

MACROECONOMIC
EFFECTS OF FISCAL
POLICY IN ALBANIA:
A SVAR APPROACH

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ABSTRACT

This paper tries to estimate the effect of fiscal policy on Gross Domestic Product, Prices and Interest Rates in Albania. The main research question is: How much of a 1 ALL discretionary fiscal policy increase goes into GDP? We discriminate between two different types of fiscal policy: a tax decrease and an expenditure stimulus. We employ a Structural Vector Auto Regressive model using real government primary expenditures, real government net revenues, real GDP, CPI, and real 12-month T-bills interest rates as endogenous variables. To identify fiscal shocks, the tax code and fiscal policy decision lags are exploited, following the methodology developed by Blanchard and Perotti (2002). The income elasticity of government revenues is needed as input to identify policy shocks. We calculate it using an application of the Divisia Index based on Choudhry (1979). The study finds that a tax cut stimulus has the highest cumulative GDP multiplier, reaching 1.65 after five quarters, indicating no evidence of Ricardian equivalence in Albanian consumers. Among capital and current spending, the GDP multiplier of capital spending is 0.95 after one quarter, and higher than the current spending multiplier. We do not find statistically significant responses of interest rates following fiscal spending shocks, but they do increase after a tax cut. Lastly, a current spending shock slightly increases prices after one quarter, while a cut in net revenues significantly decreases prices by 55 bps on impact, settling at 40 basis points after four quarters.

Keywords: Fiscal policy, Structural Vector Autoregressions, tax elasticity, fiscal multiplier

JEL Classification: E62, C32, H20, H40

1. INTRODUCTION

Fiscal policy is an important determinant of economic developments and often government decisions on spending and taxes are assigned a crucial role in speeding up or slowing down economic growth. The recent global financial and economic turmoil highlighted the importance of fiscal stimuli in enabling economic recovery, in coordination with monetary policy. This paper investigates the macroeconomic effects of discretionary fiscal policy in Albania, with the aim of identifying the most effective type of policy in bolstering economic growth, while exerting low to moderate pressures on inflation.

Economic theory remains ambivalent on the macroeconomic effects of fiscal policy, mostly torn between two schools of thought – the Classical school and the Keynesian school. The more modern approaches to these theories are the neo-classical, neo-Keynesian and monetarist views. According to classical economists, fiscal policy is ineffective in boosting demand, due to the nature of markets to settle at equilibrium at all times. Neo-classicals go even further: fiscal policy might even hinder economic growth due to crowding out effects on private consumption and investment. They build their arguments upon the rational expectations assumption. As such, one would expect that an empirical investigation of the effects of fiscal policy would conclude that the latter does not affect neither output, nor prices or interest rates, at best. Keynesian economists, on the other hand, argue that the restoration of equilibrium in markets is a lengthy process, and fiscal policy (in coordination with monetary policy, according to neo-Keynesians) is required to boost private consumption and private investments. This study will also try to validate one of these schools in the case of Albania, through estimation of Gross Domestic Product multipliers for different types of fiscal policy. To the best of my knowledge, fiscal policy effects

have not been empirically studied in Albania, so far. Thus, the paper aims at contributing to the current literature by quantitatively and qualitatively measuring government's influence on aggregate demand, prices, and interest rates, to aid both the fiscal and the monetary decision-making process.

Unlike monetary policy effects, which have been substantially studied in a time series analysis framework, fiscal shocks' dynamics on the economy have only recently received attention in terms of empirical validation of theoretical models¹. Vector Autoregressive (VAR) Models are now well-established time series tools for policy analysis, structural inference and description of economic relationships². They have been extensively used in analyzing the monetary policy transmission mechanism and to measure the effects of monetary shocks on real economic variables. In the last decade, VARs have also been used to investigate fiscal policy. The main challenge of empirical fiscal studies is the identification of discretionary (exogenous to the model) fiscal shocks. Romer and Romer (1989), Ramey and Shapiro (1997), Burnside et al. (2003), etc, identify what they call 'truly exogenous' fiscal episodes, such as the Reagan fiscal expansion or the Vietnam war, and estimate their effects on macroeconomic variables in a reduced-form VAR setup. Mountford and Uhlig (2002 and 2008) use sign restrictions to identify government spending and government revenues shocks, while controlling for business cycle and monetary shocks. For example, when tax revenues increase while government spending does not, a discretionary tax shock is identified. Another application is that of Fatas and Mihov (2001), who rely on recursive identification, with government spending shocks ordered first.

In addition, the fourth bulk of literature on fiscal policy VAR is attributed to Blanchard and Perotti (2002), extended in Perotti

¹ For a full survey of both theoretical and empirical literature of macroeconomic effects of fiscal policy, see Beetsma, R., (2008): A survey of the effects of discretionary fiscal policy, *Studier i Finanspolitik* No.2008/2.

² For fundamental work on Vector Autoregressions, see Christopher A. Sims, 1980, "Macroeconomics and Reality", *Econometrica* 48. Also, a full survey on the uses of VAR models can be found in Stock, James H., and Mark W. Watson, "Vector Autoregressions," *Journal of Economic Perspectives*, Vol. 15 No. 4 (Fall 2001), 101-115.

(2005). They use institutional information on tax and transfer systems, and exploit quarterly data dynamics and fiscal policy decision lags to identify fiscal shocks in a Structural VAR setting. While all methodologies have their advantages and disadvantages³, the last approach is deemed as more appropriate in the case of Albania, given the country's short history of free markets and the relatively long history of compliance with IMF economic programs (where fiscal consolidation has been a constant requirement).

This paper studies the effects of fiscal policy – defined as government spending and government net revenues – on Gross Domestic Product, prices, and interest rates, using the methodology developed by Blanchard and Perotti (2002). To fully identify our fiscal structural shocks we rely on the following rationale: Fiscal policy comprises three different components – an automatic response to output fluctuations (due to built-in structures like unemployment benefits, social security, etc), a systematic discretionary response (for instance, a systematic increase in public wages following recessions), and random discretionary shocks. By acknowledging that fiscal policy decisions are lagged, we can assert that it usually takes more than one quarter to decide about a systematic discretionary response. Therefore, the second component of fiscal shocks is inexistent in quarterly data.

Furthermore, we are able to identify the automatic component of fiscal shocks – expressed as the contemporaneous effect of the economic indicator to government revenues or spending – by calculating the within-quarter elasticity of net revenues and spending with respect to that indicator. All we are left with is the identified random discretionary shock. Section three explains the methodology used to calculate within-quarter elasticities. The estimation of elasticities contributes to current literature as well, since, to the best of my knowledge, there has not been a similar study for Albania, yet.

The main findings of the paper indicate that a tax cut stimulus has the highest cumulative GDP multiplier, reaching 1.65 after

³ For further discussion on the advantages and disadvantages of alternative fiscal VAR specifications, see Perotti (2005).

five quarters, indicating no evidence of Ricardian equivalence in Albanian consumers. Between capital and current spending, the GDP multiplier of capital spending is 0.95 after one quarter, and higher than the current spending multiplier. We do not find a statistically significant response of interest rates following fiscal spending shocks, but they do decrease after a tax cut. Lastly, a current spending shock slightly increases prices after one quarter, while a cut in net revenues significantly decreases prices by 55 bps on impact, settling at 40 bps after four quarters.

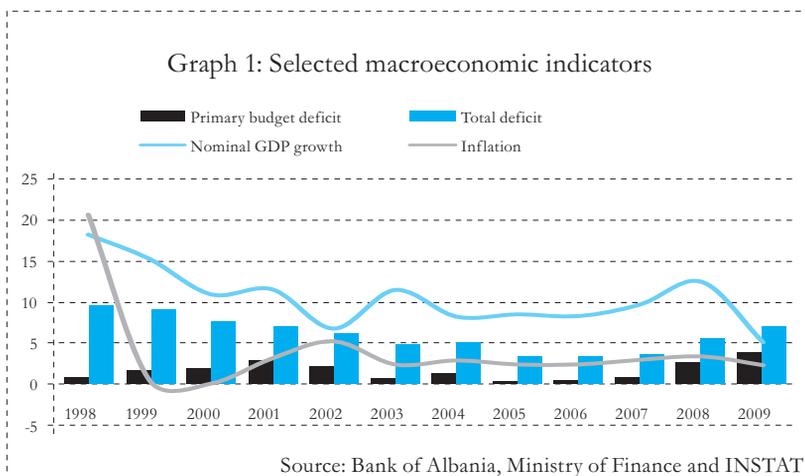
The following section presents some stylized facts on fiscal policy in Albania from 1998 onwards. In section 3, we describe the data and discuss the SVAR methodology. The same section includes the methodology used to calculate within-quarter elasticities (or the contemporaneous restrictions in the SVAR specification). Section 4 includes estimation results and impulse responses. Section 5 presents a further breakdown of fiscal spending policy into current and capital spending, compares results and presents fiscal multipliers. Section 6 concludes and discusses possible areas for future research.

2. FISCAL POLICY IN ALBANIA DURING 1998-2009

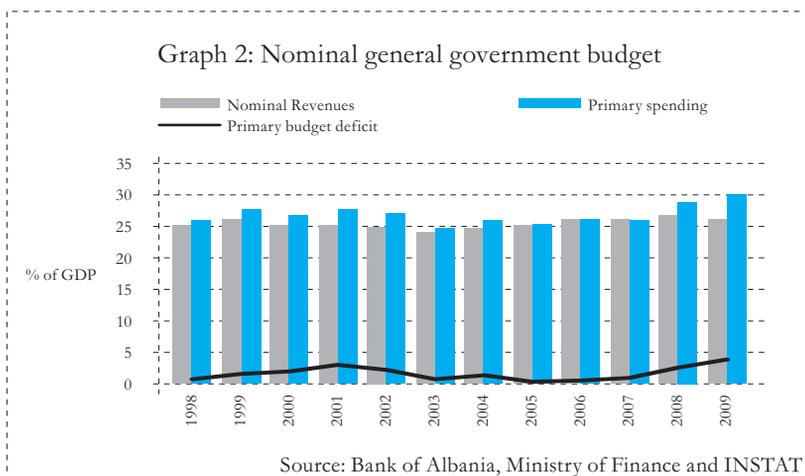
The beginning of the '90s marked the beginning of Albania's economy transition from centrally planned to a free market economy. Most of that decade witnessed very high volatility of macroeconomic and financial indicators, caused by well known factors like price liberalization, large increase in demand, opening of the economy to foreign markets, inexperience in designing and, most importantly, implementing economic policy, fragile institutions, etc. Aided by IMF stabilization programs, by the end of the '90s, the country had overcome the initial transition macroeconomic distress and was determined to achieve macroeconomic stability and sustainable, non-inflationary economic growth. The Albanian government was a crucial agent to the achievement of these objectives. Recognizing this role, it committed to reduce budget deficits through continuous fiscal consolidation, and major reformation of the tax collection system.

