

Macroeconomic Effects of Fiscal Policy in Morocco: An Approach to Structural VAR

Tlaytmaste Bahaddi¹ & Mohamed Karim¹

¹EREMEPP, University of Mohammed V, Rabat, Morocco

Correspondence: Mohamed Karim, University of Mohammed V, Rabat, Morocco.

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Abstract

This article evaluates the short-term macroeconomic effectiveness of a structural rise in public spending in Morocco through a Structural Vector Autoregressive Model (SVAR) inspired by the approach of Blanchard and Perotti (2002).

The response of the real economic activity following a structural rise of the public spending is small and significant only in the very short term. The evaluation of transmission channels reveals, moreover, a deterioration of the trade balance and a depreciation of the real effective exchange rate. Finally, the results of the estimation concluded that discretionary fiscal shocks have a Keynesian effect on the level of activity.

Keywords: fiscal policy, real economic activity, VAR structural

1. Introduction

Following the recent financial crisis, many Governments have adopted policies of fiscal stimulus, in order to fight the recession and strengthen the basis for more robust economic recovery in the long-term. These budgetary measures have led to a strong interest in the academic world and among policy makers.

In this regard, several questions arise: the discretionary measures in the field of fiscal policy are helpful or harmful for the economy? is it preferable to leave the automatic stabilizers simply to play their role?

Generally, we distinguish between two types of approaches. The interventionist approach which supposes that fiscal policies are able to maintain the equilibrium of economic activity and The second approach which assumes that interventionist measures are ineffective and may create harmful distortions in the economy.

The purpose of this study was to assess the effectiveness of the fiscal policy in Morocco through the identification of the transmissions channels of the fiscal shocks. It proposes to measure the quantitative impact of public spending on the economic activity in Morocco and The Structural VAR model will be mobilized for this purpose.

2. An Empirical Review of the Literature

The Structural VAR approach (SVAR) has reference to the pioneering work of Blanchard and Perotti (2002)¹ and this will be the object of our empirical study, it is considered as the most reliable methodology in the economic analysis of the fiscal policy effects.

Blanchard and Perotti (2002), through a SVAR, simulate a shock of public spending on the U.S. economy and find a positive reaction of the private consumption and on the U.S. GDP (the multiplier being 0.9 or 1.29 depending on the method of estimation). In contrast, a shock of tax revenue causes negatively private consumption and the GDP of the USA. They also argue that the private investment and imports do react negatively to the result of a shock on public spending.

Using the quarterly data ranging from 1961 to 2001, Perotti (2002) showed the effects of the fiscal policy in five countries of the OECD, in particular, the United States, Canada, Germany, Australia and the United Kingdom. It considers a SVAR model including five variables: public expenditure, tax revenues, GDP, interest rates, consumer price index. The results found do not confirm the effectiveness or the superiority of the tax multiplier by report to the fiscal multiplier of public expenditure.

Biau and Gérard (2004), using quarterly data over the period 1978T1-2003T4, showed that a structural shock of public spending in France impacts positively in the short term the overall demand (1.4 Euro) in France due to the positive

effects of the impact on consumption and private investment. However, economic activity reacts negatively to the result of a structural shock of tax revenues explained by the contraction of private consumption expenditures.

However, other works based on the structural VAR models showed that very low or even negative shocks of fiscal policy has effects on the fluctuations of economic activity.

Mihov and Fatas (2001) proceed to a comparison of the results of a VAR model estimated for the United States to the forecasts of a neo-classical model. It stems from their study that any increase of consumption expenditure of the State funded by a tax increase implies a reduction in the consumption of households due to the decrease in their income. By contrast, their VAR model attests that a shock on overall public spending encourages investment in the private sector and promotes the level of employment.

