Fiscal policy, output and financial stress in the case of developing and emerging European economies: a threshold VAR approach

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ABSTRACT

The aim of this discussion material will be to examine the effects of fiscal developments on economic activity and on the market condition over time. The study employs a threshold vector autoregressive approach for 10 Developing and Emerging Market economies in the Central Eastern and South Eastern European Countries. The financial stress index is constructed by considering a wide range of market patterns, including banking related stress, money market related stress, exchange markets stress and real estate markets related stress, upon which the threshold upon market condition is build. The threshold VAR model allows to analyses this interrelationship during episodes of economic downturn and stress in financial market. Finally, the empirical work considers a structural identification approach.

Keywords: Fiscal Policy, economic growth, financial market, threshold SVAR approach

JEL Classification: C3, C51, C58, E62, G15, H60

I. INTRODUCTION

Economic doctrines still remains bivalent on the macroeconomic effects of fiscal policy, being mainly divided into two schools of thought (Classical and Keynesian) that argue mostly on the effect of fiscal policy on economic activity and macroeconomic stability. According to Li and Amant (2010) the debate has received renewed interest in the light of various episodes of significant financial stress (e.g. Asian crisis, high tech boom and bust, and most importantly the recent global financial and economic crisis), which have usually revealed the strong interrelation between financial markets stress persistence and macroeconomic dynamics. Most importantly, after an initial period of resilience, the financial turmoil by 2007 in advanced economies was quickly transmitted to the developing and emerging markets. Thus, by late 2008, most of developing and emerging countries have been confronted to the effects and post-effects of this financial turmoil mainly via the financial and trade linkages [Balakrishnan, Danninger, Elekdag and Tytell, (2009)]. During this period, financial market tumbling were accompanied by slowdown in private capital inflows in developing and emerging markets, while spreads on sovereign debt widened and exchange markets came under pressure with most of the countries experiencing sharp and huge currency depreciation. At the same time, economy equity and debt funds saw significant withdrawals, and lending by advanced economies' banks dropped precipitously reflecting both a weakened outlook and the need for banks to de-leverage. Further to that, countries were faced with lower or/and negative economic growth. While fiscal stimulus could

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The views expressed herein are of the authors and do not necessarily reflect the views of the Bank of Albania.

smooth the negative effects of shocks, most of these economies faced hard budget constraints. Higher debt burdens and great financing needs to support fiscal stimulus to enable economic recovery placed more stress to financial markets via higher risky scenarios and sovereign debt defaults, which accordingly[2] have awaked new interest in assessing the effects of fiscal policy during an episode of economic or/and financial instability, mostly given the ineffectiveness of monetary policy alone to restore growth.

The idea remains that fiscal stimulus could smooth the negative effects of the shocks and enable economic recovery, in coordination with monetary policy, but such policies have required higher fiscal deficits and most economies were facing hard budget constraints. Despite, policymakers have a very limited understanding of the impact of crises on economic activity and on the transmission mechanism of fiscal policy and vice versa, while the debate about quantitative effects of such interrelations is at the top of research agenda in economics[3]. Afonso, Baxa and Slavik, (2011) assume that the effects of fiscal policy on economic activity might be different from what is usually observed in normal times compared to unusual ones. The authors believe that the link between financial stress and fiscal policy can be two-sided. On the one hand, irrespectively of the causes of financial instability, policy makers may try to soften its effect on the economy. On the other hand, so-called "bad" policies can also contribute to financial instability. The idea is that during financial stress the quality of financial institutions' assets deteriorates, as the share of non-performing loans increases and negative sentiments in the markets depress the value of other financial assets. As such, the disruptions in financial markets or problems in the banks' balance sheets may trigger a recession by reducing the flow of credit to the other sectors. In addition, the European Banking Authority has placed some restrictions on banking lending, which among others include different countries lending risk weights and therefore different lending portfolio provisions. Under such criterion the banks find it more costly to lend to a less developed country compared to a more developed one. Therefore, on such arguments among other reasons, many banks have restricted their lending to the Central Eastern and South Eastern European countries to both the public and private sector.

This material aims to evaluate the interactions between fiscal policy, output and financial market condition. The idea is that during episodes of economic downturn or stress in financial markets, the interaction between them might be different from what is usually observed in good or normal times. Such analysis has not been yet discussed and evaluated in the case of Central, Eastern and South Eastern Developing and Emerging European (CESEEDE) countries. Against this backdrop, this study employs a threshold vector autoregressive (TVAR) approach used by Afonso, et. al., (2011). It considers a panel dataset, for 10 Emerging Market and Developing economies in the Central East and South East European Countries, based on the IMF classification. The financial stress indicator (FSI) is taken by Shijaku (2014) and follows the work by Holló, Kremer and Lo Duca, (2012) and Kota and Saqe (2013). Then, threshold on FSI is calculated as in Balakrishnan, et. al., (2009) and support the study to analyses the relationship between variables of interest during good or bad episodes. Finally, the empirical work considers a structural identification approach as in Blanchard and Perrotti (2002), extended by Perrotti (2005).

The rest of this paper is structured as follows. Section 2 provides some stylized facts on the regional countries in terms of financial and fiscal developments and on macroeconomic grounds. Section 3 that follows discusses the empirical methodology and the construction of the financial stress index. Results will be commented on section 4. The last section offers concluding remarks.

[2] See Ferraresi, Roventini and Fagiolo, (2013).
[3] See also Ramey, (2011) and Blanch and Leigh (2013).

II. STYLISED FACTS

Broadly, all the countries in the CESEE that are considered as developing and emerging economies have undergone through a transition process that saw major economic, political and structural reforms in order to transform their economies into an open-market oriented system. The CESEEDE countries have been orientated toward trade liberalisation and have welcomed foreign capital inflows. However, all these countries have been highly export-dependent and very sensitive to patterns in trade-partners countries. Most of the countries have experience high growth rates fuelled by strong capital inflows and responsible fiscal policy, while monetary pressure have been under control. The global financial crises hit some of them at the first wave. The other countries were affected at a later stage, mostly through the lover economic performance mainly in the Eurozone. Liquidity dried up in financial markets and problems with the adequacy of bank capital came to the fore, driven by a general lack of confidence, increasing risk version and rapid deleveraging of balance sheets. Real economic performance has also weakened sharply. Some of them have resorted to the IMF and other international financial institutions to inject liquidity into their market. While most of these countries did not have toxic assets either in their banking system or overall in the economy because of contagion, the perception of the market has been fairly negative and unfortunately markets have put together in one overall category. Most of the central bank supported banks' liquidity needs by abolishing marginal reserve requirement on both banks' domestic and foreign liabilities, which released a part of banks' currency reserves period of abundant capital circulation.

Albania experienced a stable economic growth averaging to around 6% over the period 2001 to 2008, accompanied by rapid reductions in poverty. Public finances were subject to major reformation, which ended in fiscal consolidation through expenditure cuts and revenues increase. The economy was faced with the effect of global crises enjoying a counter-cyclical fiscal policy during 2007 – 2009. After the privatisation on the Saving Bank in 2003, banking sector has increased mainly as foreign-owned banks have entered the market. Consequently, lending saw a sharp boost to pick in year 2008. The financial sector was largely spared from the severe fallout of the 2008-2009 financial crises since it was not heavily integrated into the global financial system. But, the economy was affect by the slowdown in economic performance in the Eurozone, especially in neighboring Greece and Italy (major trading partners of Albania with a large presence in the banking sector and also host to roughly one million Albanian emigrants). The economic output slowed down, but remained positive in each year from 2009 to 2013. Public debt has aggravated to reach to around 70% by 2013. The currency has devaluated by around 10 percentages. Lending has slowdown and banking system is faced with deteriorating non-performing loans[4]. However, banking system has been well capitalised and liquid, while the central bank has continuously in advance taken measure to support the banking system during the aggravating periods of financial crises.

Bulgaria has benefited greatly from foreign direct investment and a responsible fiscal planning has contributed mostly to a steady pace of growth rate average of 6% a year. The government has managed to run a budget surplus of 3% and the economic growth rate has contributed to the enormous cuts in public debt, bridging it from 78.1% in early 2000s' to only 13.4% at the beginning of 2009. The country suffered a difficult start in 2009 after some energy gas dispute. This shock was followed by the effect of global financial crises mainly drops in consumer spending and foreign investment that depressed growth to lower level. The real estate market, although not plummeting, ground to a halt, while unemployment remains through lower economic growth, raising unemployment consistently high. Banking system remained stable as banks allocated provisions adequate to the risk in their portfolios, strengthening credit risk protection and lower the pressures of

[4] According to Shijaku (2013) the banking loan in foreign currency portfolio is relatively more problematic in terms of its quality compared to the portfolio in local currency, at 71% versus 29% of all non-performing loan (NPL) and at 17% versus 7% of all lending to private sector.

worsening loan quality by maintaining the stability of attracted funds, and cut costs. The Bulgarian National Bank helped to draft and implement measures to address the crisis, while major financial indicators reflected the risk in bank portfolios and witnesses to credit risk protection. Bulgaria's banks preserved their profit generating potential, retaining good liquidity, and boosting capital positions[5].

Before the financial crises, the reshuffling of the Croatian economy led to an economic growth rate of 5.5% annually. Fiscal policy was oriented towards consolidation and as a result public debt came to around 30% in the end of 2008. Croatia remained relatively unscathed by the global financial turbulence, but macroeconomic environment started to deteriorate compared to previous years. The crises are followed by a six year of recession, having lost over 12% of its output[6]. At the same time, banks recorded an exceptionally strong upturn in domestic deposits as households and corporates transferred their assets from the capital market into banks. Public debt has pick above 64% of GDP in 2013 and external debt will likely be close to 103% of GDP, while FDI dropped sharply by 2010. The Eurozone, especially Germany and Italy, is the source of half of Croatian trade, ad most of 75% of FDI inflow from this region. Banks ownership is concentrated to Eurozone member countries that exposes the banking sector Euro-area crises. Croatia financial intermediation has developed significantly and it continued to deepen. Substantial progress is shown in strengthening the regulatory and supervisory frameworks. In the aftermath of global crises the financial system is considered stable, but bank credit growth, deteriorating external imbalances and rising asset prices have accompanied rapid credit growth and have intensified risks[7].

Hungary economy suffered incredible hardships during the transition to a market economy. However, Hungarian economy is steadily growing by around 3.5% annually due to constant investments into transport and other services in the last 15 years. It has also experienced significant regional development and the encouragement of both foreign and domestic investment. Public finance has been characterized by persistence budget deficit, which has led to higher public debt. The Hungarian banking sector largely following the deleveraging trend after the global financial crises[8]. Banking system balance sheets have fallen by an average annual rate of around 5.5 percent since reaching their peak in 2008. The asset quality showed severe deterioration between 2009 and 2011, while the currency has devaluated by around 25-30% since the crises. Hungary reached an agreement with the IMF and EU, by late 2008, for a rescue package of €20 billion, aiming to restore financial stability and investors' confidence[9]. Monetary easing has helped the return to growth, while a number of special taxes[10] introduced over recent years have helped bring the budget deficit below 3% of GDP, but public debt still remains high at 80% of GDP. The mandate of the fiscal council is relatively narrow and it has a potentially very powerful veto over budget laws. Hungary has exited from recession in early 2013, but the recovery will be modest.

