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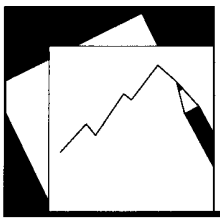

# IMF Working Paper

# Fiscal Policy during Absorption Cycles

*Gabriela Dobrescu and Ferhan Salman*

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# Fiscal Policy during Absorption Cycles

**Prepared by Gabriela Dobrescu and Ferhan Salman**

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## Abstract

Domestic absorption cycles are relevant in assessment and design of fiscal policies. Our cross-country analysis covers 59 advanced and emerging countries for the 1990-2009 period. We show that ignoring domestic absorption cycles leads to biased fiscal stance indicators, for both advanced and emerging economies, by up to 1.5 percent of GDP. The estimates of fiscal policy reaction functions indicate that absorption booms are associated with pro-cyclical fiscal policy. We tackle the endogeneity problem in reactions functions through stripping the cyclical component of the fiscal aggregates. We also find that simple filtering methods in the computation of absorption gaps perform as better as indirect methods of estimating trade balance gaps and stripping of output gaps.

JEL Classification Numbers: H20, H30, F32

Keywords: fiscal policy, structural fiscal balance, domestic absorption, output gap, fiscal reaction function

Author's E-Mail Address:gdobrescu@imf.org; fsalman@imf.org

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## I. INTRODUCTION

The recent boom-bust cycle made evident that fiscal revenues can be highly responsive to the business cycle. In particular, credit and asset price cycles are posited to be behind the large revenue volatility. Misidentification of these temporary factors can lead to inappropriate fiscal policy stances—for example, increased spending on the back on misperceived "fiscal space"——and force a difficult adjustment or jeopardize sustainability when the downturn arrives. Therefore, the importance of reliable indicators of fiscal policy stances has become more apparent than ever.

This paper reassesses fiscal stances over the business cycle, their relation to economic activity and their impact on medium-term sustainability. It is among one of the few papers to estimate structural fiscal balances in a large sample of both advanced and emerging economies. We calculate structural fiscal stances through stripping out both output and absorption cycles. We then use these new structural fiscal policy indicators to re-estimate the behavior of fiscal policy over the business cycle.

We argue for the importance of the domestic absorption cycle in the assessment and design of fiscal policy. Several studies have emphasized the importance of output composition effects in estimating fiscal stances. We focus on domestic absorption effects because these can be significant and can also be easily modeled in a cross-country setting. We present stylized facts showing the counter-cyclicality of net exports in many emerging economies and advanced economies. These patterns, together with a tax system where indirect taxes are a major revenue source, can induce significant biases in fiscal stance estimates. For example, a growth cycle based on domestic consumption and imports will lead to strong revenue growth, while an export-led growth cycle brings in weak revenue collections. These revenue fluctuations are cyclical in nature and would not be captured by standard measures of cyclically-adjusted fiscal balances correcting for the output cycle alone.

Our findings indicate that although the absorption-corrected fiscal stance and the standard fiscal stance corrected for the output cycle alone are similar when averaging over longer periods, significant differences, up to even 1.5 percent of GDP, can sometimes appear over short time spans. Most importantly, we find that larger absorption cycles are associated with pro-cyclical fiscal policy behavior. Estimates of fiscal policy reaction functions show that pro-cyclicality is mainly a response to the absorption cycle, indicating errors in setting fiscal stances as policy-makers mistake absorption booms for permanent, structural increases in output and revenues.

This result is crucial for the design of fiscal policies that ensure debt sustainability. There is a strong case for counter-cyclical fiscal policy with respect to absorption as absorption cycles are often subject to sudden, permanent reversals. Delays in recognizing these factors and in enacting similar structural adjustments in fiscal policy can endanger sustainability.

The paper is structured into seven main sections. Introduction is followed by section II that discusses the related literature. Section III introduces the need to calculate the discretionary component of fiscal policy, which will be used to derive the fiscal stance in the analysis. This section is followed by the methodology. Section V describes data which is followed by regression results of fiscal reaction functions in section VI. Section VII concludes. An appendix is provided to present formulas for the calculation of absorption gaps.

## II. BACKGROUND AND LITERATURE REVIEW

This paper relates to two main literature strands: first, the literature on structural fiscal balance indicators and second, the literature on the cyclical behavior of fiscal policy. On the first topic, we contribute by implementing a structural adjustment for the domestic demand cycle to a large panel dataset of both advanced and developing countries. On the second topic, we contribute by identifying the absorption cycle as a new determinant of fiscal policy behavior and revising estimates of fiscal policy behavior in this new empirical specification.