Afonso and Sousa (2009), from a structural VAR of Bayesian type, analyzed the empirical data of the United States, the United Kingdom, Germany and Italy, respectively for the periods 1970T3-2007T4, 1964T2-2007T4, 1980T3-2006T4 and 1986T2- 2004T4. The results of this Article may be summarized as follows: the shocks of the expenditures of the government have in general a small effect on the GDP but do not translate it into significant effects on private consumption, they affect the private investment and do not have a significant impact on the price level and the average cost of refinancing of the debt, they also have a positive impact but it is low on the monetary aggregates. On the other hand, the shocks of the public revenues have a positive effect (although shifted) on the GDP and private investment, as a result of budgetary consolidation; but they do not have an impact on the price level.

For Corsetti and al (2012), a shock on overall public expenditure causes an increase of the debt which induces over time a systematic reduction of the future expenditure of the government, this is explained by the fact that real interest rates fail to increase in response to higher public expenditure.

For Ilzetzki and other (2013), the size of budget multiplier depends on the characteristics of each country. In general, the impact of a shock on government expenditures is very low with pooled estimates close to zero.

3. Methodology

Our objective is to evaluate the effectiveness of the fiscal policy in Morocco from a structural VAR model with four variables, Two main variables to assess directly the effects of fiscal policy on the Activity - government expenditure expressed in real terms (GE) and the real GDP (GDP) - and two control variables - the current account balance to GDP (TB /GDP) and the real effective exchange rate (REER).

3.1 Specification of the Structural VAR Model

After studying the stationarity of the series, it is possible to write the structural form of the model as follow:

$$Y_t = A(L) Y_{t-1} + U_t \quad (1)$$

Where Y_t is our vector of endogenous variables composed of the log differences of the government expenditures (DLGE), the log difference of the real effective exchange rate (DLREER), the log difference of GDP (DLGDP); and the current account balance to GDP (TB/GDP). A is the square matrix of coefficients to estimate. (L) is the polynomial of delay retained in the VAR model². U_t represents the vector of canonical residues of the model and which consist of unexpected shocks on the endogenous variables.

The data of the macroeconomic variables used are extracted from the database IMF³, the statistics of the exchange office of Morocco and the Central Bank of Morocco. The data series are in quarterly frequency and seasonally adjusted. They cover the period from 1990:1 to 2013:4.

3.2 Identification of Restrictions

To be able to estimate the SVAR, we should introduce the short term restrictions which are related particularly to the phenomena of slow adjustment on certain fiscal variables.

Based on the identification method of Blanchard and Perotti (2002), we determine a transformation matrix P checking $U_t = P \cdot \varepsilon_t$. This matrix puts in linear relationships the canonical shocks to structural shocks contained in the vector ε_t .

It is assumed that the changes in the government spending require at least a quarter to respond to innovations in the other macroeconomic variables. The other assumptions of identification are incorporated in applying a decomposition of Cholesky; we follow Ilzetzki and other (2013) in ordering the current account balance and the real effective exchange rate before the GDP.

4. Results

We use the impulse functions of SVAR to analyze the effects of the fiscal shocks on the macroeconomic dynamics in Morocco and to explore the relevant factors that could explain their magnitude. The analysis focuses on the reaction of the economy to an exogenous shock in public spending.

The following figures show the results for a horizon of 20 quarters and successively, of a structural shock performed on public expenditure.

Response to Cholesky One S.D. Innovations \pm 2 S.E.

