432
<i>P-Value</i>	0.821	0.588	0.655	0.571	0.411	0.523	0.846	0.139	0.133
Δ Exp 0/1/2 (-3)	-0.107	1.12***	0.289	-0.755**	-0.717	-0.880*	-0.604*	-0.576**	-0.500*
<i>P-Value</i>	0.616	0.008	0.824	0.044	0.116	0.052	0.083	0.042	0.065
Δ Exp 0/1/2 (-4)	-0.007	-0.260	-0.084	-0.674**	-0.838**	-0.795*	-0.372	-0.406	-0.477**
<i>P-Value</i>	0.973	0.490	0.948	0.048	0.047	0.069	0.252	0.138	0.053

*Significant at the 10% level, ** Significant at the 5% level, *** Significant at the 1% level

2.2 A Granger Causality Test

The objective of our analysis is particularly suited to the Bivariate Granger Causality test (see Granger (1969) or Hamilton (1994)), which is designed for the purpose of determining the direction of causation between two cointegrated time series. This test is therefore conducted on the *levels* of inflation and expectations by regressing the equations below:

$$e_t = \gamma_0 + \sum_{i=1}^4 \mu_{t-i} e_{t-i} + \sum_{i=1}^4 \theta_{t-i} \pi_{t-i} + \varepsilon_t \quad (1)$$

$$\pi_t = \alpha_0 + \sum_{i=1}^4 \beta_{t-i} \pi_{t-i} + \sum_{i=1}^4 \delta_{t-i} e_{t-i} + \epsilon_t \quad (2)$$

e_t – Inflation expectations at time t

π_t – Realized year on year inflation at time t

We have tested two different null-hypotheses for each measure of inflation and each sector and measure of expectations: The first null-hypothesis (tested by equation 1) is that inflation does not Granger cause expectations. The second null-hypothesis (tested by equation 2) is the opposite, that expectations do not Granger cause inflation. The hypothesis is rejected if at least one lag of expectations (inflation) is found

to be a significant explanatory variable of inflation (expectations). In *Table 3* below, we have listed the null-hypotheses in the left-hand column and the respective p-values from each regression in the other three columns. The p-values are indicated by asterisks according to the significance-level at which the respective null-hypothesis can be rejected. Wooldridge (2002) suggests a lag structure of four lags on quarterly data and our test is conducted accordingly.

Table 5: Null Hypothesis – Expectations of inflation do not Granger cause actual inflation (rejected if P-Value < 0.05)

Granger Causality Test: P-Values	Financial Sector	Business	Trade Unions
Expectations for current year do not cause inflation (CPIX 2000=100)	0.1558	0.4875	0.4058
Expectations for one year ahead do not cause inflation (CPIX 2000=100)	0.1558	0.3876	0.4218
Expectations for two years ahead do not cause inflation (CPIX 2000=100)	0.1389	0.2127	0.2309
Expectations for current year do not cause inflation (CPI 2000=100)	0.1747	0.1138	0.2496
Expectations for one year ahead do not cause inflation (CPI 2000=100)	0.1504	0.1590	0.8575
Expectations for two years ahead do not cause inflation (CPI 2000=100)	0.0894*	0.1428	0.3300
Expectations for current year do not cause inflation (CPI 2008=100)	0.4621	0.1779	0.4648
Expectations for one year ahead do not cause inflation (CPI 2008=100)	0.7781	0.3001	0.3779
Expectations for two years ahead do not cause inflation (CPI 2008=100)	0.5842	0.2769	0.2354

*Hypothesis rejected at: *** 1% Significance level, **5% Significance level, *10% Significance level*

Table 6: Null Hypothesis – Inflation does not Granger cause expectations (rejected if P-Value < 0.05)