During the period of 1998–2000, Albania implemented the “Enhanced Structural Adjustment Facility II (ESAF II)” - an IMF stabilization program aiming at further consolidation of macroeconomic stability in the country through a series of structural reforms. As a result, the budget deficit in 2000 was reduced to 9.1% of GDP from 12.9% in 1997, mainly through cuts in government subsidies and personnel expenditures. During 2002–2008, several other economic IMF and World Bank economic programs were implemented by the Albanian government⁴, which ensured further fiscal consolidation, improved the tax collection system, enhanced the independence of the monetary authority and built sound foundations for fiscal sustainability. General macroeconomic development trends throughout our estimation period are depicted in graph 1.

⁴ During 2002-2005 Albania signed the “Poverty Reduction and Growth Facility (PRGF)” agreement with the IMF. This economic program was extended through 2008 with the “Extended Fund Facility (EFF)” agreement signed with the IMF and the World Bank. In January 2009, Albania graduated from the Fund-supported program.

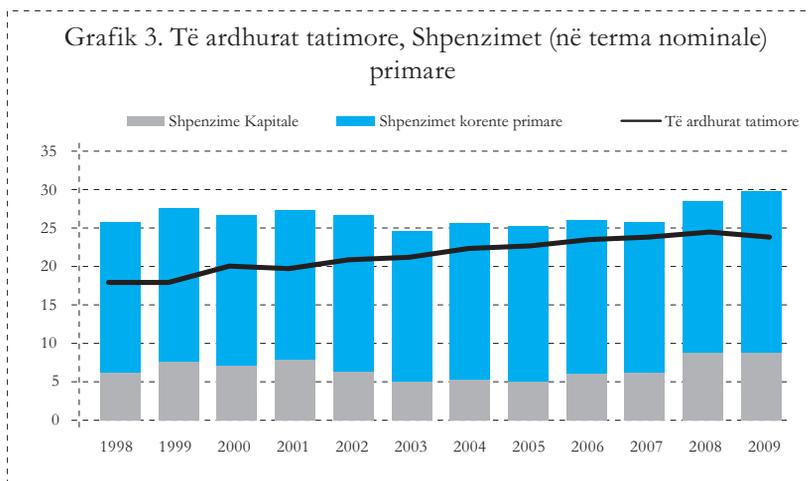


In the last decade, the Albanian tax system underwent these major reforms: the change from progressive tax rates to flat 10% income tax (2007) and corporate profit tax (2008); major reductions in customs duties imposed by the membership in the World Trade Organization, bilateral free trade agreements with South-Eastern European countries, the CEFTA agreement, the Stabilization and Association agreement with the European Union, etc.⁵, which were accompanied by considerable increases in excise taxes, and; the



⁵ For detailed information on free trade agreements' terms, see the website of the Ministry of Economy, Trade and Energy, at <http://www.mete.gov.al/index.php?l=e>.

reduction of social security contributions from 42.5% in 2005 to 26.5% in 2009. All these reforms have resulted in a balanced growth of tax revenues (despite considerable tax rate reductions). Graphs 2 and 3 show fiscal developments during our estimation period.



3. DATA AND METHODOLOGY

3.1. DATA DESCRIPTION AND SETTING UP THE VAR

The paper uses quarterly data from 1998Q1 to 2009Q4 for Gross Domestic Product, government net primary expenditures, government net revenues, the price level as measured by the Consumer Price Index, and interest rates, represented by the 12-month Treasury Bills' rate. Government net revenues are defined as in Perotti (2005): VAT revenues + Direct taxes + Revenues from Customs Duties + Excise taxes – Government transfers, where transfers represent Welfare Expenditures, Pensions, Health insurance and Social Security Expenditures, and Government Subsidies. Quarterly GDP is interpolated from annual data⁶ following Dushku (2008). Government net primary expenditures are defined as total current expenditures net of government transfers and interest payments, plus capital expenditures.

Given the relatively high frequency of quarterly data, all variables are seasonally adjusted. They are also deflated with CPI and enter the VAR in natural logarithmic form, except for the interest rate, which enters in levels.

After conducting Augmented Dickey Fuller, Philips Perron unit root tests and the KPSS stationarity test, we find conclusive evidence only on the non-stationarity of the level of GDP at a 95% confidence level. CPI, interestingly enough, has a unit root in levels, according to ADF and PP, but is also stationary in levels according to KPSS. Due to conflicting results of the ADF and KPSS tests,⁷ we remain skeptical about the power of unit root tests and specify two VAR models: one in levels and one in first differences.

⁶ The Albanian Institute of Statistics (INSTAT), which produces the official country statistics, has only recently begun to publish quarterly GDP data, starting from 2004Q1. Such a sample is not long enough for the purpose of this study, and therefore interpolated annual figures have been used. However, due diligence is paid to the convergence of both series.

⁷ Refer to Appendix A, Table 3 for ADF and PP unit root tests' results and KPSS stationarity test results.

In both cases, we do not impose long run cointegration restrictions. According to VAR literature, when there are cointegration relationships among the variables, we are able to estimate the VAR in levels and leave the long run structure unrestricted only if the cointegration rank is high and the short run coefficients are ignored (Peersman and Smets, 2001, Lütkepohl and Krätzig, 2004, and Heiricourt, 2006). For this reason, we perform a Johansen cointegration test. See Table 4, Appendix A for results. The test suggests that there are 2 cointegrating relationships among the variables in the VAR. Furthermore, the study will measure the impact of fiscal policy through impulse responses of the relevant economic variables, rather than their short run coefficients. Therefore, level estimation is justified.

Moreover, a possible disadvantage of restricting the long-term structure of VAR relationships is that errors in estimating long-run relationships can have serious implications for the short-run behavior of the model (Faust and Leeper, 1997). However, to avoid possible non-stationary impulse responses, we also estimate a VAR in first differences, assuming stochastic trends for all variables. This second specification does not impose long run structure either, focusing only on the short to medium run. Differencing in a cointegration setting might be disadvantageous in terms of losing valuable information about long run relationships. In any case, we are not interested in estimating an equilibrium; rather, we want to estimate the short to medium run fiscal policy multipliers of GDP and fiscal policy effects on prices and interest rates.

Both specifications of the VAR fulfill stability tests and residuals' autocorrelation, normality and heteroskedasticity tests⁸. To choose the appropriate lag length, we base our judgment on information criteria (BIC, AIC, HQ and LR), the length of our sample and economic sense. Due to the short time horizon of the database, we limit the lag length a-priori to 4 lags. Although most information criteria suggest using 1 lag, we will allow for dynamic interaction in up to 2 lags in the levels specification, which minimizes the AIC and 1 lag in the first-differences specification, as suggested by SC and HQ. Appendix A, Table 6 reports test results.

⁸ Refer to Appendix A, Table 5 for diagnostic tests.

The reduced-form VAR has 5 variables, where the first two represent the fiscal policy variables, namely expenditures and net taxes. In general form, the reduced-form VAR(2) can be written as:

$$X_t = \sum_{i=1}^2 \Gamma_i X_{t-i} + U_t \quad (1)$$

where $X_t = [g_t, nr_t, y_t, p_t, r_t]$ with g_t as real government expenditures, as real government net tax revenues, y_t as real Gross Domestic Product, p_t being the real CPI index, and r_t the real 12-month Treasury bills' interest rate. $U_t = [u_g, u_{nr}, u_y, u_p, u_r]$ is the vector of each equation's residuals⁹, or shocks, in VAR terminology.

When we estimate a VAR (2) in its reduced form, the errors are expected to be i.i.d. in each equation, but correlated across equations. As such, it is impossible to isolate a shock of one of the variables only, since the u_k typically contains information about the rest of the shocks, too. Thus, we need to identify our shocks of interest, i.e. the government expenditures shock and the government tax shock.¹⁰ To be able to isolate these shocks we need to impose structure on our VAR, meaning we define the contemporaneous (lag 0) effects of variables to each other.

The reduced-form VAR (2) in equation (1) is transformed into:

$$AX_t = AC + A \sum_{i=1}^2 \Gamma_i X_{t-i} + AU_t \quad (2)$$

where the A matrix contains the contemporary coefficients of our variables. The A matrix is the square root of the variance-covariance matrix Σ . Transforming the original VAR into equation (2) makes our structural shocks e_g and e_{nr} uncorrelated with the rest of the shocks; therefore fiscal shocks are now identifiable.

The relationship between reduced-form shocks u_k and e_k the structural shocks is given by the following equation:

⁹ For notational convenience, we are dropping the time subscript t from the individual equations' residuals and structural shocks from this moment on.

