How Does Monetary Policy Affect the Fiscal Multipliers in a Small and Open Economy? The Peruvian Case

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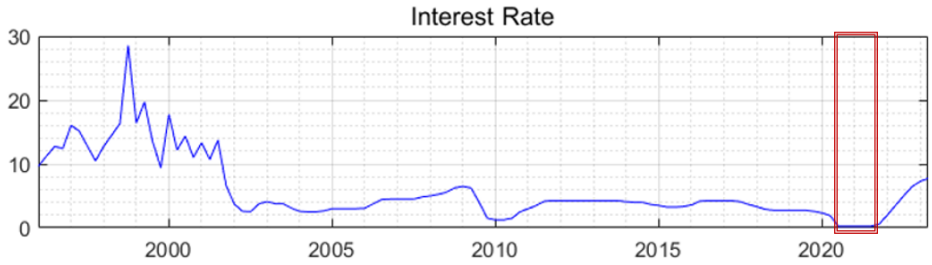
XLII Encuentro de Economistas del BCRP

October 21, 2024

Introduction

Motivation

There is a lack of studies for Peru (and other Latin American countries) that investigate fiscal multipliers incorporating monetary policy, potentially leading to biased results. Moreover, during the COVID-19 crisis, the reference rate dropped to its lowest historical value, allowing for the study of fiscal multipliers in a zero lower bound context.



Methodology

I employ a time-varying parameter vector autoregressive model with stochastic volatility (TVP-VAR-SV) with specific constraints on parameter variation. This hybrid model, known as TVP-VAR-R1-SV, was proposed by Chan and Eisenstat (2018).

Results

Monetary policy negatively impacts fiscal multipliers, while the government investment multiplier increases in a zero lower bound context.

Literature Review

- **Belinga, V., and Lonkeng Ngouana, C. A. (2015).** (Not) Dancing Together: Monetary Policy Stance and the Government Spending Multiplier.
- **Christiano, L. J., Eichenbaum, M., & Rebelo, S. (2011).** When Is the Government Spending Multiplier Large?
- **Ilzetzki, E., Mendoza, E. G., & Végh, C. A. (2013).** How Big (Small?) are Fiscal Multipliers?
- **Meléndez Holguín, A., & Rodríguez, G. (2023).** Evolution over Time of the Effects of Fiscal Shocks in the Peruvian Economy: Empirical Application Using TVP-VAR-SV Models.
- **Vtyurina, S., and Leal, Z. (2016).** Fiscal Multipliers and Institutions in Peru: Getting the Largest Bang for the Sol.
- **Pyun, J. H., & Rhee, D. (2014).** Fiscal Multipliers during the Global Financial Crisis: Fiscal and Monetary Interaction Matters.

Methodology

- Meléndez Holguín, A., & Rodríguez, G. (2023) and Pérez Rojo, F., & Rodríguez, G. (2023) find that the best model to study fiscal and monetary policy, respectively, is the TVP-VAR-R1-SV model:

$$B_{0,t}y_t = \mu + \sum_{i=1}^{p} B_i y_{t-i} + \epsilon_t,\ \epsilon_t \sim N(0, \Sigma_t), t = 1, 2..., T$$

