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Essays on Fiscal Policy in Developing Countries and Microstates

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Chapter 1

Introduction

Fiscal policy in the context of developing countries and microstates remains a relatively under explored area in the literature. The few existing studies, though an important first step in fulfilling this existing gap, remain open to many criticisms on the basis of methodological and analytical grounds.

This thesis is an attempt to address three important areas in the literature on fiscal policy, namely, the short-run effects of fiscal policy in developing countries, the cyclical behavior of fiscal policy in developing countries and the link between fiscal policy and the current account in microstates. The thesis is empirical in nature and primarily deals with fiscal policy in relation to short-run macroeconomic performance.

Chapter 2 assesses the effects of government spending shocks on the economy of developing countries. Understanding the effects of government spending shocks is important in being able to study the effects of fiscal policy on different macroeconomic variables such as consumption, net exports and exchange rate as well as in calculating fiscal multipliers. However, one big challenge in the literature is the lack of availability of suitable methodology to identify government spending shocks in developing countries.

To that end, I use a recent Structural Vector Autoregression (SVAR) technique where identification is achieved via sign restrictions. The identification scheme applies the restrictions that government spending shocks are the only shocks that raise government spending, output, deficit and tax revenue in the impact period.

I gather data on 9 countries and employ the above outlined technique. The results show that an increase in government spending would lead to a short-lived expansion of output and consumption, an immediate deterioration of net exports, and an appreciation or no effect on exchange rates. Moreover, the calculated output multipliers give values that are greater

than one for all but one country in the impact period. The results suggest a fiscal stimulus could have expansionary effects on output and consumption, however these effects would be short-lived.

In Chapter 3, I consider the issue of procyclicality of fiscal policy in developing countries. In the literature, there exist two competing plausible explanations. One espouses the view that procyclical fiscal policy is a result of lack of financial integration with the world economy while the other view attributes it to weak institutions within the country.

I analyze, by taking into consideration the different states of the economy, the role of financial openness and quality of institutions on the ability of countries to conduct counter-cyclical fiscal policy and to present empirical evidence that might contribute to the debate or help bridge the two competing views. I develop a multiplicative panel regression model with interactive terms and use data from 109 countries. The analysis shows during good times the quality of institutions has a dominant role to play in the cyclicality of fiscal policy, and during bad times both financial integration and institutions are important in the ability of countries to run counter-cyclical fiscal policy.

Chapter 4, coauthored with Charles Amo-Yartey and Therese Turner Jones, examines the empirical link between fiscal policy and the current account focusing on microstates. Microstates are defined as countries with a population of less than 2 million between 1970 and 2009. Due to microstates being characterized by special features such as small size of domestic markets, small domestic resource base, narrow range of exports, high degree of openness and large size of the public sector, among others, findings from other countries may not be applicable to such states.

In the chapter, panel regression and Panel Vector Autoregression (PVAR) are employed to estimate the impact of fiscal policy on the current account in microstates. Panel regression results show the fiscal balance improves the current account balance but the real effective exchange rate has no significant impact on the current account. PVAR results show that an increase in government consumption results in real exchange appreciation, but the effect on the current account after an initial deterioration dies out quicker. Overall, the results suggest that the weak relative price effect makes fiscal adjustment much more difficult in microstates.

Chapter 2

The Effects of Government Spending Shocks in Developing Countries

2.1 Introduction

Proper identification of exogenous government spending shocks is an invaluable input for judicious policy making. Not only does it help to assess the effects of government spending on different macroeconomic variables giving insight about countercyclical and stabilization properties of fiscal policy, but it is also useful in calculating the size of fiscal multipliers which is crucial in understanding the role of fiscal stimulus. In contrast to developed countries where several studies have been carried out, only few studies have been done in the context of developing countries. The existence of different economic environment, in developing countries, characterized by the occurrence of large swings in aggregate activity and a different government budget structure implies a need for studies that take into account these distinct features (Perotti (2007a)).

In the literature, the main methodologies used to study cyclical properties of fiscal policies have been Structural Vector Autoregressive (SVAR) models. The two main approaches to identify government spending shocks are the 'dummy variable approach' of Ramey and Shapiro (1998) that captures specific episodes of large exogenous increase in defense spending and the SVAR technique of Blanchard and Perotti (2002), in which identification is achieved by making use of decision lags in policy making and information about the elasticity of fiscal variables to economic activity.

Much of the research conducted on developed countries also employs the above two methods.[1] However, the applicability of the methods to data from developing countries is

[1] See, for instance, Ravn et al. (2012), Monacelli and Perotti (2006), Perotti (2004, 2007b), Burnside et al. (2004), Edelberg et al. (1999).

quite limited. The major problem is the difficulty of obtaining complete and good quality data. For example, one of the key elements in Blanchard and Perotti's (2002) approach is the availability of quarterly data. In most developing countries either quarterly data are absent or are interpolated from annual data, thereby making the methodology hard to apply (Perotti (2007a)). Despite these drawbacks, some authors have applied the SVAR methodology of Blanchard and Perotti (2002) to developing countries. Ilzetzki et al. (2013) calculate fiscal multipliers and examine how the level of development, exchange rate regime, trade openness and public indebtedness can influence their size on panel data from developing and developed countries. Schclarek (2007) investigated the effects of fiscal policy shocks on private consumption in groups of developed and developing countries using a similar approach.

This chapter seeks to remedy these problems by applying a suitable recent methodology to identify government spending shocks, whenever data are available, in a sample of developing countries. Data are gathered from 9 countries and the methodology employed is the SVAR technique where identification is achieved via sign restrictions. Sign restrictions are preferable to those of the standard SVAR approach, in the context of this study, particularly because they are valid with data at any frequency. The identification scheme is based on Pappa (2009) and applies the restrictions that government spending shocks are the only shocks that raise government spending, output, deficit and tax revenue in the impact period. The identified shocks serve two purposes. First, they are used to examine the effects of government spending on output, consumption, net exports and the nominal exchange rate. The knowledge of how these macroeconomic variables respond to government spending shocks helps to study the countercyclical and stabilization properties of fiscal policy and to what extent fiscal policy is able to stabilize the business cycle in developing countries. Second, the identified government spending shocks helped to learn about the output multipliers in each of these countries. The results can provide insight into the size of the multipliers and hence about the role of fiscal stimulus in the context of developing countries.

Results show that an increase in government spending would lead to a short-lived expansion of output and consumption, an immediate deterioration of net exports, and an appreciation or no effect on the exchange rate. Moreover, the calculated impact output multipliers give values that are greater than one for all but one country. However, they diminish quickly in the subsequent periods. A different specification of the model and a different identification methodology provide very similar results.

The rest of the chapter has been organized in the following way. The next section describes the econometric framework. Results are presented in section 2.3. Section 2.4 deals with checking the robustness of the results and section 2.5 gives conclusions. The Appendix contains all tables and figures.

2.2 Econometric Framework

2.2.1 Data

The sample consists of annual data from 9 developing countries. Criteria for selecting the countries was availability of data. The main source of data for the different variables is the World Development Indicators (WDI) of the World Bank. A description of the different variables used and their sources is presented in Table 2.1. In this study, note that the term government spending mainly includes current government expenditure in goods and services. Total revenue is used as proxy for tax revenue. As the main interest of including tax revenue is to identify government spending and not to analyze the effects of tax, the proxy is a suitable substitute.

In general, the data span from 1960-2006. It was not possible to obtain data for all countries in this time span. Table 2.2 presents the list of countries and their respective time periods of observations. The number of observations for the different countries ranges from 28-47 owing to absence of data for the deficit variable.

2.2.2 Reduced Form Model

A reduced form model is formed with two different sets of endogenous variables. On the one hand, the effects of government spending shocks on GDP and consumption are examined by endogenous variables consisting of the log of real per capita GDP (y_t), the log of real per capita government expenditure (g_t), the log of per real capita private consumption (c_t), the log of per real capita tax revenue (t_t), and the real per capita deficit (d_t). On the other hand, the effects on net exports and the exchange rate are studied in the model where consumption is substituted by the real per capita net exports (n_t) and nominal exchange rate (e_t). In general, the reduced form VAR can be written as

$$X_t = \mu_0 + \mu_1 t + DX_{t-1} + \varepsilon_t \tag{2.1}$$

where μ_0 is a constant, t is a linear time trend, X_t is a vector of endogenous variables and ε_t is the reduced form residuals. In the first case, $X_t = (g_t, y_t, d_t, c_t, t_t)$ and $\varepsilon_t = \left(\varepsilon_t^g, \varepsilon_t^y, \varepsilon_t^d, \varepsilon_t^c, \varepsilon_t^t\right)$; in the second case, $X_t = (g_t, y_t, d_t, n_t, t_t, e_t)$ is the vector of endogenous variables and the reduced form residuals are contained in $\varepsilon_t = \left(\varepsilon_t^g, \varepsilon_t^y, \varepsilon_t^d, \varepsilon_t^n, \varepsilon_t^t, \varepsilon_t^e\right)$, which in general will have non-zero correlations.

Model (2.1) is estimated by ordinary least squares (OLS). As the data set only span an average of 37 years, the lag length of the VAR is set to one.

Let Ω be the covariance matrix of ε_t and let S be the Cholesky factor of Ω and H any matrix such that $HH^{'} = I$. The structural shocks ω_t can be constructed from the reduced form residuals as $\omega_t = H^{'} S^{-1} \varepsilon_t$ and $E\omega_t \omega_t^{'} = I$

2.2.3 Identification

The identification methodology is based on Pappa (2009). In order to study the effects of fiscal shocks, Pappa (2009) develops a model that encompasses a flexible price Real Business Cycle and New Keynesian sticky price setup as special cases.

The methodology involves studying the sign of the responses of the macro variables after a fiscal disturbance in the impact period in both models. This is helpful because not only are the signs independent of parameterization but also are common to both models. The fiscal disturbances can then be identified by using a subset of restrictions common to the two models.

Pappa (2009) finds that all the fiscal shocks she considers increase output and deficit contemporaneously in both models. Thus, the identification restrictions arising imply that government spending shocks have positive impact effects on government spending, output and deficit in the model. As tax cut shocks might also increase output and deficit, tax revenue on impact is restricted to be positive as well. The restriction on tax revenue can avoid concerns about tax cut shocks since tax cuts, at least for the first period, cannot increase total tax revenue. However, absence of this restriction does not change the main results of this study.

Moreover, Pappa (2009) establishes that other shocks such as technology, labor supply and monetary shocks cannot produce these sign restrictions at least on impact. Specifically,

while fiscal shocks increase deficit, the other shocks typically decrease them at least on impact. However, one widely documented feature of fiscal policy in developing countries is its procyclicality with the business cycle. This might pose a challenge when applying the restrictions. In particular, care should be taken with the restriction that government spending shocks are the only shocks that may lead to increases in deficit. One way to address this concern is to study the empirical relationship between GDP and deficit in the sample of developing countries concerned. Table 2.3 presents the correlations of the cyclical components of GDP and government spending as well as that of GDP and deficit for the 9 countries.[2] The correlations of the cyclical components of GDP and deficit are negative for these countries ruling out the concern about non-fiscal shocks raising the deficit and thus supporting the validness of the sign restrictions used for identification of government spending shocks.[3]

To summarize, the sign restrictions are as follows:

1. Positive response of government spending in the first period
2. Positive response of GDP in the first period
3. Positive response of tax revenues in the first period
4. Positive response of deficit in the first period

In the reduced form model, to identify the VAR implies fixing a particular matrix H. Random h unit vectors were generated and examined for each element to see if the required sign restrictions are satisfied i.e. positive response of government spending, output, deficit and tax revenue in the impact period of the shocks. This does not give exact identification since there can be many h consistent with the restrictions imposed. Furthermore, it is also a partial identification in the sense that the interest is only on the effects of government spending shocks.

2.3 Results

2.3.1 Effects on Macroeconomic Variables

A reduced form model with two sets of endogenous variables, as mentioned in the previous section, are used in order to assess the effects of government spending shocks on the

[2]GDP and government spending are in log real per capita where as deficit is in real per capita. The data are Hodrick-Prescott filtered using a smoothing parameter of 6.25.

[3]The correlations for all countries are negative because this study excluded countries where the correlations were positive.

different macroeconomic variables. Figure 2.1, 2.2 and 2.3 present the effects of a 1% government spending increase on consumption, net exports to GDP ratio and exchange rate respectively. Each box gives the median estimates and 68% probability band constructed with Bayesian approach.

With regard to consumption, the results show that the median responses for all countries considered, except for Colombia, are positive in the impact period. Moreover, for Malaysia, Mexico, Thailand and Uruguay, they are statistically significant. In case of Malaysia, the significant positive effect on consumption extends to the second period as well. For the rest of the countries, neither the positive median responses at any point of the period horizons nor the negative responses found for some countries at the end of the horizons are statistically significant.

Overall, the effect on consumption is positive and very short-lived. It mainly lasts for one year or, in some cases, to a maximum of two years. The increase in consumption is in line with most results obtained through a SVAR approach for developed countries. It also concords with those of Schclarek (2007), who studied the effects of fiscal policy on consumption using a panel data of developing countries.

Observing the responses of net exports, the results indicate that the median impact responses of all countries considered are negative while for Malaysia and Chile, they are statistically significant as well. Afterwards, the median responses go up and the effect of government spending on net exports disappears.

Although research on the effect of government spending on net exports in developing countries is not readily available, the deterioration of the net exports found in this study corroborate the findings in developed countries reported in Ravn et al. (2012), Monacelli and Perotti (2006) and Gambetti (2011).

The results concerning the effects of government spending on exchange rate show the median responses of 7 out of 9 countries to be negative (this amounts to appreciation of the local currency following the definition of exchange rate used in the study. Likewise, an increase implies depreciation). For the remaining two countries, Colombia and Tunisia, the median impact responses are positive. For Colombia, the response is persistent, while for Tunisia, it dies out in the second period.

In general, the median response of exchange rate is not significant except in the case of Thailand. These results fall in between the ones found for developed countries. Ravn et al. (2012) and Monacelli and Perotti (2006) report a depreciation of the local currency

exchange rate following exogenous government spending increase. On the other hand, Gambetti (2011) finds an appreciation of the local exchange rate.

2.3.2 Output multiplier

Output multipliers are calculated for each country using the following formula:

$$\text{Multiplier for GDP} = \frac{\dfrac{\text{GDP response}}{\text{Initial gov. spending shock}}}{\text{Average government spending share of GDP}} \tag{2.2}$$

In all cases, the median responses of the impulse response functions are used. Table 2.4 presents the output multipliers at selected time horizons. It is interesting to note that the median impact multipliers are greater than one for all countries except Colombia. Moreover, it is statistically significant for Mexico. However, the big sized multipliers are short lived. In the subsequent periods they quickly start to diminish to zero and in the case of some countries to negative numbers.

The size of the impact output multipliers obtained in this study differ from previous research (Ilzetzki et al. (2013)). In general, for developing countries, an output multiplier of size less than 1 and near to zero has been found in the literature. In contrast, the results of this study suggest multipliers of size greater than one, at least in the impact period. A number of robustness exercises presented later also yield similar results.

2.3.3 Variance Decomposition

The variance decomposition analysis establishes how government spending is able to explain the variances in the macroeconomic variables, albeit to different degrees. As can be seen from Table 2.5 and 2.6, the results obtained from the variance decomposition analysis vary from country to country. For GDP, the explained shares range from 5% (Uruguay) to 22% (Mexico). Looking at consumption, the shares are mainly less than 20%. As for net exports and exchange rate, the shares are less than 15%. The explained shares remain roughly constant throughout the period horizon considered. Overall, shares of variance explained by government spending on macroeconomic variables appear to be small.

2.4 Check of Robustness

In order to check how robust are the results obtained, two other approaches are adopted. The first approach involves identifying the government spending shocks using a different identification methodology. To that end, a methodology commonly known as the recursive approach is applied to the reduced form model. The recursive approach assumes government spending does not react contemporaneously to shocks to other variables in the system. The argument is that movements in government spending, unlike movements in taxes, are largely unrelated to the business cycle. Therefore, it seems plausible to assume that government spending is not affected contemporaneously by shocks originating in the private sector (Caldara and Kamps (2008)). Similar to the previous section, the reduced form model is formed using two sets of endogenous variables. To calculate the effects of government spending shocks on GDP and consumption, the reduced form model with variables ordered as government spending, GDP, tax and consumption is applied. A second reduced model examines effects on net exports and exchange rate with variables ordered as government spending, GDP, tax, net exports and exchange rate. Note that the deficit variable is not included in the reduced form model since it is not essential for this identification methodology.

Secondly, a different specification of the benchmark reduced form model is used. Specifically, a quadratic time trend is substituted for the linear time trend. Then the new specification is identified by both the sign restriction and recursive schemes in order to assess the effects of government spending shocks.

The findings under both approaches show that the effects of government spending shocks on consumption, net exports and the exchange rate are consistent with the earlier results (See Fig. 2.4 - Fig. 2.12). Likewise, the output multipliers obtained in this section are also broadly similar with the ones found for the benchmark specification (See Table 2.7, Table 2.8 and Table 2.9).

2.5 Conclusion

This chapter has dealt with identification of government spending shocks using sign restrictions on SVAR model in 9 developing countries. The purpose of the study was to determine the effects of government spending shocks on certain macroeconomic variables and also to calculate output multipliers. The results have shown that an increase in the government

spending would lead to a short-lived expansion of output and consumption, an immediate deterioration of net exports, and an appreciation or no effect on exchange rate. Furthermore, the calculated output multipliers give values that are greater than one for all but one country in the impact period. However, they diminish quickly in the subsequent periods. The results are also robust to a different identification methodology and a different model specification.

The findings enhance our understanding of the effects of government spending shocks and provide important insight about fiscal stimulus with regard to the developing countries. They suggest a stimulus could have expansionary effects on output and consumption, however these effects would be short-lived. Therefore, caution must be taken as potential long run costs due to larger public debt may outweigh any benefits.

The major limitation of the study is that the number of developing countries examined were relatively small. The reasons are twofold. First, data was lacking for several countries. Second, the identification sign restrictions could only be applied to countries where the procyclicality of deficit was absent, thus further restricting the sample of countries.

Future research could be directed in reconciling the existing optimizing business cycle models and the evidence obtained about the effects of government spending in developing countries.

2.6 APPENDIX

2.6.1 Tables

Table 2.1: Variables and sources of data

Variables	Series	Source
Private consumption	Household Final Consumption Expenditure	WDI
Government spending	General Government Final Consumption Expenditure	WDI
Gross Domestic Product	GDP	WDI
Gross Domestic Product Deflator	GDP Deflator	WDI
Population	Population, total	WDI
Tax Revenue	Revenue	IFS
Fiscal Deficit	Deficit (-) or surplus	IFS
Exchange rate	DEC alternative conversion factor	WDI
Net exports	External balance on goods and services	WDI

Note: WDI refers to the World Development Indicators 2008. IFS refers to the International Financial Statistics 2007. All the series are expressed in local currency units.

Table 2.2: Countries, period and number of observations

Number	Countries	Time Periods	Number of Observations
1	Chile	1968-2000	33
2	Colombia	1960-2006	47
3	Dominican Republic	1960-2000	41
4	Malaysia	1960-2003	44
5	Mexico	1971-2006	36
6	South Africa	1971-2006	36
7	Thailand	1971-2003	33
8	Tunisia	1972-1999	28
9	Uruguay	1968-2006	39

Table 2.3: Correlations of the cyclical components of GDP, government spending and deficit

Number	**Country**	**Corr**$(CY(G),CY(Y))$	**Corr**$(CY(Def),CY(Y))$	**Corr**$(CY(Def/Y),CY(Y))$
1	Chile	0.50	-0.15	-0.09
2	Colombia	0.24	-0.30	-0.30
3	Dominican Rep.	0.24	-0.01	-0.06
4	Malaysia	0.26	-0.34	-0.22
5	Mexico	0.67	-0.18	-0.24
6	South Africa	0.15	-0.36	-0.39
7	Thailand	0.33	-0.68	-0.51
8	Tunisia	0.23	-0.16	-0.21
9	Uruguay	0.53	-0.25	-0.31

Note: $CY(G)$,$CY(Y)$**,** $CY(Def)$ and $CY(Def/Y)$ refer to the cyclical components of Government spending, GDP, Deficit and the Deficit to GDP ratio respectively.

Table 2.4: Size of output multipliers

		1st period			**2nd period**			**4th period**			**8th period**		
	Countries	lb	median	ub	lb	median	ub	lb	median	ub	lb	median	ub
1	Chile	0.84	**2.64**	5.08	-1.63	**0.34**	2.58	-3.20	**-1.14**	0.99	-2.70	**-0.93**	0.66
2	Colombia	0.23	**0.80**	1.70	-0.41	**0.37**	1.25	-1.19	**-0.36**	0.54	-1.93	**-1.03**	-0.24
3	Dominican Republic	0.81	**2.37**	4.79	0.25	**1.71**	3.76	-0.22	**1.03**	2.56	-0.65	**0.38**	1.59
4	Malaysia	0.38	**1.27**	2.53	0.42	**1.22**	2.17	0.14	**0.94**	1.87	-0.36	**0.42**	1.34
5	Mexico	2.23	**4.37**	7.09	-0.43	**2.24**	4.97	-2.43	**0.19**	2.56	-2.09	**-0.55**	0.72
6	South Africa	0.48	**1.53**	3.16	-0.66	**0.79**	2.67	-2.67	**-0.84**	1.35	-3.40	**-1.59**	-0.12
7	Thailand	0.86	**2.45**	5.06	-3.85	**-0.63**	2.13	-8.29	**-3.88**	-0.10	-6.25	**-2.09**	1.53
8	Tunisia	0.57	**2.07**	5.07	-0.81	**0.99**	3.78	-1.21	**0.04**	1.51	-0.51	**0.01**	0.57
9	Uruguay	0.52	**1.72**	3.57	-1.61	**-0.03**	1.60	-1.96	**-0.66**	0.52	-0.17	**0.32**	0.96

Note: lb and ub refer to the size of output multipliers calculated at the lower and upper bound of the 68% confidence bands respectively.

Table 2.5: Variance decomposition analysis result on GDP and consumption

		GDP				**Private Consumption**			
		Period				Period			
	Countries	1	2	4	8	1	2	4	8
1	Chile	0.11	0.09	0.10	0.11	0.13	0.13	0.11	0.11
2	Colombia	0.09	0.07	0.07	0.10	0.11	0.14	0.13	0.13
3	Dominican Rep.	0.19	0.18	0.16	0.16	0.11	0.12	0.12	0.12
4	Malaysia	0.08	0.09	0.11	0.12	0.17	0.16	0.16	0.16
5	Mexico	0.22	0.17	0.16	0.17	0.15	0.13	0.14	0.14
6	South Africa	0.14	0.09	0.10	0.12	0.17	0.15	0.13	0.15
7	Thailand	0.09	0.08	0.09	0.13	0.15	0.11	0.11	0.13
8	Tunisia	0.07	0.08	0.08	0.08	0.11	0.11	0.10	0.10
9	Uruguay	0.05	0.05	0.05	0.06	0.09	0.09	0.09	0.09

Table 2.6: Variance decomposition analysis result on net exports and exchange rate

		Net exports				**Exchange rate**			
		Period				Period			
	Countries	1	2	4	8	1	2	4	8
1	Chile	0.09	0.09	0.10	0.12	0.13	0.15	0.14	0.14
2	Colombia	0.07	0.08	0.08	0.11	0.11	0.12	0.14	0.15
3	Dominican Rep.	0.12	0.14	0.16	0.15	0.09	0.10	0.12	0.13
4	Malaysia	0.10	0.12	0.12	0.12	0.14	0.14	0.13	0.13
5	Mexico	0.11	0.10	0.10	0.11	0.08	0.09	0.12	0.13
6	South Africa	0.09	0.12	0.14	0.15	0.11	0.12	0.13	0.14
7	Thailand	0.11	0.09	0.09	0.10	0.08	0.08	0.09	0.10
8	Tunisia	0.08	0.08	0.09	0.10	0.09	0.11	0.11	0.12
9	Uruguay	0.11	0.13	0.13	0.14	0.06	0.05	0.05	0.07

Table 2.7: Size of output multipliers for recursive approach

		1st period			2nd period			4th period			8th period		
	Countries	lb	median	ub	lb	median	ub	lb	median	ub	lb	median	ub
1	Chile	1.10	**1.93**	2.76	-0.85	**0.15**	1.21	-2.67	**-1.51**	-0.21	-3.05	**-1.80**	-0.57
2	Colombia	-0.09	**0.19**	0.50	-0.46	**-0.15**	0.22	-1.15	**-0.69**	-0.19	-1.81	**-1.07**	-0.42
3	Dominican Republic	0.18	**0.79**	1.39	-0.20	**0.49**	1.18	-0.77	**0.11**	1.12	-1.27	**-0.18**	1.00
4	Malaysia	-0.03	**0.49**	1.01	0.10	**0.70**	1.20	0.30	**0.85**	1.39	0.17	**0.75**	1.44
5	Mexico	2.76	**3.30**	3.80	1.82	**2.57**	3.26	0.76	**1.65**	2.75	0.22	**0.86**	2.08
6	South Africa	-0.55	**0.01**	0.56	-1.70	**-1.05**	-0.34	-3.22	**-2.31**	-1.31	-3.20	**-1.64**	-0.40
7	Thailand	1.19	**2.41**	3.82	-0.69	**0.76**	2.27	-3.11	**-0.68**	1.65	-3.94	**-0.21**	3.30
8	Tunisia	-1.45	**-0.35**	0.86	-2.17	**-1.00**	0.34	-2.10	**-0.75**	0.38	-0.89	**-0.16**	0.36
9	Uruguay	0.63	**1.30**	1.94	-1.40	**-0.42**	0.48	-1.77	**-0.87**	-0.01	-0.30	**0.16**	0.62

Note: lb and ub refer to the size of output multipliers calculated at the lower and upper bound of the 68% confidence bands respectively.

