CHAPTER VII

THE SOURCES OF SERBIAN BUDGETARY IMBALANCES IN A TIME OF TRANSITION, CRISIS AND GLOBAL PANDEMICS

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ABSTRACT
This chapter evaluates the empirical relevance of specific cause-and-effect hypotheses that govern the dynamic relationship between government revenues and primary expenditures in the case of the Republic of Serbia after the year 2000. The results of the structural VAR model show that the institutional separation hypothesis is the most plausible explanation for the formation of structural budget imbalances in the case of Serbia between 2001Q1 and 2021Q3.

Keywords: *structural deficit, VAR model, COVID-19, Serbia.*

JEL Classification: *H60, H62, H68*

1. INTRODUCTION

After the political changes from the end of 2000, the share of government revenues and expenditures in the gross domestic product (GDP) of the Republic of Serbia was around 30%. The relatively low values of mentioned fiscal aggregates at the beginning of 2001 were a consequence of political and economic trends that influenced the Serbian economy in the last decade of the XX century (wars in former Yugoslavia, hyperinflation, international sanctions and NATO bombing). However, in only one fiscal year, due to fiscal consolidation and macroeconomic stabilisation program, as well as the effects of comprehensive tax reform implemented with the support of the IMF, public revenues and primary expenditures as % of GDP recorded an impressive growth of over ten percentage points (Arsić et al., 2001).

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After the initial success of the macroeconomic stabilisation program during 2001, and after re-establishing international trade and capital flows with the rest of the world, the Serbian economy received large inflows of capital from abroad, primarily in the form of privatisation receipts, remittances from abroad, foreign direct investments to the sector of non-tradable goods and services and the expansion of credit in the form of consumer loans via reformed banking sector, as documented in studies by Darvas (2009), Berglöf et al. (2009), Cocozza et al. (2011) and Koczan (2015).

The enormous net inflow of capital between 2002-2007 served primarily to finance domestic absorption, i.e., to finance the balance of trade deficit, consequently contributing to the build-up of external vulnerabilities. The growth of domestic absorption led to the cyclical growth of indirect taxes, primarily in value-added tax (VAT), excise taxes and public revenues due to customs. The described growth of cyclical indirect public revenues created positive fiscal space that policymakers used to conduct procyclical fiscal policy through discretionary reductions of specific tax rates and discretionary increases in public spending, primarily in the form of public wages, pensions and capital investments. These discretionary procyclical fiscal policy measures further stimulated the absorption cycle before the global financial crisis affected the Serbian economy during 2008. The described procyclical character of fiscal policy in Serbia before the Great Recession is consistent with the theoretical and empirical findings of Talvi and Végh (2005), Rahman (2010) and Dobrescu and Salman (2011). In particular, these authors find that discretionary fiscal policy measures in the form of tax cuts and spending hikes during economic expansions are the main drivers of procyclical budget deficits in developing economies.

In 2008Q2, as documented in Arsić et al. (2013) and Andrić et al. (2016a, b), the Great Recession hit the Serbian economy. The decline in the economic activity primarily occurred due to: 1) lower exports to the EU countries already affected by the global financial crisis; 2) aggregate demand contraction, as a consequence of a sharp decrease in the inflow of foreign capital. The reduced inflow of foreign capital led to the depreciation of the real effective exchange rate and consequent reduction of the balance of trade deficit. The recovery of net exports further led to a decline of indirect public revenues, widening the fiscal deficit and increasing the public debt. In particular, between 2008Q2 and 2015Q1, public debt as % of GDP increased from 25% to 70%, a staggering growth of around 45 percentage points (Andrić & Minović, 2018).

In 2015Q1, supported by the IMF stand-by arrangement, the government launched a 3-year fiscal consolidation package centered on public sector wage and pension cuts. As a consequence of the fiscal consolidation programme, the public debt-to-GDP ratio dropped to 52% at the beginning of 2021. However, the arrival of the global COVID-19 pandemics to Serbia pushed the public debt-to-GDP ratio to 58% due to a sharp one-off increase in the structural fiscal deficit of around 13% of trend GDP in 2020Q2.