Latvia has an open market economy and is part of Eurozone since 2014. The economy grew by more than 10% on average per year during 2000 – 07. But, the economy[11] entered a severe recession after the financial crises in 2008 as a result of an unsustainable current account deficit, large debt exposure and easy credit bubble that began building up during 2004 that ended up in a budget, wage

[5] Bulgarian National Bank, (2010), Bulgarian National Bank, (2011), Bulgarian National Bank, (2012),
[6] Croatian economy was badly affected by the Global Financial Crisis, and contracted by 6.9% in 2009, 1.4% in 2010, then showed signs of recovery in 2011 with 0.0% real GDP growth, but contracted again in 2012 by 1.8%.
[7] IMF (2008). Banking system has been still profitable and well capitalised, while stability was supported by very limited reliance on wholesale funding, which has been largely due to macroprudential central bank measures implemented in recent years to curb banks' foreign borrowing. See also Croatian National Bank's quarterly Financial Stability Reports.
[8] See: Magyar Nemzeti Bank (2009) and other Report on Financial Stability.
[9] The package aimed to finance balance of payments, to raise its foreign exchange reserves and to set up a bank support scheme.
[10] The tax on banks' balance sheets is likely to have reduced lending incentives.
[11] Triggered by the collapse of the second largest bank, Latvia had the worst economic performance in 2009, with annual growth rate averaging −18% and -20% in 2009.

and unemployment crisis. In response to the deteriorating quality of the loan portfolio, banks were compelled to build sizeable provisions for non-performing loans, thereby suffering record-high losses. Latvia reached an agreement with the EU, IMF and other international donors to defend the currency's peg to the euro in exchange for the government's commitment to stringent austerity measures. Fiscal policy[12] aimed to support economic recovery and stabilise the financial system by ease the risk perceptions of financial market participants and instigate higher foreign investors' interest[13], even though in 2010 public debt rose sharply to 43.9% of GDP from only 19.8% in 2008.

Lithuania is one the Baltic countries that has had the fastest economic growth over the last decade, especially after entering the EU, expanding on average by around 10% annually. Responsible and contraction fiscal policy ended in debt reduction to around 35% of GDP in 2008. The rapid loan portfolio growth had a positive effect on consumption, while the loans related to acquisition and development of real estate constituted around half of outstanding bank loans to the private sector. All these led to high inflation of goods and services, as well as trade deficit. The global credit crunch effect the economy at a later stage mostly due to the high economic performance. However, the crises hit hardly the real estate and retail sectors[14], while public debt has reached 40% of GDP in 20103. The financial sector concentrates mostly on the domestic market, while more than half of the banks belong to international corporations, mainly Scandinavian. By 2008, the loan portfolio was almost twice as big as that of deposits, showing a high on external financing. In the second half of 2008, the bank loan portfolio quality started to deteriorate and by 2009 the bank loan portfolio started to shrink. Still banking system managed to be profitable and well capitalised, which reflected better risk coverage by capital and hence higher loss absorption capacity. Bank of Lithuania lowered the reserve requirement and increased the maximum insurance coverage, made a positive contribution to the improvement of liquidity situation[15].

Poland is considered a major actor within the EU and its largest economy in Central Eastern Europe grew by around 4% annually in the period 2000 – 2004 and 7.5% until 2009. Fiscal policy has been characterised by persistence fiscal deficit due to higher public expenditure. Public debt reached 50% of GDP by 2004 from 35% in 2001, however came back to 40% by 2009 due to higher economic growth rate. Banking system has developed significantly and financial intermediation picked growth by 2008. Since then the credit and deposit growth rate has decrease significantly[16]. Poland at first thrived even during the financial crisis, but the economy has slowed abruptly in the past couple of years. The Polish financial system has been in good condition, but the persisting crisis in global markets caused an increase of risk in the domestic interbank market liquidity resulting from a fall in banks' mutual confidence[17]. In the medium term the risk to the financial system stability has increased owing to deteriorated outlook for economic growth resulting from economic slowdown among Poland's main trade partners[18]. Banks' potential difficulty in hedging foreign exchange positions was of particular significance owing to large portfolios of foreign exchange loans and the currency depreciation by around 25%. However, the sector has remained well capitalized, liquid, and profitable, even though

[12] From 2008, restrictive fiscal policies were implemented which were among the most severe in Europe. Six consolidation packages were adopted from 2009 until 2012. Wage cuts in the public sector accounted for almost half of all spending cuts from 2009 until 2011, with wages falling by an average of 30 per cent. See also Dovladbekova, I., (2012).

[13] See Latvijas Banka, (2010) and Latvijas Banka, (2011) on Financial Stability Report.

[14] GDP plunged by 15.7% in the first nine months of 2009. Lithuania enjoys a small tax burden, as well as a skilled workforce and a well-developed infrastructure, which have made it an attractive environment for business start-ups and foreign investors.

[15] See also Lietuvos Bankas [(2000); (2010), (2011)] on Financial Stability review;

[16] At the beginning of 2009, Poland's banking sector had 51 domestic banks, a network of 578 cooperative banks and 18 branches of foreign-owned banks. In addition, foreign investors had controlling stakes in nearly 40 commercial banks, which made up 68% of the banking capital.

[17] The deterioration in the financial condition of some of the Polish financial institutions' strategic investors also leads to the fact that their subsidiary companies are exposed to the negative effects of the fall in confidence towards their parent companies, despite the subsidiary companies being in good financial condition. See also the National Bank of Poland (2008) (2009) (2010) on Financial Stability Reports.

accommodating monetary policy has not help weak credit growth. Poland's government recently passed plans to limit the growth of spending as well as cut jobs in order to narrow the budget deficit and decrease the public debt[19].

Turkish economy grew by around 25% between 2000 – mid-2001, and then shrank sharply by around 13% during mid-2001 – end 2002, to return yet again at an average rate of 7% between 2003 and 2006. Turkey managed to bring public debt to less than 60% by 2006, while the budget deficit decreased from more than 10% in early 2000 to less than 2% by 2007. Turkish banking sector is among the strongest and expansive continuously over time, while part of it operates foreign ownership. Financial intermediation has expanded positively by two-digit figure. While, the economy experiences some financial shocks in the early 2000s', it managed to expand on average by 8% annually 2009 – 2012[20]. Public debt reached at 50% level of GDP, despite an upward shift during 2008 – 2009 cause by higher fiscal deficit. The Turkish banking sector[21] maintains its strong capital structure as a result of the reforms implemented decisively in the aftermath of the 2001 crisis. The banking sector continues to grow, accompanied by an on-going rise in the ratio of deposits and loans to the GDP and the ratio of loans to deposits, while being well capitalised and was strong enough to absorb the losses likely to be incurred under various shock assumptions. The BRSA approve by 2008 a regulation that made profits of bank part of the banks' capital. However, the unfavourable developments in economic activity were associated by shifts in non-performing loans of banks and then to the banks' profitability.

The Macedonia economy experienced several shocks, but the hard on was during the domestic conflicts in 2001. Thereafter, the economy grew by an average of 6% annually until 2008, while by the time public debt reached only 20% of GDP compared to 50% it was in early 2000s'. The global crises had little impact on the economy, as the macroeconomic situation was in relativity good conditions and Macedonian banks' stringent rules. However, due to strong banking and trade ties to Eurozone, it was not able to avoid the strong adverse effect from the decline of export demands, the decrease of capital inflow and deteriorated expectation of economic entities, and consequently the decline of activities in the real economy, strengthened tendencies for accumulating foreign currency, reduced scope of capital inflow from abroad and the pressure for depreciation of the domestic currency. However, as a result of conservative fiscal policies and a sound financial system, the economy enjoyed improving rating indicators, which were also supported by a prudent monetary policy, which keeps the domestic currency pegged against the euro. Despite lowering base rate, the Central Bank[22] has not changed liquidity indicators for banks or the reserve requirement since 2009, curbing credit growth to 7.5% in the first three-quarters of 2011. Macedonia became the first country eligible for the IMF's Precautionary Credit Line in January 2011, while by the end of 2008 the Macedonian government had approved a "package of anti-crisis measures" 24-composed of ten measures in financial (nominal) value of about 20 billion MKD.

Serbian is another country that has been discouraged by non-economic domestic shocks, but has managed to after 2002 to grow its economy by around 5 annually until 2008. Inflation pressure has been high, but decreasing over time due to responsible fiscal and monetary policies. Public debt has decreased from 200% of GDP in early 2000s'to less than 50% in the end of 2008, and then started increasing again as the government was fighting effects of world-wide 2008 financial crisis. Banking sector has developed and the financial market have integrated deeper, while most of the bank sector

[19] National Bank of Poland, (2011) and (2012).
[20] In 2009 the Turkish government introduced various economic stimulus measures to reduce the impact of the 2007 – 2012 global financial crises such as temporary tax cuts on automobiles, home appliances, and housing.
[21] See also the CBRT (2008, 2009, 2010, 2011, 2012) on Financial Stability Reports.
[22] See also the NBRM (2009), NBRM (2010) and NBRM (2011) on the Financial Stability Report for the Republic of Macedonia.

is own by foreign capital. Macroeconomic indicators of Serbia have deteriorated seriously since October 2008, followed by drops in economic activity, currency deprecations, as well as the still high inflation, the balance of payment position also got aggravated, since the unfavourable international liquidity makes the financing of the current transaction deficit more difficult (the deficit will, nonetheless, be reduced in 2009)[23]. The liquidity of the real sector has been significantly decreased, while the banking sector lack of liquidity and portfolio quality (the assets of which are predominantly indexed in foreign currency) deterioration since October 2008. However, the situation was resisted successfully, with an adequate and timely support from the central bank and the government. However, during the year 2010, the most potent risk underlying the system remained credit risk, largely induced by indirect FX risk implied by the relatively high level of exchange rate indexation of banks' portfolios[24].

