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Inflation targeting and the dynamics of inflation risk premia in South Africa's bond market

Chloë Allison and Theuns de Wet

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Head: Economic Research Department
South African Reserve Bank
P O Box 427
Pretoria 0001

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Inflation targeting and the dynamics of inflation risk premia in South Africa's bond market

Chloë Allison* and Theuns de Wet†

Abstract

This paper examines how inflation targeting influences the inflation risk premium embedded in South Africa's nominal government bond yields. Using a Fisher-equation-based decomposition, we extract the inflation risk premium from expected inflation, real yields and liquidity premia, focusing on the five-year maturity. Inflation risk premia are estimated from July 2011 to December 2024, the period when the South African Reserve Bank (SARB) targeted the full 3–6% inflation band and subsequently shifted towards an explicit midpoint. We employ a combination of ordinary least squares regressions and autoregressive distributed lag models to identify both static and dynamic relationships. The results indicate that while the target change itself has no strong direct effect, inflation expectations anchor the inflation risk premium in the long run. Short-run fluctuations are driven primarily by inflation surprises and tail-risk events. These findings imply that a sustained decline in inflation expectations following the move to a 3% inflation target could be another factor that supports lower nominal yields through a reduced inflation risk premium.

JEL classification

E52, E43, E31, G12

Keywords

Inflation risk premium, inflation targeting, bond yields, inflation expectations, yield decomposition

* Associate economist at the SARB. Corresponding author. Email: chloe.allison@resbank.co.za

† Head of Investment Office for a domestic systemically important bank in South Africa.

1. Introduction[1]

One of the benefits of successfully lowering inflation and inflation expectations is that nominal interest rates[2] should also decline (Loewald, Steinbach and Rakgalakane 2025; Danthine 2013). The reduction occurs because of lower inflation expectations and the inflation risk premium. This decrease should be reflected in a lowering of the cost of borrowing in the economy and contribute to reducing future debt-service costs for both the fiscus and the private sector.

While the lowering of inflation expectations should also be reflected in an eventual lowering of nominal income growth as prices rise at a slower rate, the reduction in the inflation risk premium is an unambiguous benefit to the economy. If one considers that borrowers pay the inflation risk premium, lowering it will represent a benefit to them. Lenders will, however, benefit through a reduction in the riskiness associated with their investments. Given South Africa's limited fiscal space, the need for a significant increase in infrastructure development and high household indebtedness, reducing the cost of borrowing is a benefit that should not be overlooked.

In this paper, we contribute to the discussion on the effect of lowering South Africa's inflation target by focusing on how it will affect the level of medium-term nominal yields. We focus on the potential lowering of inflation uncertainty and therefore the inflation risk premium embedded in the five-year point of the nominal yield curve.

We approach this by first describing a framework for identifying and calculating the inflation risk premium. The framework uses the Fisher equation and bond market information to decompose the nominal bond yields into their relevant risk premia (section 2). We then provide a summary of the conclusions reached by the international literature (section 3) on the extent to which inflation uncertainty premia are present in

1 We are grateful to Rudi Steinbach, Monique Reid, Nic Spearman, Shamain Matshipa and an anonymous referee for their helpful inputs and suggestions.

2 While this paper focuses on medium-term yields (interest rates paid on five-year maturity government bonds), the assertion should hold, generally, for nominal interest rates and yields with longer maturities beyond the five-year area of the yield curve. This expectation is based on a review of the literature that suggests that the effect of changes in the inflation policy increases along the term structure of interest rates.

nominal yields, and how lowering inflation expectations affects inflation uncertainty[3] and inflation risk premia.

In section 4, we present descriptive statistics of historical inflation trends before and after the adoption of inflation targeting in a few emerging and advanced economies. This suggests that inflation volatility – a measure of inflation uncertainty – falls as inflation targets are adopted, and the level of inflation and inflation expectations fall.

In section 5, using the framework developed in section 2, we estimate the inflation risk premium for a five-year government bond. To analyse the determinants of South Africa's inflation risk premium, we employ a combination of regression specifications and an autoregressive distributed lag (ARDL) framework. We first estimate three baseline models that examine whether the observed decline in the inflation risk premium could be attributed to the downward shift in inflation expectations following the effective lowering of the inflation target. We then estimate an ARDL model to capture the short-run dynamics and long-run equilibrium relationships. The ARDL framework enables us to incorporate contemporaneous and lagged effects while accounting for the persistence of the inflation risk premium through its own lags. Long-run coefficients are derived, allowing us to quantify both immediate and equilibrium responses.

The five-year yield is chosen because of the relative ease with which comparable survey data can be obtained for this part of the curve. However, the five-year area of the curve is also where several corporate borrowers issue their bonds to raise financing.[4] Using the results of section 5, along with a few simplifying assumptions, we show the potential savings that can accrue to the indebted segments in the economy if inflation uncertainty and volatility fall (section 6).

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[3] In this paper, we capture inflation risk using measures of inflation volatility.

[4] Given the fiscal limitations South Africa faces and the need for the private sector to build production capacity, the corporate bond market is likely to be increasingly used for financing capacity building. One could argue (although it needs to be statistically tested) that the same directional conclusions would be reached for maturities beyond the five-year point of the yield curve. One could further assert – given the upward-sloping nature of the yield curve (on average) – that the impacts would, however, be larger than that of the five-year area of the curve.

The approach we take in estimating the inflation risk premia also contributes to research that focuses on identifying and quantifying the unobservable risk premia (inflation risk and liquidity premia) in the South African term structure (interest rate and yield curves).

2. A framework for identifying and calculating the inflation risk premium

The inflation risk premium in nominal yields emerges due to uncertain inflation expectations and inflation volatility. Inflation risk premia therefore represent the cost of inflation uncertainty: investors holding nominal assets are exposed to unanticipated changes in inflation, which can cause misallocation of resources and lower returns. Consequently, they require a premium to compensate for the inflation they cannot forecast (Hördahl and Tristani 2012; Grishchenko and Huang 2013; Mehra 2006).

However, measuring the inflation risk premium is challenging as it is an unobservable component embedded in nominal interest rates and yields. In fact, matters are further complicated because it needs to be distinguished from the liquidity risk premium – another unobservable component that is often present in asset prices. This challenge is illustrated through applying the simple Fisher equation to the functioning of the government bond market.

The Fisher equation expresses the relationship between nominal yields (y_t^N), expected inflation ($\mathbb{E}_t\,[\pi]$) and real yields (y_t^R) as:

$$y_t^N = y_t^R + \mathbb{E}_t\,[\pi] \qquad (1)$$

However, because future inflation outcomes are uncertain, the decomposition of the nominal rate should reflect an additional component – the inflation risk premium (Sarte 1998). The Fisher equation is therefore adjusted to reflect this premium ϕ^{IRP}:

$$y_t^N = y_t^R + \mathbb{E}_t\,[\pi] + \phi^{IRP} \qquad (2)$$

Because the real yield is not directly observable, market participants and economists typically use inflation-linked bond yields, y_t^{ILB}, as an approximation of real yields. However, fixed-rate nominal- and inflation-linked bonds usually have different levels of liquidity (Kupfer 2018), with nominal bonds being more liquid than inflation-linked bonds. Investors are therefore likely to require a liquidity premium, ϕ^{LIQ}, to hold the less liquid bond. Grishchenko and Huang (2013) note that illiquidity in inflation-linked bond markets (such as the Treasury Inflation-Protected Securities (TIPS) market in the United States (US)) will push up yields on inflation-linked bonds. The relationship between the real yield and the inflation-linked bond yield should therefore be expressed as:

$$y_t^{ILB} = y_t^R + \phi^{LIQ} \tag{3}$$

Substituting Equation (3) into Equation (2) and rearranging, the nominal yield can be rewritten as:

$$y_t^N = y_t^{ILB} - \phi^{LIQ} + \mathbb{E}_t\,[\pi] + \phi^{IRP} \tag{4}$$

By rearranging Equation (4) and using the inflation-linked bond yield, one can express the inflation risk premium as:

$$\phi^{IRP} = (y_t^N - y_t^{ILB}) + \phi^{LIQ} - \mathbb{E}_t\,[\pi] \tag{5}$$

The term in brackets, $(y_t^N - y_t^{ILB})$, is commonly known as the *breakeven inflation* rate. Equation (5) is applied in section 5 to estimate the inflation risk premium in a medium-term nominal bond yield in South Africa and the relationship between the level of inflation expectations and the size of the risk premium.

3. Literature review: inflation risk premia, inflation expectations and inflation targeting

Several studies have explored the relationship expressed above to obtain estimates of the inflation risk premium contained in nominal bond yields. Apart from quantifying the inflation risk premium, the studies also suggest that a lowering of inflation expectations should also lead to a lowering of inflation risk (and hence inflation risk premia).

3.1 Estimations of inflation risk premia

Shen (1998) decomposed bond yields to examine the inflation risk premium between 1996 and 1997 using United Kingdom (UK) data and found that the premium for 10-year nominal gilts[5] ranged between 70 and 140 basis points, while that of 20-year gilts was likely to range between 100 and 160 basis points. Grishchenko and Huang (2013) extracted the inflation risk premium from TIPS market prices using US data and found that the average 10-year inflation risk premium ranged from -16 to 10 basis points over the 2000–2008 sample, depending on the proxy used for expected inflation. From 2004 to 2008, the inflation risk premium was found to be considerably less volatile, ranging between 14 and 19 basis points. Ang, Bekaert and Wei (2008) used a term structure model with regime switches, time-varying prices of risk and inflation to identify components of the nominal yield curve. They estimated inflation risk premia to be upward sloping across the term structure and 114 basis points on average (using data from 1952 to 2004). Garcia and Werner (2010) applied the same methodology to euro area data over the period 1995 to 2006 and found inflation risk premia to range from 7 basis points over the very short term (a year ahead) to 25 basis points at longer maturity horizons – again suggesting an upward-sloping inflation risk premia term structure.

While estimates for inflation risk premia vary across the literature, countries and the term structure, it is worth noting that some studies (e.g. Shen 1998) did not control for liquidity premia (which may explain some of the differences). However, the literature does suggest that different levels of inflation expectations and varying levels of central bank credibility are factors contributing to different inflation risk premia. This is discussed in more detail below.