¹⁰ Note that the only shocks that have interpretation in this estimation are the fiscal shocks. The other structural errors are not assigned any economic meaning.

$$Au_k = Be_k \quad (3)$$

with the shocks being standardized at 1¹¹. In matrix notation, the above relationship is presented as:

$$\begin{bmatrix} 1 & -a_{g,nr} & -a_{g,y} & -a_{g,p} & -a_{g,r} \\ -a_{nr,g} & 1 & -a_{nr,y} & -a_{nr,p} & -a_{nr,r} \\ -a_{y,g} & -a_{y,nr} & 1 & -a_{y,p} & -a_{y,r} \\ -a_{p,g} & -a_{p,nr} & -a_{p,y} & 1 & -a_{p,r} \\ -a_{r,g} & -a_{r,nr} & -a_{r,y} & -a_{r,p} & 1 \end{bmatrix} \begin{bmatrix} u_g \\ u_{nr} \\ u_y \\ u_p \\ u_r \end{bmatrix} = \begin{bmatrix} \sigma_g & b_{g,nr} & 0 & 0 & 0 \\ b_{nr,g} & \sigma_{nr} & 0 & 0 & 0 \\ 0 & 0 & \sigma_y & 0 & 0 \\ 0 & 0 & 0 & \sigma_p & 0 \\ 0 & 0 & 0 & 0 & \sigma_r \end{bmatrix} \begin{bmatrix} e_g \\ e_{nr} \\ e_y \\ e_p \\ e_r \end{bmatrix} \quad (4)$$

A e_k B u_k

To identify this relationship – in other words, to identify the variance-covariance matrix, – we need to impose 35 restrictions on the elements of both A and B. The number of restrictions is equal to the total number of coefficients in A and B minus the number of the distinct elements in the variance-covariance matrix. That is $2k^2 - \left(\frac{k^2 - k}{2} + k\right)$ or 35 restrictions across elements of both A and B. The diagonal elements of A are restricted to 1, since they represent the relationship of reduced-form shocks to each other. The diagonal elements of B are the standard deviations of the structural shocks. Since we want to recover fiscal policy shocks that are uncorrelated with the shocks of other equations, all elements of B are zero, except for the b coefficients representing the underlying relationship of cyclically adjusted fiscal shocks with structural shocks. Let us focus on the first two equations of (4) to show how we establish this relationship:

$$u_g = a_{g,nr}u_{nr} + a_{g,y}u_y + a_{g,p}u_p + a_{g,r}u_r + e_g + b_{g,nr}e_{nr} \quad (4.1)$$

$$u_{nr} = a_{nr,g}u_g + a_{nr,y}u_y + a_{nr,p}u_p + a_{nr,r}u_r + e_{nr} + b_{nr,g}e_g \quad (4.2)$$

By taking $a_{g,nr} = a_{nr,g} = 0$, we can remove the cyclical (correlated) components of the reduced-form fiscal residuals obtained by estimating the VAR, and write the cyclically adjusted (structural) fiscal shocks as:

¹¹ Some textbooks and econometrics software use this definition for the relationship between structural and reduced-form shocks. The estimation for this paper was carried out in Eviews and JMulTi, which do have a B matrix representing the variance of the error terms. However, equation (3) can also be found as $Au_k = e_k$, where shocks are not standardized.

$$u_g^{CA} \equiv u_g - a_{g,y}u_y + a_{g,p}u_p + a_{g,r}u_r = e_g + b_{g,nr}e_{nr} \quad (5.1)$$

$$u_{nr}^{CA} \equiv u_{nr} - a_{nr,y}u_y - a_{nr,p}u_p - a_{nr,r}u_r = e_{nr} + b_{nr,g}e_g \quad (5.2)$$

In equation (5.1), $a_{g,y}$ represents the within-quarter income elasticity of government spending. Coefficient $a_{g,y}$ represents the price elasticity of government spending; whereas $a_{g,r}$ is the interest rate elasticity of government spending. In equation (5.2), $a_{nr,y}$ is the within-quarter income elasticity of government net revenues; $a_{nr,p}$ is the price elasticity of government net revenues; while $a_{nr,r}$ is interest rate elasticity of net revenues. The estimates of all elasticities are reported in the next subsections; thus, all coefficients a_j are identified.

The last step in building our SVAR is the identification of b_j coefficients. Given the relatively long period of fiscal consolidation (see section 2), we might have grounds for suspecting that when taking policy decisions the government tends to decide on spending first, and then on tax policy. Our reasoning is also supported by the fact that the Albanian government decided to stimulate the economy during the 2009 “crisis” year through spending increases, rather than tax cuts. Therefore, we assume that the government makes spending decisions before tax decisions. The cyclically adjusted shocks become:

$$u_g^{CA} = e_g \quad (6.1)$$

$$u_{nr}^{CA} = b_{nr,g}e_g + e_{nr} \quad (6.2)$$

where by estimating equation (6.1), $b_{nr,g}$ captures the effect of a structural spending shock on a discretionary tax decision.

3.2. SHORT TERM ELASTICITIES OF GOVERNMENT SPENDING AND REVENUES

As discussed in the previous subsection, to achieve full identification of the SVAR we need to provide the contemporaneous effects of GDP, prices and interest rates on fiscal policy variables.

A useful property of our definition of government expenditures is the exclusion of interest payments. This leads to zero interest rate elasticity of spending, thus $a_{g,r} = 0$. Furthermore, we also assume zero interest rate elasticity of net revenues, since we cannot identify any measurable relationship between tax payments and interest rates. Hence, $a_{nr,r} = 0$.

3.2.1 ESTIMATING THE OUTPUT ELASTICITY OF GOVERNMENT NET REVENUES AND SPENDING

Tax elasticity in public finance is defined as the percent change in tax revenue due to a 1% change in income, or GDP. It is worth noting that tax elasticity measures the automatic, endogenous response of 1% change in income. Therefore, the elasticity of tax revenues assumes no structural change, thus no discretionary fiscal policy decisions. Tax buoyancy, on the other hand, measures the total effect of a percent increase in GDP on tax revenues. Coefficient $a_{nr,y}$ is exactly the built-in elasticity of taxes with respect to output.

Budget elasticities are nowadays routinely reported in most statistical databases of developed countries, based on the methodology developed by Giorno et al. (1995), and revised in van den Noord (2000). Both these studies are brought forth by OECD. As explained in van den Noord (2000), the OECD methodology requires data, inter alia, on the tax bases of each distinct tax category, potential employment and potential GDP, actual and potential consumption and corporate income. At present, official data on distinct tax bases, corporate income, and current consumption data are not available for Albania¹². Furthermore, except for potential output, the potential levels of all other variables need to be estimated, which goes beyond the scope of this paper. Therefore, the application of the OECD methodology in calculating tax elasticities is not viable at present, but will be addressed in future research.

¹² While there are data on annual consumption in National Accounts, the most recent figures date year 2008; there is a lag of two years in the publication of expenditure based GDP and its components.

A literature survey on alternative methods for estimating built-in tax elasticities leads to four main methods: 1. the proportional adjustment method, 2. the constant rate structure, 3. dummy variable methods, and, 4. the Divisia Index approach. The first method requires data on ex-ante and ex-post estimates of tax yields resulting from discretionary changes in fiscal policy. These data are not available for Albania. The second method requires detailed data on the tax bases of distinct tax categories, while the third can only be effective if discretionary changes have not been frequent in the past. Constrained by data availability, we believe that the only appropriate method for estimating net tax revenue elasticities is the Divisia Index approach¹³, developed by Choudhry (1979). The methodology does not require any adjustment of the revenue series to eliminate discretionary policy effects.

According to Choudhry (1979), the Divisia index - heavily used to measure technical change¹⁴ - can intuitively be used to measure discretionary fiscal change. "The intuition is clear: discretionary tax measures produce changes in tax yield over and above those caused by the automatic growth in the tax bases, as technical change induces changes in total productivity over and above those that can be accounted for by increases in factor inputs" (Choudhry, 1979, p. 89). Then, if we assume that an aggregate tax function exists, a discretionary fiscal policy shifts the aggregate tax function, just like technical change is supposed to induce a shift in the production function.

Building his rationale on the analogy with the Divisia index for technical change, Choudhry (1979) argues that a Divisia index of discretionary change should be equal to the percent increase in total tax yield divided by the percent increase in total tax yield caused by the automatic increase in tax bases. He also argues that the validity of this approach is contingent on the existence of a continuously differentiable aggregate tax

¹³ Choudhry (1979) explicitly states in his paper that whenever data are available, the proportional adjustment method should be preferred to the Divisia Index approach.

¹⁴ An application pioneered by Solow (1957) in the article "Technical Change and the Aggregate Production Function". *The Review of Economics and Statistics*, Vol. 39, No. 3. pp. 312-320.

function, which possesses the invariance¹⁵ property.

Starting from the continuously differentiable aggregate tax function:

$$T(t) = f(x_1(t), \dots, x_k(t); t) \quad (7)$$

where T is the aggregate tax yield, x_i is the proxy tax base for the k -th category of taxes and the time variable t is a proxy for discretionary tax measures, Choudhry (1979) derives the discretionary change Divisia index, by differentiating the tax function with respect to time t .

$$\log D(n) = \log \left(\frac{T(n)}{T(0)} \right) - \sum_i^k \bar{b}_i \log \left(\frac{x_i(n)}{x_i(0)} \right) \quad (8)$$

Furthermore, the tax buoyancy can be estimated from the function of taxes, expressed in terms of total tax base, i.e. GDP:

$$T = \alpha y^\mu \quad (9.1)$$

$$\text{which in logarithmic form is } \log(T) = \alpha + \mu \log(y) \quad (9.2)$$

Equation (9.2) is estimated through OLS. Allowing for both contemporaneous and lagged effects of GDP on net government revenues, a dummy for year 2009 - when real economic activity was substantially slower than the historical trend -, and a dummy for 2008Q2 to capture an outlier in government revenues, we obtain:

$$\text{LOG(NR)} = -6.68 + 1.28^* \text{LOG(Y)} - 0.064^* \text{DUM_09} + 0.42^* \text{DUM_98} + 0.15^* \text{LOG(Y(-1))} \quad (10)$$

$$\begin{pmatrix} -11.25 \\ 0.59 \end{pmatrix} \begin{pmatrix} 11.29 \\ 0.11 \end{pmatrix} \begin{pmatrix} -3.63 \\ 0.018 \end{pmatrix} \begin{pmatrix} 10.1 \\ 0.04 \end{pmatrix} \begin{pmatrix} 2.11 \\ 0.07 \end{pmatrix}$$

¹⁵ This means that if there are no discretionary tax changes, there will be no discretionary revenue changes, and tax yield will increase only due to tax base increases. Although the assumption seems strong, in terms of not accommodating progressive tax systems, Hulten (1973) has shown that the homogeneity restriction can be circumvented through a modification in the index. See Hulten, Charles (1973), "Divisia Index Numbers", *Econometrica*, Vol. 41, pp. 1017-25.

where NR and Y are defined as in the VAR, expressed in real terms and are seasonally adjusted. The brackets include t-statistics and standard errors¹⁶.

