Fiscal Policy and the Current Account

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Abstract

This paper examines the relationship between fiscal policy and the current account, drawing on a larger sample of advanced and emerging economies than in previous studies and using a variety of statistical methods: panel regressions, an analysis of large fiscal and external adjustments, and vector auto-regressions. On average, a strengthening in the fiscal balance by 1 percentage point of GDP is associated with a current account improvement of 0.3-0.4 percentage point of GDP. This association appears stronger in emerging and low-income countries, when the exchange rate is flexible, when the economies are more open, when output is above potential or initial debt levels are above 90 percent of GDP, and when using methods robust to endogeneity issues.

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I. INTRODUCTION

The relationship between fiscal policy and the current account has long attracted interest among academic economists and policymakers alike, from various angles. For example, the possible link between fiscal deficits and current account deficits has spurred many studies analyzing the "twin deficit" hypothesis, particularly for the case of the United States. For many countries where current account imbalances are especially large, a relevant question has been to what extent fiscal adjustment can contribute to resolving external imbalances. Going forward, the implications of fiscal stimulus first, and fiscal adjustment later, for current account developments will no doubt continue to generate interest in the context of returning the global economy to strong, sustainable, and balanced growth as the effects of the 2008–09 crisis gradually abate.

This paper analyzes the relationship between fiscal policy and the current account. The paper's main contribution is in the breadth of its empirical investigation, in terms of both country coverage and variety of empirical techniques—whose results are found to complement and corroborate each other. The sample includes about a hundred countries over a period of more than two decades. The estimates distinguish among advanced and emerging/low-income countries; more and less open economies; and country-years with small and large output gaps. While the analysis was also conducted for oil exporting countries, the results of that analysis are not reported as the strong association between the fiscal balance and the current account stems largely from oil price changes simultaneously impacting tax revenues and exports. The paper thus emphasizes the results for non-oil exporters and subsamples.[2]

To get a preview of the data, the paper begins with a series of panel regressions to generate broad estimates of current account responsiveness to fiscal policy, the latter proxied by the cyclically-adjusted primary balance. The regressions also help identify factors affecting this responsiveness, such as exchange rate regime, level of financial and trade openness, whether the economy is below or above potential, level of initial public debt, and the revenue expenditure mix of fiscal policy. The findings from this analysis are then located in a saving-investment identity exercise as well as an event study of episodes of large fiscal policy and current account changes. This analysis also usefully connects with ongoing debates about the need to correct large imbalances in current-account deficit countries, including, possibly, through fiscal retrenchment. The paper concludes with panel vector auto-regressions (VARs) for a smaller group of countries (mostly advanced economies, European countries and other major emerging markets) in order to address endogeneity issues using both annual and quarterly data on government consumption.

The findings vary intuitively across techniques, yielding responsiveness estimates in the 0.1-0.2 range during large episodes, around 0.3 in the panel regressions and 0.4-0.5 for the panel VARs. This association is stronger in emerging and low-income countries, more open economies, with flexible exchange rates, when output above potential or when initial debt levels are above 90 percent of GDP. These results suggest that changes in fiscal policy are indeed associated with changes in the current account, but the relationship is far less than one-for-one. Indeed, the analysis of large episodes suggests that, for the most part, the emergence or unwinding of large current account imbalances is not closely associated with fiscal policy changes. The higher estimates for the VAR analysis suggest that common factors, such as economic growth, tend to

[2] The paper is primarily concerned with the association between changes in overall fiscal policy and the current account for an individual country. It abstracts from questions about the global transmission of fiscal policy shocks.

push external and fiscal balances in opposite directions, most notably in the large episodes analysis.

The rest of the paper is organized as follows. Section II reviews the theoretical and empirical literature. Section III presents results from the panel regressions. Section IV documents the relationship between fiscal and external balances for episodes of large changes in these balances. Section V reports the findings of the panel VAR analysis. Section VI concludes. An appendix provides further detail on the theoretical literature.

II. Review of Theoretical and Empirical Studies

Basic Identities

As is well known, fiscal policy and the current account are related through the identity:

$$CA = (S_{pr} - I_{pr}) + (S_g - I_g) \quad (1)$$

where CA is the current account, S_{pr} and I_{pr} are private savings and investment, respectively; and S_g and I_g are government savings and investment. $S_g - I_g$ is equivalent to the fiscal balance. The same identity holds, and is often used, in terms of shares of GDP. Various theoretical studies have sought to flesh out the mechanisms whereby fiscal policy would affect the terms in the identity above, and to assess the net implications for the current account.

Theoretical Studies

The major channels through which fiscal policy affects the current account include the following.[3]

Direct impact through demand. The most direct way in which fiscal policy can affect the external account is through changes in the government's consumption or investment demand for tradable goods. The government often accounts for a large part of domestic demand, so that, depending on the import propensity, shifts in the government import demand function translate into movements in the trade balance. The result applies more generally, in a Keynesian context, to changes in the fiscal "stance". Thus, a fiscal expansion, whether implemented through a tax-reduction or spending increase, will tend to increase demand (including for imports) and the trade deficit, as long as agents are not fully Ricardian.

Impact through the real exchange rate. Fiscal policy can also affect the current account by altering the relative price of nontradables (the real exchange rate): higher government spending on nontradables (such as the services or real estate sectors) can induce a real appreciation, which in turn can tilt private consumption toward, and production away from, tradables. The ensuing worsening in the current account can be prolonged insofar as resource shifts are not easily reversed.

[3] The Appendix provides a more detailed summary of the theoretical literature by model classes, emphasizing assumptions relating to, for instance, agent behavior (Ricardian or not), elasticities (of intertemporal vs. intratemporal substitution), size and structure of the economy (small open or large closed) or the exchange rate regime (fixed vs. floating).

Impact on interest rates and country risk premia. Fiscal tightening can reduce interest rates, including on external debt, thereby improving the current account balance. At the same time, lower risk premia can also increase capital inflows, which can boost demand and real appreciation pressures and eventually worsen the current account (expansionary fiscal contractions). Conversely, fiscal expansions that are deemed unsustainable can generate capital flight and force a rapid external account adjustment (the case of balance of payments crises rooted in fiscal profligacy).

The relative strength of these mechanisms, and thus the net impact of fiscal policy on the current account, is determined by model assumptions. In practice, it will depend of country characteristics. For example, in a small emerging market, the current account impact of a fiscal consolidation may well be adverse if the capital inflow response to a declining risk premium outweighs any direct demand contraction effects. In a large economy, a fiscal expansion may induce a private sector response that often combines a real depreciation (effected, possibly, by firms reducing markups to try and gain market share) and rising consumption demand, so that the impact on the trade balance is difficult to predict. [4]

The importance of country characteristics suggests that, in the empirical analysis, it may be helpful to analyze groups of countries with shared features (e.g., similar levels of economic development).

Empirical Studies

Previous empirical studies have generally found evidence suggesting that fiscal expansions worsen the current account. Estimates of the impact of 1 percentage point of GDP increase in the government deficit on the current account range between 0.2–0.7 percentage point of GDP, depending on the sample and techniques used (Appendix 1). A few studies (mostly for large advanced economies) have also addressed the impact of fiscal policy on the real exchange rate, finding mixed effects.

The methodologies used can be broadly grouped into three categories. The first category studies the impact of fiscal policy on external imbalances using causality tests and VARs. The second category analyzes the long-term correlation between indicators of fiscal policy and external imbalances, using cointegration techniques, and single or panel regressions techniques. The third category invokes the narrative approach to identify exogenous changes in fiscal policy and uses regression analysis to study their impact on external imbalances. The rest of this section presents a few key recent studies for each category, with the remaining studies summarized in Table 1.

VAR Studies

Studies using VARs have primarily looked at small samples of advanced economies. An important methodological choice in this setup is how to identify exogenous fiscal shocks. The preferred method in recent studies (e.g., Monacelli and Perotti, 2007; Beetsma et al, 2007) is to use changes in the log of real government consumption, because this measure is less affected by changes in GDP than is the case for alternatives such as the overall deficit/GDP ratio or the ratio

[4] Although some studies have found empirical evidence an association between real depreciations and fiscal expansion in large economies, opinions differ on the underlying reasons. Lane (2010), for instance, emphasizes that that "news that induces the government to provide fiscal impetus may also lead to a sell-off in currency markets."

of real government consumption to GDP. Indeed, this measure will also be used in the panel VAR section of this paper.

On the whole, these studies have generally found evidence consistent with a small negative impact of fiscal expansions on the current account balance, except in large economies (like the United States), where the results are more mixed. For selected EU countries, Beetsma et al (2007) find that a government spending innovation of 1 percentage point of GDP worsens the trade balance by 0.5 percentage point of GDP upon impact and by 0.8 after two years. The real effective exchange rate appreciates (after a year), suggesting that the main short-term transmission channel upon impact is output, with the real exchange rate playing a greater role over longer horizons. For the United States, Monacelli and Perotti (2007) find that, following an increase in real government consumption by 1 percentage point of GDP, the trade balance stays around trend initially, but improves by 0.5 percentage points after about 3 years. They find stronger evidence in support of the twin deficits hypothesis (albeit only on impact) in the United Kingdom, Australia, and Canada. Similar results are obtained for the same countries by Corsetti and Muller (2006), who point out that the impact of fiscal shocks on the current account seems to be greater and longer-lasting in economies where total trade is higher as a share of GDP (Canada and the United Kingdom) than in economies where trade is a smaller share of GDP (US and Australia).

Long-term Correlations and Panel Regressions

Studies involving large panels of countries are relatively rare. They are usually based upon panel regressions and find a statistically significant impact of fiscal variables on external imbalances. Abiad, Leigh, and Mody (2009) study determinants of the current account (in percent of GDP) for 135 countries (over 1975-2004) using a battery of random effects GLS regressions, and report a coefficient of 0.3 on the fiscal balance regressor (in percent of GDP) for the full sample. Mohammadi (2004) finds, for a sample of 20 advanced and 43 emerging and developing economies that a tax-financed spending increase is associated with a current account worsening of 0.16-0.29 percent of GDP (0.23-0.32 percent of GDP for developing countries, and 0-0.26 for advanced economies). If the spending is bond-financed, the current account balance worsens by 0.45-0.72 percent of GDP (0.55-0.81 percent of GDP for developing countries, and 0.22-0.50 for advanced economies). His estimated coefficients imply broadly symmetrical impact for fiscal expansions and contractions.

Other important studies include IMF (2008), which applies panel techniques to both developing and advanced economies and finds that a 1 percentage point of GDP increase in government consumption is associated with an appreciation of the equilibrium real exchange rate of 2.5 to 3 percent. The actual impact on the current account could vary depending on the dynamic adjustment path of the actual real exchange rate toward the equilibrium; large current account worsenings can obtain if the real exchange rate appreciates above its equilibrium level (overshooting). Khalid and Guan (1999) use cointegration techniques in selected countries and find that the empirical evidence does not support any long-run relationship between the current account deficit and the fiscal deficit for advanced economies, while the data for developing countries does not reject such a relationship. However, their results suggest a causal relationship between the fiscal and current account balances for most countries in their sample, running from the budget balance toward the current account balance.

Narrative Approach

Romer and Romer (2007) investigate the impact of exogenous changes in the level of taxation on economic activity in the U.S. They use the narrative record, presidential speeches, executive-branch documents, and Congressional reports to identify the size, timing, and principal motivation for all major postwar tax policy actions. This narrative analysis allows them to distinguish tax policy changes resulting from exogenous legislative initiative (aimed, for example, at reducing an inherited budget deficit, or promoting long-run growth) from changes driven by prospective economic conditions, countercyclical actions, and government spending. Their estimates indicate that exogenous tax increases are highly contractionary, largely via a powerful negative effect on investment. Insofar as investment spending is an important current account determinant, the results point to a strong association between fiscal contraction and current account improvements. Using Romer-Romer data, Feyrer and Shambaugh (2009) estimate that one dollar of unexpected tax cuts in the U.S. worsens the U.S. current account deficit by 47 cents.

A more recent dataset by Devries et al (2010) expands the narrative approach to identify action-based consolidations in 15 advanced economies. Evidence from that dataset suggests that the current account responds strongly to fiscal consolidation; implied response ratio is about 0.6 (Leigh et al, forthcoming). As the work is, as yet, unpublished, it is not possible to comment on the robustness of this result, and the extent to which it can be extrapolated to a larger group of countries.

III. Panel Regressions of Current Account on Fiscal Balance

We begin our empirical analysis with panel regressions on 88 non-oil exporting economies spanning the period 1970-2007. The distinction between advanced (30 countries) and emerging and low-income countries (58) is as per the IMF Fiscal Monitor (April 2011). The two key variables, the current account-to-GDP ratio and the cyclically-adjusted primary balance-to-potential GDP ratio, are derived from the IMF's World Economic Outlook database (see below on derivation). Data quality checked through reconciliation with IMF staff reports (with regard to the saving investment identity). For most advanced economies, the coverage starts from 1970; however, data on transition economies and many emerging and low-income economies is available for the post-1990 period only. The analysis discriminates country-years across several dimensions:

- *Trade and financial openness:* Trade openness is measured by the sum of imports and exports of goods and services (as a share of GDP), all from the WEO database. Financial openness is drawn from the Lane and Milesi-Ferretti (2006) dataset on the wealth of nations (2008 update) and defined as the sum of gross foreign financial assets and liabilities divided by GDP.
- *Exchange rate regime:* We use the IMF's *Annual Report on Exchange Arrangements and Exchange Rates* classifications going back to 1990. The Report categorizes countries from 1 ("dollarized") through 8 (fully floating). For our purposes, we include categories 1 through 3 (3 being adjustable peg) as fixed, and 7-8 (7 being managed float) as floating.
- *Output gap:* This is defined as the percentage excess of actual over potential output, with the latter estimated using the Hodrick-Prescott filter. The output gaps were combined with a standard 1/0 elasticity assumption for revenues/expenditures to compute the cyclically-adjusted primary balance-to-GDP ratio, the main regressor.

- *Level of public indebtedness:* We use the Abbas et al (2010) dataset on annual public debt-to-GDP ratios, effectively covering the entire IMF membership over 1970-2009.

The choice of the cyclically-adjusted primary balance-to-potential GDP ratio (CAPB) as the preferred measure of fiscal policy, as opposed to the headline fiscal balance, reflects the need to address the endogeneity problem that arises because shocks to the regressand (current account), especially due to growth, are likely to be strongly correlated with headline fiscal balances. The resulting estimation bias is likely to be negative in advanced economies, with faster growth typically driving higher imports (weaker current accounts) and favorable automatic stabilizers and countercyclical fiscal policy (stronger headline balance). Denominator effects due to GDP scaling further aggravate this bias. In emerging and low-income countries, the direction of the bias is less easy to predict. Indeed in export-led economies, growth shocks would imply a co-movement in fiscal and external balances. Alternatively, financing constraints accompanying say, an adverse growth shock, could induce corrections in both fiscal and current account deficits.

The choice of CAPB (which is scaled to potential GDP), while raising methodological issues in relation to output gap measurement and elasticity assumptions, helps attenuate the "automatic stabilizer and denominator" components of the bias noted above. Although the third component, which concerns the endogeneity of fiscal *policy* remains uncorrected, recent studies suggest that counter-cyclical fiscal policy is not the norm in Europe (Beetsma et al, 2009) while action-based fiscal consolidations in advanced economies, more generally, are at least as likely to happen in bad times as in good ones (Leigh et al, 2011). This is particularly plausible in cases where growth reveals underlying structural fiscal laxity and/or places binding financing constraints; the recent experience of peripheral European countries and emerging markets and low-income countries from earlier crises tends to support this view. Moreover, insofar as fiscal *policy* is subject to implementation lags, the share of say, a counter-cyclical fiscal expansion that is observed in the year in which the negative growth shock occurred, would likely be significantly less than 1. Overall, therefore, while we expect the some residual endogeniety bias, we do not think it is substantial.

The regression results, obtained used fixed effects, are summarized in Table 1.[5] The findings suggest that, on average, a strengthening in the cyclically-adjusted primary balance-to-potential GDP ratio (CAPB) of 1 percentage point is associated with an improvement in the current account-to-GDP ratio of about 0.3. The impact varies intuitively depending on the country-year characteristics noted above.

[5] A constant and lagged per capita PPP GDP (from the World Economic Outlook database) were included in all regressions, while observations where the absolute value of the current account ratio or the CAPB ratio was above 20 percentage points were dropped.

