South African Reserve Bank Occasional Bulletin of Economic Notes

OBEN/26/01

South African Reserve Bank Economic Notes are typically short economic analyses initially written for internal discussion and to stimulate debate. They are written by staff members of the South African Reserve Bank or visiting fellows and are released publicly on an occasional basis.

Authorised for publication by:

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September 2026

South African Reserve Bank

SARB Occasional Bulletin of Economic Notes
September 2026

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OBEN 2601* – September 2025

Stress testing the 3% inflation target

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Abstract

In this note we stress test the new 3% inflation target and conclude that:

- There is a 78% chance that inflation will vary between 2% and 4% (based on a standard deviation of around 0.9%).
- Inflation will deviate by less than 1 percentage point in the event of a standalone 1 standard deviation shock to the most important inflation drivers in the Quarterly Projection Model (over a one-year horizon).
- There is a 62% weighted probability that headline inflation will be between 2% and 4% when hit by a combination of shocks.

These outcomes are due to inflation expectations being more forward-looking (i.e. anchored by the inflation target) – particularly since the South African Reserve Bank adopted its preferred inflation target of 4.5% in mid-2017. These results reflect increased monetary policy credibility, which bodes well for the achievement of a 3% inflation target.

1. Introduction

The South African Reserve Bank's (SARB's) inflation target range of 3–6% has been in place since 2000. From July 2017, the SARB explicitly revealed a preference for inflation at the midpoint of the target range (4.5%). The credibility of this target has been proven over the years, with both inflation outcomes and inflation expectations converging to the 4.5% target (see, for instance, Loewald, Steinbach and Rakgalakane 2025). Only during the global supply chain disruptions in 2022/23 did inflation temporarily – albeit substantially – overshoot the 4.5% target.

At the May 2025 Monetary Policy Committee (MPC) media conference, the Governor expressed a preference for a 3% inflation target (SARB 2025a). At the subsequent MPC meeting in July, the Governor was even more explicit and said: "We will use forecasts with a 3% inflation anchor at future meetings" (SARB 2025b). The announcement sparked mixed reactions among economists, analysts and financial markets. While some welcomed the potential shift, others raised concerns about the feasibility of achieving this lower target.

In this economic note, we stress test the ability of a 3% inflation target to handle a variety of standardised shocks. The note is structured as follows: first, we reflect on credibility considerations; we then describe the methodology; and in the final sections we reflect on the results and the implications for monetary policy.

2. Inflation-targeting considerations

Inflation targeting as a monetary policy framework is credible if it can withstand various economic conditions and shocks and maintain well-anchored inflation expectations (see, for instance, Du Plessis and Rietveld 2014; Arias and Kirchner 2019). This in turn is crucial for anchoring inflation expectations, maintaining price stability and fostering sustainable economic growth.

Balancing the goal of price stability with other economic policy objectives, such as employment growth, presents challenges to monetary policy. In addition, monetary policy actions can take a while to affect inflation, making it difficult to maintain the inflation target over all horizons.

Although clear communication about the target and the central bank's actions can build public understanding and support, credibility is essential because it allows the central bank to implement its monetary policy effectively by minimising the risk of destabilising inflation fluctuations (Honkapohja and McClung 2023).

3. Methodology

The MPC has previously emphasised that it prefers inflation to be at the 4.5% midpoint within the 3% to 6% target range. In effect that allowed a 1.5% tolerance band around the midpoint. With a 3% inflation target, if the band is also adjusted in a pro-rata manner, then the comparable band should narrow to 1% (3.5%/4.5% x 1.5% = 1%). This should, however, not be interpreted as an MPC preference for a 1% target band around the inflation target – in our view an explicit point target (without bands) is better for managing inflation expectations.[1]

The credibility of an inflation-targeting framework can be tested by its ability to withstand the majority of one standard deviation shock – that is, the typical shock magnitude that historically accounts for about 70% of past shocks. However, it will not be required to withstand severe shocks. In numerical terms we take that to mean that headline inflation should oscillate by no more than 1 percentage point from the 3% inflation target when hit by major shocks, with each having a magnitude of one standard deviation.