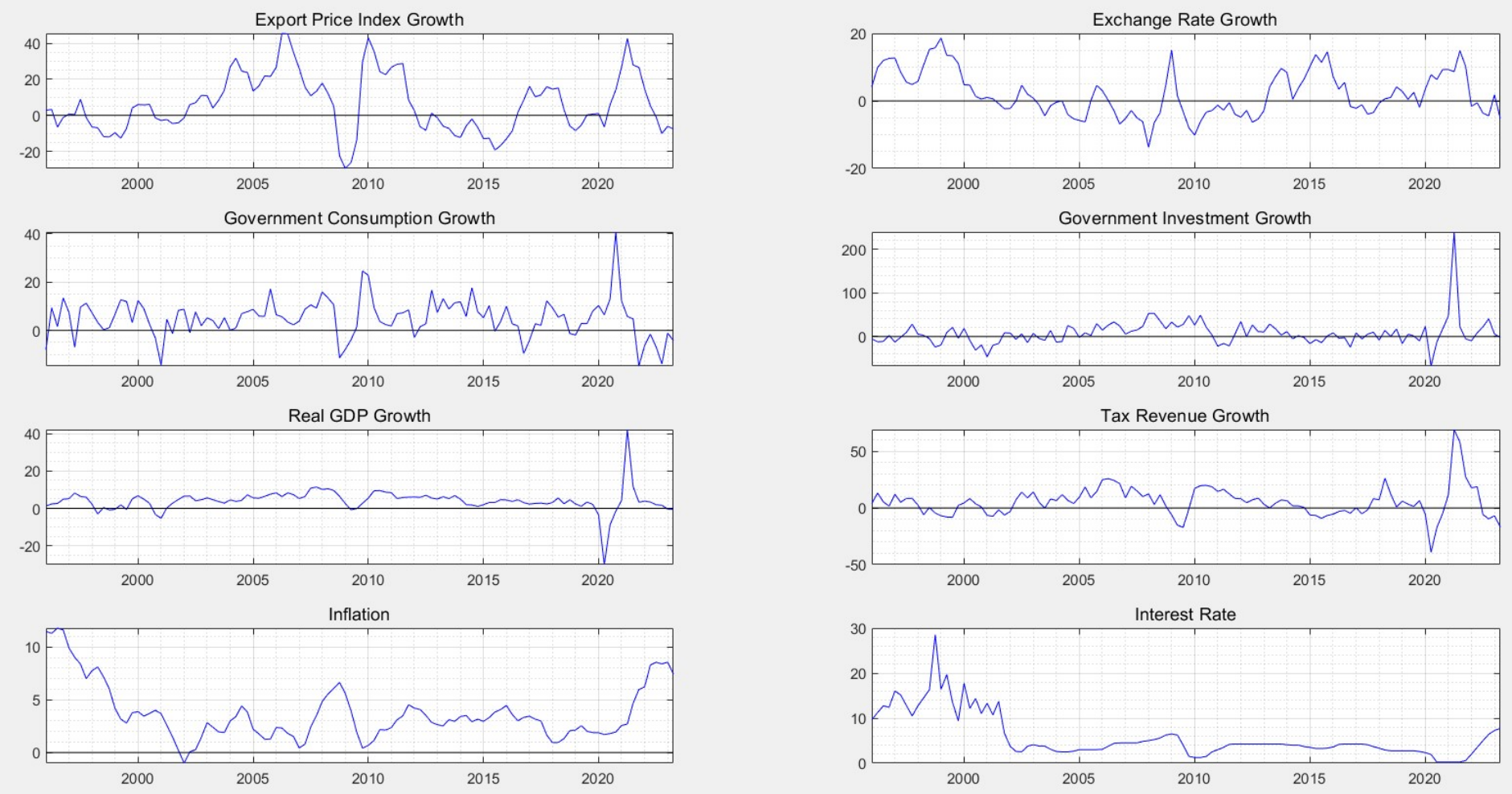
- y_t is an n×1 vector of dependent variables; μ is an n×1 vector of intercepts.
- $B_{0,t}$ is an n×n triangular inferior matrix containing the coefficients of contemporaneous effects, with diagonal elements equal to one.
- B_i is an n×n matrix containing the parameters of the lagged variables; ϵ_t is the heteroscedastic innovation.
- $\Sigma_t = diag(exp(h_{1t}), exp(h_{2t}), ..., exp(h_{nt}))$.

