Sustainability of fiscal policy: the case of Albania

Shijaku, Gerti

Bank of Albania

2012

WORKING PAPER

06 (37) 2012

BANK OF ALBANIA

SUSTAINABILITY OF FISCAL POLICY: THE CASE OF ALBANIA

Gerti Shijaku*

*Gerti Shijaku, Research Department, Bank of Albania
e-mail: gshijaku@bankofalbania.org

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

Acknowledgements: I am thankful to the Research Department of the Bank of Albania and particularly to Mr. Altin Tanku for his comments in the form of a review presented at the 5th Annual SEE Economic Research Workshop.

CONTENTS

ABSTRACT

This discussion material focuses on evaluating the long-run mean-reverting properties of debt to GDP ratio by unit root approach. Findings demonstrate that the debt to GDP is mean-reverting over time, while there seems to be no evidence when this indicator is measured in real terms. Further, the material considers a fiscal policy reaction function to understand whether government pursued appropriate policies to avoid excessive debt accumulation. Results presume that fiscal authorities react systematically to raising debt ratio, by generating future surpluses, but not enough to avoid excessive debt accumulation. Comparing simultaneously results from both approaches implies that Albanian fiscal policy is sustainable. But, the profligacy of fiscal authorities put it at risk, considering that the pursued fiscal policies do not avoid excessive debt accumulation. Error term analysis reveals that fiscal policy has been stable across time, even though evidence seems to illustrate that global financial and economic crisis had a negative impact. However, evidence seems to suggest that fiscal policy is relatively volatile when public debt is close to or above the 60 per cent of GDP ratio.

Keywords: Fiscal Policy, public debt, ADF and PP test, fiscal policy reaction function, pro-cyclicality and VAR approach

JEL Classification: C12, C36, C39, H62, H63

1. INTRODUCTION

Sustainability has become one of the most widely used concepts in assessing the behaviour of fiscal policy (FP). Although the exact definition of fiscal sustainability remains an open debate, almost everyone agrees that the sustainability of public finances is closely linked to the state of the financial situation of the government, which often represents the economical strength and stability of a country. An unsustainable FP, accompanied by high fiscal deficits or/and rising public debt will lead, sooner or later, to the need to review and accommodate the anticipated government revenues and expenditures. Thus, the need to revise the current FP is a sign of unsustainable public finances, while an adjustment caused by a loss of confidence in financial markets is generally much more costly. Moreover, the stability of FP is questionable when rising rates of debt to GDP reaches above a certain level and when the revenues are not sufficient to cover financing costs related to new levels of debt issued or when it is clear that the government needs are higher than the taxpayers can support.

The framework of the Albanian FP has been based on the anchor determined under programme arrangement with the International Monetary Fund (IMF)[1]. As such, FP aimed at achieving consolidated budget balance through deficit and public debt reduction. For this reason, public finance focused on reducing current expenditures and increasing government revenues. As a result, budget deficit, in 2010, was gradually reduced to 3.2% of GDP from 9.6% in 1998, mainly through cuts in government subsidies and personnel expenditure and revenue inflows from the privatisation process. These developments reflect the decline in interest payments (cost of debt servicing) to GDP ratio, reaching to only 2.8 per cent in 2010, compared to 9.5 per cent in1998. Public debt to GDP ratio has been within the IMF (2003) and European Union Stability and Growth Pact (SGP) bounds. Albanian economic growth performance has been deterministic for the debt declining ratio, even though, in nominal terms, debt growth has approximately exceeded real economic growth rate, mainly during the period from 2007 to 2009.

[1] See: Enhanced Structural Adjustment Facility (ESAF - 1998-2001), Poverty Reduction and Economic Growth (PREG - 2002-2005), which was extended to Extended Fund Facility (EFF - 2006-2009). In January 2009, Albania graduated from the Fund-supported programme.

Further, under debt management strategy, debt composition is orientated towards a rising tendency to borrow on foreign market, given greater accessability into the international financial institutions. Foreign debt ratio accounted to 40% of total debt in 2010, from only 20% in 1998. This has provided more liquidity for credit to domestic household and firms, but in return has raised exposure to exchange rate volatility. The exposure of external debt to depreciation of ALL against both main currencies that compose the external debt stock, the euro and US dollar, increased the total level by round 2 percentage points[2]. Additionally, in nominal terms, debt burden has raised on faster grounds than government revenues. As a result, public debt level constitutes 220 per cent of total government revenues in 2010 compared to about 160 per cent in 1998.

Besides, during the financial and global crisis, the Albanian economy took advantage of macroeconomic stimulus in the form of fiscal expansion ahead of monetary adjustments. Buffer zones had been built in previous years through consolidation of fiscal position and anchoring of macroeconomic policies and public expectations, enabling such a countercyclical FP. Expanding budget deficit, hence public debt, reflected both the impact of automatic stabilizers in the form of reduced income and the countercyclical FP through wage and capital expenditure increases. This was reflected also into raising interest payments and primary deficits, even though, the government managed to have a primary surplus in 2010.

Under such circumstances, the main question coming up relates to the analysis on whether Albanian public debt burden has reached the limit where there is less possibility to augment further. Thus, this discussion paper focuses on the question whether FP in the case of Albania tends to have a stable behaviour in the long run. In particular, the aim is to examine two aspects of the same question:

(i) Firstly, is fiscal policy stable in the presence of economic developments?

(ii) Secondly, do fiscal authorities pursue active policies to avoid excessive debt accumulation?

[2] See: Ministry of Finance (2010, 2011)

According to IMF (2003), in developing and transition countries, the possibility for generating excessive surplus diminishes, while the level of debt burden moves toward 50 per cent of GDP ratio. This suggests that, while public debt exceeds the 50 per cent threshold, the behaviour of FP is questionable and cannot guarantee financial solvency without incurring further debt growth. Such a deterministic indicator gives clear signals and is easily interpreted. But, it is based on a subjective definition because there is no strong theoretical reason to link fiscal sustainability with the return of debt to GDP ratio to a former and not another level. Meanwhile, although in some cases high levels of deficit and debt may be appropriate, it is impossible for a country to adhere to a consistent ratio throughout the time.

In terms of policymaking, information on appropriate stabilising measures may be less necessary when the country is already highly exposed to shocks such as sudden stops of capital. The implementation of this approach, therefore, does not take into account uncertainties associated with the volatility of economic growth, the price of primary exports, the interest and exchange rate movements. Determining a low ratio while the initial level is too high would require implementation of a tight FP for a long period of time [Jonas (2010)]. This, among others, could cause a decline in public investment and slowdown of potential economic growth. Meanwhile, determining a higher level would increase the level of debt to GDP ratio and interest payments and subsequent rise in general concerns about sustainability. Therefore, it is advisable to follow an empirical approach in order to have a preliminary correct answer. Beyond assisting a deterministic level, this method provides some distinct signals on the behaviour of FP by offering an investigation into the stochastic behaviour subject to long-run mean-reverting ability.

