State-dependent fiscal multipliers and financial dynamics in South Africa

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- In this context, better estimates of fiscal multipliers can support the design of optimal fiscal actions.

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3. **Multipliers tend to be higher in times of slack**
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4. **The instrument matters**
   For instance, tax cuts – particularly to personal income - are more powerful in developing countries, while spending is more effective in high-income countries, closed economies, and fixed exchange rate regimes – including South Africa (Ilzetzki 2011).

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5. **The multiplier is bigger if accounting for financial frictions associated to a negative output gap (i.e. information asymmetries, credit constraints)** Fernandez-Villaverde (2010), Eggertsson and Krugman (2012), Canzoneri et al. (2012), Makrelov et al. (2019).

   Higher fiscal spending reduces the perceived probability of default of private sector debtors; stronger balance sheets induce consumption growth but also improve the net worth of monetary institutions: more loans available will reduce the lending-deposit spread and generate **induced investment growth**.

I Literature Review

Fiscal multiplier estimates for South Africa

Authors (date)	Methodology	Peak (horizon)	Sample
Akanbi (2013)	macroeconometric model	1% (one year, recession)	1970-2011
Burrows and Botha (2013)	Input-output model	1.82 (1980); 1.60 (2010)	1980; 2010
Jooste et al. (2013)	SVECM	> 1 (Q2)	1970-2010
Jooste and Naraidoo (2017)	DSGE	0.6	
Kemp (2020)[3]	Baseline SVAR model local projections	0.36 (Q4) 0.58 (Q4, recession)	1970-2018
Kemp and Hollander (2021)	DSGE	0.6 (Q4, investment)	1994-2018
Mabugu et al. (2013)	CGE model	0.49 [investment]	2005
Makrelov et al (2018)	SFC model	2.5 (Q12, recession)	2001-2012
Nuru (2019)	SVAR model	0.4 (Q9)	1994-2014
Schroder and Storm (2020)	Input-output model	1.87	2018

II Methodology

Linear and Non-linear Local Projections

LPs (Jordá 2005) require OLS estimation of a series of regressions for each horizon h and each variable:

$$y_{t+h} = \alpha_h + \Pi_h(L)x_{t-1} + \beta_h shock_t + u_{t+h} \tag{1}$$

with 4 lags and 16 horizons: h=1,2,...12

LPs can be easily accommodated to estimate nonlinear models where the system switches across two regimes, A and B, according to a logistic probability function F(z_t) :

$$\begin{aligned} y_{t+h} = F(z_{t-1})[\alpha_{Ah} + \Pi_{Ah}(L)x_{t-1} + \beta_{Ah} shock_t] + \\ (1 - F(z_{t-1}))[\alpha_{Bh} + \Pi_{Bh}(L)x_{t-1} + \beta_{Bh} shock_t] + u_{t+h} \end{aligned} \tag{2}$$

where z_t is the switching variable that determines the two regimes (i.e. the cyclical component of GDP).

II Methodology

Data

- The **system of variables** includes real GDP, government expenditure, tax revenues, credit volume, private consumption and investment, the repo rate, and the debt-to-GDP ratio. All data is quarterly (1994-2019) and sourced from SARB.

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- All National Accounts variables are **measured as a ratio over real potential GDP**, which allows derivation of fiscal multipliers (in currency units) avoiding the bias of the "conversion factor" (*sample mean of impulse/sample mean of response*) needed on log-transformed variables (Ramey and Zubairy 2018);

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- **Fiscal spending shocks** are identified in a SVAR(4) as in Blanchard and Perotti (2002), assuming spending does not react to other variables within a quarter due to implementation lags.

III Results

Converting Impulse Response Functions into fiscal multipliers

The **fiscal multiplier** is defined as the Rand-response of GDP to a one-Rand government spending shock.