Table 1 - Fixed Effects Regressions of Current account on Cyclicaly-Adjusted Primary Balance

	1	2	3	4	5	6	7	8	9	10
	Headline regression	EMLICs vs ADV	Trade openness	Exchange rate regime	FxER & financial openness	FLER & financial openness	Output gap	Initial public debt	Revenue share in fiscal expansions	Revenue share in fiscal contractions
Lagged per capita income (US$ 000s)	0.049*** [0.017]	0.036** [0.018]	0.025 [0.017]	0.044 [0.043]	0.02 [0.068]	0.08 [0.055]	0.027 [0.018]	0.016 [0.018]	-0.017 [0.025]	0.039 [0.025]
Cyclicaly-adjusted primary balance in percent of potential GDP ("CAPB")	0.35*** [0.027]	0.24*** [0.051]	0.19*** [0.042]	0.26*** [0.061]	0.25*** [0.079]	0.56*** [0.072]	0.32*** [0.039]	0.35*** [0.033]	0.42*** [0.05]	0.31*** [0.054]
Interaction of CAPB with dummy taking value of 1 if:										
Emerging or low-income country		0.14** [0.061]								
High (-er than median of 63 percent of GDP) trade openness			0.24*** [0.052]							
Flexible exchange rate regime (dummy = 0 for fixed exchange rate)				0.13* [0.079]						
FxER regime & high financial openness					0.11 [0.12]					
FLER regime & high financial openness						-0.34*** [0.097]				
Output gap positive							0.036 [0.047]			
High initial public debt (>= 90 percent of GDP)								-0.087* [0.059]		
d_capb<0 and revenue share of d_capb >=0.19									-0.057 [0.065]	
d_capb>0 and revenue share of d_capb >=0.42										0.106* [0.075]
Observations	1,908	1,908	1,908	1,110	473	631	1,908	1,745	894	944
R-squared		0.086	0.094	0.071	0.052	0.109	0.083	0.08	0.101	0.088
Number of countries	88	88	88	86	53	57	88	87	87	88
Number of observations	1908	1908	1908	1110	473	631	1908	1745	894	944

NB. Standard errors in square brackets; *** denotes significance at 1 percent; ** at 10 percent; and * at 20 percent levels.

The coefficient on the CAPB in the overall regression is 0.35. It is notably smaller (0.24) for advanced economies and larger (0.38) for emerging and low-income economies. A possible interpretation is that, in emerging and low-income countries, public spending tends to include the purchase of foreign-made investment goods, and is thus more likely to spill over into imports than is the case in advanced economies. Moreover, as noted in the literature review on theory, relative price effects in advanced economies have been documented to be counter-intuitive, with the exchange rate often depreciating in response to fiscal expansions (Monacceli and Perotti, 2006 and Ravn et al, 2007).

Comparing across higher trade openness, the coefficient on CAPB is more than twice as large in more open economies than in less open ones. The difference is statistically significant at the 1 percent level. This result is intuitive, as in economies more open to international trade, a greater share of the additional demand stemming from a fiscal expansion would be met through imports.

Empirical regularity is also maintained for the role of exchange rate regimes, with the coefficient obtaining under flexible exchange rates higher by 0.13 percentage points than that yielded under fixed exchange rates. Theory predicts stronger fiscal policy output multipliers under fixed exchange rates, as the automatic monetary accommodation prevents (at least in the short term) the net exports crowding effect that would otherwise obtain under a flexible regime via higher interest rates and currency appreciation.

Within the context of flexible exchange rates, we obtain a somewhat puzzling result on financial openness. It would generally be expected that the more financially integrated an economy, the faster the response of capital inflows to a fiscal expansion-induced increase in interest rates, and hence the stronger the resulting currency appreciation and crowding out of net exports. However, we get the opposite result, with more financially open economies registering a significantly weaker coefficient. The strength of the result (a divergence of 0.34 percentage points significant at the 1 percent level) suggests that a superior measurement of financial openness or classification of exchange rate regime would unlikely be sufficient to solve the puzzle. In fact, the puzzle has also been observed in other recent studies of the impact of fiscal expansions on the trade balance (Dellas et al, 2005) and the interest rate (Aisen and Hauner, 2009). These studies suggest that monetary accommodation and neo-Keynesian channels may appear a stronger role than the traditional IS-LM-BP framework envisages. For instance, as discussed in Spilimbergo et al (2009), if monetary policy were targeted at stabilizing interest rates (as opposed to stabilizing inflation or nominal demand), the output multiplier could double and the net export crowding out effect associated with fiscal expansions under flexible exchange rates significantly weakened.

The association between fiscal policy and the current account also appears to be affected by the level of the output gap, albeit weakly. The direction is intuitive: when output is above its potential, a fiscal expansion is more likely to result in additional imports; on the other hand, when output is below potential, the additional demand stemming from a fiscal expansion is more likely to be met by increased production of domestic goods and services, rather than through imports.[6]

A high level of public indebtedness seems to weaken the fiscal policy-current account association, by 0.09 percentage points, although the significance level is low. The result is broadly in line with theoretical predictions that fiscal expansions at high debt levels, by accentuating debt sustainability concerns, can be contractionary, and result in a weaker association between fiscal and external balances. We explore different debt thresholds but find that the effect kicks in at a fairly high level – 90 percent of GDP – consistent with the finding in Reinhart and Rogoff (2010) that contractionary effects are not noticeable at debt levels below that.

Finally, we look at whether the revenue-expenditure mix of changes in fiscal policy matters for the latter's relationship with the current account. For this, we divide the sample into years in which there were fiscal expansions and years in which there were fiscal contractions, as measured by a change in the CAPB.[7] Then, we compute, for each sub-sample, the median contribution to the CAPB change of the change in revenue. We find this share to be 0.19 in fiscal expansions and 0.42 in fiscal contractions, suggesting that revenues have contributed twice as

[6] An alternative interpretation could be in times of economic crisis, private consumption collapses much more than government consumption, which translates into a stronger current account, while the fiscal balances deteriorate.
[7] We did not find any difference in the coefficient across fiscal expansions and contractions.

much as primary expenditures in fiscal consolidations than in fiscal expansions (the overall median for the whole sample was 0.33). Next, we generate dummy variables that take the value of 1 if the revenue share is in excess of the relevant sub-sample median. The coefficients on the interaction regressors indicate, interestingly, that revenue-led *contractions* tend to strengthen this association. This is not surprising, given the high median revenue share in contractions and the finding in Romer and Romer (2007) that tax increases exert a large negative impact on activity. If the tax increase and associated costs were seen to be very large, the favorable Ricardian offset from households (that would have otherwise supported imports) may be weakened. Moreover if the anticipated slowdown in output induced firms to reduce private investment, import demand would fall, producing an even stronger contraction in the current account.

Overall, the panel regressions suggest that the current account increases by about 0.3 percentage points to every 1 percentage point increase in the CAPB. However, this responsiveness coefficient is lower for advanced economies, while varying intuitively with trade openness, choice of exchange rate regime, initial public debt and the revenue-expenditure composition of fiscal policy changes. We now turn to episodes of large increases and decreases in the current account and CAPB both, to see the extent to which they validate the findings in the panel regressions, but also to provide insights into the correction of large imbalances.

IV. Analysis of Large Changes in Fiscal and External Balances

In the previous analysis we have pooled all changes in fiscal policy together. In this section we ask whether large changes in fiscal policy or large changes in the current account balance generate a different correlation between fiscal policy and the current account.

The starting point for this analysis is setting the criteria for identification of large continuous changes in the current account and the CAPB. To this end, we extract episodes for each advanced economy in which its current account or CAPB cumulatively improved (or worsened) by at least 2 percentage points of GDP while registering an average per annum improvement (worsening) of 1.5 percent of GDP.[8] These criteria are consistent with the well-known methodology for advanced economies in Alesina and Ardagna (1998, 2009). For emerging markets and low-income countries, there are no benchmark criteria in the literature but given the significantly higher volatility of fiscal and external balances in these countries, it would appear that somewhat tighter criteria would be needed if the focus is to remain on truly large episodes. As a result, for non-advanced economies, we use a criterion of 3 percentage points of GDP for cumulative change and 2 percent of GDP average per annum change.[9]

The application of the above noted criteria yields four sets of episodes listed in Appendix III. As can be seen, we recover about 40 episodes per set in the case of advanced economies and 100 episodes per set in the case of emerging and low-income economies. Table 2 below presents the corresponding summary saving-investment identity analysis. A number of interesting patterns emerge are discernible:

[8] No "reversals" during an episode were allowed.

[9] The factor by which these criteria were tightened is of the order of 1.33-1.5. This is close to the multiple (1.44) by which the median country's standard deviation for the current account and CAPB in the non-advanced sub-sample was higher than the median country's standard deviation for these variables in the advanced sub-sample.

The episodes in emerging and low-income economies are, on average, shorter than for advanced economies (by about half a year) but larger, by a factor of about 1.5. In advanced economies, the average change for the current account is 6.5 percent of GDP spanning over 2 years, and for the fiscal balances is around 6 percent of GDP spanning about 2.5 years. For emerging and low-income economies, the expansions and contractions are larger by a factor of 1.5, while the episodes shorter by about ½ a year.

Large current account deteriorations and improvements are generally not reflected in improvements in the government saving-investment balance (GSIB). This is clearly visible for advanced economies, where the entire action is in the private S-I balance (PSIB), with equal contributions from private saving and investment. For emerging and low-income countries, the GSIB contributes only about one-fourth of the change in the current account. The PSIB contribution in this case is notably led by changes in private saving.

For large fiscal expansions and contractions, the response ratios (reported in the final two columns) are generally in the 0.1-0.2 range, indicating low current account responsiveness. The ratios are smaller for advanced economies, especially for fiscal expansions and this appears to be driven by differences in Ricardian offsets. For advanced economies, private savings offset about 40 percent of the fiscal impulse (large CAPB changes), but this share is about one-tenth for emerging economies. This could in part reflect myopia, or the existence to a greater extent of other factors that cause Ricardian equivalence to break down, such as shorter life spans/planning horizons and liquidity constrained households. It could also reflect the higher trade openness of emerging and low-income countries (as noted in section III) as well as the non-traditional behavior of real exchange rates during fiscal expansions in advanced economies, as documented in Monacelli and Perotti (2006) and Ravn et al (2007). Studying the individual episodes, we can, in fact, confirm that the real exchange rate response to fiscal policy changes is nil in advanced economies but supportive in emerging economies.

The reason why the response ratios are somewhat stronger for fiscal contractions may be due to the fact that large corrections are typically concentrated in bad times, i.e. when growth (and demand for imports) is falling, producing stronger co-movement between external and fiscal balances. Indeed, more than two-third of the large consolidations identified in Devries et al (2010) occur against a backdrop of declining growth. We find a similar pattern in our sample: of the 186 large fiscal consolidations, 100 started in the year that growth declined. On the other hand, 93 of the 166 fiscal expansions occurred despite rising growth. That three-fourths of the fiscal consolidations follow an increase in public debt in our sample suggests that debt sustainability concerns often trump the desirability of providing counter-cyclical fiscal impetus.

Table 2 – Summary of S-I Identity Analysis of Large Episodes
(means; figures in percent of GDP, except for CAPB, which is percent of potential GDP)

Advanced Economies

Episode type (no. of episodes)	Duration (years)	Size	No. of episodes	Sg	Ig	Sg-Ig	Sp	Ip	Sp-Ip	S	I	CA	ΔCA/ΔGSIB (mean ; median)	ΔCA/ΔCAPB (mean ; median)
CA- (45)	1.9	-6.8	45	0.2	0.1	0.2	-3.5	3.3	-6.8	-3.3	3.4	-6.8		
CA+ (49)	2.2	6.5	49	-0.8	-0.3	-0.6	3.5	-3.5	7.1	2.6	-3.8	6.5		
GSIB- (35)	2.5	-5.8	35	-5.7	0.0	-5.8	3.4	-2.7	6.3	-2.2	-2.7	0.5	-0.1 ; 0.1	
GSIB+ (37)	2.4	5.9	37	5.0	-0.7	5.9	-3.4	1.7	-5.2	1.6	1.1	0.5	0.1 ; 0.2	
CAPB- (37)	2.2	-5.4	37	-3.0	0.2	-3.1	2.3	-1.2	3.6	-0.7	-1.1	0.7		-0.1 ; 0.049
CAPB+ (39)	2.5	6.0	39	3.1	-0.4	3.5	-2.7	0.2	-2.9	0.3	-0.2	0.6		0.1 ; 0.2

Emerging and Low-Income Countries

Episode type (no. of episodes)	Duration (years)	Size	No. of episodes	Sg	Ig	Sg-Ig	Sp	Ip	Sp-Ip	S	I	CA	ΔCA/ΔGSIB (mean ; median)	ΔCA/ΔCAPB (mean ; median)
CA- (105)	1.9	-8.2	105	-0.9	1.2	-2.1	-3.9	2.1	-5.9	-4.7	3.8	-8.2		
CA+ (110)	1.7	8.3	110	1.2	-1.4	2.6	4.2	-1.1	5.3	5.4	-3.1	8.3		
GSIB- (98)	1.7	-8.5	98	-5.6	2.8	-8.5	6.0	-0.6	6.6	0.4	2.2	-1.5	0.2 ; 0.1	
GSIB+ (98)	2.0	8.1	98	5.4	-2.7	8.1	-4.6	1.3	-6.0	0.7	-1.7	1.8	0.2 ; 0.2	
CAPB- (83)	1.7	-9.6	83	-3.4	0.6	-4.0	0.6	-1.5	2.1	-2.8	-0.3	-2.2		0.2 ; 0.2
CAPB+ (110)	1.9	9.2	110	2.9	-0.8	3.7	-1.1	0.5	-1.6	1.8	-0.7	2.4		0.3 ; 0.2

Notes: CA, GSIB, CAPB are abbreviations for current account, government saving-investment balance and cyclically-adjusted primary balance, respectively; "+" denotes improvement and "–"denotes worsening; Sg (Sp) denotes government (private) saving, and Ig (Ig) denotes government (private) investment, so that Sg-Ig (Sp-Ip) denotes the government (private) S-I balance.

A complementary "event analysis" generates additional insights into the dynamics of large expansions and adjustments. Appendix IV traces the paths of the key constituent variables of the S-I identity as well as fiscal balances for advanced economies, revealing that large episodes are invariably corrections on earlier trends (both improvements and deteriorations).

Finally, medians response ratios computed over several sub-samples suggest some support for patterns identified in the panel regressions, but also raise new questions (Table 2). For instance, current account responsiveness is stronger in economies more open to trade only in the case of large fiscal expansions. Fiscal contractions are characterized by larger private sector offsets in more open economies, resulting in smaller response ratios. A possible interpretation could be that the relative price adjustments in the case of fiscal contractions may be more difficult to effect than the real appreciations associated with fiscal expansions. Insofar as trade openness exacerbates this asymmetry, the response ratios would behave as observed.

With regard to exchange rate regime, the results are in line with the panel regressions: the response ratios are noticeably higher under floating exchange rates. However, we now have a bit more insight into where the puzzling result on financial openness (documented earlier) in the context of floating exchange rates comes from. As for the case of trade openness, the counter-intuitive result is driven mainly by fiscal contractions. Plausible explanations for this asymmetry could include the fact that financial market power is less diluted in emerging and low-income countries, so that interest rates rise more sharply to increased government bond issuance than they fall in response to fiscal contractions (see Abbas and Sobolev, 2009). If financial openness augments this asymmetric responsiveness, the size of fiscal expansion-induced currency appreciations would tend to be larger and the size of fiscal contraction-induced currency depreciations smaller.

Table 2 – Current Account Responsiveness to Large Fiscal Policy Changes
(median response ratio = Δ current account ratio / Δ cyclically-adjusted primary balance ratio)

(number of episodes in brackets)	Large CAPB Improvements	Large CAPB Worsenings
Less open to trade 1/	0.27 (108)	0.10 (97)
More open to trade	0.16 (80)	0.21 (63)
Fixed exchange rate	0.06 (52)	0.01 (40)
Flexible exchange rate	0.33 (50)	0.34 (34)
FLERs and less financially open 2/	0.41 (20)	0.28 (17)
FLERs and more financially open	0.16 (30)	0.39 (21)
Revenue share of CAPB change 3/:		
lies between 0 and 0.25	0.07 (7)	
0.25 and 0.5	0.09 (9)	
0.5 and 0.75	0.31 (9)	
0.75 and 1	0.58 (7)	

1/ The threshold for trade openness was the sub-sample median, around 75 percent of GDP for both large CAPB increases and decreases.