Once the buoyancy is estimated ($\mu = 1.28$), elasticity is defined as:

$$\bar{r} = \mu - \frac{\log D(n)}{\log[x(n)/x(0)]} \quad (11)$$

The calculation of the term requires data on different tax categories and proxies for their bases. As previously mentioned, real net revenues include real V.A.T taxes, real direct taxes, real excise taxes and real customs duties. All variables are quarterly, deflated with CPI and seasonally adjusted. Table 1 presents the proxy bases for our tax categories.

Table 1 Proxies for tax bases

Tax category	Base Proxy
V.A.T	Private Consumption
Direct Taxes	GDP at factor prices*
Excise Tax	Private Consumption
Customs Duties	Imports of goods and services

Source: INSTAT, the Ministry of Finance and author's calculations

*Calculated as GDP at market prices (the official published series) less V.A.T taxes plus subsidies.

The estimated quarterly elasticity of government revenues is 0.96, meaning that a 1% increase in GDP results in 0.96% increase in government revenues. Given the progressive nature of both income and corporate tax until late 2007, we would expect elasticity greater than one. Our result could be explained with the high degree of informality in the Albanian economy. However, this hypothesis goes beyond the scope of this paper, thus, interpretation and further investigation of the tax system elasticity will be addressed in further research.

¹⁶ See Appendix A, Table 7 for diagnostic tests.

We proceed with the estimation of government transfers elasticity. Using the same Divisia index method, with total GDP at market prices as transfers' base proxy, we find the transfers' elasticity to be -0.15¹⁷. We sum both elasticities after multiplying with their average weights (government revenues have a weight of 1.61 with respect to government net revenues; whereas transfers account for 0.61% of net transfers), and $a_{nr,y}$ coefficient in the matrix of contemporaneous effects is 1.45.

The income elasticity of government spending is assumed 0, because: a) it typically takes more than one quarter for the government to take spending decisions in response to GDP developments; and, b) official quarterly GDP data are published with a 12-week lag in Albania¹⁸, making it impossible for the government to take contemporaneous decisions following GDP developments.

3.1.2. ESTIMATING PRICE ELASTICITY OF FISCAL POLICY

If we divide net government spending in three components –purchases of goods and services, wages, and government investment– the average weight of the three to total expenditures is around 31%, 34% and 35%, respectively. Given that public wages are not indexed to quarterly y-o-y inflation (although they are adjusted every year or so), we would expect an elasticity of wages equal to -1, since the purchasing power decreases at the exact same amount that prices increase. Purchases of goods and services, and government investments are assumed to have 0 price elasticity. Supposing that most government purchases are contract-based, where prices are agreed upon in advance, we can assume no contemporaneous effect of inflation on purchases of goods and services. A weighted sum of all components' elasticities yields a total elasticity of -0.34. This is our $a_{g,p}$ coefficient.

¹⁷ The low elasticity of transfers suggests a weak social net; however, this remains an hypothesis to be addressed in further research.

¹⁸ Refer to the National Statistics Institute (INSTAT) for the Official Publications' Calendar at <http://www.instat.gov.al/>

With respect to price elasticity of net revenues we also assume an elasticity equal to -1 , following the same purchasing power reasoning, as in the case of wages.

4. IMPULSE RESPONSES

Once the two structural fiscal shocks are identified, we solve recursively for GDP, CPI and Interest Rates. Note that the structural identification is the same in both the level and first difference specifications, since coefficients represent elasticities. The SVAR is fully identified as:

$$\begin{array}{c}
 \begin{bmatrix}
 1 & 0 & 0 & 0.34 & 0 \\
 -a_{nr,g} & 1 & -1.45 & 1 & 0 \\
 -a_{y,g} & -a_{y,nr} & 1 & 0 & 0 \\
 -a_{p,g} & -a_{p,nr} & -a_{p,y} & 1 & 0 \\
 -a_{r,g} & -a_{r,nr} & -a_{r,y} & -a_{p,y} & 1
 \end{bmatrix}
 \begin{bmatrix}
 u_g \\
 u_{nr} \\
 u_y \\
 u_p \\
 u_r
 \end{bmatrix}
 =
 \begin{bmatrix}
 \sigma_g & 0 & 0 & 0 & 0 \\
 b_{nr,g} & \sigma_{nr} & 0 & 0 & 0 \\
 0 & 0 & \sigma_y & 0 & 0 \\
 0 & 0 & 0 & \sigma_p & 0 \\
 0 & 0 & 0 & 0 & \sigma_r
 \end{bmatrix}
 \begin{bmatrix}
 e_g \\
 e_{nr} \\
 e_y \\
 e_p \\
 e_r
 \end{bmatrix}
 \end{array}
 \quad (12)$$

A
 u_k
B
 e_k

Impulse responses are computed up to 8 periods (two years) through the Moving Average representation of the SVAR:

$$X_t = [1 - \Gamma(L)]^{-1} A^{-1} B V_t \quad (13)$$

Where $\Gamma(L)$ is the lag polynomial of reduced-form coefficients and V_t is the vector of structural shocks. One fundamental difference between the nature of structural shocks in the level VAR and first-difference VAR is the persistence of the shock. While in the former specification shocks might have either a transitory or a permanent effect on variables (depending on variables' stationarity), in the later specification we explicitly model shocks with a permanent effect on the levels of the variables. Thus, to be able to compare impulse response results, we look at the accumulated impulse responses in the first-difference VAR (which capture shocks' effect on the level of the variable, rather than on the growth rate).

Structural shocks are interpreted as a 1% increase in the policy variables, and impulse responses represent the percent change

of responding variables. We also present the 68th percentile¹⁹ confidence interval coverage, obtained from 500 bootstraps of the impulse response distributions²⁰.

4.1. THE MACROECONOMIC EFFECTS OF GOVERNMENT SPENDING

According to the level specification, a 1% increase in real government total spending leads to a 0.06% increase in GDP on impact, reaching 0.08% after one quarter and the effect disappears after three quarters. The accumulated peak response is 0.16% after two quarters, and it stabilizes at 0.11% after five quarters. Spending impulse response graphs are reported in Appendix B.

Impulse responses generated with the first-difference VAR, reveal that GDP increases by 0.07% on impact, reaching 0.1% after one quarter, to stabilize at 0.06% after four quarters. The results are very close to the level specification. Considering that a 1% spending shock accounts for only 0.18% of GDP²¹, we can conclude that the response of GDP is quite substantial and statistically significant up to three quarters.

To have a clearer picture of the magnitude of the response, we transform the shocks to 1 pp of GDP²². In the level VAR, output

¹⁹ We follow Sims and Zha (1995, 1999) in choosing to report 68th percentile confidence intervals, instead of the classical 95th percentile CI. The coverage probability of bootstrapped intervals is not a classical econometrics concept, rather, a Bayesian concept. Sims and Zha (1995, 1999) point that in most cases 68 percentile CI have a closer coverage probability to the nominal bootstrap percentile. Although one could argue that it is not justifiable to use Bayesian criteria in classical inference, Sims and Zha (1995, 1999) show that Bayesian confidence intervals are valid even under classical criteria and classical (bootstrap) inference of confidence intervals can be made under Bayesian criteria.

²⁰ Confidence intervals are obtained with Hall Bootstrap Percentile, available in the JMulTi package. For a general discussion on bootstrapping and the Hall bootstrap procedure see Hall, P. (1992) *The Bootstrap and Edgeworth Expansion*, Springer, New York.

²¹ 18% is the average share of government spending in GDP (according to the variable definitions of this study).

²² Since spending has a share of 18% in GDP, a 1 pp of GDP shock to spending means an increase of the share of spending/GDP by 1 pp (i.e. from 18% to 19%).

responds with an increase of 0.36% on impact, reaching the peak of 0.43% after one quarter, to become statistically insignificant after four quarters. The accumulated response is 0.9% at its peak, after two quarters. First-difference VAR accumulated impulse responses show an increase of 0.4% on impact, reaching a peak of 0.58% after one quarter, and stabilizes at 0.46% after four quarters.

With regard to prices, both the level and first-difference VARs generate statistically insignificant responses. Theoretically, we would expect an increase in the price level following a positive government spending shock (either on impact or at a longer horizon, depending on the level of price stickiness), supported by the considerable increase in GDP. However, we do not observe this behavior. To be able to provide an explanation, we further investigated the effects of government spending, by disaggregating spending policy into current and capital components. Section 5 presents and discusses results of government current spending and government capital spending on GDP, prices and interest rates.

Real 12-month Treasury bills rates increase by 13 bps on impact following a 1% spending shock in the level VAR, and reach a peak of 31 bps after six quarters. At the end of two years, the effect is 16 bps and statistically significant. The accumulated response reaches a peak of 2 pp at the end of the second year. In the first-difference specification, interest rates behave quite differently. Their accumulated response is statistically insignificant up to two quarters and responses become significant after three quarters, settling at -4 pp.

The level VAR indicates an interest rates' response that we would expect in case of a deficit financed spending shock, with domestic funding and liquidity constraints. According to the level VAR estimation, the primary deficit (approximated by net revenues less total primary spending) increases by 0.96% on impact, and gradually slows to 0.13% after three quarters, to become insignificant after four quarters. However, we are unable to tell whether such deficit is externally or domestically financed, making us unable to interpret the interest rates results in the level VAR. Furthermore, we can clearly spot a possible unit root in interest rates, indicated

by the permanent effect of the spending shock. This might have implications on the accuracy of confidence intervals (which rely on asymptotic properties of impulse responses' distribution) and model results²³. Therefore, we would prefer to draw conclusions about fiscal policy effects on interest rates that are estimated with a first-difference VAR. Moreover, we have theoretical reasons to expect current spending and capital spending to have different effects on interest rates. Hence, in the next section we present results of the disaggregated spending, first-difference VAR.