Table 1: A summary of the estimated level of inflation risk premia from the literature

Study	Estimated inflation risk premia (bp)
Shen (1998)	70 to 160
Grishchenko and Huang (2013)	-16 to 19
Ang, Bekaert and Wei (2008)	114 (on average across term structure)
Garcia and Werner (2010)	7 to 25

Source: Shen (1998); Grishchenko and Huang (2013); Ang, Bekaert and Wei (2008); Garcia and Werner (2010)

5 Gilts refer to a government bond in the UK.

3.2 Lowering inflation risk premia

The research on the relationship between the level of inflation and inflation risk premia seems unambiguous: a lower trend inflation rate leads to lower inflation uncertainty premia (Mehra 2006; Friedman 1977; Mankiw, Reis and Wolfers 2003). Several mechanisms drive this relationship.

First, a lower trend inflation rate is generally associated with better-anchored inflation expectations. When inflation fluctuates around a lower, more stable mean, the variance of inflation declines (Fischer, Sahay and Végh 2002).

Second, a decrease in trend inflation is often associated with improved central bank credibility, which also lowers inflation uncertainty. In fact, Shen (1998) posits that the size of the inflation risk premium in long-term nominal bonds can serve as a measure of the credibility of monetary authorities. Wright (2011) examines the behaviour of term premia and inflation uncertainty in the yield curves of several countries and finds that both inflation uncertainty and term premium estimates declined substantially in countries that adopted inflation targeting and increased central bank independence and transparency. The tail risks of runaway inflation decline when markets believe that the central bank can keep inflation around the target. This reduces both inflation uncertainty and inflation skewness, which in turn leads to lower inflation risk premia (Christensen, Lopez and Rudebusch 2010).

Mehra's (2006) results support this assertion. Mehra constructs an empirical measure of uncertainty about short-term inflation forecasts and finds that uncertainty surrounding short-term inflation forecasts raises uncertainty about long-term inflation forecasts, which could explain inflation risk premia in bond rates. However, Mehra's (2006) analysis of US data shows that this relationship has weakened over time. Mehra attributes this weakening to the increased credibility of the Federal Reserve. When investors are more confident that low and stable inflation will be achieved in the long run, fluctuations in short-term inflation uncertainty become less influential for long-term inflation forecasts.

A third mechanism that affects the relationship between lower trend inflation and inflation risk premia is investors' aversion to extreme inflation outcomes – that is, deflationary traps or stagflation. As trend inflation falls, inflationary outcomes become less likely, reducing the demand for protection against inflation and lowering the inflation risk premium embedded in nominal yields (D'Amico, Kim and Wei 2018).

The relationship between inflation targets, inflation expectations and inflation risk premia is dynamic. As central banks rely on transparency and central bank communication to anchor expectations, the role of inflation targeting in reducing inflation risk premia becomes more pronounced. The literature suggests that well-communicated, credible inflation targets that lead to a lowering of trend inflation and inflation expectations can significantly reduce inflation uncertainty, leading to lower inflation risk premia.

4. Comparison of inflation and inflation expectations behaviour before and after adoption of inflation targeting

Before narrowing our focus and quantifying the benefit of lowering the inflation target on nominal yields in South Africa, we compare the behaviour of inflation and inflation expectations before, and after, the introduction of inflation targets in several emerging (Brazil, Chile, Mexico and South Africa) and advanced economies (Australia, New Zealand, the UK and the US).

According to the literature (e.g. Wright 2011) one would expect that the adoption and/or lowering of an inflation target would result in:

1. A fall in inflation expectations (using surveyed inflation expectations as a proxy).
2. A fall in realised inflation volatility (proxied by the variance of observed inflation).
3. A fall in expected inflation volatility (using surveyed inflation expectations as a proxy).

Confirmation of these trends should support the notion that a lower inflation target should not only reduce inflation expectations but also result in a lower inflation risk premium.

In most countries in the sample, the introduction of inflation-targeting frameworks did indeed accompany lower inflation volatility and lower, more stable long-term inflation expectations. Table 2 provides a summary of the descriptive statistics of the average outcome across the sample of countries. It shows a marked drop in average inflation rates and average inflation volatility with the adoption of inflation targets. The volatility of inflation expectations was also quite low under the inflation-targeting regime framework. Unfortunately, measures of inflation expectations were not available in the pre-inflation-targeting periods.

Table 2: Summary of average inflation, inflation variance and inflation expectation variance in a sample of emerging and advanced economies

Emerging economies**				
Average inflation		**Variance of inflation**		**Variance of inflation expectations**
Before IT	**After IT**	**Before IT**	**After IT**	**On average***
9–17%	3–6%	5–20%	Below 1%	Below 0.2%
Advanced economies				
Average inflation		**Variance of inflation**		**Variance of inflation expectations**
Before IT	**After IT**	**Before IT**	**After IT**	**On average***
6–8%	1–3%	1–3%	Below 0.1%	Below 0.2%

Note: IT = inflation targeting.

* Most countries do not have inflation expectations data available before the implementation of inflation targeting.

** Brazil's variance of inflation and inflation outcomes are extremely high before inflation targeting. Therefore, we exclude Brazil from the range as it would bias the pre-IT average upwards significantly.

To bring the point closer to home, we include Figures 1, 2, 3 and 4, which show the South African experience. (Figures A1 and A2 in the annexures show the results for the other countries in the sample.)

South Africa implemented inflation targeting in 2000, aiming to keep inflation between 3% and 6%. However, in the middle of 2017 the South African Reserve Bank (SARB) shifted its guidance explicitly towards communicating a desire to target the middle of the band: 4.5%.

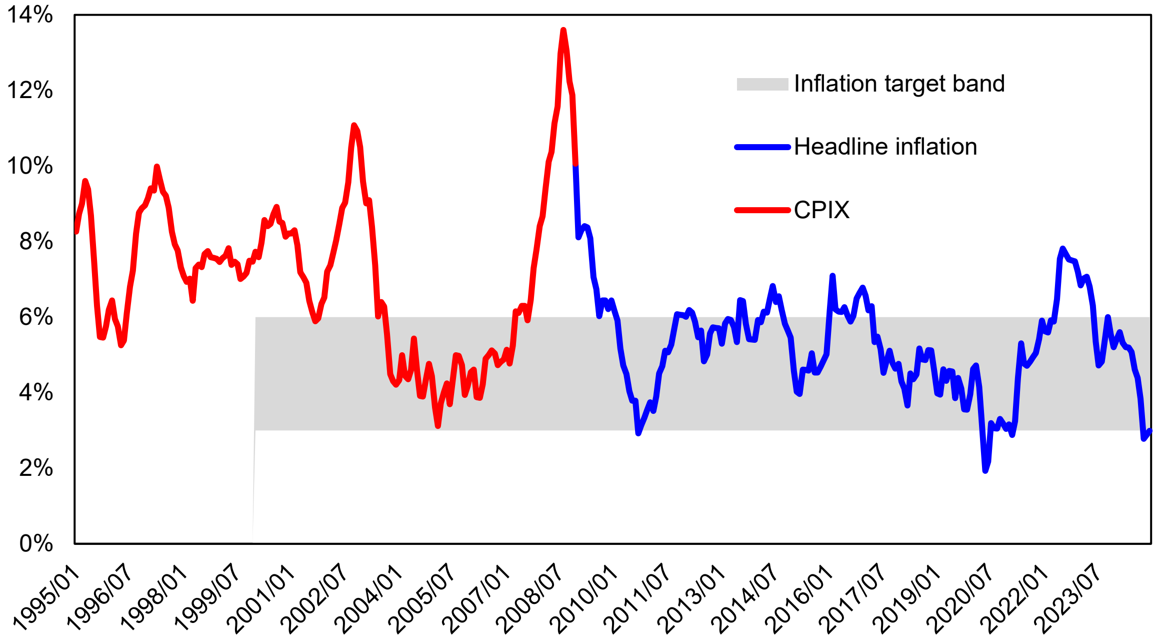
In line with the expectations presented in the literature review:

1. South Africa's level of inflation fell and remained, on average, below the top end of the target band in the wake of the shift towards a 3–6% inflation target band

in January 2000 (Figure 1).

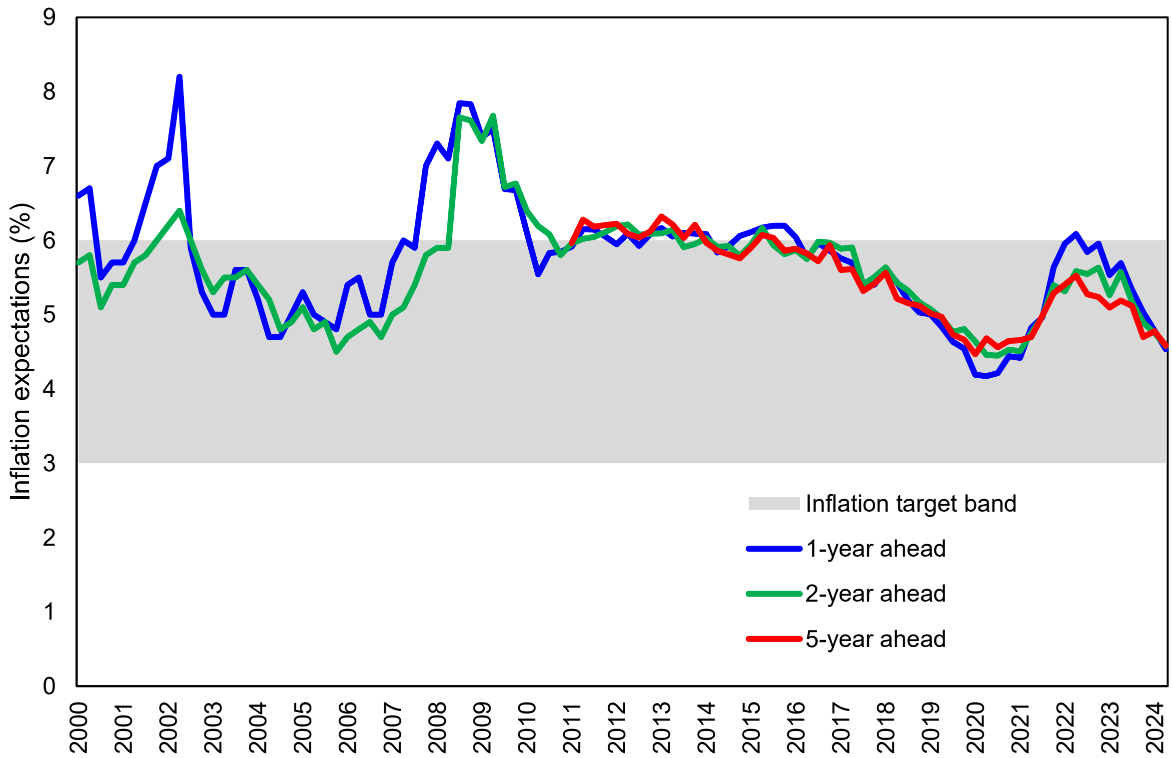
2. The level of inflation fell further in the wake of the shift towards the midpoint of the inflation target band in 2017 (Figure 1).
3. Inflation *expectations* fell into the inflation target band in the wake of the shift towards the inflation target band in January 2000 and remained around the top end until the guidance towards 4.5% became more explicit (Figure 2).
4. Inflation *expectations* fell further in the wake of the shift towards the midpoint of the inflation target band (Figure 2).
5. Inflation expectations became less volatile after the inflation target band was adopted in January 2000 (Figures 3 and 4). However, this drop was not consistent. In fact, realised volatility first lifted as inflation spiked shortly after the announcement of the adoption of the inflation target band in response to the dramatic rand depreciation towards the end of 2001. Thereafter, volatility started to subside.
6. Two factors had an impact on inflation volatility during the period where the SARB guided towards a target around the midpoint of the target band. The first relates to the temporary volatility introduced by the fall in expectations from around the top of the band towards the midpoint. The second relates to the sharp increase in inflation due to the disruption in domestic demand and global supply chains in the wake of the COVID-19 pandemic, which resulted in a slight lift in inflation volatility in the period following the SARB's guidance of expectations to the midpoint of the inflation target band (Figure 3). However, one observes a higher variance in one-year-ahead inflation expectations than the five-year-ahead inflation expectations (Figure 4). This suggests that economic agents have become more certain about the SARB's ability to keep inflation anchored around the target over time, even if the economy experiences significant shocks such as the COVID-19 pandemic.