This empirical study is in coherence with a possible need to design and implement a form of "fiscal rule" in the case of Albania. It provides some incentives to highlight and anchor in advance the expectations in favour of monetary policy (MP). The development and performance of public debt is a direct responsibility of the Albanian Government. But, the Bank of Albania has traditionally

played an advisory role in the management process. This is because first, the Bank acts as a fiscal agent and adviser to the Government in public debt management. Second, the activity of public debt management policy can affect monetary policy. Moreover, within the framework of inflation targeting regime, the elimination of fiscal volatility caused by an unsustainable behaviour is the most important pre-condition for the implementation of MP.

The paper is organized as follows: Section 2 explains the methodology for testing sustainability, the model and the data. Empirical results in Albania are presented in the following section. The paper concludes in section 4.

2. METHODOLOGY AND DATA

A. INTERTEMPORAL BUDGET CONSTRAINT, UNIT-ROOT TEST AND FISCAL POLICY REACTION FUNCTION APPROACH TO TEST FOR SUSTAINABILITY

The traditional approach in evaluating the sustainability of fiscal policies is based on the intertemporal budget constraint (IBC) of the government. Fiscal policy is considered sustainable, if debt holders expect the current debt to be offset by the sum of excepted future discount primary budget surpluses[3], expressed empirically by Bohn (1998) and Uctum (2006) as follows:

$$\Delta B_t = -S + rB_{t-1} \quad (1)$$

where, B is a measurement of government debt, S is the seignorage inclusive primary surplus and r is the ex-post interest that in the future government debt will mature and will eventuallybe repaid in full.This is also known as the transversality condition[4]. It implies that government debt is finite, while market will not tolerate Ponzi games under which new debt is issued systematically to cover interest payments on debt servicing [Cuddington, (1996)]. Based on these conditions, the hypothesis that the government is subject to IBC can be expressed mathematically as follows:

$$B_t = \delta_{t+n} B_{t+n} + \sum_{i=1}^{n} \delta_{t,i} S_{t+i,} \quad (2)$$

where, $\delta_{t+n} = \prod_{s=1}^{n} (1 + p_{t+s})^{-1}$ is the time-varing discount factor n periods ahead. A necessary and sufficient condition for sustainability is that, as n goes to infinite, $lim_{n \to \infty} \delta_{t+n} B_{t+n} = 0$.

[3] The concept of intertemporal budget constraint is based on the assumption that government expects some future tax revenues and based on this expectation, it makes the payment on debt at present. For this reason, it is necessary to discount the present-value of the expected tax revenues in the future. Discounted value is compared with government's need to make payments on time t. If the present value of expected revenues is equal or higher than the present value of government liabilities, then fiscal policy is considered stable.

[4] See Hamilton and Flavin (1986); Wilcox (1989); Trahan and Walsh (1991) and Wickens and Uctum 1993 on testing the transversality condition public debt.

In this case, Trehan and Walsh (1991) sugest that as long as the stock of the outstanding debt b_t follows a trend stationary process and if δ_{t+n} grows exponentially, then $B_t=\sum_{i=1}^{\infty}\delta_{t,i}S_{t+i,}$ and IBC are satisfied. This means that, to be sustainable, the present debt value must equal with the present value of expected surpluses. Otherwise, the adjustment of the necessary stabilising measures to restore the deficit and public debt at sustainable levels is inevitable. In this way, IBC imposes restrictions on the long-run government fiscal behaviour regarding the relationship between expenditure and revenues. First, it imposes these restrictions not to drift far away from one another, by avoiding the creation of large negative imbalances between them. Second, it requires the government to generate enough future net primary surpluses to pay back the outstanding stock of debt. Therefore, if the IBC condition is satisfied, then any debt accumulation in the long-term will be defined as mean-reverting and the budget will be balanced in present value terms [Uctum, (2006)].

For growing economies, the assessment of fiscal solvency should consider that the economy of a country expands over time with a fixed real growth rate [Hakkio and Rush (1991), Cuddington (1997)]. This means that debt sustainability depends on size of government liabilities and rate of economic growth. Thus, the ability to repay the debt grows proportionally to the rate of economic growth. Further, high and consistent borrowing rates cannot continue forever due to government borrowing capacity and higher costs associated with that [Hamilton and Flavin (1986)], and inevitably, the ratio of debt to GDP should come to an acceptable level, simply by generating positive fiscal surpluses. When the government generates a certain level of budget deficit, it implicitly promises that, in the future, it will enable positive fiscal surpluses. If high levels of past debt are offset by future positive surpluses, then it is possible that debt will be mean-reverting. According to Taylor (2002)[5], the solvency condition should consider the size of debt and the changing economic growth rate and therefore, the discounting factor presented by Trehan and Walsh (1991) will take the form:

$$\delta^{*}_{t+n}= \prod_{i=0}^{J}\frac{R_{t+i}}{G_{t+i}} \qquad (3)$$

[5] Condition is satisfied as long as $0 < g < r$, see Taylor (2002)

Where, $G=1+g$, with g representing the real economic growth rate and $R=1+r$ with r representing the real interest rate. IBC is satisfied if $lim_{n\to\infty}\delta^{*}_{t+n}B_{t+n}=0$ while n goes to infinity. This condition holds if δ^{*}_{t} follows a stochastic process bounded below by $1+\delta^{*}$ ($\delta^{*}>0$) for the expected values and the debt-to-GDP ratio is a stationary process.

Using historical data, many empirical papers[6] appraise solvency condition and mean-reverting properties based on the data generating process (DGP) for discounted debt ratio by unit root test techniques. Therefore, the solvency condition was evaluated by Augmented Dickey-Fuller (1979) test (ADF). Findings were confirmed by Philips-Perron test (PP). This considers testing the null hypothesis ($H_0:\pi=0$) against the alternative ($H_0:\pi\neq0$), while mean-reverting requires ($\pi<0$). T). The rejection of the null hypothesis (when $\pi\neq0$) suggests no unit root is present. This indicates dynamic stable behaviour on the b_t, while no Ponzi condition is satisfied. The IBC then suggests that the government revenue and expenditure can continue their past stochastic process without losing market confidence. If the null hypothesis is not rejected, the present value of budget constraint is continually violated and the current policy is then not sustainable and has to be changed.

An alternative approach estimates empirically a FP reaction function (henceforth FPRF) to test for the transversality condition and assess whether the pursued FP avoids excessive debt accumulation[7]. Accordingly, FPRF assumes that in the future the government intends to collect enough revenues as to offset the present-value of collection costs over time. On the other hand, if fiscal authorities react systematically to indebtedness, by raising the current or future budget surplus as to ensure the sustainability of debt ratio over time, then the transversality condition is satisfied, the behaviour of debt to GDP ratio over time is mean-reverting and pursued FP avoids excessive debt accumulation [Uctum, (2006)]. Such assumptions represent a form of error correction mechanism [Bohn, (2005)]. So, the rationale behind this is rooted in the

[6] See also Trehan and Walsh (1991), Sarno (2001), Taylor (2002), Chartareas (2003) and Uctum (2006).