Table 2.8: Size of output multipliers for sign restriction approach with quadratic time trend

		1st period			2nd period			4th period			8th period		
	Countries	lb	median	ub	lb	median	ub	lb	median	ub	lb	median	ub
1	Chile	0.92	**2.65**	5.13	-1.72	**0.05**	1.92	-2.37	**-0.94**	0.58	-1.19	**-0.16**	0.76
2	Colombia	0.26	**0.86**	1.80	-0.43	**0.40**	1.34	-0.92	**-0.25**	0.47	-0.97	**-0.48**	-0.06
3	Dominican Republic	1.08	**2.85**	5.46	0.43	**2.02**	4.10	-0.08	**1.15**	2.57	-0.42	**0.33**	1.30
4	Malaysia	0.41	**1.34**	2.70	0.52	**1.40**	2.48	-0.17	**0.73**	1.68	-0.54	**0.12**	0.85
5	Mexico	2.20	**4.30**	7.00	-0.45	**2.10**	5.01	-2.09	**0.56**	2.95	-2.19	**-0.42**	1.05
6	South Africa	0.42	**1.41**	2.86	-0.45	**0.91**	2.60	-1.89	**0.00**	1.94	-1.79	**-0.46**	0.74
7	Thailand	0.98	**2.93**	5.89	-4.97	**-1.25**	1.92	-9.46	**-4.96**	-1.12	-7.46	**-2.98**	0.57
8	Tunisia	0.38	**1.39**	3.54	-0.16	**1.98**	5.16	-0.58	**1.07**	3.16	-0.59	**0.38**	2.00
9	Uruguay	0.50	**1.68**	3.38	-1.37	**0.13**	1.76	-1.72	**-0.42**	0.88	-0.18	**0.23**	0.84

Note: lb and ub refer to the size of output multipliers calculated at the lower and upper bound of the 68% confidence bands respectively.

Table 2.9: Size of output multipliers for recursive approach with quadratic time trend

		1st period			2nd period			4th period			8th period		
	Countries	lb	median	ub	lb	median	ub	lb	median	ub	lb	median	ub
1	Chile	1.03	**1.86**	2.66	-1.22	**-0.22**	0.77	-2.49	**-1.49**	-0.43	-1.97	**-0.83**	0.17
2	Colombia	0.10	**0.36**	0.65	-0.29	**0.03**	0.38	-0.77	**-0.40**	0.02	-0.85	**-0.45**	-0.09
3	Dominican Republic	0.56	**1.24**	1.91	0.21	**0.92**	1.63	-0.40	**0.51**	1.44	-0.61	**0.13**	1.17
4	Malaysia	0.01	**0.57**	1.13	0.12	**0.80**	1.43	-0.06	**0.57**	1.27	-0.27	**0.22**	0.82
5	Mexico	2.75	**3.28**	3.79	1.58	**2.38**	3.10	0.56	**1.42**	2.50	0.34	**1.03**	2.05
6	South Africa	-0.23	**0.26**	0.79	-0.96	**-0.29**	0.32	-1.72	**-0.75**	0.20	-1.36	**-0.49**	0.42
7	Thailand	0.03	**1.48**	3.08	-2.57	**-0.89**	0.94	-5.81	**-3.59**	-1.11	-7.44	**-3.77**	-1.19
8	Tunisia	-1.01	**0.09**	1.28	-1.41	**-0.01**	1.40	-1.25	**0.09**	1.46	-0.51	**0.08**	1.10
9	Uruguay	0.79	**1.43**	2.05	-1.23	**-0.26**	0.69	-1.64	**-0.68**	0.24	-0.28	**0.15**	0.64

Note: lb and ub refer to the size of output multipliers calculated at the lower and upper bound of the 68% confidence bands respectively.

2.6.2 Figures

Figure 2.1: Private consumption response to government spending shocks

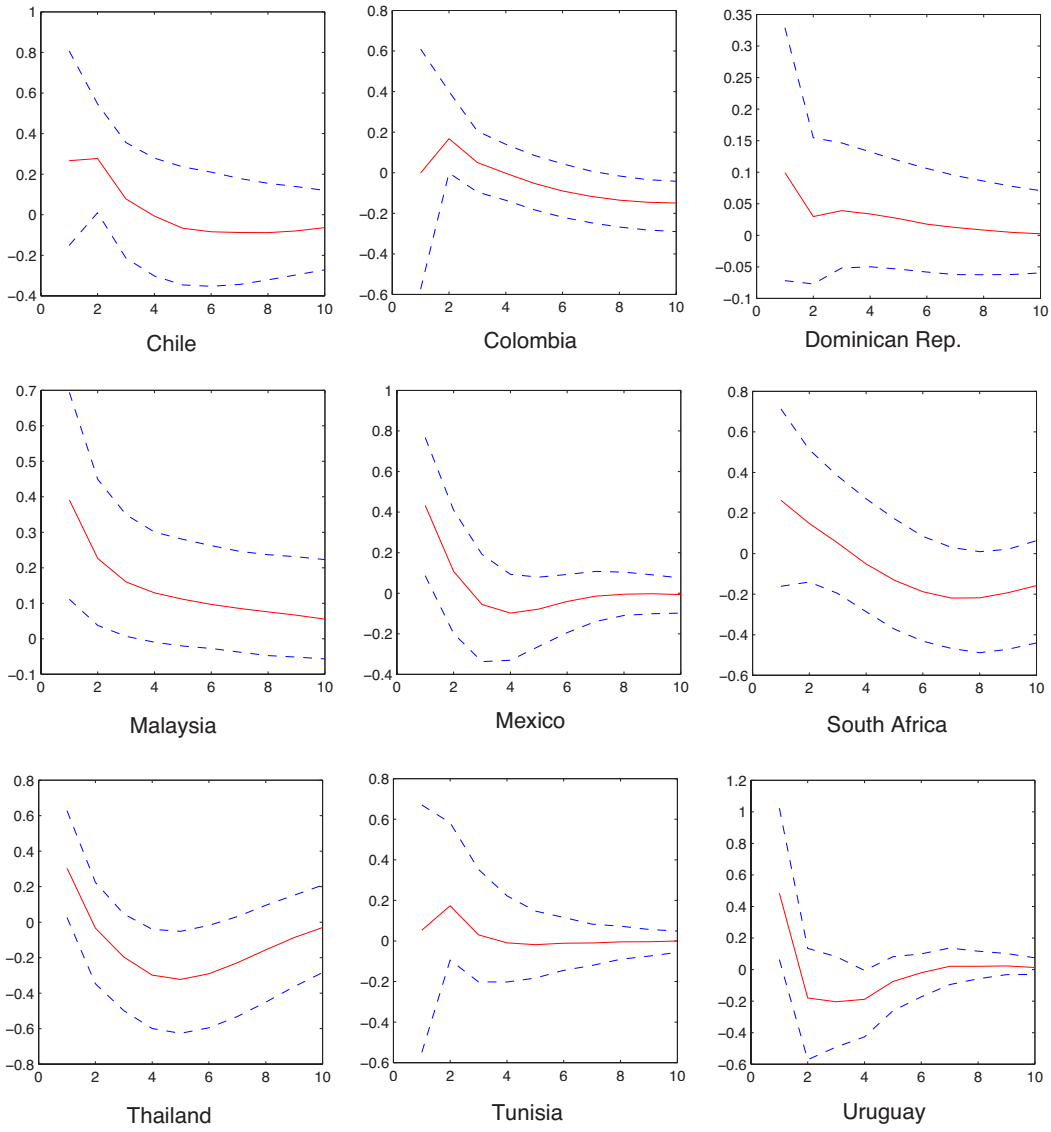


Figure 2.2: Net exports to GDP ratio response to government spending shocks

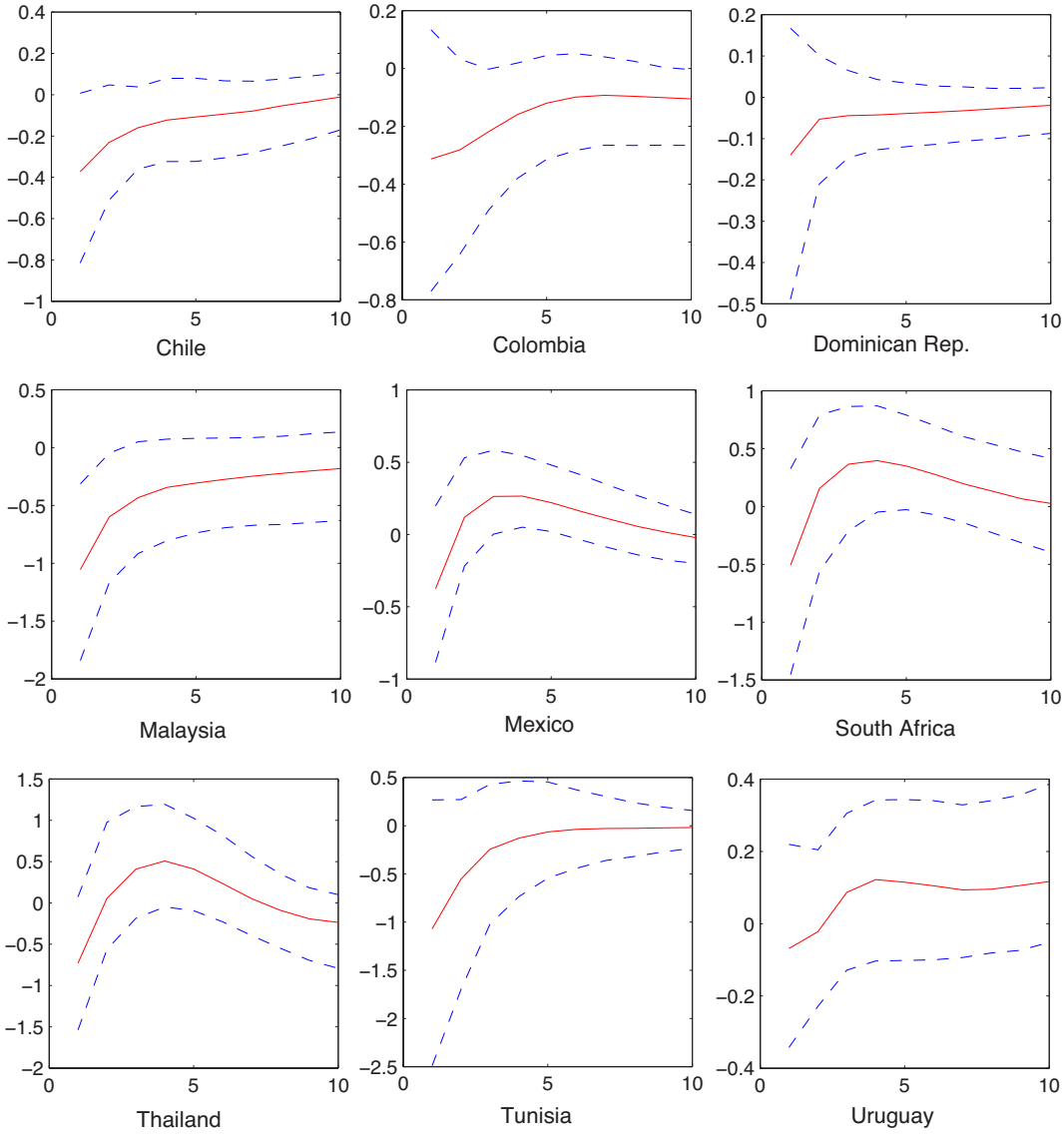


Figure 2.3: Exchange rate response to government spending shocks

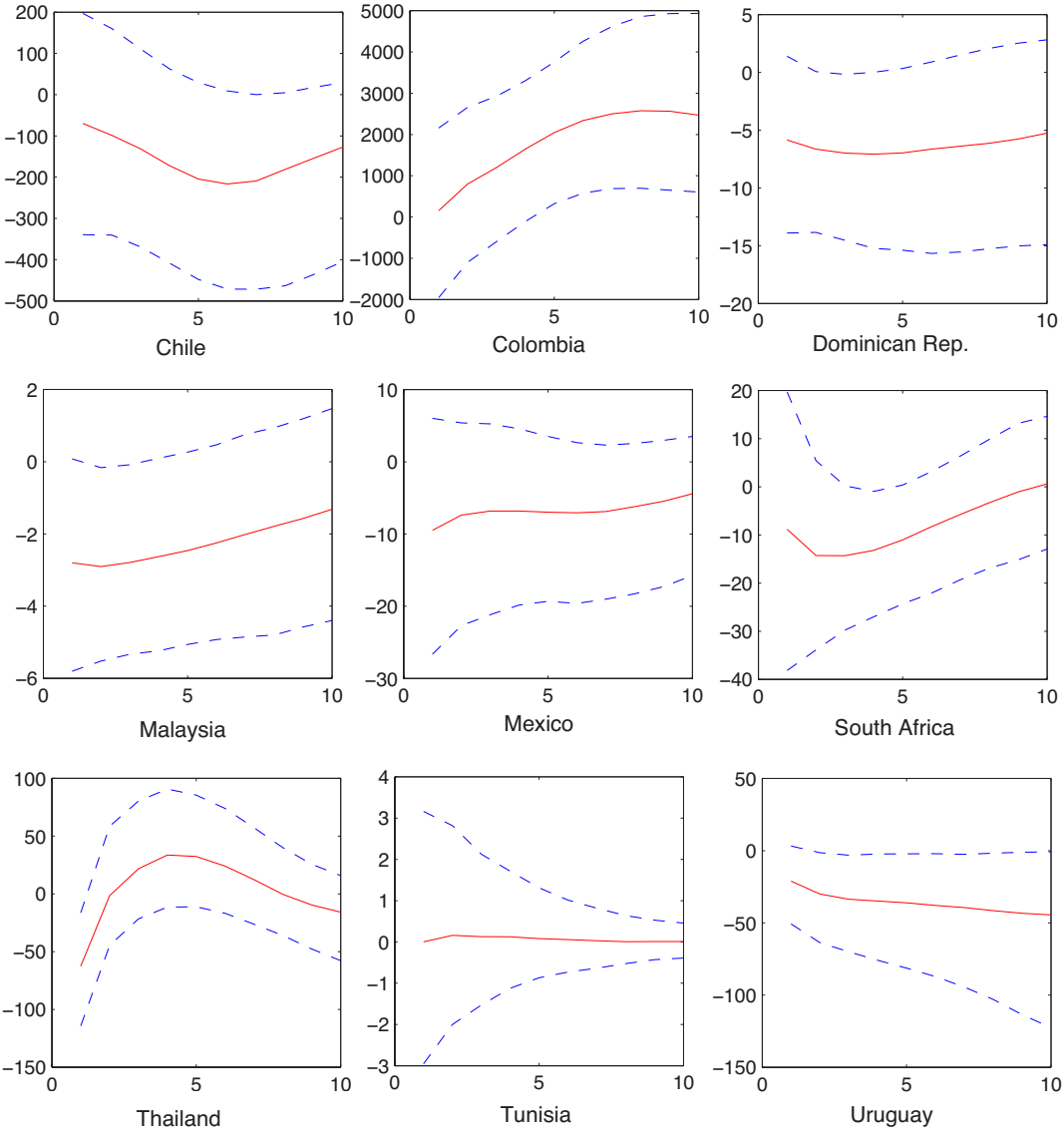


Figure 2.4: Private consumption response to government spending shocks for recursive approach

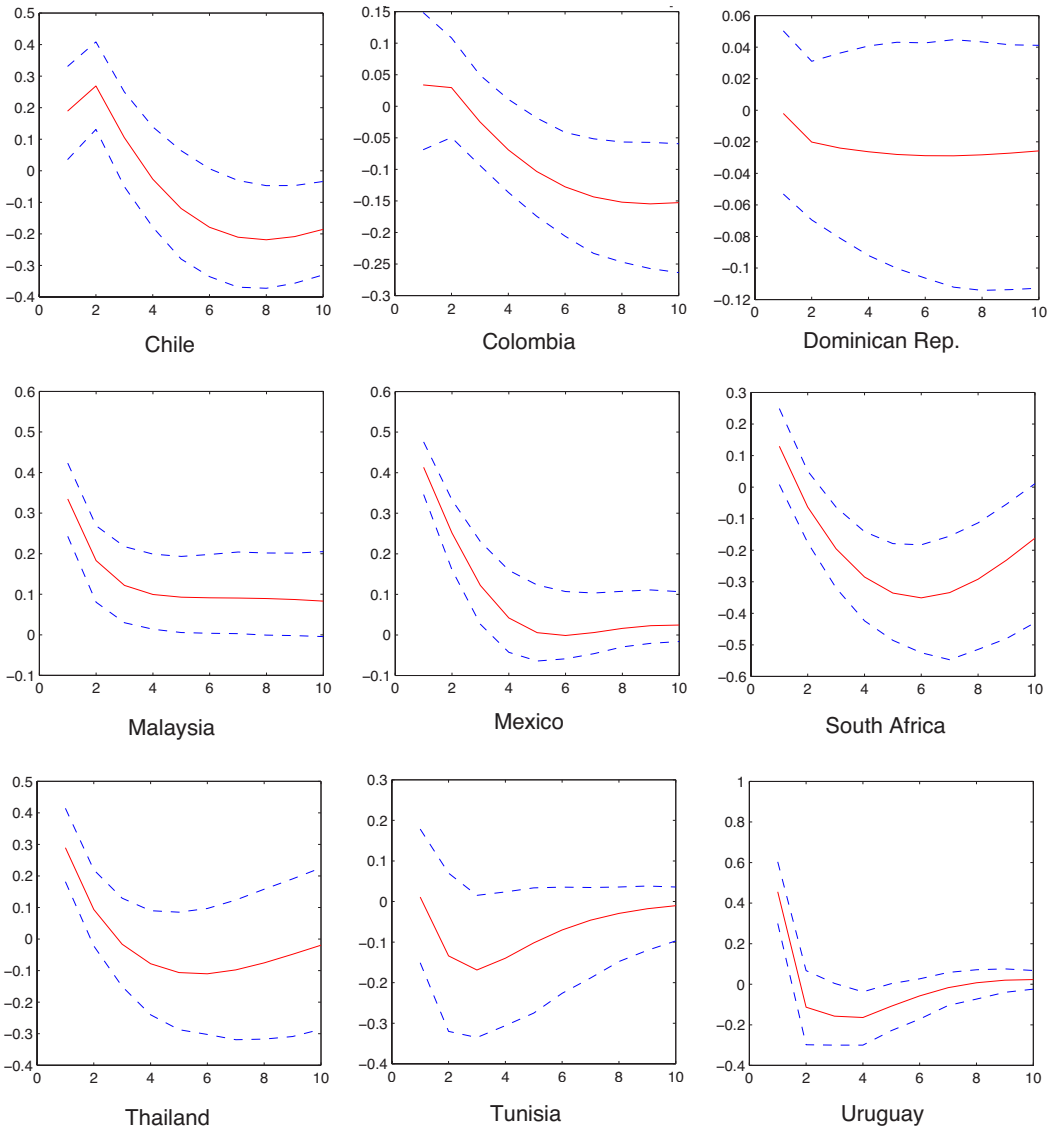


Figure 2.5: Net exports to GDP ratio response to government spending shocks for recursive approach

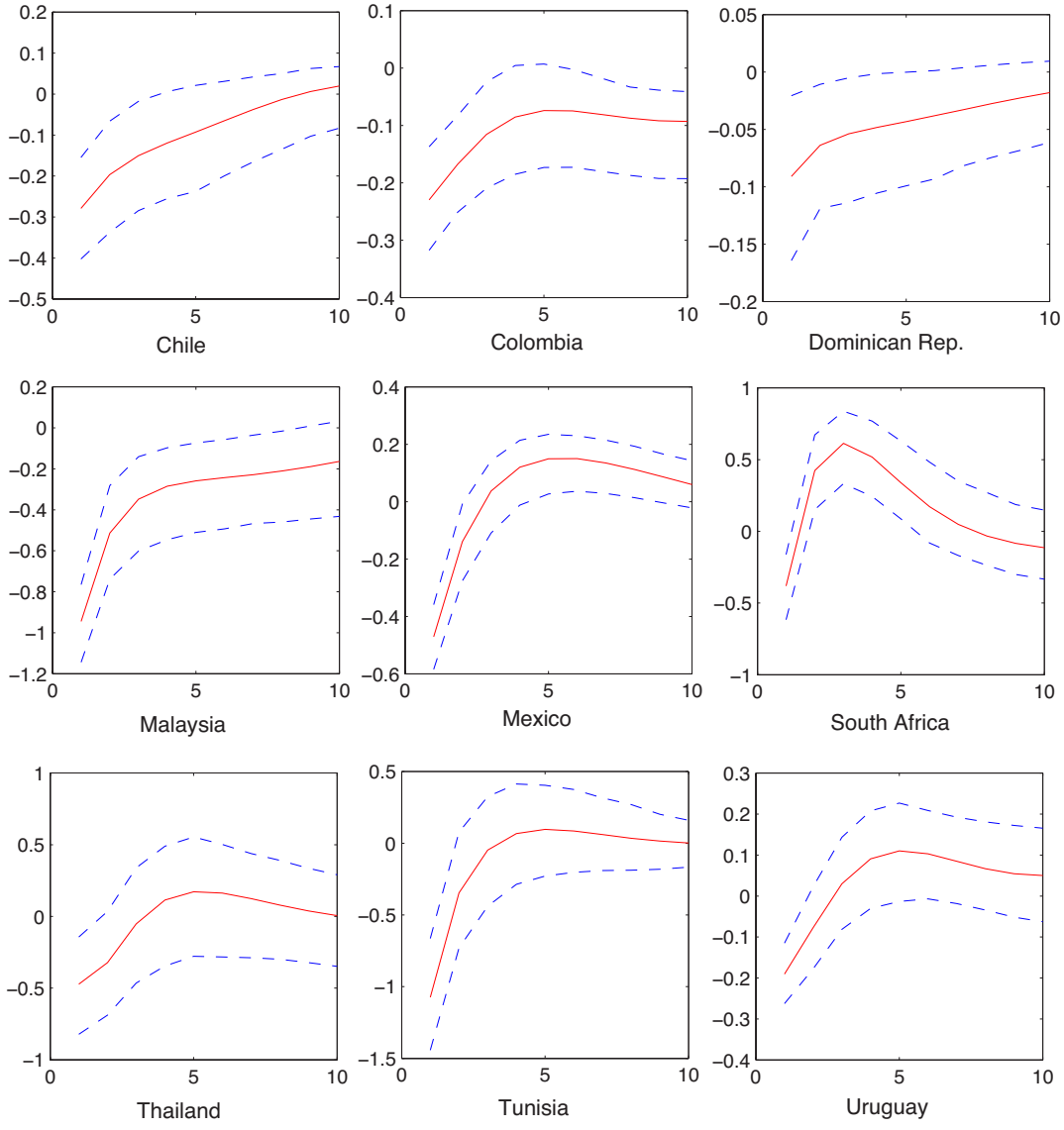


Figure 2.6: Exchange rate response to government spending shocks for recursive approach