### Structural fiscal balance indicators

Structural balances are receiving increasing attention as recent economic events made evident that factors outside the output cycle can distort fiscal stance indicators (see Bornhorst et al., forthcoming). Earlier papers have also indicated such effects. For example, Bouthevillain et al. (2001), as well as Lurch and Tourini (2009) show that output composition effects matter at certain times; for example, these effects appeared in several EU countries in the late 1990s due to the Information Technology bubble, or in Italy through the 1990s due to strong external balance movements. More recently, the literature has emphasized the role of asset price cycles and credit booms. Also related to our approach here, terms of trade shocks have also been shown to have a significant effect on fiscal balances, beyond that of output.

This paper also relates to the literature on estimates of the elasticity of revenues to the output cycle, which has been revived by the high responsiveness of revenues during the recent crisis. It has been shown that revenues can be highly responsive to the business cycle, especially in emerging economies. Other papers (see, for example, Sancak et al (2010) hypothesize several other mechanisms as explaining these facts, such consumption composition effects (durable vs. non-durable, luxury vs. necessities), or compliance. We focus on output composition effects which can explain both the high responsiveness of revenues as well as time-varying elasticities of revenues with respect to output. We also show that revenue elasticities with respect to output can be misguided when other factors are the relevant drivers of tax revenues.

### Fiscal policy reaction functions

The literature examining the cyclical behavior of fiscal policy generally shows that pro-cyclicality is determined by political economy concerns (Talvi and Végh (2000), Alessina and Tabellini (2004), Tornell and Lane (1999)) or financial frictions (Gavin and Perotti (1997) Kaminsky, Reinhart, and Végh (2004)). More closely related to our work here,

Kaminsky (2009) shows that countries generally exhibit procylical fiscal behavior with respect to terms of trade shocks. Transitory booms in commodity prices that are treated as permanent, leading to increased spending that proves unsustainable. We find similar results from domestic absorption cycles.

Lastly, in accordance to one of the interpretations of our results here, poor fiscal policy design has also been attributed to erroneous fiscal indicators or to "revenue surprises". For example, Barrios and Rizza (2010) show that that due to the unpredictability of movements in certain macro-aggregates, such as the current account or asset prices, and the uncertainty surrounding their "equilibrium" values, fiscal policy is in fact counter-cyclical based on real-time data available to policy-makers, and only pro-cyclical ex-post. Larch and Turrini (2009) also discuss the difficulties under the "Stability and Growth Pact" under unreliable indicators, describing other instances where these issues are at play, such as the period of revenue gains during the late 90's. That period allowed an illusion of fiscal space, leading countries to increase spending and later, with the burst of the ICT bubble, to find them in a tough fiscal situation and forced to a serious adjustment.

## III. Measuring Cross-Country Fiscal Stances

Structural fiscal balances are meant to strip away cyclical effects of macroeconomic variables on fiscal aggregates. This exercise yields fiscal indicators that reflect discretionary fiscal policy and the permanent, long-run fiscal stance.

So far, fiscal stance indicators available for cross-country studies have been correcting for the effects of the output cycle alone. Two approaches are most common. First, the IMF (see Fedelino (2009)) uses a standard cyclically-adjusted fiscal balance calculation, using an elasticity of one of revenue with respect to the output gap and an elasticity of zero of expenditures with respect to the output gap. On aggregate, this approach gives a budget elasticity equal to the ratio of government spending to GDP, which is a realistic proxy that is confirmed by more detailed cross-country studies such as the Girouard et al. (2003). Second, other studies (Talvi and Vegh (2000), Alesina and Tabellini (2004)) use the real spending growth as a proxy for the discretionary fiscal stance. In essence this is similar to the IMF approach above, assuming revenues are purely driven by cyclical fluctuations and expenditures are entirely discretionary. Although this variable does capture the direction of fiscal policy, it does not benchmark it to any long-term, sustainable level.

Many recent studies have recognized the need to go beyond the output cycle when adjusting fiscal balances (see Bornhorst et al (forthcoming) for a review). Among these, output composition effects have been singled out as one of the potentially relevant factors for structural fiscal balance adjustment. Fluctuations in output composition affect revenue collections by changing the weight of tax-intensive sectors in the economy. One of the clearest examples is that of the trade balance: a higher reliance on imports leads to higher indirect tax collections, whereas a higher reliance on exports, which are VAT tax exempt, limits tax collections.