It is important to note that the inflation-targeting framework has lowered average inflation and reduced inflation volatility. Compared to the 1990s, when inflation averaged 10.1% with a standard deviation of 3.6%, it moderated to an average of 6.2% with a standard deviation of 2.0% between 2000 and the first half of 2017 (Figure 1). Between 2017Q3 (when the 4.5% inflation target was announced) and 2025Q2, headline inflation moderated further, averaging 4.7% with a standard deviation of 1.29%. Alongside the decline in both inflation and its volatility, the standard deviation as a ratio to average inflation fell too (Figure 2). This is unsurprising as there is widespread consensus in macroeconomics that the level of inflation and inflation volatility are strongly and positively correlated (Karras 2017).

[1] These are strictly the views of the authors and do not necessarily reflect those of the MPC.

Figure 1: Evolution of inflation volatility over time

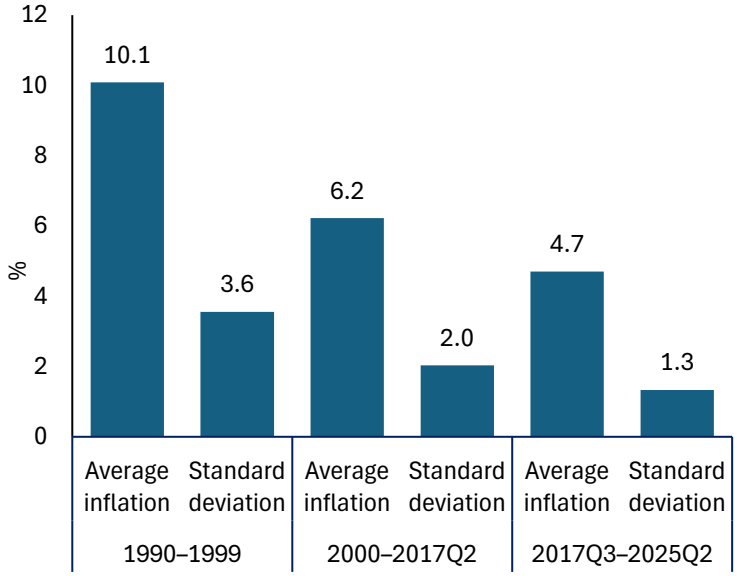
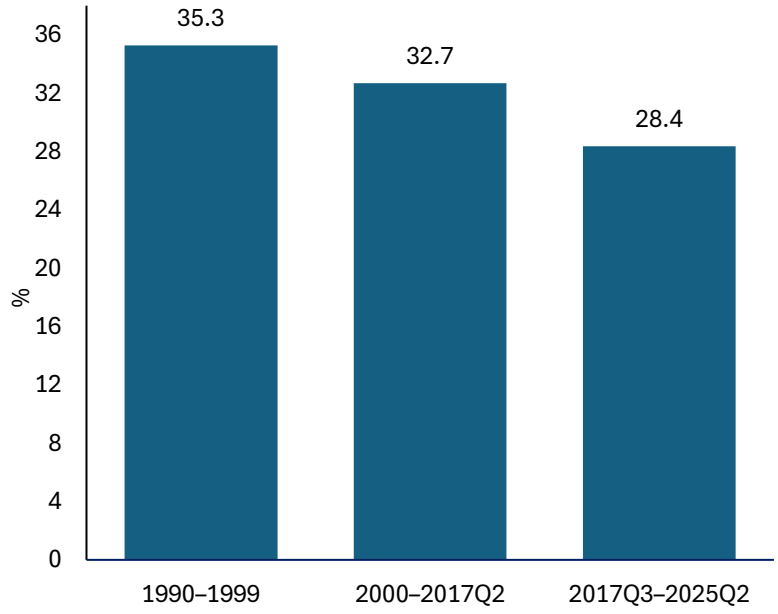


Figure 2: Standard deviation to mean ratio



Based on that consensus, it is fair to expect a further decline in the volatility of inflation under a 3% target. But even if we assume that the ratio of the standard deviation to the average observed inflation over the 2017Q3 to 2025Q2 period – 28.4% or 1.3%/4.7% – remains unchanged, 'normal' oscillation around the 3% inflation target is likely to be around 0.9 percentage points (i.e. 28.4% x 3% inflation target).