[7] See also Afonso (2005) Uctum (2006), Turrin (2008), Lewis (2010), Afonso and Jalles (2011) and Escalano (2012).

government fiscal behaviour based on IBC, while monetary policy (MP) is free to adjust its instruments such as money supply or the nominal interest rates [Walsh (2003)].

Bohn (1998) considers also that the budget balance, D, is a function of the degree of indebtedness, B, and a set of control variables, Z, of budget balance representing the Barro's (1979) variables, such as output gap and temporary government expenses. Using a similar framework, we build and estimate a Vector Autoregression (VAR) model, as follows:

$$X_t = \beta_0 \sum_{i=1}^{p} \beta_i X_{t-1} + \sum_{i=0}^{q} \beta_i Z_t + \varepsilon_t \quad (4)$$

where, X_t and Z_t is a vector given by,

$$X_t = [s_t, b_t] \text{ and } Z_t = [\tilde{y}_t, p_t, i_t]$$

where, s_t is a measure of fiscal stance, expressed as the primary fiscal surplus (expressed as a percentage of GDP) and reflects the correction of an overshot target in the year following its identification, b_t represents the stock of public debt-to-GDP ratio, $\tilde{y}_t$ represents the output gap; p_t represents annual inflation rate; i_t *is a measure of debt cost servicing;* β_0 is a vector of constant terms; β_i are the matrixes of the coefficients measuring lagged effect of variables on each other; $\varepsilon_t = [\varepsilon_{st}, \varepsilon_{bt}]$ is the vector of error terms and $\varepsilon_t \sim iid(0, \sigma^2)$.

The estimation of FPRF, through means of VAR techniques, is based on the assumption that IBC reflects primary budget surplus and the advantage is twofold. On the one hand, using the primary surplus is a reasonable choice, given that the primary expenditures are more easily controlled by the government. On the other hand, this allows analysing the effects of automatic stabilisers and discretionary policy actions. An assessment, on the other hand, through budget surplus is important and allows the identification of the effect of debt service over the business cycle. Besides, following other empirical studies[8], we opted for the unadjusted primary deficit for three reasons. First, this allows us avoiding the numerous shortfalls in the methodology of estimating

[8] See also Girouard and André (2005), Koen and van den Noord (2005), Tagkalakis (2010) and Stoica and Leonte (2011).

the cyclically adjusted variables relating to trend/potential output. Second, cyclically-adjusted primary surplus may also be affected by temporary factors, not directly linked to the cycle, including one-off operations, creative accounting and classification errors. Finally, with the exception of unemployment-related expenses that generally hold a small share in total public expenses, the dynamic of public expenses generally reflects discretionary decisions and is, hence, not correlated with the business cycle.

To meet the solvency condition, variables on primary surplus and debt burden are expressed as a ratio of nominal GDP. The variable on primary surplus also represents the moving annualised sum, given the high seasonality especially in the last quarter of each year in fiscal behaviour. The output gap, $\tilde{y}_t$, entered the model as a RHS control variable to allow for the possibility that government pursues short-run demand stabilisation [Bohn, (1998)]. It also allows considering the impact of the business cycle on the budget deficit, depending on the size of automatic stabilisers [de Mello, 2005)]. Inflation rate, p_t, accounts for shocks to seigniorage revenues [Gali and Perroti (2003)] and also symbolizes a policy coordination issue between monetary and fiscal authorities [Khalid (2007)]. Thus, we have also entered the annual inflation rate into the specified model. Further, Laubach (2009) assumes that in recession, monetary authority cuts short-term interest rates, long-term interest falls, while automatic stabilizers drive up the deficit. Hence, a negative correlation exists between interest rate and deficits (or debt), even though this is inconclusive about the partial effect of raising cost on discretionary spending or tax decision. Under the IMF programme and macroeconomic programme, Albania's Government has been under pressure to respect a certain level of budget deficit. For this reason, we included also the variable on cost of debt servicing to capture the partial effect of raising cost on primary surplus.

In the VAR model, we consider that government adjust the s_t in response to changes in b_t so as to ensure the sustainability of the debt level over time, whilst the set of control variable, Z_t, affect s_t or the b_t on a later stage and are out of the government control or decision-making process. Under such assumptions and the Granger and Causality test, the set of control variables enters into

the model as exogenous variable. Equation 4 would take the matrix form (system equations), as follows:

$$s_t=\beta_{1,0}+\beta_{1,1}^{p}s_{t-p}+\beta_{1,2}^{p}b_{t-p}+\beta_{1,3}\tilde{y}_{t-1}+\beta_{1,4}p_{t-1}+\beta_{1,5}i_{t-1}+\varepsilon_{1,t} \quad (5.1)$$

and

$$b_t=\beta_{2,0}+\beta_{2,1}^{p}s_{t-p}+\beta_{2,2}^{p}b_{t-p}+\beta_{2,3}\tilde{y}_{t-1}+\beta_{2,4}p_{t-1}+\beta_{2,5}i_{t-1}+\varepsilon_{2,t} \quad (5.2)$$

where, all variables are explained as above[9]. The study also measures the FPRF through impulse responses of the relevant economic variables based on VAR approach. First, FPRF allows to distinguish among Ricardian regime by testing the mean-reverting properties of the public debt and to localise the effects of other factors that normally have an impact on fiscal behaviour. Second, the lagged variable in the VAR approach allows us to distinguish for inertia in government behaviour and recognise the lack of government's ability to implement appropriate measures to bring a significant policy change in a single period, as explained in De Mello, (2005) and Burger, (2011). Third, the coefficient and the impulse response estimation through VAR approach allow evaluating the Albanian FP behaviour at current state and through time.

The literature on the fiscal reaction function approach does not place any restrictions on the sign of the estimated coefficients. But, under such estimation approach (eq. 5.1), $\beta_{1,1}^{p}$ and $\beta_{1,2}^{p}$ are the two key parameters to judge for fiscal solvency. The former ($\beta_{1,1}^{p}>0$) is a sign of the tendency that the government tries to increase the primary surplus, in order to react to the existing stock of public debt and comply with the government budget constraint, while solvency requires that raising indebtedness is associated with an increase in the primary surplus, ($\beta_{2,1}^{p}>0$)[10]. Hence, in such a regime, making the primary surplus a function of government debt allows testing, in other words, whether primary budget balances react to government debt to ensure fiscal solvency and vice versa. However, Alfonso

[9] In equation 5.1, (s_t) is a function of government debt (b_t) and allow testing for the solvency condition based on the Ricardian fiscal regime, while it represents a FPRF along the lines of Bohn (1998). According to Afonso and Jalles (2011), equation 5.2 embodies a standard budget deficit and debt dynamics formulation.