Although studies have shown that such output composition effects can be significant, very few cross-country studies have been able to investigate them due to the high data requirements. In order to permit a systematic, cross-country analysis, we focus on output composition effects arising only from divergences between domestic output and the external balance. The advantages of this approach are twofold: first, it allows for a consistent estimation across a large sample of advanced and emerging economies, while addressing a major structural fiscal balance adjustment; and second, it is a more structural approach than used in this literature to date, by using information on the structure of revenues as well as through the estimation of external balance benchmarks. One of the limitations of our approach is the fact that any indirect effects of external imbalances or other effects associated with external imbalances are ignored.

The focus on the external balance is motivated by business cycle stylized facts showing the counter-cyclical behavior of net exports during the output cycle. This occurs due to imperfect consumption smoothing or imperfect capital flows - pro-cyclical capital flows in fact - or when net exports do not respond to the domestic output cycle (in the case of export-led growth). In addition to being counter-cyclical, net exports and domestic absorption by consequence are also more volatile – due to sudden-stops in capital flows, external financing and lumpy trade contracts. In many cases the external balance is also associated with cycles of similar properties in asset prices, private credit growth or terms of trade. These facts indicate that the length, magnitude as well as phasing of the external balance can differ from the output cycle significantly at times.

Tables 1A and 1B illustrate these business cycle stylized facts for all the countries in our sample. The table shows the correlations of net exports and absorption with output, as well as the standard deviations of these two variables relative to output. Net exports are generally counter-cyclical, and both net exports and domestic absorption are more volatile than output. Note that this is not the case only for emerging markets, but also for advanced economies, though to a lesser extent. Note in particular, Iceland and Ireland, as two examples where these business cycle facts are preeminent and indicate the overheating of these economies in the years preceding the crisis. Similar results have been reported by Raffo (2008). Figure 1 similarly illustrates the evolution of the output and absorption cycles for selected economies, showing the potentially large deviations for some countries (Bulgaria, Iceland), or smoothness and high correlation for others (Germany).

## IV. METHODOLOGY

In the ideal case, correcting for output composition effects would follow the methodology put forth by Bouthevillain et al. (ECB, 2001). This involves data on each of the main tax bases - the wage bill, corporate profits and private consumption – as well as their benchmark, long-term trends and the elasticity of each main revenue category with respect to its respective tax base:

$$R^{CA} = \sum R_i \cdot \left( \frac{B}{B^*} \right)^{(1-\varepsilon_i)}$$

where $R_i$ represents personal income taxes, corporate income taxes or indirect taxes, $B$ and $B^*$ represent the actual and potential tax base respectively, and $\varepsilon$ represents the elasticity of revenues with respect to the tax base. In order to determine the long-term equilibrium output Bouthevillain et al. (2001) filters tax bases through statistical techniques. On the other hand, Braconier and Fosfalt (2004) uses average shares of each tax base to output as benchmarks. Our simplified methodology involves a separate adjustment of indirect tax revenues and of the remainder revenues separately for the absorption gap[1] and for the output gap, respectively (for more technical details on the methodology, please see the appendix). We assume elasticities of one for both revenue categories considered with respect to either the output gap or the absorption gap, respectively. For spending, we assume an elasticity of zero. Therefore, the cyclically-adjusted fiscal aggregates are given by the following formulas:

$$\frac{R_{ind}^{CA}}{Y^*} = r_{ind} \cdot \frac{1 + ygap}{1 + absgap}$$

$$\frac{R_{oth}^{CA}}{Y^*} = r_{oth}$$

$$\frac{G^{CA}}{Y*} = g \cdot (1 + ygap)$$

where $Y^*$ represents the level of potential output, $r_{ind}$ represents indirect revenues as a share to GDP, $r_{oth}$ represents the remainder revenues as a share of GDP, $g$ represents government spending as a share of GDP, *ygap* and *absgap* represent the output and absorption gaps as a share of their respective potential levels, and, lastly, the *CA* superscript stands for "cyclically-adjusted". Similar approach has been used in EC (2010).