Given the fiscal trends described above, this chapter tests the empirical relevance of specific cause-and-effect hypotheses that govern the dynamic relationship between government revenues and primary expenditures in the case of the Republic of Serbia after the year 2000. The results of the structural VAR model show that the institutional separation hypothesis is the most plausible explanation for the formation of structural budget imbalances in the case of Serbia between 2001Q1 and 2021Q3. However, some circumstantial empirical evidence points to the possibility of controlling primary public expenditures through the discretionary influence of the budget's revenue side. Finally, the results show that discretionary measures on both sides of the budget significantly impacted the formation of external imbalances in the analysed period.

The rest of this chapter consists of the following sections: section 2 outlines the theoretical background and reviews the critical contributions from the literature; section 3 describes stylised facts concerning the Serbian economy between 2001Q1 and 2021Q3, and it further discusses the identification of structural fiscal shocks; section 4 states the empirical findings. Finally, section 5 provides recommendations for fiscal policymakers.

2. THEORETICAL BACKGROUND

In their study of the growth of public expenditures in Great Britain between 1890-1955, Peacock & Wiseman (1961) define the *spend-tax hypothesis*, which postulates that the increase (decrease) in public revenues comes after an increase (decrease) in public expenditures. In other words, the growth of public expenditures had been a consequence of exogenous structural shocks, to which the dynamics of public revenues subsequently adjusted.

The assumption of the spend-tax hypothesis about exogenous public spending is consistent with the tax-smoothing *Ricardian equivalence hypothesis* formulated by Barro (1979). In particular, Barro (1979), assuming that relevant economic agents have rational expectations, stipulates that current tax cuts and subsequent increases in budget deficits and public debt inevitably lead to future tax increases needed to finance accumulated public debt repayments.

Friedman (1978) discusses the possibilities of controlling the level and dynamics of public expenditures by limiting the share of public revenues in GDP. Friedman's *tax-spend hypothesis* implies that an increase (decrease) in public expenditures comes after an increase (decrease) in public revenues. Friedman (1978) argues that a reduction in public revenues leads to a reduction in public expenditures and thus ensures the “starve the beast” effect.

Buchanan & Wagner (1978) advocate the *fiscal illusion hypothesis* under which the current tax cuts lead to future public spending increases. Since economic agents do not form rational expectations, reducing the tax burden today only reduces the perceived economic price of public spending and, hence, leads to greater reliance on debt financing of public expenditures.

Meltzer & Richard (1981) define the *fiscal synchronisation hypothesis*, according to which the causal intertemporal relationship between public expenditures and revenues operates on the feedback principle. In other words, increases (decreases) in public expenditures lead to an increase (decrease) in public revenues and vice versa.

Hoover & Sheffrin (1992) articulate the *institutional separation hypothesis*, which implies the absence of dynamic causation between the expenditure and revenue side of the budget. Hoover & Sheffrin (1992) explain their empirical findings by arguing that various political constituents on both sides of the federal US budget after 1960 use the legislative process to promote their particular, and often opposite, economic interests.

Finally, Gale & Orszag (2004), using data for the US economy after 2000, identify a negative correlation between public expenditures and revenues, measured as a % of trend GDP. Gale & Orszag (2004) argue in favor of *the fiscal irresponsibility hypothesis* (spending hikes accompanied with tax cuts) and *the coordinated fiscal discipline hypothesis* (tax hikes accompanied with spending cuts).

The most representative studies in this line of research utilise long-run time series data for the US economy. For example, von Furstenberg et al. (1986) find empirical evidence supporting the spend-tax hypothesis from 1954 to 1982. Bohn (1991) criticises the findings of von Furstenberg et al. (1986) because the authors do not consider the potential cointegration between public expenditures and revenues.

Bohn (1991) assumes the stationary behavior of the US budget deficit and finds empirical evidence consistent with the fiscal synchronisation hypothesis between 1792 and 1988. Finally, Romer & Romer (2009) examine the relevance of the “starve the beast” effect in a sample that includes quarterly US data after World War II.

Using a time series of narratively identified discretionary tax cuts, these authors examine whether tax cuts led to a reduction in US public spending between 1945 and 2007 and find no support for the theoretical underpinnings of the “starve the beast” effect. Contrary to the studies mentioned above, the analyses presented in this chapter contribute to this area of research by focusing on budgetary imbalances of a small open economy in a period of economic transition.