III. METHODOLOGY

A. MODEL SPECIFICATION APPROACH

The empirical literature dealing with the effects of fiscal policy on economic growth or/and during the stress in financial markets is relatively scarce, but growing[25]. This paper approaches the methodology used by Afonso, *et. al,* (2011) for the estimation of a VAR model, which includes a threshold financial stress proxy in the fiscal VAR specification. The TVAR model is specified as follows:

$$X_t = A^1 X_t + B^1(L)X_{t-1} + (A^2 X_t + B^2(L)X_{t-1})\ I[FSI_{t-d} > \lambda] + U_t \quad (1)$$

Where, X_t denotes a vector of endogenous variables such as output, inflation, fiscal variable, short term interest rate and a financial condition indicator, I is an indicator function that takes the value of 1 if financial stress is higher than the threshold value λ, and 0 otherwise. The time lag will be set at 1. $B^1(L)$ and $B^2(L)$ are lag polynomial matrices, $A^1 Y_t$ and $A^2 Y_t$ represent the contemporaneous terms, because contemporaneous effects might also differ across the regimes. U_t is structural disturbance. It is assumed that matrices A^1 and A^2 have a recursive structure.

The TVAR model uses a recursive identification scheme and the model specification is built upon the variables such as GDP growth (*Y*), inflation rate (*P*), debt burden (*f*), short term interest rate (*i*) and a dummy proxy for financial market conditions (FSI), for which I consider a systemic financial stress indicator (SFSI) estimated by Shijaku (2014) that consist on the set of information such as those used by Holló, *et. al,* (2012) and Kota and Saqe (2013) and takes the value of 1 if financial stress is higher than a threshold value calculated as in Balakrishnan, *et. al,* (2009), and 0 otherwise. The TVAR model can be specified as:

$$X_t = c + \sum_{i=1}^{p} \beta_i X_{t-1} + \varepsilon_t \quad (2)$$

Where, X_t is a vector of the endogenous variables given by $X_t = [Y_t, P_t, f_t, i_t, s_t]$, c is a (5x1) vector of constant term, β_i is a matrix of autoregressive coefficient of order (5x5) and ε_t is the vector of random disturbances. Based on Afonso, *et. al.* (2011) the TVAR model is built to capture fiscal developments by only on variable (namely debt-to-GDP ratio), as it reflects developments both in revenues and

[23] See also the NBS (2008), NBS (2008), NBS (2008) on the Financial Stability Report for the Republic of Serbia.
[24] See also the NBS, (2011) and NBS, (2012)
[25] See also Balke (2000), Atanasova (2003), Berkelmans (2005), Baldacci, Gupta, Mulas-Granados, (2009), Li and St-Amant (2010), Turrini, Röger, Székely, (2010), Afonso, et. al., (2011), Ferraresi, et. al., (2013).

expenditure and is a key variables which determines fiscal sustainability. It captures the extraordinary government actions that may not be fully reflected in the fiscal balance (e.g. purchase of financial assets, recapitalisation of banking sector or any debt adjustments). It has a closer link to financial markets than the fiscal balance because it partly captures also the risk related to the refinancing of the outstanding stock of government debt, while influencing as well interest rates. It changes in the debt ratio have an impact on the corporate sector expectations, consumption sentiment of households and on financial market conditions, since it provides information not only about the current fiscal policy but about past fiscal policies.

The TVAR model employs a panel framework to avoid spurious regression due to low number of observations in the high financial stress regime. This panel set considers 10 Emerging Market and Developing economies in the Central East and South East European Countries. The panel sample study is based on the IMF 2013 classification. It includes Albania, Bulgaria, Croatia, Hungary, Latvia, Lithuania, Macedonia, Poland, Serbia, and Turkey[26]. The model specification incorporates a dummy variable (*Dummy_EU*) to distinguish for the period of EU membership for some of the sample countries. It will take the value of 1 for the period when a country has been part of EU, and 0 otherwise. The panel approach advantages are threefold[27]. First, it provides more information contained in the cross-section dimension, while the unit root tests are more powerful than the conventional ones. Second, it reduces the probability of a spurious regression, while the variances are both cross-sectional and time series related. Third, the cross-country dependence can mirror common changes in fiscal behaviour authorities due to increasing economic synchronization across all countries. The used of VAR model is very suitable because it imposes very little theoretical structure on the data and can be used to establish some relevant stylized facts. On the other hand, the TVAR approach advantage is twofold. In the one hand, it makes it possible to analyse the impulse response functions under different financial stress regime switches. On the other hand, the variable by which regimes are defined can itself be an endogenous variable included in the VAR.

The ordering[28] of the variables in the TVAR model reflects some assumptions about the links in the economy[29]. The variable of FSI is ordered last assuming it reacts contemporaneously very quickly to all types of shocks in the system and all new changes in both macroeconomic aggregates and economic policy that occur during one quarter are transmitted to financial markets within this quarter[30]. The ordering of fiscal variable after output is motived by the need to identify the effects of automatic stabilizers in the economy[31] and following Blanchard and Perotti (2002), it is assumed that all reactions of fiscal policy within each quarter are purely automatic because of implementation lags of fiscal policy measures. Monetary policy shocks are assumed to be shocks to the short-term interest rates that do not have an impact, contemporaneously, on output and inflation. To that end, yet again the interest rate variable shows up after the fiscal variable since the short-term interest rate can react contemporaneously to fiscal policy, but not vice versa. However, Li and Amant, (2010) assumed that interest rate shocks can have a contemporaneous impact on the FSI.

Further to that, following Blanchard and Perotti (2002) and Auerbach and Gorodnichenko (2012), this paper employs a structural TVAR approach since there are many factors, exogenous to fiscal

[26] Bosnia and Herzegovina and Romania were not included due to the relatively short data disponibility.
[27] See also Barnerjee, (1999); Gali and Perotti (2003); Wyplosz (2006); Staehr (2008); Afonso and Hauptmeier (2009); Afonso and Jalles (2011).
[28] See also Balke (2000); Blanchard and Perotti, (2002); Atanova, (2003); Blanchard and Perotti (2002); Afonso, et. al. (2011); and Ferraresi, et. al. (2013).
[29] Following Li and Amant, (2010), alternative orderings were considered, but it turned out that the choice of alternative orderings makes little difference.
[30] Balke (2000) and Atanova, (2003) use similar assumptions.
[31] See also Afonso, et. al., (2011) and Ferraresi, *et. al.*, (2013).

shocks, which contribute to the movements in fiscal variables. First, the STVAR identification approach[32] is based on the recursive approach introduced by Sims (1980) and can posit the following relationship between the reduced-form residuals and the structural shocks:

$$\begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ a_{py} & 1 & 0 & 0 & 0 \\ a_{fy} & a_{fp} & 1 & 0 & 0 \\ a_{iy} & a_{ip} & a_{if} & 1 & 0 \\ a_{sy} & a_{sp} & a_{sf} & a_{si} & 1 \end{bmatrix} \begin{bmatrix} u_t^y \\ u_t^p \\ u_t^f \\ u_t^i \\ u_t^s \end{bmatrix} = \begin{bmatrix} b_{11} & 0 & 0 & 0 & 0 \\ 0 & b_{22} & 0 & 0 & 0 \\ 0 & 0 & b_{33} & 0 & 0 \\ 0 & 0 & 0 & b_{44} & 0 \\ 0 & 0 & 0 & 0 & b_{55} \end{bmatrix} \begin{bmatrix} e_t^y \\ e_t^p \\ e_t^f \\ e_t^i \\ e_t^s \end{bmatrix} \quad (3)$$

Where, u_t $[u_t^y, u_t^p, u_t^f, u_t^i, u_t^s]$ represent the reduced-form disturbances or the corresponding innovation; e_t $[e_t^y, e_t^p, e_t^f, e_t^i, e_t^s]$ is the vector of structural shocks, which are assumed to be uncorrelated with each other; α_{ij} are shock parameters, based on a A(L) matrix of VAR parameters and B structural matrix associated with innovations. Then, the study follows the identification scheme introduced by the Blanchard and Perrotti (2002), extended by Perrotti (2005) as their materials employed a five variable VAR model, as follows:

$$\begin{bmatrix} 1 & a_{yp} & \tilde{a}_{yf} & 0 & a_{ys} \\ a_{py} & 1 & 0 & 0 & 0 \\ \tilde{a}_{fy} & 0 & 1 & 0 & a_{fs} \\ a_{iy} & 0 & \tilde{a}_{if} & 1 & a_{is} \\ a_{sy} & a_{sp} & a_{sf} & a_{si} & 1 \end{bmatrix} \begin{bmatrix} u_t^y \\ u_t^p \\ u_t^f \\ u_t^i \\ u_t^s \end{bmatrix} = \begin{bmatrix} b_{11} & 0 & 0 & 0 & 0 \\ 0 & b_{22} & 0 & 0 & 0 \\ 0 & 0 & b_{33} & 0 & 0 \\ 0 & 0 & 0 & b_{44} & 0 \\ 0 & 0 & 0 & 0 & b_{55} \end{bmatrix} \begin{bmatrix} e_t^y \\ e_t^p \\ e_t^f \\ e_t^i \\ e_t^s \end{bmatrix} \quad (4)$$

Where, α_{ij} are the shocks parameter to be estimated; $\tilde{a}_{ij} = [\tilde{a}_{yf}; \tilde{a}_{fy}; \tilde{a}_{if}]$ are elasticity which are estimated outside the STVAR model[33]; and others as previously described. The structural TVAR identification is built upon some assumptions. First, it is assumed that economic activity is affected by fiscal developments both in the short run and long run[34], as well as price level have an effect on economic activity and vice versa[35]. Following previous research[36] it is assumed interest rate are effected by shocks of economic activity, price level and fiscal developments, while financial markets respond very quickly to all types of shocks in the system identified. Finally, the identification scheme follows a parsimonious approach to account only for the significant shocks to be estimated.

B. THE DATA

In the context of this paper, the empirical model evaluates the fiscal developments, output and financial stress through means of STVAR approach using data on debt burden, economic growth, inflation, short-term interest and financial market condition index. The sample data ranges from the first quarter of 2000 to the last quarter of 2013. The choice of the data sample is motivated by the willingness to study a relatively coherent time period link to the introduction of Euro currency as far as to account for the data availability for some of the sample country. The data sample consists of dynamic balanced panel countries including Albania, Bulgaria, Croatia, Hungary, Latvia, Lithuania, FYR Macedonia, Poland, Serbia, and Turkey according to the IMF 2013 classification for the

[32] The structural identification reflects some short run restricted type assumptions [*Ae=Bu where E[uu']=I*] emplaced, with a [$(n^2 + n) / 2$] total number of restrictions allowed in order to achieve idendtification.
[33] This elasticity are calculated based on a OLS estimation techniques and can be provided upon request.
[34] See also Hakkio and Rush (1991); Cuddington (1997); Cecchetti, Mohanty and Zampolli, (2011).
[35] See also Uhlig, (2004); Calza and Sousa, (2005); Mancellari, (2011).
[36] See also Li and Amant (2010); Afonso, *et. al.*, (2011).

