

# Can monetary and fiscal policy account for South Africa's stagnation?

Tumisang Loate and Nicola Viegi

Department of Economics, University of Pretoria, Pretoria, South Africa

## ABSTRACT

This paper examines the interaction between macroeconomic variables and the fiscal and monetary policy mix between 2012 and 2019, a period characterized by increased public debt and risk premium and low economic growth. We use a large Bayesian vector autoregressive model and find that monetary and fiscal policy fails to account for the observed lower real gross domestic product between 2012 and 2019. Based on their historical relationship, the results indicate that we should have observed much higher growth, especially during the 2015 to 2019 period. In addition, we find little evidence that the low growth during the period can be rationalized by the much-criticized anti-growth monetary policy.

## KEYWORDS

Fiscal policy; monetary policy; government debt; risk premium; forecasting

## JEL CLASSIFICATION

E63; F41; H68

## I. Introduction


At least up until 2014, the South African policy mix after the global financial crisis had been strongly countercyclical, with both monetary and fiscal policy being expansionary. Despite this policy mix and the continued debt accumulation, economic growth has trended downward since 2011. There is a considerable debate around the real cause of these economic performances, including adverse supply shocks – electricity supply constraints, increasing labour costs and strikes and lower education outcomes, among others – and negative demand factors such as low government investment, which has crowded out private investment (Loewald, Faulkner, and Makrelov 2020). These factors resulted in low business and consumer confidence.

Another possibility is that deficit-financed expansionary fiscal policy in emerging markets has a speed limit, where any further expansionary fiscal policy has a contractionary effect on the economy, as the positive effect of increasing government expenditure is dominated by the negative effect of the increase in the risk premium and macroeconomic volatility, Bonam and Lukkezen (2019). Thus, while expansionary fiscal policy can stimulate growth in the short-run, sustained deficit-financed fiscal expansion over the long-run can be contractionary through its effect on savings and investment (Gale and Orszag 2003).

In this paper, we investigate the interaction between macroeconomic variables and fiscal and monetary policy mix between 2012Q1 to 2019Q4, a period characterized by an increase in public debt and the risk premium, and low economic growth. A simple analysis of the relationship between public debt, the risk premium, and economic growth indicates non-linearity between the three variables. We find that the relationship between the risk premium and government debt becomes positive after 2010, indicating that above a certain threshold of the debt-to-GDP ratio, fiscal sustainability becomes a concern for investors, who in turn require a higher premium to compensate for the increase in the credit risk of the borrower, Haugh, Ollivaud, and Turner (2009). Furthermore, the non-linear relationship between government debt and economic growth indicates a possible crowding-out effect of debt above a similar threshold. Since we employ a linear model, we focus our analysis on after the 2010 period.

We divide this period into two sub-periods. The first sub-period is between 2012 and 2015, where, while debt was increasing and growth was declining, the risk premium was still lower than its starting value for most of the period, indicating some level of debt sustainability. The yield on long-term bonds averaged 8%. The second sub-period, between 2015

**CONTACT** Tumisang Loate  [tumisang.loate@up.ac.za](mailto:tumisang.loate@up.ac.za)  Department of Economics, University of Pretoria, Pretoria, South Africa 0083

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and 2019, represents a period where the risk premium remained elevated, with the yield on long-term bonds averaging over 9%. Tax policy and monetary policy were also contractionary during the second sub-period. The classification of the two periods is also similar to van Rensburg et al., (2021), who notes that from 2014 onward, the increase in the risk premium was rapid as fiscal conditions worsened and the policy uncertainty increased. We analyse the interrelationship between the macroeconomic variables and the two policies by conducting two conditional scenario analyses to answer the following questions: (1) Can we explain the debt-growth dynamics between 2012 and 2019 based on the observed path of real gross domestic product (GDP) and consumer prices or fiscal policy and monetary policy? and (2) Can the high debt and low growth be explained by changes in monetary policy?

We use a reduced-form model for our analysis. While this approach does not allow us to make inferences about the causal effect of the monetary and fiscal policy on economic activity, it can provide insights into how informative the two policies are in explaining the growth trajectory during the period under study. We follow, among others, Laséen and Sanjani (2016), Bobeica and Jarociński (2019), Jarociński and Smets (2008), Bańbura, Giannone, and Lenza (2015) and Aastveit et al. (2017), and use conditional forecasting. Since conditional forecasts are based on the pre-forecast period parameter estimates of the relationship between the variables as captured by the model, any deviation of the forecast from the actual indicates that either the parameters have changed or the economy has experienced bigger or different shocks not captured by the historical data (Aastveit et al. 2017). More specifically, conditioning on output (alone or with other variables) helps in understanding the comovement of variables with the business cycle – see Jarociński and Smets (2008), Bańbura, Giannone, and Lenza (2015), Aastveit et al. (2017), Giannone, Lenza, and Reichlin (2019) and Caruso, Reichlin, and Ricco (2019).

In the second question, we specifically look at the role of monetary policy in explaining the high

debt and low growth using counterfactual analysis. The three criticisms against monetary policy in South Africa are that the policy has not been stimulative to reduce the large output gaps; the restrictive policy has increased unemployment; and that the central bank should not respond to the second-round effects of supply shocks as these are trivial (Loewald, Faulkner, and Makrelov 2019). While Loewald, Faulkner, and Makrelov (2019) use existing literature to provide counter-arguments against this criticism, we employ a counterfactual analysis. We impose a hard condition on the policy rate while allowing it to remain endogenous, as argued in Waggoner and Zha (1999). Specifically, we study the interrelationship between the variables in a scenario where the monetary policy rate had remained unchanged at the level before the hiking cycle started in the first quarter of 2014. This scenario analysis for monetary policy is similar to Evgenidis and Malliaris (2020), who use conditional forecasting to analyse different scenario outcomes of asset and housing prices when the two variables are conditioned on different monetary policy paths.

We use the Bayesian vector autoregressive (BVAR) model to estimate the interrelationships between the variables.<sup>1</sup> The model's parameters are estimated using quarterly data from 1990Q1 to 2011Q4. Using these estimated parameters, we conduct conditional forecasts and observe the following from our results. Firstly, conditioning on both the monetary policy instrument and government debt fails to account for the observed lower real GDP between 2012 and 2019, even when we incorporate more information in the second sub-period. In fact, the gap between the conditional and observed seems to widen. A possible reason for this forecast uncertainty is a shift in the equilibrium mean of real GDP, which, whether abrupt and temporary or permanent, can result in large and systematic forecast errors (Clements and Hendry 2008; Ericsson 2008). In the case of South Africa, both supply and demand factors have contributed to the lower-than-expected estimates of output growth (Loewald, Faulkner, and Makrelov 2020) and the lack of consistent energy supply can

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<sup>1</sup>Bańbura, Giannone, and Lenza (2015) show that conducting scenario or conditional forecasting exercises with large BVAR produces similar results to employing dynamic factor models for the same exercises.

explain about 40% of the decline in economic growth (Hausmann et al. 2023). While we do not underplay the critical role of macroeconomic policies, our results suggest that during our analysis, supply factors are more informative about the evolution of economic growth than demand factors such as fiscal and monetary policy.

The second observation is that we can account for the increase in debt from 2012 to 2015 when we condition on real GDP. Low economic growth can account for the increase in debt between 2012 and 2015, supporting the negative relationship between debt and economic growth after 2010. However, the widening gap between the conditional forecast and actual debt after 2015 indicates that other factors, such as global shocks and political uncertainty, might be more important in explaining the increase in debt through their effects on long-term rates and the risk premium. Lastly, we observe that monetary policy fails to account for the observed low real GDP growth.

