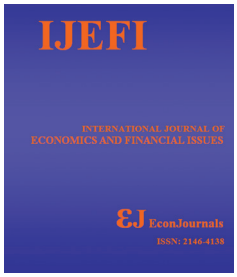

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Estimating Time-varying Fiscal Multipliers in South Africa Using Bayesian Dynamic Linear Model

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ABSTRACT

This study investigates the evolution and state-dependence of fiscal multipliers in South Africa from 1961Q1 to 2025Q1 using quarterly data on real GDP, government expenditure, inflation, interest rates, and the ZAR/USD exchange rate. Inflation and interest rate data were sourced from the Federal Reserve Economic Data (FRED) database, while the South African Reserve Bank (SARB) provided GDP, fiscal expenditure, and exchange rate series. Employing a Bayesian Dynamic Linear Model (BDLM), the analysis captures both gradual structural changes and differences in fiscal policy effectiveness across economic growth regimes. The results reveal a marked increase in fiscal multipliers over time, from negative or near-zero values in the early 1960s to approximately 0.08–0.09 in recent years. This upward trend reflects structural shifts such as the democratic transition, expanded public service delivery, infrastructure investment, and improved macroeconomic coordination. However, the estimates also show strong state dependence: the multiplier is significantly larger during high-growth periods (0.0509) than in low-growth periods (0.0006), where it is statistically indistinguishable from zero. This pattern contrasts with advanced economy evidence, where multipliers are often stronger in recessions, and suggests that structural bottlenecks—such as energy shortages, rigid labour markets, and weak investor confidence—limit fiscal effectiveness during downturns in South Africa. The findings imply that fiscal policy has historically reinforced growth momentum rather than reversing contractions. Enhancing its countercyclical potency will require structural reforms alongside targeted public investment. The study underscores the value of state-contingent fiscal planning, supported by real-time monitoring of multiplier dynamics, as a means to maximise growth impacts while maintaining fiscal sustainability.

Keywords: Fiscal Multipliers, Bayesian Dynamic Linear Model, Time-Varying Effects, South Africa
JEL Classifications: E62; E69; Z19

1. INTRODUCTION

Fiscal policy remains a key instrument for achieving macroeconomic stability, especially in developing and emerging economies where structural challenges often limit the reach and impact of monetary policy (Espinoza et al., 2020; Ilzetzki et al., 2021; World Bank, 2024). The size of fiscal multiplier; measuring the extent to which government spending influences economic output is a key determinant of the effectiveness of counter-cyclical fiscal policy (Batini et al., 2014; Ramey, 2011). Increasingly, empirical research highlights that these multipliers are not fixed but fluctuate over time in response to varying macroeconomic conditions, fiscal credibility, monetary policy stances, and external shocks (Auerbach and Gorodnichenko, 2012; Ilzetzki et al., 2013). This recognition has spurred a growing literature employing time-varying parameter models to capture the dynamic nature of fiscal multipliers across different economic regimes (Baum and Koester, 2011; Baldini and Causi, 2020).

In this context, South Africa presents a particularly relevant case, given its distinctive fiscal path, persistent structural constraints, and the evolving role of government in promoting economic growth (National Treasury, 2023; Burger and Marinkov, 2020). Conventional methods of estimating fiscal multipliers typically employ static or linear models that presume a constant relationship between government spending and output (Ramey, 2011; Ilzetzki

et al., 2013). However, such models often overlook critical heterogeneities, especially in economies subject to frequent macroeconomic shocks, evolving policy frameworks, or structural disruptions (Auerbach and Gorodnichenko, 2012; Cogley and Sargent, 2005). Recent developments in econometric techniques—particularly within the Bayesian paradigm—have provided more robust tools for capturing the dynamic nature of fiscal policy effectiveness (Primiceri, 2005; Koop and Korobilis, 2010). The Bayesian Dynamic Linear Model (BDLM), in particular, offers a flexible approach to estimating time-varying fiscal multipliers by allowing key parameters—such as the responsiveness of output to government expenditure—to evolve over time (Carriero et al., 2021). This methodology not only incorporates parameter uncertainty but also adapts to shifts in the economic environment, making it especially appropriate for a country like South Africa, where fiscal dynamics have been shaped by a complex interplay of domestic vulnerabilities and global shocks (Burger and Calitz, 2019; National Treasury, 2023).

Over the past three decades, South Africa's fiscal architecture has undergone marked shifts, reflecting both structural transformation and evolving macroeconomic priorities. In the aftermath of the democratic transition in 1994, fiscal policy was reoriented toward macroeconomic stabilization, equity, and inclusive development. Anchored in the Growth, Employment and Redistribution (GEAR) strategy introduced in 1996, the government adopted a rules-based fiscal framework emphasizing expenditure discipline, debt reduction, and public infrastructure investment aimed at addressing deep-seated historical inequalities (South African National Treasury, 1996; Fedderke and Liu, 2002). Empirical evidence suggests that this period of consolidation fostered improved investor confidence and fiscal credibility (Aron and Muellbauer, 2007; Du Plessis et al., 2007).