In our view the inflation target will thus be credible if it can withstand at least a 1 standard deviation shock, without deviating by more than 1 percentage point[2] from the 3% inflation target. In the Quarterly Projection Model (QPM),[3] the most important drivers of inflation are

[2] For simplicity, the 0.9 percentage point standard deviation is rounded up to 1 percentage point.
[3] For details on the QPM, see Pirozhkova et al. (2023).

inflation expectations (both backward- and forward-looking components), unit labour cost, the exchange rate, oil, food, electricity and remaining administered prices. In the next section we calculate the standard deviation for each of these variables, as well as the average period these respective shocks typically last. In the subsequent section we introduce these shocks into the QPM to quantify their effects on headline inflation and inflation expectations, reporting both the peak responses and the average impacts during the first year following the shock.

4. Results

Table 1 presents the impact of a 1 standard deviation shock (column B) of mean duration (column C) on headline inflation as well as inflation expectations for the following key drivers of inflation fluctuations: G3 nominal effective exchange rate (rand), oil, food, unit labour costs, electricity, administrative prices excluding fuel and electricity, and inflation.

Table 1: Impact of a 1 standard deviation shock on headline inflation

A	B	C	D	E	F	G	H	I
Variable	Size of shock		CPI impact				Inflation expectations impact	
	One standard deviation	Mean duration (quarters)	Peak impact	Average impact in 1st year	Minimum shock size that moves annual inflation by more than one percentage point	Minimum shock duration (in quarters) that moves annual inflation by more than one percentage point	Peak impact	Average impact in 1st year
Rand	8.84	2	0.89	0.63	14.03	6*	0.23	0.08
(Peak, quarters after shock)			(4)				(5)	
Oil	39.94	3	1.01	0.87	45.91	4	0.26	0.15
			(3)				(4)	
Food	2.93	3	0.67	0.61	4.81	5**	0.19	0.10
			(4)				(5)	
Unit labour cost	1.18	3	0.30	0.23	5.14	4**	0.08	0.03
			(4)				(5)	
Electricity	4.11	4	0.33	0.24	17.14	8**	0.08	0.03
			(4)				(5)	
Admin excl. fuel & electricity	1.31	2	0.15	0.14	9.36	8**	0.05	0.03
			(3)				(4)	
Headline inflation	1.33	4	NA	NA	NA	NA	0.45	0.26
							(5)	

Note:

* Longer duration raises inflation by less than 1% in the first year; the full 1 percentage point impact occurs in the second year.

** The shock is not large enough to raise inflation by more than 1 percentage point. Values reflect the number of quarters needed for the maximum (sub-1pp) impact to materialise.

In Table 1 we see that an 8.84% change in the exchange rate is equivalent to a 1 standard deviation shock (column B). Typically, as measured by the mean duration in column C, the shock lasts 2 quarters. Such a shock will, at its peak impact, raise headline inflation by 0.89 percentage points (column D) after 4 quarters (column D). On average, headline inflation will rise by 0.63 percentage points in the first year (column E). In the process, inflation expectations will increase by 0.23 percentage points at their peak impact after 5 quarters (column H), while the average first year impact will be 0.08 percentage points (column I). These impacts are also illustrated in Figures 3 and 4.