Granger Causality Test: P-Values	Financial Sector	Business	Trade Unions
Inflation (CPIX 2000=100) does not cause expectations (current year)	0.0116**	0.0020***	1.E-05***
Inflation (CPIX 2000=100) does not cause expectations (one year ahead)	0.0045***	0.0567*	0.0054***
Inflation (CPIX 2000=100) does not cause expectations (two years ahead)	0.0477**	0.1499	0.0283**
Inflation (CPI 2000=100) does not cause expectations (current year)	0.0012***	0.1018	0.0042***
Inflation (CPI 2000=100) does not cause expectations (one year ahead)	0.0058***	0.2787	0.0210**
Inflation (CPI 2000=100) does not cause expectations (two years ahead)	0.0569*	0.3113	0.0439**
Inflation (CPI 2008=100) does not cause expectations (current year)	0.0396**	0.3052	0.0453**
Inflation (CPI 2008=100) does not cause expectations (one year ahead)	0.0299**	0.2406	0.0852*
Inflation (CPI 2008=100) does not cause expectations (two years ahead)	0.0755**	0.1877	0.0716*

*Hypothesis rejected at: *** 1% Significance level, **5% Significance level, *10% Significance level*

The results displayed in Table 5-6 are both consistent and clear. As is shown in Table 5, we cannot for any measure of inflation or inflation expectations reject the hypothesis that expectations do not Granger cause inflation at the 5% significance level. At the 10% significance level, only one of the eighteen null hypotheses could barely be rejected at the 10% significance level with a P-Value of 0.0894 (Financial Sector expectations one year ahead do not cause expectations). In sum, there are highly consistent indications that inflation expectations do not cause any of the different measures of inflation. On the other hand, as can be seen from Table 6, we can for most measures of expectations and inflation reject the null hypothesis that inflation does not Granger cause expectations. The possibly surprising exception to this result is the business representatives who do not appear to let observed inflation rates affect their expectations.

To summarize, the Granger Causality test indicates the same story as the analysis above: The only significant evidence of a relationship between inflation and expected inflation is that inflation affects expectations. We have not in any stage of the analysis found evidence that inflation follows inflationary expectations.

3. Conclusion

We have shown that realised inflation has affected inflation expected to a modest degree in South Africa. But even more clearly we have shown that the reverse does not hold at all - inflation expected has not affected inflation. The supply side shocks to prices act to restrain domestic spending, as do higher interest rates. The combined effect on aggregate demand of a supply side shock that causes higher prices coupled with higher interest rates may well lead to the *very costly lost output* that Bernanke and Mishkin were concerned about, as quoted above.

A worst case but highly possible scenario would be if the concern for inflation expectations and their possible impact on inflation led the Reserve Bank to pursue a highly pro-cyclical monetary policy. That is raising interest rates when the economy is independently slowing down and lowering them when the economy is picking up momentum, without any predictable influence on inflation. The inflation outcomes may be dominated by potential shocks to the exchange rate that can occur in both directions with unpredictable timing and influence on inflation itself. The reason to worry about pro-cyclicality is that inflation expectations, although intended to be forward looking, on average look backwards. The analysis indicates that inflation expectations have lagged behind the actual inflation rate and have not caused more inflation. Indeed inflation expectations in SA have been negatively correlated with inflation that follows-for reasons independently of the inflation expectations themselves. This lag combined with the lagged effect of interest rates on aggregate demand and therefore in turn also possibly on inflation rates, can encourage a particularly backward looking monetary policy that attempts to influence inflation rates that occurred 2-3 years ago. It would seem that raising interest rates to fight inflationary expectations or so called second round effects on inflation can and have imposed large costs in the form of lost output on the SA economy to no useful anti-inflationary purpose. Thus in response to supply side shocks on inflation, a much better way should be sought to anchor longer term inflationary expectations in SA, rather than raising short term interest rates, as Bernanke and Mishkin suggested.

Business and trade unions may expect more inflation and demand higher wages and prices accordingly, but their ability to realize such demands in SA has not been revealed by subsequent inflation. This is perhaps because the independent strength in the exchange rate, especially as it corrects to an initial exchange rate shock, then dominated the subsequent inflation outcomes. Or in other words it may be the exchange rate, not inflationary expectations, that has driven the SA inflation rate in both directions. Successful inflation targeting in South Africa would therefore seem to require accurate predictions of the exchange rate itself- a clearly formidable task that would have to include an accurate prediction of the influence of (unexpected) movements in policy determined interest rates on the exchange rate itself. However, as indicated previously, identifying the effects of the exchange rate on inflation in South Africa, or indeed any other causes of inflation (other than inflation expected) is beyond the scope of this paper.

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