We compare this methodology with the standard methodology (as described above) that uses aggregate elasticities of one on revenues and zero on government spending. This provides a perfect benchmark for the approach used in this paper as it uses the same elasticities but only ignores the specific output composition effect considered here. Table 3 shows summary statistics for fiscal stances – defined as the difference between cyclically-adjusted fiscal balances from year to year – under the two methodologies, as well as for the difference in fiscal stances between the two methodologies. Note that on average the difference between the two methodologies is zero, as the cycles and their effects cancel out over time. However, in certain cases, the absorption-augmented methodology can uncover effects as large as 5 percentage points of GDP. Table 3 also shows that significant differences in fiscal stances between the two methodologies, i.e. beyond 0.5 percentage points of GDP, occur at relatively

[1] In reality, the tax base for indirect revenues is best proxied by domestic consumption. In our case, absorption still includes investment or government spending which are not always subject to indirect taxation. However, due to data availability across countries and the issues related to the determination of the long-term, sustainable investment or consumption in the economy, the use of absorption, for which a long-term benchmark is available and theoretically-grounded, is preferable in this cross-country study.

small changes in output gaps, but very large changes in current account gaps, of 4-5 percentage points of GDP. Lastly, these summary statistics are also illustrated in Figure 2 for a selected group of countries. Similar results and magnitudes have been reported in Bouthevillain et al (2001), using the more detailed methodology, as well as EC (2010) using a similar methodology as the one used here.

## V. DATA SOURCES AND ESTIMATION OF OUTPUT AND ABSORPTION GAPS

Our panel dataset covers 59 countries - 24 advanced and 35 major emerging economies - over the period from 1990 to 2009. The period is chosen to maximize data availability for emerging economies and capture the most recent economic and policy trends.

Fiscal and macroeconomic variables at annual frequencies are sourced from the IMF's October 2010 World Economic Outlook database. Fiscal aggregates are used at the highest level of government available – e.g. general government. Public debt as a percentage of GDP is reported in gross terms, also for the highest level of government. We use data for each country on the share of indirect revenues in total revenue from the IMF Fiscal Affairs Department's Tax Structure Database. This database reports the average share over the period 1993-2007, according to data availability. For countries where this information was not available, we assumed the average share of indirect taxes for their respective country group, i.e. advanced or emerging countries.

To facilitate consistent calculation of output gaps (defined as the percentage deviation of real output from the potential output) across countries, we average across different filter-based estimates of potential output. This uniform approach provides a stronger basis of cross-country comparisons, while projected to minimize measurement errors stemming from the unobservability of potential output and the difficulty in identifying the true model in estimating it (IMF SPR, 2009). Two filtering methods - the Hodrick – Prescott (HP) and Baxter and King's Band Pass (BP) filters - with alternative parameter assumptions are used to derive different potential output estimates (the smoothing parameter for HP is taken to be 6.25 and 100, and the business cycle duration for the BP filter is taken to be 1.5 to 8 and 2 to 5 years).[2,3] The filters are applied to annual data for real output for the 1960[4] – 2025 period from the WEO, for each country.

[2]A common method used by practitioners is a Hodrick-Prescott (HP) filter with smoothing parameters of 6.25 and 100 on annual data to estimate potential output. This is a relatively straightforward approach that allows rapid and readily comparable calculations across countries, but may miss important country characteristics and developments, such as structural breaks (if any) that may occur during major crises. For example, Cerra and Sazena (2008) and the SPR (2009) find that output drops due to crises are significant and on average last about seven years, which has implications for potential output losses. More sophisticated techniques can help overcome the limits of such univariate filtering—a common alternative is the production function approach—but are more data intensive and may not provide significantly different results.

[3] Boz, Daude and Durdu (2008) find that emerging market moments are captured fairly well for 2 to 5 years periodicity.

[4] Subject to data availability for each country.

Although aware of the limitations in estimating potential output with the simple statistical filtering methodologies, we find that the proposed averaging significantly improves the robustness of the estimated gap series and is most appropriate in a cross-country study. For those economies where methodological variation is high, averaging across methods provides us with a somewhat conservative measure of the cyclical position of the economy (as no one filtering technique consistently over or under estimates potential output). WEO data that include the desk economists' best estimate of real growth going forward is available only up to 2015. This series is extended forward to 2025 by keeping the real growth rate of the economy constant for the 2006-2015 period. Extending the series provides us with an estimate that avoids the end-point problem stemming from filtering techniques.

Domestic absorption *a* is defined as the difference between output *y* and net exports *nx*:

$$a = y - nx$$

The absorption gap is defined as the deviation of real domestic demand (from IMF's WEO) from potential domestic absorption. The simple average of four filters over *a* is used to calculate potential domestic absorption.