Figure 1: Targeted South African inflation



Source: Statistics South Africa (Stats SA)

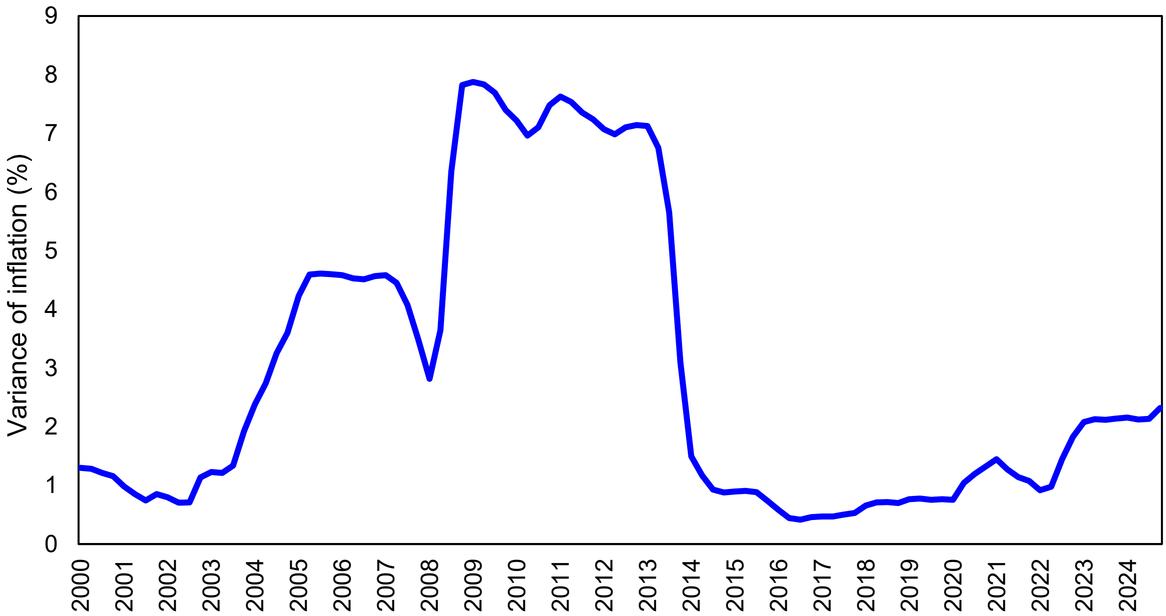
Figure 2: South African inflation expectations[6]



Source: Bureau for Economic Research (BER) inflation expectations survey

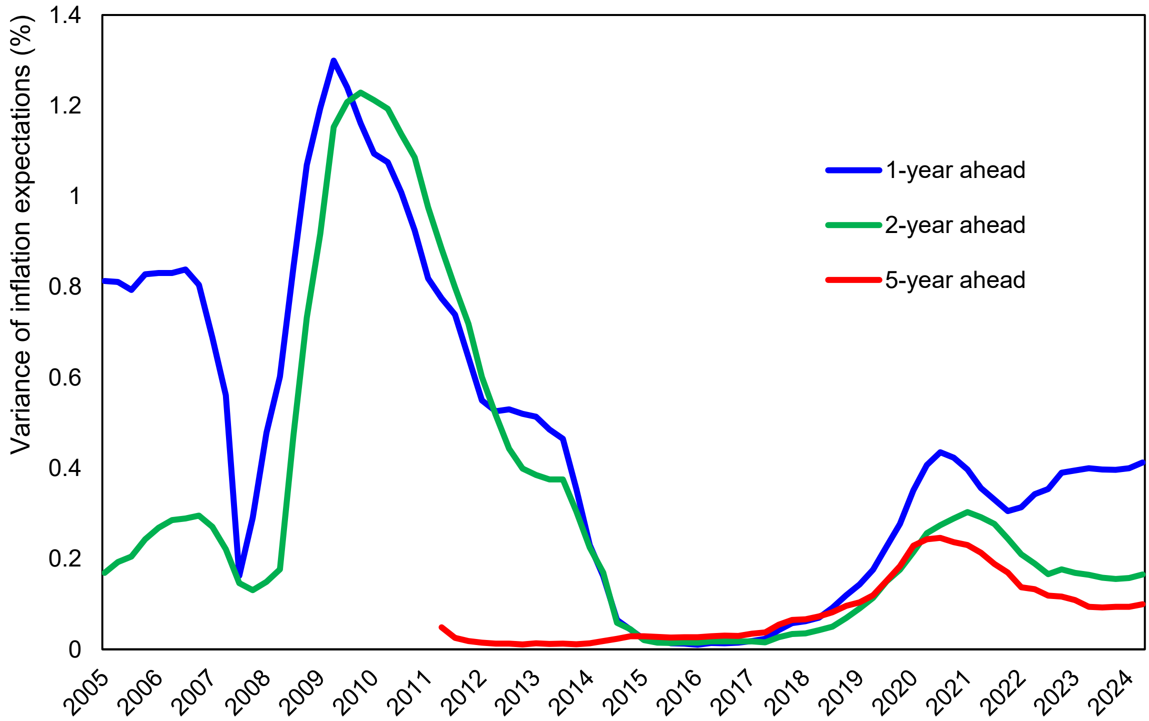
[6] Figures 2 and 4 show CPIX expectations prior to 2009.

Figure 3: South African inflation volatility (20 quarters moving window)



Source: Stats SA; authors' own calculations

Figure 4: Volatility of inflation expectations in South Africa: one-year, two-year and five-year (20 quarters moving window (% y/y))



Source: BER inflation expectations survey; authors' own calculations

The fall in inflation expectations and the decline in the average volatility of inflation and inflation expectations are in line with findings in the literature that a well-defined inflation target leads to lower trend inflation, inflation expectations and inflation uncertainty. Importantly, because lower inflation volatility is associated with a decrease in inflation uncertainty, it is another factor (beyond lower expectations) that should contribute to lower nominal interest rates through a lower inflation risk premium.

5. Estimating the inflation risk premium in South Africa's five-year nominal bond yield

Building on the theoretical framework and empirical context outlined, we investigate the inflation risk premium embedded in South Africa's five-year nominal bond yield. This analysis allows us to quantify the extent to which inflation expectations and monetary policy regimes have influenced medium-term bond pricing.

We use Equation (5) from section 2 to estimate the inflation risk premia embedded in South Africa's five-year bond yield over the period April 2011 to December 2024.

$$\phi^{IRP} = (y_t^N - y_t^{ILB}) + \phi^{LIQ} - \mathbb{E}_t\,[\pi] \qquad (5)$$

We then estimate and compare the average inflation risk premia over the periods April 2011 to June 2017 and July 2017 to December 2024. Between April 2011 and June 2017 the SARB targeted the full 3–6% range, and between July 2017 and December 2024 it explicitly guided expectations to the midpoint of the target band. We then examine the relationship between inflation risk premia, inflation expectations and the shift in communication focus towards the midpoint of the target range. We use an ARDL model to estimate the short- and long-run effects of various factors on inflation risk premia. Finally, we use the results of our analysis to obtain an estimate of how much the five-year nominal government bond yield could fall (structurally) in South Africa if inflation expectations fall from 4.5% to 3.0% in response to the recently announced 3% inflation target.

5.1 Data description

We use the following data to represent the different components in Equation (5):

- Five-year nominal bond yields: monthly average of the five-year zero coupon government bond yield.
- Five-year inflation-linked bond yield: monthly average of the five-year zero coupon government inflation-linked bond yield.
- Five-year inflation expectations: five-year inflation expectations as expressed by financial analysts in the BER inflation expectations survey. The data are available on a quarterly basis. We use linear interpolation to increase the frequency to a monthly basis.
- Five-year liquidity risk premium: the five-year liquidity risk premium is not observable. We estimated a liquidity risk premium by regressing a proxy of liquidity in the inflation-linked bond market against the breakeven inflation rate.