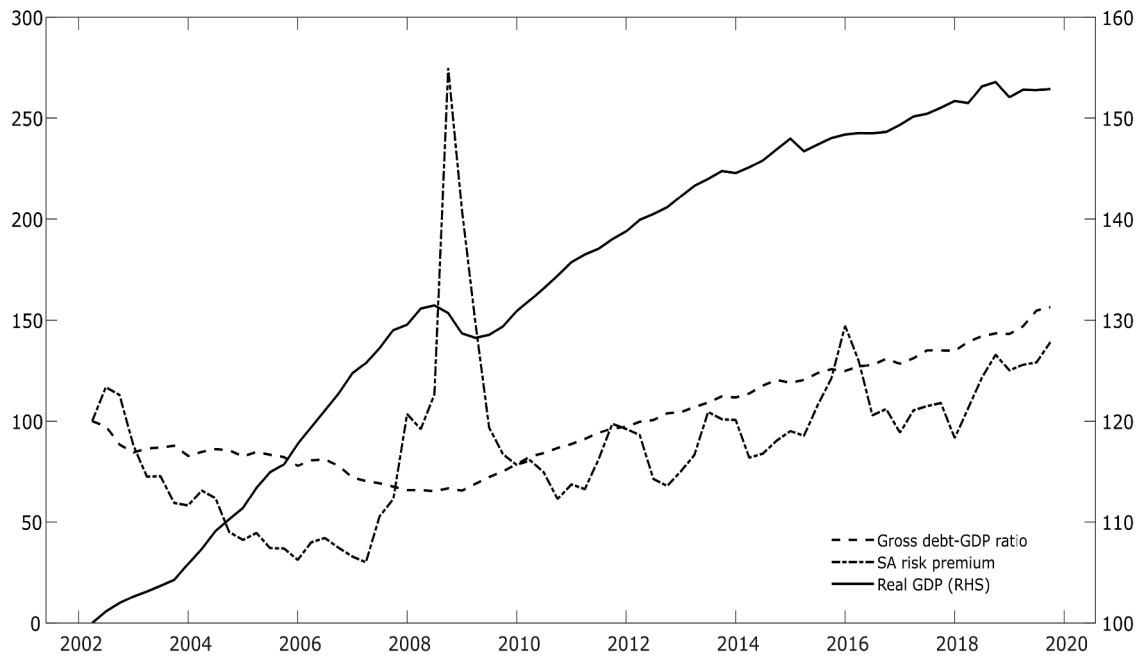
This paper is related to the literature on fiscal-monetary policy interaction and the effect of such interaction on the economy, which includes, among many others, Cavalcanti et al. (2018), Bianchi and Melosi (2019), Bonam and Lukkezen (2019), Bartsch et al. (2020), Davig and Leeper (2011), and Aktas, Kaya, and Özlale (2010). A monetary policy-induced recession can affect the budget deficit in the following ways: (i) lower tax revenue due to low output; or (ii) higher interest payment on government debt, Cavalcanti et al. (2018). The effect can be acute for countries with fiscal rules, as the fiscal adjustment required to balance the budget reinforces the negative effect of the contractionary monetary policy (Cavalcanti et al. 2018). Davig and Leeper (2011) show how monetary-fiscal coordination affects the size of government spending multipliers for the U.S. economy. Under passive monetary policy, where monetary policy authorities do not respond strongly to inflation, government spending crowds in consumption, unlike in the active monetary policy regime where there is a crowding-out effect (Davig and Leeper 2011). Similarly, Bianchi and Melosi (2019) show that lack of policy coordination in a case where the central bank is tough on inflation can lead to a vicious circle of high inflation and interest rates and low output, thus putting upward pressure on debt.

The empirical and theoretical literature on monetary-fiscal policy coordination in South Africa is scarce. Loewald, Faulkner, and Makrelov (2020) provide a discussion on the policy mix in South Africa, whereas research work by Akanbi (2013), Jooste, Liu, and Naraidoo (2013), and van Rensburg, Theo Janse and de Jager, Shaun and Makrelov, Konstantin (2021) focus on the macroeconomic effects of fiscal policy. Thus, we see this paper as a contribution to the literature on monetary-fiscal policy coordination for South Africa. Our study is not without its limitations. Firstly, the sample under analysis does not cover the COVID-19 pandemic. The pandemic period is interesting to study as it captures the deterioration in the fiscal metrics as the government responded to the pandemic. And similar to the 2008 global financial crisis, monetary-fiscal policy coordination was also tested to revive the economy. Secondly, as discussed above, we use a reduced-form model, which does not allow us to make any inference about the causality of the relationship. We leave the latter for future research.

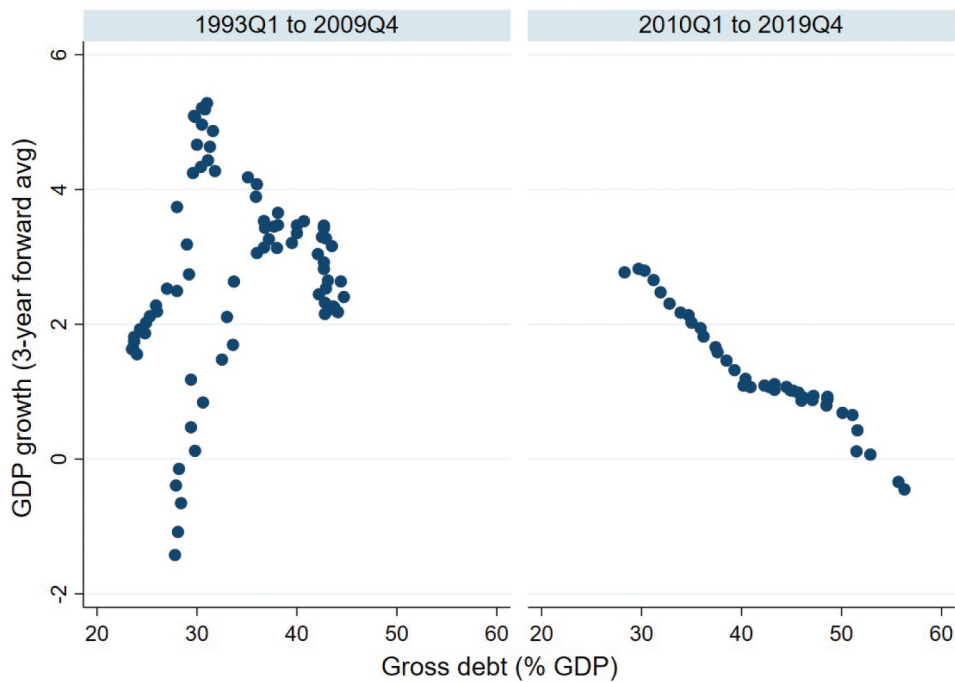
The remainder of the paper is organized as follows. In the next section, we look at some stylized facts before discussing the methodology and data used in Section III. The results for our conditional forecasting scenario are presented in Section IV before concluding in Section V.