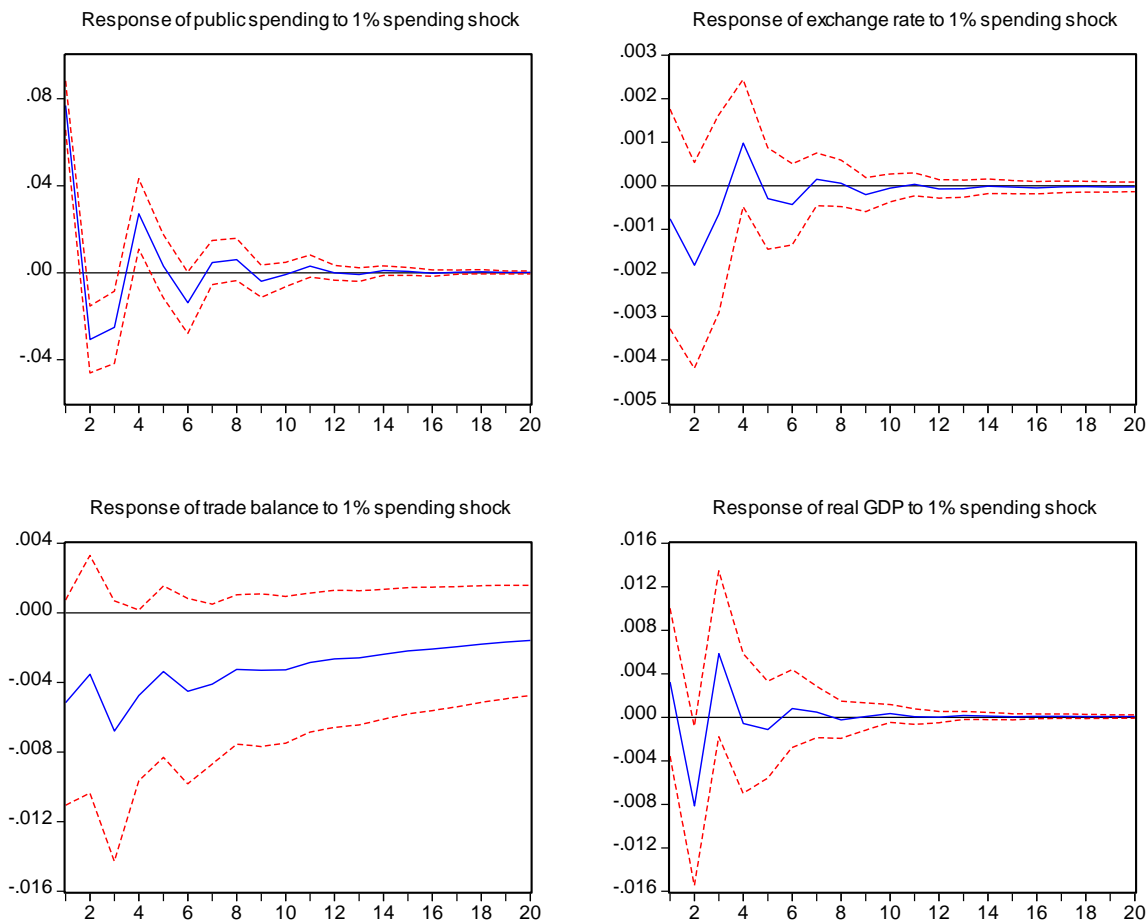


Figure1. Response of macroeconomic variables to a structural shock of public expenditure

The results suggest that a structural shock of public expenditure has a low impact on most of the macro-economic variables, particularly real GDP.

After 2 quarters, the level of activity increases reaching a peak equal to 0.005 per cent, the effect is for a short period because it disappears completely after 8 quarters.

However, the reaction of the current account balance is negative, In fact due to the 1% spending shock; the current account balance deteriorates by approximately 0.004 per cent.

The increase of public spending led to a depreciation of the real effective exchange rate during the first four quarters. Subsequently, the exchange rate increases but the effect remains volatile.

Given that the plans of fiscal stimulus can be implemented over time and the response of the economy is progressive, we analyze the cumulative response functions of the variables as a result of a positive variation of 1% of public expenditure

Accumulated Response to Cholesky One S.D. Innovations \pm 2 S.E.