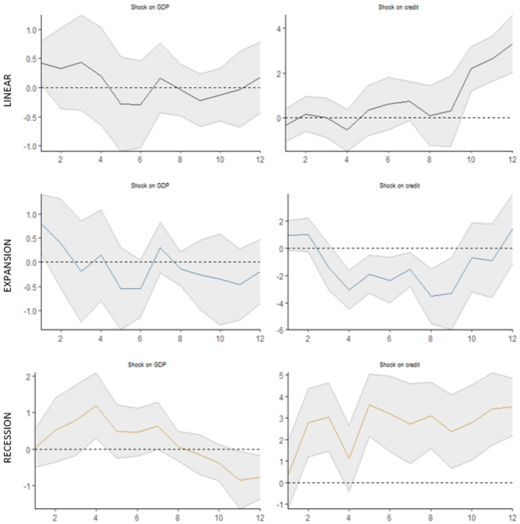
The traditional way to quantify fiscal multipliers from IRFs is to calculate the ratio of the output response at its peak to the government spending increase at horizon zero.

Instead, Mountford and Uhlig (2009) suggest the computation of **cumulative multipliers**: at any given horizon h, the multiplier corresponds to the cumulative output response relative to the cumulative government spending up to that horizon:

$$multiplier_h = \frac{\sum_h^{j=0} y_{t+j}}{\sum_h^{j=0} g_{t+j}} \tag{3}$$

III Results

Figure 1. IRFs of GDP and credit volume (1994q2-2019q4)



III Results

Table 1. Cumulative multipliers at different horizons: GDP and credit volume (1994q2-2019q4)

Model	Response variable	Q1	Q3	Q6	Q9	Q12
Linear	GDP	**0.43**	0.40	0.19	0.14	0.12
	Credit volume	-0.32	-0.05	0.06	0.68	**1.57**
Expansion	GDP	**0.80**	0.29	0.01	0	-0.18
	Credit volume	**0.95**	0.16	-1.72	-2.76	-2.58
Recession	GDP	0.02	0.52	**1.20**	1.08	0.34
	Credit volume	0.33	2.42	4.91	**6.03**	5.52

III Results

Figure 2. IRFs of Private consumption and Private investment (1994q2-2019q4)

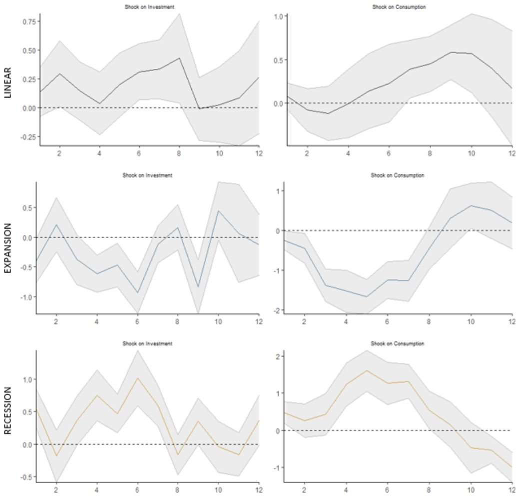


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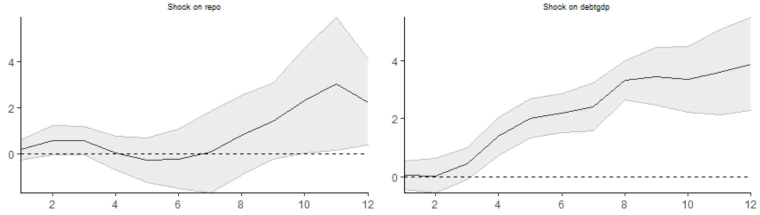
Table 2. Cumulative multipliers at different horizons: Private consumption and Private investment (1994q2-2019q4)