As in output gaps, one can argue that simple filtering techniques are bringing in measurement error to the calculation of absorption gaps. In this regard, for robustness we also employ an alternative and structural approach in the computation of gaps based on the current account norm. In absence of a trade balance "norm", we approximate it by the current account norm derived from the difference between medium term current account and estimated equilibrium current account.

$$a^* = y^* - ca^{norm}{}_5$$

Equilibrium current account is regressed on a set of macroeconomic fundamentals including fiscal balance, demographics, oil prices, economic crises, economic growth, financial crisis, remittance and aid inflows (Lee et al. (2008), Vitek, 2010). The latter two variables are only for emerging and developing economies that complement the variables considered at Lee (2008). The econometric specification is described by the following equation, where *ca* denotes the current account balance to GDP ratio of economy *i* at time *t*, and *x* represent the vector of explanatory variables.

$$ca_{i,t} = \beta_0 + \beta^T x_{i,t} + \varepsilon_{i,t}$$

$$\varepsilon_{i,t} \sim N(0, \sigma_i^2)$$

[5] Note that the current account norm is derived as a share of potential GDP, therefore, in the equation above it is multiplied by the potential output in order to derive a potential absorption level series.

The framework covers all (182) advanced, emerging and low income economies reported in the IMF's WEO. The panel is unbalanced and covers the 1973-2009 period (Vitek, 2010).

All explanatory variables are calculated with trade weighted deviations from trading partner positions for the respective variable. This approach allows for a fair representation of a countries sustainable external position compared to her trading partners. Next, the current account gap is calculated as the difference between projected current account in the medium term and estimated equilibrium current account.

## VI. Fiscal Policy Behavior during absorption cycles

To illustrate and motivate the potential association between the absorption cycle and fiscal aggregates, Table 2 shows the correlations between absorption, output and revenues and expenditures. In two thirds of the countries in our sample the effects of output and absorption on fiscal aggregates differ, with correlations differing by over 0.5 percentage points. Moreover, a majority of the countries shows a higher correlation of fiscal aggregates with absorption, in line with the business cycle facts described earlier. For countries with export-led growth, the correlations between domestic absorption and fiscal aggregates tend to be weaker, as expected. Lastly, the correlations with expenditures represent a first indication that absorption affects fiscal policy behavior, and not just cyclical revenues.

For better identification of the relationship we present new estimates of fiscal policy reaction functions using our proposed indicators for the fiscal stance. This approach aims to correct previous estimates of fiscal policy functions and to investigate the behavior of fiscal policy with respect to the absorption cycle.

Fiscal reaction functions that relate the fiscal stance and its potential determinants have been examined in a number of studies (Mélitz, 1997; Galí and Perotti, 2003; IMF, 2003, 2004; Wyplosz, 2005, O. Celasun et al., 2006, SPR, 2009). The fiscal stance is mostly defined in these studies as the change in the primary balance. The main explanatory variables used in these models are the initial fiscal position, debt sustainability, cyclical factors (output), commodity prices and country specific fixed effects. The cyclicality of policy is given by the coefficient on the output gap. The estimation of such fiscal reaction functions is subject to endogeneity problems due to the correlation of the output gap with fiscal policy shocks and to the correlation of lagged debt with past fiscal stance shocks. Celasun et al. (2006) provides a good discussion of potential endogeneity problems in panel estimation of fiscal reaction functions. The usual solutions for these econometric problems are to instrument the output gap and lagged debt[6].

We extend this framework in two ways: first, we use a different indicator for the fiscal policy stance and second, we include the absorption gap as one of the determinants of fiscal policy behavior. We use a specification in first differences with country fixed effects. By using the

[6] Celasun et al. (2006) for example use lagged US bond yields and fiscal cost of banking shocks as instruments for debt and import demand in trading partners for the output gap.

change in the cyclically-adjusted fiscal balance rather than in the headline balance itself, we partially avoid the potential endogeneity from the correlation of the errors with the output gap. Our measure of the fiscal policy stance is the change in the structural fiscal balance, adjusted for both the output and the absorption cycle, as described in the previous sections.

Equation below describes our baseline specification (our prior for the true model):

$$FS_{i,t} = \alpha + \beta \Delta Ygap_{i,t} + \gamma \Delta Agap_{i,t} + \delta D_{i,t-1} + \phi FS_{i,t-1} + u_i + \eta_t + \varepsilon_{i,t}$$

Where *t* indexes time, *i* indexes countries, *FS* represents the fiscal stance, equal to the annual change in primary balance or in the structurally adjusted primary balance, *Ygap* and *Agap* are output and absorption gaps, respectively, and *D* is the debt-to-gdp ratio. We expect the fiscal stance to be counter-cyclical ($\beta>0$) with respect to output gap and pro-cyclical ($\gamma<0$) with respect to absorption. On the other hand, rising debt levels should limit the fiscal expansion ($\delta>0$).