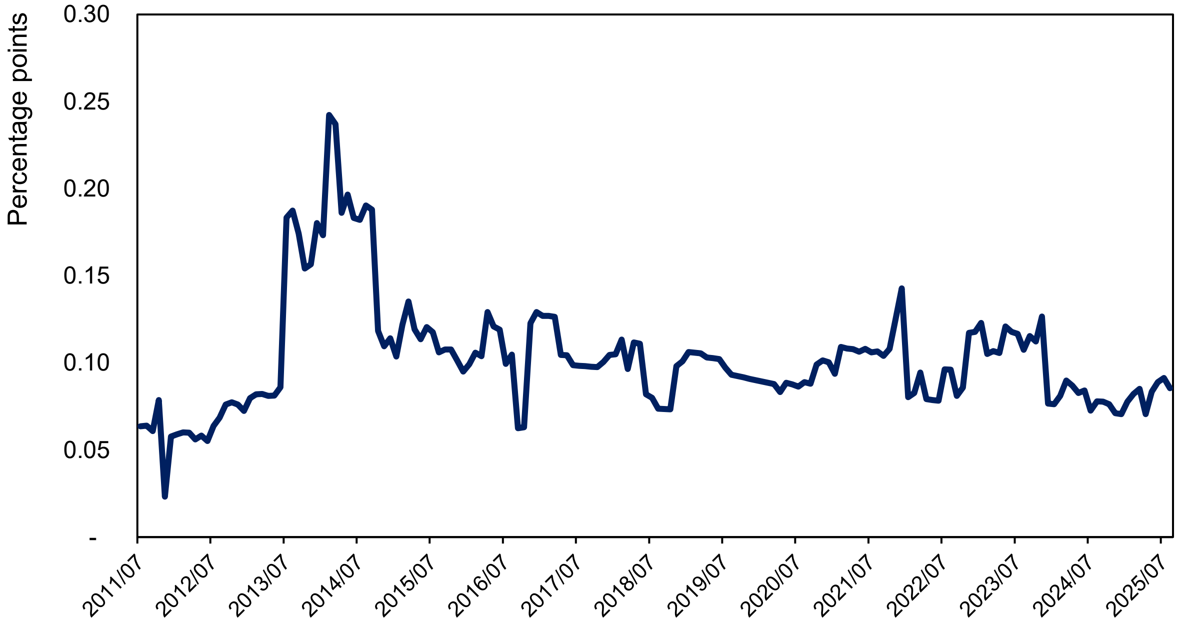
5.2 Estimating the liquidity risk premium

As is the case in most countries that issue inflation-linked bonds, the South African inflation-linked government bond market is not as liquid as that of the nominal government bond market. According to Velandia-Rubiano, David-Pur and Cabral (2022), the illiquidity is, among other reasons, the consequence of the buy-and-hold nature of pension funds and insurance companies that typically hold these instruments. The Bank for International Settlements (2009) notes that the inflation-linked bond market tends to be more illiquid than the nominal bond market, suggesting that the depth of the market plays a significant role in the lower liquidity characteristics. Given the relatively small size of the South African inflation-linked bond market (only around R1.25 trillion of issuance compared with more than R6 trillion of debt), it is not surprising that South Africa’s inflation-linked bond market is also quite illiquid.

To control for the liquidity risk premium that investors would require to hold an inflation-linked bond, we estimated a proxy for the liquidity in the South African bond market. This proxy is the bid-offer spread of an interpolated constant maturity five-year inflation-linked bond over the sample period.

Figure 5 shows the bid-offer proxy over the sample period. In the absence of readily available time series for both the bid and offer yields for a constant five-year-maturity bond in the South African market, the bid and offer yields of several inflation-linked bonds of different maturity dates were used to infer a constant five-year bid yield and a constant five-year offer yield. The bid and offer yields of the respective bonds were obtained from Bloomberg. Linear interpolations were used to infer the five-year maturity point and missing values where they were not available.

Figure 5: Interpolated constant maturity five-year bid-offer spread for an inflation-linked bond



Source: Bloomberg and own calculations

The average bid-offer spread on the five-year inflation-linked bond proxy was 10 basis points over the sample period. The finding that the bid-offer spread for our inflation-linked bond proxy is quite wide is supported by the fact that the average bid-offer spreads on medium-term inflation-linked bonds were between 8 and 9 basis points over the sample period. This compares with the bid-offer spread of a liquid nominal bond that is around 3 basis points (e.g. the R186 bond).

We regressed this spread against the breakeven inflation rate over the sample period and controlled for the expected average inflation rate by including the analysts' five-year inflation expectations (as reflected in the BER inflation expectations survey) in the following regression equation:

$$\mathbb{E}_t\,[\pi]^{BE} = \alpha\mathbb{E}_t\,[\pi] + \beta{\phi_t}^{LIQproxy} + \varepsilon_t \qquad (6)$$

Table 3: Results of liquidity premium proxy regression

Variables	Coefficient
5Y ILB bid-offer spread	2.906**
	(1.222)
5Y inflation expectations	1.084***
	(0.026)
Observations	162
R-squared	0.992

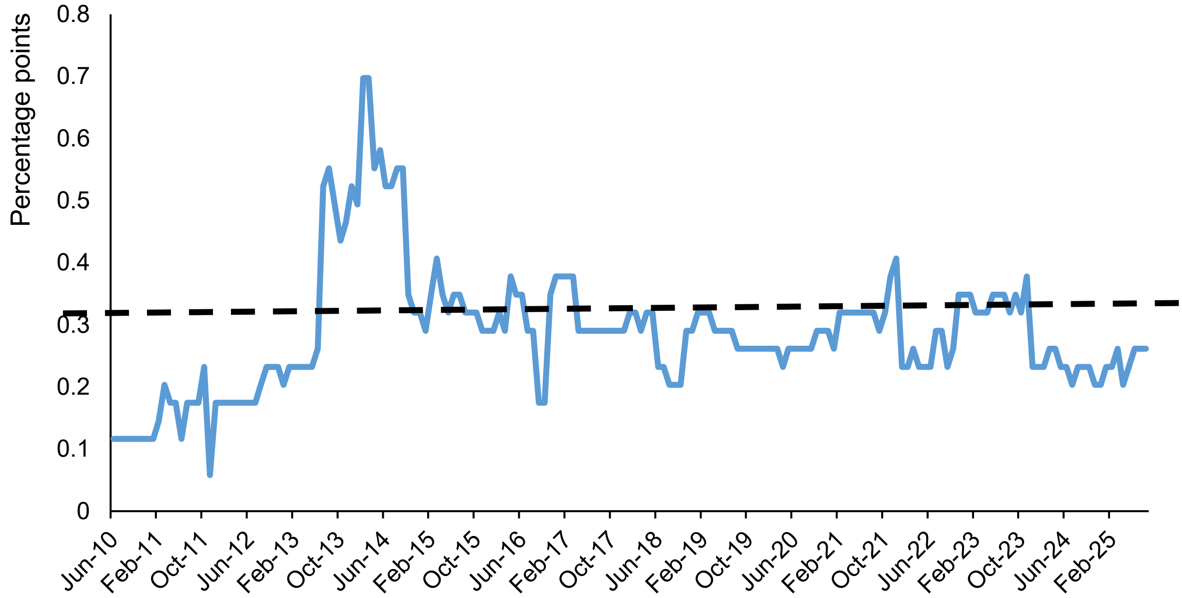
Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

We used the result to solve for a liquidity spread using the following equation:

$${\phi_t}^{LIQ} = \beta{\phi_t}^{LIQproxy} \qquad (7)$$

This provided an estimated average liquidity spread of 30.2 basis points over the sample period (more detail in Table 4 below). Figure 6 reflects the estimated liquidity premium over time. The marked increase in the spread over the mid-2013 to mid-2014 period corresponds with the ‘taper-tantrum’ and resultant fallout in global bond markets (the rand and South African bonds came under marked pressure). While the liquidity proxy did lift from the pre-COVID-19 lows and remained above its average well into 2021, the fact that it did not increase more could be ascribed to the significant measures the SARB took to inject liquidity into South African financial markets (Shikwane, de Beer and Meyer 2020).

Figure 6: Estimated liquidity premium for the five-year inflation-linked bond yield



Source: Own calculations

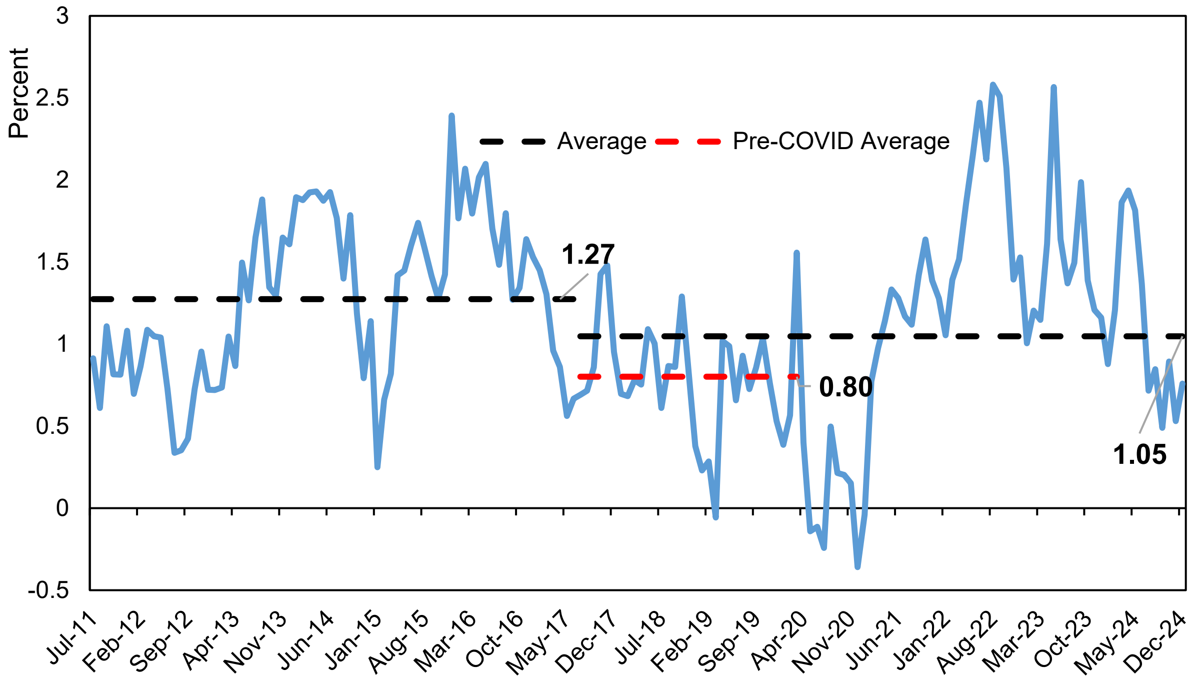
5.3 Implied inflation risk premium and the impact of lower inflation expectations on it

Using the data described in section 5.1 and the estimated liquidity premium (section 5.2), we can solve for the estimated inflation risk premium, using Equation (5):

$$\phi^{IRP} = (y_t^N - y_t^{ILB}) + \phi^{LIQ} - \mathbb{E}_t[\pi] \qquad (5)$$

Figure 7 shows the estimated inflation risk premium over the sample period. Our results indicate that the inflation risk premium averaged 127 basis points when inflation expectations averaged 5.5% during the period where the SARB was targeting the full 3–6% target range (between July 2011 and June 2017). After the SARB became explicit in targeting the midpoint of the target band, this risk premium dropped to an average of 105 basis points when inflation expectations averaged 4.7% (between July 2017 and December 2024).