## II. Economic growth, debt and the risk premium

To understand the relationship between government debt, economic growth and the risk premium, we evaluate their correlations. We are interested in whether there was a change in the debt-growth dynamics relationship and the risk premium and debt. Based on Figure 1, we consider the correlations before and after 2010, when government debt shifted upward. Figure 2 shows the correlation between real GDP and debt-to-GDP ratio for 1993Q1 to 2009Q4 on the left panel and for the 2010Q1 to 2019Q4 period on the right panel. We use the three-year forward average real GDP growth to address the bidirectional causality between debt and economic growth. The scatter plot for the debt-to-GDP ratio and risk premium in Figure 3 is dictated by the start date of the data for the risk premium. Again, the correlation is also



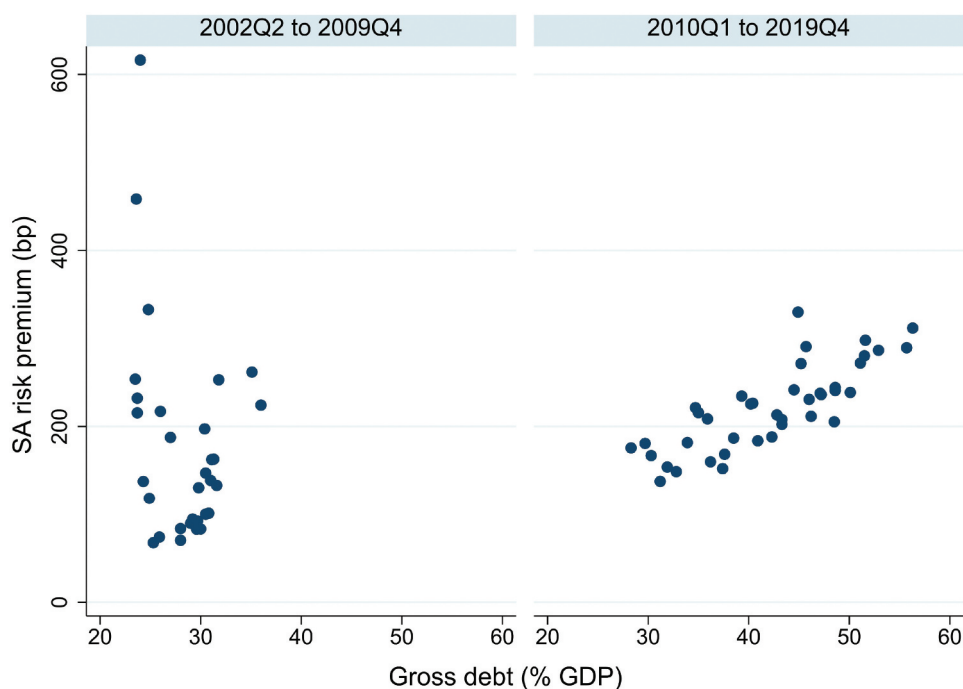
**Figure 1.** Real economic growth vs debt-to-gdp vs risk premium. Source: South African Reserve Bank (SARB), JP Morgan, authors' calculations. Note: All variables are indexed to 100 at the start of the sample period.



**Figure 2.** Real economic growth and debt-to-gdp ratio. Source: SARB, authors' calculations. Notes: This figure shows the scatter plot of the three-year forward rolling average for real economic growth and the government debt-to-GDP ratio.

shown for the periods before and after 2010 on the left and right panels, respectively. Before 2010, the correlations between government debt and real GDP or the risk premium exhibited an unclear relationship. In contrast, a clear negative

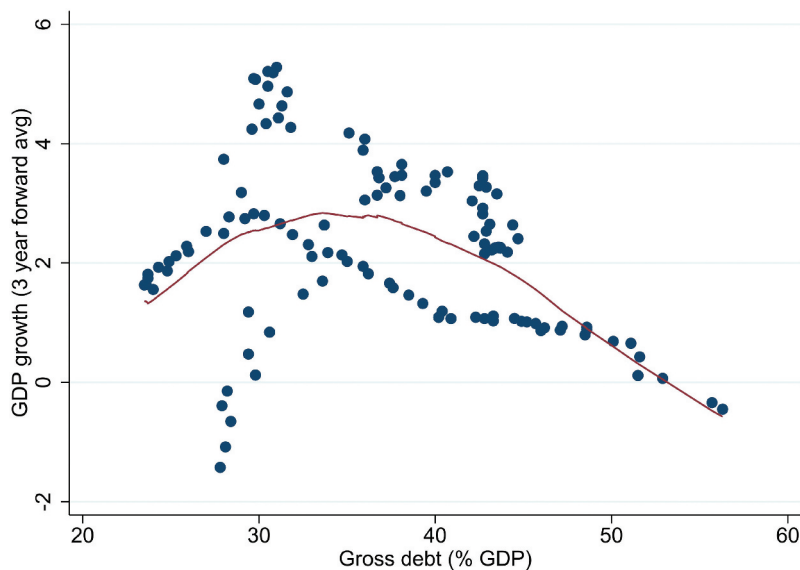
correlation exists between the debt-to-GDP ratio and real GDP post-2010. Similarly, the relationship between the government debt ratio and the risk premium changed from unclear to positive after 2010.



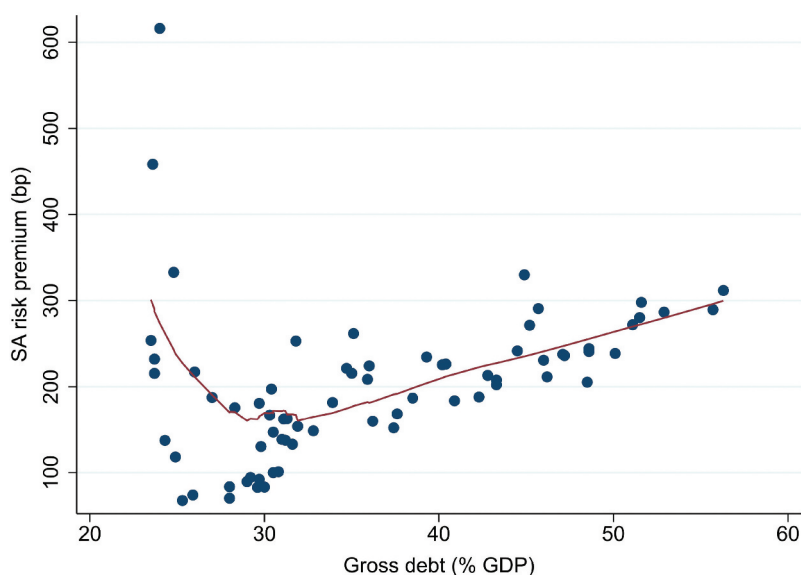
**Figure 3.** Risk premium and debt-to-gdp ratio. Source: SARB, JP Morgan, authors' calculations. Notes: This figure shows the lowest regression of the risk premium on government debt-to-GDP ratio. The risk premium is expressed in basis points (bp).