$$h_t = h_{t-1} + \zeta_t, \quad \zeta_t \sim N(0, \Sigma_h)$$

- Order: $y_t = \left(XPI_t, e_t, GC_t, GK_t, GDP_t, TR_t, \pi_t, i_t\right)'$

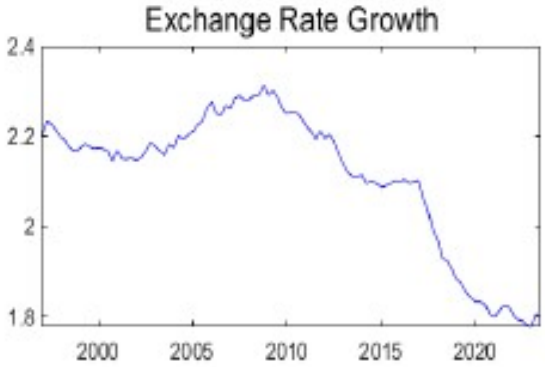
Variables

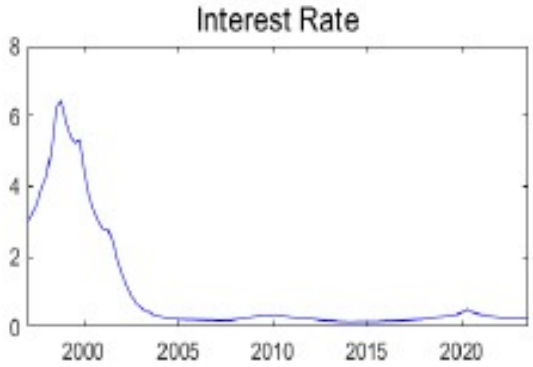
Sample: 1996Q1-2023Q3

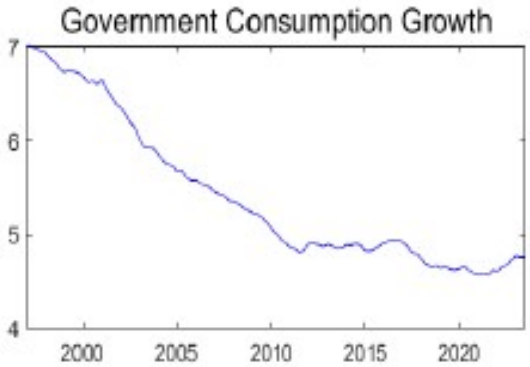


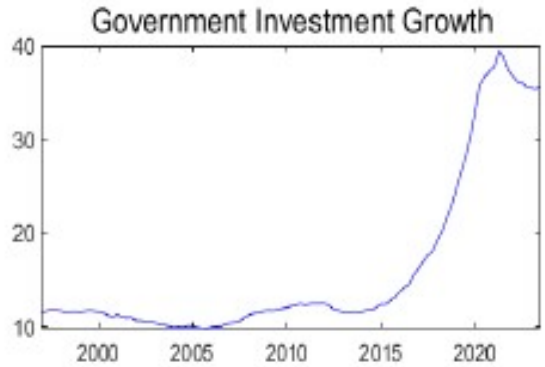
Source: Central Reserve Bank of Peru

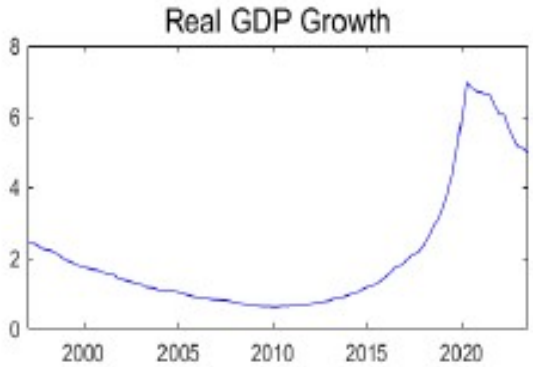