Figure 7: Estimated inflation risk premia



Source: Own calculations

As previously noted, the COVID-19 pandemic introduced substantial volatility into the bond market, temporarily elevating inflation risk premia as uncertainty spiked. When we end the sample at the onset of the pandemic (March 2020), the inflation risk premium averaged 80 basis points, with inflation expectations averaging 5%.

Table 4 provides a decomposition of a five-year nominal bond yield into the different components, as expressed in Equation (4). Column 7 shows the inflation risk premia across the different sample periods, while column 4 shows inflation expectations. It is clear that as the SARB became explicit in its intention to target the midpoint of the target band, the inflation expectations component in nominal bond yields dropped and the inflation risk premium in bond yields declined.

The drop in inflation expectations and inflation risk premia was, however, more than offset by a lift in the real yield (column 5). This increase was likely due to a deterioration in South Africa's sovereign risk premia, although the proof of this assertion is beyond the scope of this paper.

Table 4: Descriptive statistics and implied inflation risk premium for the five-year inflation-linked bond

	(1) 5-year nominal yield (%)	(2) 5-year ILB yield (%)	(3) Implied breakeven inflation (%)	(4) 5-year BER inflation expectations (%)	(5) Estimated 5-year real yield (%)	(6) Estimated liquidity risk premium (%)	(7) Estimated inflation risk premium (%)
July 2011 – December 2024							
Average	8.18	2.25	5.92	5.08	1.95	0.30	1.15
Standard deviation	1.12	1.21	0.79	0.45	1.22	0.10	0.59
July 2011 – June 2017							
Average	7.63	1.18	6.45	5.50	0.86	0.33	1.27
Standard deviation	0.90	0.66	0.47	0.11	0.65	0.14	0.50
July 2017 – December 2024							
Average	8.62	3.11	5.51	4.74	2.83	0.28	1.05
Standard deviation	1.09	0.78	0.75	0.31	0.79	0.05	0.64
July 2017 – March 2020							
Average	8.26	2.74	5.38	5.00	2.50	0.28	0.80
Standard deviation	0.43	0.42	0.45	0.26	0.43	0.03	0.35

Source: Own calculations

5.4 The relationship between inflation guidance, inflation expectations and inflation risk premia

To confirm statistically whether the fall in inflation risk premia was the result of the SARB's guidance towards targeting the midpoint of the target band, or whether it was the indirect result of a fall in inflation expectations, we examined the relationship between the shift to the midpoint of the target, five-year inflation expectations and the estimated inflation risk premium in South Africa's bond market. We estimate three ordinary least squares (OLS) regressions using monthly data from July 2011 to December 2024:

$$\phi^{IRP} = \beta_0 + \beta_1 Target + \beta_2 Covid1 + \beta_3 Covid2 + \mathcal{E}t \tag{8}$$

$$\phi^{IRP} = \delta_0 + \delta_1 Target + \delta_2 \mathbb{E}_t\,[\pi] + \delta_3 Covid1 + \delta_4 Covid2 + \mathcal{E}t \tag{9}$$

$$\phi^{IRP} = \gamma_0 + \gamma_1 \mathbb{E}_t[\pi] + \gamma_2 Target + \gamma_3 Target \times \mathbb{E}_t[\pi] + \gamma_4 Covid1 + \gamma_5 Covid2 + \varepsilon t \quad (10)$$

where $Target$ is a binary variable that equals 0 before the SARB's explicit guidance (July 2011 to June 2017) towards the midpoint of the inflation target (4.5%) and 1 after (from July 2017 onwards). To control for the exogenous COVID-19 shock, we include two binary variables, $Covid1$ and $Covid2$. $Covid1$ represents the period where the COVID-19 lockdown caused a significant deflationary shock as domestic demand collapsed, and $Covid2$ represents the period thereafter where the disruption in supply chains and recovery in domestic demand caused a significant inflationary shock. The $Covid1$ dummy takes on the value of 1 between April 2020 and April 2021 and $Covid2$ takes on the value of 1 between May 2021 and December 2023.

The columns in Table 5 represent the results of each estimation. The results of the estimation of Equation (8) indicate that, on average, the inflation risk premium decreased by about 39 basis points (coefficient = -0.391) after the SARB shifted towards the midpoint of the target band. The two COVID variables indicate, as expected, that the initial COVID-19 shock coincided with a significant reduction in the inflation risk premium (Covid 1 coefficient = -0.671) and that the subsequent inflationary COVID-19 period coincided with an increase in the inflation risk premium of 71 basis points. This suggests that the inflation risk premium responds strongly to extreme tail-risk events. These results provide initial evidence that monetary policy credibility and large, exogenous shocks play a central role in shaping the inflation risk premium.

Column 2 shows the results of the estimation of Equation (9), where the five-year inflation expectations are included along with the dummy variable controlling for a reduction in the target. In this instance, the (absolute value) of the coefficient on the target dummy variable decreases to 0.28 and its statistical significance declines. At the same time, inflation expectations have the expected directional impact but are not statistically significant (at a level above 90% confidence). This suggests that the inflation risk premium may be more sensitive to the risk of extreme deviations from expected inflation rather than just marginal changes. The interaction between inflation expectations and the target dummy, shown in column 3, is also insignificant, suggesting that the introduction of an explicit point target did not alter the sensitivity of the inflation risk premium to expectation changes (i.e. the market's behaviour did not change).

The R-squared values (around 0.38) indicate that the equations explain a relatively modest share of the variation in inflation risk premia. That said, low R-squared values are common in empirical finance and macroeconomic studies because asset prices and risk premia are influenced by several factors, such as global risk sentiment, liquidity conditions and term premia.

Table 5: The relationship between the inflation target, inflation expectations and the inflation risk premium: regression results

	(1)	(2)	(3)
Variables	**Baseline**	**With controls**	**Include interaction**
Target	-0.391***	-0.284**	3.336
	(0.086)	(0.123)	(3.568)
Inflation expectations		0.166	0.757
		(0.163)	(0.631)
Interaction term			-0.667
			(0.653)
Covid 1	-0.617***	-0.538***	-0.575***
	(0.142)	(0.172)	(0.174)
Covid 2	0.712***	0.735***	0.725***
	(0.104)	(0.113)	(0.114)
Constant	1.274***	0.360	-2.887
	(0.059)	(0.899)	(3.471)
Observations	162	162	162
R-squared	0.374	0.378	0.383

Note: The sample period for the results in this table is July 2011 to December 2024. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

The results from Equations (8) and (9) introduce the possibility that the market may be reacting to deviations from the inflation target. To capture this possibility, we introduce an 'inflation gap' variable into the specification that measures the deviations of inflation from the inflation target ($\pi_{GAP} = \pi_{ACTUAL} - \pi_{TARGET}$).

The results are shown in Table 6. Column 1 shows the baseline regression. Column 2 introduces the inflation gap into the baseline specification and shows that the inflation risk premium rises when inflation deviates from the perceived policy anchor, as indicated by the positive and highly significant coefficient (0.263) on the inflation gap.

The coefficient on the inflation target remains significant and negative but increases in magnitude, indicating that the reduction in the target contributed to a 45.5-basis-point reduction in the inflation risk premium. This suggests that, once inflation deviations are accounted for, the effect of the formal target on the inflation risk premium is more clearly observed. Notably, the coefficients on the COVID dummies decline in magnitude once the inflation gap is included, implying that part of the inflation risk premium response during the COVID-19 period was driven by inflationary pressure itself, which is now captured by the inflation gap. The remaining COVID-19 effects are still significant, indicating that the inflation risk premium is sensitive to residual tail-risk events beyond realised inflation deviations. Columns 3 and 4 show, again, that inflation expectations and the interaction components are not statistically significant.

Table 6: Results of regression analysis, including the 'inflation gap' variable

	(1)	(2)	(3)	(4)
Variables	**Baseline**	**Include inflation gap**	**With inflation expectations**	**Include interaction**
Target	-0.391***	-0.455***	-0.578***	1.445
	(0.086)	(0.078)	(0.112)	(3.234)
Inflation gap		0.263***	0.282***	0.278***
		(0.043)	(0.048)	(0.048)
Inflation expectations			-0.185	0.149
			(0.153)	(0.587)
Interaction				-0.372
				(0.591)
Covid 1	-0.617***	-0.251*	-0.313**	-0.336**
	(0.142)	(0.138)	(0.147)	(0.148)
Covid 2	0.712***	0.284***	0.229*	0.229*
	(0.104)	(0.105)	(0.126)	(0.126)
Constant	1.274***	1.353***	2.374***	0.536
	(0.059)	(0.054)	(0.845)	(3.223)
Observations	162	162	162	162
R-squared	0.374	0.484	0.488	0.489

Source: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

5.5 A dynamic model for inflation risk premia[7]

The static regressions indicate that inflation expectations are not strongly correlated with the inflation risk premium. This is consistent with the notion that, in the short run, the inflation risk premium is primarily driven by realised deviations from the target and by tail-risk events, while changes in long-run expectations carry limited information. However, these static models do not capture the potential dynamic and long-run effects of persistent inflation expectation changes, which may accumulate over time and gradually influence risk premia.