From the early 2000s, South Africa benefited from robust commodity-driven growth and buoyant tax revenues, allowing the state to run budget surpluses, lower the debt-to-GDP ratio, and scale up social expenditure—particularly through expanded transfers to low-income households (Bhorat et al., 2014). By 2007, public debt had declined to below 30% of GDP, and social grants reached more than 10 million beneficiaries, marking significant progress in redistribution (Inchauste et al., 2021). However, this fiscally conservative trajectory reversed in the aftermath of the 2008–09 global financial crisis. In response to collapsing external demand and deteriorating domestic output, the government implemented an aggressive counter-cyclical fiscal stimulus, which, while cushioning short-term economic contraction, triggered a sustained rise in public deficits and debt levels (National Treasury, 2010; IMF, 2011). The stimulus measures largely directed toward infrastructure spending and employment-intensive public works programmes—raised the consolidated budget deficit from 0.5% of GDP in 2007/08 to 5.3% by 2009/10, while gross debt increased sharply in the years that followed (Calitz, 2025). These fiscal pressures have persisted amid weak economic growth, state-owned enterprise bailouts, and rising interest costs, underscoring the delicate balance between fiscal consolidation and pro-growth spending in South Africa's contemporary policy landscape.

Globally, numerous empirical studies have attempted to estimate fiscal multipliers. Auerbach and Gorodnichenko (2012), using a regime-switching VAR, argued that U.S. multipliers are as high as 2 during recessions but fall below 1 in expansions. Similarly, Primiceri (2005) applies time-varying parameter VARs to analyze macroeconomic evolution under different policy regimes. Ramey and Zubairy (2018) use local projection methods to show that multipliers depend on the state of the economy and monetary policy stance.

In the African context, empirical studies remain limited. For South Africa, Jooste et al. (2013) employ a Markov-switching SVAR and find that multipliers are significantly larger during periods of economic slack. This is found to be consistent with international evidence on non-linear fiscal effects as argued by Auerbach and Gorodnichenko (2012).

Also, Maluleke (2020), using a Bayesian VAR, estimates multipliers between 0.6 and 1.2 depending on the composition of government spending. Makrelov et al. (2018) apply general equilibrium modelling to evaluate the impact of infrastructure investment, finding that well-targeted spending yields higher and more persistent multipliers. Similarly, Makrelov et al. (2021) find that fiscal multipliers tend to be higher when spending is channelled toward productive investment, such as infrastructure and human capital development, supporting broader findings from low- and middle-income economies (Ilzetzki et al., 2013; Gechert and Rannenberg, 2018).

Nonetheless, a common limitation of these studies is their reliance on static, linear, or regime-dependent frameworks, which fail to capture the continuous and dynamic evolution of fiscal policy effectiveness over time. As highlighted in recent international literature, time-varying parameter models—particularly those based in the Bayesian paradigm—offer more flexible tools for capturing shifts in multiplier effects across different macroeconomic contexts, policy regimes, and debt levels (Primiceri, 2005; Carriero et al., 2021). More specifically, not many empirical attempts have used BDLMs to explicitly model time-varying multipliers in a continuous form in the context of South Africa. A model that accounts for temporal fluctuation in fiscal efficacy is essential for improved policy formulation, given the nation's high levels of inequality, fluctuating policy frameworks, and cyclical instability. Furthermore, the requirement for instruments that may direct the real-time evaluation of fiscal actions is underscored by the COVID-19 epidemic and recent instances of fiscal strain. This study, however, contributes to the literature by applying a Bayesian Dynamic Linear Model to estimate time-varying fiscal multipliers in South Africa. It improves upon static or regime-dependent models by flexibly capturing changes in multiplier values across time, using posterior distributions to quantify uncertainty. By leveraging South Africa's detailed national accounts and fiscal data, the paper provides empirically grounded insights into when and how fiscal policy is most effective — thereby informing the ongoing debate around fiscal consolidation versus stimulus in a constrained environment. The remainder of our study is organised as follows.

2. THEORY AND EMPIRICAL APPROACH

The current section outlines both the theoretical foundations that underscores the study and empirical approach to the study

2.1. Theoretical Foundation

Based on John Maynard Keynes' General Theory of Employment, Interest, and Money (Keynes, 1936), the Keynesian theory of fiscal policy contends that taxes and expenditures by the government have a significant impact on output and aggregate demand, particularly in times of economic recession. The main idea is that markets don't always immediately adjust themselves following shocks, and that a lack of aggregate demand might result in idle resources and protracted unemployment.

A fiscal multiplier, according to Keynesian theory, is the ratio of a change in national income to the change in government expenditure or taxation that brought about the change. An increase in government expenditure will result in an output increase that is more than proportionate to the amount of slack in the economy, which is defined as underutilised labour and capital. The marginal propensity to consume (MPC) amplifies this effect, since families and businesses partially re-spend each unit of income generated by government spending, producing a "multiplier effect."