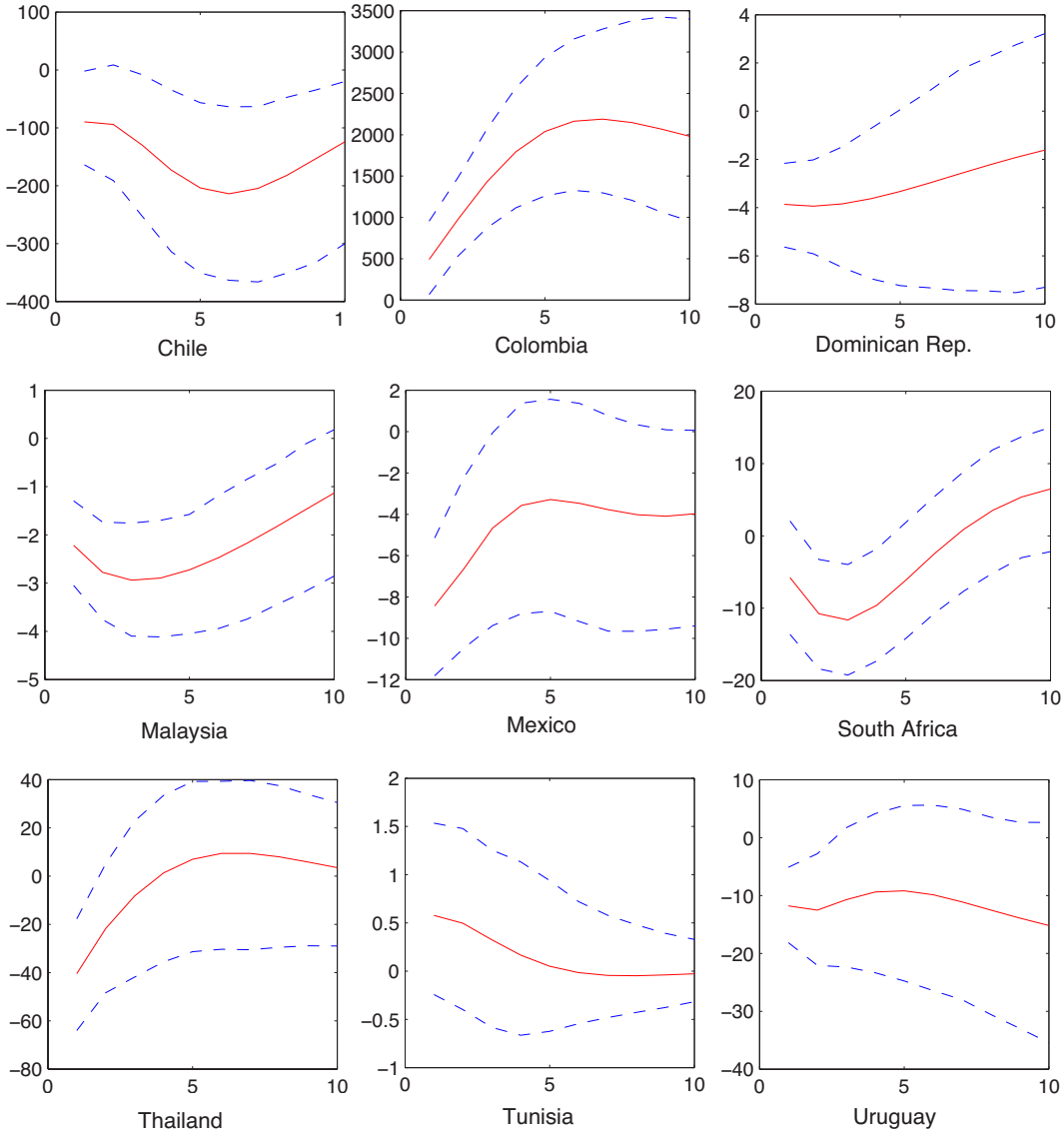


Figure 2.7: Private consumption response to government spending shocks for sign restriction approach with quadratic time trend

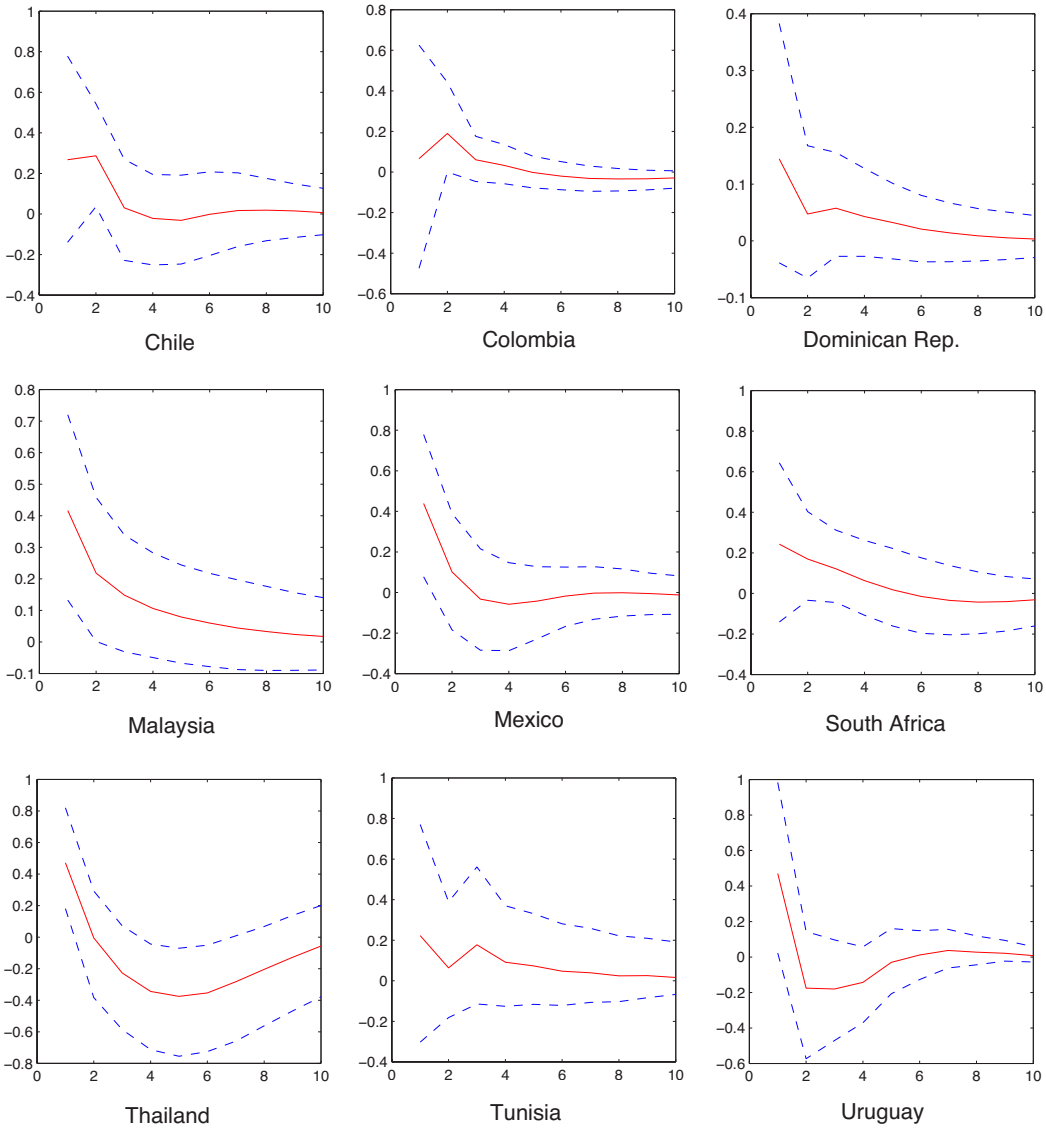


Figure 2.8: Net exports to GDP ratio response to government spending shocks for sign restriction approach with quadratic time trend

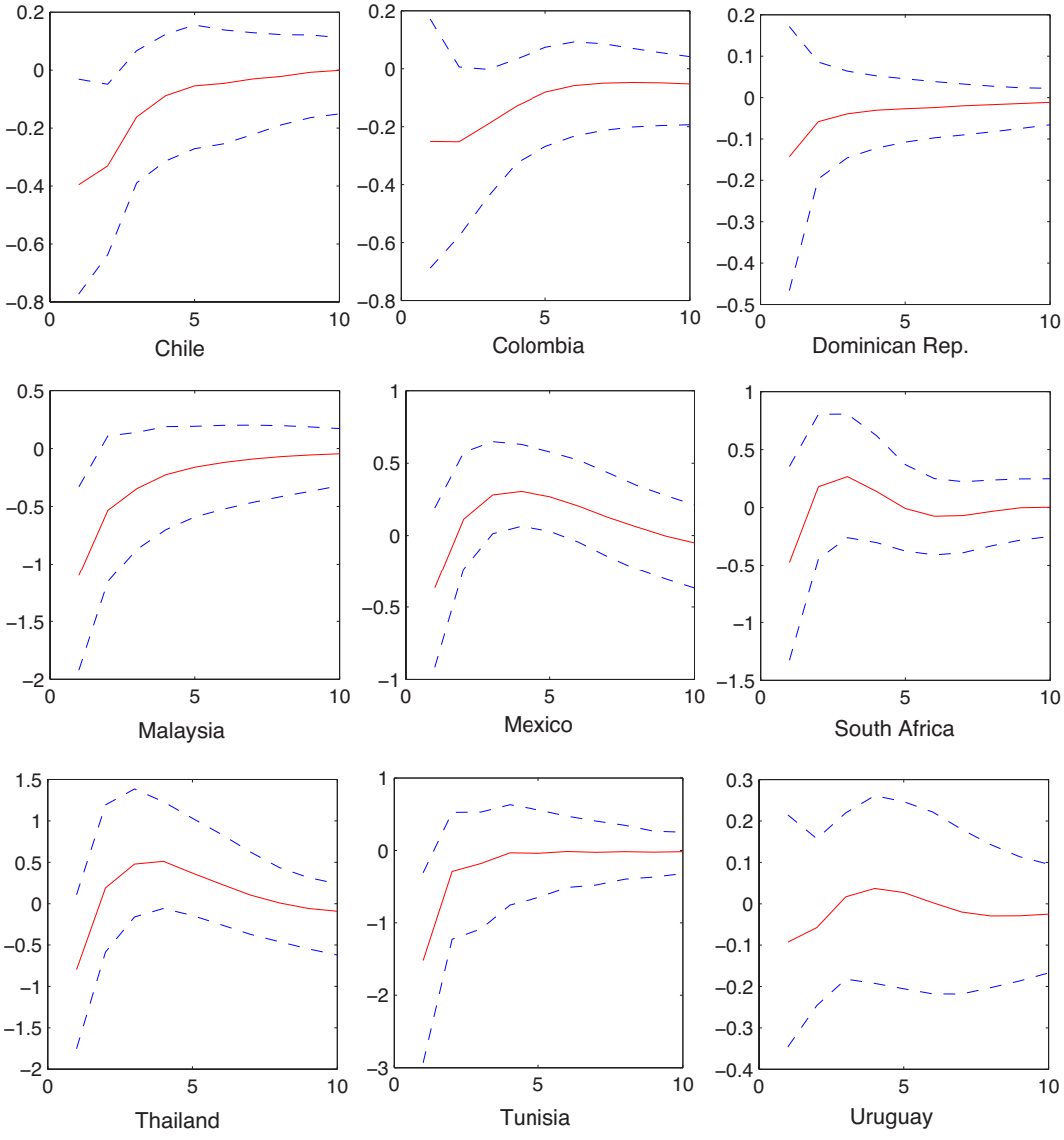


Figure 2.9: Exchange rate response to government spending shocks for sign restriction approach with quadratic time trend

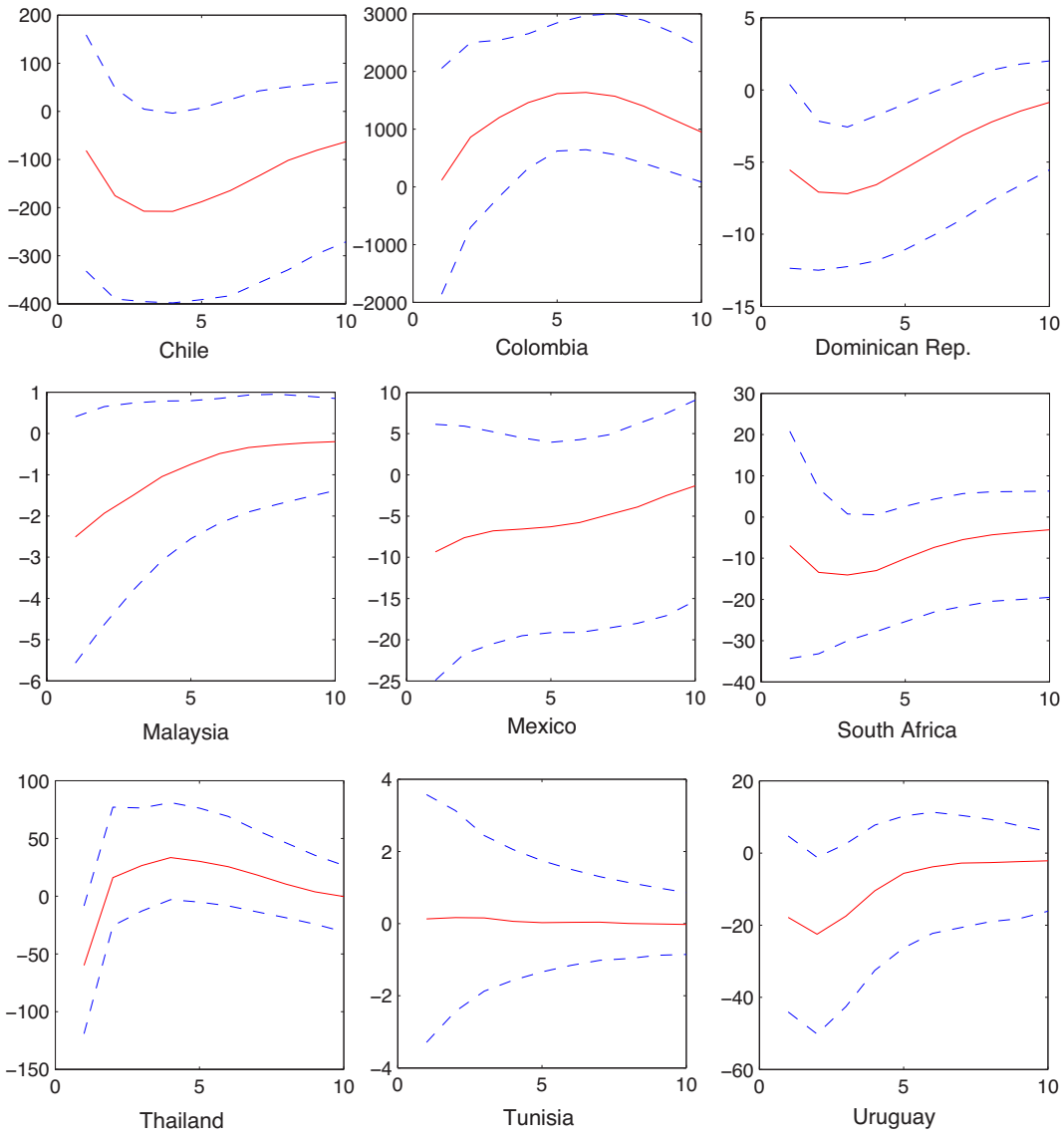


Figure 2.10: Private consumption response to government spending shocks for recursive approach with quadratic time trend

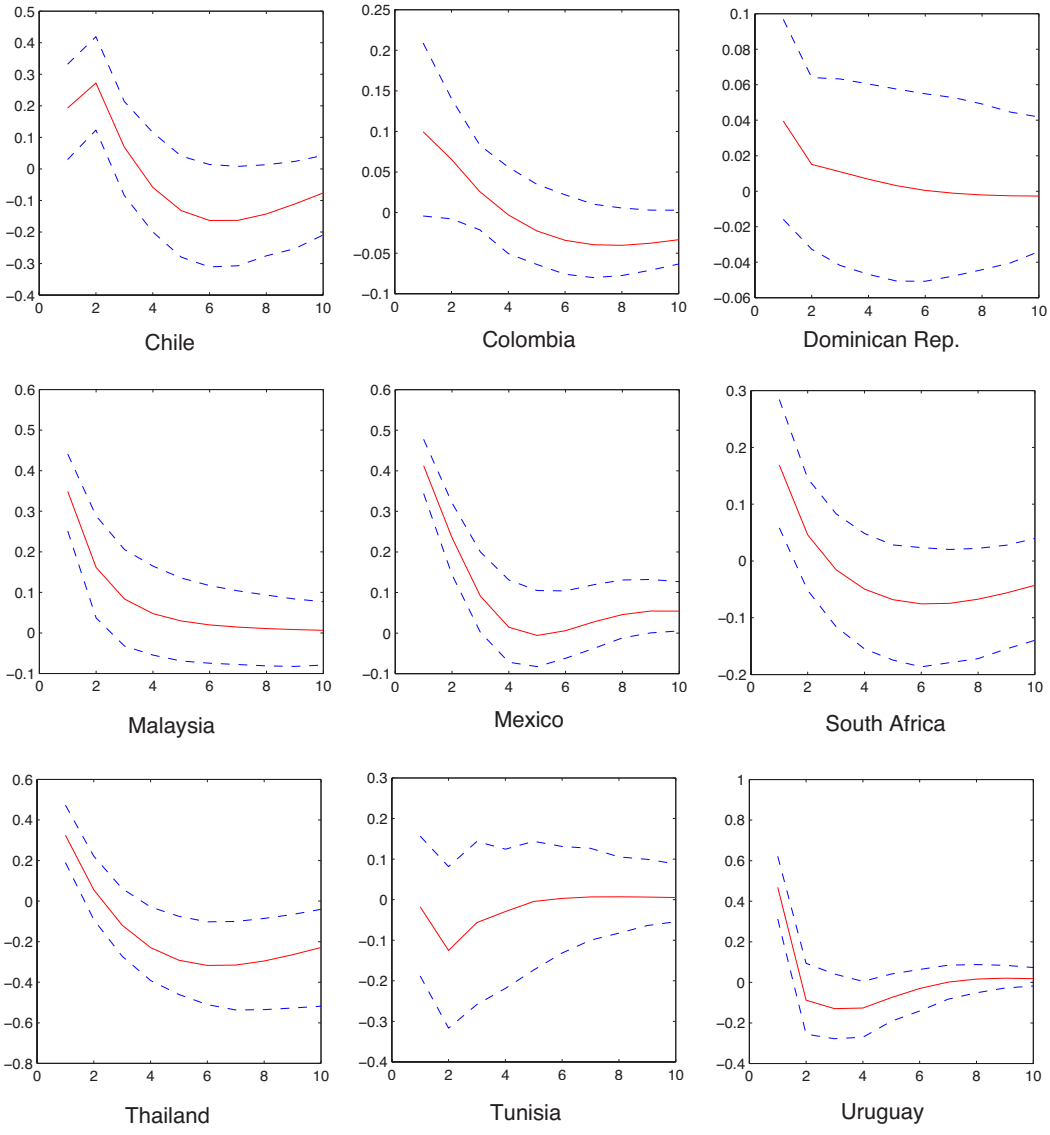


Figure 2.11: Net exports to GDP ratio response to government spending shocks for recursive approach with quadratic time trend

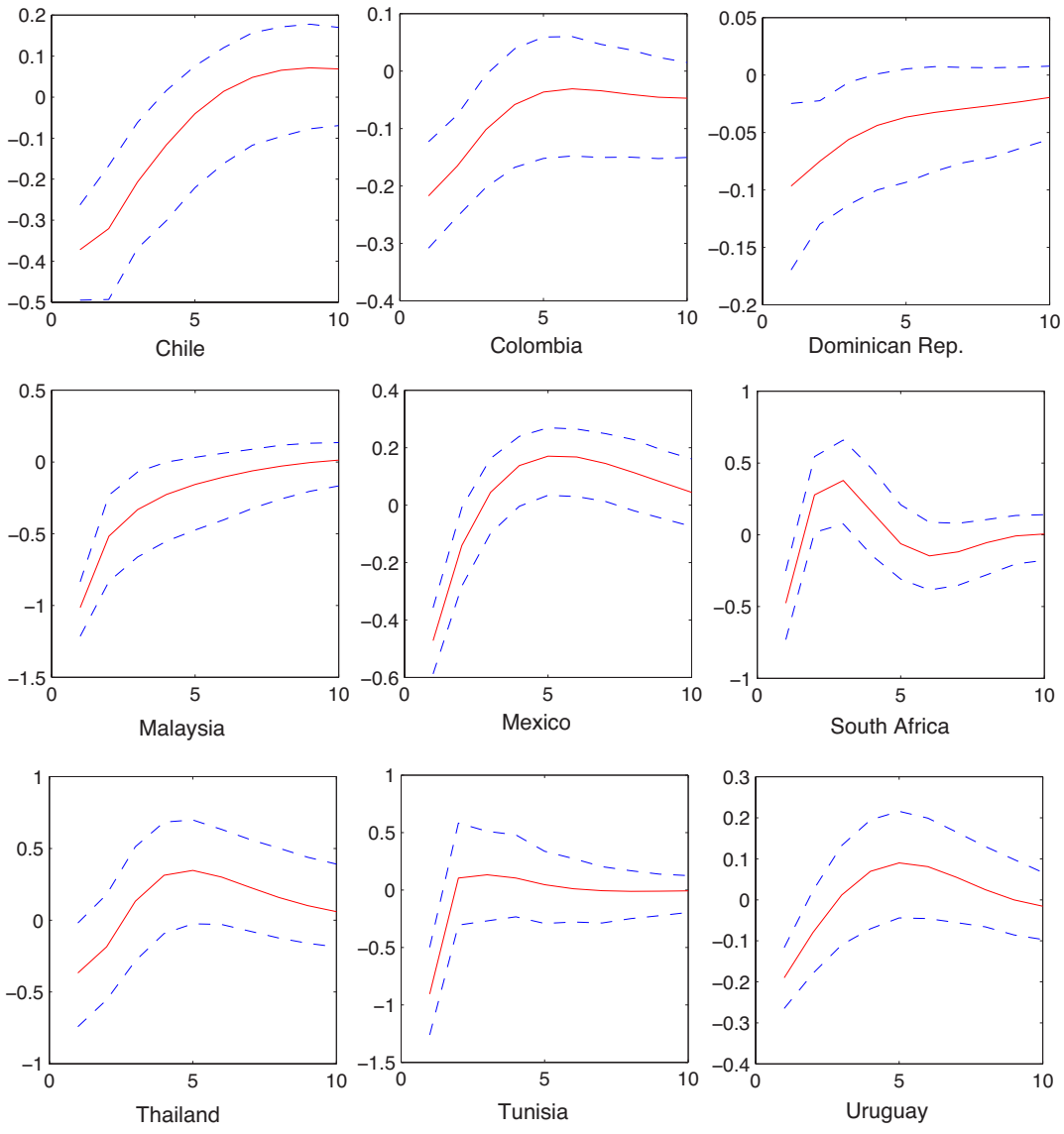
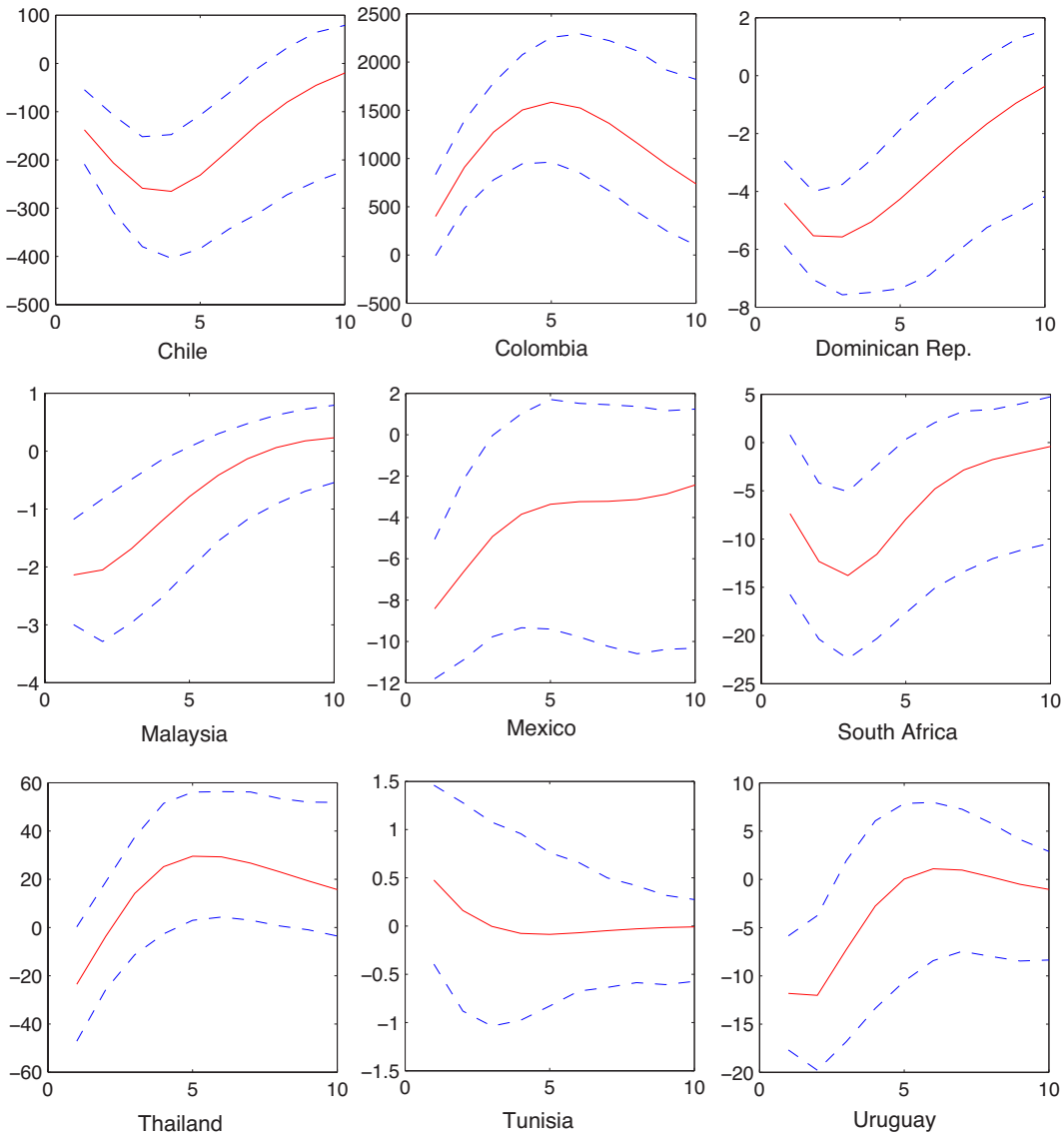


Figure 2.12: Exchange rate response to government spending shocks for recursive approach with quadratic time trend



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Chapter 3

The Cyclicality of Fiscal Policy in Good and Bad Times

3.1 Introduction

Fiscal policy is procyclical in many developing countries. In their seminal work, Gavin and Perotti (1997) showed that fiscal policy was procyclical in Latin America. Following works by Kaminsky et al. (2004), Talvi and Végh (2005) and Ilzetzki and Végh (2008), among others, have reported that not only Latin America but also most developing countries exhibit procyclical fiscal policy.