To get a more complete understanding of the drivers and dynamics behind the inflation risk premia, we estimate a dynamic statistical model that accounts for persistence and additional controls. Specifically, we estimate an ARDL model that allows for the inclusion of both contemporaneous and lagged values of the explanatory variables, as well as lagged values of the dependent variable, to capture short-run dynamics and persistence. The optimal lag structure for the ARDL model was determined using the Akaike information criterion, with a maximum of two lags considered for each variable. The resulting model was ARDL (1,0,2,0,0,1,0). The model is expressed as:

$$\phi^{IRP}{}_t = \beta_1 \phi^{IRP}{}_{t-1} + \beta_2 \mathbb{E}_t\,[\pi] + \beta_3 \pi_{GAP\,t} + \beta_4 \pi_{GAP\,t-1} + \beta_5 \pi_{GAP\,t-2} + \beta_5 \Delta ZAR_t + \beta_6 Target_t + \beta_7 Covid1_t + \beta_8 Covid1_{t-1} + \beta_9 Covid2_t + \mathcal{E}_t \quad (11)$$

where π_{GAP} represents the deviations of inflation from the inflation target, ΔZAR_t represents changes in the rand-dollar exchange rate, and $Covid1_t$ and $Covid2_t$ represent two binary variables to account for the COVID-19 pandemic. The results are shown in Table 7.

[7] See Annex A3 for unit root test results.

Table 7: Results of ARDL analysis

	(1)
Variables	**ARDL short-run**
${\phi^{IRP}}_{t-1}$	0.727***
	(0.058)
$\mathbb{E}_t\,[\pi]$	0.062***
	(0.016)
${\pi_{GAP}}_t$	0.056
	(0.060)
${\pi_{GAP}}_{t-1}$	0.109
	(0.084)
${\pi_{GAP}}_{t-2}$	-0.120**
	(0.059)
ΔZAR_t	0.254***
	(0.043)
$Target_t$	-0.074
	(0.058)
$Covid1_t$	-0.579**
	(0.234)
$Covid1_{t-1}$	0.621**
	(0.243)
$Covid2_t$	0.088
	(0.092)
Observations	159
R-squared	0.950

Source: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

The model indicates that the inflation risk premium is *highly persistent*. The coefficients on the lagged inflation risk premium are large and significant for the first lag (β_1= 0.727). We can interpret this result as a 100-basis-point fall (increase) in the inflation risk premium in the previous period (last month) is correlated with a 72-basis-point fall (increase) in this period (this month) (and vice versa). This implies that shocks to the inflation risk premium decay slowly over time.

The target dummy variable representing a shift in the inflation target is insignificant, indicating that once inflation dynamics and macroeconomic shocks are controlled for, the target change does not exert a strong immediate effect on the inflation risk premium in this dynamic specification. This is likely because a shift in the inflation target influences the inflation risk premium indirectly, through changing inflation expectations.

Inflationary pressures, measured by the inflation gap, affect the inflation risk premium through a lagged structure. While contemporaneous and first-lag effects are not statistically significant, the second lag of the inflation gap enters with a negative and statistically significant coefficient. This pattern suggests that inflation surprises may initially raise the inflation risk premium but are subsequently reversed as inflation outcomes evolve or as policy responses reduce perceived inflation risk.

COVID-related shocks exhibit pronounced but transitory effects. The contemporaneous initial COVID-19 shock (shown by Covid 1) is associated with a reduction of 58 basis points in the inflation risk premium, followed by a statistically significant rebound in the subsequent period. This pattern is consistent, with temporary repricing driven by extreme uncertainty and policy interventions during the pandemic, rather than a permanent shift in inflation risk pricing. It is interesting to note that the post-COVID indicator is not statistically significant. While this may suggest that the effects of the pandemic on the inflation risk premium dissipated once acute disruptions subsided, its effects may also be captured by the inflation gap variable.

The effect of inflation expectations on inflation risk premia in the short run is positive and statistically significant but small: a 100-basis-point increase in inflation expectations is correlated with only a 6-basis-point increase in the inflation risk premium. However, this does not negate the effect of inflation expectations on risk premia; rather it implies that their influence is more likely to be seen over time.

While the ARDL specification captures rich short-run dynamics, it does not distinguish between transitory fluctuations and long-run equilibrium relationships. To address this, Table 7 presents the error-correction representation of the ARDL model.

Panel A of Table 8 shows that the adjustment coefficient on the lagged inflation risk premium is negative and statistically significant at the 1% level, indicating the presence of a stable long-run relationship among the variables. The magnitude of the adjustment term implies that approximately 27% of deviations of inflation risk premia from their long-run equilibrium level are corrected within a month, pointing to relatively rapid adjustment dynamics.

Long-run results shown in Panel B suggest that changes in the exchange rate have amplified effects at equilibrium. By contrast, the inflation gap does not enter significantly in the long-run relationship, suggesting that deviations of inflation from the target may only influence the inflation risk premium primarily through transitory channels rather than permanent repricing. The inflation target dummy is negative in the long-run relationship but not statistically significant, indicating that the target change does not independently shift the long-run level of the inflation risk premium once expectations and exchange rate dynamics are accounted for. Similarly, COVID-related indicators are not statistically significant in the long run.

However, the long-run coefficient on inflation expectations is positive and highly significant (0.227), showing that a 100-basis-point decrease (increase) in inflation expectations lowers (raises) the inflation risk premium by about 23 basis points over time.

Short-run dynamics in the error-correction model, shown in Panel C, are dominated by temporary shocks. Changes in the inflation gap exhibit limited contemporaneous effects but enter significantly at a lag, consistent with a delayed adjustment of inflation risk pricing to realised inflation outcomes. COVID-19 shocks exert large and statistically significant short-run effects, reflecting abrupt shifts in uncertainty during periods of acute stress.

Taken together, these results indicate that inflation expectations anchor the long-run level of inflation risk premia, while realised deviations from the inflation target and tail-risk events drive short-run fluctuations around that equilibrium.

Table 8: Error correction model

Panel A: Adjustment term	
	(1)
L.Inflation risk premium	-0.273***
	(0.058)
Observations	159

Panel B: Long-run dynamics	
	(1)
5Y inflation expectations	0.227***
	(0.025)
Inflation gap	0.164
	(0.133)
ΔZAR	0.930***
	(0.271)
Target dummy	-0.271
	(0.203)
Covid shock	0.153
	(0.421)
Post-Covid indicator	0.323
	(0.328)
Observations	159

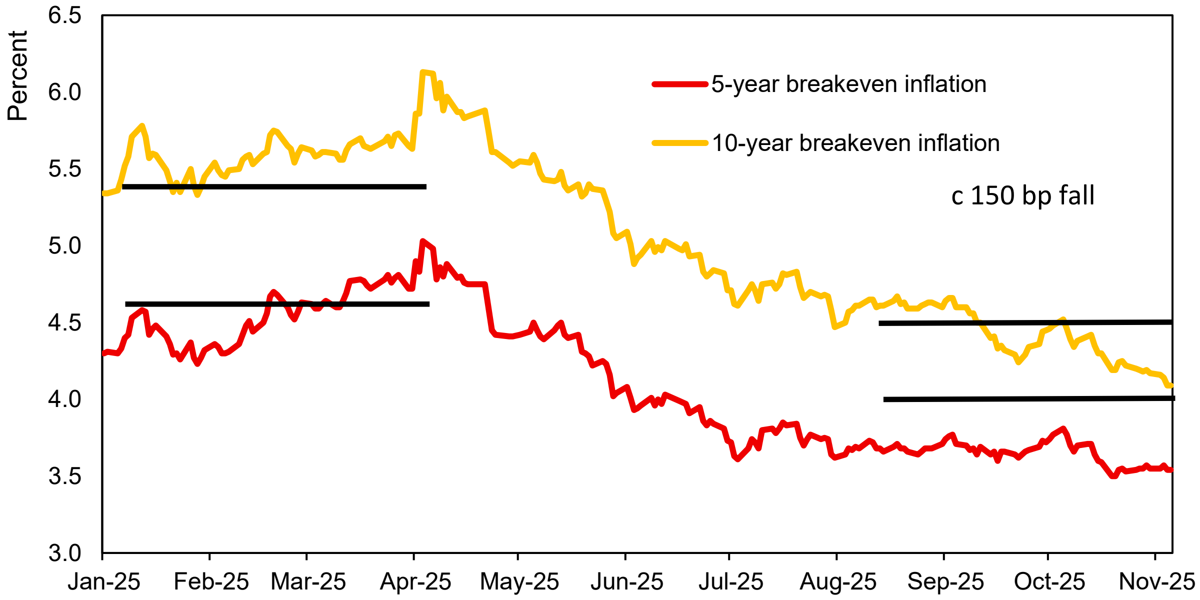
Panel C: Short-run dynamics	
	(1)
D.Inflation gap	0.011
	(0.059)
LD.Inflation gap	0.120**
	(0.059)
D.Covid shock	-0.621**
	(0.243)
Observations	159

Note: Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

6. The implication of lower inflation expectations and inflation risk premia

In this section, we provide an estimate of the savings that could result from declines in both inflation expectations and the inflation risk premium in nominal bonds. With the SARB now targeting 3% inflation, and the Minister of Finance confirming this shift, the breakeven inflation rate priced into the bond market has already fallen materially (see Figure 8). Although it is still early, this decline aligns with our earlier findings: both the inflation expectation and inflation risk premium components of the breakeven rate are expected to decrease.