Mathematically, fiscal multiplier can be stipulated as:

$$\text{Multplier} = \frac{\Delta Y}{\Delta G}$$

ΔY is the change in output and ΔG is the change in government expenditure. The size of fiscal multipliers has always been an important theoretical discussion and is largely dependent on presumptions on pricing rigidities, the response of monetary policy, the level of economic openness, and the condition of public finances.

From Keynesian perspective, fiscal policy stabilise the economy by increasing aggregate demand, especially when the output gap is negative during recessions. When private demand is low or nominal interest rates are at or close to the zero or lower bound, Keynesian multipliers tend to be bigger (Blanchard and Leigh, 2013). On the other hand, because of intertemporal substitution, rational expectations, and crowding-out effects, New Classical and Ricardian models frequently forecast lower or even negative multipliers. In these contexts, if agents anticipate future tax increases, then higher government spending may result in lower private investment or consumption (Barro, 1974).

Recent theoretical developments have highlighted the significance of state-dependent and nonlinear multipliers. According to Keynesian theory, the multiplier is also state-dependent, and it can be more than one during recessions when interest rates are low and there is no crowding out.

Keynes argued that smaller multipliers or even neutral impacts may result from supply restrictions and higher interest rates during booms. For instance, Auerbach and Gorodnichenko (2012) propose that fiscal policy is more effective during economic downturns than in booms, based on a regime-switching DSGE framework. Similarly, models incorporating fiscal fatigue and debt sustainability constraints suggest that multipliers may diminish or even reverse when debt levels become unsustainable (Corsetti and Müller, 2015). Multiplier magnitudes in open economies are also influenced by trade openness and exchange rate regimes. For instance, in flexible exchange rate regimes, fiscal expansions often result in currency appreciation, which reduces the output effect by dampening net exports. In South Africa, where exchange rate swings and capital flow volatility are substantial, this is especially pertinent. In other words, critics argue that in open economies like South Africa, some of the demand boost seeps out through imports, lowering the multiplier, and that more government expenditure may discourage private investment by raising borrowing rates. In conclusion, according to the state-dependent fiscal effectiveness perspective, key state variables include among others; (i) Business Cycle Phase as multipliers tend to be higher during recessions and lower during expansions, (ii) Public Debt Level as high debt can lower fiscal effectiveness due to investor concern over sustainability, higher borrowing costs, or fiscal consolidation pressures, (iii) Monetary Policy Stance—if interest rates are at the zero lower bound (ZLB) or accommodative, fiscal multipliers are larger, (iv) Openness of the Economy because high import penetration hampers the domestic impact of fiscal stimulus and v) nature or type of Spending as investment spending often has higher multipliers than current expenditure.

2.2. Empirical Approach

Several approaches have been adopted in estimation of fiscal multipliers. Some of the traditional techniques employed in the literature include Structural Vector Autoregression (SVAR) models (Blanchard and Perotti, 2002), Local Projection (LP) methods which was largely popularized by Jordà (2005), Panel regressions and Dynamic stochastic general equilibrium (DSGE) models. The major drawback of most of these methods is they are tatic in nature as they often assume constant coefficients, which may obscure important changes in fiscal policy effectiveness over time. This limitation has motivated the use of time-varying parameter (TVP) models, particularly within the Bayesian framework, which allow the fiscal multiplier to evolve as the economic environment changes.

Hence, this study uses a Bayesian Dynamic Linear Model (BDLM), a special example of a state-space model evaluated inside a Bayesian framework, to estimate time-varying fiscal multipliers for South Africa. BDLMs let coefficients to change over time in accordance with stochastic processes, in contrast to conventional regression techniques that presume fixed parameters. This is especially appropriate for the South African economy, which has undergone substantial macroeconomic, institutional, and structural changes in the last 60 years. One of the major benefits of the Bayesian framework is that it incorporates prior beliefs about parameter behaviour, updates them as new data become available, and yields full posterior distributions for both parameters and predictions, rather than point estimates alone.

This is crucial for policy relevance, as it allows quantification of uncertainty surrounding multiplier estimates.

A standard BDLM expresses the relationship between output and government spending as:

$$Y_t = \beta_{0,t} + \beta_{1,t} G_t + \varepsilon_t \qquad \varepsilon_t \sim N(0,\delta^2)$$

$$\beta_t = \beta_{t-1} + w_t \qquad w_t \sim N(0,W)$$

β_t is the fiscal multiplier at time t, and is allowed to evolve according to a stochastic process (random walk). This framework allows the estimation of not only the central value of the multiplier but also its credible intervals, capturing uncertainty over time.

The estimated model is in form of the extended BDLM, and it can be expressed in observation-state form as follows

$$\Delta log(GDP)_t = \alpha_t + \beta_{1,t}\,\Delta log\,(GovExp)_t + \beta_{2,t}\,InterestRate_t + \beta_{3,t}\,Inflation_t + \beta_{4,t}\,\Delta\,log\,(ZAR/USD)_t + \varepsilon_t$$

GDP is the real GDP growth, α_t is the time-varying intercept, *GovExp* is the government expenditure, $\beta_{1,t}$ is the fiscal multiplier, at time *t*, which is the key parameter of interest. $\beta_{2,t}\beta_{3,t}\beta_{4,t}$ are time-varying elasticities of GDP with respect to interest rate, inflation rate and exchange rate respectively.