[10] See also [Bohn (1998), Afonso and Hauptmeier (2009), Lewis (2009) and Afonso and Jalles (2011)]

(2005) suggests that the solvency condition requires that the size of the coefficient should be closer to one and statistically significant. Further, according to Uctum (2006), if both unit-root tests and the FPRF approaches[11] are conducted simultaneously, fiscal solvency can be appraised from a different perspective. The former approach describes sustainability based on the data-generating process characterizing the debt variable. The later reflects the role of the government in shaping the fiscal policy and whether it reacts to debt position. Analysing through both approaches provides four possible ways, as follows:

(i) Test results are consistent and fiscal policy is sustainable if (H_0: $\pi \neq 0$) rejected and ($\beta^{p}_{1,2} > 0$);
(ii) Test results are consistent and fiscal policy is not sustainable if (H_0: $\pi \neq 0$) not rejected and ($\beta^{p}_{1,2} < 0$);
(iii) Primary surplus generated by the government has not been sufficient to revert the unsustainable path of fiscal policy and further efforts are required if (H_0: $\pi \neq 0$) not rejected and ($\beta^{p}_{1,2} < 0$);
(iv) Fiscal policy is sustainable, but the profligacy of government may put it at risk if (H_0: $\pi \neq 0$) rejected and ($\beta^{p}_{1,2} < 0$);

Moreover $\beta_{1,3} < 0$, is evidence of a pro-cyclical policy ($\beta_{1,3} > 0$, a countercyclical), which means that primary surplus falls when actual output gap rises relatively to potential output, reducing the sustainability of the public finances [Turrini (2008) and Dobrescu and Salman (2011)]. For developing and transition economies, pro-cyclicality is not surprising and is mostly dictated by borrowing constraint and financial institutions development [Gavin et al (1996)]. We, therefore, expect Albania FP to be pro-cyclical, given that rising Albanian indebtedness was associated with raising raising interest payments and borrowing constraints[12] as financial markets and institutions became more conservative during the global financial and economic crisis and the public finance crisis

[11] The former approach evaluates solvency on unit root analysis for bt, while the latter checks out whether the government reacts to raising debt by generating future primary surplus in order to ensure fiscal solvency.

[12] Standart and Poors (S&P) evaluated the long-term external debt with (B+) and the domestic debt with (B). Countries with such an assessment are considered as economies with a rapid financial volatility. A negative and unstable assessment on country risk is not welcomed by the markets and is expected to generate higher rates of public debt service, and consequently negative effects arising from it.

in Greece. According to Khalid (2007), the parameter magnitude ($\beta_{1,4}>0$) assumes that there is a coordination problem between fiscal and monetary policies and inflationary pressures are not taken into account, and vice versa. Finally, according to Laubach (2009), ($\beta_{1,5}<0$) assumes that rising debt cost servicing lowers the primary surplus and vice versa.

B. DATA

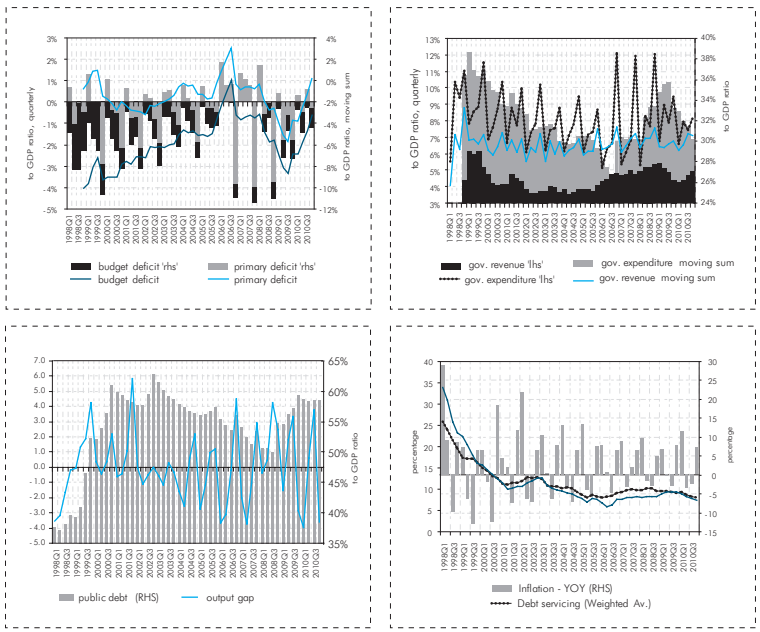
The study focuses on testing the solvency condition and the relevance of the existence of a Ricardian fiscal regime is based on unit root test on debt-to-GDP ratio and the FPRF approach as specified in equations 5.1 and 5.2. The empirical model evaluates the FP stance through FPRF approach using policy inertia instruments (primary surplus), debt burden, economic fluctuations, inflation rate and the variable reflecting interest payments on debt stance. The study considers quarterly data from 1998 Q1 to 2010 Q4 and is based on eq. (4).

Primary surplus is the sum of revenues excluding primary expenditure (expenditure minus interest payments) and together with stock of government debt (domestic + foreign borrowing) are expressed to nominal GDP ratio (the annualised sum of 4 quarters nominal GDP). Real public debt (B_{real}) symbolizes the real public debt deflated by Consumer Price Index (CPI). The ratio of real public debt (b_t^{real}) is expressed as the ratio of real public debt (defleated by CPI) to nominal GDP. It is also generated as the ratio of nominal public debt to real GDP ($b_t^{y\_real}$). The time series on public debt and primary surplus are taken from the Ministry of Finance. The data on the output gap, ($\tilde{y}$), are taken from the Research Department of the Bank of Albania and represents a deviation of nominal GDP from potential GDP estimated by the Production Function Cobb-Douglas approach [Kota, (2007)]. The data on Consumer Price Index (CPI) are taken from the Albanian Institute of Statistics (INSTAT). Data on inflation rate (p) represent the annualized inflation rate generated as [dlog(CPI)x400]. Data on interest payments, (i) are expressed as the weighted value of nominal rate of treasury bonds (weighted value) and foreign borrowing based on 10-year European bonds rate and the flows of domestic and foreign debt borrowing. The

data on the interest rate of domestic borrowing are taken from the Bank of Albania and those for external borrowing are taken from the European Central Bank.

The appropriate lag length in the autoregressive unit root test process (Appendix A) is based on Schwarz Info Criterion (SIC). After conducting Augmented Dickey Fuller (ADF), Philips Perron (PP) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS)[13] unit-root tests, we find conclusive evidence on the stationarity of the variables. Thus, we have estimated a VAR model in level. The appropriate one lag length on VAR model was based on SIC criteria, stability condition and LM test for serial correlation. The model fulfils condition on stability, autocorrelation, normality and heteroskedasticity tests.