Emerging Market and Developing economies in the Central East and South East European Countries. The data are grouped into two main categories: data to construct the financial condition index and the other group of data for the estimation purpose. The former are taken from the empirical work as explained in Shijaku (2014). The latter includes GDP, inflation, debt burden, short-term interest and FSI. GDP presents the real quarterly GDP. The price level is based on the Consumer Price Index (CPI) as the first difference of the logarithm of CPI. Debt burden represent the ratio of nominal public debt to the GDP level. Finally, 3-TBill rate is a proxy for the short-term interest rate. Instead the analysis is based also on the 12-TBill rate as alternative variables for sensitive analysis in turn of lasing period effects. All the data entered the model as annual growth rate, besides the financial stress indicator. The data are constructed for 10 emerging and developing countries, for the period 1999 Q01 – 2013 Q04. The data are taken from European Institute of Statistics (Eurostat), National Central Banks and Ministry of Finance as explained in Table 1 in Appendix.

IV. EMPIRICAL RESULTS AND DISCUSSION

The unit root test rests, reported in Table 2 in the Appendix, reject the null hypothesis at the conventional significance statistical level for all the variables. Variables included at the specified model are considered as stationary and the model TVAR is estimated in level. The appropriate 11 lag length TVAR model was based on the SIC criteria, stability condition and LM test for serial correlation, while diagnostic tests (See Table 4 and Diagram 1 in Appendix) satisfy condition on stability, autocorrelation, normality, etc. Empirical results on impulse response are based on a parsimonious shock identification scheme represented in Table 5 in Appendix. Results suggest that only inflationary and interest shocks have a statistical significant effect. The shock on P are estimated to affect γ negatively by round *0.664pp* and the shock on ι is found to boost negative effect on s by round *0.137pp*. The estimated effect of e_t^s and e_t^i suggests that the innovation shock have a great impact on financial and money markets. The e_t^f is found to have a relatively smaller effect on the debt ratio level, while the e_t^y and e_t^P have a relatively very small coefficient.

Results by impulse response are shown in Figure 1 – 8. In a high financial stress regime, f shifts upward by around 0.1pp in response of 1pp negative shock on debt patterns. This impact is estimated to be significant and it will pick 0.5pp after 6 quarters. This impact is small and takes a longer time to materialise during low stress regime. The 1pp negative shock leads to a 0.08pp after 1 quarter and reaches a maximum value of 0.4pp after 8 quarters. The effect of negative fiscal shock during high stress regime is transmitted to γ, but the accumulating impact is relatively small. Output initially decreases by around 0.01pp in response of a 1pp negative shock in f and picks up at round 0.04pp after 4 quarters. The effect is statistically insignificant after 8 quarters. When the budget deficit was used instead of the f, the results are slightly different. A negative 1pp shock in fiscal deficit is found to be accomplished by an initial non-significant effect, but the accumulated response becomes statistically significant and picks gradually at 0.2pp after 8 quarterly. The response of output to a negative deficit shock is associated with an initial small negative effect, which picks up at round 0.1pp after 10 quarters and is always statistically significant[37]. During a low stress regime, the negative 1pp of f shock reaches at a maximum of 0.04pp after 6 quarter and is statistically insignificant after 10 quarters. Fiscal patterns are found to have no effect of inflation pressure regardless of the state of stress regime, but are found to cause a negative effect on money market. During high stress regime, T-Bill rate will increase by 0.02pp in response of a 1pp negative shock in f. It reached 0.1pp after 6 quarter, which is the period found to be statistically significant. The effect is found slightly greater and lasts longer statistically in the case of 12 months T-Bill rate rather the 3 months T-Bill rate. One preliminary reason to this might be the changing structure of debt towards longer maturities, since

[37] In a robustness check attempt, negative fiscal shock is found to increase the output gap, but the effect is statistically insignificant.

fiscal authorities in the CESEEDE countries have swap the 3 months debt auctions in favour of longer maturities, mostly 12 months. The effect was found relatively the same when deficit was used instead. Money market rate are not affected initially, but in response of 1pp in deficit picks to round 0.2pp after 8 quarters.

Further to that, fiscal developments are less dominant during the low stress regime. The effect of a negative shock takes longer to materialize, while the magnitude is even smaller compared to the high stress regime. Negative fiscal developments are found to create reverse effect on financial stress, but such effect is statistically insignificant during both regimes. This is not surprising new. Most of the government in each CESEEDE countries have pursued responsible and consolidating fiscal policies. These countries have lowered pressure on domestic market by orienting debt management policies toward foreign borrowing and longer maturities. Meanwhile, deteriorating fiscal stance was a result of the economic slowdown in the aftermath of financial crises and the higher risk perception by financial institutions. However, a strong response is found when deficit indicator is used instead. Market conditions are found to deteriorate by 0.25pp in response of 1pp increase in fiscal deficit and maximise at 0.5pp after 4 quarters. This impact is found to be statistically significant. Afonso, *et. al.* (2011) view debt developments compare to deficit patterns, as longer term policy indicator. Thus, the estimated impact might be a result of the ability of financial market in CESEEDE to facilitate moment and longer term shocks[38].

During high stress regime, output innovations are found to increase growth rate by 0.04pp in response to a 1pp positive shock. The effect is statistically significant and accumulated effect maximises at round 0.1pp after 4 quarters. This effect is higher and statistically significant during low stress regime. A 1pp positive shock leads to around 0.1pp after 1 quarter and stabilises at around 0.2pp in 4 quarters. The effect of γ on f is found to be greater than vice versa. During high stress regime, f is found to decrease after one quarter in response of positive output shock. The accumulated impact maximises at round -0.15pp corresponding to a 1pp increase in γ after 6 quarters, but becomes statistically insignificant after 10 quarters. Improving fiscal stance patterns is also found when deficit is used instead, even though the effect is statistically insignificant. Despite the same behaviour, the impact of output innovation is found to be relatively stronger during normal time. A 1pp positive shock in γ brings a 0.25pp cuts in f. Financial markets are found to react positively to better economic performance. The accumulated effect becomes significant after 2 quarters, and reaches 0.25pp in response of 1pp boost in economic growth. However, during both regimes the effect is found to be statistically significant after 6 quarters. Inflationary pressures are found to be influenced by Keynesian demand side effects. Price level would not react initially in a high stress regime, but the accumulated impact stabilises at round 0.06pp after 12 quarters in response to a 1pp positive output shocks. This behaviour is relatively similar also during normal times, but the accumulated impact reaches 0.1pp after 10 quarters. During financial instability, money market rates react statistically significant after 4 quarters, while the accumulated effect reaches 0.3pp after 10 quarters and stabilised thereafter, in response of initial output innovations. However, during normal times, the effect of positive output shock takes longer time to materialise, but reaches 0.6pp after 10 quarters.

There is a strong and statistically significant inertia in financial market, which is found to be more persistent during financial instability. The effect of a 1pp negative shock in financial stress during bad time is transmitted by around 0.25pp in the next quarter. This effect accumulates at round 0.48pp in 4 quarters and then diminishing. This behaviour is observed even when deficit is used as a fiscal indicator, but it is found to be lower than the magnitude found in f. During normal time, positive

[38] The impact of deficit increases is found to be weaker during low stress regime both in terms of the magnitude and lasting periods.

shock in s improve market conditions by around 0.22pp after 1 quarter and reach the maximum effect at around 0.4pp in 5 quarters. During high stress regime, stressful markets provide negative stimulus for economic activity, while easing stress and sound financial situation policies boost growth. The effect of market condition materialise more during high stress regime. During these episodes, a 1pp stress increase of s is associated by round 0.04pp negative stimulus on output growth. The effect reaches 0.8pp after 8 quarters and is throughout statistically significant. During low stress regime, sound financial market boost growth by around 0.03pp after 4 quarter and reach the maximum effect by around 0.07pp after 8 quarters. Still, the based on the magnitude, the effect of market conditions on economic activity remains relatively small.

The effect of market stress is more evident regarding fiscal developments. The analyses suggest that the effect of market condition on fiscal developments is more evident during bad times than normal times. During high stress regime, a 1pp increase in s is statistically significant and is transmitted to raising f after one quarters. The effect reaches 0.1pp in four quarters and picks up at 0.3pp in 8 quarters and then diminishes throughout. This effect is also observed when deficit is used instead. However, during low stress regime, better market condition by 1pp leads to a low initial improvement in the fiscal stance, which reaches 0.05pp cuts after 4 quarters and maximise the effect at around 0.25pp after 8 quarters. At the same time, T-Bill rates seem to be affected negatively during financial instability and improve during normal times, even though the relationship is found to be statistically insignificant. This behaviour is also observed at price level. Even though relatively small, the decreasing accumulated response to stressing market becomes statistically significant after six quarters only in the case of financial instability. Price level seems to under demand side effects during normal time, but the relationship is relatively small and statistically insignificant.

Empirical results by variance decomposition (Table 6) show that volatility in economic performance and price level has been low both during high and low stress regime. Regarding other variables, standard error increases over time, despite the state of financial market condition. Shocks in output activity are explained more by the autoregressive behaviour. Financial developments contribute to growth volatility more during a high stress regime compared to low stress regime. After 10 quarters, it represents round 28.5% during bad times and nearly 18% during normal times. Despite autoregressive influence, during high stress regime price level shocks are caused also by output and financial condition. The former, accounts more during normal times, which reaches nearly 20% after 10 quarters. Further to that shocks in the T-Bill rates are mostly cause by their autoregressive behaviour. At the same time, fiscal policy decision-making seems to contribute mostly to fiscal developments. However, in a low stress regime, the market condition causes nearly 20% of overall volatility, which goes to nearly 35% during high stress regime. Economic activity is also another source, but its impact does not exceed 10% in either of regimes. Finally, as in the other variables, financial shocks also are influenced by autoregressive behaviour, which is more persistence during high stress regime.

V. CONCLUSION

The global financial crises revealed a strong interaction between fiscal policy, output and financial market condition. The 2008 – 2009 negative shocks in advance economies were quickly transmitted to developing and emerging markets though financial and trade linkages. Although, some of the Central Eastern and South Eastern countries were not hit at the first wave, they were all faced with deteriorating macroeconomic conditions. Slowdown in foreign capital inflows and widening of spreads on sovereign debt, were accomplished by sharp and huge currency depreciation, while equity and debt funds saw significant withdrawals, and lending by advanced economies' banks dropped precipitously reflecting both a weakened outlook and the need for banks to de-leverage. Most of these

economies pursued fiscal stimulus and easing monetary and financial conditions to smooth the negative effects of shocks and enable economic recovery, but were all faced with hard budget constraints and raising debt, placing more stress to financial markets via higher risky scenarios and sovereign debt defaults.

This material aimed to analyse the interrelation between fiscal policy, output and financial market condition developments in the case of Central Eastern and South Eastern Developing and Emerging economies during episodes of economic downturn or stress in financial markets. The paper follows a two-step procedure. First, it uses a binary approach to identify periods that signal stress on financial market, which is an aggregated composition of four sub-indexes that allow capturing a better stress realistic index through different financial market segments. Second, it specify a threshold vector autoregressive approach for ten CESEEDE countries based on a structural identification approach and analyses results based on accumulated impulse response function during high and low stress regime.