Stochastic Volatility in each Equation

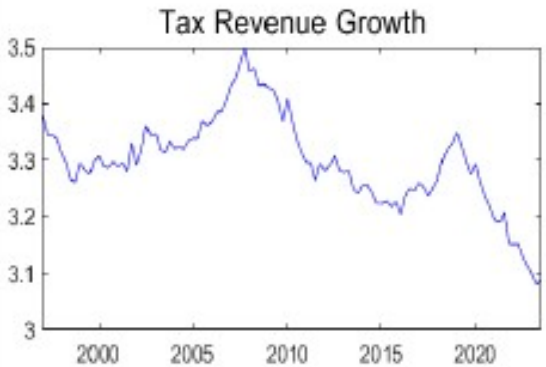


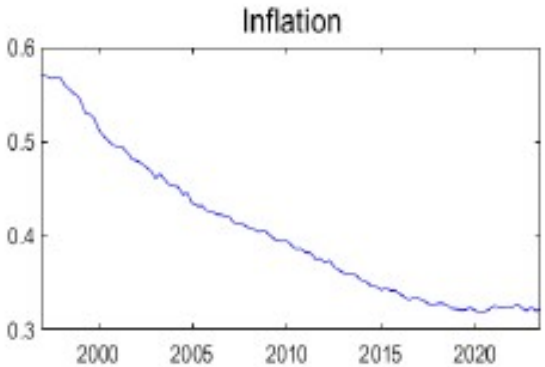




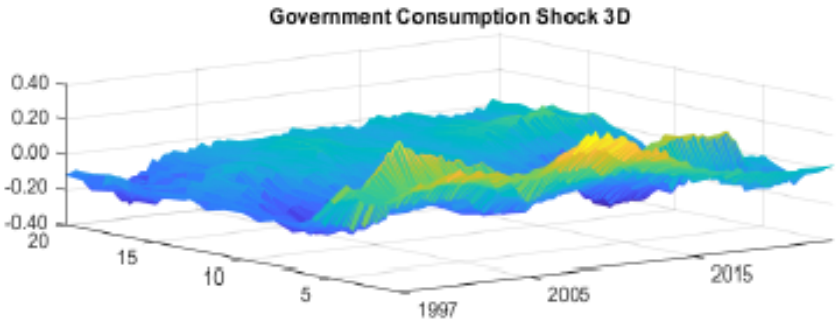


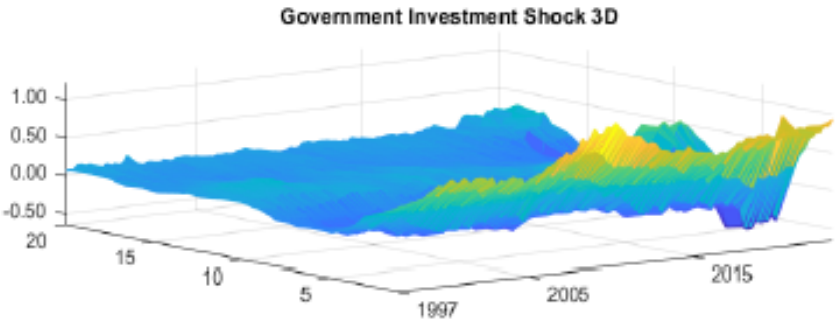


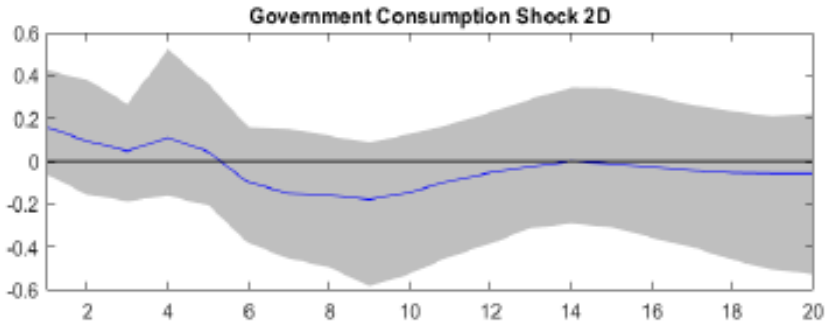


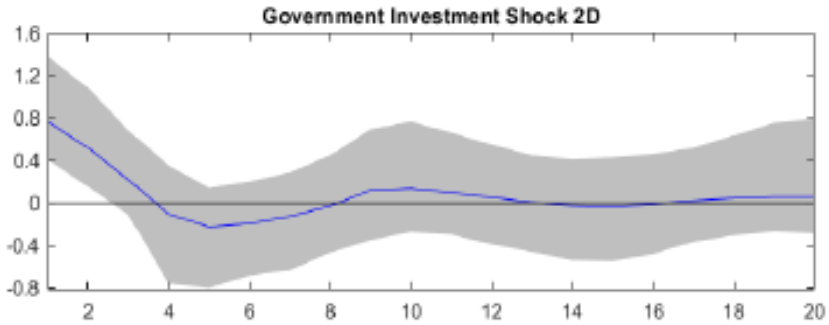


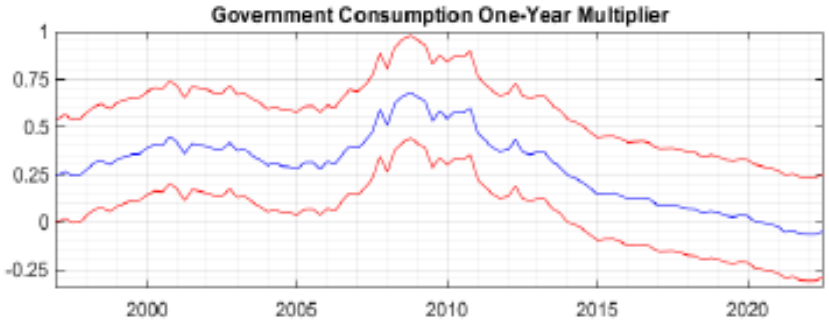
Impulse Response Functions and Fiscal Multipliers











Comparison of One Year Fiscal Multipliers