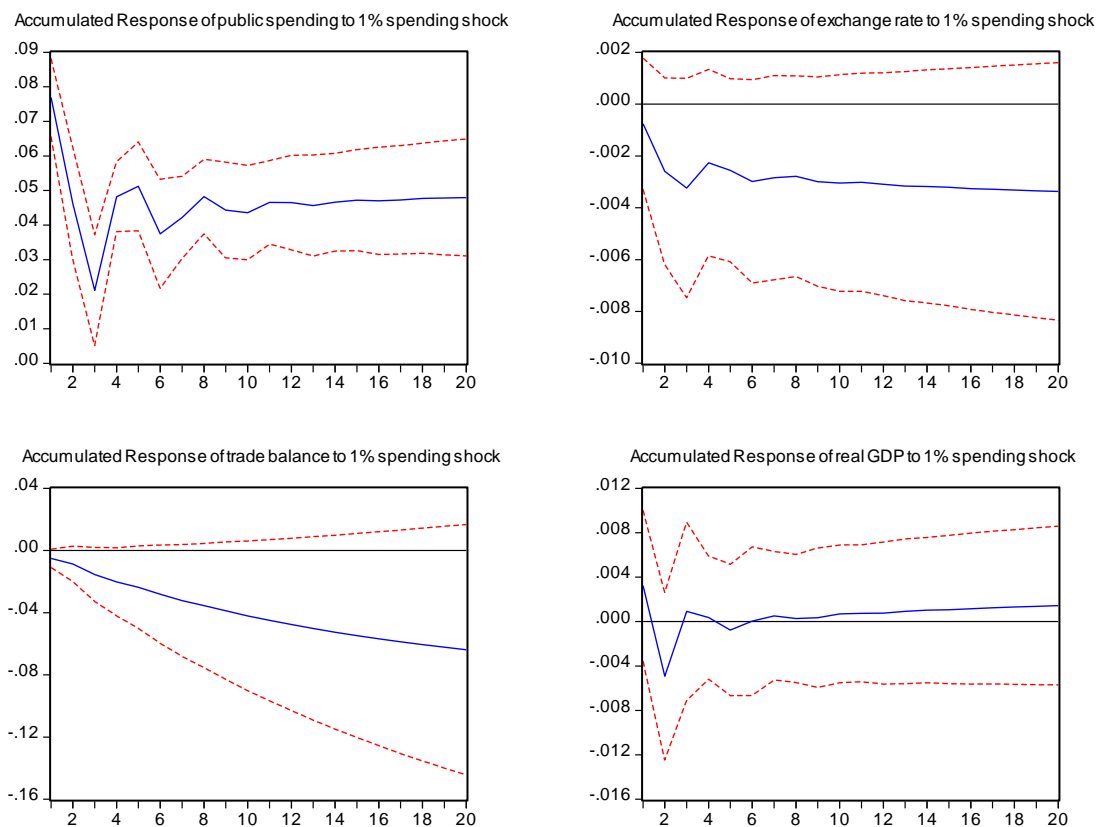


Figure 2. Accumulated response of macroeconomic variables to a structural shock of public expenditures

It seems that the cumulative effect of a fiscal shock on output is more important with a level reached to 0.002% at the end of 20 quarters. The discretionary fiscal policy allows to restart an overall economic activity but with a low magnitude.

In order to evaluate the effectiveness of the discretionary fiscal policy in Morocco, we must assess the magnitude of the Keynesian multiplier⁴. In the following table, we identify the different values of the multipliers of public expenditure in Morocco.

Table 1. Impact of a change of 1 dirham public spending⁵

Horizon	Keynesien Multiplier
T=1	0.1617
T=3	0.1608
T=7	0.0567
T=10	0.0638
T= 13	0.0771
T= 20	0.1145

Table 1 describes the impact of an unanticipated change of 1 DIRHAM public expenditures on the level of activity. It seems that the effect of the fiscal stimulus in Morocco is positive. At the end of 3 quarters, the increase of 1 DIRHAM of public spending increases the level of economic activity by 0.16 DIRHAMS, whereas at the end of 7 quarters the level of activity increases 0.0567 DIRHAMS. We can see that the Keynesian multiplier is less than the unit which implies that the fiscal stimulus is less effective in Morocco.