An alternative method to evaluating the correlation between the variables without imposing a structural break in the sample period is to use the lowess-smoothed regression model, which allows smoothing the scatter plots by giving weights to the closest local points (Ash, Basu, and Dube 2017). As before, we use the three-year forward average real GDP growth. Figures 4 and 5 show the correlation between the debt-to-GDP ratio and real GDP and

between the debt-to-GDP ratio and the risk premium, respectively. Starting with economic growth and debt, the lowess-smoothed regression indicates an inverted U-shape relationship between the two variables. We observe a positive relationship between the two variables when debt is below 35%, and thereafter, the relationship turns negative. We provide an additional visual presentation of the contemporaneous relationship between debt-to-GDP



**Figure 4.** Lowess plots for real GDP and debt-to-gdp ratio. Source: SARB, authors' calculations.



**Figure 5.** Lowess plots for risk premium and debt-to-gdp ratio. Source: SARB, JP Morgan, authors' calculations. Notes: The risk premium is expressed in basis points (bp).

ratio and real GDP growth and between debt-to-GDP ratio and three-year lagged average real GDP growth in Figure B1 in Appendix B. Since contemporaneous debt cannot have any causal effect on past economic growth, Figure B1 suggests that the causality runs from economic growth to debt. Taken together with Figure 4, the visual presentation of the data indicates that the relationship between the two variables is non-linear and suggests that the causality is bidirectional. Similar to economic growth, the results in Figure 5 show that the correlation between government debt and the risk premium also changed from a somewhat negative relationship to a positive relationship. These results corroborate the non-linearity shown by the scatter-plots.<sup>2</sup>

The non-linear relationship between the risk premium and government debt indicates that above a certain threshold of the debt-to-GDP ratio, fiscal sustainability becomes a concern for investors, who in turn require a higher premium to compensate for the increase in the credit risk of the borrower, Haugh, Ollivaud, and Turner (2009). Furthermore, the non-linear relationship between government debt and economic growth indicates a crowding-out effect of debt above a similar

threshold for risk premium and debt. However, since we have established that the causality between economic growth and debt is bidirectional, another possible explanation for the non-linear relationship is that post-2010, the interest on debt outpaced the economic growth rate. To reduce this interest rate-growth differential, thus the debt, a primary surplus is required, or the economy needs to grow. Economic improvements are likely to reduce nominal interest rates (through the risk premium), thereby reducing interest rate-growth differential, Abbas et al. (2013). As of writing, economic growth or a primary surplus has thus far been unattainable for South Africa.<sup>3</sup>

### III. Methodology and data

In this section, we present the medium-scale BVAR model used by Bańbura, Giannone, and Reichlin (2010), who show that it performs as well as the large model with hundreds of variables. We follow the authors and run a medium-sized model with 23 variables. Given our interest in the dynamics between macroeconomic variables and fiscal and monetary policy, we include real and nominal

<sup>2</sup>The results also corroborate the findings by Loate, Pirozhkova, and Viegi (2021), who find a structural break in the relationship between the risk premium, government debt and the volatility index after the global financial crisis and also show that fiscal performance, as measured by government debt, explains more than 70% of the variability of the risk premium and that an increase in the risk premium has a contractionary effect on output.

<sup>3</sup>We thank an anonymous referee for the suggestion to also look at the interest rate-growth differential.

macroeconomic aggregates that proxy local macroeconomic conditions and fiscal and monetary policy instruments. These variables are in line with those included in large BVAR models, such as in the paper by Ellahie and Ricco (2017), which includes 43 variables. Small fiscal VAR models, such as in Favero and Giavazzi (2007), only include output, inflation, interest rate and fiscal variables – such as total government spending and taxes. Ellahie and Ricco (2017) argue that these small VAR models suffer from fiscal policy foresight, omitted variable bias and heterogeneity in the components of total government spending.<sup>4</sup> Since our study is not concerned with disaggregating the different effects of government spending, we only address the first two issues in selecting our variables. According to Ellahie and Ricco (2017), the general solution to address fiscal foresight, which refers to the response of economic agents to anticipated changes in fiscal policy before the changes are implemented, is to include variables that proxy economic agents' expectations about future fiscal policy. Here, we rely on information about the country's risk premium, yields on government bonds and inflation expectations to capture agents' expectations about the future of fiscal policy. Lastly, to address the issue of omitting variables important to the transmission of fiscal shocks, Ellahie and Ricco (2017) suggest including variables such as government debt, the budget deficit and financial and credit variables in the model's information set. Thus, compared to the model by Ellahie and Ricco (2017), our model can be viewed as a medium-scale fiscal BVAR model.

Annexure A provides a description of the variables. Real sector variables include real GDP, employment in the non-agricultural sector and private investment. Price variables include the consumer price index (CPI), two-year ahead inflation expectations and the following interest rates: monetary policy rate, yields on long-term government bonds for 0 to 3 years, 3 to 5 years, 5 to 10 years and over 10 years. We also include the South African risk premium and the exchange rate, proxied by the United States dollar and South African rand exchange rate. Since South Africa is also a commodity exporter, we include

the price indices for coal and precious metals as proxies for commodity prices. Financial and credit variables include South African share and house prices and credit extended to the non-financial sector by domestic banks. We include a measure of monetary aggregate, the M2 money supply. The fiscal variables are government expenditure and tax revenue. We also include government debt and the deficit. We construct these two variables using their respective components as defined in Equations 2 and 3, respectively. Favero and Giavazzi (2007) and Caruso, Reichlin, and Ricco (2019) argue for the inclusion of the evolution of government debt in the fiscal VARs to ensure consistency of the empirical VAR model with the dynamic general equilibrium models that impose the government budget constraint. We follow these papers and estimate the following BVAR model:

<sup>3</sup>We thank an anonymous referee for suggesting model validation and general comments on restructuring the results.

$$Y_t = c + A(L)Y_{t-1} + D(L)d_{t-1} + \mu_t \quad (1)$$

where  $Y_t$  is a vector of our endogenous parameters,  $c$  is a vector of constant parameters, and  $\mu_t$  is the residual, which is normally distributed with the covariance matrix  $\Sigma$ .  $A(L)$  and  $D(L)$  are the coefficient matrices of polynomials with lag order ( $L$ ) of 4. To construct the counterfactuals for the government debt-to-GDP ratio of GDP ( $d$ ), we define debt as:

$$d_t = \frac{1 + i_t}{(1 + \pi_t)(1 + \Delta y_t)} d_{t-1} + p d_t \quad (2)$$

where  $i_t$ ,  $\pi_t$  and  $\Delta y_t$  are the long-term interest rate, proxied by the yields on 10-year+ government bonds, year-on-year inflation and year-on-year real GDP growth.  $p d_t$  is the government deficit (as a ratio of GDP), calculated as non-interest government expenditure ( $g_t$ ) less tax revenue ( $t_t$ ).<sup>5</sup>

$$p d_t = g_t - t_t \quad (3)$$

A summary of the BVAR model by Reichlin and Ricco (2019) is provided in Appendix C. The BVAR is estimated in log levels except for variables in percentages. We use quarterly data from 1990Q1

<sup>4</sup>See Yang (2005) for a detailed discussion of fiscal policy foresight.

to 2019Q4. Any conditional forecast starting from period  $T + 1$  is based on parameters estimated using data from 1990Q1 to  $T$ .

### Conditional forecasting

So far, we have established the following stylized facts:

- (1) There was a change in the trend of real GDP growth following the 2008 global financial crisis. At the same time, debt started to increase.
- (2) The relationship between government debt and real GDP growth changed from positive to negative once debt reached about 35% of GDP around 2012.
- (3) The relationship between debt and the risk premium became positive around the same time as the change in the relationship between debt and real GDP growth.

A natural way to proceed, given these stylized facts, is to employ an empirical methodology that would capture these non-linear relationships between the variables – such as a time-varying VAR model, a Markov-switching model with high and low debt states or a threshold-VAR model – and evaluate the effects of monetary and fiscal policy on economic growth.

Given the large number of variables in our model, a time-varying approach would aggravate the curse of dimensionality, as argued in Giannone, Lenza, and Reichlin (2019). An alternative way to look at the stability of the relationship between the two policies and economic growth is to use conditional forecasting, following the work by Bańbura, Giannone, and Lenza (2015), Giannone,

Lenza and Reichlin (2019) and Caruso, Reichlin, and Ricco (2019) among others. Conditional forecasting allows the econometrician to project the path of some variables (conditioning variables) on other variables (conditioned variables) to see how much the conditioned variables comove with the conditioning variables (Bańbura, Giannone, and Lenza 2015).