Figure 3: Impact of regular-sized (1 standard deviation) shock on headline inflation

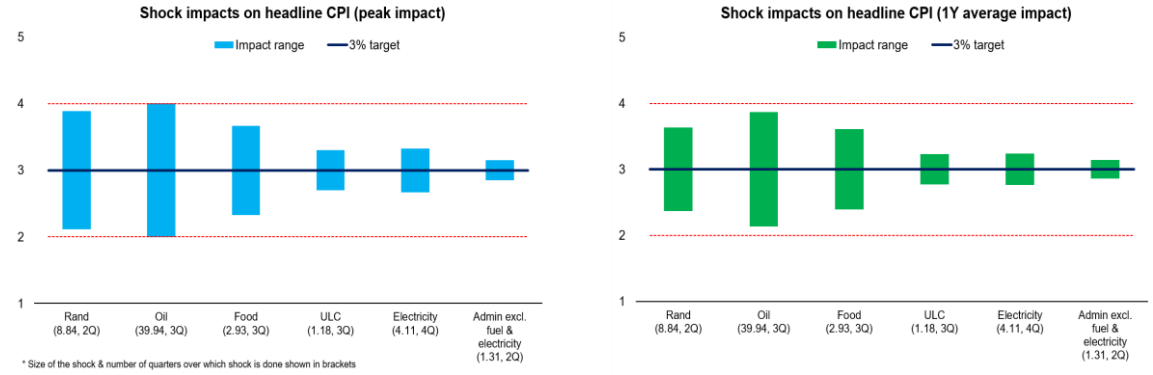
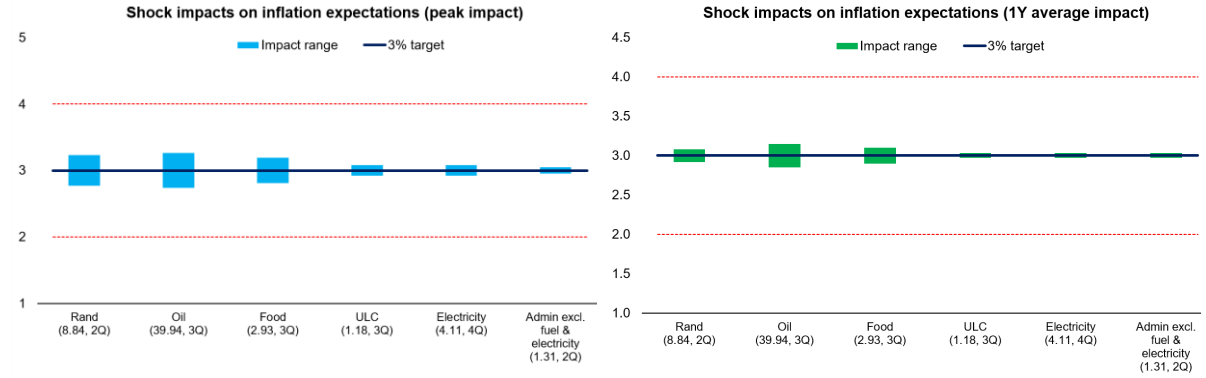


Figure 4: Impact of regular-sized shock on inflation expectations



A 1 standard deviation shock to electricity prices amounts to 4.11%, with an average duration of 4 quarters. In contrast, oil prices are very volatile, with a standard deviation of almost 40%. Specifically, a 39.94% oil price shock sustained over 3 quarters results in a peak impact of 1.01 percentage points on headline inflation (in the third quarter after the shock begins). On average, it raises headline inflation by 0.87 percentage points and inflation expectations by just 0.15 percentage points over the first year.

Apart from oil prices, a 1 standard deviation shock to food prices (2.93% price increase for 3 quarters) carries the largest risk of headline inflation (a 0.67% increase), deviating by more than 1 percentage point from the 3% inflation target. The impacts on inflation expectations are similar, albeit smaller in size, and with longer lags.

It is important to note that for all the respective 1 standard deviation shocks of mean duration reported in Table 1, the average first year impact causes headline inflation to deviate by less than 1 percentage point from the 3% inflation target. This suggests that a 3% inflation target would be able to withstand typical shocks affecting the main drivers of headline inflation, when evaluated over a one-year horizon.