The state equation can be expressed as follows:

$$\alpha_t = \alpha_{t-1} + \eta_{\alpha,t} \qquad \eta_{\alpha,t}, \sim N(0,\,\delta^2)$$

This makes it possible for the parameters to progressively change over time in reaction to shocks, policy changes, or structural changes.

2.3. Prior Distributions

For Bayesian estimation, all unknown parameters must have priors specified. In consonance with standard practice in time-varying parameter estimation, initial states (α_0, β_j, 0), diffuse normal priors, $(0,10^2)$, showing minimal prior knowledge. The state variances are expressed as $\left(\sigma_\alpha^2,\sigma_j^2\right)$ and inverse -gamma priors as *IG*(0.01,0.01), which allows the data to determine the degree of parameter variation. The observational variance $\left(\sigma_\varepsilon^2\right)$ with the inverse -gamma prior as *IG*(0.01,0.01). Our priors are weakly informative as weakly informative priors ensure that results are primarily based on observed data while maintaining estimation regularisation.

The model is estimated using Markov Chain Monte Carlo (MCMC) simulation methods, specifically the Gibbs sampler in conjunction with the Forward Filtering Backward Sampling (FFBS) algorithm for state estimation. The following steps are taken in order to implement the computations: Transform data, take logs and/or growth rates to ensure stationarity, and then standardise variables if necessary. Specify BDLM structure, i.e., observation and state matrices. Set priors, as previously discussed. Execute MCMC simulation, generate posterior draws for parameters and states. Evaluate convergence using trace plots, Gelman–Rubin statistics, and effective sample size diagnostics. Extract results, including posterior means, medians, and credible intervals for the sample period.

The model is based on quarterly time-series data from 1961Q1 to 2025Q1. The Federal Reserve Economic Data (FRED) database provided quarterly inflation rate and interest rate data, while the South African Reserve Bank (SARB) provided data on real GDP, government expenditure, and exchange rates.

3. EMPIRICAL FINDINGS

This section presents the empirical findings of the study. First, the descriptive and preliminary analysis provides a statistical overview of the data, highlighting the main characteristics, trends, and interrelationships among the key macroeconomic variables. This offers important insights into the underlying patterns in South Africa's economy and provide justification for the subsequent econometric modelling. Second, the results of the Bayesian Dynamic Linear Model (BDLM) are discussed, focusing on the time-varying and regime-dependent fiscal multipliers.

3.1. Preliminary Data Patterns and Justification for a Time-Varying Approach

The summary characteristics of the variables used to estimate the time-varying fiscal multipliers are shown in Table 1. These consist of inflation, interest rates, exchange rates, real GDP growth (GDP_GROWTH), and government expenditure growth (GE_GROWTH). With a median of 0.684% and a mean GDP growth rate of 0.679% for the sample period, the average rate of economic expansion appears to be somewhat low. Though the economy has seen periods of both severe contraction (minimum of -16.84%) and great expansion (highest of 13.76%), the comparatively low mean conceals significant volatility across the sample. Growth in government spending (mean = 5.73%) is continuously positive, indicating a long-term propensity for fiscal expansion during both prosperous and struggling times. Price pressures are still there as seen by the average inflation rate of 7.76%, which is higher than the usual inflation objectives in industrialised economies. In keeping with an atmosphere of high inflation expectations, the interest rate is likewise still comparatively high on average (10.61%). With a mean of 5.4138 and a somewhat lower median (3.1224), the exchange rate indicates times of significant currency depreciation that cause the average to rise disproportionately.

The significant volatility in South Africa's growth performance is highlighted by the GDP growth standard deviation, which stands at 1.716% in relation to its mean. During economic crises, when fiscal multipliers may diverge significantly from stable times, this volatility is exacerbated. Interest rates and inflation also show significant fluctuations, with inflation ranging from high inflation (18.65%) to deflationary spells (-0.69%). Significant exchange rate instability, which is a prevalent feature of emerging market economies subject to external shocks, changes in commodity prices, and reversals in capital flows, is shown in the exchange rate standard deviation (5.28). The skewness and kurtosis also emphasise the existence of non-normality. Large recessions