3. DATA AND METHODOLOGY

3.1. Stylised Facts

Our empirical analyses use seasonally adjusted time series of cyclically and absorption adjusted revenues (CAAR) and primary expenditures (CAAE) between 2001Q1 and 2021Q3. We obtain seasonally unadjusted data from the official websites of the Statistical Office and the Ministry of Finance of the Republic of Serbia. Following the recommendations of Eurostat (Eurostat, 2015), we seasonally adjust the original data using the TRAMO/SEATS seasonal adjustment procedure.

The Census X-12 residual seasonality tests rejected the presence of unaccounted for seasonality in the final seasonally adjusted time series. We also test for the presence of stochastic trends in seasonally adjusted data using the unit root tests defined in Elliott et al. (1996) and Ng & Perron (2001). The results of unit root tests indicate the absence of a stochastic trend in the dynamics of cyclically and absorption adjusted public revenues (CAAR) and primary government expenditures (CAAE) [3], measured as % of trend GDP. Following Schüler (2018) and Hodrick (2020), we obtain the trend GDP using the standard HP filter ($\lambda = 1600$).[4]

We adjust public revenues for the effect of the business cycle (YGAP) and absorption cycle (AGAP) according to the following formula:

$$CAAR = R - 0.17 \times (YGAP + AGAP) \tag{1}$$

in which R represents seasonally adjusted public revenues as % of trend GDP, YGAP denotes the output gap, while AGAP represents the absorption gap.[5] The calculated

[3] The results are available from the authors upon request.
[4] We opt for the HP filter instead of Hamilton's regression filter, given the recommendations outlined in Schüler (2018) and Hodrick (2020).
[5] The coefficient of 0.17 in equation (1) refers to the average share of direct and indirect government revenues in GDP for 2001Q1-2021Q3. For details, see Arsić et al. (2013).

series of cyclically and absorption adjusted government revenues (CAAR) only measure the revenue changes due to discretionary fiscal policy operations.

In addition, the cyclically and absorption adjusted primary expenditures (CAAE), which measure the discretionary changes on the expenditure side of the budget, are identical to overall primary expenditures as % of trend GDP, due to a relatively small share of unemployment benefits in GDP.

We calculate the output gap (YGAP) from formula (1) as:

$$YGAP = \frac{Y - trend\, Y}{trend\, Y} \times 100. \tag{2}$$

The absorption gap (AGAP) from formula (1) equals

$$AGAP = \frac{A - trend\, A}{trend\, Y} \times 100. \tag{3}$$

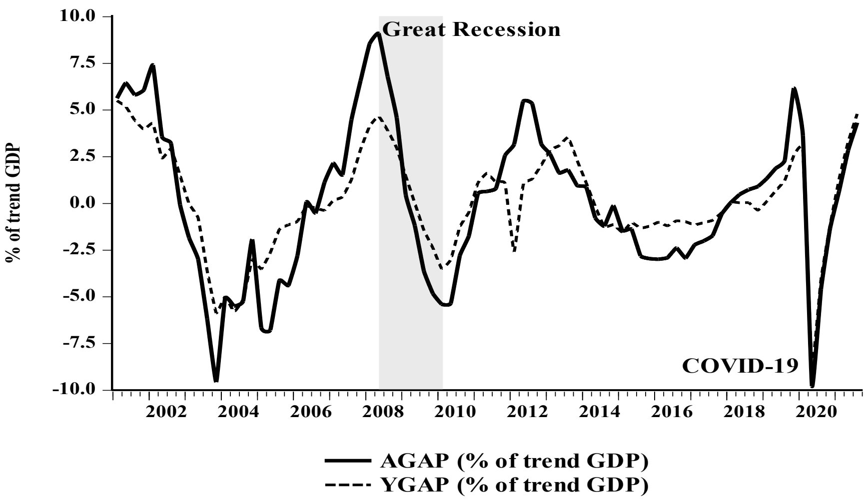
in which Y represents nominal GDP, while A, A=C+I+G, denotes domestic absorption equal to the sum of household consumption (C), gross fixed capital formation (I) and government spending (G). Figure 1 depicts the dynamics of YGAP and AGAP between 2001Q1 and 2021Q3. Several stylised facts from Figure 1 are worth emphasising: 1) the two gaps exhibit a strong positive correlation throughout the sample span, although the volatility of AGAP is more pronounced in comparison with YGAP variability; 2) the figure clearly shows the build-up of external imbalances in the wake of the Great Recession resulting subsequently in a sharp negative structural break in the dynamics of absorption gap between 2008Q2-2010Q1; 3) both output gap and absorption gap exhibit the highest drop in their respective values in 2020Q2 due to the spillover of global COVID-19 pandemics to the Serbian economy. In particular, the drop in YGAP was around nine percentage points of trend GDP, while the contraction of the AGAP approximately equalled ten percentage points of trend GDP, implying that the COVID-19 crisis primarily affected the aggregate demand side of the Serbian economy.