Chart 1 Budget and primary deficit and explainatory variables



Source: Bank of Albania, Ministry of Finance and European Central Bank

[13] Result on KPSS test can be provided on request.

3. EMPIRICAL RESULTS

A. UNIT-ROOT TESTS

The data analysis (Chart 1) suggests that the dynamic developments in nominal and real public debt are characterised by an upward trend during the period in review, while the ratio to GDP does not present a clear deterministic trend. Based on this, the empirical analysis on *b*, b^{real}, b^{y_real} will include a constant, and a constant and a trend on $B_{nominal}$ and B_{real} model. The tests on unit root are based on equation (4). Findings in Table 2 show that the null hypothesis is rejected for b and accepted for b^{y_real} and b^{real}. According to Trehan and Walsh (1991) and Taylor (2002) the debt-to-GDP ratio is stable (stationary) in nominal terms, but unstable (non-stationary) in real terms. This is also confirmed by the other unit-root test employed, whereas ADF test conclusions on the dynamic analysis of $B_{nominal}$ and B_{real} are rejected by PP test. In general, under this approach, results on *b* indicate that past high levels are offset by positive balances in the future, such as to allow the public debt to GDP to be mean-reverting. The no Ponzi condition and the Ricardian equivalence are satisfied asymmetrically. But in real terms, findings represent a different state of fiscal stance. Based on the estimated results, in real terms, debt ratios are unstable and therefore IBC condition is not fulfilled. However, this means that the final conclusions on long-run mean-reverting behaviour of fiscal stance are dictated by the methodology and criteria employed, while real economic growth is vital and may play an important deterministic role. According to Tanku *et al* (2007), this means that, in the decision-making process, attention should be paid to economic policies coordination (monetary and fiscal) in order to maintain and accommodate the medium and long-term real economic growth.

B. FISCAL POLICY REACTION FUNCTION

Following the previous section, this part checks whether governments respond to debt accumulation by generating primary

surplus in the manner suggested in equations (5.1) and (5.2), and where the feedback coefficients capture these effects. The unit root test results, reported in Table 2 in the Appendix, reveal that the null unit root hypothesis is rejected at the conventional significance statistical level for all or most of the cases. Based on conclusive evidence, we can support the stationarity of primary surplus, inflation rate, output gap and interest payments on debt servicing. Thus, we have estimated a VAR model in level (debt to GDP ratio entered the model in level)[14]. The appropriate one lag length on VAR model was based on SIC criteria, stability condition and LM test for serial correlation. The model fulfils condition on stability, autocorrelation, normality and heteroskedasticity tests.

Empirical results, (Table 1), all together with impulse response function (in Appendix) have brought up some vital information for the decision-making process. Results show that primary surplus is linked positively to previous balances. The coefficient on s_{t-1}($\beta^1_{1,1}$=.5288) is statistically significant at conventional level. Accordingly, this reveals that the Albanian fiscal policy-makers do analyse the evolution of the previous surplus indicator within the decision-making process. The magnitudes of primary surplus parameter exhibit substantial inertia in Albanian fiscal behaviour, given that the most significant influence is caused by previous development on the primary surplus itself. According to the impulse response generated by the VAR in level, primary surplus grows by .08pp on impact of 1pp shock on itself, to reach .05pp after one quarter, to stabilise at about .02pp after 6 quarters. But, this effect becomes insignificant after three quarters. The accumulated response is .01pp after 1 quarter and peaks .02pp after six quarters. This suggests that by the sixth quarter, primary surplus is .02pp higher than before the positive shock in the variable itself, but this effect diminishes over time.

The coefficient on public debt with one lag ($\beta^1_{1,2}$=-.10) has a negative sign and is statistically significant at conventional level. This implies that primary surplus will diminish in the following period in response to increases in the debt ratio. This entails

[14] We did also estimate a VAR all in level (also debt-to-GDP ratio entered in the first difference) and found relatively the same results.

that fiscal authorities react systematically to the increasing debt ratio, by generating future surpluses, but not enough to fulfil the solvency condition and be coherent with the IBC and Ricardian fiscal regime. Accordingly, however, the size of the coefficient emphasizes that such behaviour is not sufficiently incoherent to IBC. Consequently, government fiscal behaviour can be considered to be on the bounds of non-Ricardian equivalence. Results by impulse response reveal that primary surplus rises by .02pp on impact of 1pp positive shock on debt ratio only after two quarters, to reach about .03% after four quarters. This effect becomes insignificant after 8 quarters. The accumulated response is increasing throughout the sample. Impulse response suggests that debt ratio would decrease by raising primary surplus, but this effect is statistically insignificant. Besides, debt ratio would further increase to raising indebtedness, which is statistically insignificant. According to Uctum (2006), conducted simultaneously results on unit-root tests and FPRF approaches imply that FP is sustainable, but the profligacy of fiscal authorities put it at risk, considering that the pursued fiscal policies do not avoid excessive debt accumulation. This indicates that appropriate stabilisation policies are needed so as to bring deficit and debt back to a lower and more sustainable level, considering also the results by Shijaku and Gjokuta (2012).

With regard to other determining factors, results demonstrate that the coefficient of output gap (β_3=-.1596) has the expected negative sign and is statistically significant at conventional level. This means that primary surplus falls by round .1596pp in response to 1pp increase in the output gap. This also implies that, during the sample period, the reaction of fiscal policy is considered to be pro-cyclical, thus putting more risk relating to the position of fiscal stance. But, compared with studies for other countries[15], this magnitude is relatively low. This can be due to weaker transmission mechanism in the economy in the case of Albania. Moreover, based on the coefficient sign, there seems to be no policy coordination problem between fiscal and monetary authorities in terms of exchanging information on long-term fiscal and monetary strategies.[16] Still the estimation coefficient is statistically insignificant,

[15] See: Alfonso, A., (2005), De Mello (2005), Lozano (2010)) and Burger, et. al. (2011).

[16] See: Bank of Albania's Monetary Policy Document, Ministry of Finance's Economic and Fiscal Programme and Luci et. al., (2006).

and so we cannot draw a firm conclusion. Further, the coefficient on debt cost suggests that an increase in cost of debt servicing lowers the primary surplus, but this effect is statistically insignificant.