The empirical results subject to the focus of the study are relatively satisfying. They suggest that there is a strong fiscal inertia, especially during high stress regime. Deteriorating fiscal policy has a relatively small negative effect on output during both low and high stress regime. However, positive economic innovations are found to improve much more the fiscal stance. The effect is greater during low stress regime, even though the ability of fiscal policy to affect output evolved over time. Indeed, stress in financial market is found to impact the fiscal stance rather than vice versa, even though market condition are more sensitive to short term shocks or/and policies compared to long term ones. The effect of market condition is greater during high stress regime. Financial stress is found to have a strong negative effect on output growth, even though relatively smaller in both regimes compared to the improving financial stance caused by higher growth rate. Fiscal patterns are found to have no effect of inflation pressure, but are found to cause a negative effect on money market, especially on longer term maturities.

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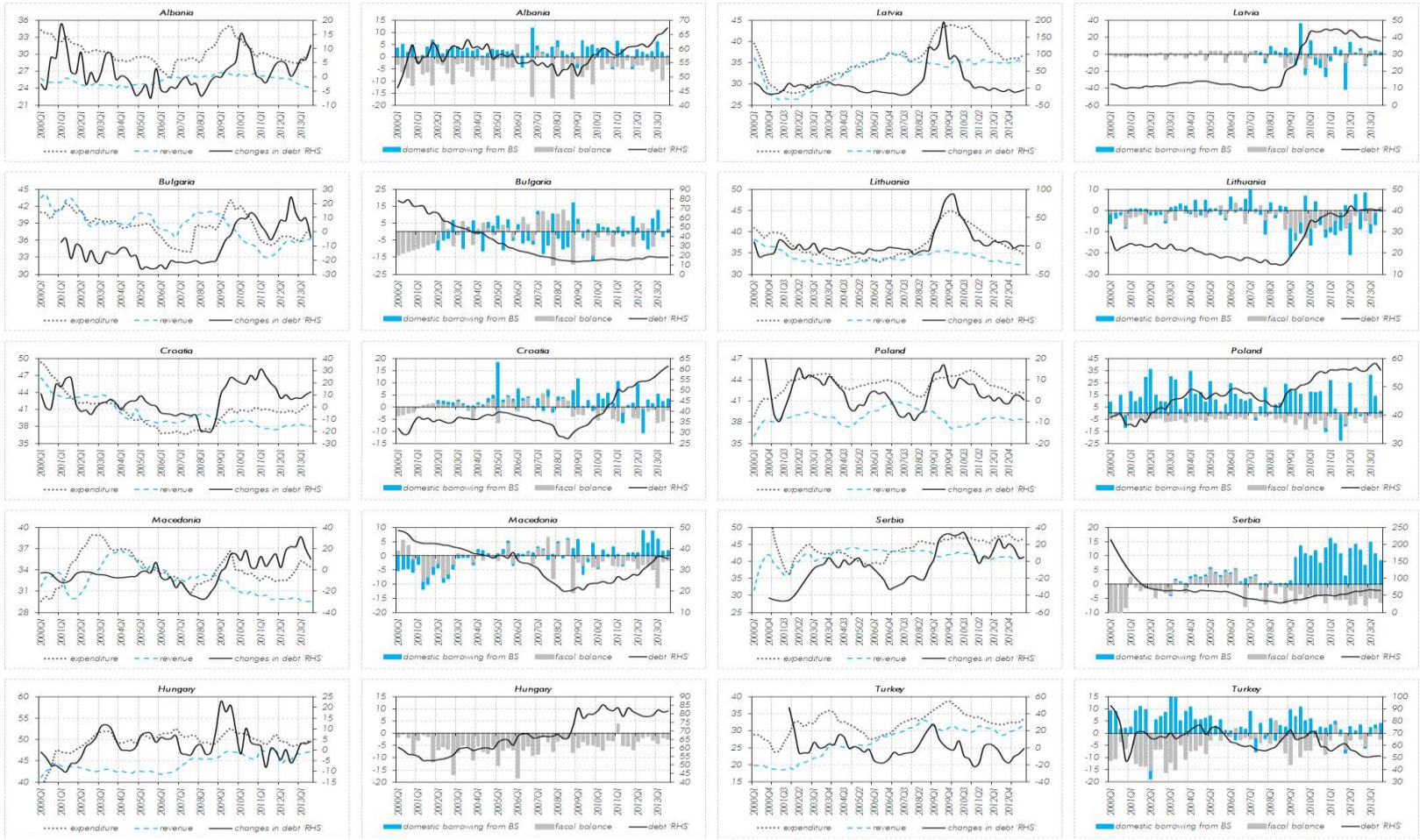
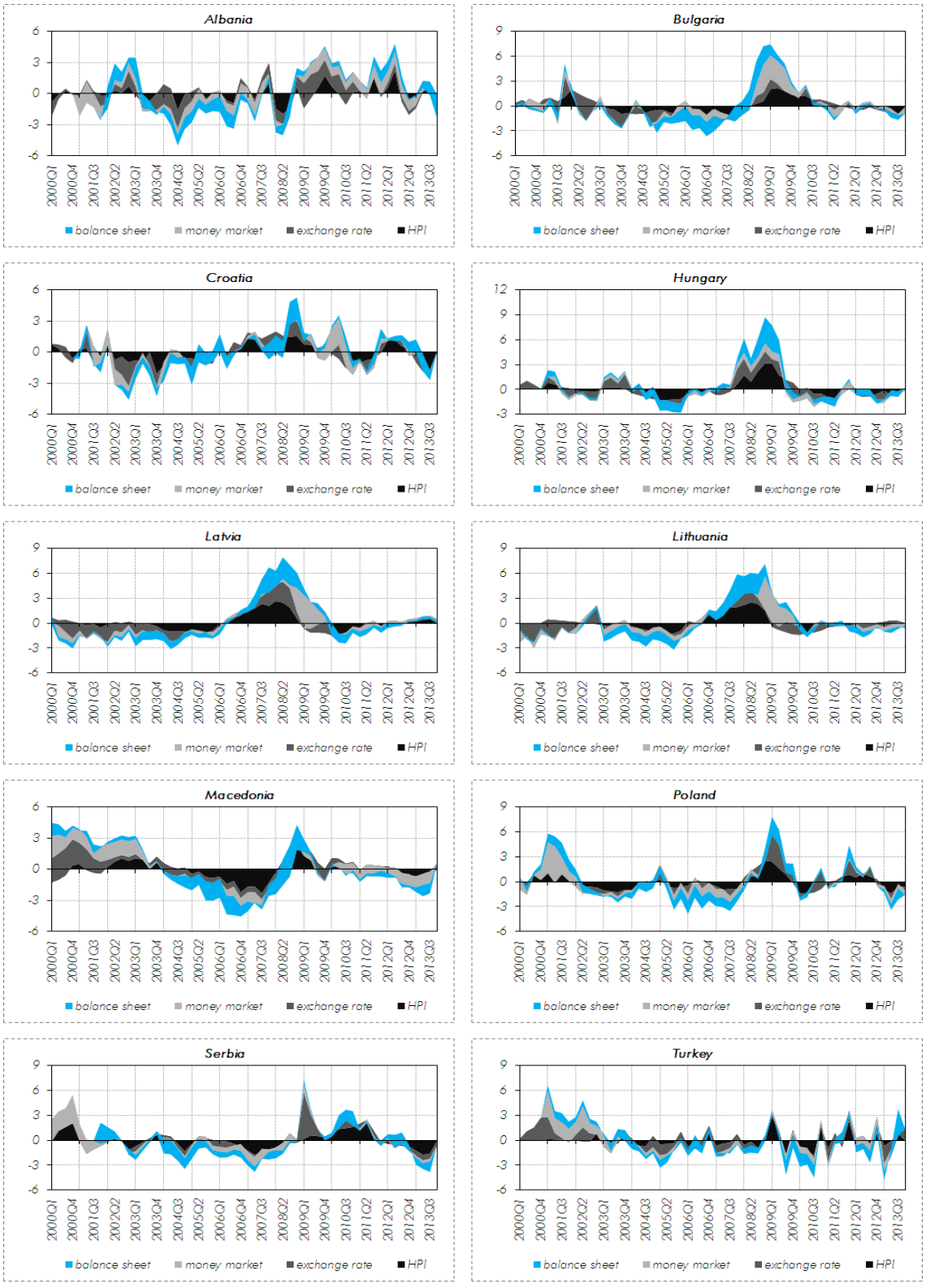
APPENDIX

Figure 1 Fiscal Indicator during 2001 Q01 – 2013 Q04.



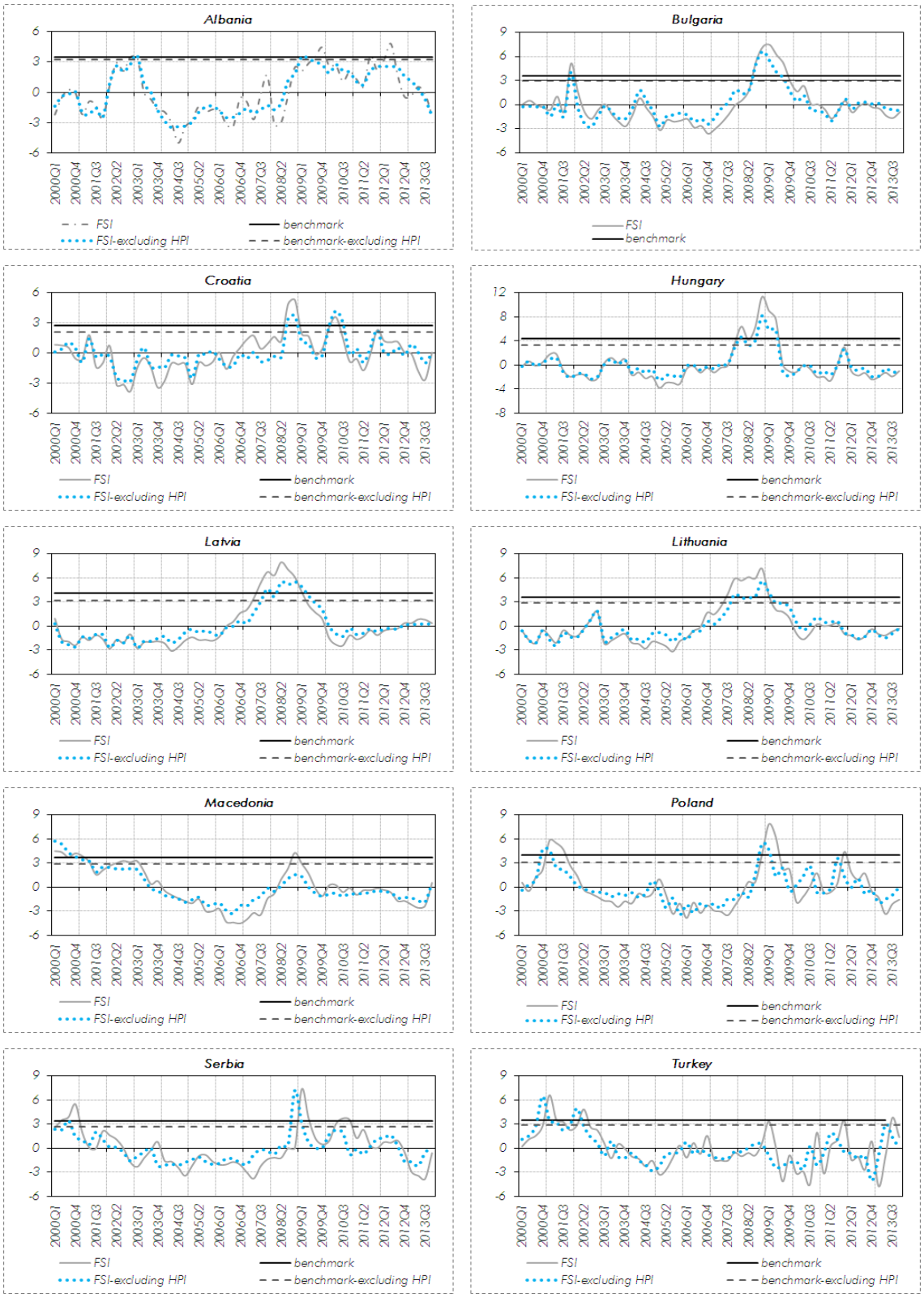
Source: IMF, National Ministry of Finance, National Central Banks, Eurostat, National Institue of Statistics