Table 1: Summary statistics

Statistics	GDP_GROWTH	GE_GROWTH	INFLATION	INTERESTRATE	EXCHANGERATE
Mean	0.678975	5.734086	7.764163	10.61202	541.3750
Median	0.684102	5.750000	6.180000	9.660000	312.2400
Maximum	13.75638	6.220000	18.65000	17.79000	1888.480
Minimum	−16.84257	5.010000	−0.69	4.750000	67.08000
Std. Dev.	1.716037	0.285844	4.522363	3.508340	528.4227
Skewness	−2.356331	−0.475091	0.476159	0.385399	1.001160
Kurtosis	56.47191	2.623652	2.235020	2.052432	2.871551
Jarque-Bera	30855.57	11.18466	15.97796	15.97701	43.10942
Probability	0.000000	0.003726	0.000339	0.000339	0.000000
Sum	174.4965	1473.660	1995.390	2727.290	139133.4
Sum Sq. Dev.	753.8647	20.91701	5235.653	3150.962	71483028
Observations	257	257	257	257	257

and infrequent but severe expansions dominate the heavy-tailed distribution of GDP growth, which is significantly negatively skewed (–2.356) and has an exceptional kurtosis value of 56.47. The impacts of fiscal policy are most likely to shift over time in these extreme circumstances, which are frequently linked to domestic policy shocks, collapses in commodity prices, or global financial crises. GE_GROWTH, inflation, and interest rates, on the other hand, show mild skewness (around zero) and kurtosis values close to the normal range (2–3), indicating more stable and symmetrical distributions. The moderately right-skewed exchange rate (1.001) is consistent with sporadic abrupt depreciation occurrences. The existence of notable deviations from Gaussian distributions is confirmed by the Jarque-Bera statistics for all the variables as the null hypothesis of normality is rejected at the 1% level. Due to extreme levels and asymmetry, this is most noticeable for GDP growth, where the Jarque-Bera statistic surpasses 30,000.

The findings from the summary properties of the variables in Table 1 strongly motivate the adoption of a Bayesian Dynamic Linear Model for the estimation of fiscal multipliers based on the following reasons (i) It is improbable that the fiscal multiplier will remain constant throughout time due to the significant variability in GDP growth and the macroeconomic environment. Time-varying coefficients can be explicitly accommodated by a BDLM, enabling the growth effect of government spending to adapt to various macroeconomic regimes (ii) The high kurtosis and negative skewness of GDP growth suggest that the sample is dominated by rare cases of booms and crises. Conventional constant-parameter models might obscure significant state-dependent effects by averaging over these occurrences. In contrast, regime shifts can be captured by BDLM without the need for predetermined breakpoints, (iii) Significant parameter uncertainty is implied by the observed volatility and heavy tails. Credible intervals are inherently incorporated into Bayesian approaches, enabling a more nuanced interpretation of fiscal multiplier estimates across a range of economic scenarios, and (iv) with only 257 observations in the dataset, the Bayesian technique provides higher small-sample efficiency than simply frequentist time-varying models since estimates can be regularised in times when data variance is minimal because of prior information.

Figure 1 illustrates the time-series trends of the five variables employed in the BDLM estimation. Exchange rate movements show a long-run upward trajectory, reflecting the persistent depreciation of the South African rand since the 1960s, with marked episodes of sharp declines during the late 1990s emerging market crises, the 2008 global financial crisis, and the COVID-19 pandemic in 2020–2021. GDP growth exhibits relatively stable fluctuations around zero for much of the sample period, but large deviations are visible during crisis periods, notably the steep contraction in 2020 due to pandemic-related lockdowns. Government expenditure growth trends upward over the decades, consistent with South Africa's expansionary fiscal stance in response to social and infrastructural demands, yet shows temporary accelerations during downturns, consistent with countercyclical spending patterns. Inflation displays high volatility in the 1970s and 1980s, partly due to oil price shocks and domestic structural constraints, before moderating in the post-apartheid period under inflation targeting, although spikes still occur during currency crises. Interest rates follow a similar pattern, rising sharply in the early 1980s to combat inflation, declining in the 2000s, and adjusting upward again in response to inflationary pressures in recent years.

From a modelling perspective, these series clearly reflect non-constant relationships over time, as the co-movement between macroeconomic variables appears to shift in response to both domestic policy changes and external shocks. This is precisely the context in which a Bayesian Dynamic Linear Model (BDLM) is more appropriate than static models: it allows parameters to vary over time, capturing shifts in fiscal and monetary transmission mechanisms, exchange rate pass-through effects, and inflation–interest rate linkages. The observed heterogeneity across sub-periods in Figure 1 reinforces the need for a time-varying approach to accurately assess fiscal multipliers in South Africa.

Figure 2 shows the distributional patterns and pairwise correlation graphs of the variables used in the BDLM estimation. With an almost perfect positive correlation (0.98) between GDP growth and government expenditure growth, fiscal policy in South Africa is pro-cyclical, with government expenditure often increasing during economic expansion. Inflation and interest rates are strongly correlated (0.70), indicating the central bank's reliance on interest rate adjustments to manage price stability, while the moderate negative relationship between inflation and the exchange rate (0.35) suggests imported inflationary pressures. These correlation structures, combined with the presence of both persistent trends and episodic shocks, justify the use of a BDLM.