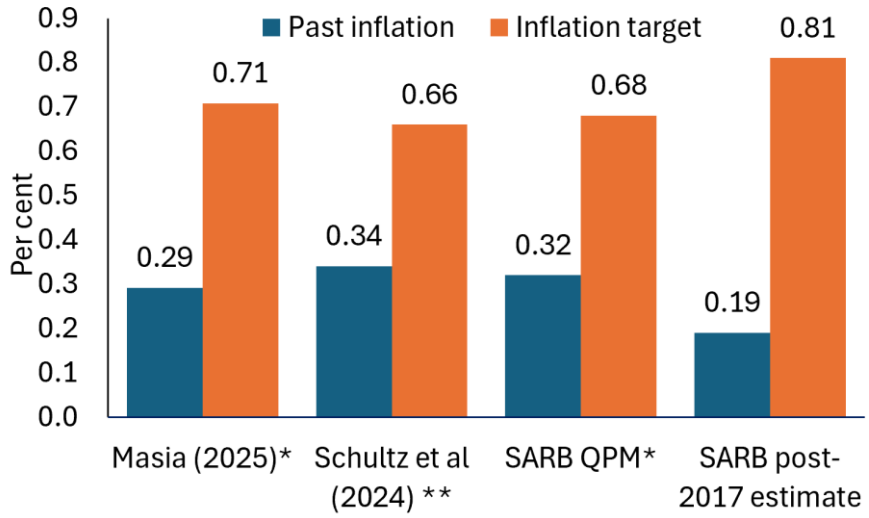
A further observation from the above is the small spillovers to inflation expectations. We reflect on this in the next section.

5. Reflections on inflation expectations

A major concern has been that the stickiness of inflation expectations might negatively affect the credibility of the inflation target. However, econometric analysis has found that inflation expectations are (at least partly) anchored to the inflation target – rather than purely backward-looking. This is confirmed by work done by the SARB and other institutions.

Figure 5 presents modelling results from Masia (2025), Schultz, Carrara and Klein (2024), and the SARB,[4] based on regressions of inflation expectations on past inflation – representing the backward-looking component – and the inflation target, which captures the forward-looking aspect of expectations.[5] Across all specifications, the findings consistently indicate that the inflation target acts as the dominant anchor for expectations.

Figure 5: Regression coefficients for drivers of inflation expectations



Note: * Coefficients for past inflation and the inflation target are rescaled to sum to 1; the persistence term is excluded. ** Latest coefficient estimates derived from a rolling window regression.

A more formal exercise has also been conducted at the SARB. Foresto et al. (2026) find that inflation expectations have been predominantly anchored to the inflation target. Importantly, after the announcement of the 4.5% inflation target in 2017, the weight of the backward-looking component has declined further. This partly reflects enhanced policy credibility and bodes well for the official introduction of a lower inflation target.

6. What will cause inflation to deviate by more than 1 percentage point from the target?

Given the ability of the inflation target to withstand 1 standard deviation shocks of mean duration, we investigate what type of shocks will be needed to move inflation by more than 1 percentage point from the target. The results in terms of size and duration are reported in Table 1 and Figure 6.