Figure 2 Composite-related Financial Stress Indicator.



Source: Author's Calculations

Figure 3 The Financial Stress Indicator and the Estimated Threshold.



Source: Author's Calculations

Table 1 Unit Root Test Results

Variable	Im, Pesaran and Shin W-stat					
	Level			First difference		
	Intercept	Intercept and trend	None	Intercept	Intercept and trend	None
Y	[0.0000]	[0.0000]	-	[0.0000]	[0.0000]	-
P	[0.0000]	[0.0005]	-	[0.0000]	[0.0000]	-
f	[0.0001]	[0.0317]	-	[0.0000]	[0.0000]	-
i	[0.0000]	[0.0000]	-	[0.0000]	[0.0000]	-
ADF - Fisher Chi-square						
Y	[0.0000]	[0.0001]	[0.0001]	[0.0000]	[0.0000]	[0.0000]
P	[0.0000]	[0.0027]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
f	[0.0000]	[0.0101]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
i	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
PP – Fisher Chi-square						
Y	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
P	[0.0000]	[0.0039]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
f	[0.0013]	[0.1081]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
i	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
Levin, Lin & Chu t*						
Y	[0.1631]	[0.6245]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
P	[0.0235]	[0.3229]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
f	[0.1285]	[0.4756]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
i	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]

Exogenous variables: None
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Source: Author's Calculations

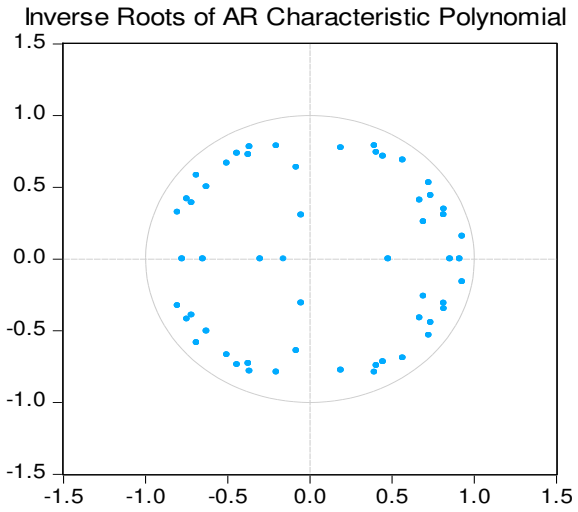
Table 2 VAR Residual Serial Correlation LM Tests

Null: no SC at lag order h; Sample: 2001Q1 2013Q3; Included observations: 441; Probs from chi-square with 25 df.

Lags	LM-Stat	Prob	Lags	LM-Stat	Prob
1	22.74003	0.5927	7	24.53671	0.4886
2	19.16561	0.7891	8	30.10505	0.2204
3	20.75113	0.7064	9	23.29983	0.5601
4	39.50923	0.3027	10	21.80035	0.6472
5	32.62577	0.1407	11	27.42968	0.3348
6	22.34835	0.6156	12	24.87888	0.4692

Source: Author's calculations

Figure 4 Stability test on the 11-lag TVAR model.



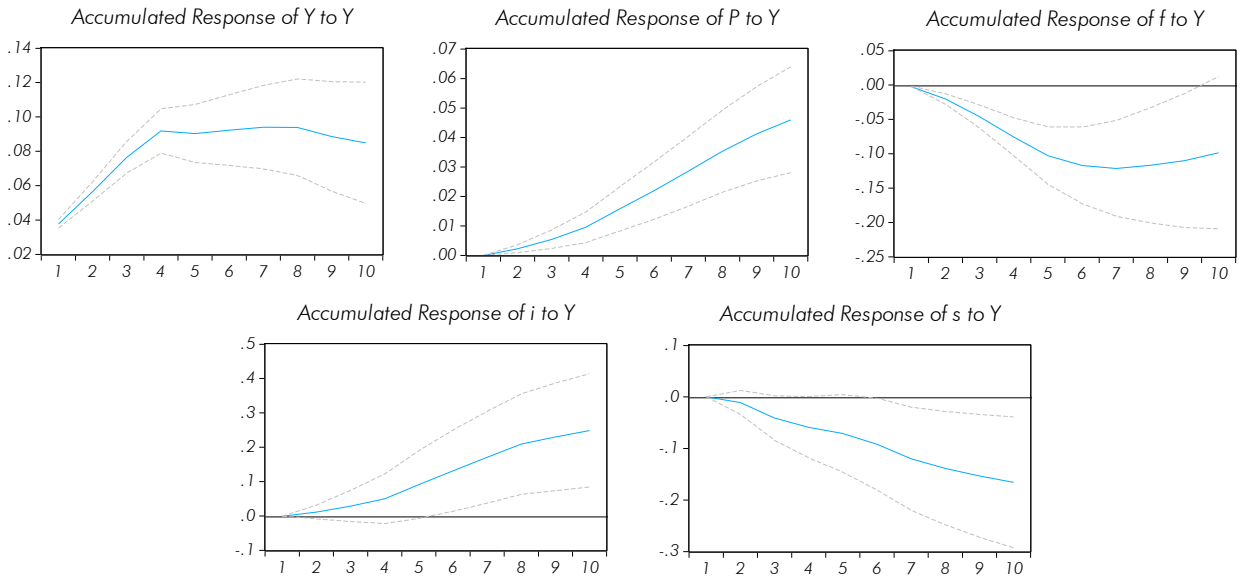
Source: Author's calculations

Table 3 Restriction identification

Model: Ae = Bu where E[uu']=I				
Restriction Type: short-run pattern matrix				
	Coef.	*Std. Error*	*z-Statistic*	*Prob.*
C(1)	*0.644*	*0.1402*	*4.6*	*0.000*
C(2)	*-0.137*	*0.0551*	*-2.5*	*0.013*
C(3)	*0.038*	*0.0013*	*29.7*	*0.000*
C(4)	*0.013*	*0.0004*	*29.7*	*0.000*
C(5)	*0.088*	*0.0030*	*29.7*	*0.000*
C(6)	*0.195*	*0.0066*	*29.7*	*0.000*
C(7)	*0.228*	*0.0077*	*29.7*	*0.000*

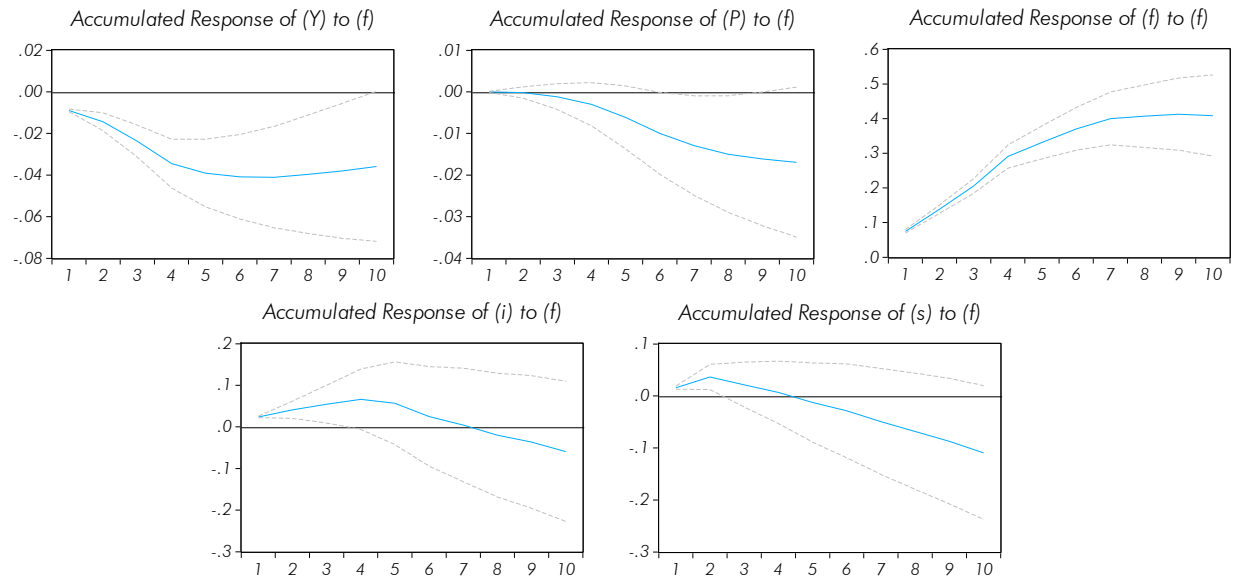
Source: Author's calculations

Figure 5 Accumulated Response to Structural One S.D. Innovations ± 2 S.E. of the output shock during high stress regime.