Model	Response variable	Q1	Q3	Q6	Q9	Q12
Linear	Consumption	0.13	0.19	0.25	**0.38**	0.36
	Investment	0.08	-0.04	0.06	0.35	**0.46**
Expansion	Consumption	-0.40	-0.16	-0.65	-0.61	-0.50
	Investment	-0.24	-0.60	-1.38	-1.44	-1.10
Recession	Consumption	0.55	0.28	**1.03**	1.01	0.67
	Investment	0.48	0.46	1.83	**1.97**	0.91

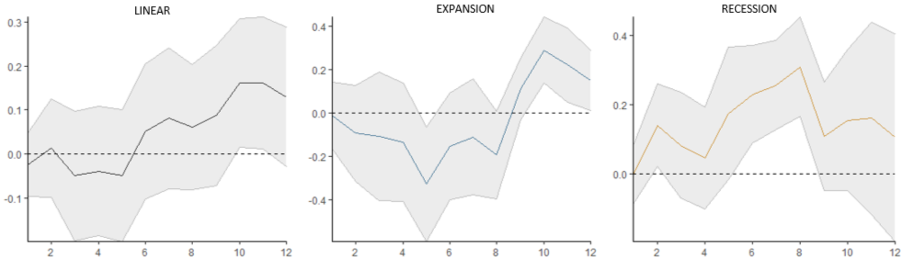
III Results

Figure 3. IRFs from linear local projections: repurchase rate and debt-to-GDP ratio (1994q2-2019q4)



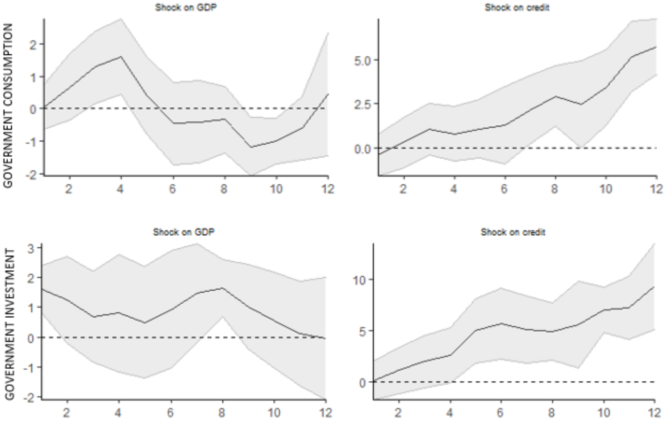
III Results

Figure 4. IRFs from linear local projections: JSE/FTSE All Share Index (1994q2-2019q4)



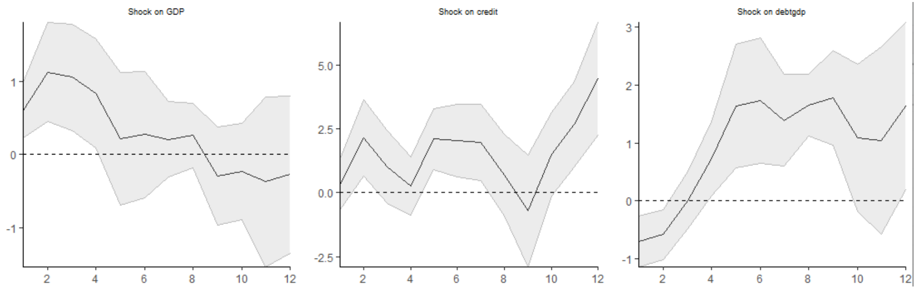
III Results

Figure 5. IRFs from linear local projections: shock on government consumption and investment (1994q2-2019q4)



III Results

Figure 6. IRFs from linear local projections: reduced sample size (1994q2-2009q4)



Conclusions

- No single multiplier estimate. The average value of the multiplier since 1994 is found to be below 0.5: it peaks at 1.2 during recessions.

  The business cycle effect is more pronounced in the response of credit volume.

  Despite the monetary contraction, the multiplier appears to crowd in both consumption and investment on average and during recessions.

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- It depends on the **instrument** used: in particular, public investment has a positive and more persistent effect on output than current spending.