2/ The threshold for financial openness was the sub-sample median, around 150 percent of GDP for both CAPB increases and decreases.

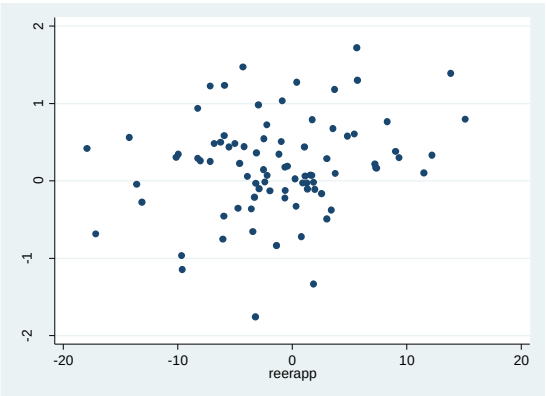
3/ Advanced economies only.

The results on the revenue share in large fiscal contractions echo those obtained earlier. More revenue-led consolidations appear to drive progressively weaker private sector offsets, strengthening the fiscal policy-current account association.

Finally, Figure 2 documents the possible role of "over-heating" in determining the effectiveness of large fiscal consolidations for correcting external imbalances. The left panel plots the current account response ratios against the cumulative real exchange rate appreciation in the two years prior to the first year of consolidation. The right panel plots response ratios against the level of the output gap at the start of the episode. The results are intuitive and statistically significant: response ratios are stronger the greater the degree of overheating at the start of the episode.

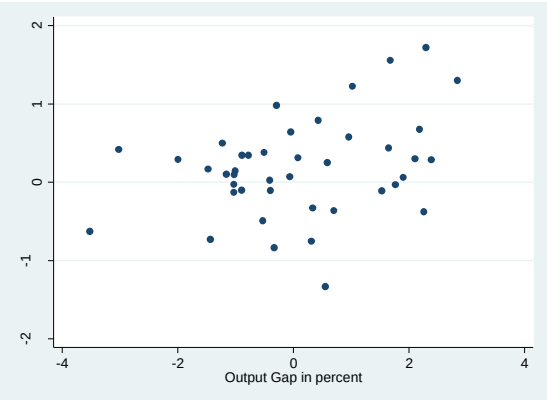
Figure 2 – Current Account Responsiveness to Fiscal Consolidations – The Role of Overheating

RRs vs. real appreciation through year 0



Slope of 0.14 (p-value 0.03)

RRs vs. output gap at year 0



Slope of 0.02 (p-value 0.05)

Overall, we find that the large episodes analysis confirms several of the panel regression findings. Although the median response ratios are generally lower (in the 0.1-0.2 region), the across-episode variation therein can be explained by the same factors that were highlighted in section III. Given these broad patterns and insights from the data, we turn to more refined econometric analysis, where issues of endogeneity can be better addressed and so our estimates of current account responsiveness sharpened.

V. PANEL VECTOR AUTO-REGRESSIONS

To analyze the dynamic impact of fiscal policy changes on the current account, this section moves to a VAR specification. Understanding the dynamic effects of fiscal policy changes has been the focus of a recent literature that started with the work of Blanchard and Perotti (2002), Fatás and Mihov (2001) among others. The main difficulty of this literature is to identify the exogenous changes in fiscal policy. Fiscal policy reacts to changes in GDP so to be able to provide a structural interpretation to the correlation between macroeconomic variables and fiscal policy we need some identifying assumptions. One of the most-used methods in the literature has been the approach of Blanchard and Perotti (2002). By using information on elasticities of taxes and government spending, one can separate the endogenous component of fiscal policy from the exogenous one.

While this approach can be implemented for advanced economies, where there is detailed information on tax elasticities, it is much harder to implement for a large sample of countries. One way to solve this problem is to focus on the component of the budget that is less likely to react to changes in output: government consumption. Blanchard and Perotti (2002) make use of the assumption that government consumption does not react to changes in output within a quarter.

In our case, because of the absence of reliable data on tax elasticities, we will follow this approach and restrict our analysis to shocks in government consumption. While this just provides a partial view on potential changes in fiscal policy, we are more confident of the exogeneity of the changes than if we were to look at tax shocks. This approach has been followed by many of the recent empirical papers in the literature.

We could also follow the narrative approach of Romer and Romer (2007) applied to the analysis of the current account in Feyrer and Shambaugh (2009) or Bluedorn and Leigh (2011). But given our interest in a large sample of countries this is not feasible. In addition, there are concerns about the potential subjectivity in the definition of these events as well as about the possible anticipation before the actual date when they are coded (Ravn et al, 2007).

Regarding the frequency of the data, we perform two separate exercises. We start with a large sample that uses annual data. Clearly, the assumption that government consumption does not respond to GDP within a year is less justifiable than if we simply assume that there is no reaction within a quarter. However, we are not the only ones looking at annual data. Recent papers in the literature such as Corsetti et al (2010) or Beetsma et al (2007) have made use of annual data . The motivation for using annual data is to look at a larger sample of countries over a longer time span. How restrictive is the assumption that government consumption does not react to output within a year? Corsetti et al (2010) discuss this issue in detail and while it might be that during the 2008-09 crisis governments reacted quickly to economic conditions (maybe as fast as 5 to 8 months), this is more of the exception than the norm. In fact, the evidence from VARs that use quarterly data show that in response to output shocks the response of government consumption is

small and insignificant over the first quarters (in most cases it remains insignificant at any horizon). In addition, Corsetti et al (2010) also justify the use of annual data on the grounds that spending shocks might be foreseeable.

While we feel confident that the VAR using annual data provide useful insights into the effects of government consumption shocks, we later address the use of annual data by building a database with quarterly data for a large number of countries, both advanced and emerging, and we repeat the panel VAR exercise on that sample.

Our specification measures fiscal policy as the logarithm of real government consumption (denoted by *lrgovcons*). The key variable of interest remains the current account-to-GDP ratio (*cagdp*). Output shocks are controlled for by including the log of real GDP (*lrgdp*) or the output gap (*gap*) in the VAR. This specification is similar to the one used by Monacelli and Perotti (2007) or Beetsma et al (2007). We run *panel* VARs, removing individual country fixed effects through the Helmert transformation.[10]

This paper's identification and ordering scheme follows that employed in Beetsma et al (2007). Specifically, letting Z_t denote a vector containing the variables described above, the following structural model is estimated:

$$A_0 Z_t = A_1 Z_{t-1} + A_2 Z_{t-2} + \varepsilon_t$$

where ε_t is a vector of mutually uncorrelated innovations and the A_i are coefficient matrices.[11]

We include three variables in our specification: $Z_t = \left[lrgovcons, cagdp, lrgdp \right]'$. By including (log) real government consumption "first" we impose the assumption that government spending responds to the other variables with a delay of one year, while the other variables can react contemporaneously to changes in government consumption. The ordering of the other two variables is irrelevant to our results as we only analyze shocks to government consumption. We run this VAR for different subsamples and we also include in some of the cases the (log of the) real exchange rate.

Results are presented in the form of the dynamic impulse response of the three variables to an increase in the log of real government consumption equivalent to the sample standard deviation. In our description of the results we focus on the response of the current account. Impulse responses are within a band representing a 90 percent confidence interval estimated using Monte Carlo simulations (with 500 iterations).

The empirical findings suggest that a fiscal expansion (proxied here by an increase in government consumption) generally leads to a worsening in the current account balance, though there are differences in the duration or the impact depending on the country sample.

Appendix V Figure 1 shows the response to a shock to the log of real government consumption by one standard deviation. The first panel includes all countries in the sample. The shock

[10] The standard mean-differencing method to remove fixed effects would bias coefficient because of the correlation between lagged dependent variable regressors and fixed effects, The Helmert transformation avoids this problem by using forward mean-differencing (Arellano and Bond, 2005).

[11] The coefficients matrix A_0 reflects contemporaneous relationships among the variables in Z_t. It is not possible to estimate A_0 and therefore identify the innovations ε_t without further assumptions. Therefore, we assume that A_0 is a lower triangular matrix.

amounts to an 8% increase in government consumption. Given that the average ratio of the government consumption to GDP ratio in this sample is about 16%, this implies a change in this ratio of about 1.3 percentage points, if the level of GDP remained the same. In the impulse response we see that GDP increases on impact although it does so by a small amount (implying that our estimated multiplier is small). If we were to correct the change in the consumption to GDP ratio by taken into account the GDP change, we would be looking at a change in this ratio by about 1.1 percentage points. Of course, to understand how this change in government consumption affects the government balance we need to know how other components of the government budget are reacting to the shock (e.g. transfers or taxes). Given our focus on government consumption, we cannot measure these changes. However, the literature that has estimated VARs including taxes tend to estimate very small and insignificant responses of taxes to shocks to government spending.[12]

The effect on the current account upon impact is significant: during the year of the spending shock, for the full sample the results imply a deterioration in the current account by 0.35 percentage points of GDP. The response is similar for the next two years and then it fades away and gets closer to zero and insignificant by year 5. Although not reported, we have run the same regression just excluding oil exporters from the sample and the implied coefficient is smaller, at about 0.28 percentage point of GDP.

To compare with our previous results, if we normalize the shock to one that changes the government consumption-to-GDP ratio by 1%, we obtain a current account *multiplier* of about 0.3. This magnitude is similar to the results obtained in the panel regressions.

We also present in Appendix V Figure 1 the results of running the same regression using only the emerging and low income countries (Panel B). Qualitatively the results are very similar except that the response of the current account is even more persistent and still significantly different from zero after year six. In terms of the size of the shock, we are looking at a similar change (about 9%). Given that the ratio of consumption to GDP in this sample is close to that of the full sample (about 15.3% of GDP), we are looking at a similar change in the government consumption to GDP ratio, of about 1.2-1.3 percentage points. The response of the current account is similar upon impact (0.35 percentage points) but it grows and reach a level of 0.53 in the second and third years. If we translate these figures into a current account *multiplier*, we conclude that a 1 percentage point increase in the government consumption to GDP ratio worsens the current account by as much as 0.44 percentage points.[13] The fact that the effect on the current account is larger for emerging and low-income countries is also consistent with our previous results.

Panel C and D splits the sample according to how open the economy is in terms of trade. We establish a cutoff of 70% for the sum of exports and imports as a % of GDP.[14]

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[12] We are referring here to discretionary changes in taxes. Of course, taxes are likely to react to changes in output via automatic stabilizers, but given that response of output is small this will not represent a large change in the budget balance.

[13] If we exclude the oil exporters (not shown in the figure), in response to a 1 percentage point of GDP increase in government consumption, the current account worsens by 0.20 percentage point of GDP during the year of the shock and 0.24 percentage point of GDP one year after the shock. The impact gradually peters out and becomes insignificant after four years for the sample that excludes the oil exporters. The somewhat stronger response in a sample consisting of emerging and low-income countries only, compared with the full sample, is consistent with the view that the import content of government consumption is higher, and the relative price channel more important, in emerging and developing countries than is the case for advanced economies.

[14] The cutoff is calculated for the average over the whole sample.

We find that while the shocks to government consumption are similar in size. The response of the current account is larger for economies that are less open to trade. But the persistence of the response is stronger for more open economies. In addition, the precision of the estimates worsens and the standard errors are wider than before so statistically these differences are not significant.

Next we include an additional variable in our VAR: the log of the real exchange rate. Controlling for variations in the exchange rate can provide a more accurate picture of the response of the current account. Appendix V Figure 2 provides the impulse responses for the 4 variable VAR both for the whole sample (Panel A) and for the sample of emerging and low income countries (Panel B). Introducing the real exchange rate does not significantly change the shape of the impulse responses. The current account still reacts negatively to a positive shock to government consumption in both the full sample and the sample of emerging and low income countries. The real exchange rate appreciates in response to the shock and the response is significant on impact. After the second year the response becomes insignificant and the confidence bands widen significantly.

In terms of the magnitude of the response of the current account, overall we see a larger response to the shock in government consumption. If we normalize the shock to a change in the government consumption to GDP of 1%, the current account responds by about 0.23 percentage points of GDP for both samples. In the case of emerging and low income countries the response increases to as much as 0.49 percentage points while in the case of advanced economies we see it reaching a maximum of about 0.37. From a statistical point of view the different between these estimates is not significant but it is interesting to see that after introducing the real exchange rate we obtain a result which remains consistent with the 3-variable panel VAR.

The response of the real exchange rate is similar for both samples. If we consider a 1 percentage point shock to the government consumption to GDP ratio, the real exchange rate appreciates by about 3% on impact. Interestingly, this is very similar to the estimates of IMF (2008).

Panel Vector Auto-regressions (VARs) with quarterly data

We now turn to our results using quarterly data. We have put together a database of quarterly data for a significant number of advanced and emerging economies. Finding quarterly data for emerging countries is a challenge and in many cases the length of the time series is short. But as we will be looking at a panel of countries we can handle time series that are too short to provide a proper analysis if each country is looked at in isolation. Of course, the panel structure imposes constraints on the similarities of response across countries but this is the only way to move forward if quarterly data is required. This is the approach followed by Ilzetzki et al (2009) or Ravn et al (2007) when measuring fiscal policy multipliers using quarterly data for emerging countries.

We run a similar specification to the one we run for our annual data, initially with three variables (log of real government consumption, the current account to GDP balance and the output gap). The identifying assumption for the government consumption shock remains the same: both the current account and the output gap react contemporaneously to changes in government consumption but not the other one around. The difference, of course, is that we only need to assume that government consumption does not react to output within a quarter, as opposed to a year.

Appendix V Figure 3 presents the baseline specification for the full sample (Panel A) as well as the sample of emerging and low income countries (Panel B). Overall, we confirm the results using annual data. In response to a shock in government consumption, the current account worsens. From a quantitative point of view we have shocks that are smaller in size, because of the different frequency, but if we rescale the shocks to an implied change in the government consumption to GDP ratio of one percentage point, the response of the current account to GDP ratio is about 0.45 percentage points on impact and it goes up to 0.54. These *multipliers* are not far from what we obtained with annual data but slightly larger (for annual data we had 0.3).

For the sample of emerging and low income countries we find a very similar effect. The effect on the current account to GDP ratio of a change in one percentage point of the government consumption to GDP ratio is about 0.51 on impact and it reaches a maximum of 0.54. Therefore, as it happened with the annual data analysis, it seems that the impact on the current account for emerging markets and low income countries is larger than for advanced economies (although the difference is small and insignificant).

We also split the sample into countries with trade openness above the average and those below the average. This is presented in Panels C and D of Appendix V Figure 1. Overall, we get, once again, similar qualitative responses of the current account in both samples. However, and unlike in the case of annual data, here we can see a stronger response of the current account for countries that are more open. In particular, if we compute the government consumption multiplier on the current account, we obtain 0.3 for less open economies and above 0.5 for economies that are more open. Although one should notice that the results for less open economies are more precisely estimated and remain significantly different from zero for a longer number of years.

Finally, we look at the differences in response depending on the exchange rate arrangement. On theoretical grounds we expect that the response of the current account varies depending on whether a country has a fixed or a flexible exchange rate. In the traditional Mundell-Fleming model fiscal policy is more effective under fixed exchange rates because of the necessary accommodation of monetary policy. Under flexible exchange rates and under the extreme assumption that monetary policy does not accommodate the output effects of expansionary fiscal policy we have, following an increase in government spending, no effect on output because there is a one-to-one crowding out effect via net exports.

Exchange rate arrangements are not always stable so we need to look at episodes where there is some persistence in the regime chosen. Here we follow Ileztki et al (2009) and we use the same periods that they label as fixed and flexible. Of course, we have a large number of years where none of these labels apply. We then run our panel VAR for each of the three samples (fixed, flexible and unclassified). We report in Appendix V Figure 4 the response of the current account for each of the three samples. The size of the shock has been normalized to be equal to a 1% change in the ratio of government consumption to GDP. The standard errors are large for each of the three subsamples and the displayed responses are not statistically significant from each other. The estimates are similar and surprisingly we get a slightly larger response for the case of fixed exchange rate relative to flexible exchange rates. While this might be surprising we need to remind ourselves that the theoretical prediction that the response is larger under flexible exchange rates requires a certain behavior of monetary policy, for which we are not controlling. Ilzetzki et al (2007) find that the response is also similar across the two groups and the difference is statistically insignificant although their estimates show a slightly larger response of the current account in the case of flexible exchange rates. Interestingly, the response of the current account

for the countries/years that have not been labeled as flexible or fixed exchange rates is as large or even larger on impact than for the other two groups.