However, this is rather puzzling as both neoclassical and New Keynesian models have shown that procyclical fiscal policy is not optimal. Optimal fiscal policy in neoclassical models requires either acyclical (Barro (1979)) or counter-cyclical (Baxter and King (1993)) fiscal policy, whereas in New Keynesian models, the optimal policy is essentially counter-cyclical due to the presence of sticky prices or wages (Christiano et al. (2011) and Nakata (2011)).

Different theoretical models trying to explain the puzzle have been put forth. The theoretical models in general can be categorized into those that rely on financial market imperfections and those that posit weak institutions. Of the first group, Aizenman et al. (2000) argue that given many developing countries have limited access to international credit markets, procyclical fiscal policy could arise during bad times when binding constraints force governments to reduce expenditure or increase taxation. On the other hand, Riascos and Végh (2003) show a standard neoclassical model with incomplete market featuring only risk-free debt could produce procyclical government consumption.

The second strand of literature focuses on quality of institutions. Tornell and Lane (1999) study the fiscal process in an economy with weak and legal political infrastructure in the presence of several influential groups. During upturns, the fiscal competition intensifies and the dynamic interaction of the multiple groups leads to a government budget deficit. Talvi and Végh (2005) show that the optimal fiscal policy could be procyclical in a standard optimal fiscal model with the introduction of political distortion. Because of pressure from lobbies to raise public spending, the distortion makes running budget deficits costly. As a result, during good times, tax rates decrease and spending increases.

Alesina et al. (2008) argue procyclical fiscal policy could result in corrupt democracies where voters, who are able to perceive economic conditions but not government borrowing, seek to minimize rent extraction by government officials in times of economic upturns. Equally important, Ilzetzki (2011) shows that procyclical fiscal policy could arise in a dynamic political economy model where a distortion is added in the form of a disagreement by alternating governments on their preferred public spending distribution.

Recent empirical works in the area (Calderón and Schmidt-Hebbel (2008), Frankel et al. (2011)) have pointed out that the dominant factors are institutions, as opposed to financial market imperfections leading to procyclical fiscal policy. Although they have tilted the consensus on the procyclicality of fiscal policy towards weak institutions, to date the debate continues.

So far, however, the previously mentioned empirical studies suffer from some serious limitations. They tend to overlook the different phases of the business cycle and make no attempt to differentiate between recessions and upturns. While making comparisons, far too little attention has been paid to the role of financial integration and institutions in the different states of the economy. A more systematic study should address these limitations.

The aim of this study is to examine, by taking into consideration the different states of the economy, the role of financial openness and quality of institutions on the ability of countries to conduct counter-cyclical fiscal policy and to present empirical evidence that might contribute to the debate or help bridge the two competing views.

The methodology adopted to undertake the empirical evaluation is panel regressions with multiplicative interaction terms. Regressions are made using annual data for 109 countries for the period 1985-2009 to test the main conjecture of the study that whether the role of financial openness and quality of institutions on the degree of cyclicality of fiscal policy is contingent on the state of the economy.

The empirical findings provide a new understanding on the cyclicality of fiscal policy. The findings show that the role of financial openness and quality of institutions on the degree of cyclicality of fiscal policy is contingent on the state of the economy. In particular, they suggest that during good times the quality of institutions has a dominant role to play in the cyclicality of fiscal policy and during bad times both financial integration and institutions are important factors affecting the ability of countries to run counter-cyclical fiscal policy.

The rest of the chapter is structured in the following way. The next section presents the data and methodology. Results are presented and discussed in Section 3.3. Section 3.4 deals with checking the robustness of the results and section 3.5 concludes. The appendix contains all figures and tables.

3.2 Data and Methodology

3.2.1 Data

Data are gathered from multiple sources for 109 countries, of which 83 are classified as developing, for the period 1985-2009. The main national account variables such as GDP, government consumption, and the GDP deflator are collected from the IMF's International Financial Statistics (2011). Institutional quality measures are obtained from the International Country Risk Guide (ICRG) as compiled by PRS (Political Risk Services) group. The capital openness index from Chinn-Ito (2012) is applied to measure the level of financial integration of countries to the international market . Finally, the Direction of Trade Statistics (2011) of the IMF and the World Development Indicators (2011) of the World Bank are used to construct our instrumental and control variables. Table 3.1 describes the different variables used and their sources. In addition, Table 3.2 presents the average financial openness and quality of institutions for the considered time period for the sample countries in the empirical work.

3.2.2 Methodology

The main goal of this study is to analyze the role of financial integration and institutional factors in determining the ability of governments to conduct counter-cyclical fiscal policy

and assess their relative importance in the different states of the economy. We begin by describing the variables chosen to measure fiscal policy, financial integration, institutional factors and the state of the economy.

Fiscal policy is proxied by government consumption. As Kaminsky et al. (2004) and Ilzetzki and Végh (2008) have pointed out, the two fiscal instruments, government consumption and tax rates are well suited to measure fiscal policy. However, due to lack of data on tax rates, we focus only on government consumption.

The capital openness index is used to measure financial integration (Chinn and Ito (2006)). It is based on the binary dummy variables for the four major categories of restrictions on external accounts; presence of multiple exchange rates, restrictions on current account transactions, restrictions on capital account transactions and the requirement of the surrender of export proceeds. Countries' score range from the "most financially open" value of 2.46 to the "least financially open" score of -1.86.

Institutional factors are measured by the political risk index as in Calderón and Schmidt-Hebbel (2008). This index consists of indicators on government stability, socio-economic conditions, investment profile, internal conflict, external conflict, corruption, military in politics, religious tensions, rule of law, ethnic tensions, democratic accountability and the quality of the bureaucracy. It has values that range from 0-100 where larger values indicate higher quality.

The state of the economy is divided into bad and good times. Bad times are defined to be times of negative output gaps whereas good times are those times with positive output gaps. The output gaps are constructed, on a country-by-country basis, from the HP-filtered log of real output[1].

3.2.2.1 Benchmark Model

We start by studying the role of financial openness and quality of institutions on the cyclicality of fiscal policy. The methodology adopted to undertake the empirical evaluation is panel regressions with multiplicative interaction terms. Similar to recent empirical works (Alesina et al. (2008), Calderón and Schmidt-Hebbel (2008)), our benchmark regression equation takes the form:

[1]The data are Hodrick-Prescott filtered using a smoothing parameter of 6.25, however, using a smoothing parameter of 100 doesn't change our results.

$$\Delta G_{i,t} = \alpha + \eta_i + \phi G_{i,t-1} + \beta_i \Delta Y_{i,t} + C' X_{i,t} + \varepsilon_{i,t} \tag{3.1}$$

$$\text{where } \beta_i = \beta_0 + D' F_{i,t}$$

G is the log of real government consumption, Y is the log of real GDP, X is a matrix that includes financial openness (FO), quality of institutions (QI) and change in terms of trade, η_i refers to country fixed effects, and $\varepsilon_{i,t}$ is the stochastic error term. Besides, ϕ is a parameter indicating the persistence of government consumption and C is the matrix of parameters of the control variables. The parameter β_i is modeled as a function of financial openness and quality of institutions contained in the F matrix that interacts with output growth $\Delta Y_{i,t}$ to determine the cyclicality of fiscal policy.

$$\beta_i = \beta_0 + \beta_1 FO_{i,t} + \beta_2 QI_{i,t} \tag{3.2}$$

Equation (3.2) assumes the differences in the extent of international capital market integration and quality of institutions across countries account for the difference in the degree of cyclicality of fiscal policy. Equation (3.1) together with equation (3.2) give:

$$\Delta G_{i,t} = \alpha + \eta_i + \phi G_{i,t-1} + \beta_0 \Delta Y_{i,t} + \beta_1 \Delta Y_{i,t} FO_{i,t} + \beta_2 \Delta Y_{i,t} QI_{i,t} + C' X_{i,t} + \varepsilon_{i,t} \tag{3.3}$$

We expect fiscal policy measured by the government consumption to be counter-cyclical if:

$$\frac{\partial \Delta G_{i,t}}{\partial \Delta Y_{i,t}} = \beta_0 + \beta_1 FO_{i,t} + \beta_2 QI_{i,t} < 0 \tag{3.4}$$

According to (3.4), the cyclicality of fiscal policy depends on the coefficient of the output growth (β_0), the coefficient of interaction between output growth and financial openness (β_1) and the coefficient of interaction between output growth and the quality of institutions (β_2) as well as the levels of financial openness and quality of institutions. Countries with wider access to international capital markets ($\beta_1 < 0$ and higher FO) and a better quality of institutions ($\beta_2 < 0$ and higher QI) are more likely to run counter-cyclical fiscal policy. The coefficient for output growth, β_0, measures estimates of the cyclicality of fiscal policy when financial openness and quality of institutions are at a specific value, namely, when

both are equal to zero. In order to make this coefficient meaningful, financial openness and quality of institutions variables are mean centered in the empirical evaluation. Hence, β_0, measures estimates of the cyclicality of fiscal policy when financial openness and quality of institutions are "average".

Brambor et al. (2006) argue that in multiplicative interaction models the marginal effects of the variables of interest, equation (3.4) in our case, and the significance of these effects should be provided. Aiken and West (1991) standard errors are used to calculate the confidence intervals. On this basis, we discuss the marginal effects of output growth on the growth of government consumption.

3.2.2.2 Main Regression Model

In order to study the effects of financial openness and quality of institutions on the cyclicality of fiscal policy in the different states of the economy, we extend the panel regression model (3.1) to include three-way interaction terms, where the third interaction term indicates the state of the economy, namely good and bad times. Specifically, we model the parameter β_i as follows:

$$\beta_i = \beta_0 + \beta_1 FO_{i,t} + \beta_2 QI_{i,t} + \beta_3 Times_{i,t} + \beta_4 FO_{i,t} Times_{i,t} + \beta_5 QI_{i,t} Times_{i,t} \tag{3.5}$$

where *Times* takes values of 0 and 1 to indicate the two states of the economy. In addition, we extend the matrix X to include *Times*, interaction of financial openness and *Times* as well as interaction of quality of institutions and *Times*. Hence, the main regression takes the form:

$$\begin{aligned}\Delta G_{i,t} = \alpha + \eta_i + \phi G_{i,t-1} + \beta_0 \Delta Y_{i,t} + \beta_1 \Delta Y_{i,t} FO_{i,t} + \beta_2 \Delta Y_{i,t} QI_{i,t} \\ + \beta_3 \Delta Y_{i,t} Times_{i,t} + \beta_4 \Delta Y_{i,t} FO_{i,t} Times_{i,t} + \beta_5 \Delta Y_{i,t} QI_{i,t} Times_{i,t} + C' X_{i,t} + \varepsilon_{i,t}\end{aligned} \tag{3.6}$$

Fiscal policy is expected to be counter-cyclical if

$$\frac{\partial \Delta G_{i,t}}{\partial \Delta Y_{i,t}} = \beta_0 + \beta_1 FO_{i,t} + \beta_2 QI_{i,t} + \beta_3 Times_{i,t} + \beta_4 FO_{i,t} Times_{i,t} + \beta_5 QI_{i,t} Times_{i,t} < 0 \tag{3.7}$$

When $Times = 0$, the slope equation reduces to:

$$\frac{\partial \Delta G_{i,t}}{\partial \Delta Y_{i,t}} = \beta_0 + \beta_1 FO_{i,t} + \beta_2 QI_{i,t} \tag{3.8}$$

When $Times = 1$, the slope equation takes the form:

$$\frac{\partial \Delta G_{i,t}}{\partial \Delta Y_{i,t}} = (\beta_0 + \beta_3) + (\beta_1 + \beta_4) FO_{i,t} + (\beta_2 + \beta_5) QI_{i,t} \tag{3.9}$$

The coefficient β_4 is the slope difference for the two-way interaction parameter for output growth and financial openness between $Times = 1$, minus $Times = 0$. Likewise, β_5 is the slope difference for the two-way interaction parameter for output growth and quality of institutions between $Times = 1$, minus $Times = 0$. If the coefficients are significant, they imply that the role of financial openness and quality of institutions to conduct counter-cyclical fiscal policy varies depending on whether the state of the economy is good or bad.

The interpretation of the lower-order coefficients always are conditionalized on the higher-order product terms, with the conditionalization being that the other variables in the higher order product terms equal zero (Jaccard and Turrisi 2003). For example, the coefficient β_1 reflects the effect of the two-way interaction between output growth and financial openness on growth of government consumption when $Times = 0$. The coefficient β_0, measures estimates of the cyclicality of fiscal policy when financial openness, quality of institutions and *Times* are equal to zero. Again, in order to make this coefficient meaningful, financial openness and quality of institutions variables are mean centered. Hence, β_0, measures estimates of the cyclicality of fiscal policy when financial openness and quality of institutions are "average" in the state of the economy where *Times* is equal to zero. As in the case of the benchmark model, we complement the analysis by providing the marginal effects of output growth on the growth of government consumption.

Both the benchmark and main regressions are estimated using instrumental variable (IV) approach. The reason is to address any problems related to the endogeneity of output growth ΔY (Jaimovich and Panizza (2007), Ilzetzki and Végh (2008)). In this regard, obtaining good instruments for ΔY becomes important.

In this study, we use three instruments based on suggestions in the literature. The instruments are lagged domestic output growth, GDP growth of the region of country *i*

excluding country i itself (Alesina et al. (2008))[2] and the trade weighted average of the trading partners' GDP growth (Jaimovich and Panizza (2007)). The trade weighted average of the trading partners' GDP growth is constructed as:

$$ShockJP_{i,,t} = \frac{EXPORT_i}{GDP_i} \sum_j \pi_{ij,t-1} RGDPGR_{j,t} \tag{3.10}$$

where $RGDPGR_{j,t}$ measures real GDP growth in country j in period t, $\pi_{ij,t}$ is the fraction of export from country i going to country j and $\frac{EXPORT_i}{GDP_i}$ measures country i's average exports expressed as a share of GDP.

3.3 Results

In this section, we present the empirical results. Regressions are estimated using annual data for 109 countries for the period 1985-2009. First, the results of our baseline regressions are used to assess the role of financial openness and quality of institutions on the ability of countries to run counter-cyclical fiscal policy. Second, we test the main conjecture of the study that whether the state of the economy being in good or bad times influences the role of financial openness and quality of institutions on the degree of cyclicality of fiscal policy. In the regressions, IV estimates are presented for different model specifications where we control for country fixed effects, country and time fixed effects as well as GMM IV estimates with country fixed effects controlled for. The discussion below is primarily focused on the standard specification in the literature, where we allow for only country fixed effects.

Table 3.3 shows some sample statistics on growth of government consumption, output growth, financial openness and quality of institutions for the full sample as well as industrial and developing countries. In general, industrial countries have higher financial openness and strong institutions than developing countries. In Table 3.4, simple correlations between

[2] Following Alesina et al. (2008), the regions are as defined by the World Bank: High-Income OECD countries, High-Income non-OECD countries, East Asia and Pacific, Eastern Europe and Central Asia, Latin America and Caribbean, Middle East and North Africa, South Asia, and Sub-Saharan Africa. To measure the region's output purchasing power parity (PPP)–adjusted terms are used.

cyclical components of government consumption and GDP indicate higher positive correlation values for developing countries than industrial countries. Besides, financial openness and quality of institutions seem to influence the correlation between cyclical components of government consumption and GDP.

3.3.1 Baseline regressions

The baseline regressions to assess the role of financial openness and quality of institutions on cyclicality of fiscal policy for the full sample countries are reported in Table 3.5. Regardless of the specifications, the estimates are similar. As mentioned in the previous sections, in order to make the interpretations meaningful, the financial openness and quality of institutions variables are mean centered.

In this regression, we have two separate interaction terms indicating how the relationship between growth of government consumption and output growth varies across different levels of financial openness and quality of institutions. The coefficient for interaction effect between output growth and financial openness is negative, but it is not statistically significant. Hence, financial openness appears not to influence the cyclicality of fiscal policy at the business cycle level.

On the other hand, the coefficient for the interaction effect between output growth and quality of institutions is negative and it is statistically significant indicating how the relationship between growth of government consumption and growth of GDP varies across different levels of quality of institutions.

The output growth coefficient is positive and significant, thereby implying a procyclical fiscal behavior in countries with average financial openness and quality of institutions. As a supplementary analysis, Figure 3.1 shows the marginal effect of output growth on growth of government consumption, termed in the figure as the cyclicality of fiscal policy, conditional on different levels of financial openness (quality of institutions) while keeping quality of institutions (financial openness) constant at its low, average and high values. The dashed lines present the 95% confidence intervals.

The figure suggests that fiscal policy could be procyclical for very low quality of institutions irrespective of the level of financial openness. However, for countries to be able to run counter-cyclical fiscal policy, stronger institutions seem to be important together with wider access to the international market.

3.3.2 Main regressions

In the second set of regressions, we test the major conjecture of this study that whether the role of financial openness and quality of institutions on the degree of cyclicality of fiscal policy is contingent on the state of the economy. The regressions include, among other terms, two separate three-way interactions; an interaction between output growth, financial openness and *Times*, and output growth, quality of institutions and *Times*. The *Times* variable is measured as a dummy that takes the value of one for bad times and zero for good times.

The results of the regressions are reported in Table 3.6. The coefficient for the interaction between output growth, financial openness and *Times* is negative and significant. This suggests that wider access to world financial markets contributes to less procyclical or more counter-cyclical fiscal policy in bad times than in good times. On the other hand, the interaction between output growth, quality of institutions and *Times* is positive and significant indicating strong institutions lead to less procyclical or more counter-cyclical fiscal policy in good times than in bad times.

Given the role of financial openness and quality of institutions on the degree of counter-cyclicality of fiscal policy could be different contingent on the state of the economy, we examine the good and bad times in greater detail.

During good times, the coefficient for the interaction between output growth and financial openness is positive and significant whereas the interaction between output growth and quality of institutions is negative and significant. The result suggests that countries are likely able to run counter-cyclical fiscal policy during good times if they have stronger institutions and do not have higher financial openness.

Figure 3.2 depicts the marginal effects of output growth on the growth of government consumption conditional on the different combinations of levels of financial openness and quality of institutions during good times. The figure suggests that the level of quality of institutions mainly drives the behavior of the cyclicality of fiscal policy in good times. Specifically, irrespective of the level of financial openness; while very low quality of institutions could lead to procyclical fiscal policy, very high quality of institutions could result in counter-cyclical fiscal policy. Interestingly in the case of average quality of institutions with higher openness levels, financial openness could be influential in leading to a procyclical fiscal behavior.

During bad times, both the interactions between output growth and financial openness, and between output growth and quality of institutions are negative. It is significant as well for the latter one. To have a better understanding of the role of financial openness and quality of institutions, Figure 3.3 presents the marginal effects of output growth on the growth of government consumption during bad times. The figure suggests that during bad times, unlike good times, countries could conduct counter-cyclical fiscal policy if they have both stronger institutions and wider access to the international capital market. In particular, the figure suggests that neither financial openness nor quality of institutions on its own could lead to counter-cyclical fiscal behavior, thereby implying both factors are important in the ability of countries to run counter-cyclical fiscal policy during bad times.

The empirical assessment has provided two major findings. First, while financial openness tends to contribute to less procyclical or more counter-cyclical fiscal behavior in bad times than in good times, quality of institutions appears to contribute to less procyclical or more counter-cyclical fiscal policy in good times than in bad times. Second, the level of quality of institutions mainly drives the behavior of the cyclicality of fiscal policy in good times whereas both factors are important in the ability of countries to run counter-cyclical fiscal policy during bad times.

3.4 Check of Robustness

The robustness of our results is assessed along two dimensions. First, we rerun our regressions using lagged values of financial openness and quality of institutions. Second, we check the sensitivity of our definition of good and bad times.

We begin by substituting financial openness and quality of institutions by their lagged values in the benchmark regressions. The results of the regressions are presented in Table 3.7. Figure 3.4 illustrates the robustness checks for the marginal effects of output growth on the growth of government consumption. These results are in agreement with our earlier findings. Likewise, the results for the main regressions using lagged values of financial openness and quality of institutions variables are presented in Table 3.8. Equally important, Figure 3.5 and 3.6 depict the marginal effects of output growth on growth of government consumption in good and bad times respectively. Again, the previous section's results remain unchanged and robust.

To check the sensitivity of our definition of good and bad times, we apply a criterion commonly found in the literature to divide the state of the economy (Kaminsky et al. (2004), Jaimovich and Panizza (2007)). According to this criterion, good times are defined to be times when annual real GDP growth is above the median whereas bad times are those times where growth falls below the median. The relevant median is calculated on a country-by-country basis. The results under this approach are also consistent with our main findings (See Table 3.9, Table 3.10, Fig. 3.7 and Fig. 3.8).

3.5 Conclusion

This chapter has empirically investigated the role of financial openness and quality of institutions on the degree of cyclicality of fiscal policy giving special emphasis to the state of the economy. The purpose of the investigation was to shed more light on and contribute to the current debate regarding the observed procyclical fiscal policy in many developing countries. One view espouses that procyclical fiscal policy is a result of lack of financial integration to the world while another view attributes it to weak institutions within the country. This study has tried to bridge the two competing views through an empirical assessment of the cyclicality of fiscal policy in good and bad times.

The empirical findings show that the role of financial openness and quality of institutions on the degree of cyclicality of fiscal policy depends on the state of the economy. The findings suggest that the level of quality of institutions mainly drives the behavior of the cyclicality of fiscal policy in good times whereas both financial integration and institutions are important in the ability of countries to run counter-cyclical fiscal policy during bad times.

Two caveats need to be noted. First, the study has only examined government consumption as a fiscal policy indicator. A complete study on fiscal policy should have considered tax rates too. Second, lack of wide variety of instrumental variables has created difficulty in addressing the different endogeneity concerns of the empirical assessment in a satisfactory way.

A further study could incorporate the empirical findings into theoretical models and explore possible mechanisms that might explain together the role of financial integration and institutions on the cyclicality of fiscal policy.