The main limitation of using the conditional-on-observation forecast exercise as opposed to the

structural scenario analysis is that it does not allow us to pinpoint or analyse the transmission mechanism of the conditioning variables (Antolin-Diaz, Petrella, and Rubio-Ramírez 2021). Nonetheless, we still see this as a valuable exercise that is not complicated by the issue of identifying monetary and fiscal shocks, as is the case for the structural scenario analysis.

## IV. Results

We start the results with the out-of-sample unconditional forecasts. Since unconditional forecasts extrapolate the trend of the variables based on the estimated model's parameters, comparing the realized paths of the variables provides an analysis of how well the model can track the data (Bańbura, Giannone, and Lenza 2015). We then proceed with our analysis of the conditional forecast to evaluate if the observed path of our variables of interest can be explained by changes in real GDP and consumer prices, our measures of the business cycle. The latter exercise is similar to the work by Caruso, Reichlin, and Ricco (2019), Giannone, Lenza, and Reichlin (2019) and Bańbura, Giannone, and Lenza (2015), although in the latter paper, the authors also include a monetary policy instrument as a conditioning variable. We complete our analysis by conditioning on variables used as proxies for monetary policy and fiscal policies – the bank rate and government debt.<sup>5</sup>

We present the unconditional and conditional forecasts together for ease of comparison and to make our results compact. The comparison of the unconditional and conditional forecasts provides an indirect analysis of the comovement of the conditioned variables with the conditioning variables (Caruso, Reichlin, and Ricco 2019). We divide our analysis into 2012Q1 to 2015Q4 and 2015Q1 to 2019Q4. Because we look at the two periods separately, instead of forecasting from 2012 to 2019, the coverage intervals are not as wide. In all figures, the solid line shows the actual data, while the dotted line shows the median of the conditional forecast with the 68% (dark shade) and 90% (light shade) coverage intervals. The dashed line shows the median of the unconditional forecast.

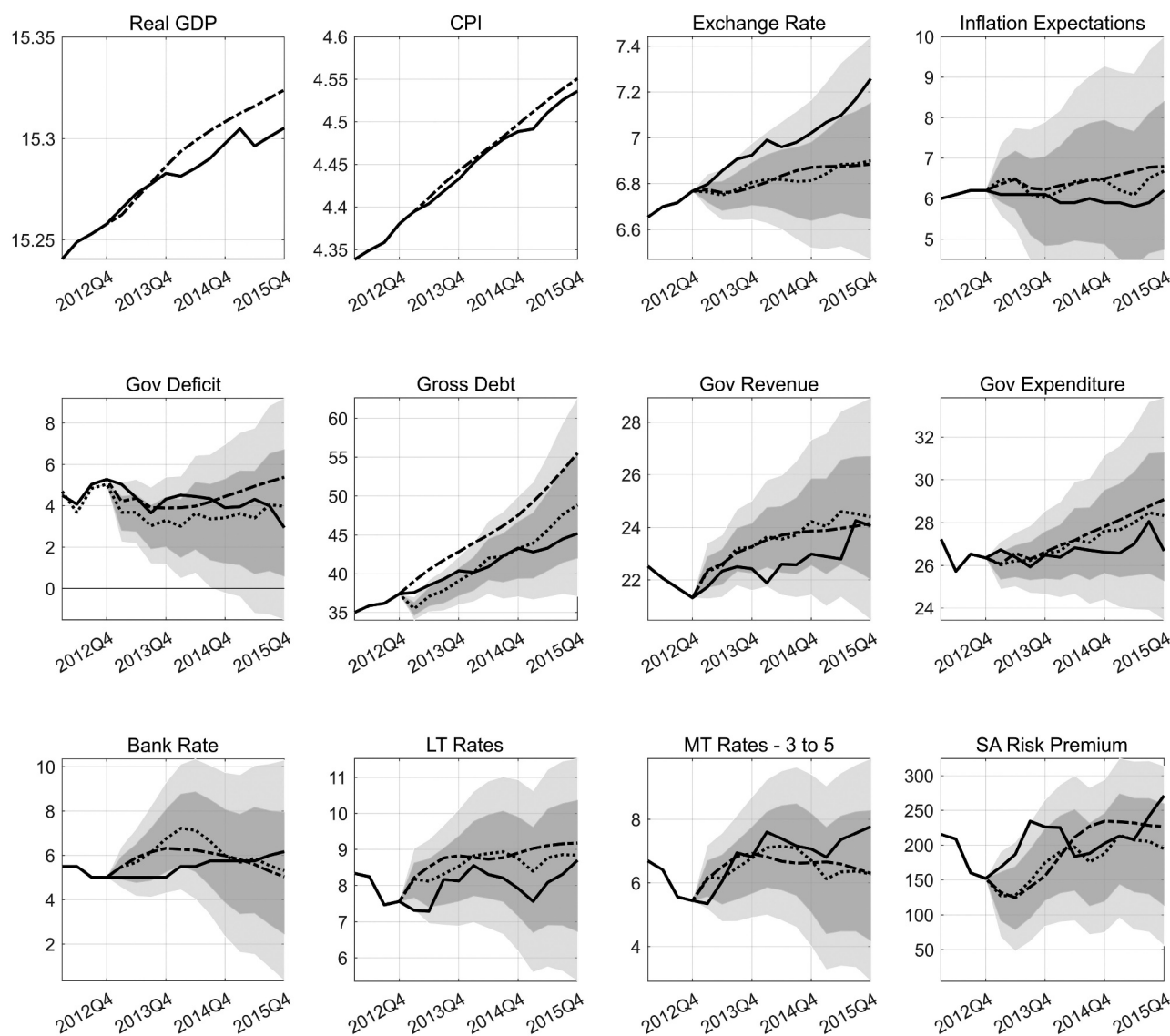
<sup>5</sup>In an earlier version of the paper, we use constructed data for debt and the deficit; the results are robust to using actual published data for the two variables.