VI. Conclusion

This paper has analyzed the relationship between fiscal policy and the current account. The paper's contribution consists of the breadth of its empirical investigation, in terms of both empirical techniques and country coverage. On average, a strengthening in the fiscal balance by 1 percentage point of GDP is associated with a current account improvement of 0.3-0.4 percentage point of GDP. This association appears stronger in emerging and low-income countries, when the exchange rate is flexible, when the economies are more open, when output is above potential or initial debt levels are above 90 percent of GDP, and when using methods robust to endogeneity issues.

REFERENCES

Abiad, Abdul, Daniel Leigh, and Ashoka Mody, 2009, "Financial Integration, Capital Mobility, and Income Convergence," *Economic Policy,* Vol. 24, No. 58, pp. 241–305.

Adam, Christopher, and David Bevan, 2005, "Fiscal Deficits and Growth in Developing Countries," *Journal of Public Economics,* Vol. 89, No. 4.

Alworth, Julian, and G. Arachi, 2007, "Taxation policy in EMU." Paper presented at the EMU at 10 years Conference held in Brussels on November 26–27.

Arellano, Manuel, and Olympia Bover, 1995, "Another Look at the Instrumental Variable Estimation of Error Component Models," *Journal of Econometrics,* Vol. 68, pp. 29–51.

Backus, David, Patrick J. Kehoe, and Finn E. Kydland, 1994, "Dynamics of the Trade Balance and the Terms of Trade: The J-Curve?" *American Economic Review,* Vol. 84, No. 1, pp. 84–103.

Baxter, Marianne, 1995, "International Trade and Business Cycles," In: G. M. Grossmann and K. Rogoff, Editors, *Handbook of International Economics,* Vol. 3, Amsterdam, North–Holland, pp. 1801–1864.

Beck, Stacie, and Cagay Coskuner, 2007, "Tax Effects on the Real Exchange Rate," *Review of International Economics,* Vol. 15, No. 5, pp. 854–868 (November).

Bussière, Matthieu, Marcel Fratzscher, and Gernot J. Müller, 2005, "Productivity Shocks, Budget Deficits, and the Current Account," European Central Bank Working Paper, No. 509.

Beetsma, Roel, Massimo Giuliodori, and Franc Klaassen, 2007, "The Effects of Public Spending Shocks on Trade Balances and Budget Deficits in the European Union," *Journal of the European Economic Association,* April–May 2008, Vol. 6, No. 2–3, pp. 414–23.

Bernheim, Douglas B.,1988, "Budget Deficits and the Balance of Trade," *Tax policy and the Economy,* Vol. 2, 1988, pp. 1–31.

Chinn, Menzie D., 2005, "Getting Serious About the Twin Deficits," Council on Foreign Relations Special Report.

Chinn, Menzie D., and Eswar S. Prasad, 2003, "Medium-Term Determinants of Current Accounts in Industrial and Developing Countries: An Empirical Exploration," *Journal of International Economics,* Vol. 59, pp. 47–76.

Corsetti, Giancarlo, André Meier and Gernot J. Müller, 2010, "What determines government spending multipliers?," Unpublished manuscript.

Corsetti, Giancarlo, and Gernot J. Müller, 2006, "Budget Deficits and Current Accounts: Openness and Fiscal Persistence," *Economic Policy,* Vol. 21 (October), No. 48, pp. 597–638.

Dewald, William G., and Michael Ulan, 1990, "The Twin-Deficit Illusion," *Cato Journal*, Vol. 9 (Winter), No. 3, pp. 689–707.

Edwards, Sebastian, 1989, *Real Exchange Rates, Devaluation, and Adjustment: Exchange Rate Policy in Developing Countries* (Cambridge, Massachusetts: MIT Press).

Enders, Walter, and Bong-Soo Lee, 1990, "Current Account and Budget Deficits: Twins or Distant Cousins?" *Review of Economics and Statistics*, Vol. 72, No. 3, pp. 373–81.

Feyrer, James, and Jay Shambaugh, 2009, "Global Savings and Global Investment: The Transmission of Identified Fiscal Shocks," Dartmouth College and NBER (Cambridge, Massachusetts: National Bureau of Economic Research).

Frenkel, Jacob A., and Assaf Razin, 1996, *Fiscal Policies and Growth in the World Economy* (Cambridge, Massachusetts: MIT Press).

Froot, Kenneth A., and Kenneth Rogoff, 1995, "Perspectives on PPP and Long-Run Exchange Rates," NBER Working Paper No. 4952 (Cambridge, Massachusetts: National Bureau of Economic Research).

Ilzetzki, Ethan, Enrique Mendoza, and Carlos A. Vegh, 2009, "How big (small?) are fiscal multipliers?" Unpublished manuscript.

International Monetary Fund, 2008, *Exchange Rate Assessments: CGER Methodologies*, IMF Occasional Paper No. 261 (Washington: International Monetary Fund).

Kawai, Masahiro, and Louis J. Maccini, 1995, "Twin Deficits versus Unpleasant Fiscal Arithmetic in a Small Open Economy," *Journal of Money, Credit, and Banking*, Vol. 27, pp. 639–58.

Kennedy, Mike, and Torsten Sløk, 2005, "Structural Policy Reforms and External Imbalances," OECD Economics Department Working Paper, No. 415 (Paris: Organization for Economic Cooperation and Development).

Khalid, Ahmen M., and Teo W. Guan, 1999, "Causality Tests of Budget and Current Account Deficits: Cross-Country Comparisons," *Empirical Economics*, Vol. 24, 1999, pp. 389–402.

Kim, Soyoung, and Nouriel Roubini, 2008, "Twin Deficit and Twin Divergence? Fiscal Policy, Current Account, and Real Exchange Rate in the U.S.," *Journal of Economic Literature*, Vol. 74, pp. 362–383.

Kumhof, Michael, and Douglas Laxton, 2009, "Fiscal Deficits and Current Account Deficits," IMF Working Paper No. 09/237 (Washington: International Monetary Fund).

Lane, Philip R., and Gian M. Milesi-Ferretti, 2006, "The External Wealth of Nations Mark II: Revised and Extended Estimates of Foreign Assets and Liabilities, 1970–2004," IMF Working Paper No. 06/69 (Washington: International Monetary Fund).

Lane, Philip R., 2010, "External Imbalances and Fiscal Policy," IIIS Discussion Paper No. 314, Institute for International Integration Studies, Trinity College Dublin and CEPR.

Leigh, Daniel, 2008, "Achieving a Soft Landing: The Role of Fiscal Policy," IMF Working Paper No. 08/60 (Washington: International Monetary Fund).

Miller, Stephen M., and Frank S. Russek, 1989, "Are the Twin Deficits Really Related?" *Contemporary Policy Issues*, Vol. 7 (October).

Mohammadi, Hassan, 2004, "Budget Deficits and the Current Account Balance: New Evidence from Panel Data," *Journal of Economics and Finance*, Vol. 28, No. 1, (Spring), pp. 39–45.

Monacelli, Tommaso, and Roberto Perotti, 2007, "Fiscal Policy, the Trade Balance, and the Real Exchange Rate: Implications for International Risk Sharing," Università Bocconi, Milan, Italy.

Montiel, Peter J., 1999, In: Lawrence Hinkle and Peter J. Montiel, Editors, *The Long-Run Equilibrium Real Exchange Rate: Conceptual Issues and Empirical Research*, pp. 219–263 (Oxford: Oxford University Press).

Mundell, Robert A., 1960, "The Monetary Dynamics of International Adjustment Under Fixed and Flexbile Exchange Rates," *Quarterly Journal of Economics*, Vol. 74 (May), No. 2, pp. 227–257.

Mundell, Robert A., 1960, "The Pure Theory of International Trade," *American Economic Review*, Vol. 50 (March), pp. 67–110.

Normandin, Michel, 1999, "Budget Deficit Persistence and the Twin Deficits Hypothesis," *Journal of International Economics*, Vol. 49, pp. 171–193.

Normandin, Michel, 2006, "Fiscal Policies, External Deficits, and Budget Deficits," Cahier de Recherche/Working Paper No. 06–32 (Montreal: CIRPÉE).

Obstfeld, Maurice, and Kenneth Rogoff, 1995, "Exchange Rate Dynamics: Redux", *Journal of Political Economy*, Vol. 103, pp. 624–660.

Obstfeld, Maurice, and Kenneth Rogoff, 1996, *Foundations of International Macroeconomics* (Cambridge, Massachusetts: MIT Press).

OECD, 2007, "Consumption Taxes: the Way of the Future?" October Policy Brief (Paris: Organization for Economic Cooperation and Development).

Piersanti, Giovanni, 2000, "Current Account Dynamics and Expected Future Budget Deficits: Some International Evidence," *Journal of International Money and Finance*, Vol. 19, pp. 255–271.

Ravn, Morten O., Stephanie Schmitt-Grohe, and Martin Uribe, 2007, "Pricing to Habits and the Law of One Price," *American Economic Review*, Papers and Proceedings, Vol. 97 (May), pp. 232–238.

Ravn, Morten O., Stephanie Schmitt-Grohe, and Martin Uribe, 2007, "Explaining the Effects of Government Spending Shocks on Consumption and the Real Exchange Rate" (Durham, North Carolina: Duke University).

Romer, Christina D., and David H. Romer, forthcoming, "The Macroeconomic Effects of Tax Changes: Estimates Based on a New Measure of Fiscal Shocks," *American Economic Review*.

Roubini, Nouriel, 1988, "Current Account and Budget Deficits in an Intertemporal Model of Consumption and Taxation Smoothing. A Solution to the Feldstein-Horioka Puzzle?" NBER Working Paper, No. 2773.

Salter, Wilfred A., 1959, "Internal and External Balance: The Role of Price and Expenditure Effects," *Economic Record*, Vol. 35, pp. 226–38.

Summers, Lawrence H., 1986, "Debt Problems and Macroeconomic Policies," NBER Working Paper, No. 2061 (Cambridge, Massachusetts: National Bureau of Economic Research).

Truman, Edwin, 2004, "Budget and External Deficits: Same Family but Not Twins." Prepared for the Federal Reserve Bank of Boston Annual Research Conference, June 14–16.

Tanzi, Vito, and Howell H. Zee, 2000, "Tax Policy for Emerging Markets – Developing Countries," IMF Working Paper No. 00/35 (Washington: International Monetary Fund).

Appendix I. Synthetic Summary of the Empirical Literature

Selected Papers	Sample and Methodology	Type of Fiscal Shock	Effect on (Correlation With) the Current Account	Effect on the Exchange Rate	Comments
			Papers using dynamic (VAR) specification or causality tests		
This paper	124 countries, annual data, 1985-2007, panel VAR	1 percent increase in real government consumption.	The current account worsens by 0.3 pct of GDP on impact. The effects gradually peter out, becoming insignificant after 2-4 years.		The impact is longer-lasting in emerging countries than in advanced countries.
Monacelli and Perotti (2007)	US, UK, Canada and Australia, quarterly data, 1975-2006, VAR	1 percent of GDP increase in government spending.	The trade balance deteriorates sharply (>0.6 pct. of GDP) in the UK (after 5 quarters) and Australia (after 3 quarters). It does not change significantly for the US and Canada.	By one year, the real effective exchange rate depreciates by 4 percent in the US and Australia, and by 2 percent in the UK and Canada. After 2 years, it starts appreciating in Canada.	The behavior of the trade balance follows that of investment. When the latter falls, the trade balance improves.
Beetsma et al (2007)	14 EU countries, annual data, 1970-2004, panel VAR 2/	1 percent of GDP increase in government spending.	The trade balance deteriorates by 0.5 percent of GDP on impact and by 0.8 percent of GDP after two years.	The real effective exchange rate appreciates, though with some delay (after a year).	The findings suggest that the main source of movement of the trade balance is an increase in output (and not the exchange rate) following the increase in public spending.
Corsetti and Miller (2006)	Australia, Canada, the UK and the US, quarterly data, 1980-2006.	1 percent of GDP increase in government spending.	The trade balance deteriorates by 0.5 percent of GDP for the UK, 0.17 percent of GDP for Canada. No significant effect for the US and Australia.		The impact reaches -0.8 percent of GDP after 4 quarters for the UK but vanishes after 10 quarters. For Canada, the impact reaches 1 percent of GDP after 5 quarters and is persistent for extended period of time.
Normandin (2006)	G7 countries, quarterly data, 1975-2001, causality tests, VAR.	One currency-unit tax cut.	No causality from the real CA (nominal deflated by CPI) to real budget balance (nominal deflated by CPI). VAR estimates suggest that the effect on the CA is not significantly different from zero, except for France and Germany.		
Kim and Roubini (2004)	US, quarterly data, 1973-2004, VAR	1 percent of GDP increase in government primary deficit.	The CA balance improves marginally (less than 0.1 pct of GDP) for about a year and the impact disappears thereafter.	Both the nominal and real exchange rates depreciate persistently	The improvement in the CA comes from the effects of higher savings and lower investments as interest rates rise.

Appendix I. Synthetic Summary of the Empirical Literature (continued)

Selected Papers	Sample and Methodology	Type of Fiscal Shock	Effect on (Correlation With) the Current Account	Effect on the Exchange Rate	Comments
Normandin (1999)	Us and Canada, quarterly data, 1950-1992, VAR.	Lump-sum tax cut that increases the real budget deficit (nominal adjusted by GDP deflator) by 1 unit.	The (real) CA balance deteriorates by 0.21-0.98 units for the US, and by 0.19-0.67 units for Canada.		
Khalid and Guan (1999)	5 advanced economies (1950-94) and 5 developing countries (1955-93) annual time series. Cointegration and causality tests. 3/		No cointegration (long-run relation) between the CA and budget balance in advanced economies, but evidence does not reject such a relationship in developing countries. For most of the countries, evidence suggest a causal relationship.		UK and Australia (no causality in either direction). US, France, Egypt, and Mexico (causality from the budget balance to the CA balance). Canada, and India (causality in both directions).
Enders and Lee (1990)	US, quarterly data, 1947-87, VAR.	Increase in real government spending (nominal adjusted for inflation) by one unit; increase in (real) government debt.	The (real) trade balance is not affected on impact, but worsens it by 0.002 units after 8-10 quarters;	The nominal exchange rate is initially volatile but depreciates after 9 -16 quarters.	
		Papers using single equations or panel regressions			
This paper	124 countries, annual data, 1985-2007, panel regressions.	1 percent of GDP increase in government budget balance.	The CA balance improves by about 0.3 percent of GDP.		The improvement is stronger for emerging countries than for advanced ones. The improvement is smaller when one excludes oil exporters. The improvement is also larger when GDP is above potential than when it is below potential.
Abiad, Leigh, and Mody (2009)	135 countries, 1975-2004, 5-year averages, random effects generalized least squares (with clustered standard errors), panel regressions.	1 percent of GDP increase in the contemporaneous budget balance (in percent of GDP)	The current account improves by about 0.3 percent of GDP in the full sample regression. The coefficient becomes negative/insignificant in regressions with regional sub-samples of mostly advanced and emerging economies.		Use additional controls the impact of age dependency, net foreign assets-to-GDP and financial integration.
IMF (2008)	48 countries, annual data, 1980-2004, panel cointegration 1/	1 percent of GDP increase in government consumption.		The equilibrium real exchange rate appreciates by 2.5 to 3 percent.	The equilibrium real exchange rate could be significantly different from the actual real exchange rate (misalignment)

Selected Papers	Sample and Methodology	Type of Fiscal Shock	Effect on (Correlation With) the Current Account	Effect on the Exchange Rate	Comments
Bussière and Fratzscher (2005)	G7 and 21 OECD countries, annual data, 1960-2003, panel and country-specific time series regressions.	1 percent of GDP increase in the cyclically-adjusted primary budget balance.	No significant effect for the G7 panel and country regressions. Small and marginally significant increase (0.07 pct of GDP) on the on CA for the group of OECD countries.		Productivity seems to play a more significant role. A 1 percent increase in country-specific productivity decreases the CA balance by 0.15 pct of GDP.
Kennedy and Slok (2005)	14 OECD countries, annual data, 1982-2003, panel regressions	1 percent of GDP increase in government budget balance.	The CA balance improves by about 0.3 pct of GDP, once indicators of structural policy are included.		The REER only has a marginal effect on the CA. Indicators of structural policies capture changes in product market regulations, changes in stock market capitalization, FDI restrictiveness, employment protection legislation, changes in structural unemployment, and changes in trend participation rate.
Mohammadi (2004)	63 countries (20 advanced and 43 developing), annual data, 1975-98, panel regressions.	1 percent of GDP increase in government spending.	If the spending is tax-financed, the CA balance worsens by 0.16-0.29 percent of GDP (0.23-0.32 percent of GDP for developing countries, and 0.00-0.26 for advanced countries). If the spending is bond-financed, the CA balance worsens by 0.45-0.72 percent of GDP (0.55-0.81 percent of GDP for developing countries, and 0.22-0.50 for advanced countries).		An improvement in the budget balance by 1 percent of GDP improves the CA by 0.30-43 percent of GDP (0.33-49 percent of GDP for developing countries, and 0.21-0.24 percent of GDP).
Piersanti (2000)	17 OECD countries, annual data, 1970-1997 panel and country-specific time series regressions	1 percent of GDP increase in expected future government budget balance.	The CA balance improves for most countries. The improvement varies from about 0.02 pct of GDP to about 0.32 pct of GDP		Within the sample period, actual budget balances are assumed to be the best market estimates of the expected future government balance.
Chinn and Prasad (2000)	18 advanced and 71 developing countries, annual data, 1971-95, cross-section, Panel.	1 percent of GDP increase in government budget balance.	The CA balance improves by 0.25-0.46 percent of GDP in the cross-section regressions. The CA balance improves in the range 0.26-0.39 pct of GDP.		Panel regression suggest that the effect of the government balance is not statistically significant for advanced countries. Both panel and cross-section regressions suggest that the impact of the budget balance on the CA balance is larger in developing countries than in advanced ones.