5. Discussion

We find through estimates made on the Moroccan economy that discretionary fiscal shocks have a Keynesian effect on the level of activity. In terms of public expenditure, we find that the fiscal multiplier is different from zero, but smaller than 1, this means that although government spending has a positive effect on output; it ends up being smaller than the initial shock to public spending, this finding is consistent with other studies in developing countries. These studies assume that fiscal expansion in these countries has a low impact on activity, which confirms the small size of the fiscal multiplier for developing countries.

The effect of a shock in government expenditure could be affected by a number of factors, specifically household behavior; the high propensity to consume and import foreign products offset the impact of a government spending shock on real GDP, as important links exist.

Economically, an expansionary fiscal policy stimulates, slightly, the economic activity in Morocco, which causes an increase of the medium term demand (consumption of the households), therefore, causing an increase in imports rather than exports that leads to a trade balance deficit. As a result, the level of activity decreases and the exchange rate depreciates.

The government can improve the effectiveness of fiscal policy by investing in the practices of good governance; improving the quality of democratic institutions, the regulatory institutions, combating corruption, which will lead to encourage investment in the equipment, human capitals and technologies, improve the quality of spending and accordingly the economies grow.

6. Conclusion

A structural shock of public expenditure has a positive impact on the activity in the short term that fades with time (from the 8nd quarter), this shock aggravates the current account balance and leads to a depreciation of the real effective exchange rate in the short term.

Overall, these reactions of the activity are consistent with the expected effects of a Keynesian stimulus. Thus, the fiscal multipliers in Morocco are not significantly different from the estimates for the emerging market economies.

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Notes

Note 1. Blanchard, O & Perotti, R. (2002). An Empirical Characterization of the Dynamic Effects of Changes in Government Spending and Taxes on Output , The Quarterly journal of Economics, 117(4), p. 1329-1368.

Note 2. (L) is a polynomial of degree 2: the choice of the number of delays is obtained from a likelihood ratio test .In addition, the residue of the VAR (2) is non-autocorrelated and normal (the LM test of autocorrelation and the test of normality).

Note 3. International Monetary Fund

Note 4. The impact multiplier calculates the variation of GDP at period k induced by a variation in government expenditure at the first period. In order to obtain the value of multiplier, the ratio of the contemporaneous response of GDP to a shock in spending is divided by the average ratio of fiscal variable to GDP in the sample used to estimate the VAR.

Note 5. Author's calculations

Appendix A: Normality Tests

Component	Skewness	Chi-sq	df	Prob.
1	0.346875	2.034416	1	0.1538
2	0.023351	0.009649	1	0.9218
3	0.042850	0.032474	1	0.8570
4	0.185314	0.599641	1	0.4387
Joint		2.676180	4	0.6134
Component	Kurtosis	Chi-sq	df	Prob.
1	2.210690	5.622090	1	0.0177
2	2.831146	0.026618	1	0.8704
3	3.960208	6.090697	1	0.0136
4	3.029569	0.193725	1	0.6598
Joint		11.93313	4	0.0179
Component	Jarque-Bera	df	Prob.	
1	7.656506	2	0.0217	
2	0.036267	2	0.9820	
3	6.123170	2	0.0468	
4	0.793367	2	0.6725	
Joint	14.60931	8	0.0672	

Appendix B: Autocorrelation LM Tests

Lags	LM-Stat	Prob
1	32.05008	0.0099
2	33.28365	0.0068
3	14.77140	0.5414
4	39.09446	0.0011
5	17.13389	0.3770
6	14.06668	0.5937
7	17.23619	0.3705
8	18.00557	0.3236
9	22.08702	0.1404
10	14.24954	0.5801
11	20.58190	0.1951
12	10.83436	0.8196

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