Figure 1: Movement of the variables over time

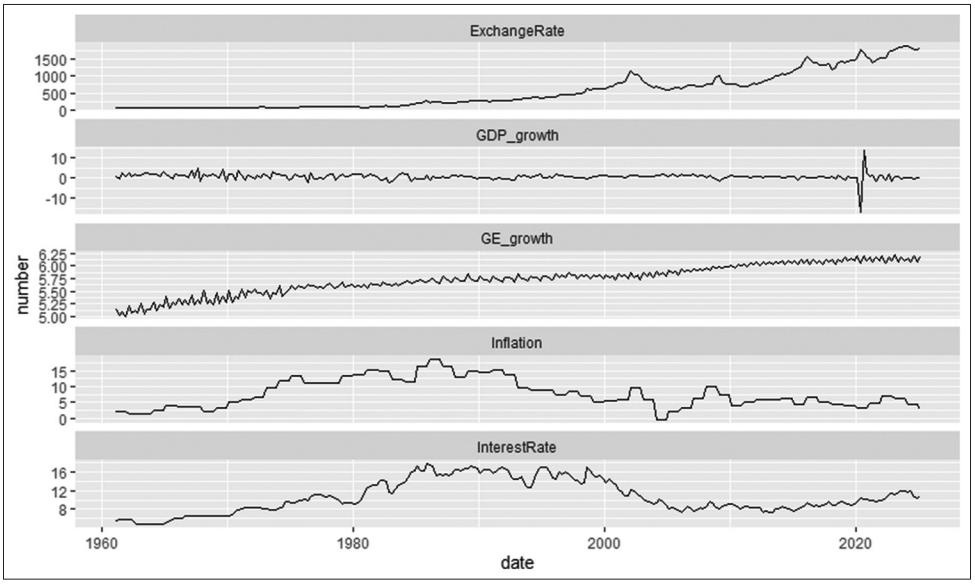
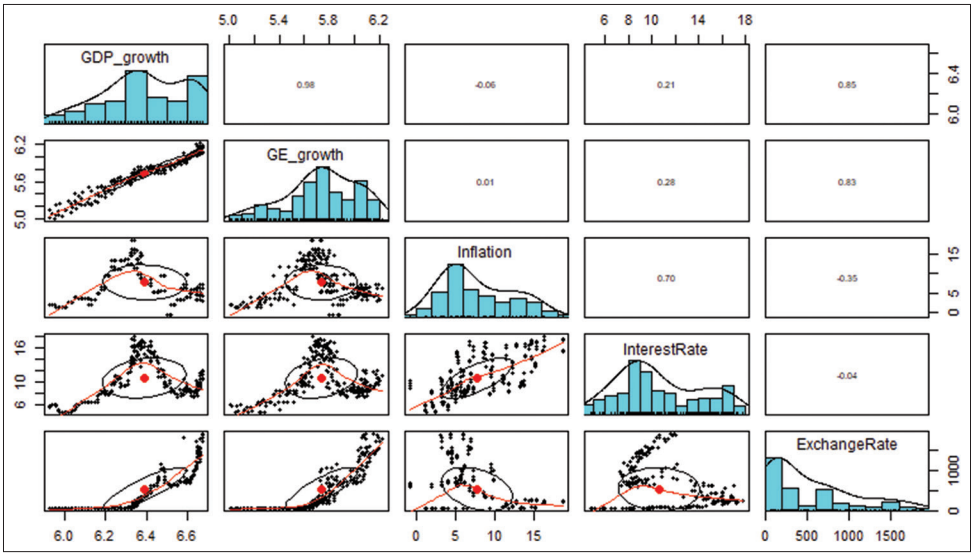


Figure 2: Correlation chat



A static parameter model would obscure the time-varying nature of these relationships, whereas the BDLM can capture dynamic shifts in macroeconomic linkages, particularly during crisis periods such as the global financial crisis or the COVID-19 pandemic as this provides a clearer understanding of policy transmission in South Africa.

3.2. Results of Time-Varying and Regime-Dependent Fiscal Multipliers

Figure 3 presents the estimated time-varying fiscal multiplier for South Africa, derived from the Bayesian Dynamic Linear Model (BDLM), along with the associated 90% credible intervals. The black line represents the posterior mean of the multiplier (measured as the raw coefficient on government expenditure in the growth equation), while the shaded region around it indicates the statistical uncertainty. Periods of low economic growth—defined as the bottom 25% of observed real GDP growth rates—are highlighted in darker grey.

The results reveal three distinct phases. In the early 1960s, the multiplier was slightly negative (around –0.03 to –0.04), suggesting that increases in government expenditure had limited or even contractionary short-run effects. This outcome likely reflects the structural nature of the South African economy at the time, where fiscal resources were concentrated in non-productive sectors under the apartheid regime, alongside international isolation and structural rigidities that weakened aggregate demand responses.

From the early 1970s to the mid-1990s, the multiplier turned positive and exhibited a gradual upward trajectory. This period encompasses both the late-apartheid years (when fiscal policy became more expansionary in response to socio-political pressures) and the democratic transition of the mid-1990s, which was marked by significant macroeconomic restructuring, institutional reforms, and social spending expansion. The narrowing of the credible band in this phase suggests reduced estimation uncertainty, possibly due to more stable fiscal policy frameworks and improved data quality.