Selected Papers	Sample and Methodology	Type of Fiscal Shock	Effect on (Correlation With) the Current Account	Effect on the Exchange Rate	Comments
Dewald and Ulan (1990)	US, annual data, 1961-85, single equations.	1 percent of GDP increase in government budget deficit.	The increase in the government budget deficit is associated with an increase of the CA deficit of 0.61 percent of GDP.		Same as Roubini (1988) for the US. The coefficient is much smaller when alternative specifications or other measures of the fiscal stance are used.
Miller and Russek (1989)	US, quarterly data, 1946-1971, 1971-87, causality tests, OLS and cointegration.	1 percent of GDP increase in government budget deficit.	Causality tests suggest that fiscal deficits generally lead trade deficits, and support for reverse causation is not overwhelming. The increase in the government budget deficit is associated with an increase of the CA deficit that varies from 0.20 to 0.45 percent of GDP depending on model specification.		
Roubini (1988)	18 OECD countries, annual data, from 1961-85 to 1971-85, single equations.	1 percent of GDP increase in government budget deficit.	The increase in the government budget deficit is associated with an increase of the CA deficit of 0.14-0.61 percent of GDP depending on the country.		
Bernheim (1988)	US, UK, Canada, Germany, Mexico, annual data, 1960-84, single equations.	1 percent of GDP increase in government budget surplus.	The increase in the government budget surplus is associated with an increase of the CA surplus of 0.3 percent of GDP for the US, Canada, the UK, 0.2 percent of GDP for Germany, and 0.7 for Mexico.		
Summers (1986)	US, annual data, 1950-1985, single equations	1 US dollar increase in budget deficit	The current account balance worsens by 0.25 dollars.		Private savings improve by about 0.06 dollars and net foreign investment by about 0.32 dollars, leading to a decline in the current of about 0.25 dollars.

1/ See *Exchange Rate Assessments: CGER Methodologies* , Occasional Paper 261, International Monetary Fund, Washington DC, 2008.

2/ Austria, Belgium, Denmark, Finland, France, Ireland, Italy, Germany, Greece, the Netherlands, Portugal, Spain, Sweden, and the UK.

3/ Advanced economies: US, UK, France, Canada, Australia. Developing countries: India, Indonesia, Pakistan, Mexico, and Egypt.

Appendix II: Fiscal Policy, the Current Account and the Real Exchange Rate: A Review of Theory

Given the difficulty of predicting short-run nominal exchange rate movements, studies of exchange rate determination have typically focused on identifying variables that drive "real" exchange rates over the medium to long-run (Froot and Rogoff, 1995). Fiscal policy emerges as a natural protagonist in these studies due to its potentially significant impact on the size and composition of aggregate demand both of which are directly relevant for exchange rate movements (Corsetti and Muller, 2006). Moreover, fiscal and current account balances are bound by the well-known saving-investment identity—current account balance equals (public plus private) saving minus investment. The "twin deficits" debate is usually framed around this identity (see Truman, 2004 or Chinn, 2005 for recent non-technical summaries).

The possible causal channels running from fiscal policy to the current account and real exchange rate operate through economic agents: choices about *intra*temporal and *inter*temporal trade.

> *Intratemporal trade (relative price changes):* this channel works through the compositional effects of fiscal policy on aggregate demand—i.e. whether a fiscal policy change raises the demand for domestic (or nontradable) goods relative to foreign (or tradable) goods—and the impact thereof on the real exchange rate (the relative price of home to foreign goods) and the trade balance. Thus, increases in government spending (tax or debt-financed) if skewed towards home (or non-tradable goods), appreciates the real exchange rate and worsens the trade balance. The channel is highlighted well by both the Mundell-Fleming (1960) and dependent economy models (*a la* Salter, 1959).
>
> *Intertemporal responses:* this channel abstracts from differentiated goods and real exchange rate misalignments, focusing instead on the intertemporal response of private agents to a given fiscal policy action in a one-commodity world. Now, a debt-financed fiscal impetus that seeks to worsen the trade balance, induces forward-looking agents to impute to their permanent incomes the offsetting future tax increases consistent with intertemporal government solvency. Hence, labor supply rises while private consumption falls, both effects seeking to *improve* the trade balance and pushing the economy towards a Ricardian outcome. The channel is articulated well in Obstfeld and Rogoff (1996) and Frenkel and Razin (1996).

More recent advances in theory—exemplified by dynamic general equilibrium/new open economy models such as Backus et al (1994), Obstfeld and Rogoff (1995), Monacelli and Perotti (2007) and Kumhof and Laxton (2009)—have permitted an integration of both the static and intertemporal dimensions, and an explicit treatment of imperfect competition, nominal rigidities and policy reaction functions, to help uncover more complex transmission channels between fiscal and external sector aggregates.

The Mundell-Fleming model highlights well the workings of the *relative price* channel for a small open economy, as well as the importance of variables such as financial openness, currency structure of public debt, and monetary/exchange rate regime in determining the current account impact of fiscal policy changes. An expansionary fiscal shock raises the demand for home goods and money, inducing a real appreciation (either through higher interest rates and arbitrage capital inflows, or a rise in domestic prices) that crowds out net exports. However, if the capital account is relatively closed, a more enduring increase in interest rates results, crowding out investment, raising private savings, and thus softening the impact on the currency and trade balance. Similarly, with a large initial foreign currency debt commitment, a currency depreciation (not

appreciation) is required to induce the negative wealth effect necessary to restore money market equilibrium.

The model also reveals the centrality of exchange rate regime, degree of price flexibility and risk premia in determining whether fiscal policy can reduce external imbalances. For example, starting from a position of full employment and trade deficit, a fiscal contraction can restore external balance by inducing a nominal exchange rate depreciation (that makes foreign goods more expensive) and boosting net exports. With a currency peg, however, a "real" depreciation is required, which is possible only if prices are downwardly flexible. Moreover, the fiscal contraction can lower endogenous risk premia (due to improved perceptions of fiscal solvency and encourage more capital inflows, leading to inflationary pressures and a further worsening of the current account (expansionary fiscal contractions).

The intuition of the Mundell-Fleming model—which cannot distinguish between the real exchange rate (an endogenous variable) and the terms of trade—does not naturally extend to small developing economies facing exogenous terms of trade. As Montiel (1999) and Edwards (1989) note, dependent economy models can usefully delineate the real exchange rate as the relative price of tradable to nontradables from the exogenously given terms of trade. The impact of fiscal policy on the trade balance can be best understood through an experiment involving a shift in government spending from tradables to non-tradables. Two offsetting effects obtain: a reduction in government tradables consumption that improves the trade balance; and an induced real appreciation (higher relative price of nontradables) that switches private consumption [production] toward [away from] tradables and worsens the trade balance. An additional layer of complexity is added if government spending is assumed to exert direct supply-side effects through either crowding out/in of private capital accumulation or raising/lowering of productivity (Adam and Bevan, 2005; Leigh, 2008).

In contrast to the two relative price approaches described above, the *intertemporal* approaches take a longer-run view, abstracting from deviations from purchasing power parity (and thus real exchange rate misalignments), and casting the current account simply as the excess of current domestic production over current domestic consumption of a single homogenous worldwide good (Frenkel and Razin, 1996). A key assumption in these forward-looking micro-founded models is that agents take into account future events in their current decisions (agents are Ricardian or near-Ricardian).

An increase in debt-financed government spending, in this framework, works through the "future" to induce a higher saving and work effort response from private agents "today": agents can foresee that the government must raise future taxes in order to offset the current fiscal deficit and ensure intertemporal solvency; these tax increases reduce the present value of future income (human wealth) and thus induce lower private consumption and higher labor supply in the present. The latter also raises the marginal product of capital, crowding in private investment. The current account deteriorates as long as the private saving increase (net of higher investment) does not offset the decline in public savings (Baxter, 1995).

A related class of models, cast mostly in the overlapping generations framework (i.e. non-Ricardian agents), locates the current account response to a current debt-financed fiscal expansion in the context of anticipated "closure rules." Kawai and Maccini (1995) show that, under the knowledge of a binding intertemporal solvency constraint on the government, agents with finite lives would consume more today (leading to a larger current account deficit) in response to a debt financed fiscal expansion if they anticipate its future closure through higher

taxes. This on-impact "twin deficits" result is stronger when future taxes are expected to fall on consumption, as an intertemporal substitution of consumption occurs towards the present. By contrast, the current account could improve if agents anticipate that the government will resort to inflationary finance in the future: the real value of money holdings falls, so that given a fixed initial bondholding, real wealth falls and hence consumption declines. In the same vein, Abbas (forthcoming) shows how the anticipation of future debt relief can render a foreign debt-financed fiscal expansion a pro-borrowing policy and exacerbate current account deficits.

New open economy models developed recently in advanced country contexts incorporate both the intertemporal and intratemporal dimensions as well as other advanced features such as imperfect competition, sticky prices and policy reaction functions, in an attempt to reconcile empirical puzzles found in the data: private consumption *rising*, real exchange *depreciating* (despite the trade balancing worsening) in response to a *positive* government spending shock.

Perotti and Monacelli (2007) argue that private consumption could indeed rise in response to a government spending shock if agents needed to consume more to compensate for the misery of working harder and agents were unwilling to tilt consumption towards the future (small intertemporal elasticity of substitution). The real exchange rate depreciation is explained through international risk-sharing in complete financial markets: i.e. the marginal rate of substitution between the home and foreign country private consumption must be mirrored by the real exchange rate. Thus, a rise in current home private consumption (relative to the rest of the world) implies a real depreciation of the home currency. Finally, the worsening of the trade balance obtains if consumption of foreign goods is relatively insensitive to the real depreciation (intratemporal elasticity of substitution between home and foreign goods is low). Ravn et al (2007) offer a different set of explanation for the same result: higher demand following the government spending shock induces firms to lower their markups (real depreciation) in a bid to capture market share; consumption rises and the trade balance worsens.

Thus, unlike the simple Mundell-Fleming model, these new open economy models permit the real exchange rate to depreciate and the trade balance to worsen at the same time. The models also highlight the role of interaction variables such as intertemporal and intratemporal elasticities, trade and financial openness, and government size, which can alter the expected effects of fiscal policy.

Insights of the IMF GIMF model (Kumhof and Laxton, 2009) on the effects of fiscal consolidation are also worth noting: a permanent cut in government consumption weakens aggregate demand (and output) on impact, lowers inflation relative to target, and induces a monetary policy reaction in the form of an interest rate cut. This depreciates the real exchange rate and boosts domestic absorption, partially offsetting the contractionary effects of the fiscal consolidation. Net exports and the current account improve, and so do net foreign assets and domestic savings. The decline in public debt and the associated reduction in interest payments (due to reduction in risk premium) permit a reduction in taxes, which raises output above the initial steady state over the medium to long-run (Leigh, 2008).

Other channels binding the fiscal and current account balances can occur through current or anticipated tax policy changes—especially the mix of capital and labor income/consumption taxes on the one hand, and of consumption and social security contributions on the other—which can affect capital inflows, investment, work effort and consumption, all of which are important for the external sector (OECD 2007; Beck and Coskuner, 2007; Tanzi and Zee, 2000; Alworth and Arachi, 2007).

Appendix III – Listing of Large Episodes of Current Account and Fiscal Policy Changes

Start years, followed by duration of episode and size of change in parenthesis

A. Current Account Deteriorations

Advanced Economies									
Belgium	1999 (2, 4.5)								
Czech Republic	1993 (3, 7.9)								
Denmark	2005 (2, 3.3)								
Estonia	1993 (1, 8.2)	2005 (2, 7.9)	1995 (2, 6.9)	2001 (3, 6.6)					
Finland	1978 (2, 4.5)	2004 (1, 4.3)	2002 (1, 3.7)						
Germany	1989 (2, 6)	1978 (2, 3.3)							
Greece	1981 (2, 23.7)	2004 (3, 8.3)	1997 (3, 5.4)	1987 (3, 5.3)	1984 (1, 4)				
Hong Kong SAR	1999 (1, 2.1)								
Iceland	2002 (4, 26.9)	1997 (1, 5)	1994 (2, 3.7)	1999 (1, 3.5)					
Ireland	1975 (4, 10.4)	1980 (1, 2.8)							
Israel	1986 (1, 7.8)	1980 (2, 4.6)	2006 (1, 2.9)						
Italy	1972 (2, 9.1)	1978 (3, 6.8)							
Korea	1977 (3, 12.2)	1998 (4, 10.6)	1988 (3, 10.5)	2004 (2, 3.5)					
Netherlands	1997 (1, 3.3)								
New Zealand	1988 (1, 2.9)	1998 (1, 2.3)							
Portugal	1980 (1, 11.7)	1995 (5, 10.1)	1986 (2, 5.3)	1993 (1, 2.6)					
Singapore	1998 (2, 10.6)	2003 (1, 6.5)	1992 (1, 4.7)	1979 (1, 4.5)	1986 (1, 2.6)	1995 (1, 2.1)			
Slovak Republic	1994 (2, 14.3)	2000 (1, 5)							
Slovenia	2002 (2, 3.7)								
Spain	1973 (1, 4)								
Sweden	1978 (2, 3.1)								
Switzerland	2000 (1, 4.4)								
Emerging and Low-Income Countries									
Afghanistan, I.R. of	2002 (1, 12)								
Argentina	2002 (3, 6.8)								
Benin	1994 (1, 3.4)	1996 (1, 3.2)							
Bulgaria	2002 (5, 18)								
Burkina Faso	1994 (3, 7.1)	1998 (2, 5.4)	1984 (1, 5.2)						
Burundi	2005 (2, 15)	1997 (1, 6.7)	2002 (2, 5.9)	1995 (1, 5.5)	1999 (1, 3.5)	1991 (1, 3.2)			
Cape Verde	1997 (2, 7.4)	2005 (2, 5.9)	2003 (1, 3)						
Central African Rep.	2004 (1, 5.8)								
Chile	1983 (1, 5.3)	1991 (2, 5)							
China,P.R.: Mainland	1991 (2, 5.1)								
Colombia	1991 (4, 8.7)								
Congo, Dem. Rep. of	2003 (2, 11)	1996 (2, 8.4)							
Côte d'Ivoire	2002 (3, 6.4)	2006 (1, 3.5)							
Djibouti	2003 (4, 27)	1991 (1, 6.3)	1999 (1, 5.2)						
Ethiopia	1998 (1, 5.4)	1995 (2, 4.5)							
Gambia, The	2004 (1, 10)	1994 (2, 9.7)	1992 (1, 5.2)						
Ghana	1995 (2, 12)	2003 (4, 12)	1998 (1, 6.7)						
Hungary	1991 (2, 12)	1984 (2, 5.9)							
Kyrgyz Republic	1997 (1, 13)	1994 (2, 12)	2004 (2, 8.1)						
Lao People's Dem.Rep	2002 (3, 10)	2006 (1, 6.7)	1999 (1, 6.2)						
Latvia	1994 (4, 14)	2005 (2, 10)	2002 (2, 6)						
Liberia	2002 (1, 21)	2004 (2, 13)	2000 (1, 6.1)						
Lithuania	2005 (2, 6.6)								
Malawi	1993 (1, 15)	1990 (2, 8.7)	1998 (1, 7.8)	1988 (1, 7.7)	2000 (2, 7.1)	1984 (1, 6.1)	2003 (2, 4.3)	1996 (1, 3.8)	
Malaysia	1987 (4, 16)	1999 (2, 7.8)							
Maldives	2003 (1, 12)	1998 (1, 9.8)	1992 (1, 8.4)	1996 (1, 3.6)					
Mali	2006 (1, 4.4)								
Mauritania	2002 (3, 49)	2006 (1, 9.8)							
Moldova	2004 (3, 14)	1995 (3, 13)							
Mozambique	2006 (2, 16)	1985 (2, 11)	1997 (2, 8.4)	1990 (3, 7.1)	1988 (1, 3.7)				
Pakistan	2003 (4, 9.6)	1973 (1, 8.6)	1992 (1, 3.5)						
Philippines	2006 (2, 10)	2001 (1, 6.2)	1998 (1, 6)	1988 (2, 5)	1986 (1, 4.5)	1992 (1, 3.6)			
Romania	2002 (5, 10)	1994 (2, 4.9)	1991 (1, 3.4)						
Rwanda	1995 (2, 6.7)	2001 (2, 6.4)	2005 (1, 6)						
São Tomé & Príncipe	1979 (3, 37)	2005 (1, 32)	1987 (2, 21)	1994 (1, 14)	1983 (1, 12)	2000 (1, 12)	2003 (1, 8.1)	1990 (2, 5)	1997 (1, 3.1)
Sierra Leone	1998 (2, 13)	1984 (6, 13)	1991 (2, 7.7)	1994 (2, 6.2)					
St. Vincent & Grens.	2002 (2, 13)	2005 (2, 4.5)							
Tajikistan	2005 (2, 8.4)								
Tanzania	1996 (2, 7.7)								
Thailand	1998 (7, 17)	1986 (4, 8.9)	1982 (1, 4.4)						
Togo	1999 (1, 6)	1984 (2, 5)	1995 (2, 4.4)						
Turkey	1998 (2, 4.5)								
Uganda	1994 (2, 6.4)	1997 (2, 5.4)	1990 (1, 5)	1992 (1, 3.6)					
Ukraine	2004 (3, 14)								
Zambia	1980 (1, 6.5)	1983 (3, 6.2)	1988 (1, 4.2)	1991 (1, 3.9)					