Figure 2 depicts the dynamics of CAAE and CAAR between 2001Q1 and 2021Q3. The time series plots from Figure 2 show: 1) public finances in Serbia recorded a structural primary fiscal deficit between 2006Q3 and 2015Q1 of approximately 3% of trend GDP, on average; 2) between 2015Q1 and 2018Q1, the government implemented the package of fiscal austerity measures which resulted in an average structural primary fiscal surplus of approximately 1.8% of trend GDP between 2015Q1 and 2020Q1; and 3) in 2020Q2, due to a package of fiscal measures designed to support the economy, the structural primary fiscal balance recorded a temporary fiscal deficit of around 13% of trend GDP. The successful fiscal consolidation before the COVID-19 crisis enabled the government to offer one of the most extensive stimulus packages in the region of which approximately 5 per cent of trend GDP was in the form of loan guarantees, and around 8 per cent of trend GDP was a range of revenue and expenditure measures (World Bank, 2021).[6]

3.2. Methodology

The vector autoregression models (VARs) represent an appropriate econometric methodology suitable for examining the dynamic causal relationship between discretionary public revenues and discretionary primary public expenditures.[7]

Figure 1. Absorption Gap (AGAP) and Output Gap (YGAP) in Serbia, 2001Q1-2021Q3.



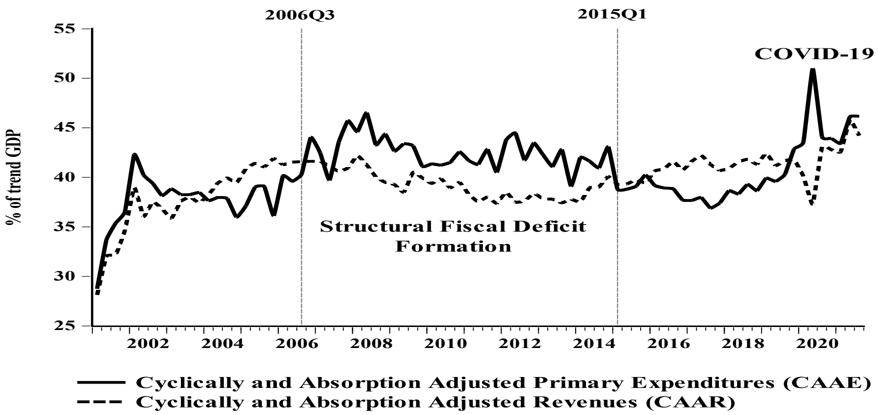
Source: Authors' calculations

This chapter estimates two 3-variable VAR specifications of order 2 ($p = 2$) via the ordinary least squares method, where CAAR, CAAE and AGAP correspond to a set

[6] For a detailed list of all fiscal policy measures, see World Bank (2021).
[7] See Milunovich & Minovic (2014) and Minović et al. (2021) for details about the VAR modelling approach.

of endogenous variables.[8] We identify structural shocks in VAR specifications using the triangular Cholesky decomposition: VAR 01 implies a recursive **CAAE→CAAR→ AGAP** identification scheme, while the VAR 02 model follows the **CAAR→CAAE→ AGAP** identification scheme. Both Cholesky schemes imply that discretionary public revenues and primary public expenditures respond to absorption shocks with a one-quarter delay, similar to Blanchard & Perotti (2002). The use of the absorption gap instead of the output gap is justified, given that in small open indebted economies, the discretionary fiscal policy measures exert their influence on external balance rather than on economic growth and associated business cycle fluctuations (Ilzetski et al., 2010). We approach the identification issue in this chapter by assessing the structural VAR specifications that emphasise economic theory in identifying structural fiscal shocks.