Figure 8: Five- and 10-year breakeven inflation rates

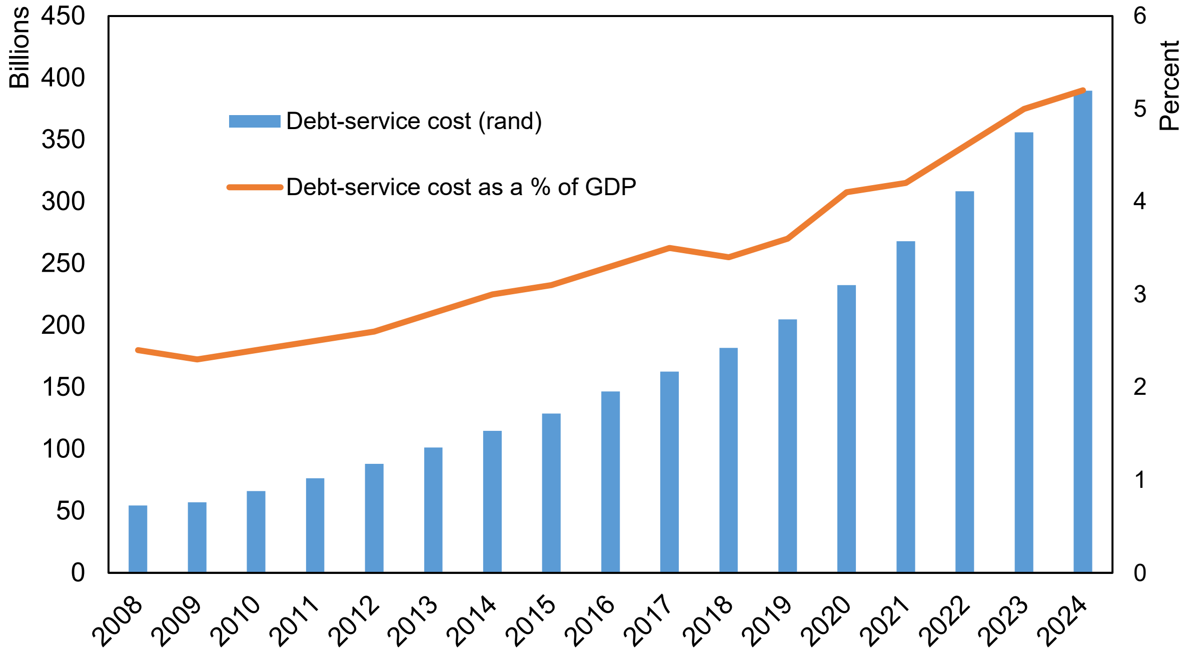


Source: Bloomberg

South Africa's debt burden has increased significantly over the past two decades. For example, government debt has risen from 24% of GDP in 2008 to 77% in 2025 (National Treasury 2025). This higher level of borrowing has resulted in a substantial increase in debt-service costs. As shown in Figure 9, government debt-service costs have climbed steadily since 2008, rising from 2.3% to 5.2% of GDP by 2024.

However, it is not only the government that carries debt. South African households and corporates are also indebted, although to a lesser extent. As of June 2025, households owed about R2.6 trillion, non-financial corporates owed about R2.6 trillion and the government's debt stood at R5.9 trillion. In total, South Africa's non-financial sector debt amounted to R11.1 trillion (International Institute of Finance 2025).

Figure 9: Government debt-service costs



Source: National Treasury 2025

Our analysis allows us to estimate the savings that could accrue to the indebted sectors of the economy. As shown in section 5.5 (Table 8), a 100-basis-point decline in inflation expectations reduces the inflation risk premium by 22.7 basis points in the long run. If the inflation target is reduced from 4.5% to 3%, and inflation expectations fall by 150 basis points as a result, we would expect the inflation expectation component in yields across the curve to decline by 150 basis points, while the inflation risk premium would fall by 34 basis points.

Assuming that the results for the five-year yield hold across the term structure,[8] that the current debt for all sectors will be rolled over at lower yields, and that purchasing

[8] Based on the evidence from the literature review, this would be a conservative assumption for those sectors that pay interest rates priced off longer maturities (the government and some corporates) than the five-year point of the yield curve. It is, however, likely to be an overestimation for those sectors (households) that pay interest rates priced off shorter maturities on the yield curve as the literature suggests the impact of lower inflation risk premia increases along the term structure of yields and interest rates.

power parity holds over time, indebted sectors could experience meaningful savings. The estimated savings are summarised in Table 9.

Table 9: Potential debt-service-cost savings on in-force debt portfolio

	Debt	Total saving (bps)	Total saving	IRP (bps)	IRP saving	IE (bps)	IE saving
Households	R2 562 bn	184	R47.1 bn	33	R8.7 bn	150	R38.4 bn
Non-financial corporates	R2 589 bn	184	R47.6 bn	33	R8.8 bn	150	R38.8 bn
Government	R5 973 bn	184	R109.9 bn	33	R20.3 bn	150	R89.6 bn
Total	R11 100 bn	184	R204.3 bn	33	R37.8 bn	150	R166.5 bn

Source: Own calculations

Note: IRP = inflation risk premium; IE = inflation expectation.

These results suggest that lowering the inflation target can have a marked impact on indebted segments of the economy, with the lower inflation uncertainty premium resulting in real savings. A lower inflation target leads to a lower inflation risk premium; consequently, borrowing costs will be lower for both the public and private sectors. In a fiscally constrained environment, this can result in (gross and net) savings on debt-service costs and create space for much-needed investment in infrastructure and development.

However, these estimates assume that all debt is rolled over at new, lower yields and that market adjustment is both swift and complete. In practice, the speed and magnitude of realised savings will depend on refinancing schedules, prevailing market conditions and the credibility of the inflation-targeting regime.

7. Conclusion

South Africa's experience with inflation targeting has aligned closely with the evidence presented in the literature: credible and transparent monetary policy frameworks reduce inflation uncertainty and, as a result, the inflation risk premium embedded in nominal yields. South Africa's inflation-targeting regime has led to lower variance of inflation and inflation expectations and better alignment with its advanced economy counterparts.

In this paper, we have examined how reducing the inflation target can lower inflation uncertainty and the inflation risk premium embedded in five-year nominal yields. To do this, we decomposed nominal bond yields using the Fisher equation and adjusted for liquidity risk in the inflation-linked bonds. We estimated that the inflation risk premium in South Africa's five-year nominal bond yield averaged 127 basis points when inflation expectations were 5.5% (2011–2017) and dropped to 105 basis points when expectations fell to 4.7% (2017–2024). If one excludes the COVID-19 period (i.e. the shock), the inflation risk premium averaged 80 basis points with expectations at 5% (2017–2020).

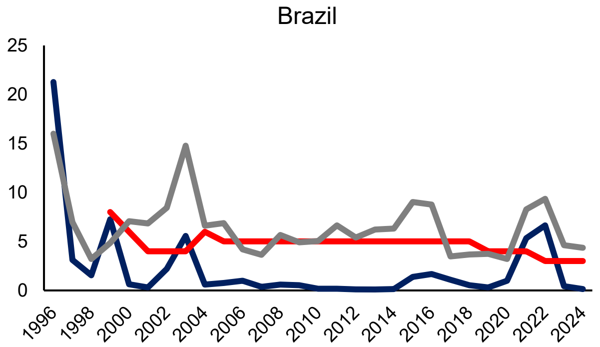
Using OLS regression and ARDL models, we showed that the long-term impact on the inflation risk premium is largely explained by lower inflation expectations following the target change, and not the target change itself. Our results indicate that for every 100-basis-point decrease in inflation expectations, the inflation risk premium drops by about 23 basis points in the long run.

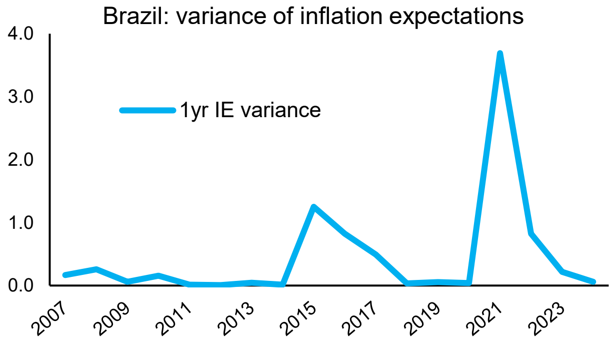
With the Minister of Finance's recent announcement (November 2025) of the new inflation target of 3% (lowered from 4.5%), and if we assume inflation expectations adjust accordingly, our analysis estimates a potential reduction in yields of 184 basis points in the long run (150 basis points from expectations, 34 basis points from risk premium). This could represent meaningful savings in debt-service costs for the government, households and corporates if all debt is rolled over at lower rates. While the fall in inflation expectations should also be reflected in a commensurate fall in other costs and nominal earnings receipts (through time), the savings attributed to the drop in inflation risk premia should represent an absolute savings to borrowers in the economy.

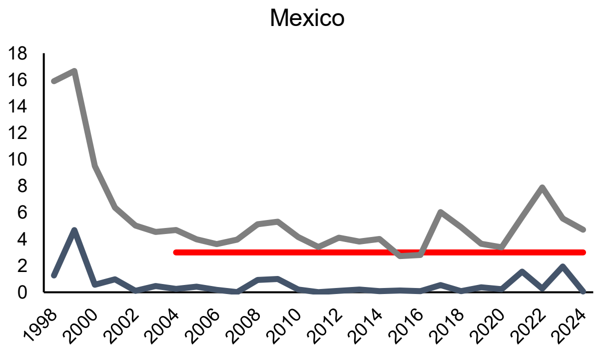
Looking ahead, continued commitment to transparent and credible inflation targeting will be vital for maintaining a low inflation risk premium. Future research could explore the transmission of these effects across different maturities and sectors, perform robustness checks of the estimation of the liquidity risk premium and expand on the savings benefits of lower inflation risk premia to South Africa's economy.