B. Current Account Improvements

Advanced Economies									
Australia	1999 (2, 3.4)								
Austria	2001 (1, 3.5)								
Belgium	1998 (1, 2.7)								
Czech Republic	2003 (2, 4.7)	1996 (2, 4.5)							
Denmark	1986 (2, 4.2)	1998 (1, 2.8)							
Estonia	1997 (2, 6.7)	1994 (1, 2.8)							
Finland	1991 (4, 9.4)	1983 (1, 2.2)							
France	1974 (1, 2.1)								
Germany	2000 (2, 3.7)								
Greece	1985 (2, 10.2)	1978 (1, 9.6)	1980 (1, 7)	1990 (2, 4.6)	1993 (1, 2.4)				
Hong Kong SAR	1997 (2, 10.7)	2000 (3, 6.3)							
Iceland	2000 (2, 11.8)	2006 (1, 9.8)	1991 (3, 5.9)						
Ireland	1981 (7, 12.9)								
Israel	1982 (4, 12.3)	1987 (2, 4.2)							
Italy	1974 (1, 6.7)	1976 (2, 5.5)	1981 (2, 4)						
Korea	1980 (8, 16)	1996 (2, 15.7)	1975 (2, 8.5)	2002 (2, 3.2)					
New Zealand	1984 (4, 8)	1999 (2, 3.4)	1997 (1, 2.5)						
Portugal	1981 (5, 18.3)	1988 (1, 2.3)	1994 (1, 2.2)						
Singapore	1980 (6, 15.5)	2000 (3, 11.6)	1987 (2, 10.4)	1993 (2, 9.8)	2004 (3, 7.6)	1996 (2, 7.2)	1990 (2, 3.4)		
Slovak Republic	1998 (2, 6.3)	2005 (2, 3.1)							
Spain	1976 (2, 4.9)	1969 (2, 3.3)							
Sweden	1982 (2, 4)	1977 (1, 2.2)							
Switzerland	2001 (6, 9.1)								
United Kingdom	1989 (2, 3.3)								
Emerging and Low-Income Countries									
Afghanistan, I.R. of	2003 (2, 13)	2006 (1, 5.8)							
Argentina	1998 (4, 13.7)								
Armenia	1998 (4, 15.9)								
Benin	1988 (1, 6)								
Bolivia	1993 (1, 3.3)								
Bulgaria	2001 (1, 3.2)								
Burkina Faso	2005 (3, 14.8)	1982 (2, 5.4)	1988 (1, 3.1)						
Burundi	1992 (3, 9.3)	1990 (1, 9)	2004 (1, 7.8)	2000 (2, 5.3)	1996 (1, 4.6)				
Cape Verde	2004 (1, 11.1)								
Central African Rep.	1998 (2, 4.8)	2005 (1, 3.2)							
Chile	1984 (5, 10.1)	1981 (2, 8.8)	1998 (1, 5.1)	2005 (1, 3.4)	2003 (1, 3.2)				
China,P.R.: Mainland	1989 (2, 4.2)	1993 (1, 3.3)							
Colombia	1985 (1, 4.7)								
Congo, Dem. Rep. of	2005 (3, 13.5)	1998 (1, 6.5)	2001 (2, 5.1)						
Côte d'Ivoire	2000 (2, 9.5)								
Djibouti	2000 (3, 12.1)	1998 (1, 4.1)							
Ethiopia	1993 (2, 4.6)								
Gambia, The	1996 (1, 12.5)	2005 (1, 3.5)	1990 (1, 3.4)						
Ghana	1999 (4, 13.3)	1997 (1, 9.4)	1993 (2, 7.1)						
Hungary	1993 (2, 7.4)								
Kyrgyz Republic	1998 (3, 20.2)	1996 (1, 15.2)	2002 (2, 8.7)						
Lao People's Dem.Rep	2005 (1, 7.2)								
Latvia	1998 (2, 4.8)								
Lesotho	2005 (2, 20.1)	2003 (1, 7.2)							
Liberia	2006 (2, 36.7)	2003 (1, 12.6)	2001 (1, 10.1)						
Lithuania	1998 (3, 7)								
Malawi	1994 (2, 16.7)	1997 (1, 10.7)	1980 (1, 9.7)	1983 (1, 8.2)	2005 (2, 8.2)	2002 (1, 6.6)	1989 (1, 5.7)	1992 (1, 3.5)	1999 (1, 3.3)
Malaysia	1997 (2, 21.5)	1985 (2, 10.1)	1995 (1, 5.2)	1991 (1, 4.8)					
Maldives	1993 (1, 12.8)	1999 (1, 5.5)	2001 (2, 5.3)						
Mali	2001 (1, 7.3)	2005 (1, 4.5)							
Mauritania	2005 (1, 45.8)	2001 (1, 14.2)							
Moldova	1998 (1, 13.4)	1993 (2, 10.6)	2003 (1, 4.3)						
Mozambique	1993 (4, 12.4)	2002 (2, 9.9)	1982 (3, 6.9)	1989 (1, 4.8)	1999 (1, 3.4)				
Nepal	1998 (1, 5)	1996 (1, 4.2)	1994 (1, 3.9)						
Niger	2005 (3, 10.3)								
Philippines	1982 (4, 11.8)	1999 (2, 9.7)	1997 (1, 7.5)	1990 (2, 4.2)					
Romania	1992 (2, 6)								
Rwanda	2006 (2, 13.7)	2003 (2, 11.1)	1993 (2, 8.5)						
São Tomé & Príncipe	1982 (1, 25)	1995 (2, 18.8)	1985 (1, 16.6)	2006 (1, 15)	2001 (2, 15)	1992 (2, 14.6)	2004 (1, 9.1)	1989 (1, 5)	
Senegal	1993 (1, 4.2)								
Sierra Leone	1990 (1, 16.9)	1996 (2, 15.1)	1981 (3, 10.8)	2000 (2, 7.2)	2005 (1, 3.9)	1993 (1, 3.4)			
Tanzania	1994 (2, 10.5)								
Thailand	1996 (2, 20.6)	2005 (2, 10.7)	1983 (3, 7.7)	1981 (1, 4.6)					
Togo	1982 (2, 12.1)	1997 (2, 6)	1990 (1, 3.3)						
Turkey	2000 (1, 5.7)	1993 (1, 3.6)							
Uganda	1993 (1, 8.2)	1991 (1, 5.8)	1999 (2, 5.7)						
Ukraine	1998 (2, 7.8)	2003 (1, 4.9)	2001 (1, 3.8)						
Uzbekistan	2002 (5, 17.8)								
Zambia	1986 (2, 16.6)	1981 (2, 11.8)	1989 (2, 4.1)						

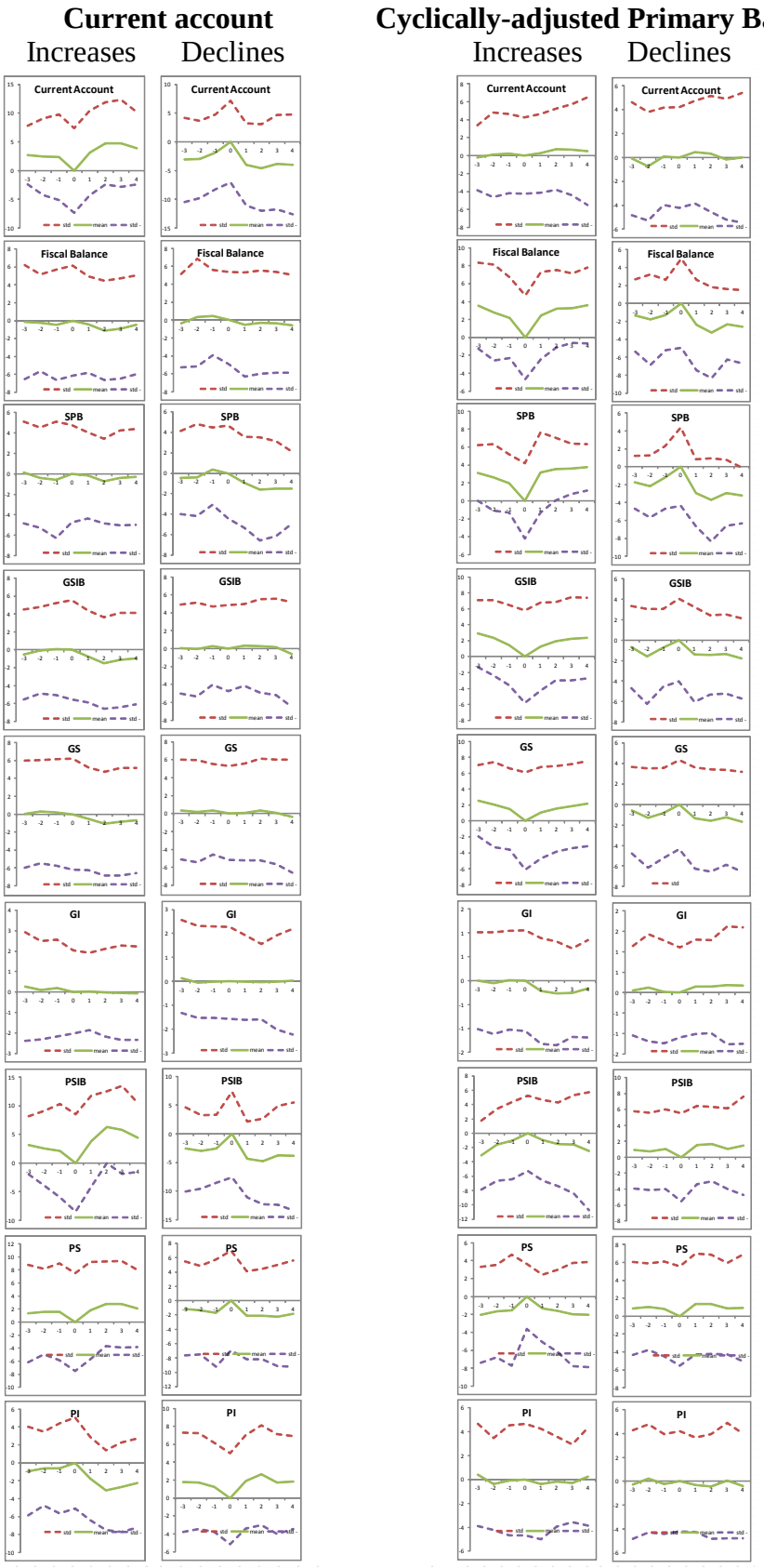
C. Cyclically-Adjusted Primary Balance Deteriorations

Advanced Economies							
Austria	1977 (2, 16.7)	1983 (4, 6.3)	2003 (1, 3.2)				
Belgium	1979 (2, 4.3)	2003 (2, 3.9)					
Canada	1974 (3, 7.2)						
Czech Republic	1993 (2, 19.2)						
Denmark	1973 (3, 5)						
Estonia	1994 (2, 4)	1997 (2, 4)					
Finland	1989 (4, 8.6)	1976 (4, 6.7)	1981 (2, 3.7)	1986 (1, 2.4)			
Germany	2000 (2, 4.6)	1989 (2, 4.5)					
Greece	1988 (1, 3.3)						
Hong Kong SAR	1997 (1, 6.9)	1999 (2, 6.2)	1980 (3, 4.9)				
Iceland	1984 (2, 6.4)	1992 (2, 3.5)	1973 (1, 3.5)	2000 (2, 3.5)	1976 (1, 2.4)	1978 (1, 2.3)	1982 (1, 2)
Ireland	2000 (2, 5)	1976 (2, 4.7)					
Israel	1986 (4, 11.8)	1994 (2, 4.9)	1983 (1, 4.6)	1991 (1, 2.6)			
Japan	1974 (2, 3.5)	1977 (1, 2.2)					
Korea	1976 (2, 6.3)						
Netherlands	1988 (2, 3.2)						
Portugal	1985 (2, 3.8)	2003 (2, 3.7)	1992 (1, 2.3)				
Singapore	1993 (5, 9.9)						
Slovak Republic	1994 (3, 7.4)	1999 (1, 3.3)					
Spain	1981 (1, 3.1)						
Sweden	1987 (6, 14.3)						
United Kingdom	1989 (4, 7.2)	2006 (2, 3.5)					
United States	2000 (3, 6.1)	1974 (1, 3.5)					
Emerging and Low-Income Countries							
Bolivia	1986 (1, 6.3)						
Bulgaria	2000 (2, 4.8)						
Burkina Faso	2006 (1, 22.3)	1989 (2, 6)	1992 (1, 4.9)				
Burundi	1995 (1, 4.2)	2002 (1, 3.3)					
Cape Verde	1998 (2, 18.4)	1990 (4, 11.2)					
Central African Rep.	1993 (1, 16.9)	1997 (1, 9.4)	1987 (1, 5.4)	1995 (1, 3.8)			
Comoros	1993 (2, 8.6)	1997 (1, 4.3)					
Djibouti	1980 (3, 16.4)	1991 (1, 9.4)	1989 (1, 6.7)	1985 (1, 5.3)	1998 (1, 3.4)		
Dominica	1988 (2, 13.7)	1996 (3, 8.2)	1992 (2, 4.7)				
Ethiopia	1997 (3, 6.8)						
Gambia, The	2000 (1, 15.1)	1992 (3, 10.6)	1982 (1, 4.8)	1988 (1, 4.4)			
Georgia	2004 (3, 14.1)						
Guinea-Bissau	1994 (3, 22.2)	1980 (1, 20.2)	1986 (2, 14.9)	1990 (2, 13.7)	1983 (1, 4.9)		
Guyana	1993 (5, 16)	1999 (4, 10.1)					
Hungary	1999 (3, 8.4)	1990 (3, 7.2)	2004 (2, 4.4)				
Kyrgyz Republic	1994 (1, 4)						
Latvia	1993 (1, 5.5)						
Lesotho	1993 (6, 18.8)	1984 (3, 11.8)	1981 (1, 3.3)	2001 (1, 3.3)			
Lithuania	1997 (2, 4.7)						
Madagascar	2006 (1, 40.7)	1997 (1, 4.2)	1988 (1, 3.9)	1990 (1, 3.2)			
Malawi	1989 (3, 9.8)	2006 (1, 6.2)	1993 (1, 3.8)				
Malaysia	1997 (3, 8.2)						
Maldives	1990 (2, 25.8)	1979 (1, 15.2)	2004 (3, 7.5)	1982 (1, 6.2)	1988 (1, 5.9)		
Mali	2006 (1, 34.4)						
Mauritania	2006 (1, 36.8)	2002 (1, 8.9)					
Moldova	1995 (2, 8)	2001 (1, 4.2)					
Mongolia	2006 (1, 6.1)	1997 (1, 5.7)					
Mozambique	1982 (1, 8.6)	1980 (1, 7.1)	2000 (2, 5.4)	1992 (2, 5.1)			
Myanmar	1999 (1, 3.9)						
Nicaragua	1995 (1, 6.7)	1993 (1, 5.6)					
Niger	2006 (1, 40.8)	1980 (1, 4.1)					
Poland	1988 (1, 9.6)	1985 (2, 5.5)					
Romania	1993 (3, 7.9)	1989 (1, 7.2)	1991 (1, 5.7)				
Rwanda	1995 (1, 6)						
São Tomé & Príncipe	2005 (1, 50.2)	1981 (1, 16.9)	1997 (3, 13)	1988 (1, 9)	1983 (1, 6.8)	2002 (2, 6)	1993 (1, 3.8)	1986 (1, 3.6)
Senegal	2002 (2, 4.5)	1991 (2, 4)	2000 (1, 3.9)				
Sierra Leone	1992 (3, 7.6)	1988 (2, 4.4)	2000 (2, 4.4)				
St. Lucia	1998 (1, 5.7)	1985 (1, 3.4)					
Tajikistan	2006 (1, 8.2)	1995 (1, 7.2)					
Tanzania	1990 (3, 7)						
Togo	1984 (3, 6.8)	2003 (3, 6.4)	1992 (1, 5.1)				
Turkey	1990 (1, 3.8)						
Uganda	1998 (2, 8.7)						
Ukraine	2002 (2, 7.1)	1996 (1, 3.3)					
Uzbekistan	1992 (1, 17.6)	1995 (1, 4.4)					
Zambia	2006 (1, 21.4)	1987 (2, 9.9)	1981 (1, 9.6)	1995 (3, 7.6)	1984 (1, 6.4)	1999 (2, 4.3)	
Ukraine	2002 (2, 7.1)	1996 (1, 3.3)					
Uzbekistan	1992 (1, 17.6)	1995 (1, 4.4)					
Zambia	2006 (1, 21.4)	1987 (2, 9.9)	1981 (1, 9.6)	1995 (3, 7.6)	1984 (1, 6.4)	1999 (2, 4.3)	