Figure 2: Cyclically and Absorption Adjusted Government Revenues (CAAR) and Primary Expenditures (CAAE), 2001Q1-2021Q3



Source: Authors' Calculations

When assessing the relevant structural specifications, it was necessary, therefore, to make an appropriate identification assumption about the causal relationship between discretionary public revenues and discretionary primary public expenditures within a quarter. Hence, the identification within VAR 01 model implies exogenous primary government expenditures (**CAAE→CAAR**), following the Ricardian equivalence

[8]The estimated VAR model satisfies the stability condition. The order of estimated VAR model stems from AIC, HQ and SC information criteria. The residual diagnostics tests (LM autocorrelation test, White's heteroscedasticity test, and Lutkepohl's normality test) show no signs of VAR misspecifications at the 1% level of statistical significance.

tax-smoothing model of Barro (1979). On the other hand, given the results of Friedman (1978), Buchanan & Wagner (1978), Blanchard & Perotti (2002) and Romer & Romer (2009), the VAR 02 model assumes exogenous revenue shocks (**CAAR→CAAE**).[9]

In addition to endogenous variables, we fit the following exogenous variables to our preferred VAR specifications: a constant, linear and quadratic time trend, as in Ramey (2020), as well as dummy variables IMF, VAT, ELECTIONS, GREAT RECESSION and COVID-19.[10]

4. EMPIRICAL RESULTS

This section presents econometric findings from the VAR models described in section 3. In particular, it discusses the values of accumulated impulse response functions and forecast error variance decompositions up to 12 quarters after the initial shock in CAAE and CAAR, since, according to Alesina et al. (2019), the average duration of fiscal consolidation programs is three years. The 95% confidence intervals, obtained via 10000 Monte Carlo simulations as in Romer & Romer (2009), are also reported to evaluate the statistical significance of the results at the 5% significance level.

4.1. Baseline Cholesky Identification-Exogenous Expenditure Shocks

The VAR 01 model has the following mathematical representation:

$$A_0 Y_t = \sum_{i=1}^{2} A_i Y_{t-i} + BX_t + \varepsilon_t \tag{4}$$

in which Y_{t-i}, *i=0,1,2* denotes the *3* x *1* column vector of endogenous variables (CAAE, CAAR and AGAP), while A_i, *i=0,1,2* represent *3* x *3* coefficient matrices. The X_t is an *8* x *1* column vector of exogenous variables, while *B* stands for the

[9] Due to a relatively short sample span in question, we do not construct a time series of narratively identified spending shocks. In addition, we do not construct narratively identified tax shocks since they are a weak instrument for the time series of cyclically adjusted tax revenues, as shown in Hebous and Zimmermann (2014).

[10] The dummy variable IMF equals +1 in periods 2002Q2-2006Q1, 2009Q1-2011Q1, 2011Q4-2013Q1, 2015Q1-2018Q1, and 0 in other quarters. The dummy variable VAT equals -1 in 2004Q1, +1 in 2005Q1, and 0 in other quarters. The dummy variable ELECTIONS equals +1 in 2006Q4, 2007Q4, 2012Q1, 2012Q2 and 2020Q2, and 0 in other quarters. The dummy variable GREAT RECESSION equals *t*, *t=1, 2,…8* between 2008Q2 and 2010Q1 and 0 in other quarters. Finally, the dummy variable COVID-19 equals +1 in 2020Q2 and 0 in other quarters.

exogenous variables' 3 x 8 coefficient matrix. Finally, the ε_t corresponds to a *3* x *1* column vector of structural shocks such that $\varepsilon_t : N(\mathbf{0}, \Sigma_\varepsilon)$, and $E(\varepsilon_t \varepsilon_t^T) = \Sigma_\varepsilon = I_3$.

Figure 3 presents estimates of the accumulated impulse response functions along with the 95% confidence intervals. The results are consistent with the institutional separation hypothesis. One standard deviation (1 S.D) shock to CAAE implies an accumulated increase of discretionary primary expenditures as % of trend GDP of approximately four percentage points. The accumulated impulse response is statistically significant at 5% level. The response of CAAR to a 1 S.D shock in CAAE is, however, not statistically significant, implying that the dynamics of the revenue side of the budget is mainly unaffected by the developments on the spending side of the budget. Finally, the response of AGAP after 12 quarters amounts to approximately 3.5 percentage points, documenting that discretionary government spending additionally exacerbated external imbalances in the case of Serbia in the analysed period.