The post-2000 era is characterised by a sustained and steeper rise in the multiplier, reaching values around 0.08–0.09 by 2024. This pattern aligns with large-scale public investment programmes, infrastructure expansion, and targeted social transfers implemented during the 2000s and 2010s. The widening credible intervals after 2010 indicate greater uncertainty, increased macroeconomic volatility and episodes of domestic fiscal stress. Notably, the low-growth shading in the early sample shows that fiscal multipliers were smaller during downturns in the earlier decades, contrasting with later years when countercyclical fiscal measures appear to have been more effective in cushioning output losses.

Table 2 further examines state-dependent fiscal multipliers by distinguishing between low-growth (bottom 25% of GDP growth) and high-growth (top 75%) regimes. In the low-growth state, the average multiplier is not statistically different from zero (posterior mean of 0.0006, with a 90% credible interval spanning –0.0149 to 0.0149). This indicates that during downturns, fiscal expansions have historically had negligible short-run effects on output. By contrast, the high-growth state exhibits a substantially larger and statistically significant multiplier of 0.0509, with a narrow credible interval [0.0323, 0.0682], suggesting that fiscal policy is more effective when implemented during economic upswings.

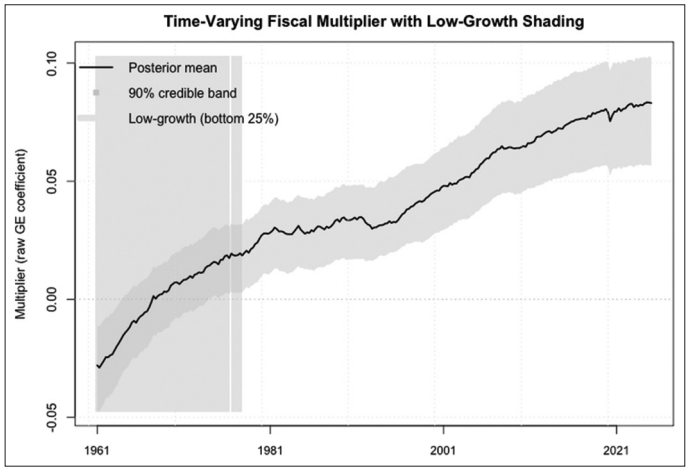
Taken together, the time-varying and regime-dependent results highlight two important dynamics.

First, there is a structural rise in fiscal policy effectiveness in South Africa over the past six decades, particularly after the democratic transition and post-2000 public investment drive. The second dynamics is what we call a persistent state dependence, whereby fiscal policy has historically reinforced growth during expansions but shown limited countercyclical potency during recessions. These findings underscore the value of the BDLM approach, which allows for both gradual structural changes and growth-regime heterogeneity in fiscal effects.

Table 2: Regime-dependent Fiscal multipliers results

Regime	Average multiplier	90% credible interval	Share of sample (%)
Low-growth state	0.0006	[–0.0149, 0.0149]	25
High-growth state	0.0509	[0.0323, 0.0682]	75

Figure 3: Time- varying Fiscal multiplier plot



4. DISCUSSION OF RESULTS

The results from the Bayesian Dynamic Linear Model estimation indicate that fiscal multipliers in South Africa have evolved considerably over the past six decades, exhibiting both structural increases in effectiveness and clear state dependence. In the early part of the sample (1960s), multipliers were negative or close to zero, implying that fiscal expansions had limited or contractionary impacts on output. This aligns with the historical realities of the apartheid economy, where fiscal resources were disproportionately allocated to the defence sector, public administration serving minority interests, and other non-productive uses, while international sanctions and structural distortions weakened aggregate demand responses.

From the 1970s through the mid-1990s, the gradual rise in the multiplier coincided with shifts in fiscal composition towards social and infrastructure investment, and with broader political-economic transitions. The post-1994 democratic period saw a notable improvement in fiscal effectiveness, likely reflecting expanded public service delivery, improved fiscal institutions, and better macroeconomic coordination. This is consistent with Keynesian theory, which predicts higher multipliers in environments with underutilised resources and well-targeted public spending (Blanchard and Perotti, 2002).

The marked increase in multipliers post-2000, ranging between 0.08–0.09 in recent years coincides with the government's large-scale infrastructure investments and social transfer programmes. However, the widening credible bands during the 2010s point to heightened uncertainty in fiscal transmission, in part due to global and domestic shocks. The 2008–09 global financial crisis, the commodity price slump of 2014–15, and the COVID-19 pandemic disrupted growth and constrained fiscal space. The recent slowdown in growth, high unemployment, and rising public debt burden suggest that sustaining high multipliers may be challenging in the current environment without addressing structural bottlenecks.

The regime-dependent analysis reveals a persistent asymmetry as multipliers are substantially larger in high-growth periods than in low-growth states. This contrasts with the findings of Auerbach and Gorodnichenko (2012), who, using OECD data, found higher multipliers during recessions, and Ramey and Zubairy (2018), who reported similar countercyclical patterns for the United States. In the South African case, weak low-growth multipliers may reflect deep-seated structural constraints associated with labour markets rigidity, infrastructure deficits, and low investor confidence that limit the effectiveness of fiscal stimulus during downturns. This observation resonates with Batini et al. (2014), who note that in developing and emerging markets, supply-side bottlenecks and financing constraints often suppress the countercyclical potential of fiscal policy.