Table 1. Comparison of One Year Fiscal Multipliers

Source	Cicle/Model	GC Multiplier	GK Multiplier
BBVA Research (2014)	Lineal	0.30	1.50
MEF (2015)	Expansion	0.82	1.74
	Recession	0.95	1.69
BCRP (2012-2015)	Expansion	0.28	0.73
	Recession	0.93	1.42
Vtyurina and Leal (2016)	Expansion	0.05	0.40
	Recession	0.10	0.60
Consejo Fiscal (2018)	Lineal	0.96	1.08
Jiménez et al. (2023)	Time-varying	0.44	0.89
Meléndez Holguín and Rodríguez (2023)	Time-varying	0.34	0.44
Meléndez Holguín (2024)	TVP-VAR-R1-SV	0.28	1.06

- Incorporating monetary policy into the model allows for the capture of market expectations and policy credibility. A predictable and credible monetary policy can strengthen the effectiveness of fiscal policy.

Determinants of the GC and GK Multipliers

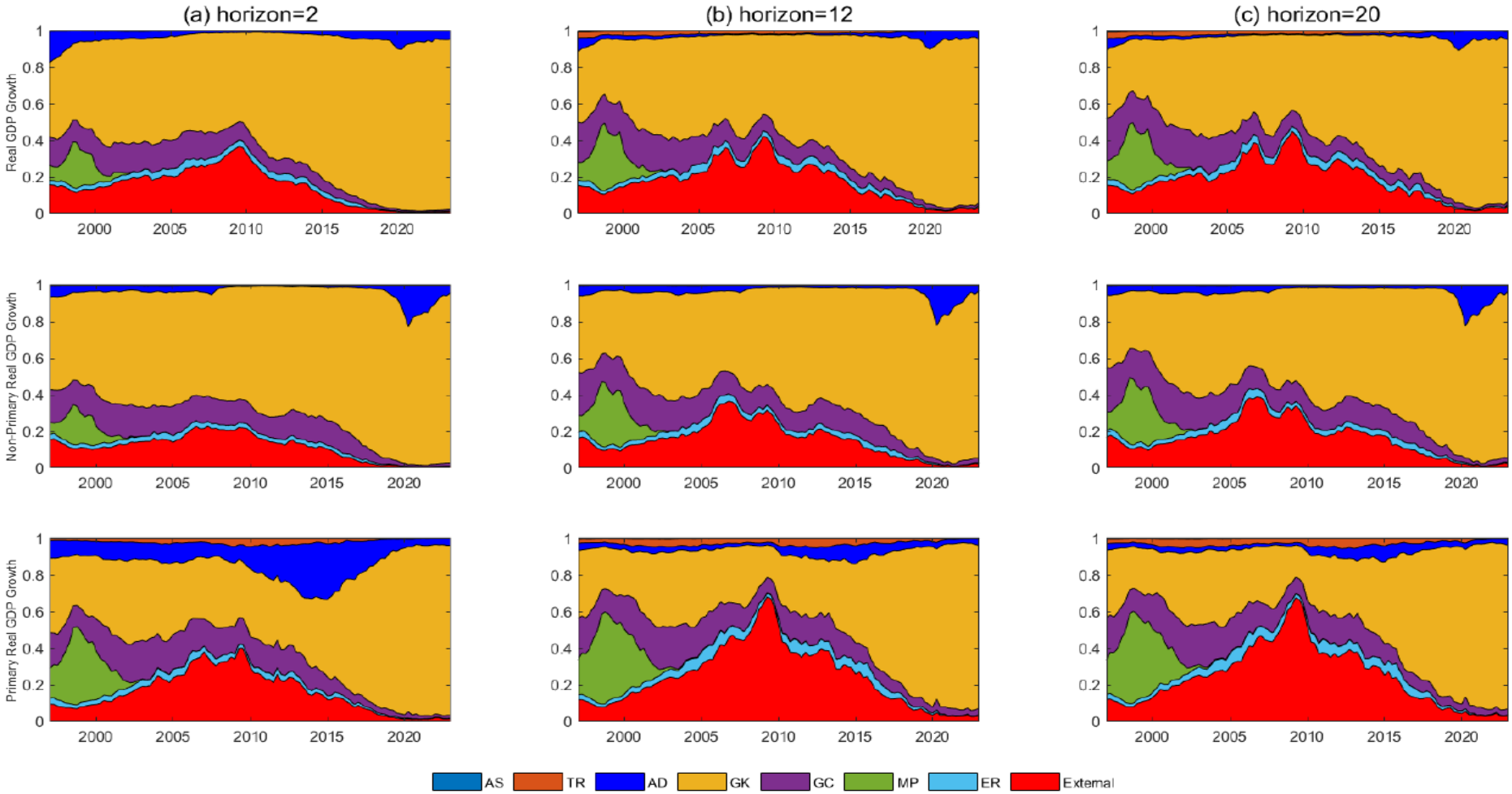
Table 2. Determinants of the Variation of Fiscal Multipliers