Table 1 presents the results of forecast error variance decompositions. The results support the findings obtained from the estimated impulse response functions presented in Figure 3. In particular, both columns from table 1 imply no economic and statistical relationship between the CAAE and CAAR in explaining the variability of their respective forecast errors, yielding additional empirical support for the institutional separation hypothesis.

4.2. Alternative Cholesky Identification-Exogenous Revenue Shocks

To test the robustness of the findings presented in figure 3 and table 1, a VAR 02 with exogenous revenue shocks is estimated which implies the following structural shock identification

$$\begin{bmatrix} a_{11} & 0 & 0 \\ a_{21} & a_{22} & 0 \\ a_{31} & a_{32} & a_{33} \end{bmatrix} \begin{bmatrix} v_{CAAR,t} \\ v_{CAAE,t} \\ v_{AGAP,t} \end{bmatrix} = \begin{bmatrix} \varepsilon_{CAAR,t} \\ \varepsilon_{CAAE,t} \\ \varepsilon_{AGAP,t} \end{bmatrix} \tag{5}$$

in which v_t is a *3* x *1* column vector of reduced form residuals such that $v_t : N(\mathbf{0}, \Sigma_v)$ and $E(v_t v_t^T) = \Sigma_v$, consistent with the **CAAR→CAAE→AGAP** Cholesky triangular ordering**.**

Figure 4 presents estimates of the accumulated impulse response functions along with the 95% confidence intervals. To a certain extent, the results are consistent with the tax-spend hypothesis. In particular, one standard deviation (1 S.D) shock to CAAR implies an accumulated increase of discretionary primary expenditures as %

of trend GDP of approximately 1.6 percentage points two years after the initial shock. However, the accumulated impulse response of CAAE two years after the CAAR shock becomes statistically insignificant, consistent with the institutional separation hypothesis. The response of CAAR to a 1 S.D shock in CAAR amounts to approximately three percentage points 3 years after the initial shock. Finally, the accumulated response of AGAP is statistically significant only one year after the initial CAAR shock, and it amounts to approximately one percentage point of trend GDP.

Table 2 presents the results of forecast error variance decompositions. The results support the findings associated with the VAR 01 model, i.e., with the postulates of the institutional separation hypothesis. In particular, both columns from table 2 imply that shocks to CAAR cannot explain the movements in the CAAE's forecast error variance, and vice versa.

5. CONCLUSION

The results of estimated structural VAR models show that the institutional separation hypothesis is the most plausible explanation for the formation of structural budget imbalances in the case of Serbia between 2001Q1 and 2021Q3. The findings are consistent with the recommendations of Alesina et al. (2019), who argue in favor of expenditure-based fiscal consolidations. Hence, policymakers in Serbia should focus on controlling the expenditure side of the budget by limiting the growth rate of public spending to the growth rate of trend GDP and forming counter-cyclical fiscal reserves in periods of economic booms and expansions (Frankel, 2012). These fiscal policy rules would significantly reduce the occurrence of sovereign debt default, which is still probable given that the public debt to GDP ratio is still above its upper 45% limit defined in the fiscal rules of the Republic of Serbia. The results of this research could be of interest to other economies from Central and Eastern Europe, which experienced large external imbalances during their respective periods of economic transition.