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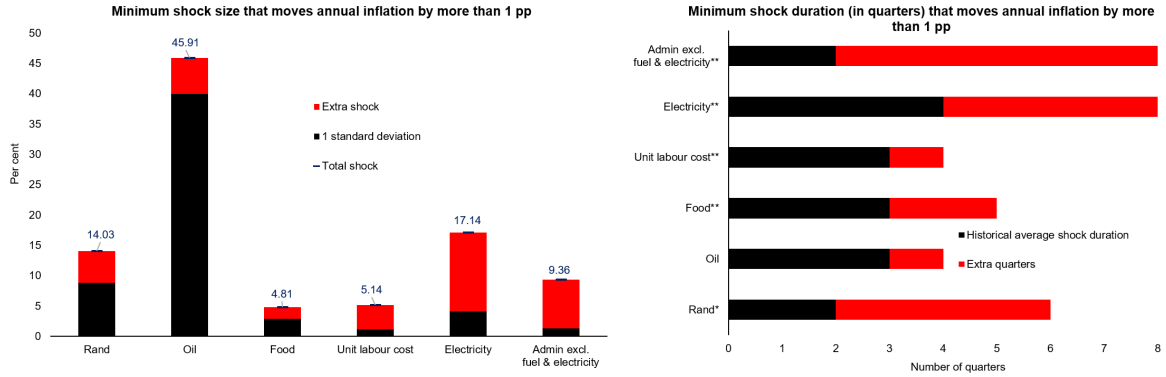
4 SARB results are from the QPM, as well as our own estimates obtained via ordinary least squares regression based on the 2017Q3–2025Q2 sample.

5 Some of the regression specifications included a persistence term for inflation expectations; however, the results reported here exclude this component.

For example, to increase headline inflation by more than 1 percentage point for a full year – and thus no longer be interpreted as a temporary shock – the rand would need to depreciate by about 14% (1.6 standard deviations (SDs)), while oil prices would need to rise by roughly 46% (1.1 SDs). The respective shock sizes for food (4.81%, 1.6 SDs), unit labour cost (5.14%, 4.4 SDs), electricity (17.14%, 4.2 SDs) and non-energy administrative prices (9.36%, 7.1 SDs) are reported in Table 1, column H.

Alternatively, shocks of standard magnitude but extended duration can also result in inflation deviating by more than 1 percentage point from the target. As shown in Table 1, column I, a 1 standard deviation rand depreciation lasting 6 quarters – compared to the average of 2 – pushes headline inflation beyond the 1 percentage point threshold, though this effect only materialises in the second year. A similarly prolonged oil price shock (lasting at least 4 quarters) also produces a deviation exceeding 1 percentage point on an annual basis. For the remaining inflation drivers, however, even extended durations do not generate deviations of this magnitude. Their peak annual impact occurs before inflation breaches the 1 percentage point threshold. Therefore, as long as the magnitude of these shocks remains within 1 standard deviation, the 3% inflation target remains sturdy.

Figure 6: Shocks that will take inflation outside a 1 percentage point band



Note:

* Longer duration raises inflation by less than 1% in the first year; the full 1 percentage point impact occurs in the second year.

** The shock is not large enough to raise inflation by more than 1 percentage point. Values reflect the number of quarters needed for the maximum (sub-1pp) impact to materialise.

However, it is also important to keep in mind that multiple shocks can occur at once and reinforce each other. In the next section we investigate the impact when a combination of shocks happens simultaneously.

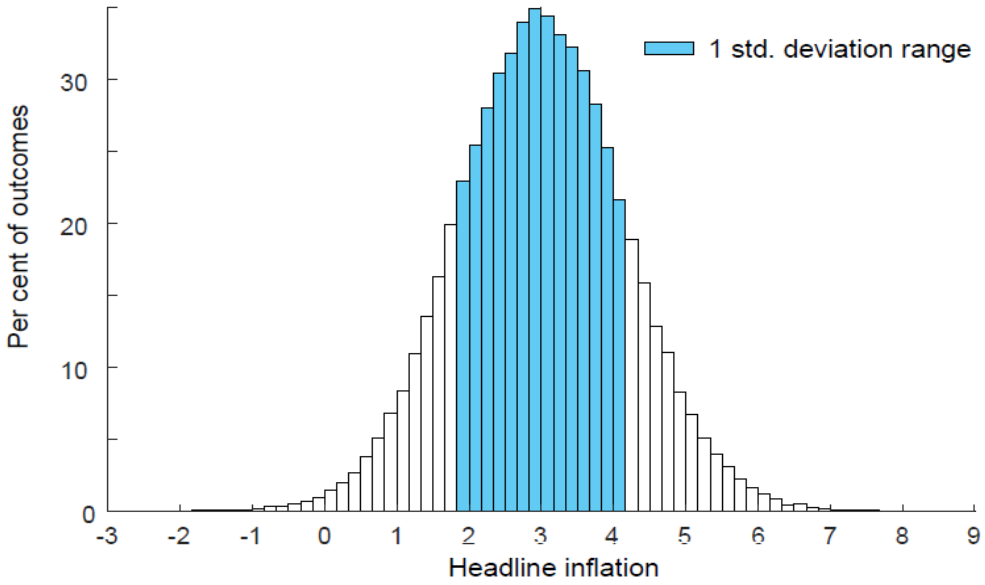
7. What if inflation is hit by a combination of shocks?