### Unconditional forecasts

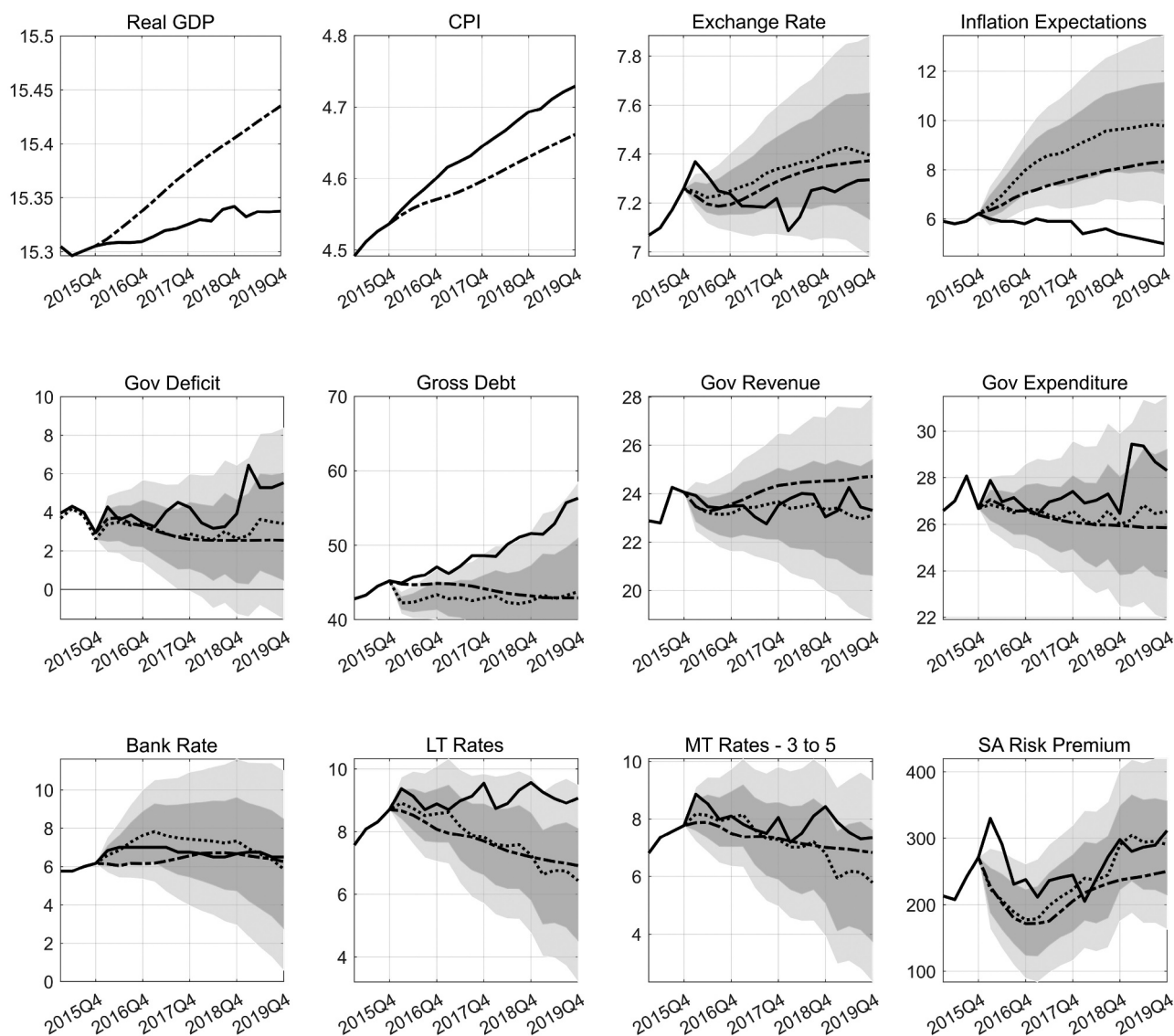
Figure 6 shows the 2012Q1–2015Q4 forecast results. Starting with the conditioning variables, real GDP and consumer prices, the unconditional forecast for consumer prices is very close to its actual path. Similarly, the model tracks the realized path of the two-year ahead inflation expectations. On the other hand, the unconditional forecast for real GDP is higher than the actual. This is unsurprising given the change in the trend of actual real GDP observed in Figure 1. The model's failure to track actual data is acute for the exchange rate.

Unconditional forecasts for the fiscal variables are higher than their actual paths, especially for debt. For the interest rates, medium-term rates are better forecast than short – and long-term rates.

Figure 7 shows the 2015Q1–2019Q4 forecast results. As in Figure 6, we include unconditional and conditional forecasts. Relative to the first forecast period, we observe a widening gap between the forecasts for real GDP and consumer prices and their respective actual paths. Thus, despite the inclusion of more years in the estimation of the model's parameters, which include the decline in



**Figure 6.** Conditional forecasting on output and prices – 2012Q1 to 2015Q4. Source: Authors' calculations. Note: This figure shows the conditional forecast for the 2012Q1 to 2015Q4 period. The solid line shows the actual data, and the dotted line (...) is the median of the conditional forecast with 90% in light shade and 68% in dark shade coverage intervals. The dashed line (- -) shows the median of the unconditional forecast. Fiscal variables are expressed as percentages of GDP. A positive government deficit represents a deficit, and a negative figure represents a surplus.



**Figure 7.** Conditional forecasting on output and prices – 2015Q1 to 2019Q4. Source: Authors' calculations. Note: This figure shows the conditional forecast for the 2015Q1 to 2019Q4 period. The solid line shows the actual data, and the dotted line (...) is the median of the conditional forecast with 90% in light shade and 68% in dark shade coverage intervals. The dashed line (- -) shows the median of the unconditional forecast. Fiscal variables are expressed as percentages of GDP.

real GDP, the model still fails to track actual data. This persistent deviation of the actual paths from their pre-2015 trends is also observable for inflation expectations, fiscal variables, and medium – to long-term rates.

### **Conditioning on real GDP and CPI**

In this section, we focus on conditional forecasts to establish whether observed low economic growth can account for the increase in government debt.

To answer this question, we condition the forecast of our variables on the realized paths of real GDP and consumer prices as proxies for the business cycle.

The results for the 2012Q1–2015Q4 sub-period are presented in Figure 6. The unconditional and conditional forecasts for the exchange rate do not track the actual data well, whereas, in the case of inflation expectations, the two forecasts are well predicted by the model. The persistent deviation of the exchange rate forecast from its actual path indicates that real GDP and consumer prices

cannot account for the depreciation of the local currency during this period. In contrast, inflation expectations can be explained by changes in real GDP and consumer prices, as evidenced by how the forecasts track the actual data. The pre-2012 relationship between the conditioning variables and revenue and expenditure continues during this forecast period, as shown by the close movement of both forecasts. The conditioning variables account for changes in government expenditure better than changes in revenue. Real GDP and consumer prices can also account for the increase in debt, at least until mid-2015. Even though the medium – and long-term rates, the bank rate and the risk premium comove with real GDP and CPI, medium – and long-term rates are better explained by real GDP and CPI than the latter two variables.

The 2015Q1–2019Q4 sub-period results are presented in [Figure 7](#). The conditional and unconditional forecast for the exchange rate and inflation expectations show that both variables still comove with the conditioning variables, though not as strongly as in the first forecasting period. Unlike in the first forecasting period, the conditioning variables can account for the exchange rate movement, as indicated by the smaller difference between the forecasts and the actual path. On the other hand, the deviation of inflation expectations from both forecasts indicates that the variable has decoupled from the conditioning variables. Global and local factors such as the moderation in core and global inflation, weaker exchange rate pass-through, and improved credibility of monetary policy have been attributed to the observed decline in inflation expectations during this forecast period (Loewald, Faulkner, and Makrelov 2019). The risk premium, a variable easily affected by both local and global shocks, not only comoves with the conditioning variables but is also better accounted for, especially from 2017 onward. The results for medium – and long-term rates indicate that the two variables also comove with the conditioning variables, more so for the long-term rates. However, the actual movement of long-term rates is not well accounted for by real GDP and consumer prices. The widening gap between the two forecasts and the actual long-term rates from 2017 onward coincides with similar movements in government debt and deficit. Do these results suggest that the