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APPENDIX

Figure 3. Accumulated Impulse Response Functions from VAR 01 Model

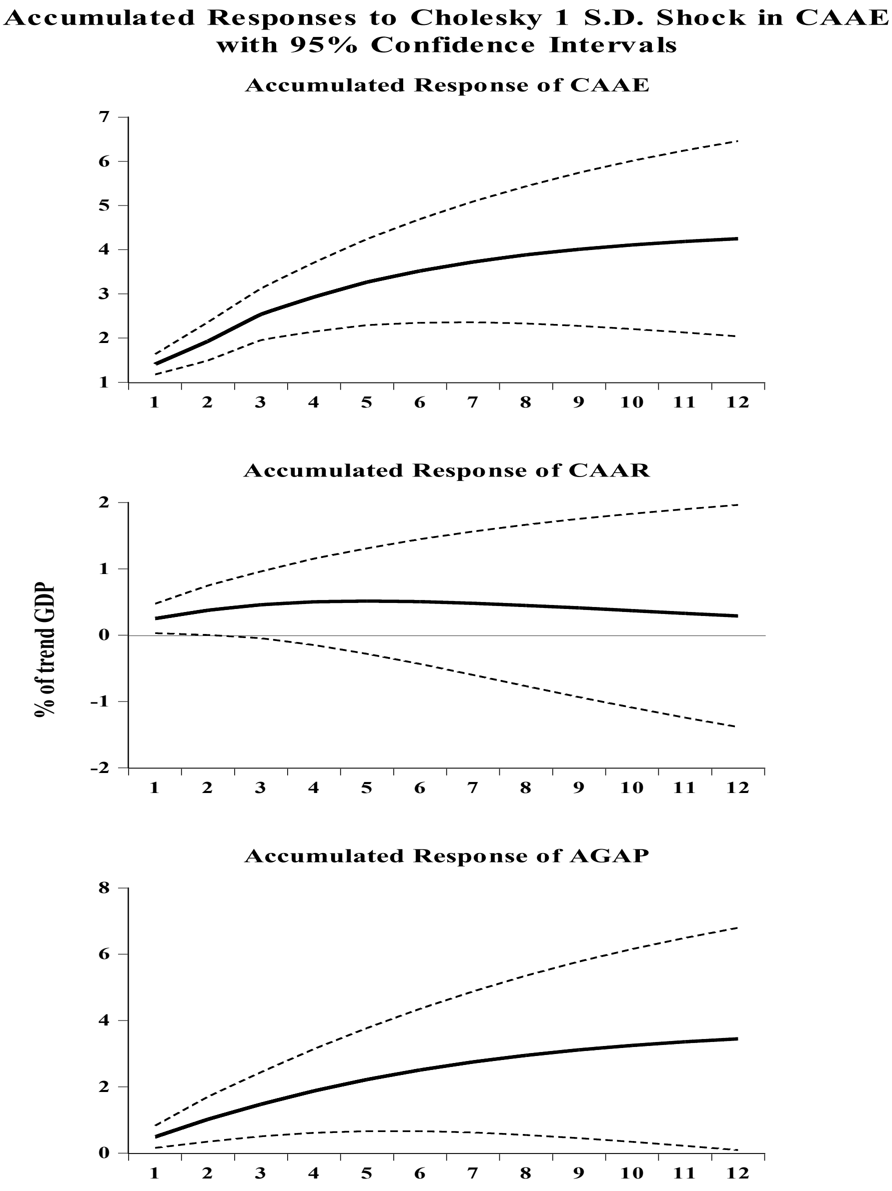

Table 1. VAR 01-Forecast Error Variance Decomposition

PERIODS AHEAD	Contribution of CAAR Shocks to CAAE Forecast Error Variance (%)	Contribution of CAAE Shocks to CAAR Forecast Error Variance (%)
1	**0.00** (0.00)	**6.55** (5.33)
2	**1.96** (2.85)	**6.86** (5.74)
3	**1.73** (2.56)	**6.18** (5.48)
4	**2.19** (3.18)	**5.78** (5.43)
5	**2.23** (3.30)	**5.41** (5.29)
6	**2.39** (3.63)	**5.17** (5.21)
7	**2.47** (3.83)	**5.03** (5.16)
8	**2.55** (4.05)	**4.98** (5.16)
9	**2.60** (4.22)	**4.98** (5.18)
10	**2.65** (4.37)	**5.01** (5.22)
11	**2.68** (4.49)	**5.05** (5.27)
12	**2.70** (4.59)	**5.10** (5.32)

Notes: standard errors in () obtained via 10000 Monte Carlo Simulations. Cholesky ordering**:** CAAE→CAAR→AGAP. Source: Authors' calculations.