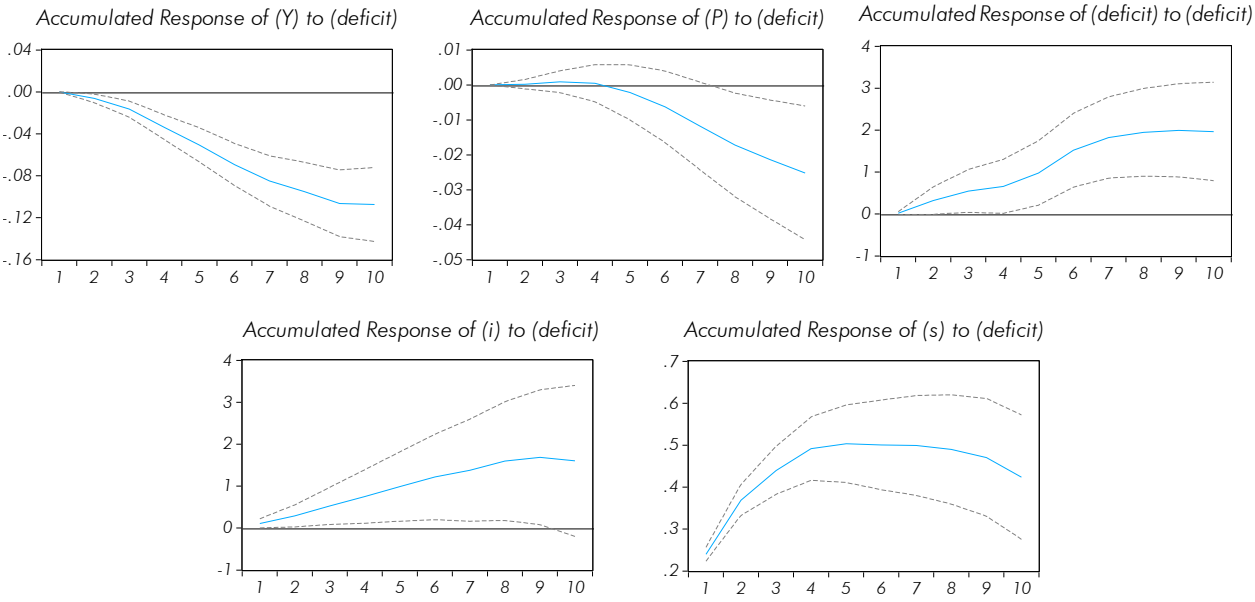
Source: Author's calculations

Figure 6 Accumulated Response to Structural One S.D. Innovations ± 2 S.E. of the fiscal shock during high stress regime.



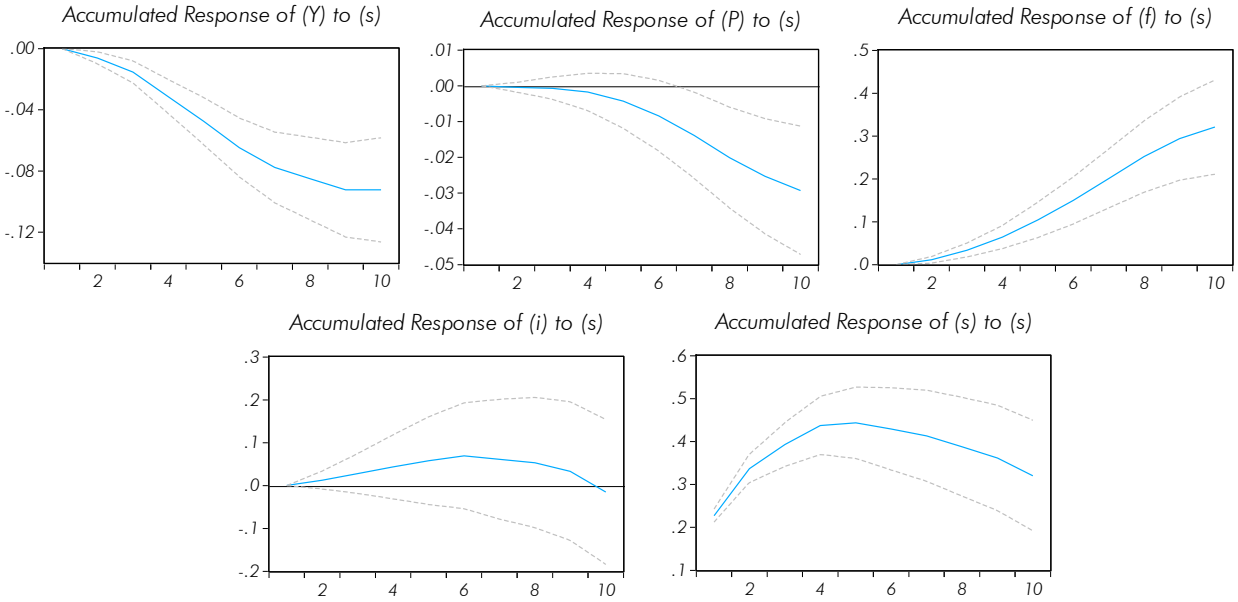
Source: Author's calculations

Figure 7 Accumulated Response to Structural One S.D. Innovations ± 2 S.E. of the deficit shock during high stress regime.



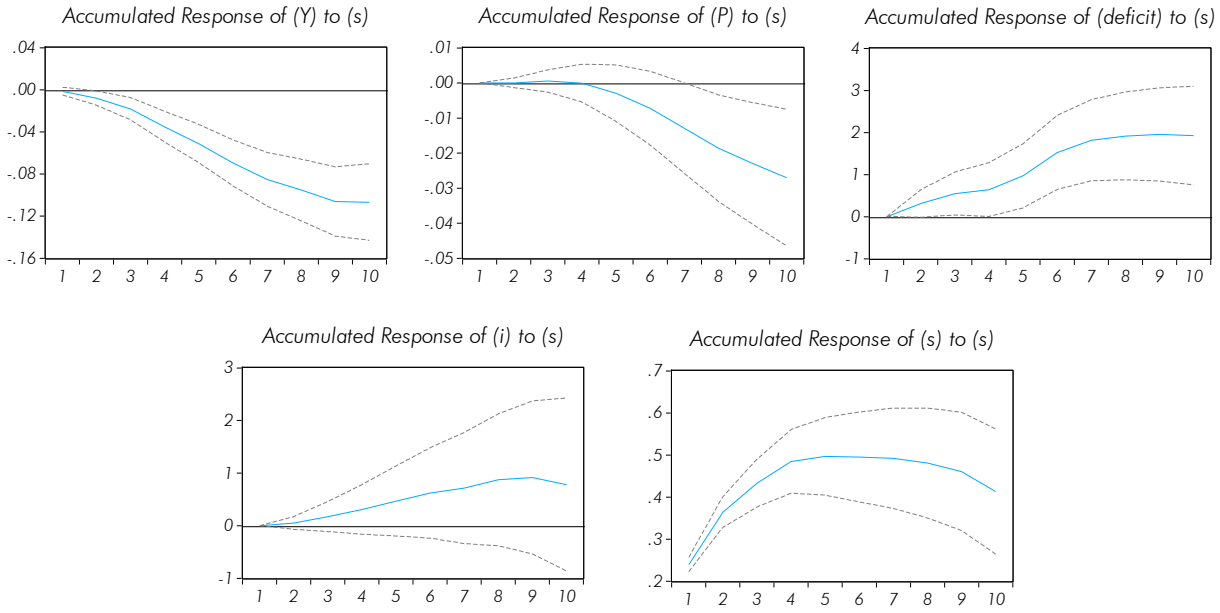
Source: Author's calculations

Figure 8 Accumulated Response to Structural One S.D. Innovations ± 2 S.E. of the stress shock during high stress regime.



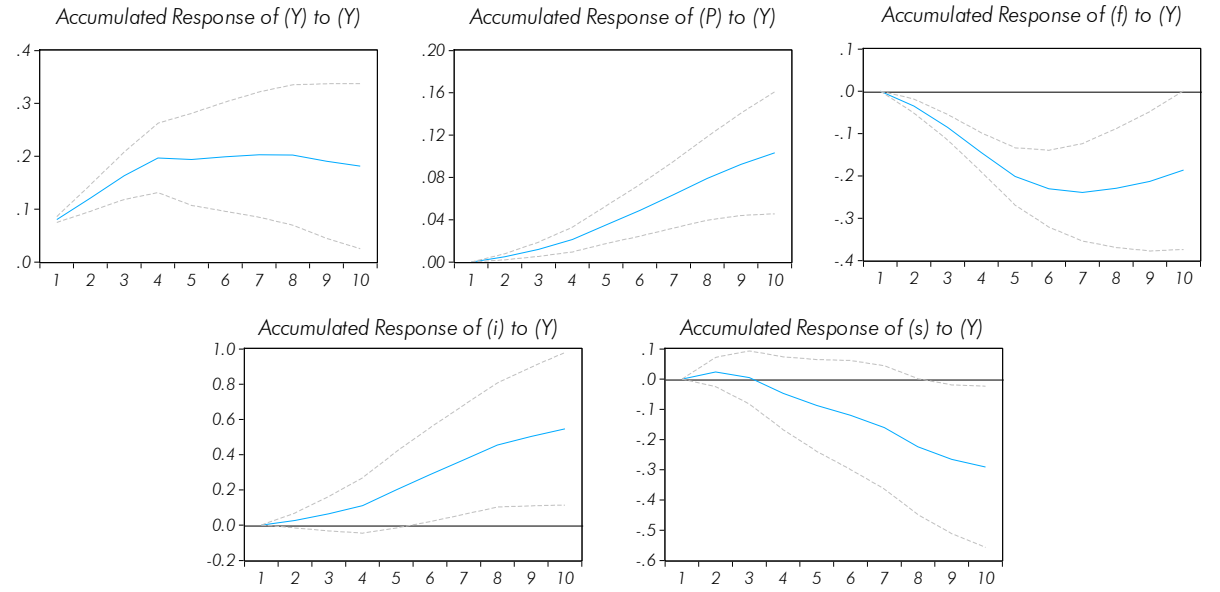
Source: Author's calculations

Figure 9 Accumulated Response to Structural One S.D. Innovations ± 2 S.E. of the stress shock during high stress regime.