4.2. EFFECTS OF NET REVENUES ON REAL GDP, PRICES AND INTEREST RATES

The level VAR generates an increase of 0.05% in GDP on impact to a negative 1% shock in net revenues²⁴. However, the response is insignificant, and becomes statistically significant in quarters two to five, but with a reversed sign. This peculiar result could be explained with the fact that following a tax cut, government total spending decreases by around 1% at peak²⁵. However, given the potential impulse response stability problems mentioned in section 4.1, we prefer to rely on the first-difference specification to draw conclusions.

Accumulated impulse responses generated with the first-difference VAR reveal that GDP increases by 0.18% on impact, reaching 0.19% after two quarters and stabilizing around this level. First-difference VAR yields the expected sign and significance of GDP response.

When the tax shock is transformed to 1 pp of GDP, the accumulated first-difference VAR GDP response is 1.4% on impact, reaches the peak of 1.5% after one quarter, and stabilizes around 1.49% after three quarters.

²³ Other variables are not structurally affected by interest rates, since interest rates are ordered last in the VAR, but they are affected by lagged values.

²⁴ We assume a symmetrical response of shocks, meaning that negative shocks and positive shocks have the same effect in terms of magnitude, but with a different sign.

²⁵ If we analyze the effect of a 1% tax increase shock, higher revenues from taxes could be interpreted as greater room for more discretionary expenditures. In reality, we can expect this government behavior.

We need to note though, that this is a cumulative non-cyclically adjusted effect. Because GDP increases on impact, net revenues continue to increase at every quarter due to the high income elasticity of net revenues, which GDP and other variables perceive as a highly persistent shock. We would need to estimate cyclically adjusted responses to address this issue. We present results in subsequent sections.

As for prices, in the level VAR, prices increase by 23 bps on impact following a 1% net revenues decrease, reaching a peak of 73 basis points after one quarter and becoming statistically insignificant after five quarters. Theoretically speaking, the sign of price response depends on the price setting behavior of economic agents. For example, we would expect a price decrease following a tax increase if private demand decreases to the point of driving prices downwards. However, we would expect a price increase if prices are set in a monopolistic fashion, where producers transfer tax increases to consumers through higher prices. The level results confirm the first explanation (i.e. prices are driven up by increased demand following a tax cut). In cumulative terms, however, price impulse responses are statistically insignificant, which could be explained as balanced pressures from supply and demand sides.

On the other hand, first-difference VAR price responses seem to validate higher supply side price control, since the impact response is 50 bps decrease, reaching 45 bps after two quarters and settling at this level.

Real interest rates have a statistically insignificant response up to two quarters ahead, and increase by 0.12 pp after two quarters, reaching a peak of 0.14 pp after four quarters. In cumulative terms, the accumulated response is statistically significant at 0.31 pp. In the first difference VAR, interest rates increase by 0.15 pp on impact (statistically significant), reach a peak of 0.26 pp after four quarters and settle at that level. This result is expected, since a tax reduction stimulates short term private consumption, which in turn, decreases savings and drives up interest rates.

5. FISCAL MULTIPLIERS OF GOVERNMENT CURRENT SPENDING, CAPITAL SPENDING AND NET REVENUES

To be able to assess in a comparative fashion the effects of different types of policy on Gross Domestic Product, we compute fiscal multipliers. Since there is sufficient evidence to support different effects of specific components of government spending²⁶, we disaggregate government spending into net primary current spending and capital spending (i.e. public investment). The new SVAR specification is estimated in first-differences, motivated by some of the ambiguous results obtained in subsections 4.1. and 4.2.

The identification task requires some a-priori assumptions on the order of decision-making when the government decides to implement all three kinds of policies contemporaneously. Recalling equations (5.1) and (5.2) in subsection 3.1 we can write in a similar way:

$$u_{g_c}^{CA} \equiv u_{g_c} - a_{g_c,y}u_y - a_{g_c,p}u_p - a_{g_c,r}u_r = e_{g_c} + b_{g_c,g_i}e_{g_i} + b_{g_c,nr}e_{nr} \quad (14.1)$$

$$u_{g_i}^{CA} \equiv u_{g_i} - a_{g_i,y}u_y - a_{g_i,p}u_p - a_{g_i,r}u_r = e_{g_i} + b_{g_i,g_c}e_{g_c} + b_{g_i,nr}e_{nr} \quad (14.2)$$

$$u_{nr}^{CA} \equiv u_{nr} - a_{nr,y}u_y - a_{nr,p}u_p - a_{nr,r}u_r = e_{nr} + b_{nr,g_c}e_{g_c} + b_{nr,g_i}e_{g_i} \quad (14.3)$$

Because we already know all a_j elasticities²⁷, we only need to identify b_j coefficients. In recent years, public investment has been the main priority of the Albanian government. Apart from this, we can argue that in transition economies government capital spending comprises a sustainable portion in fiscal programs due to the continuous need to build capacity and infrastructure that was

²⁶ Current government expenditures are accounted for as consumption in National Accounts data; whereas capital expenditures directly affect gross capital formation, thus investments.

²⁷ The only extra computations that we need to make regard the price elasticity of current and capital spending. The latter is assumed 0, due to the contractual nature of such spending; while the former is recalculated to be -0.57, because the only component that is contemporaneously affected by prices is wage expenses (decreased purchasing power) that have a share of 57% to total net primary current expenditures.

either lacking in the command economic regime, has outdated technology, or is not ample enough to accommodate the fast convergence process to a free market economy. Therefore, we assume that capital spending decisions are taken first, current spending decisions follow, and tax decisions are taken last. Simple estimation of the following relationships fully identifies our three fiscal shocks:

$$u_{g_i}^{CA} = e_{g_i} \quad (15.1)$$

$$u_{g_c}^{CA} = e_{g_c} + b_{g_c,g_i} e_{g_i} \quad (15.2)$$

$$u_{nr}^{CA} = e_{nr} + b_{nr,g_c} e_{g_c} + b_{nr,g_i} e_{g_i} \quad (15.3)$$

Once the 6-variable first difference SVAR(1)²⁸ is estimated we compute impulse responses of GDP, Prices and Interest Rates to 1% fiscal shocks. Appendix B shows impulse responses.

A 1% increase in net primary current spending causes an impact increase in GDP of 0.064%, reaching to a 0.037% increase after four quarters, and does not change thereafter. GDP responds by 0.03% on impact to a 1% increase in capital spending. It reaches a peak of 0.04% after one quarter and settles at an increase of 0.032% after three quarters. With regard to taxes, following a 1% decrease in net revenues, GDP increases by 0.21% on impact, and settles at 0.19% after two quarters.

A current spending shock results in statistically insignificant response of prices on impact, and a slight increase of 10 bps after two quarters. Capital expenditures do not seem to affect prices at all, since their cumulative impulse responses are always insignificant. Although price response magnitude is lower for capital expenditures, when aggregated in total spending, their effect might explain the ambiguous results we get in the 5 variable-VAR. A 1% net revenues decrease shock causes prices to increase on impact by 54 bps, reaching 40 bps after four quarters and settling there.

²⁸ Lag length information criteria suggest a lag 0 specification; however, we are allowing for some dynamic interaction and choose to estimate a model with one 1 lag. See Appendix A, Table 4 for test results.

Interest rates have statistically insignificant responses to both current and capital spending shocks. This result is somewhat unexpected, given the recent evidence of 12-month Treasury bills' interest rates increase²⁹ in the Albanian economy that is mainly attributed to increased spending (due to domestic financing). However, year 2009 witnessed sharp liquidity constraints³⁰ in the Albanian banking system, reflecting an abnormal situation for the availability of credit to the economy. Therefore, during that year, upward pressures on interest rates are mainly caused by liquidity constraints, and do not represent an average situation for the Albanian economy. In an IS-LM framework, an increase in either current or capital expenditures results in an upward shift of the IS curve, which would normally drive interest rates up. A no change or very small change in interest rates could result only if a) the LM curve shifts to the right as well, or b) if the LM curve does not shift, but has a very small slope (nearly flat). A shift of the LM curve means an increase in the money supply following an expansionary fiscal policy shock. We tend to believe that the statistically insignificant change in interest rates is better explained with the shape of the LM curve. Kolasi et al. (2010) report that an increase in the interest rate causes money demand to statistically significantly decrease only after five quarters. This result suggests a low short-term interest rates elasticity of money demand. Therefore, we have reasonable grounds to believe that the short- run LM curve might have a small slope.

A 1% net revenue decrease (tax cut) results in a statistically significant increase in interest rates by 0.16 pp on impact, reaching 0.26 pp after two quarters and stabilizing at that rate. Theoretically, this result is expected since a tax cut results in an immediate increase in consumption, discouraging saving, and thus driving interest rates up. In an IS-LM framework, a tax would decrease the slope of the IS curve, thus increasing output and slightly increasing interest rates (if we believe in an almost flat LM curve).

²⁹ See The 2009 Annual Report of the Bank of Albania, p. 207, at http://www.bankofalbania.org/web/2009_Annual_Report_5733_2.php

³⁰ See The 2009 Annual Report of the Bank of Albania, p. 11, for a description of the Albanian economy during 2009, at http://www.bankofalbania.org/web/2009_Annual_Report_5733_2.php

We then use the impulses responses to calculate GDP multipliers of fiscal policy. We provide results for two definitions of the multiplier: 1. The cumulative percent change in GDP up to quarter h over the cumulative cyclically-adjusted change³¹ in the fiscal policy variable up to quarter h , following a shock equal to 1 pp of GDP; 2. The cumulative percent change in GDP up to quarter h over the cumulative cyclically-adjusted deficit generated by a 1 pp of GDP shock to the fiscal policy variable. Table 2 reports cumulative multipliers.