Table 1 Fiscal policy reaction function based on VAR assumptions

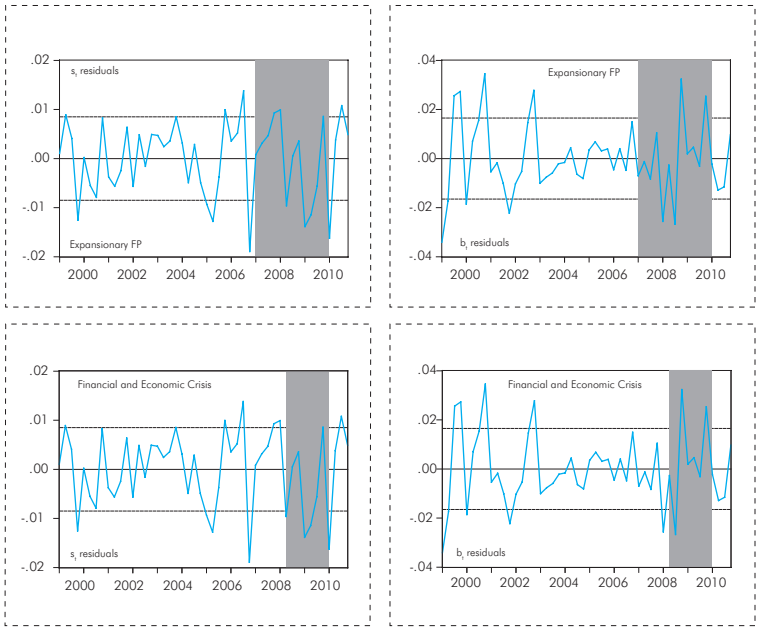
Sample (adjusted): 1999Q1 2010Q4 Included observations: 48 after adjustments t-statistics in [ ]		
	s_t	b_t
s_{t-1}	0.5288	-0.0842
	[5.4]	[-0.4]
b_{t-1}	-0.10	0.9038
	[-2.9]	[12.0]
Exogenous Variables		
c	0.068029	0.037188
	[2.1]	[0.5]
i_t	-0.1781	0.1863
	[-1.3]	[0.6]
$\widetilde{y}_t$	-0.1596	0.2826
	[-3.2]	[2.6]
p_t	-2.68E-03	-1.55E-03
	[-0.2]	[-0.04]
@TREND	8.98E-05	-9.15E-05
	[0.5]	[-0.2]
R-squared	0.827014	0.890076
Adj. R-squared	0.796741	0.870839
Sum sq. resids	0.002257	0.011088
F-statistic	27.31886	46.26954
Akaike AIC	-6.793804	-5.201846
Schwarz SC	-6.481937	-4.889979

Source: Authors' calculations

Finally, Lazano (2010) assumes that any exogenous fiscal decision, which cannot be associated with the debt level, the state of the economy (output gap) or inflation, is captured by the error term ε_t. Consequently, the error behaviour allows analysing the volatility in the discretionary fiscal policy and therefore getting a perception of the effects of pursued FP, from a macroeconomic volatility perspective. Chart 8 shows error volatility for Albania

since 1998, drawn from the VAR estimation (eq. 6). Fiscal volatility, thus, measured by the standard deviation on the error term is small, considering the value (SSR=.002257) on the primary surplus and (SSR=.011088) on the debt estimated model. This reveals that discretionary fiscal policy has been stable over the sample time, but evidences illustrate that volatility has been higher since 2007 and FP is more unstable when public debt is close to or above the 60 per cent of GDP ratio. On one hand, this is mainly due to the stabilisation and gradual improvement in the macroeconomic and fiscal indicators associated with high economic growth rate. On the other hand, raising volatility reflects the expansionary fiscal policy during 2007 to 2009 and the impact of financial and economic crisis on the economic growth rates.

Chart 2 Volatility of fiscal policy based on VAR Standartised Residual



Source: Author's calculations.

4. CONCLUSION

This discussion paper focuses on evaluating the long-run mean-reverting properties of debt-to-GDP ratio by unit root approach and the government reaction function to understand whether government pursued appropriate policies to avoid excessive debt accumulation. These methods, beyond concluding on a deterministic empirical level, allow analysing the stochastic behaviour of fiscal policy over time. This will serve to recognize the past, analyse it and draw conclusions, serving as a threshold to project the future and change it, if necessary.

Findings demonstrate that the debt to GDP is mean-reverting over time, while there seems to be no evidence when this indicator is measured in real terms. This is also confirmed by PP test approach. Under the FPRF assumption, results demonstrate that primary surplus is positively linked to its previous development and negatively to raising debt ratio. Accordingly, this reveals that Albanian fiscal policy-makers do analyse the evolution of the previous surplus indicator within the decision-making process. Fiscal authorities react systematically to the increasing debt ratio, by generating future surpluses, but not enough to be coherent with the IBC and Ricardian fiscal regime. However, considering Alfonso (2005) the size of the coefficient emphasizes that such behaviour is not sufficiently incoherent to IBC. Consequently, government fiscal behaviour can be considered to be on the bounds of non-Ricardian equivalence. According to Uctum (2006), conducted simultaneously results on unit root tests and FPRF approaches imply that FP is sustainable, but the profligacy of fiscal authorities put it at risk, considering that the pursued fiscal policies do not avoid excessive debt accumulation.

With regard to other determining factors, results demonstrate that during the sample period fiscal authorities' reaction is pro-cyclical, thus putting more risk relating to the position of fiscal stance. However, compared with other studies, this magnitude is relatively low. There seems to be no policy coordination problem between fiscal and monetary authorities, considering the exchange of information on long-term fiscal and monetary strategies. Still

the estimation is insignificant, and so we cannot draw a firm conclusion. Moreover, raising cost of debt servicing will lower the primary surplus, but this effect is statistically insignificant. Results suggest that discretionary fiscal policy has been stable over the sample time, but evidence illustrates that the volatility has been higher since 2007 and FP is more unstable when public debt is close to or above the 60 per cent of GDP ratio. On one hand, this is mainly due to the stabilisation and gradual improvement in the macroeconomic and fiscal indicators associated with high economic growth rate. On the other hand, raising volatility reflects the expansionary fiscal policy during 2007 to 2009 and the impact of financial and economic crisis on the economic growth rates.

However, the model takes an empirical approach based on developments in the past, while the sustainability of fiscal policy depends on macroeconomic conditions, especially in the future. On the other hand, unit-root approach fails to capture any possible structural breaks and nonlinear behaviour in the time series [Uctum et al (2006)], while the mean-reverting assumption does not provide a deterministic level when debt ratio revert towards high or lower levels. Thus, future research will consider nonlinear unit-root test or Smooth Transition Autoregressive model (STAR) and Threshold Autoregressive models (TAR) to capture the reverting level of debt ratio. Moreover, despite progress in macroeconomic indicators over time, the slowdown in economic growth during financial and economic crisis, the need for reforms of the pension fund, financing the strategic sectors like infrastructure, water supply, health, education and structural reforms, the importance of fiscal discipline and European perspective in the long term will keep alive the debate on fiscal sustainability over a long time. Further, future research will also consider a structural VAR approach, notably with variables entering the model as endogenous.