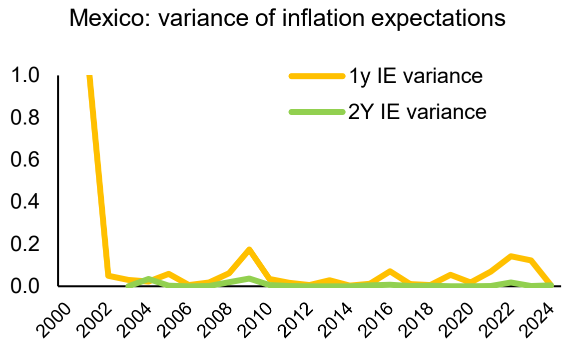
Annexures

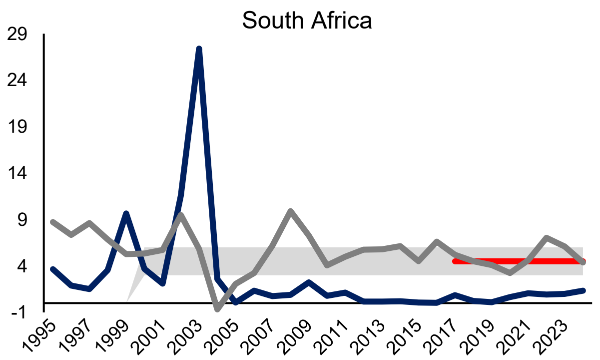
Annex A1: Emerging markets

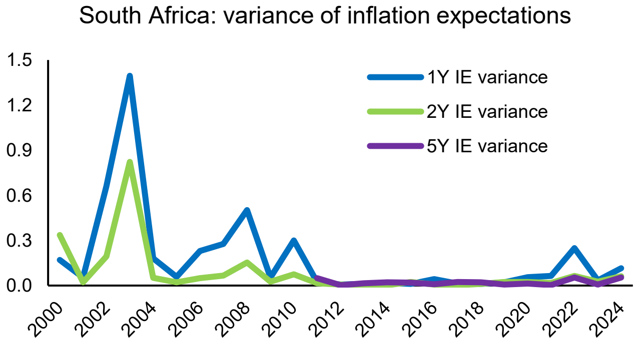


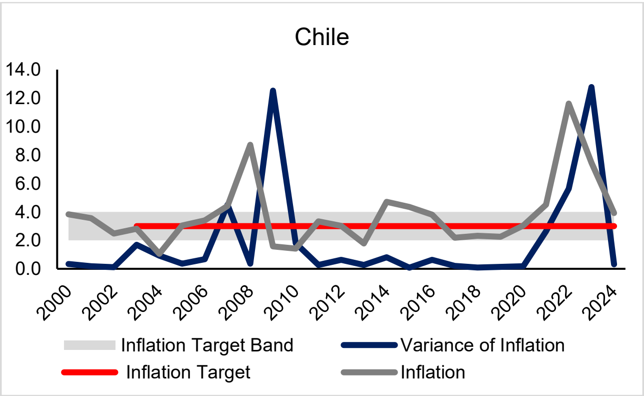


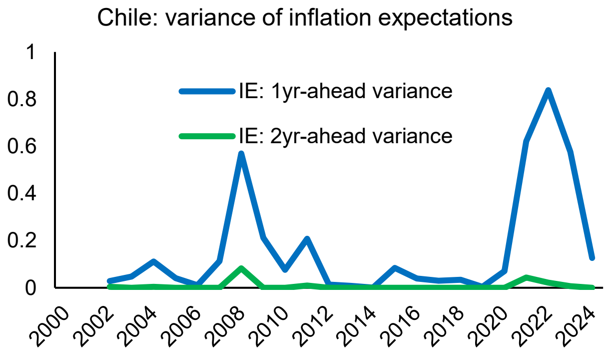




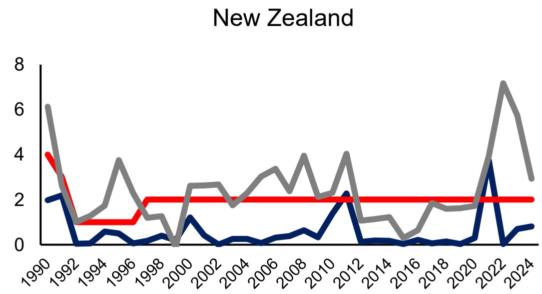


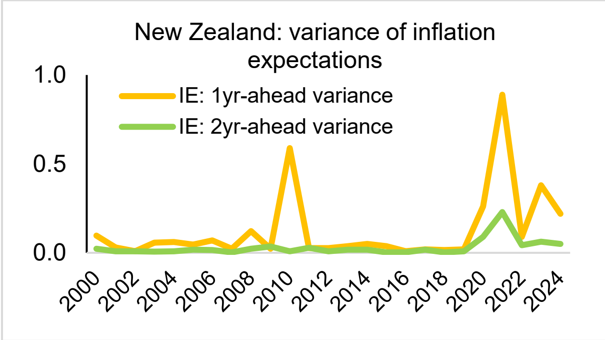


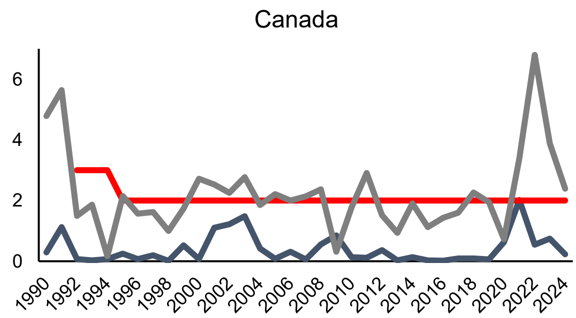


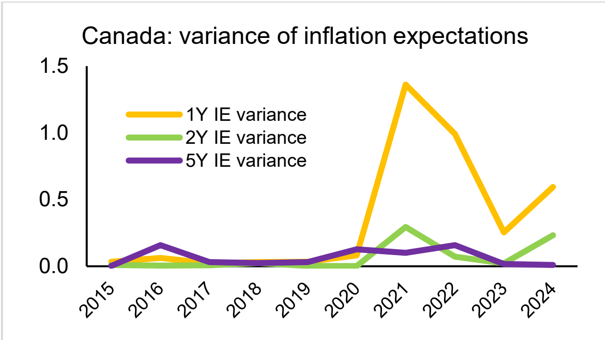


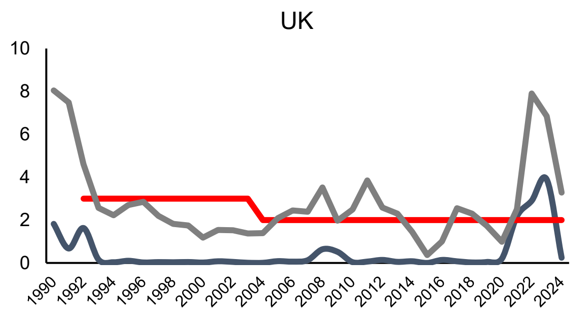
Annex A2: Advanced economies

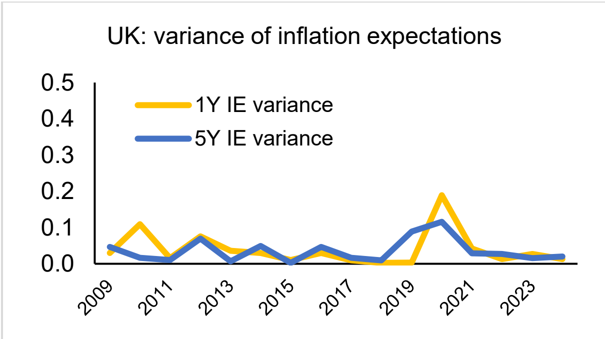


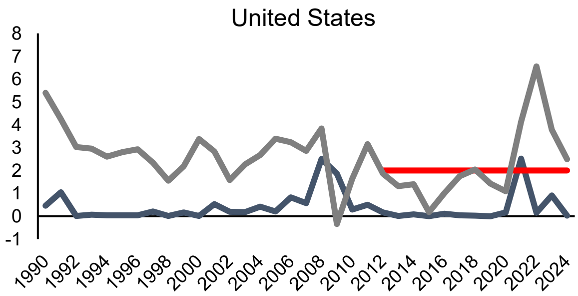


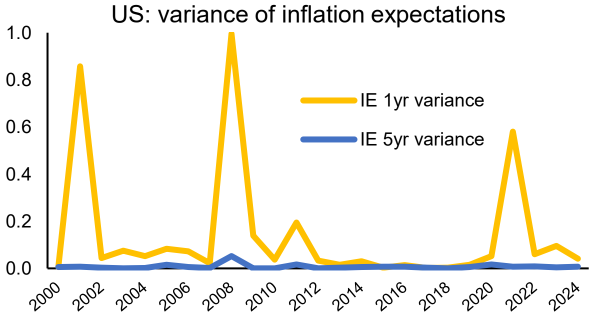


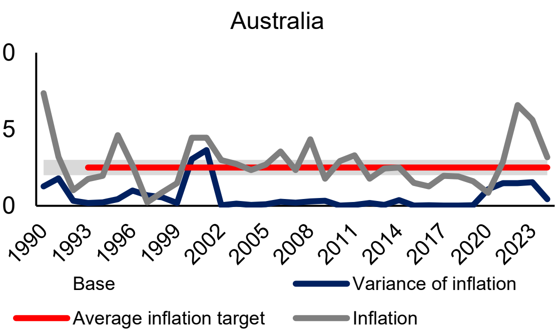


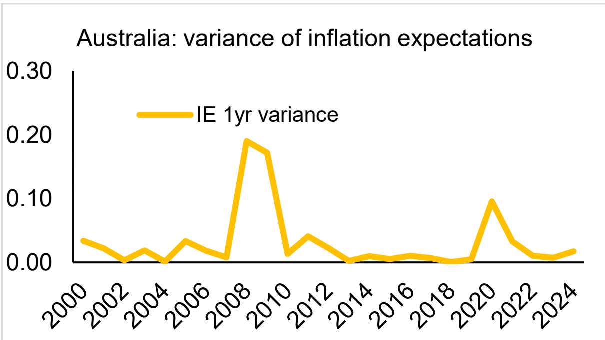












Annex A3: Unit root tests

Table A3.1 reports augmented Dickey-Fuller (ADF) unit root test results for all variables used in the analysis, evaluated in levels and first differences. The reported order of integration is based on standard 5% critical values. The ADF tests are conducted to assess stationarity in levels and first differences. The results indicate that the variables are either stationary in levels or become stationary after first differencing, with none exhibiting integration of order two. This combination of I(0) and I(1) variables supports the use of the ARDL framework, which allows for valid inference in the presence of mixed integration orders.

Table A3.1: Unit root test results

Variable	Obs.	Lags	Test statistic (Z(t))	1% CV	5% CV	10% CV	p-value	Stationary?
IRP	160	1	-3.665	-4.020	-3.442	-3.142	0.0248	Yes (5%)
Inflation expectations	160	1	-2.677	-4.020	-3.442	-3.142	0.2458	No
ΔZAR	159	1	-9.627	-4.020	-3.442	-3.142	0.0000	Yes (1%)
Target	160	1	-1.865	-4.020	-3.442	-3.142	0.6725	No
Inflation gap	160	1	-3.049	-4.020	-3.442	-3.142	0.1189	No

Note: Null hypothesis: series has a unit root (random walk with or without drift).

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