Figure 4. Accumulated Impulse Response Functions from VAR 02 Model

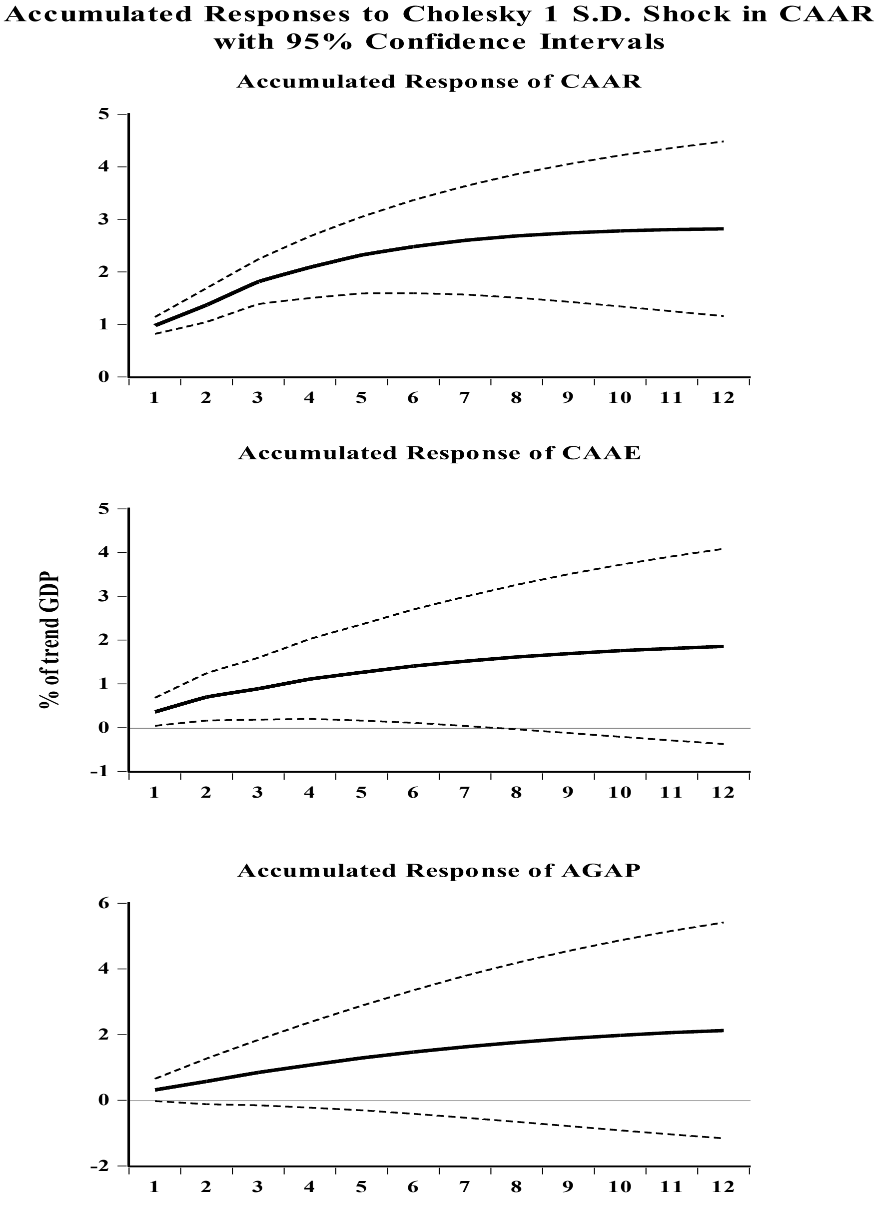

Table 2. VAR 02-Forecast Error Variance Decomposition

PERIODS AHEAD	Contribution of CAAE Shock to CAAR Forecast Error Variance (%)	Contribution of CAAR Shocks to CAAE Forecast Error Variance (%)
1	**0.00** (0.00)	**6.55** (5.33)
2	**0.05** (1.17)	**10.64** (6.96)
3	**0.12** (1.17)	**10.45** (6.90)
4	**0.15** (1.52)	**11.55** (7.54)
5	**0.29** (1.92)	**11.79** (7.78)
6	**0.43** (2.31)	**12.16** (8.13)
7	**0.61** (2.70)	**12.35** (8.36)
8	**0.77** (3.03)	**12.51** (8.58)
9	**0.93** (3.33)	**12.62** (8.74)
10	**1.06** (3.58)	**12.70** (8.88)
11	**1.18** (3.80)	**12.75** (8.98)
12	**1.28** (3.97)	**12.79** (9.07)

Notes: standard errors in () obtained via 10000 Monte Carlo Simulations. Cholesky ordering**:** CAAR→CAAE→AGAP. Source: Authors' calculations.