3.6 APPENDIX

3.6.1 Tables

Table 3.1: Variables and sources of data

Descriptor	**Database**
Gross Domestic Product (GDP)	International Financial Statistics (IFS)
Government Consumption Expenditure	International Financial Statistics (IFS)
GDP Deflator	International Financial Statistics (IFS)
Political Risk Index	International Country Risk Guide (ICRG)
Capital Openness Index	Chinn-Ito Index
Terms of Trade	World Economic Outlook (WEO)
Gross Domestic Product (GDP), PPP	World Development Indicators (WDI)
Exports of a country to the world by partner	Direction of Trade Statistics (DOTS)
Exports of Goods and Services	International Financial Statistics (IFS)

Table 3.2: Average financial openness and quality of institutions of the sample countries

Country	FO	QI	Country	FO	QI	Country	FO	QI
Industrial			Burkina Faso	-1.04	-9.02	Mongolia	0.73	0.98
Australia	1.50	18.99	Cameroon	-0.57	-10.61	Morocco	-1.32	-1.57
Austria	1.78	21.40	Chile	-1.30	5.10	Mozambique	-1.58	-9.63
Belgium	1.66	16.23	China,P.R.	-0.55	0.71	Myanmar	-1.81	-17.35
Canada	-1.21	19.60	Colombia	-1.59	-9.32	Namibia	-1.47	8.06
Cyprus	-0.49	6.91	Congo, Dem. Rep.	-1.42	-31.13	Nicaragua	0.49	-9.68
Denmark	1.79	21.71	Congo, Republic	-1.36	-12.53	Niger	-0.91	-13.00
Finland	1.78	24.77	Costa Rica	-1.38	6.94	Nigeria	-1.32	-18.74
France	1.43	14.04	Croatia	0.25	7.46	Oman	1.91	4.25
Germany	2.20	18.52	Czech Republic	1.19	13.64	Pakistan	-1.45	-19.51
Greece	0.42	6.57	Côte d'Ivoire	-0.21	-8.89	Panama	2.20	-3.35
Iceland	-0.05	21.58	Dominican Rep.	-0.98	-3.62	Papua New Guinea	-0.65	-5.41
Ireland	1.33	19.20	Ecuador	-0.04	-7.13	Paraguay	-0.06	-6.11
Italy	1.43	11.75	Egypt	0.10	-6.93	Peru	0.88	-11.01
Japan	2.15	18.03	El Salvador	0.42	-8.29	Philippines	-0.44	-7.63
Luxembourg	-	27.54	Ethiopia	-1.48	-18.69	Poland	-1.18	6.26
Malta	-0.64	12.15	Ghana	-1.62	-4.91	Romania	-0.76	-1.26
Netherlands	2.20	22.83	Guatemala	0.72	-10.09	Saudi Arabia	1.57	-1.71
New Zealand	2.14	21.13	Guinea-Bissau	-1.48	-16.91	Senegal	-0.96	-7.52
Norway	1.17	21.53	Guyana	0.43	-6.76	Sierra Leone	-1.27	-19.30
Portugal	1.15	14.71	Haiti	0.51	-25.84	Singapore	2.12	17.54
Qatar	2.20	0.88	Honduras	-0.72	-11.42	South Africa	-1.55	0.15
Spain	1.22	10.62	Hungary	-0.16	11.90	Sri Lanka	-0.36	-15.54
Sweden	1.67	21.75	India	-1.42	-9.48	Syrian Arab Republic	-2.12	-6.97
Switzerland	2.20	24.49	Indonesia	1.54	-12.54	Tanzania	-1.38	-4.38
United Kingdom	2.20	17.67	Iran, I.R. of	-1.33	-10.08	Thailand	-0.46	-1.15
United States	2.20	17.42	Israel	0.09	-6.59	Togo	-1.42	-15.97
Developing			Jamaica	0.64	3.75	Trinidad and Tobago	0.93	0.45
Angola	-1.67	-16.41	Jordan	0.54	-2.04	Tunisia	-1.25	0.90
Argentina	-0.33	1.69	Kenya	-0.25	-7.76	Turkey	-1.03	-7.65
Bahrain	2.11	-0.19	Korea, Rep.	-0.63	7.67	Uganda	0.38	-15.72
Bangladesh	-1.53	-17.86	Libya	-1.48	-8.10	Uruguay	1.50	2.84
Bolivia	0.50	-8.64	Madagascar	-0.88	-5.77	Venezuela, Rep. Bol.	-0.42	-4.97
Botswana	0.32	7.61	Malawi	-1.49	-7.17	Vietnam	-1.51	-3.75
Brazil	-1.35	0.67	Malaysia	0.77	5.73	Yemen, Republic of	1.79	-4.84
Brunei Darussalam	-	14.36	Mali	-0.96	-12.14	Zambia	0.31	-6.59
Bulgaria	-0.35	4.52	Mexico	0.15	4.19	Zimbabwe	-1.84	-14.4

Note: Financial openness (FO) and Quality of institutions (QI) are mean centered.

Table 3.3: Sample statistics

Variables	**All**	**Industrial**	**Developing**
Growth in Government Consumption	0.035	0.034	0.035
	(0.13)	(0.05)	(0.14)
GDP Growth	0.036	0.028	0.039
	(0.09)	(0.03)	(0.10)
Financial Openness	0	1.321	-0.415
	(1.60)	(1.29)	(1.46)
Quality of Institutions	0	17.385	-5.501
	(14.96)	(8.18)	(12.15)

Financial openness (FO) and Quality of institutions (QI) are mean centered.
Standard deviations are reported in parentheses below the average values.

Table 3.4: Simple correlations

Variables	**All**	**Industrial**	**Developing**
(Cygcon, Cygdp)	0.316	0.178	0.326
(Corr(Cygcon, Cygdp), Financial Openness)	-0.022	0.146	0.101
(Corr(Cygcon, Cygdp), QI)	-0.139	0.035	0.061
(Corr(Cygcon, Cygdp), GDPPC in PPP)	-0.18	0.05	0.03

Cygcon : Cyclical component of Government Consumption
Cygdp : Cyclical component of GDP

Table 3.5: Cyclicality of fiscal policy: the role of financial openness and quality of institutions

Dependent Variable: Growth in Government Consumption			
Instrumented Variable: GDP growth and interaction terms with GDP growth			
Instruments: Lagged GDP growth, GDP growth of trading partners, GDP growth of the rest of region			
	Fixed Effects	Fixed Time Effects	Fixed Effects, GMM
GDP growth	0.680**	1.185***	0.547*
	(2.54)	(3.17)	(1.79)
GDP growth X FO	-0.0643	-0.0173	-0.0237
	(-0.42)	(-0.10)	(-0.16)
GDP growth X QI	-0.0552***	-0.0378**	-0.0527***
	(-3.39)	(-2.12)	(-3.65)
Change in ToT	-0.00108***	-0.000976***	-0.00122***
	(-4.69)	(-4.18)	(-4.06)
FO	0.0129**	0.00573	0.0139**
	(2.26)	(0.90)	(2.13)
QI	0.00361***	0.00200**	0.00400***
	(4.99)	(2.39)	(5.26)
Lagged Gov. Consumption	-0.0650***	-0.104***	-0.0636***
	(-4.06)	(-3.47)	(-3.53)
Constant	1.671***	2.748***	
	(4.01)	(3.51)	
Observations	1831	1831	1831

Note: T statistics in parentheses. * p<0.1, ** p<0.05, ***p<0.001

Table 3.6: Cyclicality of fiscal policy: the role of financial openness and quality of institutions in good and bad times

Dependent Variable: Growth in Government Consumption			
Instrumented Variable: GDP growth and interaction terms with GDP growth			
Instruments: Lagged GDP growth, GDP growth of trading partners, GDP growth of the rest of region			
	Fixed Effects	Fixed Time Effects	Fixed Effects, GMM
GDP growth	-0.481	-0.310	-0.0454
	(-0.70)	(-0.44)	(-0.07)
GDP growth X FO	0.754*	0.770*	0.500
	(1.93)	(1.89)	(1.39)
GDP growth X QI	-0.137***	-0.119***	-0.122**
	(-3.22)	(-2.66)	(-2.54)
GDP growth X Times	0.825	1.027	0.476
	(1.32)	(1.57)	(0.83)
GDP growth X FO X Times	-0.936**	-0.754**	-0.666*
	(-2.49)	(-1.97)	(-1.91)
GDP growth X QI X Times	0.0908**	0.0891**	0.0761*
	(2.20)	(2.14)	(1.65)
Change in ToT	-0.00109***	-0.00102***	-0.00130***
	(-4.12)	(-4.01)	(-3.80)
FO	-0.0239	-0.0304	-0.0133
	(-1.27)	(-1.49)	(-0.73)
QI	0.00859***	0.00678***	0.00765***
	(4.02)	(3.05)	(2.93)
Times	-0.0484	-0.0558	-0.0313
	(-1.35)	(-1.53)	(-0.92)
FO X Times	0.0431**	0.0390*	0.0303
	(2.17)	(1.89)	(1.60)
QI X Times	-0.00475**	-0.00421**	-0.00396
	(-2.31)	(-2.04)	(-1.60)
Lagged Gov. Consumption	-0.0887***	-0.150***	-0.0677***
	(-4.57)	(-5.09)	(-3.61)
Constant	2.330***	4.006***	
	(4.45)	(5.05)	
Observations	1831	1831	1831

Note: The reference category is good times. T statistics in parentheses. * p<0.1, ** p<0.05, ***p<0.001

Table 3.7: Cyclicality of fiscal policy: using lagged values of financial openness and quality of institutions

Dependent Variable: Growth in Government Consumption			
Instrumented Variable: GDP growth and interaction terms with GDP growth			
Instruments: Lagged GDP growth, GDP growth of trading partners, GDP growth of the rest of region			
	Fixed Effects	Fixed Time Effects	Fixed Effects, GMM
GDP growth	0.931***	1.349***	0.794**
	(3.11)	(3.59)	(2.41)
GDP growth X Lagged FO	-0.0332	0.00264	-0.0196
	(-0.21)	(0.02)	(-0.14)
GDP growth X Lagged QI	-0.0748***	-0.0560***	-0.0655***
	(-3.96)	(-2.68)	(-3.39)
Change in ToT	-0.00103***	-0.000947***	-0.00109***
	(-4.12)	(-3.76)	(-3.48)
Lagged FO	0.00713	0.00166	0.00714
	(1.21)	(0.25)	(1.38)
Lagged QI	0.00440***	0.00319***	0.00450***
	(5.85)	(3.98)	(5.05)
Lagged Gov. Consumption	-0.0556***	-0.0875***	-0.0564***
	(-3.08)	(-2.72)	(-2.60)
Constant	1.420***	2.312***	
	(3.02)	(2.74)	
Observations	1823	1823	1823

Note: T statistics in parentheses. * p<0.1, ** p<0.05, ***p<0.001

Table 3.8: Cyclicality of fiscal policy in good and bad times: using lagged values of financial openness and quality of institutions

Dependent Variable: Growth in Government Consumption			
Instrumented Variable: GDP growth and interaction terms with GDP growth			
Instruments: Lagged GDP growth, GDP growth of trading partners, GDP growth of the rest of region			
	Fixed Effects	Fixed Time Effects	Fixed Effects, GMM
GDP growth	0.0137	-0.0512	0.238
	(0.02)	(-0.07)	(0.36)
GDP growth X Lagged FO	0.854*	0.927*	0.653
	(1.91)	(1.83)	(1.55)
GDP growth X Lagged QI	-0.187***	-0.167***	-0.173***
	(-3.42)	(-2.68)	(-2.65)
GDP growth X Times	0.473	0.782	0.312
	(0.73)	(1.11)	(0.51)
GDP growth X Lagged FO X Times	-0.924**	-0.823*	-0.733*
	(-2.16)	(-1.74)	(-1.83)
GDP growth X Lagged QI X Times	0.124**	0.122**	0.111*
	(2.38)	(2.19)	(1.76)
Change in ToT	-0.00109***	-0.00103***	-0.00128***
	(-3.90)	(-3.82)	(-3.86)
Lagged FO	-0.0338	-0.0416*	-0.0258
	(-1.59)	(-1.68)	(-1.23)
Lagged QI	0.0117***	0.00990***	0.0108***
	(4.00)	(3.12)	(2.92)
Times	-0.0188	-0.0357	-0.0123
	(-0.52)	(-0.94)	(-0.33)
Lagged FO X Times	0.0469**	0.0463*	0.0371*
	(2.10)	(1.82)	(1.71)
Lagged QI X Times	-0.00749***	-0.00674**	-0.00660*
	(-2.78)	(-2.33)	(-1.92)
Lagged Gov. Consumption	-0.0779***	-0.136***	-0.0644***
	(-3.88)	(-4.52)	(-3.32)
Constant	2.021***	3.612***	
	(3.74)	(4.46)	
Observations	1823	1823	1823

Note: The reference category is good times. T statistics in parentheses. * p<0.1, ** p<0.05, ***p<0.001

Table 3.9: Cyclicality of fiscal policy in good and bad times: good and bad times defined on the basis of median growth

Dependent Variable: Growth in Government Consumption			
Instrumented Variable: GDP growth and interaction terms with GDP growth			
Instruments: Lagged GDP growth, GDP growth of trading partners, GDP growth of the rest of region			
	Fixed Effects	Fixed Time Effects	Fixed Effects, GMM
GDP growth	-1.783*	-1.725*	-1.057
	(-1.83)	(-1.75)	(-1.26)
GDP growth X FO	1.528**	1.606***	1.546**
	(2.57)	(2.59)	(2.46)
GDP growth X QI	-0.225***	-0.220***	-0.254***
	(-2.83)	(-2.68)	(-2.92)
GDP growth X Times	1.705*	2.069**	1.076
	(1.89)	(2.25)	(1.42)
GDP growth X FO X Times	-1.529***	-1.374**	-1.454***
	(-2.79)	(-2.37)	(-2.61)
GDP growth X QI X Times	0.161**	0.174**	0.181**
	(2.31)	(2.50)	(2.36)
Change in ToT	-0.00114***	-0.00109***	-0.00158***
	(-4.28)	(-3.97)	(-4.37)
FO	-0.0839**	-0.0936**	-0.0874**
	(-2.31)	(-2.45)	(-2.22)
QI	0.0153***	0.0144***	0.0176***
	(3.17)	(2.87)	(3.22)
Times	-0.120**	-0.125**	-0.0777
	(-2.15)	(-2.25)	(-1.64)
FO X Times	0.105***	0.106***	0.106***
	(2.79)	(2.69)	(2.65)
QI X Times	-0.0109**	-0.0110**	-0.0130***
	(-2.48)	(-2.44)	(-2.63)
Lagged Gov. Consumption	-0.0989***	-0.172***	-0.0791***
	(-5.47)	(-7.00)	(-4.28)
Constant	1831	1831	1831
	(3.74)	(4.46)	
Observations	1823	1823	1823

Note: The reference category is good times. T statistics in parentheses. * p<0.1, ** p<0.05, ***p<0.001

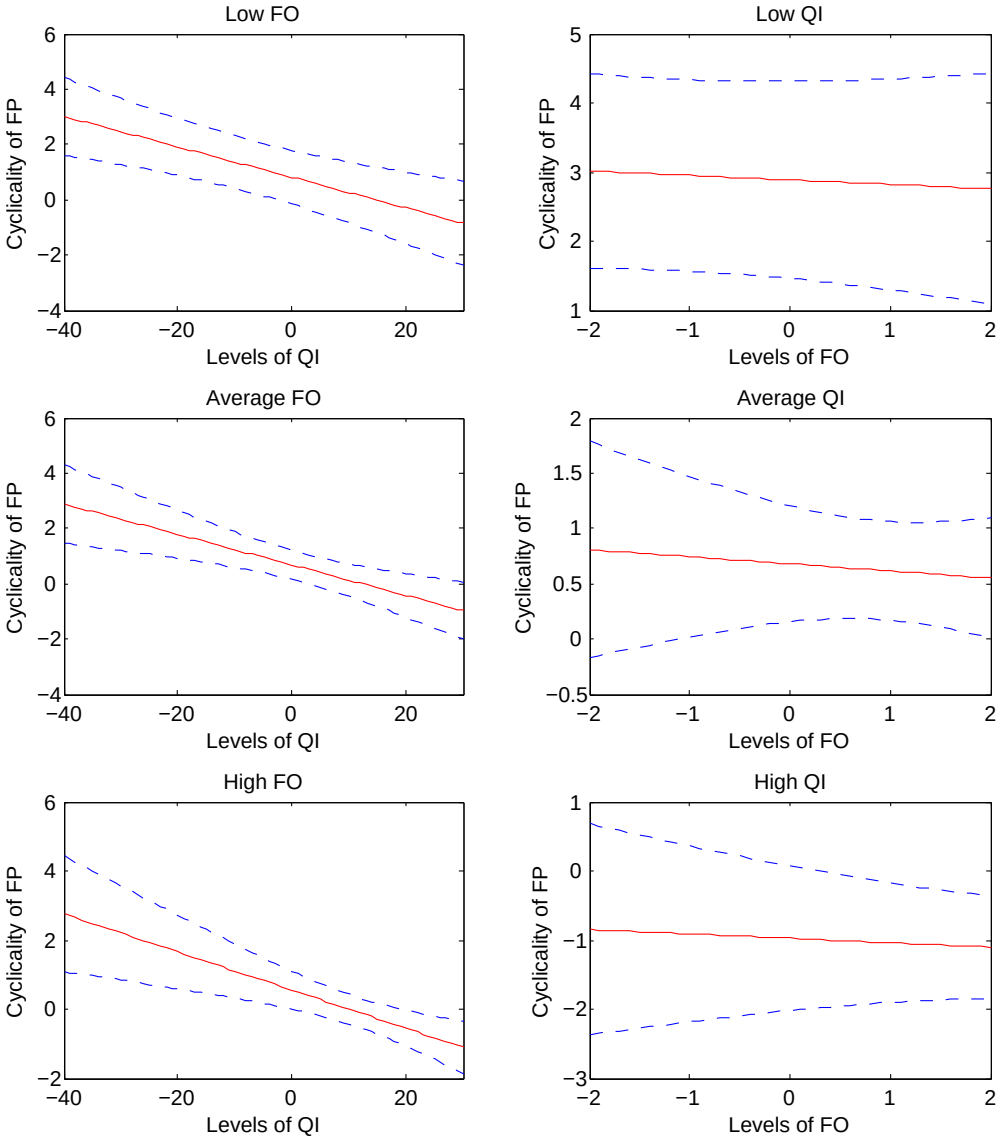
Table 3.10: Cyclicality of fiscal policy in good and bad times: using lagged values of financial openness and quality of institutions & good and bad times defined on the basis of median growth

Dependent Variable: Growth in Government Consumption			
Instrumented Variable: GDP growth and interaction terms with GDP growth			
Instruments: Lagged GDP growth, GDP growth of trading partners, GDP growth of the rest of region			
	Fixed Effects	Fixed Time Effects	Fixed Effects, GMM
GDP growth	-1.879	-1.609	-0.937
	(-1.61)	(-1.42)	(-0.77)
GDP growth X Lagged FO	2.100**	1.908**	1.606*
	(2.53)	(2.28)	(1.90)
GDP growth X Lagged QI	-0.302***	-0.257**	-0.272**
	(-2.84)	(-2.39)	(-2.50)
GDP growth X Times	2.111*	2.254**	1.328
	(1.92)	(2.06)	(1.25)
GDP growth X Lagged FO X Times	-2.017***	-1.691**	-1.520**
	(-2.67)	(-2.17)	(-2.00)
GDP growth X Lagged QI X Times	0.224**	0.204**	0.189*
	(2.36)	(2.24)	(1.87)
Change in ToT	-0.00100***	-0.000960***	-0.00140***
	(-3.49)	(-3.38)	(-3.66)
Lagged FO	-0.120**	-0.113**	-0.0922*
	(-2.41)	(-2.23)	(-1.82)
Lagged QI	0.0203***	0.0168***	0.0189***
	(3.09)	(2.59)	(2.77)
Times	-0.121*	-0.116*	-0.0686
	(-1.85)	(-1.85)	(-1.00)
Lagged FO X Times	0.138***	0.123**	0.107**
	(2.66)	(2.33)	(2.03)
Lagged QI X Times	-0.0156***	-0.0133**	-0.0143**
	(-2.60)	(-2.23)	(-2.29)
Lagged Gov. Consumption	-0.0944***	-0.159***	-0.0762***
	(-4.55)	(-6.02)	(-3.58)
Constant	1823	1823	1823
	(3.74)	(4.46)	
Observations	1823	1823	1823

Note: The reference category is good times. T statistics in parentheses. * p<0.1, ** p<0.05, ***p<0.001

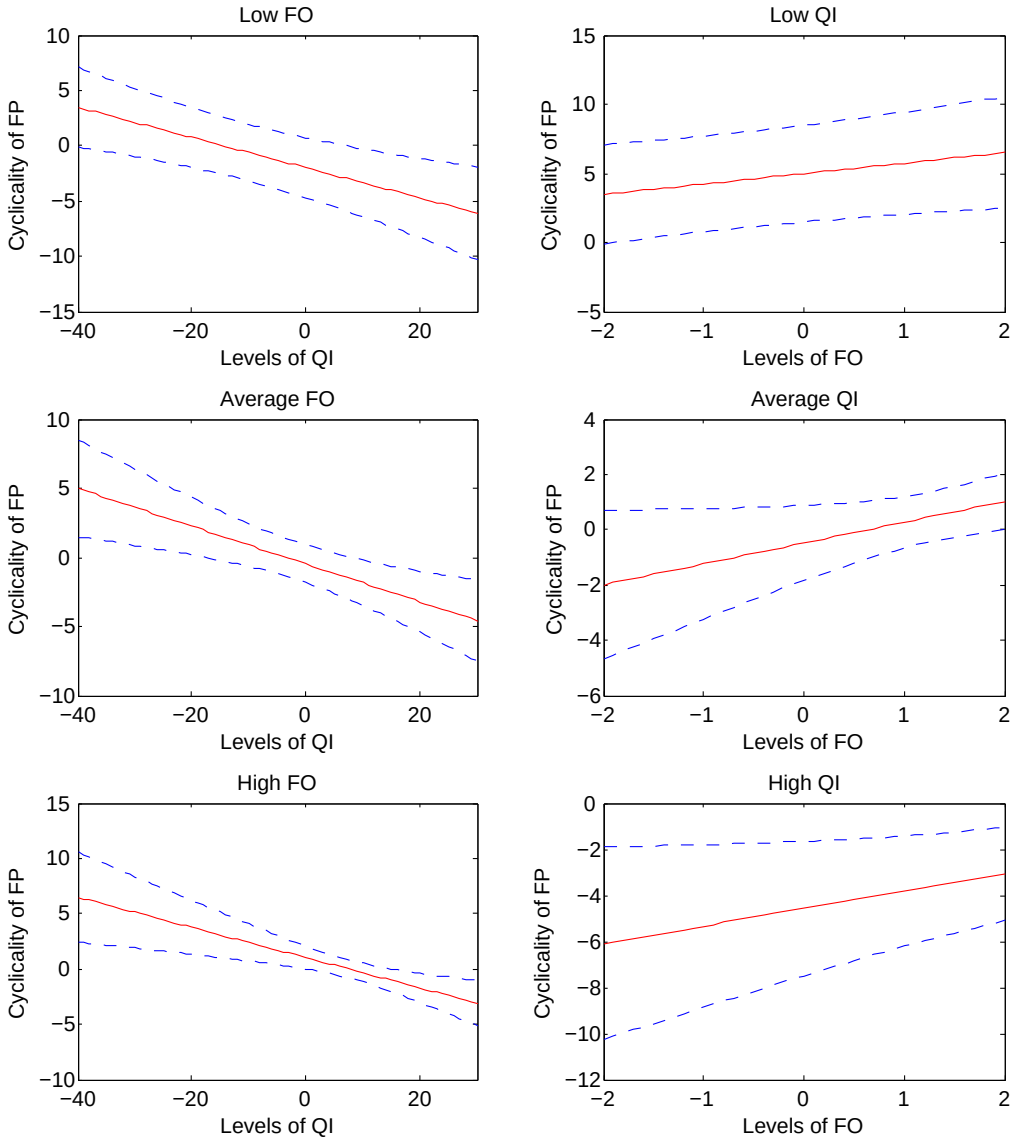
3.6.2 Figures

Figure 3.1: Cyclicality of fiscal policy: the role of financial openness and quality of institutions



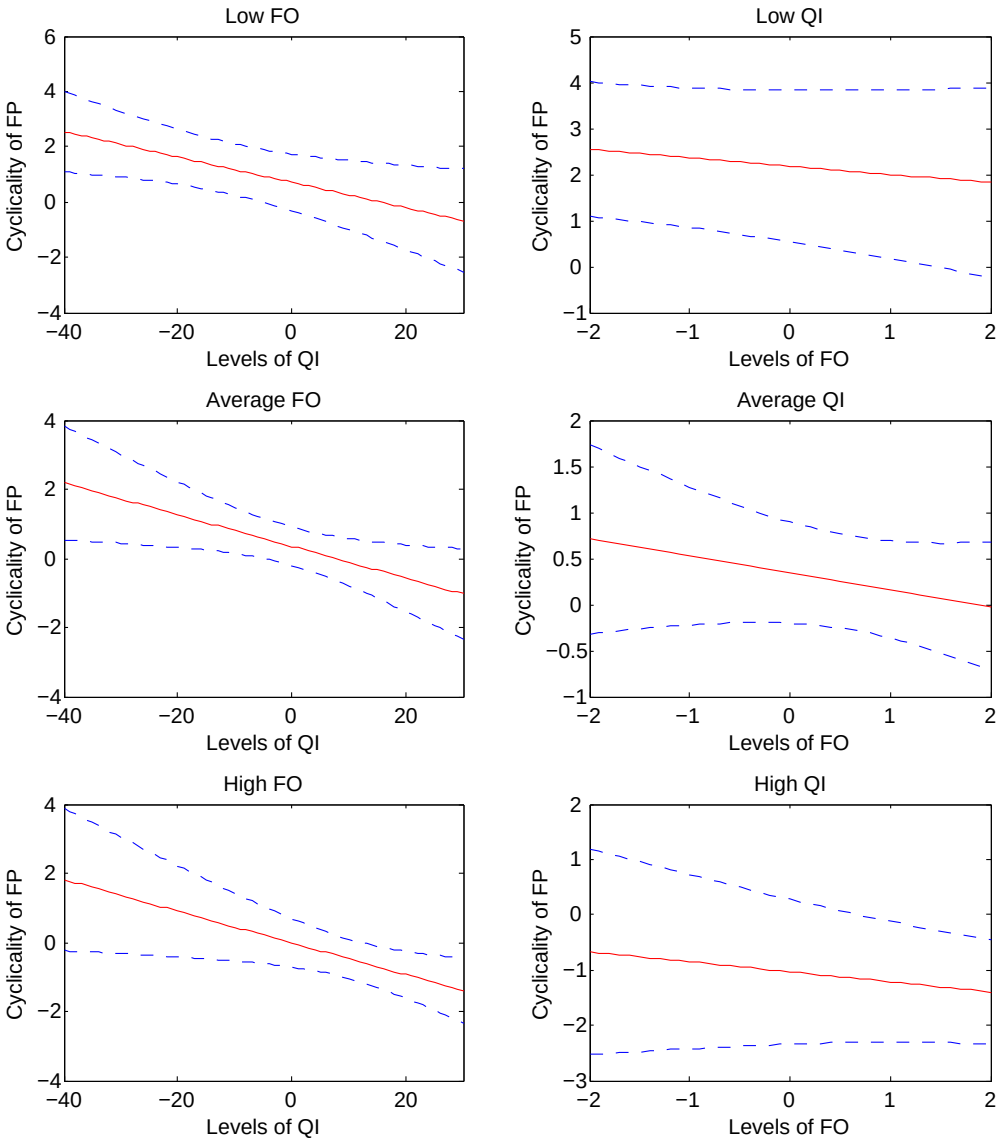
Note: Financial openness (FO) and Quality of institutions (QI) are mean-centered. The cyclicality of fiscal policy (FP) refers to the marginal effect of output growth on the growth of government consumption. It is calculated conditional on the levels of one variable while keeping the other variable constant at its low, average and high values. The dashed lines represent the 95% confidence interval.