REFERENCES

Alfonso, A., (2005), "Ricardian Fiscal Regimes in the European Union", ECB, Working Paper Series No. 558/November 2005;

Alfonso, A., and Jalles, J. T., (2011), "Appraising fiscal reaction functions", Technical University of Lisbon, Working Paper 23;

Barro, R., (1979), "On the determination of public debt", Journal of Political Economy, Vol. 87, No. 5, pp: 940-971;

Bohn, H., (1998), "The behaviour of US public debt and deficits", The Quarterly Journal of Economics, Vol. 113 (3), pp: 949-63;

Bohn, H., (2005), "The sustainability of fiscal policy in the United States", CESifo Working Paper;

Burger, Ph., Stuart, I., Jooste,Ch. and Cuevas, A., (2011), "Fiscal sustainability and the fiscal reaction function for South Africa", IMF Working Paper, WP/11/69;

Cuddington, J. T., (1996), "Analyzing the sustainability of fiscal deficits in developing countries", Georgetown University, Working Paper 97/01;

De Mello, L., (2005), "Estimating a fiscal reaction function: the case of debt sustainability in Brazil", OECD Economics Department, Working Paper No. 43;

Dobrescu, G., and Salman, L., (2011), "Fiscal Policy during Absorption Cycles", IMF Working Paper, WP/11/4;

Escolano, J., Eyraud, L., Badia, M. M., Sarnes, J. and Tuladhar, A., (2012), "Fiscal Performance, Institutional Design and Decentralization in European Union Countries", IMF Working Paper, WP/12/45;

Gali, J., and Perotti, R., (2003), "Fiscal policy and monetary integration in Europe", Economic Policy, 18 (37), pp. 533-572;

Gavin, M., Hausmann, R., Perotti, R., and Talvi, E., (1996), "Managing Fiscal Policy in Latin America and the Caribbean: Volatility, Procyclicality, and Limited Creditworthiness", Working Paper no. 326, Inter-American Development Bank (1994);

International Monetary Fund, (2003), "World Economic Oulook", September 2003, Washington, D.C.;

Hakkio, C., and Rush, M., (1991), "Is the deficit too large?", Economic Inquiry, Vol. 29, pp: 429–45;

Hamilton, D. J., and Flavin, M. A., (1986), "On the limitations of government borrowing: a framework for empirical testing", The American Economic Review, Vol. 76, No. 4, pp: 808-819;

Jonas, J., (2010), "Fiscal objectives in the post IMF programme world: the case of Albania", IMF Working Paper, WP/10/77;

Khalid, M., Malik, W. Sh. and Sattar, W. A., (2007), "The fiscal reaction function and the transmission mechanism for Pakistan", The Pakistan Development Review, Vol. 46: Part II (Winter 2007), pp. 435-447;

Kota, V., (2007), "Alternative methods of estimating potential output in Albania", Research Department, Bank of Albania;

Laubach, Th., (2009), "New evidence on the interest rate effects of budget deficits and debt", European Economic Association, Vol. 7, No. 4, pp: 858-885;

Lewis, J., (2010), "Fiscal Policymaking in Central and Eastern Europe: What Does 12 Years of Real Time Data Tell Us", Economics and Research Division , De Nederlandsche Bank;

Lozano, I., and Toro, J., (2007), "Fiscal policy throughout the business cycle: the Colombian experience", Ensayos Sobre Politica Economica, Edicion Dicimbre 2007, pp. 12-39;

Lozano, I., (2010), "Fiscal policy in Colombia and a prospective analysis after the 2008 financial crisis", Fiscal Workshop, Perugia, Italy, March 25-27 2010;

Luci, E., Gjermeni, M., and Gazidede, A., (2006), "Coordination between the central bank and the ministry of finance under the Inflation Targeting", Working Paper, Open Forum 2nd December 2006, Bank of Albania, pp: 302;

Ministry of Finance, (2011), "Economic and fiscal programme 2011-2013, Albania", February (2011);

Ministry of Finance, (2010), "Economic and fiscal programme 2010-2012, Albania", January (2010);

Shijaku, G., and Gjokuta, A., (2012), "Fiscal Policy and economy growth: The case of Albania", Bank of Albania, presented at the 5th SEE Economic Research Workshop, [unpublished];

Tanku, A., Ruçaj, E., and Frasheri, A., (2007), "Albanian current account deficit: does it possess mean reverting properties?", Research Department and Statistics Department, Bank of Albania;

Taylor, M. A., (2002), "A century of current account dynamics", NBER Working Paper Series, Working Paper 8927;

Trehan, B., and Walsh, C., (1991), "Testing intertemporal budget constraints: theory and applications to U.S. federal budget and current account deficits", Journal of Money Credit and Banking, Vol. 23, pp: 210-223;

Turrini, A., (2008), "Fiscal policy and the cycle in the euro area: the role of government revenue and expenditure", Economic and Financial Affairs, Directorate-General;

Uctum, M., Thurston, Th. and Uctum, R., (2006), "Public debt, the unit-root hypothesis and structural breaks: a multi-country analysis", Economica, No. 73, pp: 129-156;

Walsh, C. E., (2003), "Monetary theory and policy", 2nd edition, Massachusetts: the MITT Press.