Table 2 Cumulative cyclically adjusted fiscal multipliers

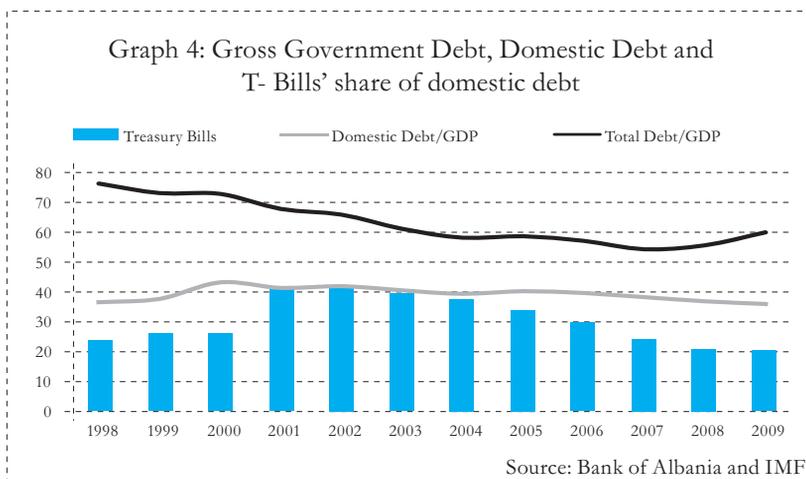
	Cyclically adjusted cumulative multipliers			
	Impact	Peak	1 year	2 years
Current Expenditures	0.52	0.69	0.47	0.49
Capital Expenditures	0.42	0.95	0.71	0.71
Tax cut	1.58	1.65	1.63	1.65
	Cyclically adjusted cumulative deficit multipliers			
	Impact	Peak	1 year	2 years
Current Expenditures	0.53	0.79	0.5	0.51
Capital Expenditures	0.39	0.89	0.66	0.66
Tax cut	1.58	1.65	1.63	1.65

One of the most interesting results is that a tax stimulus has the highest multiplier, which is even higher than 1. In standard Keynesian economics textbooks, the highest multiplier is expected to be that of government spending, since a tax cut would also induce increased savings, along with increased consumption. However, the tax multiplier largely depends on the marginal propensity to consume, on the degree of “forward-looking” behavior of consumers and on the level of income of the consumers it targets. Therefore, if the marginal propensity to consume is high; consumers are either myopic or do not have reasonable grounds to believe in a future

³¹ We follow Perotti (2005) and compute cyclically adjusted multipliers, which take out the automatic effect of GDP on policy variables. The cyclically adjusted impulse responses of the policy variables are: $\tilde{g}_{-c}^{CA} = \tilde{g}_{-c} - a_{g-c,p} \tilde{p}_t$, $\tilde{g}_{-i}^{CA} = \tilde{g}_{-i}$, and $\tilde{n}r_t^{CA} = \tilde{n}r_t - a_{m,y} \tilde{y}_t - a_{m,p} \tilde{p}_t$, where the tilde, as in Perotti (2005), denotes an impulse response.

tax increase (do not exhibit Ricardian Equivalence); and are not in the high end of income level, a tax cut is likely to be entirely consumed. Furthermore, a tax cut might also result in a crowding-in of investment, if it provides enough incentives to increase capital holdings and expand investments.

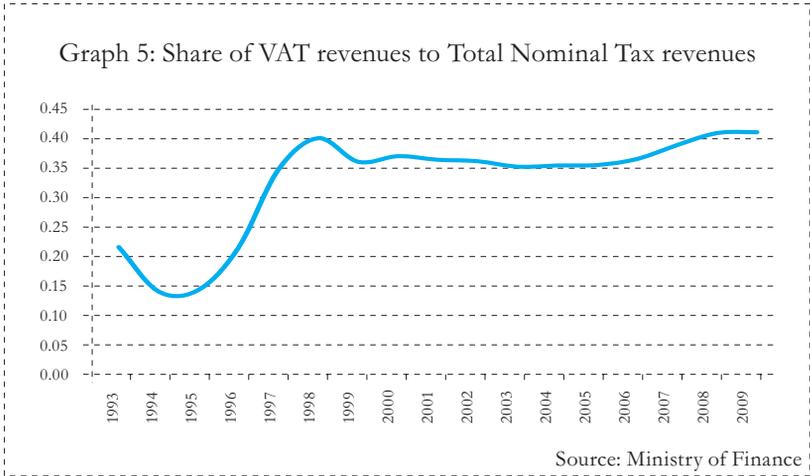
According to Dushku et al. (2007), the Albanian consumers' marginal propensity to consume is around 0.8. Furthermore, we tend to believe that consumers do not exhibit Ricardian Equivalence, since taxes in Albania have mostly been decreasing, rather than increasing throughout the past two decades. Moreover, public debt also shows a downward trend (except for the last two years) as a result of continuous fiscal consolidation, which probably does not raise concerns about future fiscal sustainability among consumers. However, these results might not be valid in the future, if the raising debt to GDP level starts to raise concerns about fiscal sustainability. Graph 4 shows debt developments during 1998 – 2009.



Another possible explanation³² of the high tax multiplier is directly linked to the composition of government tax revenues. Graph 5 shows that VAT revenues make up the bulk of government tax revenues; therefore, tax elasticity of prices is mostly affected by

³² I am thankful to Ms. Anjeza Gazidede, Economist at the Monetary Policy Department, Bank of Albania, for indicating this possible channel of the multiplier.

the VAT elasticity of prices. As such, we can speculate that half of a 1% government net revenues cut goes to a VAT decrease. If we believe that the decrease in VAT decreases the cost of production, then we would observe a simultaneous shift to the right of both the aggregate demand and the aggregate supply curves, leading to no



change/lower prices and higher output.

High tax multipliers (although for developed economies) are also found by other authors employing not only Vector Autoregressions, but also other models for estimating fiscal multipliers. Romer and Romer (2010) find that a \$1 tax cut results in \$3 increase in GDP after ten quarters. Mountfort and Uhlig (2004) report a deficit multiplier, caused by a tax shock, equal to 3.22 after twelve quarters; while Blanchard and Perotti (2002) report a tax multiplier of 1.32 after eight quarters. Tax multipliers in all these studies are higher than spending multipliers, which are reported as smaller than 1.

With regard to spending multipliers, our results show that the cumulative deficit multiplier caused by capital spending is higher than that caused by current expenditures, reaching a maximum of 0.9 after one quarter and settling at 0.66 after four quarters. Although the lower than 1 multiplier suggests some crowding-out effect of private consumption and investment, we did not find

statistically significant responses on interest rates, which leads us to conclude that there might be some leakages caused by an increase in imports, that result in lower than 1 ALL-to-1 ALL effects.

6. CONCLUSIONS AND FUTURE RESEARCH

In this study we investigated the macroeconomic effects of fiscal policy in Albania, by employing Structural Vector Autoregressions to measure the responses of GDP, Prices and Interest rates to a current expenditure shock, a capital expenditure shock and a net revenues decrease shock. We find that an exogenous tax cut has the highest multiplier effect on GDP, reaching up to 1.65 after five quarters. Between current and capital expenditures, capital expenditures have peak cumulative multiplier effect of 0.95 on GDP after one quarter; while current expenditures multiply GDP by 0.69 at peak, after one quarter.

While a tax cut causes interest rates to decrease, due to increased consumption and lower savings, capital and current expenditure shocks do not result in a statistically significant change in interest rates. We believe that this result might be supported by a relatively insensitive money demand to interest rates (i.e. a relatively flatter LM curve).

Furthermore, a tax cut causes prices to decrease by 55 bps on impact, reaching 40 bps after four quarters and settling at that level. A 1% increase in current expenditures causes prices to statistically significantly increase after one quarter by 10 bps, and settle at 9 bps after four quarters. A capital expenditures increase has no statistically significant effect on prices.

Although standard Keynesian economics textbooks explicitly state that government spending has a higher multiplier than a tax cut stimulus, many empirical studies reveal the opposite³³. The multipliers we estimate are also consistent with multipliers generated with the structural Macroeconometric Albanian Model (MEAM) of the Bank of Albania. Dushku and Kota (2010) report a government spending multiplier equal to 0.75 after one year³⁴.

³³ Gregory Mankiw provides a list of authors that find this result, at <http://gregmankiw.blogspot.com/2008/12/spending-and-tax-multipliers.html>

³⁴ In their paper, Dushku and Kota (2010) report the response of GDP following a 10% increase in government spending. We transform it into a multiplier by dividing the GDP response with the average share of government consumption, which is around 13%.

A similar exercise for a tax cut results in a multiplier of 2 after one year and 1.5 after two years; and the capital expenditure multiplier is 0.96 after one year and 0.37 after two years.

Although our results are validated by a structural model and theoretical explanations, there are some caveats that deserve special attention and possibly further research:

- Our time series include only eleven years of observations, which imposes limitations in our choice on the number of endogenous variables to include in the VAR. A useful exercise would be to include different components of GDP and check fiscal policy effects on consumption and investment separately. However, at present a VAR estimation would suffer from loss in degrees of freedom, and results would be questionable.

- Favero and Gaviazzi (2007) show that VAR results on fiscal multipliers might be misleading when the stock-flow relationship between fiscal variables and government debt is not accounted for. They particularly show that insignificant effects of fiscal shocks on long-term interest rates can be explained by the misspecification resulting from a missing debt feedback effect. For this reason, we will try to address the debt feedback issue in future research.

- Since the income elasticity of government revenues is an important input (assumption) in determining structural relationships among our variables, we will attempt to calculate a more precise elasticity estimate in future work.

- Motivated by the notable advantages that Bayesian estimation provides, especially when dealing with short time series, we will attempt to estimate the SVAR with Bayesian techniques in the future. Impulse response error bands show the coverage probability of confidence intervals through many replications of the posterior likelihood of response distributions.