Figure 3.2: Cyclicality of fiscal policy: the role of financial openness and quality of institutions in good times



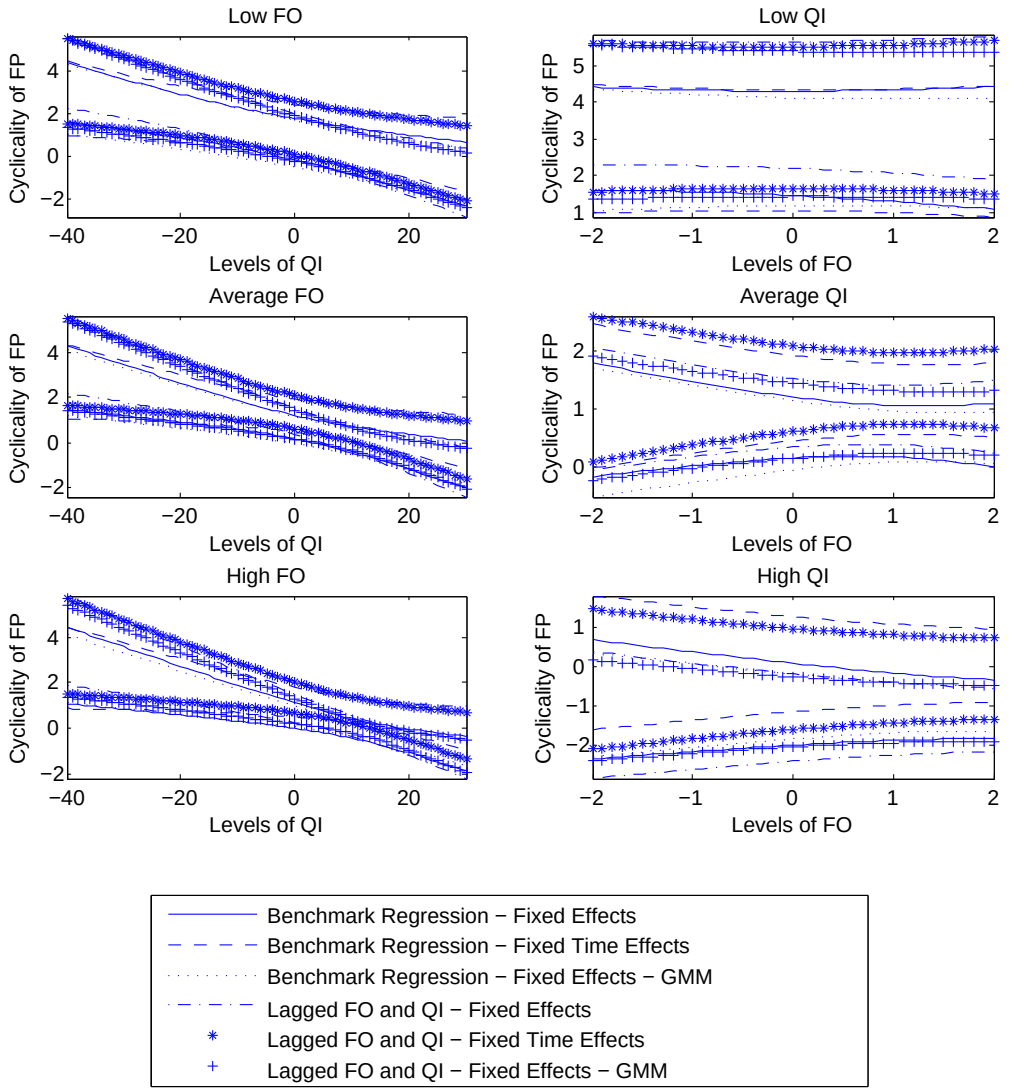
Note: Financial openness (FO) and Quality of institutions (QI) are mean-centered. The cyclicality of fiscal policy (FP) refers to the marginal effect of output growth on the growth of government consumption. It is calculated conditional on the levels of one variable while keeping the other variable constant at its low, average and high values. The dashed lines represent the 95% confidence interval.

Figure 3.3: Cyclicality of fiscal policy: the role of financial openness and quality of institutions in bad times



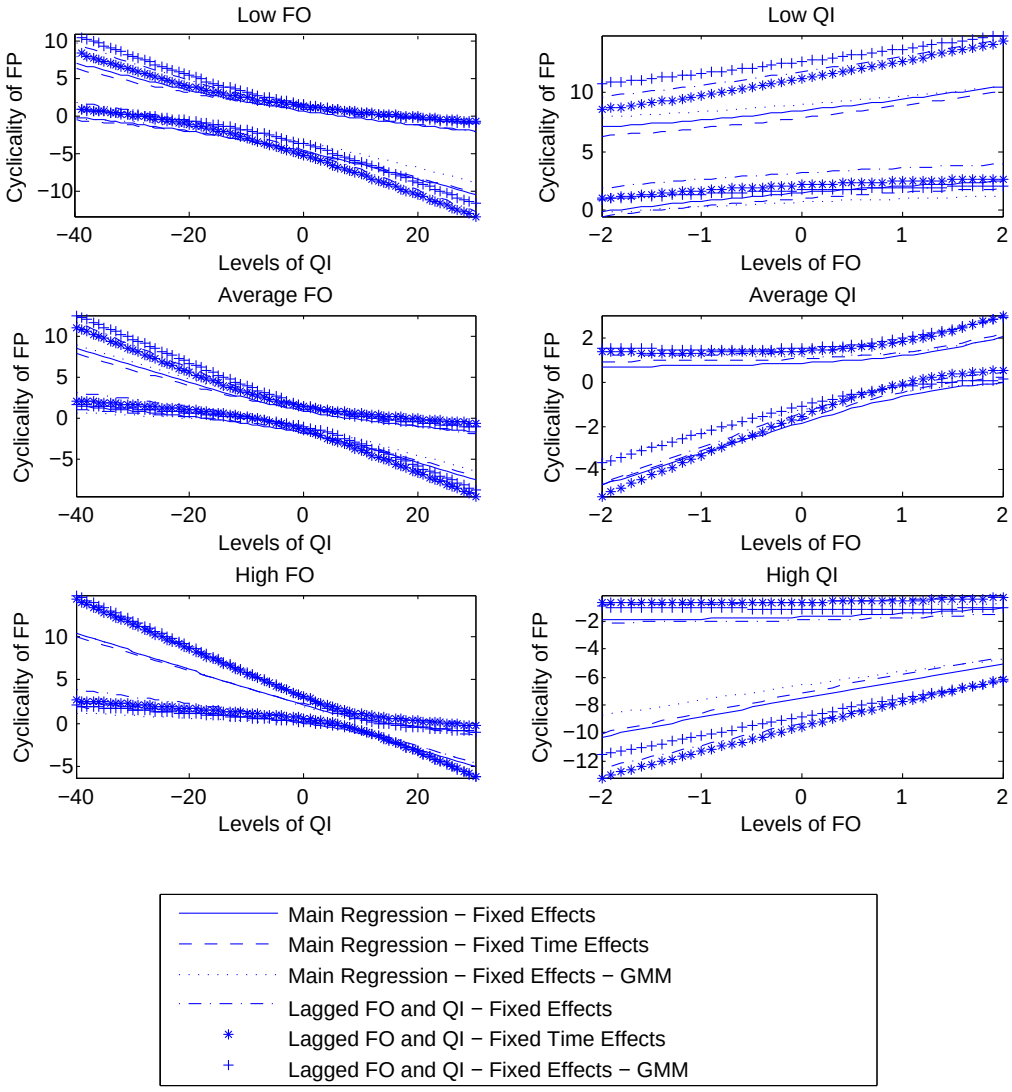
Note: Financial openness (FO) and Quality of institutions (QI) are mean-centered. The cyclicality of fiscal policy (FP) refers to the marginal effect of output growth on the growth of government consumption. It is calculated conditional on the levels of one variable while keeping the other variable constant at its low, average and high values. The dashed lines represent the 95% confidence interval.

Figure 3.4: Cyclicality of fiscal policy: the role of financial openness and quality of institutions - robustness checks



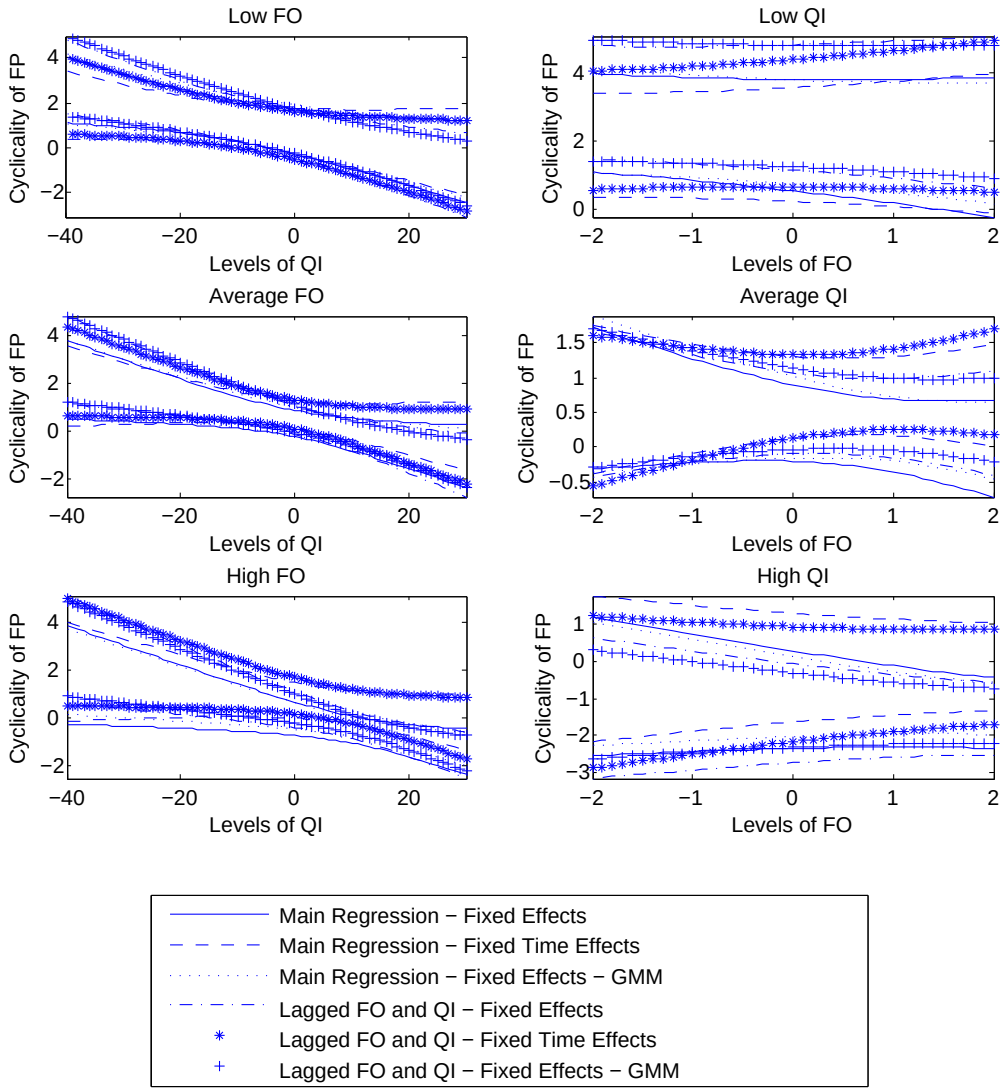
Note: Financial openness (FO) and Quality of institutions (QI) are mean-centered. The cyclicality of fiscal policy (FP) refers to the marginal effect of output growth on the growth of government consumption. It is calculated conditional on the levels of one variable while keeping the other variable constant at its low, average and high values. The different lines represent the 95% confidence intervals under different specifications.

Figure 3.5: Cyclicality of fiscal policy: the role of financial openness and quality of institutions in good times - robustness checks



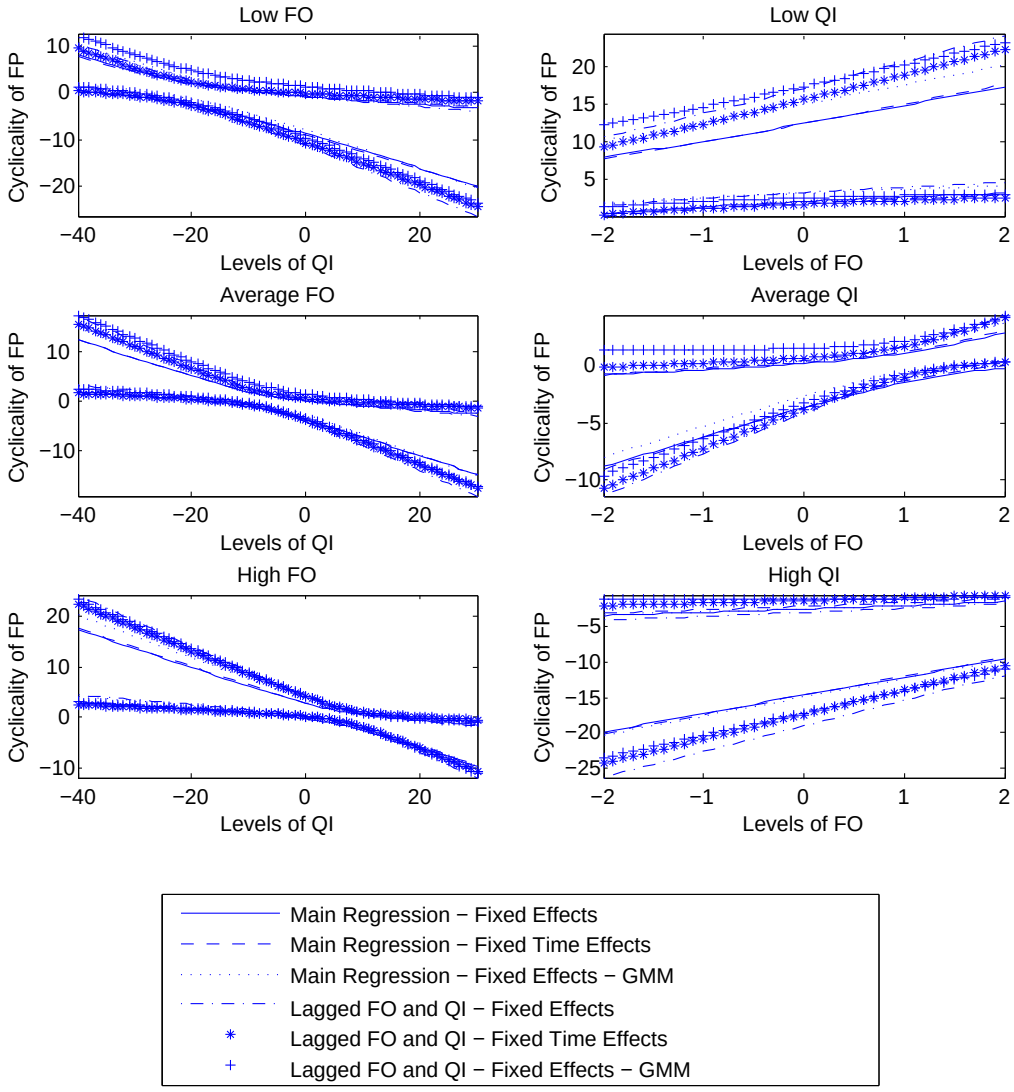
Note: Financial openness (FO) and Quality of institutions (QI) are mean-centered. The cyclicality of fiscal policy (FP) refers to the marginal effect of output growth on the growth of government consumption. It is calculated conditional on the levels of one variable while keeping the other variable constant at its low, average and high values. The different lines represent the 95% confidence intervals under different specifications.

Figure 3.6: Cyclicality of fiscal policy: the role of financial openness and quality of institutions in bad times - robustness checks



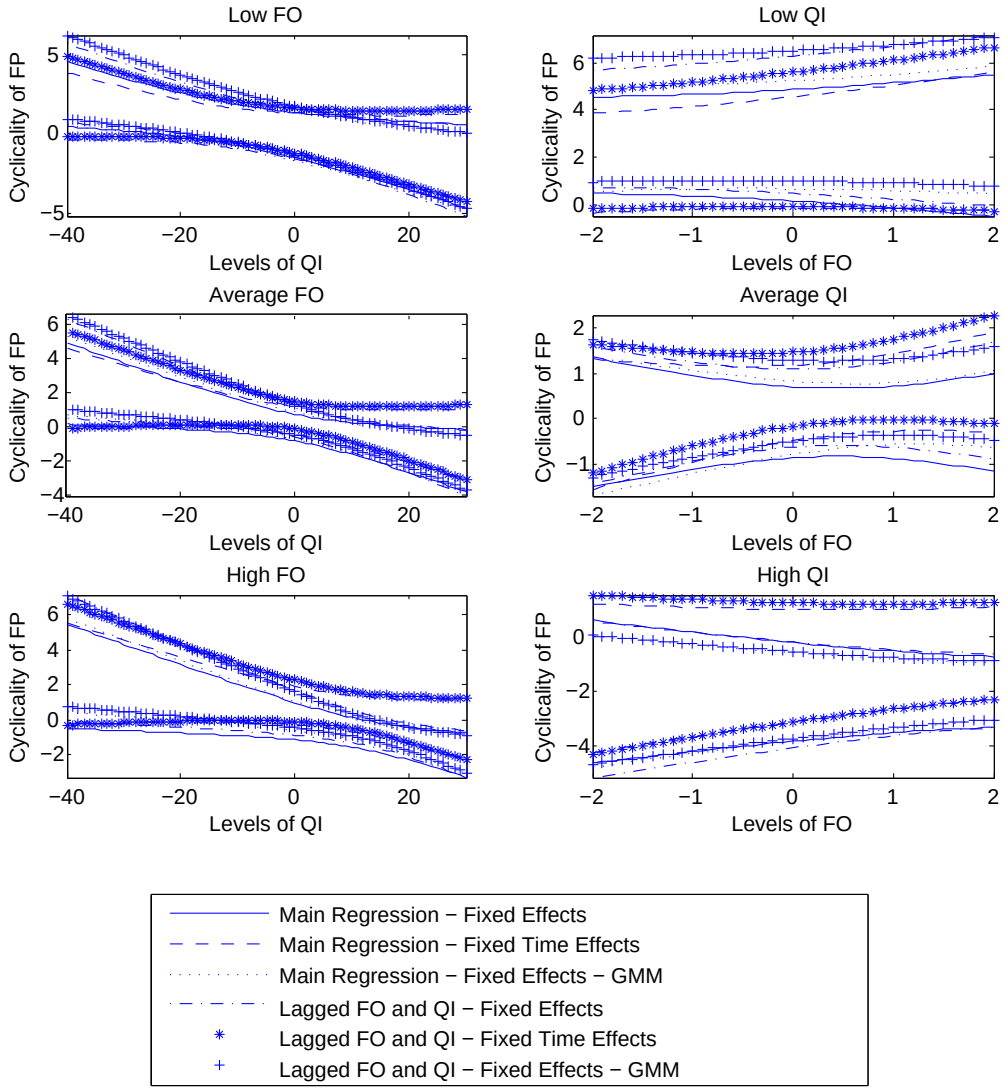
Note: Financial openness (FO) and Quality of institutions (QI) are mean-centered. The cyclicality of fiscal policy (FP) refers to the marginal effect of output growth on the growth of government consumption. It is calculated conditional on the levels of one variable while keeping the other variable constant at its low, average and high values. The different lines represent the 95% confidence intervals under different specifications.

Figure 3.7: Cyclicality of fiscal policy in good times: good and bad times defined on the basis of median growth



Note: Financial openness (FO) and Quality of institutions (QI) are mean-centered. The cyclicality of fiscal policy (FP) refers to the marginal effect of output growth on the growth of government consumption. It is calculated conditional on the levels of one variable while keeping the other variable constant at its low, average and high values. The different lines represent the 95% confidence intervals under different specifications.

Figure 3.8: Cyclicality of fiscal policy in bad times: good and bad times defined on the basis of median growth



Note: Financial openness (FO) and Quality of institutions (QI) are mean-centered. The cyclicality of fiscal policy (FP) refers to the marginal effect of output growth on the growth of government consumption. It is calculated conditional on the levels of one variable while keeping the other variable constant at its low, average and high values. The different lines represent the 95% confidence intervals under different specifications.

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Chapter 4

Fiscal policy and the current account: are microstates different?[1]

4.1 Introduction

This chapter examines the empirical link between fiscal policy and the current account focusing on microstates defined as countries with a population of less than 2 million between 1970 and 2009. The extent to which fiscal adjustment can lead to predictable development in the current account remains controversial with two competing views. The traditional view argues that changes in fiscal policy are associated with changes in the current account through a number of channels that are discussed in the literature review. The traditional view is challenged by the Ricardian equivalence principle, which states that an increase in budget deficit (through reduced taxes) will be offset by increases in private saving, insofar as the private sector fully discounts the future tax liabilities associated with financing the fiscal deficit, hence not affecting the current balance.

The study employs panel regression and Panel Vector Autoregression (PVAR) to estimate the impact of fiscal policy on the current account. The main challenge in the empirical literature is how to measure fiscal policy that reflects deliberate policy decisions and not simply the impact of business cycle fluctuation. The conventional approach to address this problem is to use the cyclically adjusted fiscal data to identify deliberate changes in fiscal policy. The presumption is that cyclically adjusted changes in the fiscal balance reflect decision by policy makers to adjust tax rates and expenditure levels.[2] IMF (2011) outlines

[1] This chapter is coauthored with Charles Amo-Yartey and Therese Turner-Jones. The chapter is published as: Endegnanew, Y., C. Amo-Yartey and T. Turner-Jones, 2013, "Fiscal Policy and the current account: are microstates different?" *Applied Economics* 45, 4137–4151.

[2] IMF (2011) outlines a number of shortcomings of using the cyclically adjusted fiscal balance as a measure of deliberate fiscal policy changes.

a number of shortcomings of using the cyclically adjusted fiscal balance as a measure of deliberate fiscal policy changes. International Monetary Fund (IMF (2010)) uses an alternative approach based on identifying changes in fiscal policy directly from historical records. While this approach could be superior to the conventional approach, this study follows the conventional approach because of the difficulties in constructing exogenous fiscal policy measures from historical records in microstates.

Panel regression results show that a percentage point improvement in the fiscal balance improves the current account balance by 0.4 percentage points of Gross Domestic Product (GDP) (similar to the coefficient of 0.34 found for the global sample). The real effective exchange rate has no significant impact on the current account in microstates but the coefficient is significant in the global sample. PVAR results show that an increase in government consumption results in real exchange appreciation, but the effect on the current account after an initial deterioration dies out quicker in microstates in contrast to the global sample where the deterioration remains for extended periods. The results imply that fiscal policy has little effect on the current account in microstates beyond its direct impact on imports. Overall, the results suggest that the weak relative price effect makes fiscal adjustment much more difficult in microstates.

The remainder of this chapter is organized as follows. The next section reviews the theoretical and empirical literature on fiscal policy and the current account. Section 4.3 reviews the literature on microstates with focus on their characteristics that have implications for the current account. In Sections 4.4 and 4.5, we evaluate econometrically the relationship between fiscal policy and the current account using both panel regression and PVAR, respectively. Section 4.6 concludes the chapter. All tables and figures are presented in the Appendix.