The shocks reported earlier were done as standalone 1 standard deviation shocks where nothing else changes (ceteris paribus conditions). In real life, multiple shocks of varying degree and duration continuously hit the economy. Sometimes these shocks (partially) neutralise each other, but they may also result in (perfect) storms that will exacerbate the inflation impacts. For instance, between 2016 and 2017 there was a strong negative correlation (-0.79) between oil prices and the rand/US$ exchange rate. As oil prices rose, the rand strengthened, thereby (partly) neutralising the impact of higher oil prices. On the other hand, over the 2022–2023 period, higher global inflation strongly correlated with a weaker

rand (the correlation coefficient was +0.96 for US inflation and the rand/US$ exchange rate), thus exacerbating the shock.

It is impossible to predict the next confluence of shocks, their size or sign. Consequently, we refrained from testing specific scenarios, instead opting to employ the QPM to perform 100 000 random simulations over a 10-quarter horizon based on historical data and shocks, including not only the most important shocks described earlier, but accounting for all possible sources of inflation variation.[6] For each of the shocks in every quarter of each simulation, a random magnitude is drawn from a statistical distribution with a mean and standard deviation based on the specific shock's historical properties.[7] This approach allows for the shock combinations to vary between shocks that are smaller and larger than 1 standard deviation, but also between positive and negative. In some instances, several shocks could be large and of the same sign, while at other times combined shock impacts on inflation may be either small or offsetting (e.g. a weaker rand combined with falling oil prices). Moreover, using a range of statistical distributions helps to better reflect the outliers often observed in inflation outcomes. Figure 7 depicts the distribution of potential inflation outcomes 6 quarters ahead – broadly aligning with the policy horizon.

Figure 7: Distributional impact on headline inflation of a combination of shocks



We see that 68% of the 100 000 simulation outcomes result in headline inflation varying between 1.83% and 4.17% around the 3% target. In extreme cases, where shocks combine to exacerbate the impact in an unfortunate way, headline inflation could rise to more than 7% (or fall below 0%). But the probability of that happening is extremely small. In fact, based on