We are still left with the endogeneity between the level of debt and its correlation to the errors due to dependency to prior fiscal policy decisions. However, this would create a downward bias to the coefficient estimates. Therefore, the correlation would not change results qualitatively.[7] Another issue is the high degree of correlation between the output and absorption gaps (76 percent). This correlation would bias the errors upwards resulting in a type II error. We will interpret our results with this error in mind since we believe the true model is as represented above and the cost of making type II errors is outweighed by the omitted variable bias created by the exclusion of either output or absorption gap from the equation.

The results are presented on Table 4. We first present the results using the standard fiscal policy indicators used in the literature in order to then contrast them with the new results brought by our current study.

The first column of the Table 4a presents the regression results for fiscal reaction function with the dependent variable being the fiscal stance that only adjusts for the output cycle. The standard measure of fiscal impulse indicates that countries on average employ acyclical policies represented by the insignificant coefficient on output gap. Bearing in mind the omitted variable bias due to $\gamma=0$ the coefficient estimate on output gap needs to be adjusted upward. Notice the positive and significant relationship between the public debt stock and the fiscal stance across countries pointing to efforts for fiscal consolidation for high debt levels.

When fiscal stance is adjusted for both output and absorption gaps regressions indicate the counter-cyclicality of fiscal policy with respect to the business cycle, when pro-cyclical relative to the absorption cycle. We standardize both output and absorption gaps with their

[7] We are not dealing with the endogeneity bias created due to this correlation since it has little implications on the qualitative results. We refer to Celasun et al (2006) and the use of instruments to overcome the problem.

means in order to be able to compare the coefficients of these two variables. The relationship is not as robust with respect to the output gap as it is for the absorption. In regressions that only include one of these two variables show that absorption gap survives whereas output gap does not. Columns 4 and 7 of Table 4a presents this result for fiscal stance adjusted for absorption gaps that is calculated with filters and through estimation of current account gap. The absorption gaps from these two methods are also adjusted with respect to their own means. In both approaches fiscal stance is negatively correlated with absorption gaps indicating pro-cyclicality with respect to domestic absorption. An interesting result is the similar coefficient estimates in the two methods for absorption adjustments. Simple filtering methods are able to generate the same results as the cumbersome methods of estimating absorption gaps through current account norms. This is an important result given the importance of estimates of the structural "potential" for determining fiscal stance indicators.

A natural extension of the model is to control for the omitted variable bias that may be due to intertemporal policy adjustment. This is the model given in the equation above. Results on Table 4B presents regressions with lag dependent variable as an added control variable to the regressions. The coefficient of the lag dependent variable confirms that loose (tight) fiscal policy is followed by tight (loose) policies in the subsequent periods, although not statistically significant. The pro-cyclicality result remains to be robust with respect to domestic absorption. These results are similar to those that are documented in EC (2010).

The coefficients associated with the output and absorption gap may also depend on the business cycle. Tables 4C and D highlight that in boom years fiscal stances react more to domestic absorption relative to bust years. When fiscal policy enjoys larger fiscal space during boom years, extra spending is made parallel to larger revenues; however, the adjustment in bust years when revenues fall significantly is milder, though still pro-cyclical. These results are not influenced by the counter-cyclical policy response to the recent crisis (Tables 4E, F and G).

2009 has been an unusual year for the global economy. Fiscal policies across the board had to adjust dramatically to counteract the negative outturn in the real economy. In order to see that our results are not affected by the inclusion of this year, for robustness check regressions are reran for the pre-crisis years. Table 4E outlines the results. Not surprisingly, the exclusion of 2009 does not alter the results.

Lastly, we find that the procyclical policy bias due to the absorption cycle is not a characteristic of the country's development level, but rather of the country's size. In contrast, previous studies have shown that procyclical fiscal policies predominate in emerging economies. We show in the first two columns in Table 4H that there are no systematic policy responses with respect to output and absorption gaps for emerging or advanced economies as a group. However, the last two columns of the same table show that small countries are particularly subject to procyclical policy biases due to absorption cycles, whereas large G-20 countries, both advanced and emerging, have in fact procyclical fiscal behavior with respect to domestic absorption.[8] These findings are in accordance with the business cycle stylized

[8] Small countries are defined as countries with GDP in USD in 2005 below 250 mill.

facts presented earlier in the paper, showing that net exports can be significantly countercyclical even in advanced economies.

## VII. CONCLUSION

- Large external disequilibria impact the fiscal stance through their role on indirect taxes. In those countries where deviations of domestic demand relative to its potential are observed, this result implies revenues react more cyclically. Therefore, one needs to take into account that external and internal balances are not always aligned and therefore, especially in times of high economic volatility, adjustment for external disequilibrium is warranted in the design of fiscal policy.