D. Cyclically-Adjusted Primary Balance Improvements

Advanced Economies								
Austria	1982 (1, 6.1)	1995 (2, 4.5)	1976 (1, 4.5)	2000 (1, 2.7)	2004 (1, 2.5)			
Belgium	1983 (4, 7.3)	1981 (1, 4.7)	2005 (1, 2.2)					
Canada	1992 (5, 8)	1985 (2, 4.3)						
Czech Republic	1995 (2, 10.2)	2002 (2, 3.9)						
Denmark	1982 (4, 12.3)							
Finland	1995 (5, 12.2)	1980 (1, 2.5)	1983 (1, 2.2)					
Germany	1988 (1, 2)							
Greece	1989 (6, 12.1)	2004 (2, 4)						
Hong Kong SAR	2001 (6, 12)	1995 (2, 6.1)	1990 (1, 2.6)	1998 (1, 2.4)				
Iceland	1974 (2, 6.3)	2002 (4, 6.3)	1994 (3, 4.8)	1983 (1, 4.2)				
Ireland	1978 (6, 11.6)	1986 (3, 9.5)						
Israel	1984 (2, 16.9)	1980 (3, 11.1)						
Italy	1990 (3, 5.3)							
Korea	1999 (1, 2.5)							
Netherlands	1990 (1, 3)	1992 (1, 2.5)						
Portugal	1983 (2, 6.1)	1993 (2, 3.6)	1987 (1, 3.6)	1981 (1, 2.3)	1991 (1, 2.2)			
Slovak Republic	1992 (2, 10.6)	1997 (2, 3.4)						
Spain	1995 (2, 3.2)							
Sweden	1993 (5, 12.2)	1982 (5, 9.4)	1980 (1, 3.2)					
Emerging and Low-Income Countries								
Argentina	2001 (3, 7)							
Armenia	1994 (1, 8)							
Bolivia	2002 (4, 12)	1985 (1, 7.4)	1993 (2, 4.5)					
Brazil	1997 (2, 4.9)	1991 (1, 3.1)						
Bulgaria	1993 (1, 7.8)							
Burkina Faso	2005 (1, 21.6)	1988 (1, 7.6)						
Burundi	1999 (1, 5.1)	1996 (1, 3.9)	2001 (1, 3.1)					
Cape Verde	2000 (1, 13.3)	1994 (4, 13.2)	1986 (2, 6.4)	2002 (2, 5)	2006 (1, 3.7)			
Central African Rep.	1990 (3, 14.2)	1994 (1, 10.8)	1998 (1, 7.2)	1996 (1, 6.2)	2000 (2, 4.1)	1988 (1, 3.3)		
Comoros	1998 (1, 6.4)	1995 (2, 5.1)	1992 (1, 5)	1988 (1, 3)				
Djibouti	1992 (4, 9.7)	1990 (1, 5.5)	1983 (2, 5.4)	1986 (1, 5.3)	1997 (1, 4.5)	1988 (1, 3.9)		
Dominica	1999 (4, 13.1)	1990 (2, 8.8)	1994 (2, 4.7)					
Ethiopia	2002 (2, 5.6)	1990 (2, 4.7)	2000 (1, 3.8)					
Gambia, The	2001 (2, 12)	1985 (1, 8.2)	1995 (3, 7.9)	1987 (1, 6.9)	2006 (1, 5.8)	1983 (1, 4.7)	1999 (1, 3.5)	
Georgia	1994 (1, 11.9)	2003 (1, 5.6)						
Guinea	2003 (2, 5.6)							
Guinea-Bissau	1992 (2, 20.7)	1997 (2, 15.3)	1981 (2, 12.4)	1984 (2, 11.9)	1988 (2, 6.9)			
Guyana	1998 (1, 3.9)							
Hungary	1993 (3, 9.3)	2006 (1, 4.7)						
Kyrgyz Republic	1999 (3, 7.4)	1993 (1, 6.9)	1995 (1, 4.9)					
Lao People's Dem.Rep	1998 (1, 3.5)	2003 (1, 3.1)						
Latvia	1992 (1, 4.9)							
Lesotho	1987 (6, 22.7)	2002 (5, 17.5)	1999 (2, 13.7)	1982 (2, 8.9)	1980 (1, 3.9)			
Lithuania	1999 (3, 6.9)							
Madagascar	2004 (2, 42.3)	1980 (8, 16.4)	1989 (1, 3.2)					
Malawi	1980 (5, 12.2)	1994 (1, 9.9)	2001 (2, 7.6)	1987 (2, 5.8)				
Maldives	1989 (1, 18.4)	1980 (2, 17.8)	1992 (2, 7)	1986 (2, 6.9)	1983 (1, 5.3)			
Mali	2005 (1, 34.1)	1999 (1, 3.2)						
Mauritania	2005 (1, 39.9)	2001 (1, 8.1)	2003 (1, 7.1)	1995 (1, 4)				
Moldova	1992 (3, 28.9)	1997 (4, 11.4)						
Mongolia	2002 (4, 11.3)	1998 (3, 9.2)						
Mozambique	1986 (3, 6)	1990 (2, 5.7)	1983 (2, 5.3)	1981 (1, 4.3)	2002 (1, 3.8)	1994 (1, 3.7)		
Myanmar	2000 (2, 4.7)							
Nicaragua	1991 (2, 7.9)	1994 (1, 6.4)	2001 (1, 6.1)					
Niger	2004 (2, 42.9)	1981 (3, 9.1)	1994 (2, 6.3)	1999 (1, 3.1)				
Poland	1989 (1, 11.2)							
Romania	1996 (3, 8.4)	1990 (1, 5.2)	1983 (1, 3.5)					
Rwanda	1992 (3, 14.8)	1999 (1, 5.3)						
São Tomé & Príncipe	2004 (1, 53.1)	1980 (1, 14.7)	2000 (2, 13)	1982 (1, 11.5)	1984 (2, 10.6)	1992 (1, 6.3)		
Senegal	2001 (1, 4)							
Sierra Leone	2002 (5, 32.5)	1990 (2, 6.5)	1998 (2, 4.3)	1995 (1, 3.9)				
St. Lucia	1996 (2, 5.6)	1986 (1, 5.2)	1983 (2, 5.2)	2002 (1, 4.2)				
Tajikistan	2005 (1, 6.2)	1996 (1, 4.6)						
Togo	2000 (1, 4.9)	1993 (2, 4.7)	1996 (1, 3.1)					
Turkey	1987 (3, 12.4)	1997 (4, 8.6)	1993 (1, 5)					
Uganda	2000 (1, 6.9)							
Ukraine	1994 (2, 5.6)							
Uzbekistan	1993 (2, 13)	1996 (1, 5.8)						
Zambia	2005 (1, 21.6)	1982 (2, 14.4)	1989 (4, 10.6)	1985 (2, 7.3)	1977 (1, 6.8)	1979 (2, 5.8)	2001 (1, 4)	

Appendix IV – Event Study of Large Changes in External and CAPB Balances in Advanced Economies

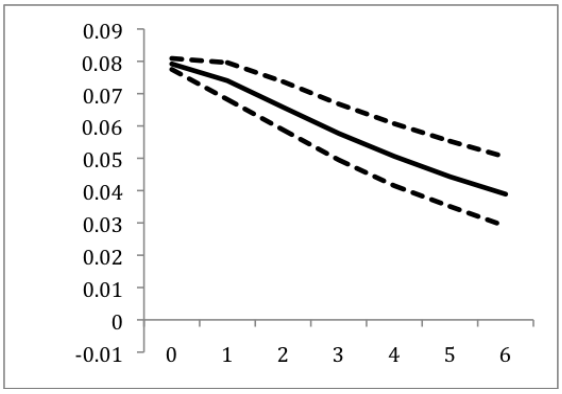


Appendix V – Panel Vector Autoregression Results

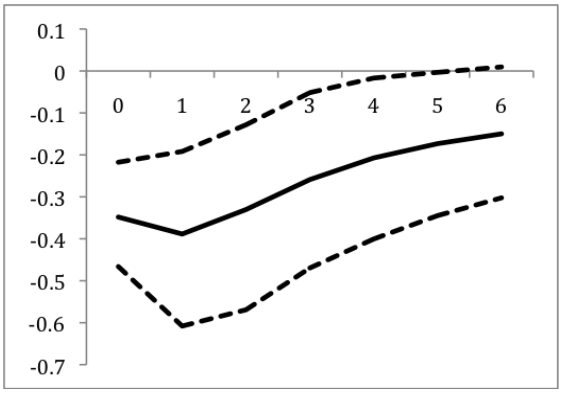
Figure 1. Response to Shock in the Log of Real Government Consumption

A. Full Sample

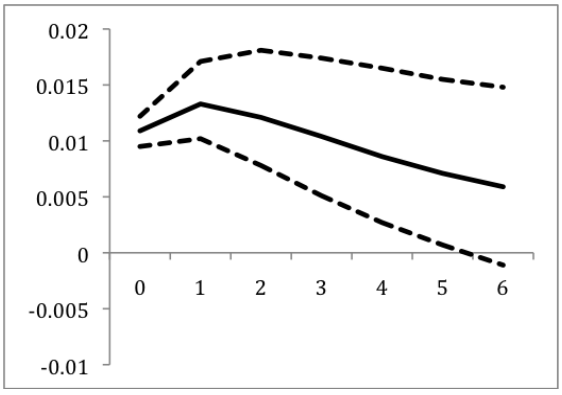
Government Consumption



Current Account (as % of GDP)

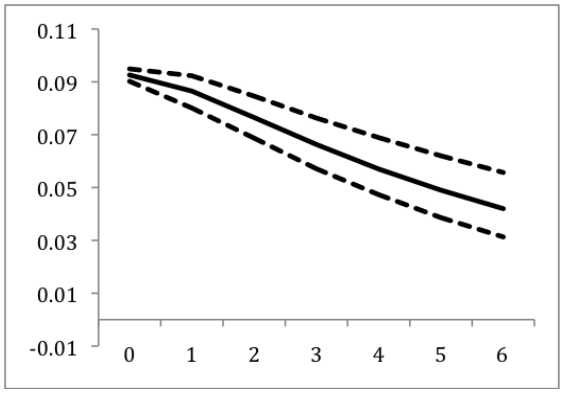


Output

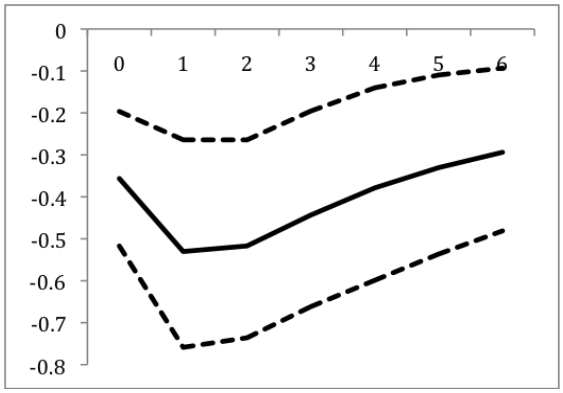


B. Emerging and Low Income Countries

Government Consumption



Current Account (as % of GDP)



Output

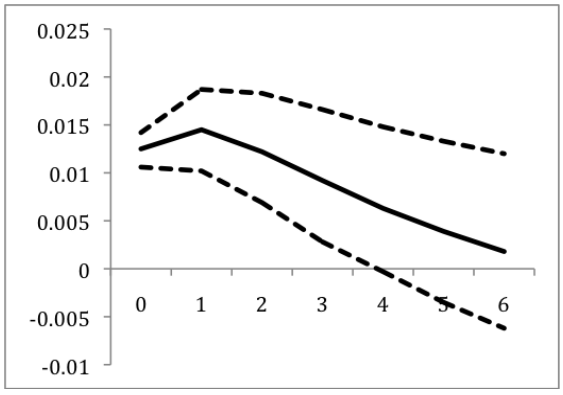
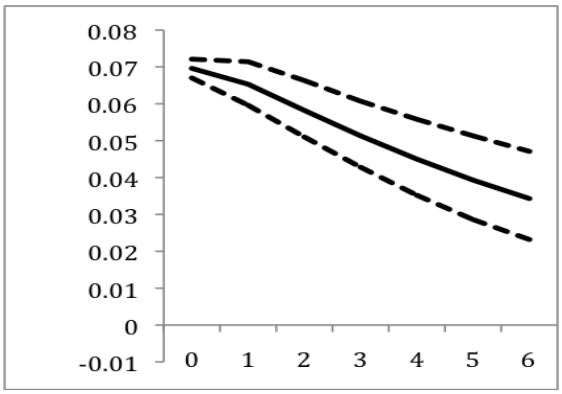


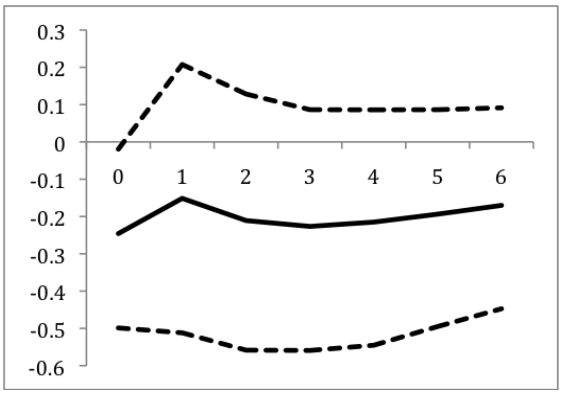
Figure 1. Response to Shock in the Log of Real Government Consumption (cont.)