- Finally, one known caveat of the methodology we employ is its inability to model expectations and take into account anticipated fiscal policy shocks. Perotti (2005) provides a thorough discussion

of this critique and concludes that “there are many reasons why fiscal decisions announced in advance might not be taken at face value by the public...[since] the yearly budget is often largely a political document...; any decision to change taxes or spending in the future can be modified before the planned implementation time arrives” (p.14). Furthermore, “whether estimated innovations are truly unanticipated matters only if anticipated and unanticipated fiscal policies have different effects. This is a controversial empirical issue, largely revolving around the importance of liquidity constraints” (p.14). The methodology developed by Mountford and Uhlig (2004) can tackle the problem of anticipated fiscal policy, thus in future research we will try to apply this model.

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APPENDIX A: TIME SERIES TESTS, LAG LENGTH CRITERIA AND VAR DIAGNOSTICS

Table 3 Unit Root Tests

H0: Variable has Unit Root	Augmented Dickey Fuller Test P-values				Philips Perron Test P-values			
	Level	First Diff.	Intercept	Trend	Level	First Diff.	Intercept	Trend
S	0.010		√		0.010		√	
NR	0.021		√		0.000		√	
Y		0.000	√			0.000	√	
P		0.000	√			0.000	√	
R_int		0.000	√		0.011		√	
Curr	0.000		√	√	0.014		√	
Cap	0.005		√		0.005		√	

The null is rejected for p-values smaller than 5%.

H0: Variable is stationary	KPSS LM Statistic			
	Level	First Diff.	Intercept	Trend
S	0.483**		√	
NR	0.165**		√	√
Y		0.322**	√	
P	0.873**		√	
R_int	0.483***		√	
Curr	0.857**		√	
Cap	0.154***		√	√

*The null for stationary is accepted at 10% significance level.

**The null is accepted at 5%.

***The null is accepted at 1% significance level.

Table 4 Johansen Cointegration Test

Hypothesized No. of CE(s)	Unrestricted Cointegration Rank Test (Trace)			
	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.676	104.990	69.819	0.000
At most 1 *	0.475	54.313	47.856	0.011
At most 2	0.355	25.336	29.797	0.150
At most 3	0.090	5.593	15.495	0.743
At most 4	0.030	1.347	3.841	0.246
Trace test indicates 2 cointegrating eqn(s) at the 0.05 level.				
* denotes rejection of the hypothesis at the 0.05 level.				
**MacKinnon-Haug-Michelis (1999) p-values.				

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**MacKinnon-Haug-Michelis (1999) p-values.				

Table 5 Diagnostic Tests of the 3 VAR specifications

	Diagnostic tests		
	5-variable levels VAR(2) P - value	5-variable first diff. VAR(1) P - value	6-variable first diff. VAR(1) P - value
LM-test H0: No serial correlation at lag order h			
Lag 1	0.650	0.153	0.134
Lag 2	0.256	0.252	0.119
Lag 3	0.953	0.967	0.889
Lag 4	0.390	0.063	0.087
White HSK test H0: No heteroskedasticity	0.696	0.746	0.284
Normality: Square Root of Covariance (Urzua) - J. Bera	0.969	0.137	0.353
Normality: Structural Factorization - J. Bera	0.063	0.316	0.480

The null hypotheses of: No 4th order serial correlation; No Heteroskedasticity; and Jointly Normal Errors are accepted at a 95% confidence level (p-value > 0.05).

Figure 1 Stability of the 3 VAR specifications

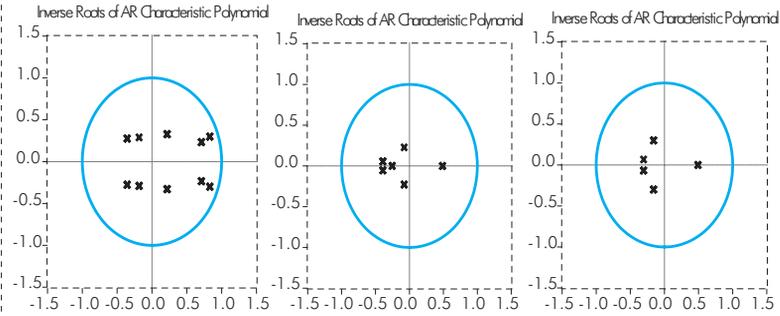


Table 6 Lag length Criteria

Level VAR						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	242.100	NA	0.000	-10.323	-9.714	-10.097
1	324.716	135.191*	0.000*	-12.942	-11.320*	-12.340*
2	350.628	36.512	0.000	-12.983*	-10.347	-12.006
3	370.270	23.213	0.000	-12.740	-9.090	-11.386
4	398.227	26.686	0.000	-12.874	-8.211	-11.145
First Differenced VAR						
0	422.215	NA	0.000	-19.173	-18.763	-19.022
1	495.864	123.320	0.000*	-21.436	-20.002*	-20.907*
2	518.578	32.751	0.000	-21.329	-18.872	-20.423
3	537.128	22.433	0.000	-21.029	-17.548	-19.745
4	581.960	43.789*	0.000	-21.952*	-17.446	-20.290
First Differenced, 6-variable VAR						
0	474.507	NA*	0.000*	-21.512	-21.020*	-21.331*
1	500.697	42.634	0.000	-21.056	-19.090	-20.331
2	536.306	48.031	0.000	-21.037	-17.597	-19.769
3	577.999	44.602	0.000	-21.302	-16.387	-19.490
4	641.521	50.227	0.000	-22.582*	-16.193	-20.226

* indicates lag order selected by the criterion

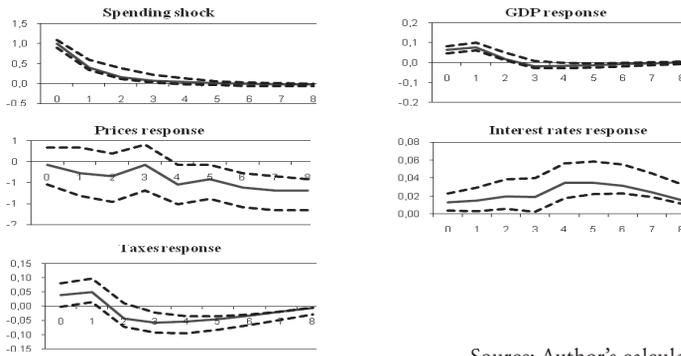
Table 7 Buoyancy estimation by OLS: diagnostic tests

Diagnostic test	P - value
Breusch-Godfrey SC test H0: No serial correlation	0.120
White HSK test H0: No heteroskedasticity	0.745
Jarque - Bera Statistic	0.352

The null hypothesis is accepted at a 95% confidence level for all tests.

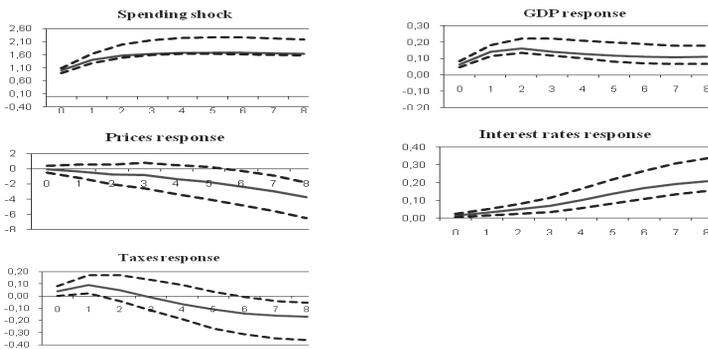
APPENDIX B. IMPULSE RESPONSES AND FISCAL MULTIPLIERS

Graph 6: Impulse Responses of a 1% structural spending shock in the levels SVAR(2)

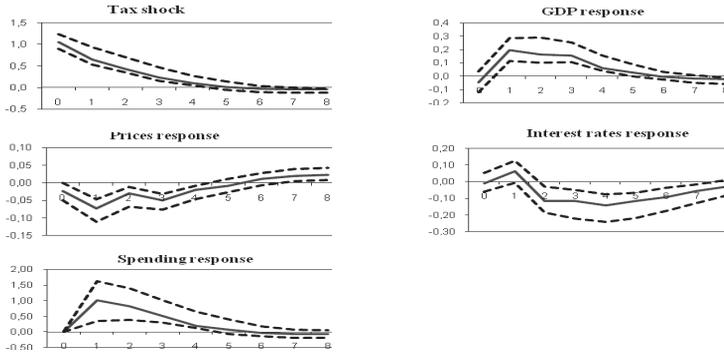


Source: Author's calculations

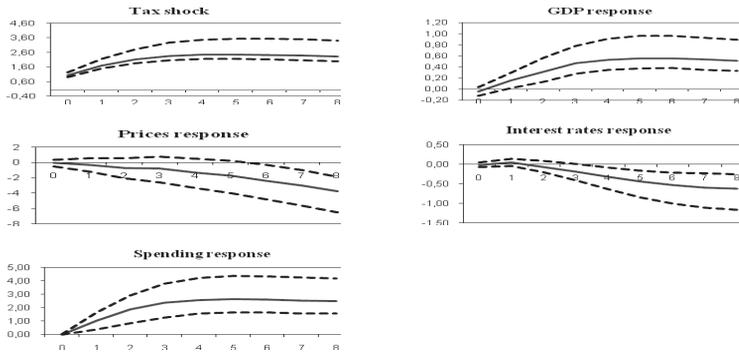
Graph 7: Cumulative Impulse Responses to a 1% spending shock in the levels SVAR(2)



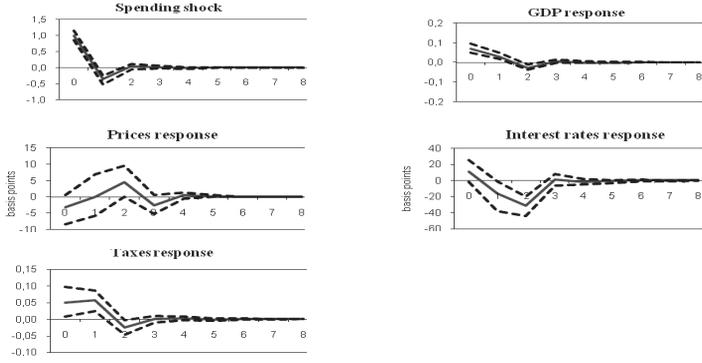
Graph 8: Impulse Responses of a 1% tax increase shock in the levels SVAR(2)