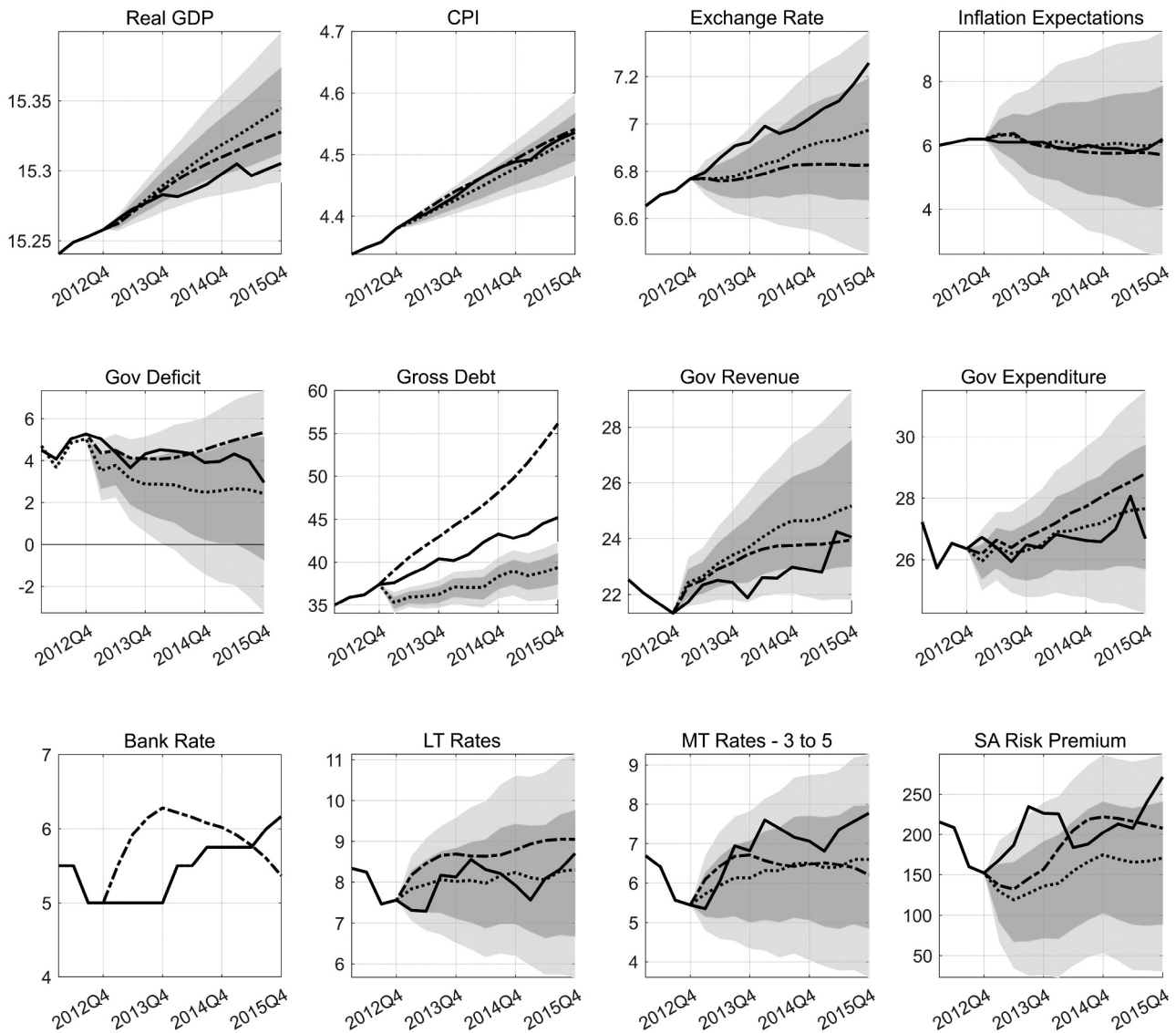
observed path of government debt can account for the observed long-term rates? We return to this point in the next section. Government revenue is better forecast when we consider real GDP and consumer prices during this period.

### ***Conditioning on interest rate and debt***

We repeat the conditional forecasting exercise above with the monetary policy rate and government debt as our conditioning set of variables for the two sub-samples. As indicated, monetary policy was accommodative until 2013, when a hiking cycle started while government debt continued to increase. Similar to the above results, we compare the conditional and unconditional forecasts. Even though we condition on government debt, we still estimate the counterfactual based on the conditional forecasts of its sub-components.

[Figure 8](#) shows the results for the 2012Q1 to 2015Q4 period. The first observation is that conditioning on both the monetary policy instrument and government debt fails to account for the observed lower real GDP. In contrast to the results for real GDP, the narrow gap between the forecasts and actual consumer prices indicates that not only did consumer prices comove with the conditioning variables, but the two variables can also account for the observed movement in this variable. We also observe that the conditional forecast for the exchange rate is close to its actual path, suggesting that exchange rate movement can be rationalized better, relative to real GDP and CPI, by a combination of the two policies.

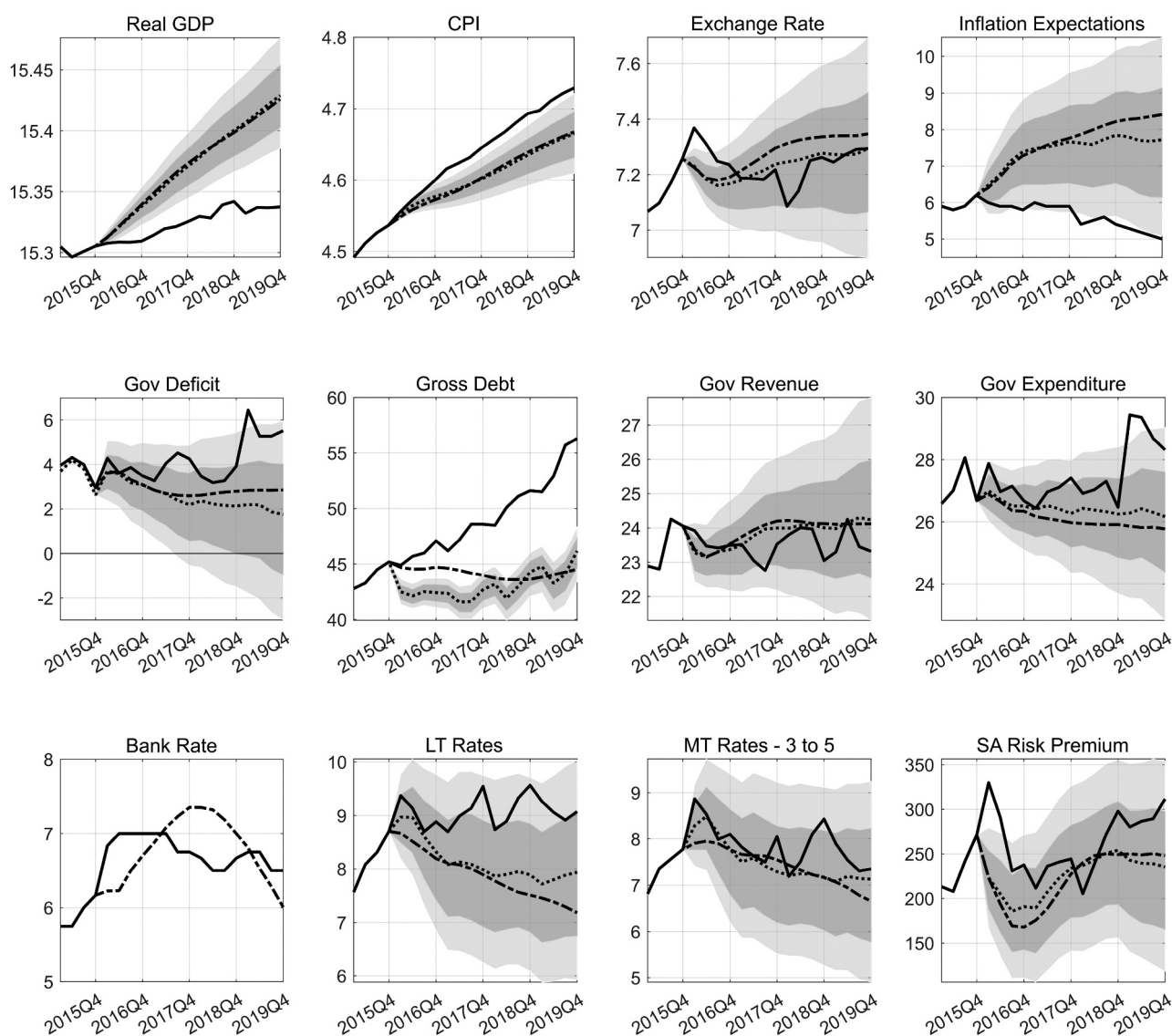
The risk premium comove more with real GDP and consumer prices than with the policy rate and government debt, as evidenced by the narrower gaps between the unconditional and the conditional forecasts in [Figure 6](#) than in [Figure 8](#). While both sets of conditioning variables can account for actual movements in the long-term rates, as evidenced by the narrow gaps between the conditional forecasts and actual path, conditioning on real GDP and consumer prices produces results that better capture the actual movements in the risk premium. This is also the case with government revenue and the deficit, whereas, for government expenditure, both sets of the conditioning variables can account for its actual path.