APPENDIX

Table 2 Unit-Root Tests

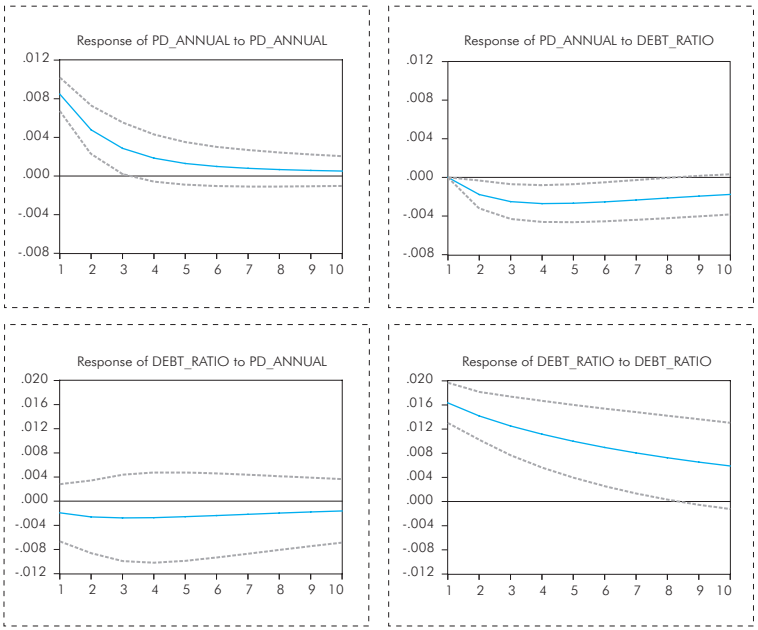
Variables	ADF test				Phillips-Perron test			
	Null Hypothesis: Unit Root				Null Hypothesis: Unit Root			
	Level		First Difference		Level		First Difference	
	[Prob.]	Lag[a]	[Prob.]	Lag[a]	[Prob.]	Bandëidth[b]	[Prob.]	Bandwidth[b]
Intercept								
b	[.0001]	4	[.1279]	4	[.0931]	1	[.0000]	3
$B_{nominal}$	[.9736]	6	[.0332]	5	[.9645]	2	[.0000]	2
B_{real}	[.4840]	5	[.0439]	4	[.6052]	4	[.0000]	5
b_t^{real}	[.6096]	5	[.0279]	4	[.4387]	2	[.0000]	6
$b_t^{y\_real}$	[.1099]	4	[.3124]	3	[.3708]	8	[.0000]	6
s	[.2864]	0	[.0000]	0	[.1786]	2	[.0000]	1
$\widetilde{y}$	[.0123]	4	[.0000]	2	[.0000]	17	[.0000]	13
p	[.0077]	5	[.0000]	3	[.0000]	13	[.0001]	11
i	[.0062]	1	[.0012]	0	[.0009]	2	[.0018]	2
Intercept and Trend								
b	[.0014]	4	[.0001]	0	[.5003]	2	[.0001]	5
$B_{nominal}$	[.0388]	4	[.3299]	4	[.8974]	0	[.0000]	2
B_{real}	[.0859]	5	[.1250]	4	[.5654]	3	[.0000]	6
b_t^{real}	[.0058]	5	[.0575]	4	[.4336]	3	[.0002]	9
$b_t^{y\_real}$	[.0360]	4	[.5552]	3	[.5611]	6	[.0000]	7
s	[.6461]	0	[.0002]	0	[.4787]	2	[.0002]	1
$\widetilde{y}$	[.0399]	4	[.0000]	2	[.0000]	20	[.0000]	13
p	[.0448]	5	[.0000]	3	[.0000]	12	[.0001]	11
i	[.0089]	1	[.0029]	0	[.0179]	2	[.0034]	2
None								
b	[.7319]	4	[.0157]	4	[.9145]	2	[.0000]	3
$B_{nominal}$	[.9932]	6	[.3201]	3	[1.0000]	1	[.0000]	0
B_{real}	[.9629]	5	[.0340]	4	[.9997]	0	[.0000]	1
b_t^{real}	[.5648]	5	[.0017]	4	[.7004]	2	[.0000]	6
$b_t^{y\_real}$	[.8688]	4	[.1087]	3	[.9902]	4	[.0000]	2
s	[.1118]	0	[.0000]	0	[.0763]	2	[.0000]	1
$\widetilde{y}$	[.0008]	4	[.0000]	2	[.0000]	16	[.0000]	13
p	[.4179]	7	[.0000]	3	[.0000]	46	[.0000]	11
i	[.0001]	0	[.0034]	2	[.0023]	3	[.0002]	2

[a] Automatic lag selection based on SC criteria

[b] New-West Bandwidth selection through using the Bartlett Kernel

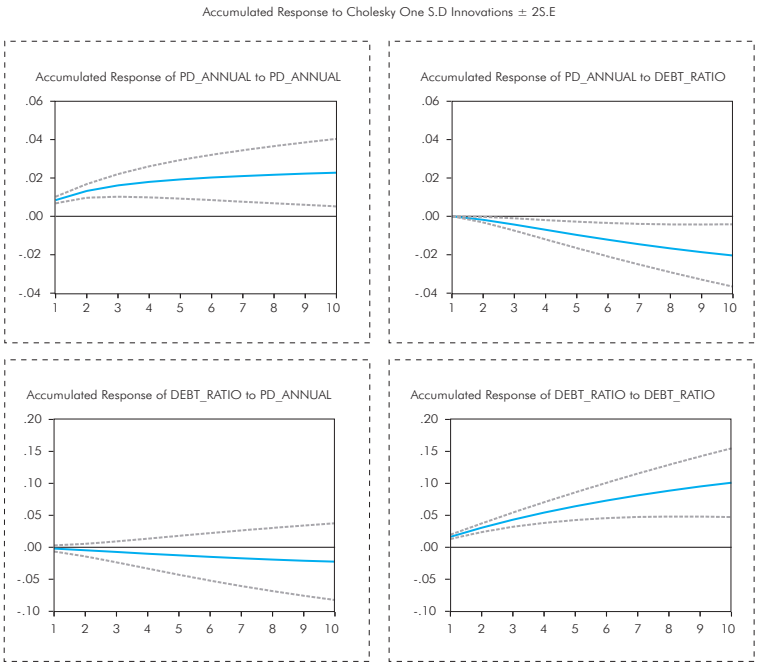
Chart 3 Impulse Response of a 1% primary surplus and public debt shock in levels VAR (1)

Response to Cholesky One S.D Innovations ± 2S.E



Source: Author's calculations.

Chart 4 Cumulative Impulse Response of a 1% primary surplus and public debt shock in levels VAR (1)



Source: Author's calculation

Table 3 VAR Residual Serial Correlation LM Tests

Null Hypothesis: no serial correlation at lag order h		
Sample: 1997 Q4 2010 Q4		
Included observations: 48		
Lags	LM-Stat	Prob.
1	2.935339	0.5687
2	2.588490	0.6289
3	8.689315	0.0694
4	6.842975	0.1444
5	8.213043	0.0841
6	0.796874	0.9389
7	3.539097	0.4720
8	4.220205	0.3770
9	0.844718	0.9324
10	2.343287	0.6729
11	0.871584	0.9286
12	6.140582	0.1889
Probs from chi-square with 4 df.		

Table 4 AR Residual Normality Tests

Orthogonalization: Cholesky (Lutkepohl)				
Null Hypothesis: residuals are multivariate normal				
Sample: 1997 Q4 2010 Q4				
Included observations: 48				
Component	Skewness	Chi-sq	df	Prob.
1	-0.408387	1.334240	1	0.2481
2	0.383382	1.175851	1	0.2782
Joint		2.510092	2	0.2851
Component	Kurtosis	Chi-sq	df	Prob.
1	1.730928	3.221085	1	0.0727
2	2.316164	0.935264	1	0.3335
Joint		4.156350	2	0.1252
Component	Jarque-Bera	df	Prob.	
1	4.555326	2	0.1025	
2	2.111116	2	0.3480	
Joint	6.666441	4	0.1546	

CIP Katalogimi në botim BK Tiranë

Gerti Shijaku
Sustainability of fiscal policy:
The case of Albania- /
/ Shijaku Gerti - Tiranë:
Bank of Albania, 2012

-36 f; 15.3 x 23 cm.

Bibliogr.
ISBN: 978-99956-42-65-6.

You may find this paper in the following address:

www.bankofalbania.org

If you want to receive a hard copy of this paper, write to us at:

Bank of Albania
Sheshi "Avni Rustemi", Nr. 24, Tiranë, Shqipëri
Tel.: + 355 4 2419301/2/3; + 355 4 2419409/10/11
Fax: + 355 4 2419408

or send an e-mail to:

public@bankofalbania.org

Printed in 500 copies