	1999Q2-2022Q4		2003Q4-2022Q4	
VARIABLES	GC Multiplier	GK Multiplier	GC Multiplier	GK Multiplier
Interest rate (-1)	-0.0035	-0.0108	-0.0243***	-0.0617**
	(0.0024)	(0.0101)	(0.0080)	(0.0304)
Debt/GDP (-1)	-0.0084***	-0.0091**	-0.0116***	-0.0160***
	(0.0010)	(0.0041)	(0.0013)	(0.0050)
Trade openness (-1)	0.0080***	0.0152***	0.0116***	0.0246***
	(0.0013)	(0.0052)	(0.0018)	(0.0069)
ZLB	0.0772*	0.5212***	0.0711	0.5699***
	(0.0437)	(0.1809)	(0.0505)	(0.1921)
Constant	0.6884***	1.4498***	0.7242***	1.4251***
	(0.0836)	(0.3454)	(0.1022)	(0.3884)
Trend	-0.0091***	-0.0138***	-0.0098***	-0.0149***
	(0.0004)	(0.0017)	(0.0005)	(0.0019)
Observations	95	95	77	77
R-squared	0.6709	0.4268	0.7371	0.4486

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

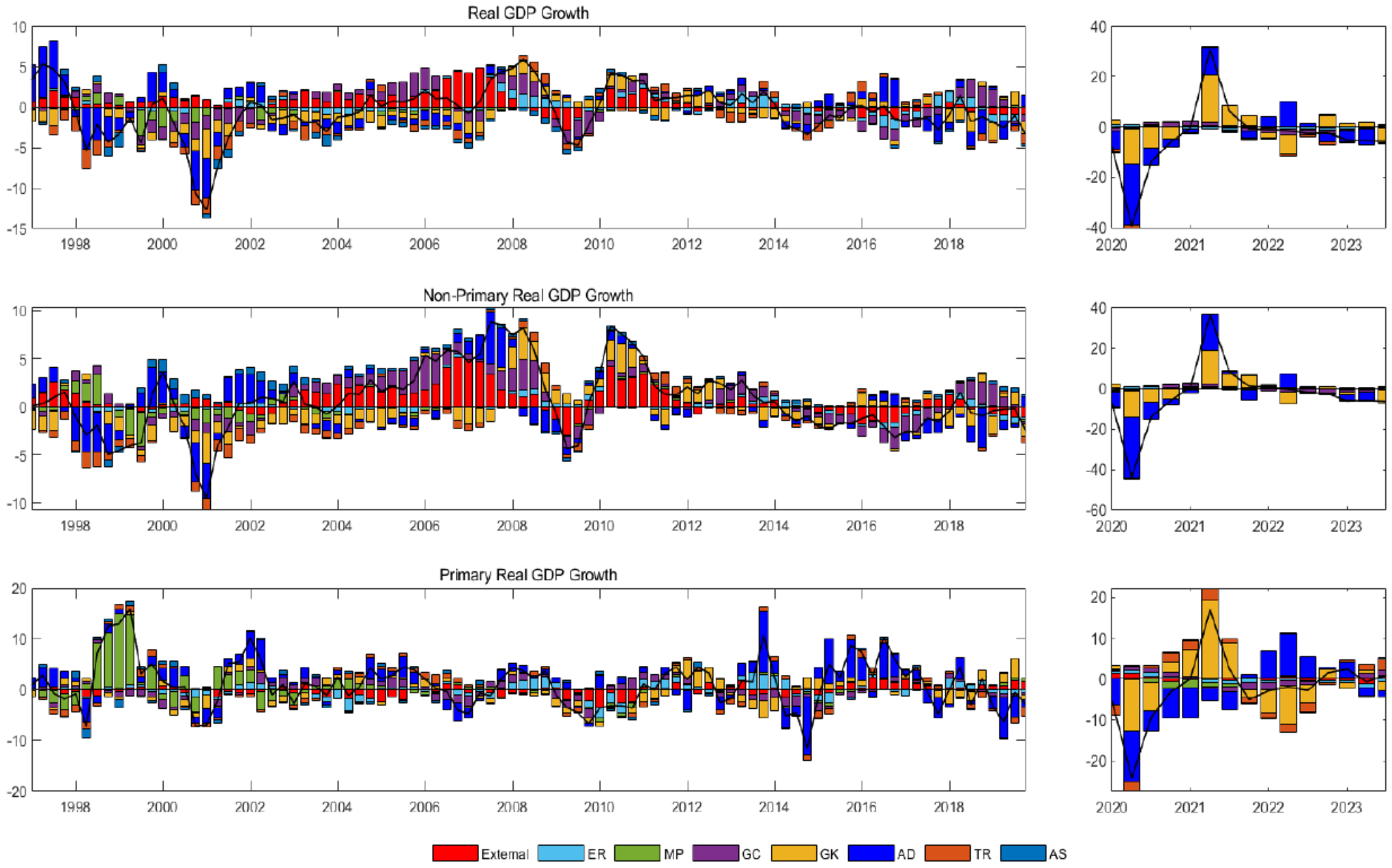
In 2003Q4 the BCRP started controlling the reference rate.

Other Results: Forecast Error Variance Decomposition



- Non-Primary GDP: Electricity and water, Construction, Commerce, Services, Non-Primary Primary Manufacturing.
- Primary Real GDP: Agriculture and Livestock, Fishing, Mining and fuel, Primary Manufacturing.

Other Results: Historical Decomposition



Conclusions

- The analysis delineates a discernible negative impact of monetary policy on both GC and GK multipliers, particularly pronounced post the implementation of interest rate control by the BCRP.
- In a scenario approximating the ZLB - notably during the COVID-19 crisis - the GK multiplier is observed to increase substantially.
- The IRFs reveal that GK shocks exert a significant and positive impact on GDP. Additionally, the GC and GK shocks are substantial contributors to the FEVD of GDP, specially the latter.
- The GC multiplier peaked in 2008Q4, thereafter exhibiting a declining trend. The GK multiplier, on the other hand, exhibits greater volatility but reaches its zenith in 2011Q1 and 2011Q3, and again in 2020Q2.
- The incorporation of monetary policy considerations into the analysis significantly amplifies the GK multiplier.