**Figure 8.** Conditional forecasting on the policy rate and debt – 2012Q1 to 2015Q4. Source: Authors' calculations. Note: This figure shows the conditional forecast for the 2012Q1 to 2015Q4 period. The solid line shows the actual data, and the dotted line ( . . . ) is the median of the conditional forecast with 90% in light shade and 68% in dark shade coverage intervals. The dashed line ( - - ) shows the median of the unconditional forecast. Fiscal variables are expressed as percentages of GDP.

Next, we look at the conditional forecasts for the short-term rate and government debt for the 2015 to 2019 period, proceeding as before with the comparison to unconditional forecasts. The results are presented in Figure 9. Similar to the first forecast period, conditioning on the two variables fails to account for the observed lower real GDP. In fact, the gap between the conditional and the actual path for real GDP widens. The conditioning variables also fail to account for actual consumer prices, a feature of the model that was not present in the first

forecast period. The results for the exchange rate, inflation expectations, government debt and revenue and the risk premium are generally similar to those in Figure 7 where we condition on real GDP and consumer prices. Lastly, compared to the conditional forecasts for real GDP and consumer prices, medium – and long-term rates are also better forecast when we condition on short-term rates and debt. However, the persistent gap between the conditional and the actual long-term rates indicates that other factors are important in explaining movements in



**Figure 9.** Conditional forecasting on the policy rate and debt – 2015Q1 to 2019Q4. Source: Authors' calculations. Note: This figure shows the conditional forecast for the 2015Q1 to 2019Q4 period. The solid line shows the actual data, and the dotted line (...) is the median of the conditional forecast with 90% in light shade and 68% in dark shade coverage intervals. The dashed line (- -) shows the median of the unconditional forecast. Fiscal variables are expressed as percentages of GDP.

the long-term rates. According to Soobyah and Steenkamp (2020), the long-term maturity of South African government debt, together with the large local currency proportion of the same debt, means that global shocks are likely to have a bigger effect on long-term yields as investors seek compensation for the term and exchange rate risk.

What if monetary policy remained expansionary? Lastly, we look at a forecast scenario where we mute monetary policy. We leave the monetary policy rate at 5%, the level before the hiking cycle started in 2014Q1. This is similar to the scenario

forecast analysis by Bańbura, Giannone, and Lenza (2015). Keeping interest rates constant directly answers our second empirical question of whether tighter monetary policy, especially after 2014, contributed to the increase in debt. If monetary policy is to blame, we would expect lower forecasts for government debt and higher forecasts for output. The results remain largely unchanged, as shown in Figure D1 in Annexure D. The main conclusion is that imposing a hard condition of a fixed policy rate does not yield better output results, nor does it change the forecast for debt.

### Discussion of the results

Overall, our results can be summarized as follows:

- The first observation is that conditioning on both the monetary policy instrument and government debt fails to account for the observed lower real GDP between 2012 and 2019, even when we incorporate more information in the second sub-period. In fact, the gap between the conditional and observed worsens. A possible reason for this forecast uncertainty, put forward by Clements and Hendry (2008) and emphasized in Ericsson (2008), is a shift in the equilibrium mean of real GDP. The authors argue and show that this location shift in the mean, whether abrupt and temporary or permanent, results in large and systematic forecast errors. Botha, Ruch, and Steinbach (2018) show how potential growth was negatively affected by supply shocks, namely labour unrest and drought, between 2014 and 2016. Another important supply shock which can explain the failure of the two policies in explaining low economic growth after the financial crisis is the electricity constraint. A report by Hausmann et al. (2023) indicates that lack of consistent energy supply can explain about 40% of the decline in economic growth.
- The second observation is that we can account for the increase in debt from 2012 to 2015 when we condition on real GDP. However, the widening gap between the conditional forecast and actual debt post-2015 indicates that other factors, such as global shocks and political uncertainty, might be more important in explaining the increase in debt through their effects on long-term rates and the risk premium. The start of this forecast period, 2015, coincides with a period where we observed an increase in political and fiscal policy uncertainty, as evidenced by the elevated sovereign risk premium, following the unexpected axing of the then-Finance Minister, who an unknown candidate then replaced.
- The last observation of our results is that monetary policy also fails to account for the observed low real GDP. This result is not surprising since

Botha, Ruch, and Steinbach (2018) show that when the supply shocks are accounted for in the estimate of the output gap, the new output gap is slightly narrower than the one followed by the SARB. Figure D2 in Loewald, Faulkner, and Makrelov (2020) show that the real policy rate was lower than the neutral rate until 2017. The results by Botha, Ruch, and Steinbach (2018) and lower real policy rate imply that monetary policy was less restrictive.

### V. Conclusion

In this paper, we investigated the interaction between macroeconomic variables and the fiscal and monetary policy mix between 2012 and 2019, a period characterized by increases in public debt and the risk premium and low economic growth. We applied the BVAR methodology to conduct two out-of-sample conditional scenario analyses to answer the following questions: (1) Can we explain the debt-growth dynamics during the 2012 to 2019 period based on the observed path of real GDP and consumer prices or fiscal policy and monetary policy? And (2) Can the high debt and low growth be explained by changes in monetary policy?

We looked at two forecast periods, 2012 to 2015 and 2015 to 2019, and found the following. The first observation is that conditioning on both the monetary policy instrument and government debt fails to account for the observed lower real GDP between 2012 and 2019, even when we incorporate more information in the second sub-period. A possible reason in the literature for this forecast uncertainty is a shift in the equilibrium mean of real GDP, which can result in large and systematic forecast errors, whether abrupt and temporary or permanent. Secondly, we can account for the increase in debt in the first forecast period when we condition on real GDP. However, the widening gap between the conditional forecast and actual debt post-2015 indicates that other factors, such as global shocks and political uncertainty, might be more important in explaining the increase in debt through their effects on long-term rates and the risk premium. Lastly, monetary policy also fails to account for the observed low real GDP. While we do not underplay the important role of macroeconomic policies, our results suggest that

during our analysis, supply-side factors are more informative about the evolution of economic growth than fiscal and monetary policy. Investigating the importance of these factors is beyond the scope of our paper. In addition, understanding these correlation versus causation dynamics between our variables of interest would require using a structural model or structural scenario analysis. We leave this for future research.

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