Within the South African literature, the time-varying nature of multipliers is rarely modelled explicitly. Previous studies such as

Jooste et al. (2013) and Perrelli et al. (2014) generally estimate constant multipliers using structural VARs, yielding results in the range of 0.3–0.6 in the short run for spending shocks. While these estimates are larger in magnitude than the posterior means obtained here, the BDLM approach captures gradual evolution and uncertainty, offering a richer perspective on policy effectiveness over time. Furthermore, the state-dependent results shed light on the heterogeneity masked in average multiplier estimates, highlighting the importance of macroeconomic conditions in shaping fiscal transmission.

Comparing these findings with broader developing country evidence, the upward trend in South Africa's multipliers is consistent with cross-country results by Ilzetzki et al. (2013), who report higher spending multipliers in more open economies with flexible exchange rates. On the other hand, the low-growth inefficacy observed here underscores a divergence from advanced economy patterns, where fiscal policy is often more potent during recessions. This divergence suggests that for South Africa, fiscal policy alone is insufficient to lift output during downturns without complementary measures addressing structural barriers to growth.

In sum, the findings contribute to the fiscal multiplier literature in three key ways. First, they provide long-horizon evidence on the time-varying nature of fiscal effectiveness in South Africa, linking historical institutional and macroeconomic developments to changing multiplier sizes. Second, they demonstrate that the growth regime materially influences fiscal outcomes, with implications for countercyclical policy design. Third, they show that while multipliers have strengthened over time, their ability to offset downturns remains limited, pointing to the need for a holistic policy mix that combines fiscal stimulus with structural reforms to maximise growth impacts.

5. CONCLUSION AND POLICY IMPLICATIONS

This study examined the evolution and state-dependence of fiscal multipliers in South Africa over the period 1961Q1 to 2025Q1, using quarterly time-series data on GDP, government expenditure, interest rates, inflation, and the ZAR/USD exchange rate. Data on inflation and interest rates were sourced from the Federal Reserve Economic Data (FRED) database, while the South African Reserve Bank (SARB) provided GDP, fiscal expenditure, and exchange rate series. The Bayesian Dynamic Linear Model (BDLM) framework was employed to estimate time-varying fiscal multipliers, enabling the capture of gradual changes in fiscal policy effectiveness and heterogeneity across different growth regimes.

The results reveal a long-term upward trend in fiscal multipliers, from negative or near-zero values in the early 1960s to approximately 0.08–0.09 in recent years. This rise reflects structural shifts in South Africa's fiscal landscape, including the transition to democracy, expanded public service delivery, infrastructure investments, and improvements in macroeconomic management. However, the analysis also highlights persistent state dependence: multipliers are significantly higher in high-growth periods (0.0509) than in low-growth periods (0.0006), where they are statistically indistinguishable from zero. This contrasts with advanced economy findings, which often show stronger fiscal effects during recessions, and underscores the structural constraints limiting fiscal potency in South Africa during downturns.

From a policy perspective, there are many implications that can be derived from our findings. First is timing and state-contingency of fiscal policy. The stronger multipliers observed during expansions suggest that fiscal policy in South Africa has historically been more effective at reinforcing growth momentum than at reversing contractions. This calls for greater attention to the cyclical timing of spending measures and the design of automatic stabilisers that can deliver countercyclical support more effectively during recessions.

Enhancement of low-growth fiscal effectiveness is another implication from our findings. This means that negligible multiplier in low-growth regimes points to deep-seated bottlenecks, such as energy shortages, logistical inefficiencies, rigid labour markets, and weak investor confidence that dampen fiscal transmission. Addressing these constraints through targeted structural reforms could amplify the growth impact of fiscal policy during downturns.

Another implication from our findings is on how to ensure fiscal sustainability and debt management. With rising public debt levels and constrained fiscal space, especially in the post-COVID-19 era, maximising the efficiency of each rand spent becomes critical. Evidence from this study suggests prioritising high-impact, growth-enhancing expenditures—such as infrastructure, skills development, and productivity-boosting investments—over recurrent spending that offers limited multiplier effects.

Finally. our study provides approach to data-driven fiscal planning. The BDLM's ability to track time-varying fiscal effectiveness underscores the value of adopting real-time monitoring frameworks for fiscal multipliers. This approach can help policymakers adapt spending plans dynamically to prevailing economic conditions and structural shifts.

In conclusion, while South Africa's fiscal multipliers have strengthened over the long term, their effectiveness remains conditional on the growth environment. Policymakers should therefore pursue a dual strategy: enhancing fiscal potency during downturns through structural reforms and targeted interventions, while leveraging periods of expansion for strategic public investment that reinforces long-run growth. The evidence presented here highlights the importance of state-contingent fiscal planning, underpinned by robust data analysis, as a cornerstone of sustainable and inclusive economic development in South Africa.

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