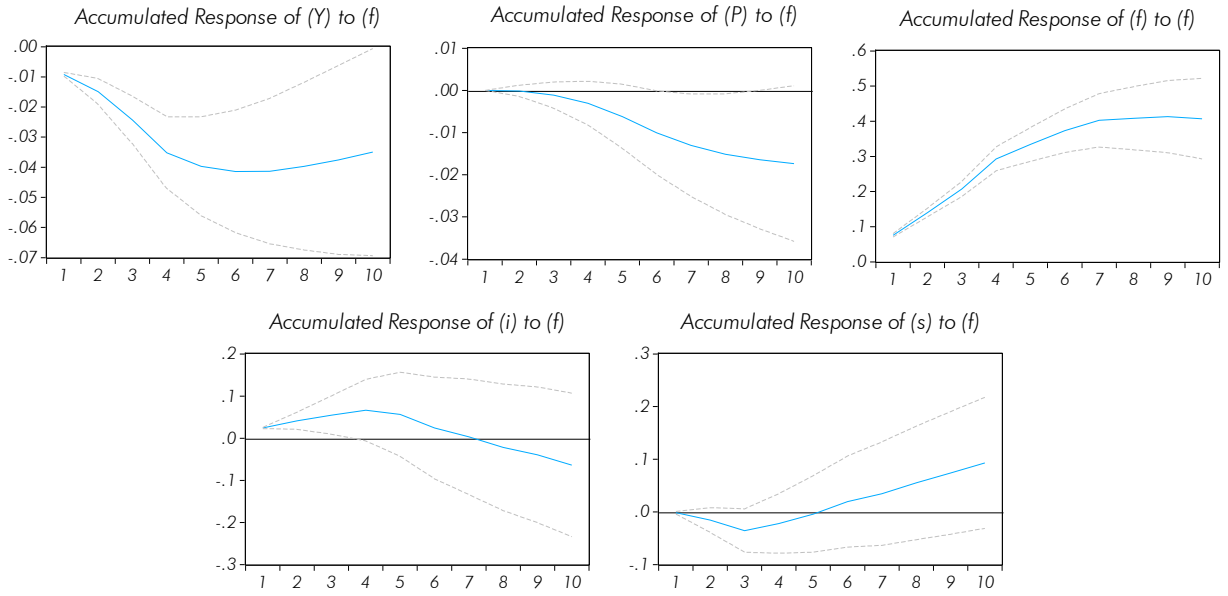
Source: Author's calculations

Figure 10 Accumulated Response to Structural One S.D. Innovations ± 2 S.E. of the output shock during low stress regime.



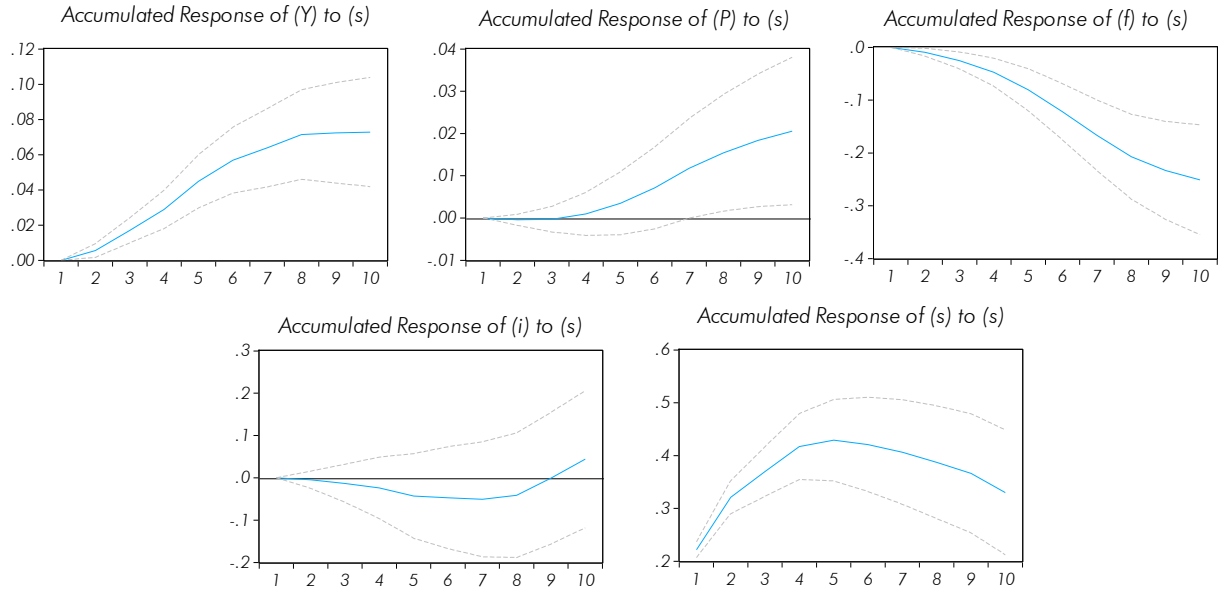
Source: Author's calculations

Figure 11 Accumulated Response to Structural One S.D. Innovations ± 2 S.E. of the fiscal shock during low stress regime.



Source: Author's calculations

Figure 12 Accumulated Response to Structural One S.D. Innovations ± 2 S.E. of stress regime shock during low stress regime.



Source: Author's calculations

Table 4. Variance decomposition results

During High Stress Regime							During Low Stress Regime					
Variance Decomposition of y:												
Period	S.E.	y	P	f	ι	s	S.E.	y	P	f	ι:	s
1	0.037	100.0	0.0	0.0	0.0	0.0	0.038	100.0	0.0	0.0	0.0	0.0
2	0.043	96.9	0.2	0.1	0.8	1.9	0.044	97.1	0.3	0.3	0.8	1.5
3	0.049	91.6	0.3	1.3	2.3	4.5	0.051	90.2	0.3	2.0	1.7	5.9
4	0.055	81.2	0.3	3.0	4.3	11.2	0.057	83.9	0.2	4.3	2.5	9.0
5	0.058	72.7	0.8	3.5	5.8	17.2	0.060	75.9	0.5	5.6	3.1	14.9
6	0.062	64.7	2.4	3.1	6.1	23.7	0.062	71.8	1.5	5.5	3.6	17.6
7	0.065	59.4	5.1	2.9	5.7	27.0	0.063	69.5	3.2	5.3	3.9	18.1
8	0.067	56.3	7.7	2.7	5.4	27.8	0.064	66.9	5.2	5.1	4.1	18.6
9	0.068	54.3	9.2	2.6	5.2	28.7	0.065	65.9	6.3	5.0	4.6	18.3
10	0.068	53.9	9.9	2.6	5.2	28.5	0.065	65.5	6.8	4.9	4.7	18.1
Variance Decomposition of P:												
1	0.013	5.1	94.9	0.0	0.0	0.0	0.013	4.4	95.6	0.0	0.0	0.0
2	0.019	2.7	97.1	0.0	0.2	0.0	0.019	2.2	97.6	0.1	0.0	0.1
3	0.023	1.8	98.0	0.0	0.2	0.0	0.024	1.5	98.4	0.1	0.0	0.0
4	0.027	1.5	98.2	0.1	0.1	0.1	0.027	1.5	98.1	0.2	0.0	0.2
5	0.028	4.4	93.9	0.6	0.2	0.9	0.029	4.8	93.6	0.6	0.1	0.9
6	0.030	7.4	88.2	1.3	0.5	2.7	0.031	8.2	88.0	1.4	0.2	2.2
7	0.031	10.8	81.6	1.4	0.7	5.5	0.032	12.2	82.0	1.6	0.2	4.0
8	0.032	13.7	75.9	1.3	0.7	8.5	0.033	15.9	77.3	1.5	0.4	4.9
9	0.033	15.7	72.2	1.3	0.7	10.1	0.034	18.4	73.8	1.5	1.0	5.3
10	0.034	16.9	70.0	1.3	0.8	11.0	0.035	20.0	71.5	1.4	1.5	5.6
Variance Decomposition of f:												
1	0.075	0.1	0.5	99.4	0.0	0.0	0.075	0.1	0.8	99.1	0.0	0.0
2	0.100	2.5	2.7	92.8	0.7	1.2	0.101	3.2	2.9	92.2	0.8	0.9
3	0.123	5.5	2.8	87.1	0.5	4.1	0.124	6.6	3.3	87.2	0.7	2.1
4	0.153	6.8	2.6	83.2	0.7	6.7	0.157	8.5	3.1	83.1	2.1	3.2

5	0.165	8.7	2.3	75.9	1.1	12.0	0.170	11.1	2.8	76.8	2.8	6.4
6	0.177	8.6	2.2	70.3	1.3	17.7	0.182	11.2	2.5	72.4	3.3	10.6
7	0.189	7.8	2.4	64.3	1.7	23.8	0.193	10.6	2.4	68.1	4.5	14.4
8	0.199	7.1	3.6	58.2	1.8	29.4	0.199	10.1	2.8	64.5	5.1	17.5
9	0.207	6.5	4.8	54.2	1.7	32.8	0.203	9.8	3.4	62.7	5.7	18.5
10	0.211	6.4	5.6	52.2	1.6	34.2	0.205	9.7	3.8	61.6	6.0	18.9
Variance Decomposition of $\imath$:												
1	1.212	0.0	0.3	6.5	93.1	0.0	0.199	0.1	0.0	7.0	92.9	0.0
2	1.782	0.0	0.7	6.1	93.2	0.0	0.281	0.1	0.1	6.6	93.2	0.0
3	2.147	0.0	1.5	5.1	93.3	0.1	0.326	0.1	0.6	6.6	92.7	0.1
4	2.320	0.0	2.2	4.6	92.6	0.5	0.346	0.2	1.0	6.8	91.8	0.2
5	2.482	0.6	3.4	4.2	91.0	0.9	0.350	1.1	1.6	6.7	90.2	0.5
6	2.628	1.0	6.0	3.7	88.1	1.2	0.355	2.0	2.4	7.1	88.1	0.5
7	2.732	1.3	8.0	3.6	86.1	1.1	0.360	2.9	2.8	7.1	86.8	0.4
8	2.820	1.9	9.0	3.4	84.6	1.2	0.365	4.1	2.7	7.2	85.4	0.5
9	2.883	2.2	8.9	3.3	84.4	1.3	0.369	4.8	2.7	7.3	83.6	1.6
10	2.946	3.2	8.7	3.2	83.7	1.3	0.374	5.4	2.8	7.6	81.3	3.0
Variance Decomposition of s:												
1	0.236	0.2	0.6	0.5	0.5	98.3	0.222	2.5	0.4	1.9	0.0	95.1
2	0.271	0.1	0.5	1.8	2.8	94.8	0.247	2.9	2.0	2.7	0.6	91.9
3	0.282	1.0	0.9	1.7	3.0	93.4	0.262	2.5	1.9	4.4	5.9	85.3
4	0.288	1.2	1.4	1.8	2.9	92.8	0.269	2.7	1.8	4.2	7.2	84.1
5	0.291	1.2	2.3	2.0	3.0	91.5	0.271	2.9	2.2	4.2	7.6	83.1
6	0.292	1.6	2.5	2.0	3.3	90.7	0.273	3.1	2.7	4.7	7.6	81.9
7	0.293	2.1	2.6	2.0	3.3	90.0	0.274	3.7	2.7	4.8	7.5	81.3
8	0.294	2.3	2.6	2.1	3.4	89.6	0.278	4.9	2.7	4.8	8.3	79.3
9	0.295	2.4	2.6	2.2	3.5	89.3	0.285	5.4	2.5	4.7	11.1	76.3
10	0.299	2.5	2.6	2.5	3.6	88.9	0.290	5.5	2.5	4.9	11.8	75.3
Cholesky Ordering: γ, P, f, $\imath$, s												

Source: Author's Calculations