- In this paper we introduce a straight forward way to modify fiscal stance to incorporate absorption gaps. Our main result is that countries behave pro-cyclically with respect to absorption and counter-cyclical with respect to output cycle. On the other hand, the initial level of debt and fiscal deficits remain constraining factors in the design of fiscal policy. These results suggest errors in fiscal policy setting due to absorption cycles not being properly identified and incorporated.

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## APPENDIX: FORMULAS AND CALCULATIONS OF ABSORPTION-AUGMENTED FISCAL STANCE

Notation:

Revenue ratios: $r_{ind} = \frac{R_{ind}}{Y}$ ; $r_{oth} = \frac{R_{oth}}{Y}$

Expenditure ratio: $g = \frac{G}{Y}$

Balance: $b = r - g$

Output gap: $ygap = \frac{y - y^*}{y^*}$

Absorption: $A = Y - NX \approx Y - CA$ or domestic demand WEO submission;

Absorption gap: $absgap = \frac{A - A^*}{A^*}$

Elasticities:

$\frac{R_i^{CA}}{R} = (\frac{Y^*}{Y})^{\varepsilon_{i,R}}$, where $R^{CA}$ represents cyclically-adjusted revenues and $i = ind, oth$

$\frac{G^{CA}}{G} = (\frac{Y^*}{Y})^{\varepsilon_G}$

Assumptions:

$\varepsilon_{i,R} = 1$

$\varepsilon_G = 0$ for $i = ind, oth$

Formulas:

Cyclical revenues and expenditures:

$$\frac{R_{ind}^{Cycl}}{Y^*} = r_{ind} \cdot \frac{1+ygap}{1+absgap} \cdot absgap$$
$$\frac{R_{oth}^{Cycl}}{Y^*} = r_{oth} \cdot ygap$$
$$\frac{G^{Cycl}}{Y*} = 0$$

Cyclically-adjusted revenues and expenditures:

$$\frac{R_{ind}^{CA}}{Y^*} = r_{ind} \cdot \frac{1+ygap}{1+absgap}$$
$$\frac{R_{oth}^{CA}}{Y^*} = r_{oth}$$
$$\frac{G^{CA}}{Y*} = g \cdot (1+ygap)$$

Cyclically-adjusted balance:

$$\frac{CAB}{Y^*} = \frac{R_{ind}^{CA}}{Y*} + \frac{R_{oth}^{CA}}{Y*} - \frac{G^{CA}}{Y*}$$

Fiscal impulse:

$$FI = \Delta(\frac{CAB}{Y^*}) = \Delta b + r_{ind} \cdot \Delta(\frac{ygap - absgap}{1+absgap}) - g \cdot \Delta ygap$$

Automatic stabilizers:

$$AS = \Delta(\frac{CyclB}{Y^*}) = r_{ind} \cdot \Delta(\frac{ygap - absgap}{1+absgap}) + r \cdot \Delta ygap$$

Table 1A. Business Cycle Stylized Facts for Advanced Economies

| COUNTRY | Correlation between output and net exports | Standard deviation of net exports relative to output | Correlation between output and domestic absorption | Standard deviation of domestic absorption relative to output |
|---|---|---|---|---|
| Denmark | -0.6 | 5.2 | 0.6 | 1.5 |
| Spain | -0.6 | 4.5 | 0.7 | 1.6 |
| Ireland | -0.6 | 2.5 | 0.7 | 1.3 |
| United States | -0.5 | 3.2 | 0.7 | 1.3 |
| Australia | -0.5 | 6.1 | 0.8 | 1.8 |
| New Zealand | -0.5 | 4.1 | 0.7 | 1.4 |
| Norway | -0.4 | 8.1 | 0.2 | 3.4 |
| United Kingdom | -0.4 | 2.6 | 0.6 | 1.1 |
| Cyprus | -0.4 | 2.9 | 0.7 | 2.4 |
| France | -0.4 | 2.8 | 0.6 | 1.3 |
| Sweden | -0.3 | 2.9 | 0.3 | 0.9 |
| Netherlands | -0.2 | 2.9 | 0.6 | 1.7 |
| Canada | -0.2 | 4.6 | 0.5 | 0.9 |
| Italy | -0.2 | 5.9 | 0.7 | 1.4 |
| Portugal | -0.2 | 3.3 | 0.4 | 1.6 |
| Belgium | -0.2 | 2.4 | 0.4 | 1.7 |
| Finland | -0.2 | 2.4 | 0.4 | 1.0 |
| Malta | -0.2 | 2.8 | 0.5 | 2.3 |
| Greece | -0.1 | 3.1 | 0.6 | 1.6 |
| Austria | 0.0 | 3.5 | 0.4 | 1.0 |
| Germany | 0.0 | 4.2 | 0.6 | 1.3 |
| Japan | 0.0 | 4.7 | 0.7 | 1.1 |
| Switzerland | 0.1 | 6.3 | 0.5 | 3.3 |
| Czech Republic | 0.1 | 5.3 | 0.8 | 1.5 |
| Luxembourg | 0.4 | 1.6 | 0.6 | 1.1 |
| | | | | |
| Mean | -0.2 | 3.9 | 0.6 | 1.6 |
| Median | -0.2 | 3.3 | 0.6 | 1.4 |
| Min | -0.6 | 1.6 | 0.2 | 0.9 |
| Max | 0.4 | 8.1 | 0.8 | 3.4 |