C. More Open Economies

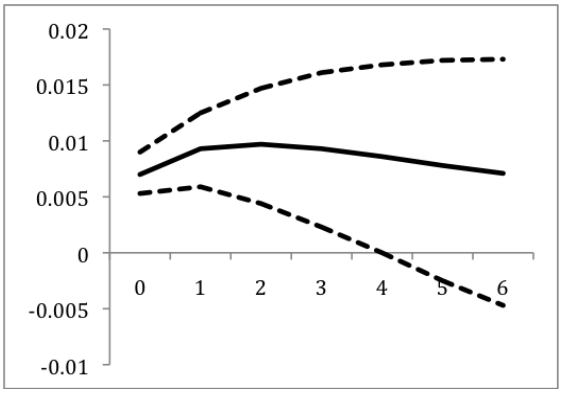
Government Consumption



Current Account (as % of GDP)

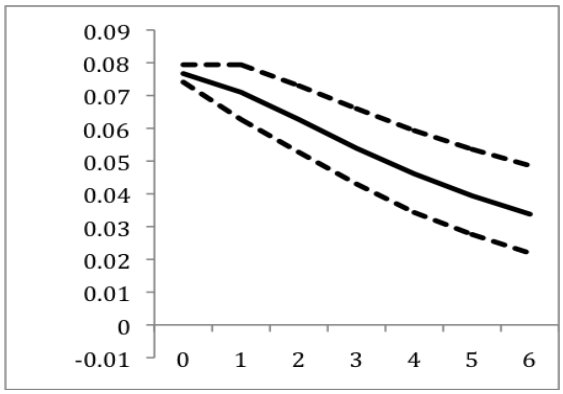


Output

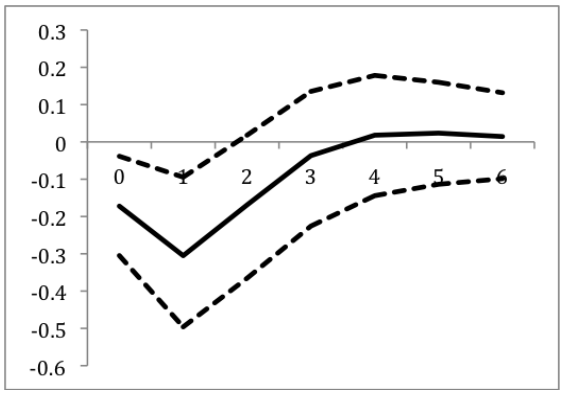


D. Less Open Economies

Government Consumption



Current Account (as % of GDP)



Output

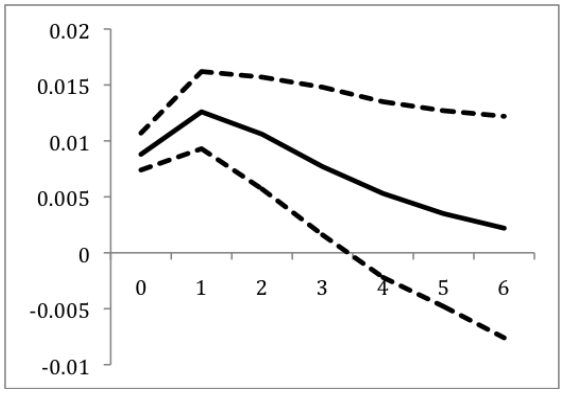
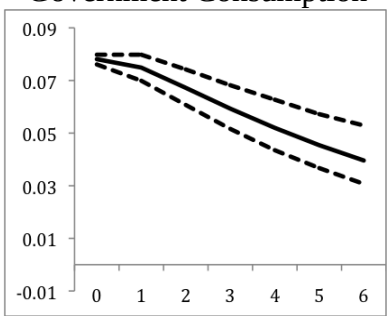


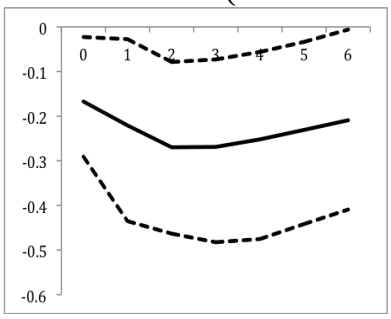
Figure 2. Response to Shock in the Log of Real Government Consumption (4 variable VAR)

A. Full Sample

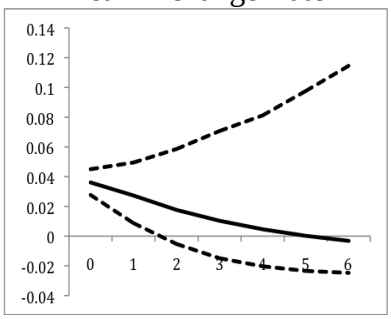
Government Consumption



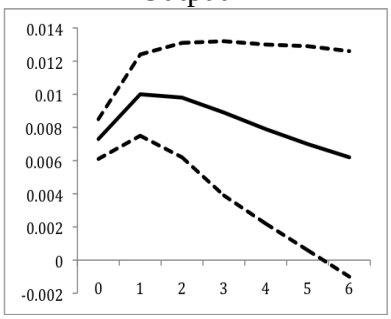
Current Account (as % of GDP)



Real Exchange Rate

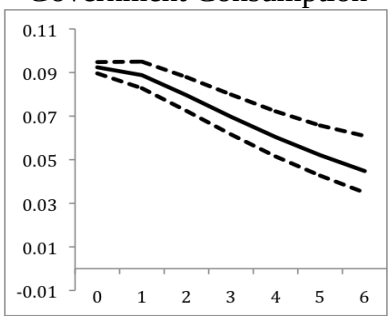


Output

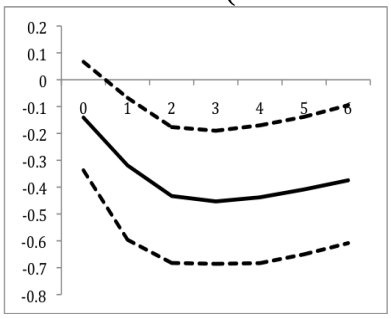


B. Emerging and low-income countries

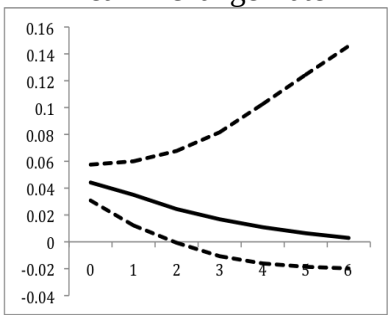
Government Consumption



Current Account (as % of GDP)



Real Exchange Rate



Output

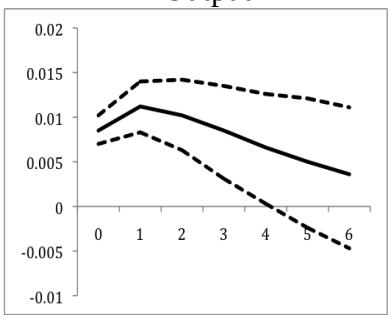
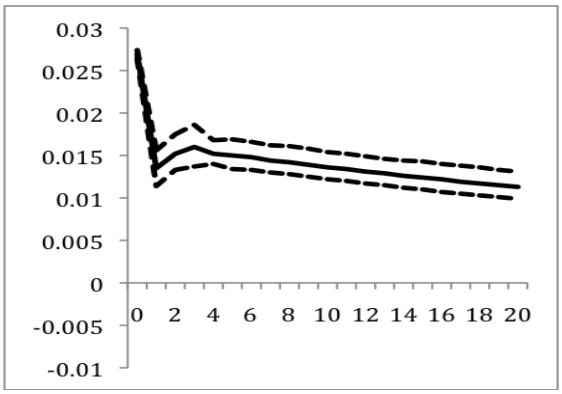


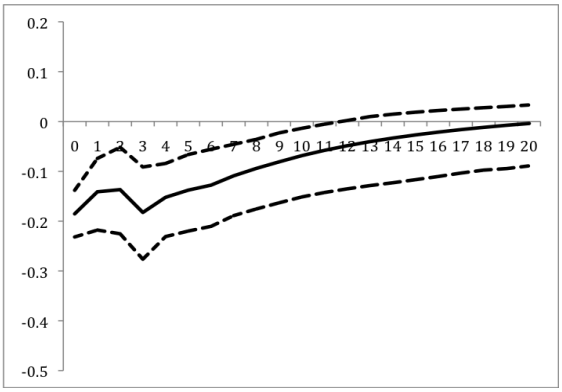
Figure 3. Response to Shock in the Log of Real Government Consumption
Quarterly Data

A. Full Sample

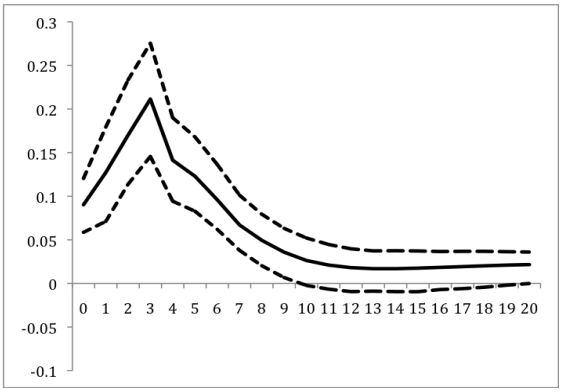
Government Consumption



Current Account (as % of GDP)

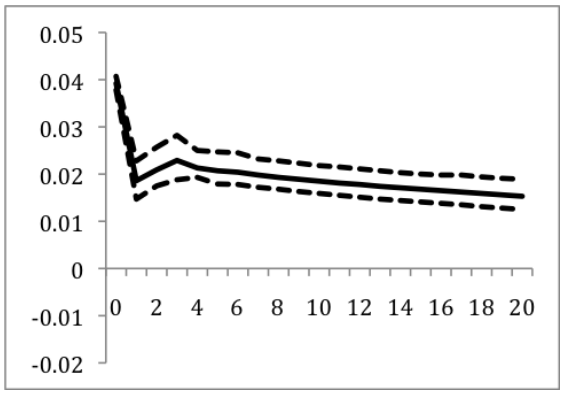


Output Gap

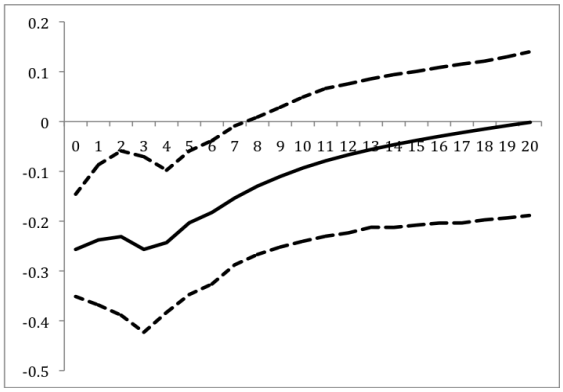


B. Emerging and Low Income Countries

Government Consumption



Current Account (as % of GDP)



Output Gap

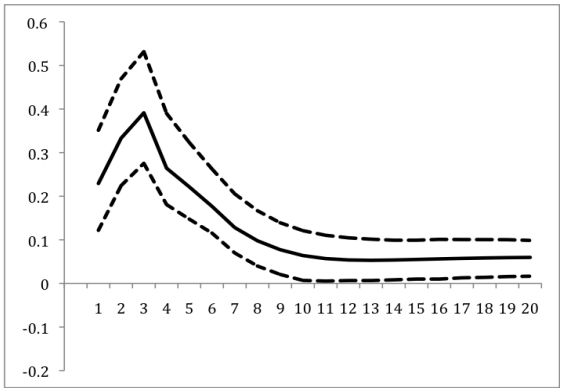
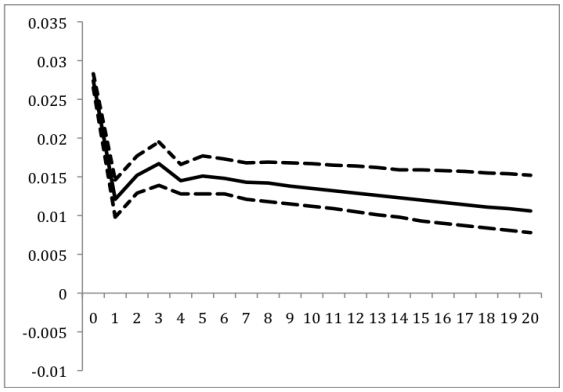


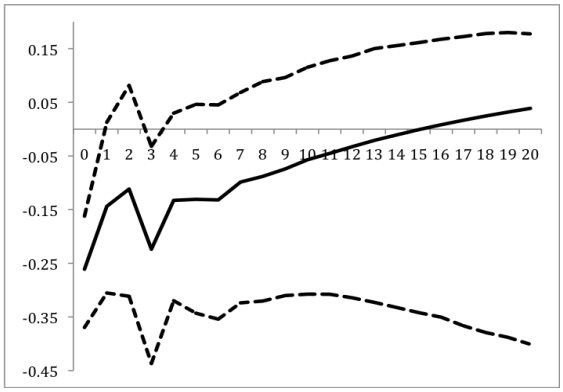
Figure 3. Response to Shock in the Log of Real Government Consumption
Quarterly Data (contd.)

C. More Open Economies

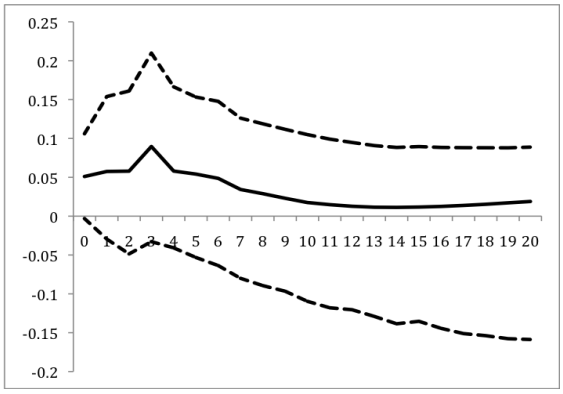
Government Consumption



Current Account (as % of GDP)

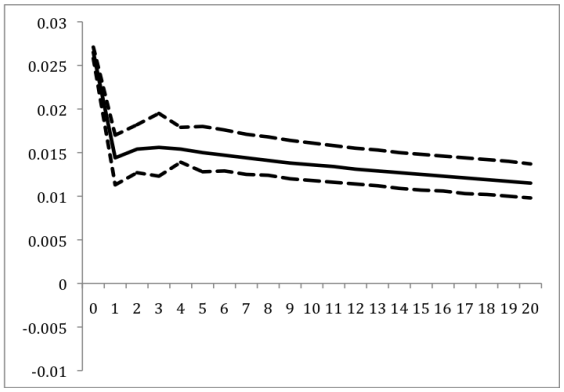


Output Gap

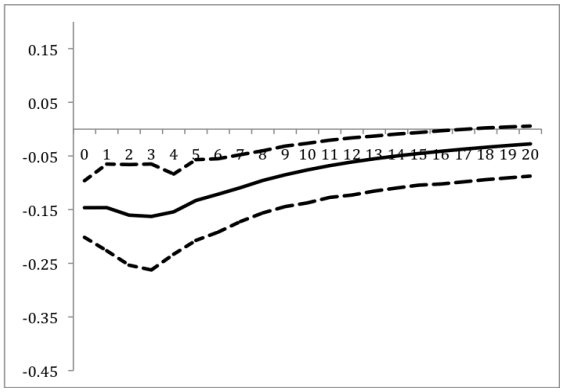


D. Less Open Economies

Government Consumption



Current Account (as % of GDP)



Output Gap

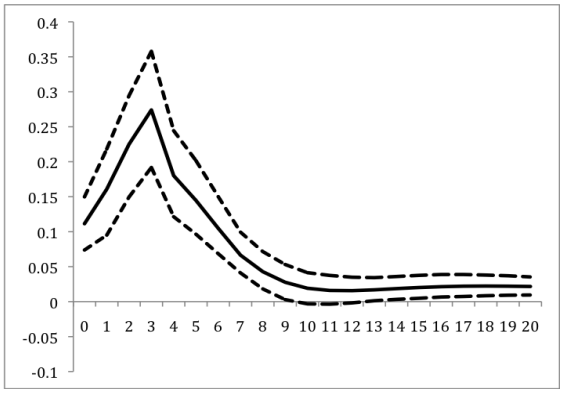


Figure 4. Response of the Current Account to GDP ratio to a Shock in the Log of Real Government Consumption across different exchange rate regimes. Quarterly Data