4.2 Literature Review

This study builds on the literature on fiscal policy and the current account and the literature on microstates. The theoretical and empirical relationship between fiscal policy and the current account is studied extensively. Theoretically, there are competing views that give different results depending on the kind of transmission mechanisms considered in the model to explain the link between fiscal policy and the current account.

Theoretical studies differentiate between intratemporal and intertemporal transmission mechanisms. The Mundell–Fleming model and the Swan– Salter model focus on intratemporal (the relative price effect) mechanism (Salter (1959), Mundell (1960)). In the Mundell–Fleming model, an expansionary fiscal policy by raising domestic demand and increasing interest rate leads to a real exchange appreciation through higher capital inflows to the domestic economy. In this model, financial openness and exchange rate regime can affect the effectiveness of the transmission mechanism. In the Swan– Salter model, exchange rate is defined as the relative price of tradables to nontradables. If the government spending is skewed to nontradables, the induced real exchange appreciation might worsen the trade balance by driving the production away from tradables and switching consumption towards tradables.

The intertemporal approach (Baxter (1995) Frenkel and Razin (1996)), on the other hand, suggests that declines in public saving resulting from a fiscal expansion would be offset by an equal increase in private saving leaving the national saving unaffected. In models of intertemporal mechanism, an increase in debt-financed government spending lead forward looking private agents to consume less and increase labour supply to offset the future tax increases resulting in improvements in the current account that counteract the negative effect of government spending on the current account.

New open economy models that incorporate both the intertemporal and intratemporal mechanisms have been developed recently to address empirical findings on developed countries that show positive government spending shocks, resulting in an increase in private consumption and real exchange depreciation in spite of the worsening of the trade balance. Monacelli and Perotti (2006) developed an open economy model with nonseparable preferences mitigating the negative wealth effect of an increase in government spending and giving rise to a positive consumption response. Furthermore, when the elasticity of substitution between domestic and imported goods is sufficiently small, the model is also successful in delivering real exchange depreciation and trade balance deterioration after government spending shocks. Ravn et al. (2007) offer alternative explanation using a two country model that incorporates deep habit mechanism. Under deep habits, an increase in government spending in the domestic economy leads to a decline in domestic markups relative to foreign markups that induces the real exchange rate to depreciate. At the same time, a decline in domestic markups raises labour demand, giving rise to an increase in domestic real wages. In turn, the rise in wages leads households to increase their leisure

consumption strong enough to offset the negative wealth effect stemming from the increase in government spending, resulting in an equilibrium increase in private consumption.

Empirically, the evidence is less debatable and the balance of evidence seems to support the intratemporal mechanism of a strong relationship between fiscal policy and the current account. Empirical research on the relationship between fiscal policy and the current account can be grouped into two according to the fiscal variable of interest and the methodology used. Studies based on panel regression approach (Chinn and Prasad (2003)) examine the effect of changes in the fiscal balance on the current account. Generally, they find evidence suggesting that fiscal expansion worsens the current account. Estimates of the impact of 1 percentage point of GDP increase in the government deficit on the current account range between 0.2 and 0.7 percentage points of GDP, depending on the sample and techniques used. Studies based on VAR (Ravn et al. (2007), Beetsma et al. (2008)) analyze the effect of government spending on the current account. These studies find evidence to show that an increase in government spending has a deteriorating effect on the current account except for countries like the United States where the results are mixed (Kim and Roubini (2008)). A summary of selected recent empirical works is presented in Table 4.2.

Abbas et al. (2011) apply both the panel regression and PVAR approaches to study the effect of fiscal policy on the current account using a large sample of advanced, emerging and low-income economies. They find that a strengthening in the fiscal balance by 1 percentage point of GDP is associated with a current account improvement of 0.3 percentage points of GDP. This relationship appears to be stronger in emerging and low-income economies; when the exchange rate is flexible; in economies that are more open; when output is above potential; and when initial debt levels are above 90% of GDP. Studies on the impact of the relationship between fiscal policy and the current account in microstates are sparse. Imam (2008) attempted to identify policies that help reduce the current account in microstates. The results suggest that microstates are more likely to have large current account adjustments if they are already running large current account deficits, run budget surpluses and are less open. Interestingly, Imam (2008) finds that changes in the real effective exchange rate do not help drive reductions in the current account deficit in microstates.

4.3 Characteristics of Microstates

This chapter defines microstates as countries with an average population of less than 2 million between 1970 and 2009. Using this definition, about 42 microstates were identified

of which about 70% are islands and usually located in the Caribbean, the African region and the Pacific. Table 4.1 presents the real GDP per capita and population of selected microstates. Microstates possess a wide range of characteristics such as location, climate and size, which create a variety of comparative advantages as well as disadvantages. This section highlights some of the unique characteristics of microstates with a focus on those characteristics that have implications for the current account.

4.3.1 Small size of domestic market

Microstates are characterized by small size of domestic market making the level of domestic demand lie below the minimum efficient scale of the output (Armstrong et al. (1993)). Due to the small size, microstates are usually disadvantageous as a location for extensive industrial activities, especially those that could substantially raise growth. The small domestic market is less conducive for the development of indigenous technologies limiting the growth of research and development, technical progress and technology acquisition. In addition, a small domestic market does not allow competitive firms to emerge within microstates because of the limited number of participants involved in any economic activity. As a result, prices of goods are generally higher in microstates than larger economies (Armstrong et al. (1993)).

4.3.2 Small domestic resource base

Microstates have small and/or poor domestic resource base due to their small size. In countries where agriculture dominates economic activity, the sector tends to absorb a significant share of land endowment thereby depriving other alternative production activities from this resource (Commonwealth Consultative Group (1997)). The relatively small population tends to make labour very scarce in microstates, as a result output in microstates is usually enhanced through the accumulation of human or physical capital rather than through employment (Bhaduri et al. (1982)). The small size of domestic market and scarce labour tends to narrow the structure of domestic output in microstates making them dependent on a small number of activities and hampering the potential to implement import substitution industrialization strategies thereby exposing them to exogenous shocks.

4.3.3 Narrow range of exports and export markets

Microstates have narrow range of exports and export markets due in part to the narrowness of their domestic production structures. The need for specialization tends to limit export-oriented domestic output to just a few products. Tourism and financial services are usually the main service sectors in microstates normally complemented by an uncompetitive agricultural sector. Offshore financial services have become an important sector in microstates due to their strategic location and enabling local laws. Highly liberalized financial systems based on lax regulatory standards or strong supervisory frameworks have been a major attraction in the emergence of microstates as offshore financial centers. The export specialization of microstates renders them vulnerable to external shocks and the vulnerability is exacerbated by reliance on export market in just a few countries (Armstrong et al. (1998)).

4.3.4 High degree of openness

Microstates are usually characterized by a high level of openness to trade. The small domestic market and the tendency towards a high degree of specialization in output and export limit the potential for import substitution because of the adverse impacts on the price level and competitiveness. The importance of tradable goods to these economies necessitates the pursuit of highly open trading regime. Consequently, import barriers are less important than for larger states (Selwyn (1975)). There is a substantial asymmetry between domestic production patterns and consumption of microstates. Therefore, the proportion of imports in domestic consumption is high.

4.3.5 High transport cost and lumpiness of investment

Armstrong et al. (1993) discussed extensively the specific problems of landlocked and island microstates including high transport cost and a high degree of dependence of adjacent states for surface communications and port facilities, and therefore access to export markets and import sourcing. High transport cost has the effect of reducing prices received for exports and raising prices of imports leading the current account to deteriorate. Djankov et al. (2006) estimated that microstates were on the average 50% more distant from trading partners than larger countries. Microstates can suffer from lumpiness of investment due to small size. A single large investment project has an immediate effect on the current account making it more volatile than it would be in larger economies.

4.3.6 Large size of the public sector

Per capita cost of supplying public goods may be higher in microstates than larger states due to the lack of economies of scale in supplying public goods. The public sector as a share of GDP tends to be bigger. Since government spending is biased toward nontradables, and since historically microstates have had large current account deficits, the current account tends to be structurally more vulnerable in these countries (Imam (2008)).

While there is near consensus that the salient features of microstates make them disadvantageous, microstates also possess some advantages that could help external stability: greater social homogeneity and cohesion, a consequent greater flexibility and decision-making efficiency, greater openness to change and the gains from greater openness (Streeten (1993)). For instance, greater social homogeneity should enable adjustment to shocks to be more promptly handled because the shifting of adjustment onto other social groups is not possible (Alesina and Drazen (1991)).

4.4 Panel Regression

4.4.1 Data

This study uses data from 155 countries out of which 42 are microstates. The full list of the sample countries is presented in Table 4.3. The main data source is the World Economic Outlook (WEO) where we obtained most of the fiscal variables. The real per capita in purchasing power parity is taken from WDI. We used the updated and extended version of the Lane and Milesi-Ferretti (2007) database to get data on net foreign assets. The real effective exchange rate is obtained from the IMF's INS database. The data range from 1970 to 2009 whenever they are available. Description of the different variables and sources of data can be found in Table 4.4.

4.4.2 The model

The benchmark specification assumes a fixed effects model of the form:

$$Y_{i,t} = (\alpha + f_i) + \beta X_{i,t} + \varepsilon_{i,t} \tag{4.1}$$

where f_i is the country fixed effects, Y is the current account to GDP ratio and X is a vector of explanatory variables including cyclically adjusted primary balance to potential GDP ratio, the lagged log real GDP per capita, trade openness (imports plus exports to GDP ratio), the lagged net foreign assets to GDP ratio, the volatility of terms of trade and the lagged log of real effective exchange rate.

The explanatory variables might influence current account through the following ways.

Cyclically adjusted fiscal balance. An increase in government balance could improve the current account through an increase in national saving in the absence of Ricardian equivalence. Reduction in government spending or tax increase would lead to an increase in public saving. Unless the private sector is fully Ricardian, the total national saving would increase thereby improving the current account. This study uses the Cyclically Adjusted Primary Balance (CAPB) to potential GDP ratio to capture the fiscal balance. This choice is motivated by the fact that there could be some endogeneity problems between fiscal balance and the current account balance because of common reaction to the business cycle. IMF (2011) criticized what they call the conventional approach of using cyclically adjusted fiscal data on the grounds that CAPB may still include nonpolicy factors or it may reflect deliberate policy responses to other developments affecting economic activity or to the current account itself. This study attempts to address these problems by applying a PVAR methodology using another fiscal variable less vulnerable to the criticisms, namely government consumption, in the next section.

The CAPB is calculated by applying Hodrick–Prescott (HP) filtering to the real GDP to obtain the output gap measure and then use 1 and 0 as the elasticity of revenue and expenditure, respectively, with respect to the output gap. In this way, the CAPB becomes

$$CAPB = R(\frac{Y^P}{Y}) - G \tag{4.2}$$

where R is revenue and grants, G is the government spending less interest payment, Y^P is the potential output and Y is the actual output.

Trade openness. Due to high increase in the international trade during the past decades, it would be interesting to study the relationship between trade openness and the current account balance. Microstates are characterized by narrow range of exports, large proportion of imports and high degree of openness. We would expect more trade openness in microstates to lead to more imports implying a negative relationship between trade openness and the current account balance.

Net foreign assets. The relation between Net Foreign Assets (NFA) and the current account is ambiguous as NFA may have two different effects. On the one hand, a negative relationship can exist between NFA and the current account because high NFA might lead to think that economies can afford to prolong trade deficits. On the other hand, high NFA could bring higher net income flows resulting in a positive relationship with the current account balance.

Terms of trade volatility. Increased uncertainty associated with high volatility in terms of trade might lead agents in the economy to save more for precautionary reasons. Moreover, for the same reason the economies may also experience low investment. Therefore, we expect a positive relationship between high terms of trade volatility and the current account balance. The volatility of the terms of trade is constructed by taking the 3-year moving standard deviation of the terms of trade of goods and services index.

Real effective exchange rate. Depreciation of the real effective exchange rate makes imports more expensive and exports cheaper. As a result, the real effective exchange rate is expected to be negatively related with the current account balance.

4.4.3 Results

This section presents the panel regression results for the global sample and microstates. Tables 4.5 and 4.6 give the results obtained for the benchmark model and its variations under different specifications. To take into account cross-country differences in time invariant characteristics of our microstates, we use the panel fixed effects estimation as our baseline model. We also control for income levels in all specifications of our model.

The results show that in both the global sample and microstates, the fiscal balance appears to be positively associated with the current account. The size of the CAPB coefficients is 0.34 and 0.39 for the global sample and the microstates, respectively. The coefficient for microstates reflects their openness to trade and the likely impact of fiscal expansion on imports. Our results compare well with the CAPB coefficient obtained by Abbas et al. (2011) for large sample of countries, which is 0.35 and who also show that the coefficient is larger for countries with high degree of trade openness.

In line with the a priori expectations, the degree of openness appears to be negatively related to the current account balance. The coefficient is statistically significant at 1% in microstates, while it is only significant at the 10% level in the global sample. One possible interpretation for this is that with limited exports and already high trade openness

in microstates, an increase in the degree of openness is likely to imply more imports. Chinn and Prasad (2003) find similar negative relationship in the medium term between openness and the current account balance.

The coefficient of the NFA is positive and statistically significant both for the global sample and microstates implying that high NFA helps countries to obtain higher net income flow and that negative NFA are associated with low current account balance due to outward interest payment. Imam (2008), however, finds a negative relationship between NFA and the current account and suggested that high NFA help to finance and sustain a current account deficit.

The coefficient of terms of trade volatility appears to have an insignificant relationship with the current account in both the global sample and microstates. One plausible explanation is that changes in saving and investment decisions taken by agents – the main channel through which volatility affects the current account balance – could be more of a medium-term behavior that is difficult to capture in our annual data framework. Chinn and Prasad (2003) supported this hypothesis by finding a strong positive relationship between terms of trade volatility and the current account in the medium term (using 5-year averages) but a negligible relationship in the short term.[3]

In the global sample, the coefficient of the real effective exchange rate implies that appreciation appears to be associated with deterioration of current account balance. However, in microstates, the impact is not statistically significant. As counter intuitive as it may sound, the result is not surprising. This might be due to the fact that imports, mainly food and fuel, are inelastic in microstates preventing the expenditure switching effect from taking place as relative price changes. Moreover, most imports are not produced locally limiting the ability of substitution. In addition, exports such as tourism and banking are usually conducted in foreign currency suggesting exports may not be cheaper after devaluation. Imam (2008) documents similar results for microstates.

4.4.4 Robustness tests

We examined the robustness and sensitivity of our results to different estimation techniques. As in the previous section, we control for GDP per capita, trade openness, NFA and the volatility of terms of trade. In the first specification, we allow for country fixed effects

[3] We used a 5-year moving standard deviation and changes in terms of trade but the result remains the same.

as well as time effects. The results are very similar to the benchmark model that allows for only country fixed effects. The next specification excludes oil exporting countries. Here, the coefficients for CAPB weaken to 0.28 and 0.31 for the global sample and microstates, respectively. This is not surprising given that oil price shocks typically induce large comovements in public sector balances, through oil revenues, and the current account, through oil exports, in oil-exporting countries. In addition, we estimated the baseline model using a pooled OLS regression and a dynamic panel data model, where the lagged variable of the current account is included as an explanatory variable. The results are similar to those obtained from the benchmark model. We also restricted the sample to a more recent period (1990–2009) and estimated the benchmark model using different estimation methods (See Table 4.7 and 4.8). Overall, our main results seem to hold.

4.5 Panel VAR

4.5.1 The model

The next exercise we conduct in this chapter is to examine the impact of fiscal policy on the current account using PVAR methodology. The PVAR technique combines the traditional VAR approach that treats all variables in the system as endogenous with the panel data approach that allows for unobserved individual heterogeneity. In this study, the benchmark specification is a second-order PVAR model of the form:

$$Z_{i,t} = \alpha_0 + \alpha_1 Z_{i,t-1} + f_i + \varepsilon_t \tag{4.3}$$

where Z_t is a four-variable vector of log of real government consumption, log of real GDP, current account to GDP ratio and log of real effective exchange rate. We have allowed for individual heterogeneity by adding country fixed effects, f_i. As the fixed effects are correlated with the lags of the dependent variables, instead of the mean-differencing procedure, a forward mean-differencing procedure is used to remove the fixed effects.[4] We apply the Stata program used by Love and Zicchino (2006) to estimate the panel VAR.

[4] This procedure is also known as Helmert transformation that is based on Arellano and Bover (1995). The procedure preserves the orthogonality between the transformed variables and the lagged regressors, which can be used as instruments to estimate the coefficients by system GMM.

Identification of government consumption shocks is achieved through a methodology that is commonly known as the recursive approach. This study uses the recursive approach taking into account the difficulty involved in trying to apply other methodologies such as a sign restriction or a narrative approach in the large sample of countries considered. The recursive approach assumes that government consumption does not react to the changes in other variables within a given period. To this end, a reduced-form model with variables ordered as government consumption, GDP, current account to GDP ratio and the real effective exchange rate is used.

4.5.2 Results

Figures 4.1 shows, for the global sample and microstates, the response of government consumption, GDP, current account to GDP ratio and the real effective exchange rate to a one standard deviation shock in government consumption. The results show that a one standard deviation shocks in government consumption on impact increases government consumption by 12% in the global sample and by 11% in the microstates. In both cases the effect on the government consumption seems to die slowly. The effect on GDP is small in both samples indicating a very small multiplier. However, while the effect in microstates dies out quickly; it persists in the global sample.

As the current account is used as percent of GDP, we normalize the one standard deviation shocks in government consumption to 1 percentage point increase in government consumption to GDP ratio and assess the result to the recalculated effect on current account to GDP ratio. To do this, we follow a number of steps. First, we calculate the average government consumption to GDP ratio over the sample period for the global sample and the microstates. This gives 18.5% and 22.5%, respectively. Second, we transform the increase on government consumption to an increase in government consumption to GDP ratio. For the global sample, an increase in 12% of the average 18.5% government consumption to GDP ratio translates to 2.2% increase in the average government consumption to GDP ratio. For microstates, similar calculation gives 2.5%. Third, we normalize these changes and the effects on current account to GDP ratio to a 1 percentage point increase in government consumption to GDP ratio.

A percentage point increase in government consumption to GDP ratio leads to 0.21 percentage points deterioration in the current account to GDP ratio in the global sample. The equivalent effect for the microstates is a worsening of the current account by 0.42

percentage points. The result is not surprising given the fact that the proportion of imports in domestic consumption is high. Although the impact effect of a government consumption shock is larger in microstates, the impact is short lived and dies out in 2 years and becomes insignificant. On the other hand, the impact effect of a government consumption shock in the global sample though smaller is significant and persistent even after 5 years.

The effect of an increase in government consumption on real effective exchange rate is not significant in the global sample, while in microstates there seems to be a significant appreciation of the real effective exchange rate on impact although it becomes insignificant in the subsequent periods. The appreciation of the real effective exchange rate in microstates might be the result of their limited ability to influence the price of tradable goods as opposed to nontradable goods. However, the real exchange rate is unable to reinforce the deterioration of the current account. Once again, this highlights the weakness of the relative price effect and limits the impact of fiscal policy on the current account in microstates.

4.5.3 Robustness tests

The robustness of our results is tested by the following measures. First, we estimate the benchmark model with different specifications, including changing the lag length from 2 to 3 (See Fig. 4.2) and changing the order of the variables in the model (See Fig. 4.3). Second, we re-estimated the PVAR model excluding oil-exporting countries (See Fig. 4.4). Third, we restricted the time period to recent years starting from 1990 (See Fig. 4.5). All in all, the results seem to support our benchmark results for microstates of short-lived, larger impact period response of the current account after an increase in government consumption.

4.6 Conclusion

This chapter has examined the empirical link between fiscal policy and the current account in microstates. The results suggest that there is indeed a relationship between fiscal policy and the current account in microstates. Panel regression results suggest that a strengthening of the fiscal balance improves the current account in microstates. However, the real effective exchange rate has no significant impact on the current account in microstates.

PVAR results show that an increase in government consumption leads to an immediate deterioration of the current account in microstates. The deterioration effect dies out together with the government consumption, notwithstanding the appreciated exchange rate, which according to theoretical mechanisms should have sustained the deterioration longer. The result implies that fiscal policy has little effect on the current account in microstates beyond its direct impact on imports. Overall, the results suggest that the weak relative price effects make fiscal adjustment much more difficult in microstates.

4.7 APPENDIX

4.7.1 Tables

Table 4.1: Real GDP per capita and population of selected microstates (2009)

Country	Real GDP Per Capita in USD	Real GDP Per Capita in PPP	Population
Antigua and Barbuda	12,920	18,778	87,600
Bahamas, The	16,300	22,868	341,713
Bahrain, Kingdom of	26,021	39,200	791,473
Barbados	9,244	17,504	255,872
Belize	4,062	6,628	333,200
Bhutan	1,831	5,113	697,335
Botswana	6,064	13,384	1,949,780
Cape Verde	3,064	3,644	505,606
Comoros	812	1,183	659,098
Cyprus	31,280	30,848	871,036
Djibouti	1,214	2,319	864,202
Equatorial Guinea	15,397	31,779	676,273
Fiji	3,326	4,526	849,218
Gabon	7,502	14,419	1,474,586
Grenada	6,029	8,362	103,930
Guinea-Bissau	519	1,071	1,610,746
Guyana	2,656	3,240	762,498
Iceland	38,029	36,795	319,062
Kiribati	1,306	2,432	98,045
Luxembourg	105,044	83,820	497,854
Maldives	4,760	5,476	309,430
Malta	19,248	24,814	414,971
Mauritius	6,735	12,838	1,275,323
Qatar	69,754	91,379	1,409,423
São Tomé & Príncipe	1,171	1,820	162,755
Seychelles	8,688	19,587	87,972
St. Kitts and Nevis	10,988	14,527	49,593
St. Vincent & Grenadines	5,335	9,154	109,209
Suriname	2,668	6,930	519,740
Swaziland	2,533	4,998	1,184,936
Trinidad and Tobago	15,841	25,572	1,338,585
Vanuatu	2,702	4,438	239,788

Note: PPP refers to Purchasing Power Parity.

Source: World Development Indicators (WDI).

Table 4.2: Selected recent empirical works

Selected works	Sample and Methodology	Results
This study	155 countries of which 42 are micro-states, annual data, 1970-2009, Panel regression and Panel VAR	1) 1% of GDP increase in the CAPB improves current account by 0.35% of GDP in the global sample and 0.4% of GDP in the microstates. 2) 1% of GDP increase in government consumption worsens the current account by 0.21% of GDP in the full sample and 0.42% of GDP in microstates on impact.
Abbas et al. (2011)	124 countries, annual and quarterly data, 1985-2007, Panel regression and PVAR	1) 1% of GDP increase in the CAPB improves current account by 0.3% of GDP 2) 1% of GDP increase in government consumption worsens the current account by 0.3% of GDP on impact.
Abiad et al. (2009)	135 countries, 5-year averages, 1975-2004, Panel regression	1% of GDP increase in the budget balance improves current account by 0.3% of GDP
Beetsma et al. (2008)	14 EU countries, annual data, 1970-2004, PVAR	1% GDP increase in government spending worsens the trade balance by 0.5% of GDP on impact and a peak fall of 0.8% of GDP after 2 years
Chinn and Prasad (2003)	89 countries, annual data, 1971-1995, Panel regression	1% of GDP increase in the budget balance improves current account by 0.25-0.4% of GDP
Corsetti and Müller (2006)	Australia, Canada, the UK and the US, quarterly data, 1975-2001, VAR	1% GDP increase in government spending worsens the trade balance by 0.5% of GDP in UK, by 0.17% of GDP in Canada and to a non-significant effect of trade balance in US and Australia on impact
Monacelli and Perotti (2006)	Australia, Canada, the UK and the US, quarterly data, 1975-2006, VAR	1% GDP increase in government spending worsens the trade balance by between 0.4 to 0.9 percentage point of GDP in the different countries
Ravn et al. (2007)	Australia, Canada, the UK and the US, quarterly data, 1975-2005, Panel VAR	1% increase in government spending worsens trade balance (to GDP ratio) by around 0.03% at impact and to a peak of 0.05% after one year.