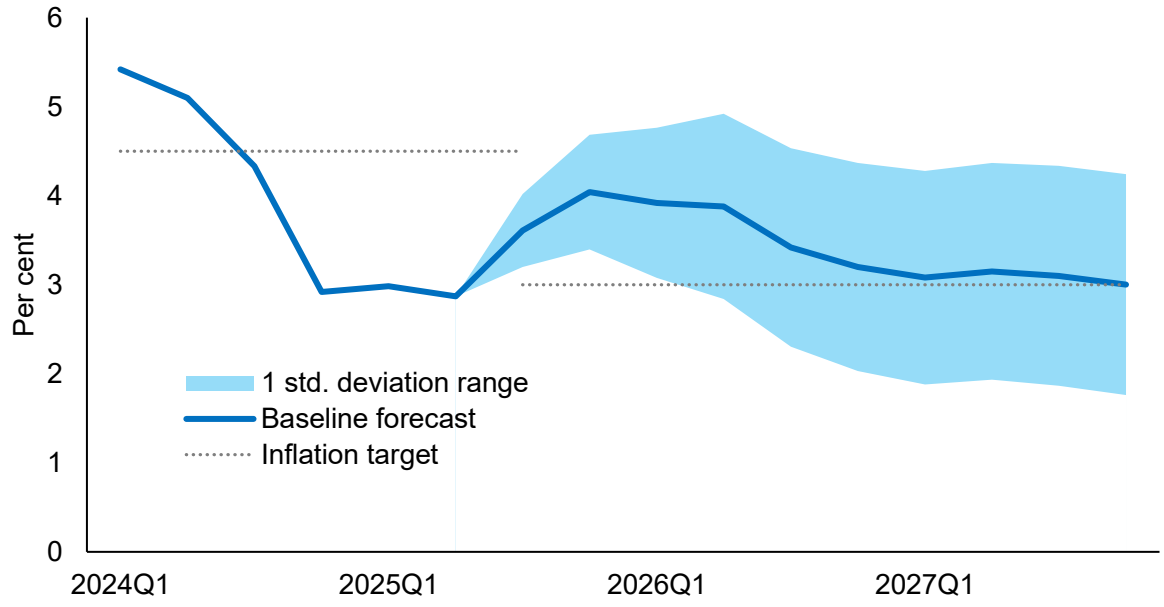
6 A total of 43 shocks drive macroeconomic fluctuations that affect inflation in the QPM. Some shocks such as oil prices and the exchange rate have larger impacts on inflation, while others such as changes in the fiscal stance have lesser impacts.

7 The historical distribution of each of the 43 shocks is compared to five separate candidate statistical distributions, with the best-fitting distribution for each shock selected based on the Kolmogorov-Smirnov goodness-of-fit hypothesis test. The following distributions are considered: a normal distribution; two composite normal distributions that have higher variance in the tails to better capture outliers; and Student's t-distributions with differing degrees of tail heaviness.

all the modelled outcomes, there is a 62% weighted probability[8] that headline inflation will vary between 2% and 4% when hit by a combination of shocks. With lower inflation and by implication reduced volatility, standard deviations for many variables are also likely to decline, ceteris paribus. This will likely reduce the variance of the simulated outcomes.

Imposing these distributed shock combinations on the September MPC inflation forecast yields similar results. If past patterns hold, inflation could rise to 4.9% in the second quarter of 2026, compared to the baseline prediction of 3.9%. On the contrary, if shocks were to combine in a beneficial way, inflation could register 2.8% in that quarter. Moving to the second half of 2026 – a key time frame of the current policy horizon – inflation could be expected to vary within a range from 2.2% to 4.5%. These ranges capture the most likely outcomes, but it is possible – though less likely – that inflation could fall outside them if unusual shocks occur.

Figure 8: Distributional impact of a combination of shocks over the inflation forecast



8. Concluding remarks

Inflation targeting as a monetary policy framework is credible if it can withstand various economic conditions and shocks. This in turn is crucial for anchoring inflation expectations, maintaining price stability and fostering sustainable economic growth.

Our econometric analysis finds that under normal circumstances (i.e. an absence of material shocks) there is a 78% chance that inflation will vary between 2% and 4%. In the event of a standalone 1 standard deviation shock to the most important inflation drivers, inflation will deviate by less than 1 percentage point from the target in the QPM over a one-year horizon.

Even when hit by a combination of shocks, there is still a 62% weighted probability that headline inflation should vary between 2% and 4%. (The probability was also tested under the 4.5% inflation target regime, with similar outcomes.) However, it is important to note that when lower inflation is accompanied by reduced volatility – as has been the case historically – the

[8] We also back tested the probabilities under the 4.5% inflation target scenario and found similar likelihood when hit by a combination of shocks.

responses to shocks are likely to be more muted. This could reduce the variance of the simulated outcomes under the 3% target scenario.

Finally, our simulations indicated that inflation expectations are predominantly forward-looking – that is, largely anchored by the inflation target. Moreover, following the announcement of the new 4.5% inflation target in 2017, the coefficient on the backward-looking inflation component declined. This is reflective of a credible central bank and bodes well for the official introduction of the lower inflation target of 3%.

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