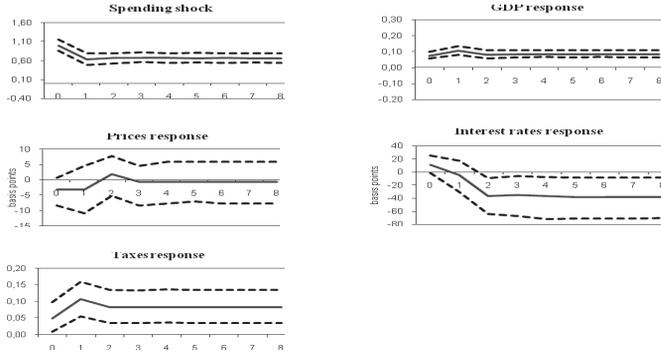
Graph 9: Cumulative Impulse Responses to a 1% tax increase shock in the levels SVAR(2)



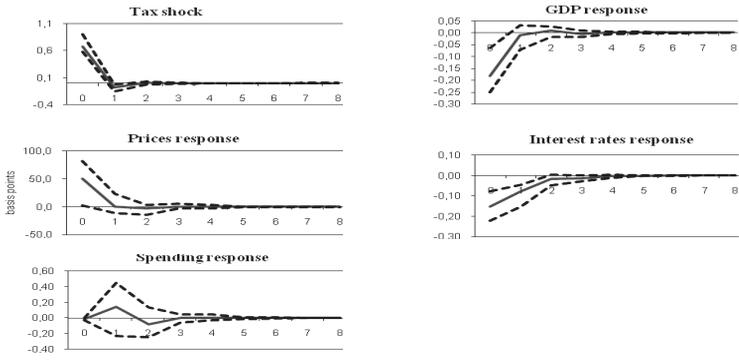
Graph 10: Impulse Responses of a 1% structural spending shock in the first-differences SVAR(1)



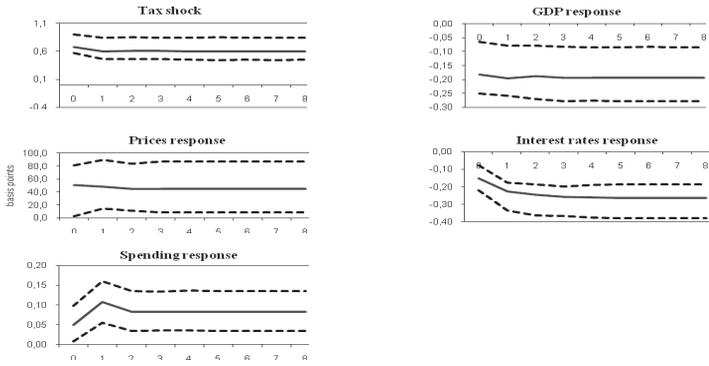
Graph 11: Cumulative Impulse Responses to a 1% spending shock in the first-differences SVAR(1)



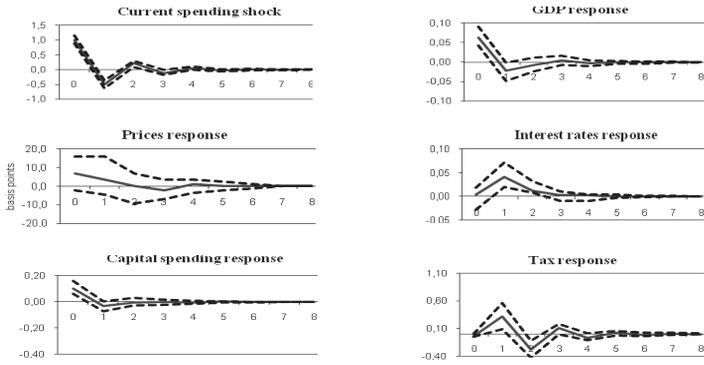
Graph 12: Impulse responses to a 1% tax shock in the first-differences SVAR(1)



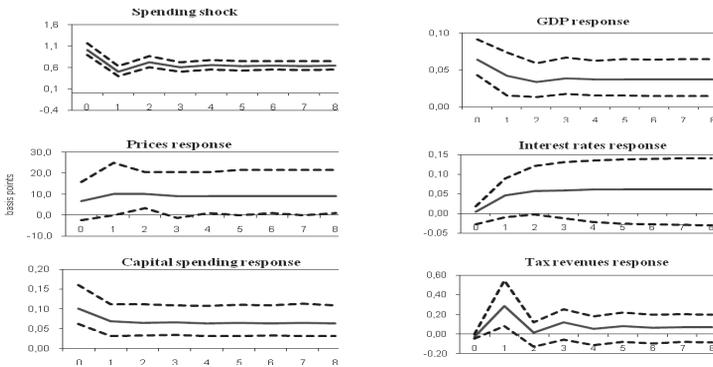
Graph 13: Cumulative Impulse responses to a 1% tax shock in the first-differences SVAR(1)



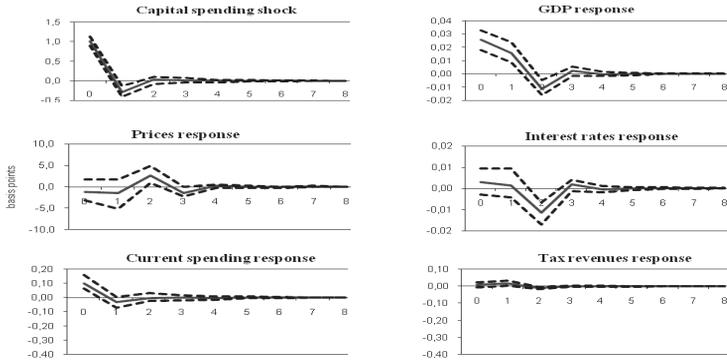
Graph 14: Impulse responses to a 1% current spending shock in a 6-variable first-difference SVAR(1)



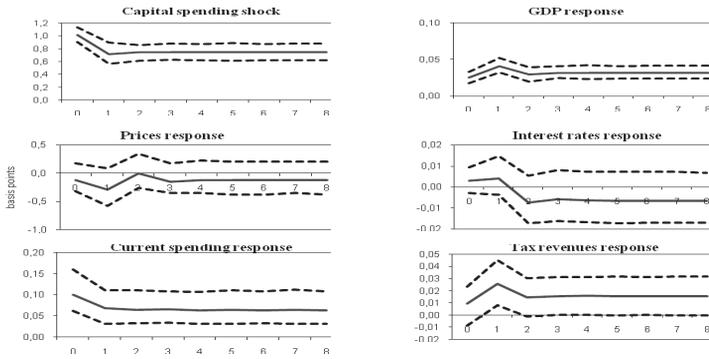
Graph 15: Cumulative Impulse responses to a 1% current spending shock in the first-differences SVAR(1)



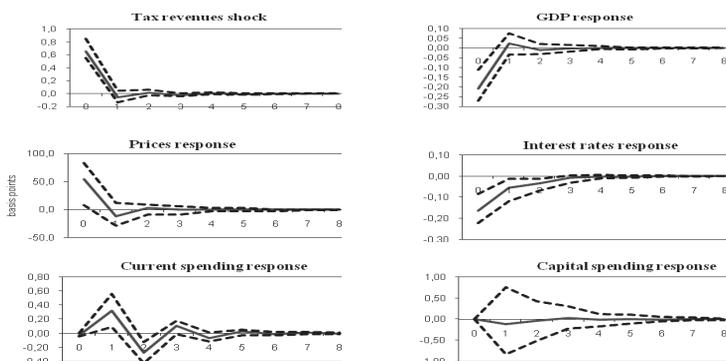
Graph 16: Impulse responses to a 1% capital spending shock in a 6-variable first-difference SVAR(1)



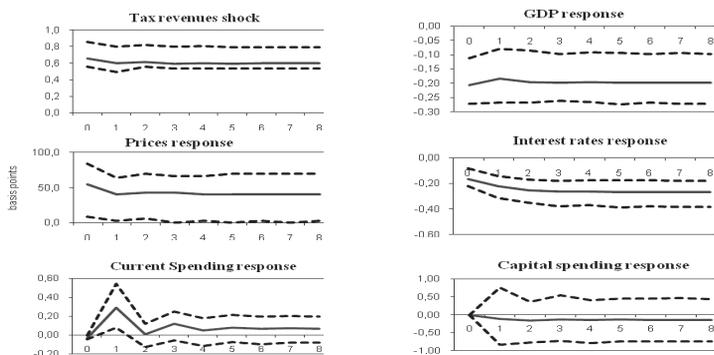
Graph 17: Cumulative Impulse response functions to a 1% capital spending shock



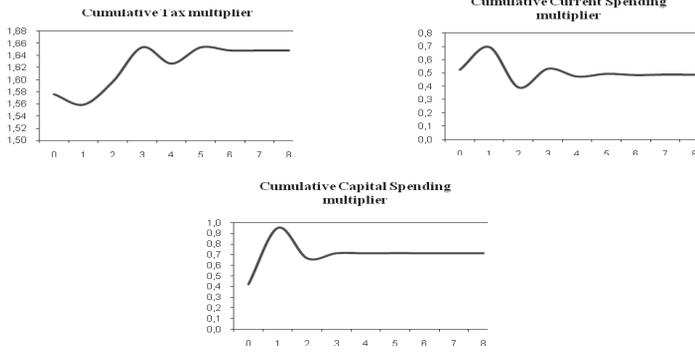
Graph 18: Impulse responses to a 1% tax increase shock in a 6-variable, first-difference SVAR(1)



Graph 19: Cumulative Impulse response functions to a 1% tax increase shock



Graph 20: Cumulative cyclically adjusted GDP multipliers of fiscal policy



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