Table 4.3: List of the sample countries

Albania	**Comoros**	Honduras	Mongolia	**Solomon Islands**
Algeria	Congo, Dem. Rep. of	Hungary	Morocco	South Africa
Angola	Congo, Republic of	**Iceland**	Mozambique	Spain
Antigua and Barbuda	Costa Rica	India	Myanmar	Sri Lanka
Argentina	Côte d'Ivoire	Indonesia	**Namibia**	**St. Kitts and Nevis**
Australia	Croatia	Iran, I.R. of	Nepal	**St. Lucia**
Austria	**Cyprus**	Ireland	Netherlands	**St. Vincent & Grens.**
Bahamas, The	Czech Republic	Israel	New Zealand	Sudan
Bahrain, Kingdom of	Denmark	Italy	Nicaragua	**Suriname**
Bangladesh	**Djibouti**	Jamaica	Niger	**Swaziland**
Barbados	**Dominica**	Japan	Nigeria	Sweden
Belgium	Dominican Republic	Jordan	Norway	Switzerland
Belize	Ecuador	Kenya	**Oman**	Syrian Arab Republic
Benin	Egypt	**Kiribati**	Pakistan	Tanzania
Bhutan	El Salvador	Korea, Republic of	Panama	Thailand
Bolivia	**Equatorial Guinea**	**Kuwait**	Papua New Guinea	Togo
Botswana	Ethiopia	Lao People's Dem.Rep	Paraguay	Tonga
Brazil	**Fiji**	Lebanon	Peru	**Trinidad and Tobago**
Brunei Darussalam	Finland	**Lesotho**	Philippines	Tunisia
Bulgaria	France	Libya	Poland	Turkey
Burkina Faso	**Gabon**	**Luxembourg**	Portugal	Uganda
Burundi	**Gambia, The**	Macedonia, FYR	**Qatar**	United Arab Emirates
Cambodia	Germany	Madagascar	Romania	United Kingdom
Cameroon	Ghana	Malawi	Rwanda	United States
Canada	Greece	Malaysia	**Samoa**	Uruguay
Cape Verde	**Grenada**	**Maldives**	**São Tomé & Príncipe**	**Vanuatu**
Central African Rep.	Guatemala	Mali	Saudi Arabia	Venezuela, Rep. Bol.
Chad	Guinea	**Malta**	Senegal	Vietnam
Chile	**Guinea-Bissau**	Mauritania	**Seychelles**	Yemen, Republic of
China,P.R.: Mainland	**Guyana**	**Mauritius**	Sierra Leone	Zambia
Colombia	Haiti	Mexico	Singapore	Zimbabwe

Note: The countries written with bold letters are microstates.

Table 4.4: Variables and sources of data

Descriptor	Series Code	Database
Current account balance	BCA	WEO
Imports of goods and services	BM	WEO
Exports of goods and services	BX	WEO
Central government balance	GCB	WEO
Central government, total expenditure and net lending	GCENL	WEO
General government, total revenue and grants	GGRG	WEO
General government expenditure, interest	GGEI	WEO
Public consumption expenditure, current prices	NCG	WEO
Gross domestic product, current prices	NGDP	WEO
Gross domestic product deflator	NGDP_D	WEO
Gross domestic product, current prices, U.S. dollars	NGDPD	WEO
Consumer price index	PCPI	WEO
Terms of trade, goods & services	TT	WEO
GDP per capita' PPP (constant 2005 international $)	NYGDPPCAPPPKD	WDI
Real effective exchange rate	EREER	INSDATA
Net foreign asset to GDP ratio (%)	NFAGDP	LM

Notes: WEO refers to the World Economic Outlook. WDI refers to the World Development Indicators. INSDATA refers to IMF's INS database. LM refers to the updated version of the Lane and Milesi-Ferretti (2007) database.

Table 4.5: Panel regressions – global sample

Dependent Variable: Current account balance to GDP ratio					
	Fixed Effects	Fixed Time Effects	Pooled OLS	Excluding Oil Exporting Countries	Dynamic Panel GMM
Cyclically adjusted primary balance to potential GDP ratio	0.346***	0.322***	0.367***	0.289***	0.297***
	10.61	9.76	11.41	8.63	8.57
Lagged log per capita income	-0.481	0.836	0.628***	-0.666	-1.713*
	(-1.00)	1.37	2.72	(-1.35)	(-1.93)
Trade Openness	-0.0128*	-0.00328	-0.0154***	-0.00684	-0.0488***
	(-1.87)	(-0.46)	(-3.13)	(-0.98)	(-4.92)
Lagged NFA to GDP ratio	0.0221***	0.0263***	0.0256***	0.0203***	-0.0120***
	7.81	9.32	10.87	7.07	(-2.59)
Volatility of Terms of Trade	0.00152	0.00207	0.00116	0.00108	-0.00123
	0.65	0.89	0.5	0.47	(-0.13)
Lagged log of real effective exchange rate	-1.237***	-1.279***	-1.032**	-0.968**	-1.569**
	(-2.79)	(-2.71)	(-2.41)	(-2.00)	(-2.23)
Lagged current account to GDP					0.324***
					14.21
Constant	8.599*	-4.562	-1.586	8.219*	22.85***
	1.87	(-0.87)	(-0.53)	1.75	2.7
Number of observations	2370	2370	2370	2211	2131

Notes: GMM: Generalized Method of Moments. t-statistics are in parentheses.
*, **, and *** denote significance at the 10, 5 and 1% levels, respectively.

Table 4.6: Panel regressions – microstates

Dependent Variable: Current account balance to GDP ratio					
	Fixed Effects	Fixed Time Effects	Pooled OLS	Excluding Oil Exporting Countries	Dynamic Panel GMM
Cyclically adjusted primary balance to potential GDP ratio	0.394***	0.443***	0.416***	0.313***	0.361***
	5.25	5.71	5.63	4.02	5.49
Lagged log per capita income	-1.043	2.305	1.398*	-1.607	-4.807***
	(-0.76)	1.2	1.73	(-0.92)	(-3.17)
Trade Openness	-0.0537***	-0.0519***	-0.0599***	-0.0394**	-0.0335*
	(-2.84)	(-2.74)	(-3.70)	(-1.97)	(-1.88)
Lagged NFA to GDP ratio	0.0363***	0.0381***	0.0421***	0.0322***	0.00589
	4.57	4.53	7.59	3.87	0.78
Volatility of Terms of Trade	-0.000823	-0.0014	-0.000528	-0.00081	-0.00163
	(-0.27)	(-0.46)	(-0.18)	(-0.27)	(-0.72)
Lagged log of real effective exchange rate	1.599	-1.896	1.733	1.828	3.105
	-0.58	(-0.63)	0.7	0.64	1.38
Lagged current account to GDP					0.428***
					10.59
Constant	2.84	-7.807	-17.52	4.434	26.75
	0.14	(-0.37)	(-1.17)	0.19	1.43
Number of observations	510	510	510	472	444

Notes: t-statistics are in parentheses.
*, **, and *** denote significance at the 10, 5 and 1% levels, respectively.

Table 4.7: Panel regressions: sample period restricted to 1990–2009 – global sample

Dependent Variable: Current account balance to GDP ratio

	Fixed Effects	Fixed Time Effects	Pooled OLS	Excluding Oil Exporting Countries	Dynamic Panel GMM
Cyclically adjusted primary balance to potential GDP ratio	0.326***	0.319***	0.358***	0.238***	0.233***
	(8.72)	(8.56)	(9.76)	(6.18)	(5.25)
Lagged log per capita income	-1.920***	-0.494	0.612**	-2.327***	-3.290**
	(-2.94)	(-0.59)	(2.36)	(-3.39)	(-2.30)
Trade Openness	-0.0125	-0.00460	-0.0157***	-0.00838	-0.0437***
	(-1.52)	(-0.53)	(-2.83)	(-1.01)	(-3.39)
Lagged NFA to GDP ratio	0.0179***	0.0233***	0.0238***	0.0155***	-0.0309***
	(5.15)	(6.70)	(8.69)	(4.42)	(-5.26)
Volatility of Terms of Trade	0.00448	0.0131	0.00346	-0.00731	0.00292
	(0.47)	(1.37)	(0.37)	(-0.75)	(0.22)
Lagged log of real effective exchange rate	-1.121*	-0.972	-0.998	-0.841	1.625
	(-1.77)	(-1.54)	(-1.64)	(-1.26)	(1.52)
Lagged current account to GDP					0.266***
					(8.54)
Constant	20.07***	6.213	-1.693	21.55***	19.99
	(3.33)	(0.85)	(-0.45)	(3.45)	(1.55)
Number of observations	1915	1915	1915	1787	1641

Notes: t-statistics are in parentheses.
*, **, and *** denote significance at the 10, 5 and 1% levels, respectively.

Table 4.8: Panel regressions: sample period restricted to 1990–2009 – microstates

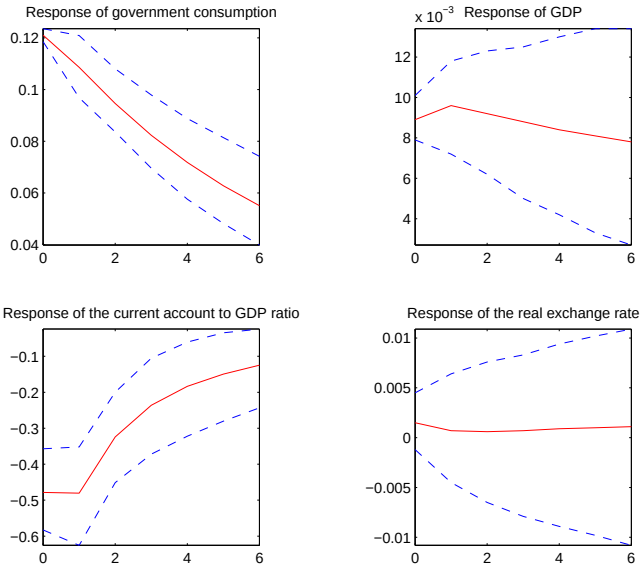
Dependent Variable: Current account balance to GDP ratio

	Fixed Effects	Fixed Time Effects	Pooled OLS	Excluding Oil Exporting Countries	Dynamic Panel GMM
Cyclically adjusted primary balance to potential GDP ratio	0.356***	0.417***	0.377***	0.220**	0.431***
	(4.21)	(4.83)	(4.51)	(2.49)	(4.95)
Lagged log per capita income	-0.123	3.002	1.776*	-3.830	-7.760
	(-0.07)	(1.34)	(1.95)	(-1.50)	(-1.61)
Trade Openness	-0.0659***	-0.0600***	-0.0659***	-0.0545**	-0.133***
	(-2.95)	(-2.67)	(-3.57)	(-2.33)	(-4.18)
Lagged NFA to GDP ratio	0.0108	0.0171	0.0322***	-0.000521	-0.0171
	(1.04)	(1.56)	(4.86)	(-0.05)	(-1.20)
Volatility of Terms of Trade	0.00542	0.0286	0.00877	-0.0201	0.0105
	(0.19)	(0.97)	(0.34)	(-0.63)	(0.29)
Lagged log of real effective exchange rate	2.414	0.387	-0.629	4.236	-0.223
	(0.69)	(0.11)	(-0.20)	(1.18)	(-0.05)
Lagged current account to GDP					0.355***
					(7.03)
Constant	-8.589	-24.61	-9.742	12.42	76.76
	(-0.35)	(-0.94)	(-0.54)	(0.43)	(1.58)
Number of observations	415	415	415	382	343

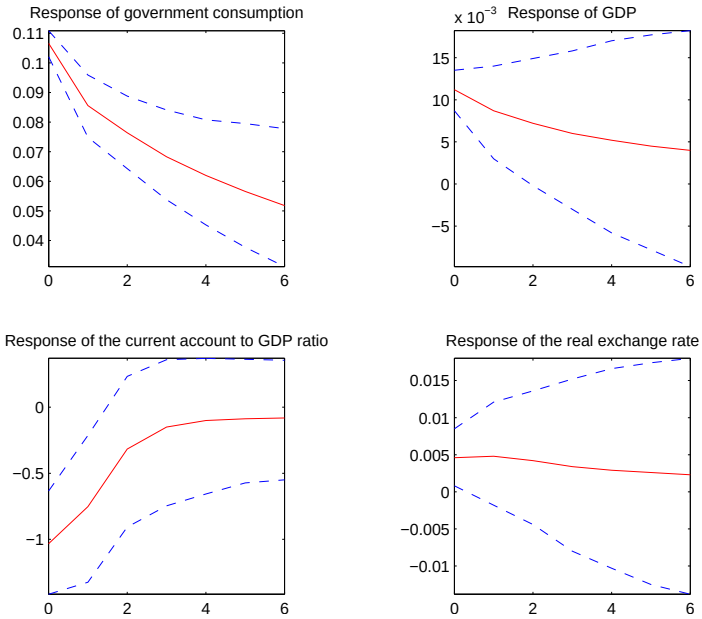
Notes: t-statistics are in parentheses.
*, **, and *** denote significance at the 10, 5 and 1% levels, respectively.

4.7.2 Figures

Figure 4.1: PVAR – impulse response to one standard deviation shocks in government consumption
a) Global sample



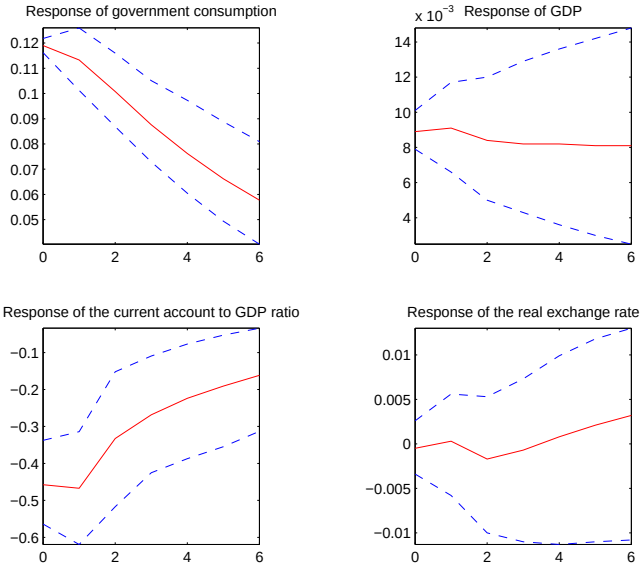
(b) Microstates



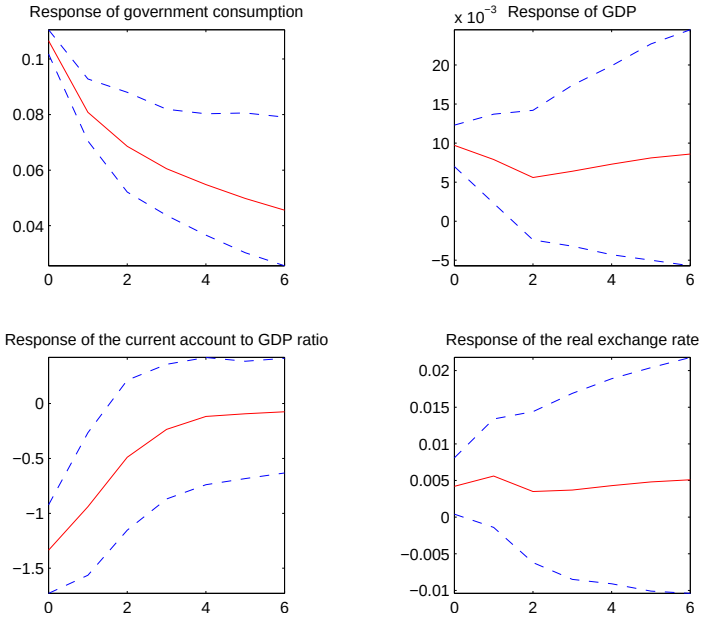
Notes: x-axes refer to years after the shock. Confidence bands are the 5^{th} and 95^{th} percentiles from Monte Carlo simulations based on 500 replications.

Figure 4.2: PVAR – impulse response to one standard deviation shocks in government consumption: lag length set to three.

(a) Global sample



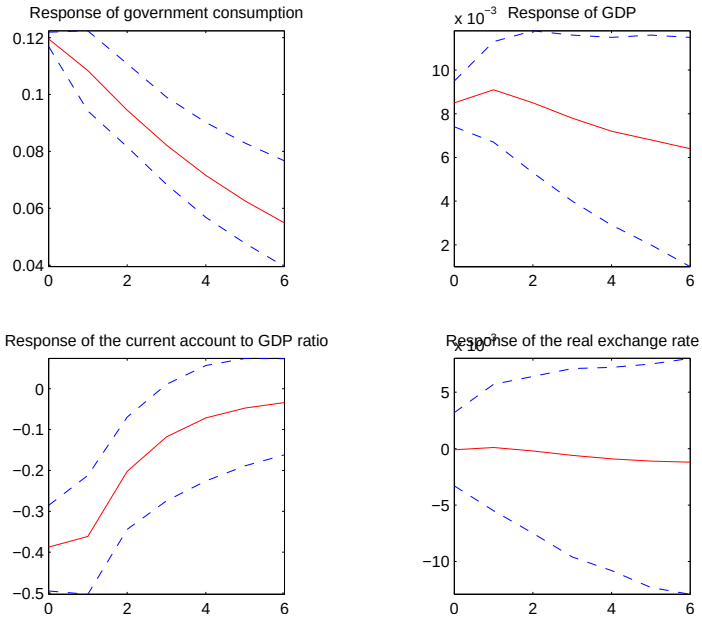
(b) Microstates



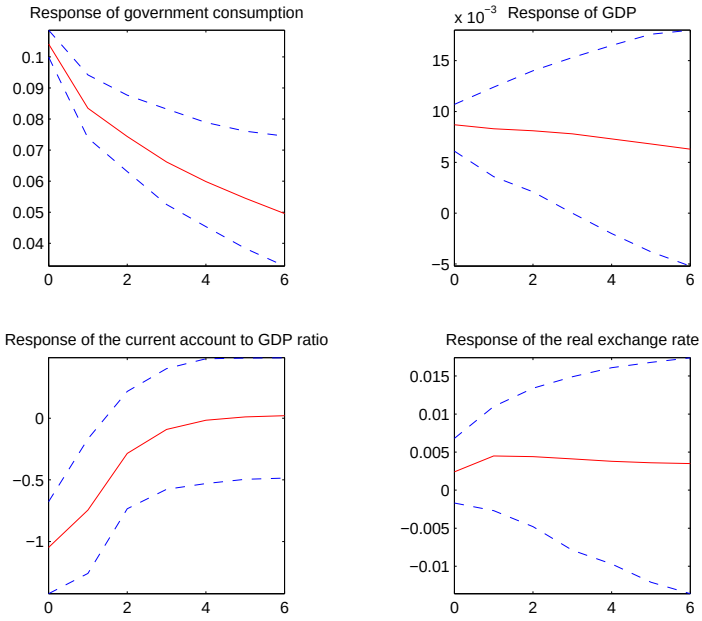
Notes: x-axes refer to years after the shock. Confidence bands are the 5^{th} and 95^{th} percentiles from Monte Carlo simulations based on 500 replications.

Figure 4.3: PVAR – impulse response to one standard deviation shocks in government consumption: excluding oil-exporting countries.

(a) Global sample



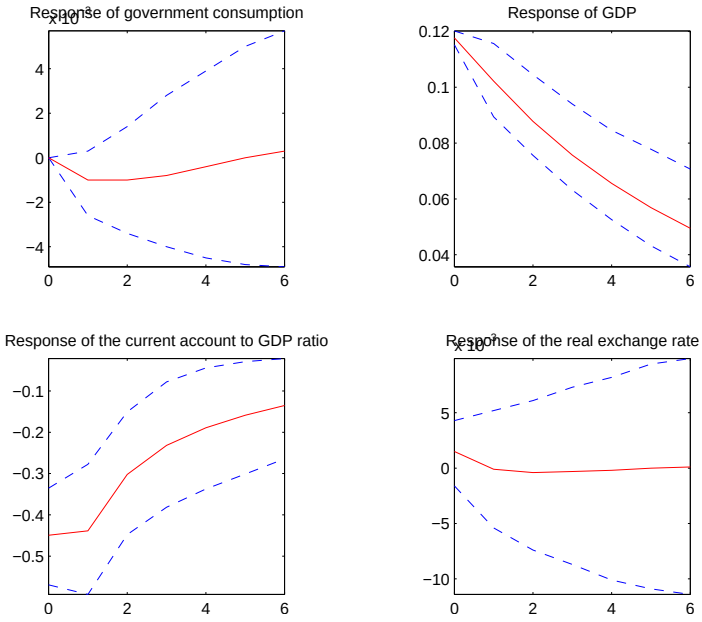
(b) Microstates



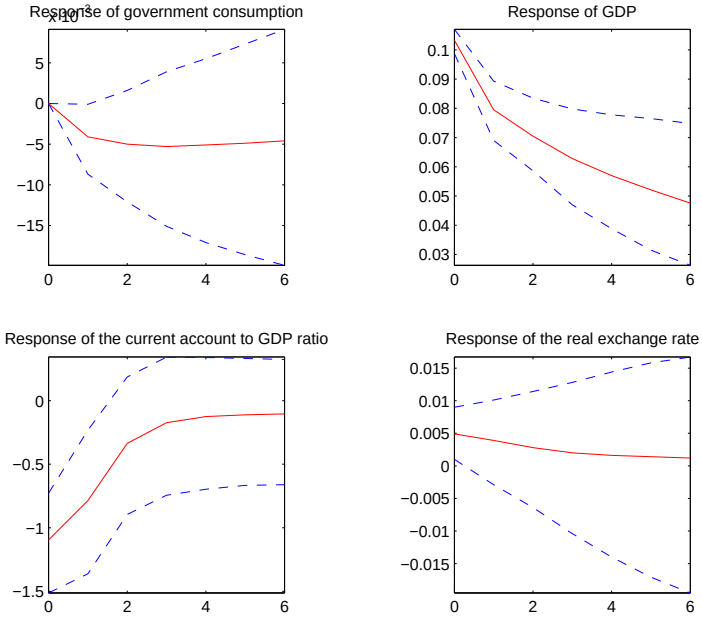
Notes: x-axes refer to years after the shock. Confidence bands are the 5^{th} and 95^{th} percentiles from Monte Carlo simulations based on 500 replications.

Figure 4.4: PVAR – impulse response to one standard deviation shocks in government consumption: government consumption ordered second.

(a) Global sample



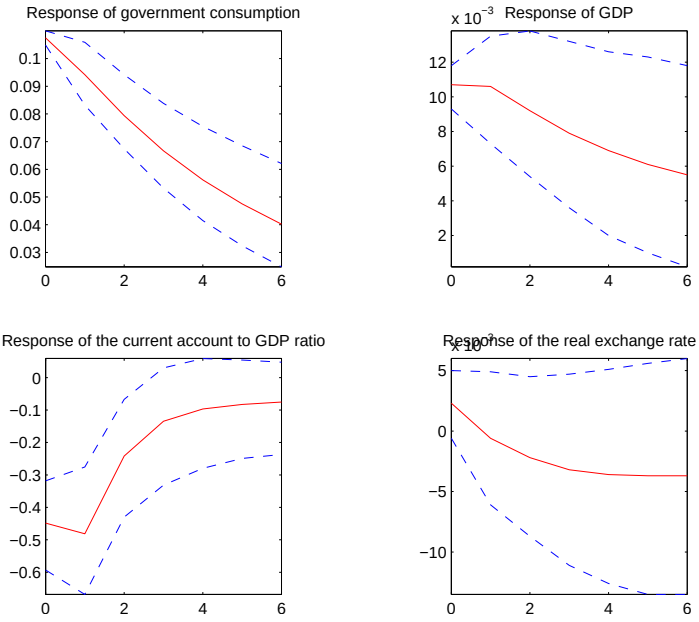
(b) Microstates



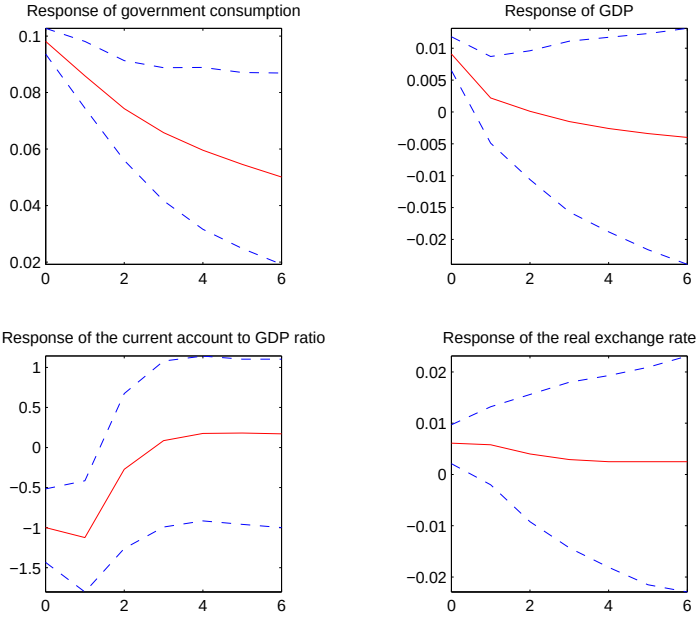
Notes: x-axes refer to years after the shock. Confidence bands are the 5^{th} and 95^{th} percentiles from Monte Carlo simulations based on 500 replications.

Figure 4.5: PVAR – impulse response to one standard deviation shocks in government consumption: sample period restricted to 1990–2009.

(a) Global sample



(b) Microstates



Notes: x-axes refer to years after the shock. Confidence bands are the 5^{th} and 95^{th} percentiles from Monte Carlo simulations based on 500 replications.

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