Source: WEO and IMF Staff estimates.

domestic absorption are in logs. Net exports are expressed as a share of GDP. Correlations are derrived from the coefficients of simple OLS regressions over the period 1990-2009.

Table 1B. Business Cycle Stylized Facts for Emerging Economies

| COUNTRY | Correlation between output and net exports | Standard deviation of net exports relative to output | Correlation between output and domestic absorption | Standard deviation of domestic absorption relative to output |
|---|---|---|---|---|
| Argentina | -0.9 | 2.2 | 0.9 | 1.5 |
| Estonia | -0.8 | 4.4 | 0.9 | 1.5 |
| Lithuania | -0.8 | 2.4 | 0.9 | 1.4 |
| Mexico | -0.8 | 5.0 | 0.9 | 1.4 |
| Latvia | -0.7 | 1.0 | 0.8 | 1.8 |
| Korea | -0.6 | 10.7 | 0.4 | 2.2 |
| Turkey | -0.6 | 2.4 | 0.9 | 1.3 |
| Uruguay | -0.6 | 3.0 | 0.9 | 1.4 |
| Indonesia | -0.6 | 7.2 | 0.8 | 1.3 |
| Peru | -0.6 | 2.2 | 0.8 | 1.2 |
| Colombia | -0.5 | 12.7 | 0.7 | 1.7 |
| Bulgaria | -0.5 | 3.9 | 0.5 | 2.1 |
| Brazil | -0.4 | 2.9 | 0.7 | 1.3 |
| Iceland | -0.4 | 10.7 | 0.6 | 2.2 |
| Croatia | -0.4 | 4.2 | 0.8 | 1.6 |
| Guatemala | -0.3 | 11.2 | 0.8 | 2.1 |
| Slovenia | -0.3 | 2.5 | 0.8 | 1.7 |
| Egypt | -0.2 | 7.6 | 0.8 | 2.3 |
| Romania | -0.2 | 4.2 | 0.5 | 1.1 |
| Dominican Republi | -0.2 | 14.0 | 0.7 | 1.7 |
| China | -0.2 | 7.3 | 0.3 | 1.5 |
| India | -0.2 | 8.5 | 0.8 | 1.4 |
| Bosnia and Herzeg | -0.2 | 5.4 | 0.5 | 1.7 |
| Philippines | -0.2 | 10.3 | 0.7 | 1.9 |
| Honduras | -0.1 | 9.7 | 0.7 | 1.8 |
| Hungary | -0.1 | 9.8 | 0.6 | 1.7 |
| Paraguay | -0.1 | 11.0 | 0.5 | 1.5 |
| Israel | 0.0 | 4.0 | 0.4 | 1.3 |
| Costa Rica | 0.1 | 8.3 | 0.9 | 1.4 |
| Pakistan | 0.2 | 10.1 | 0.7 | 1.7 |
| Hong Kong | 0.2 | 5.4 | 0.5 | 1.5 |
| Poland | 0.2 | 4.7 | 0.8 | 1.5 |
| Tunisia | 0.2 | 3.9 | 0.5 | 1.6 |
| Morocco | 0.2 | 2.7 | 0.5 | 1.0 |
| Macedonia | 0.2 | 6.3 | 0.0 | 1.2 |
| Mean | -0.30 | 6.34 | 0.67 | 1.59 |
| Median | -0.24 | 5.40 | 0.74 | 1.54 |
| Min | -0.90 | 1.05 | 0.00 | 0.96 |
| Max | 0.21 | 13.96 | 0.90 | 2.26 |

Source: WEO and IMF Staff estimates.
Note: Countries are ordered by the correlation between output and net exports. All series are filtered. Output and domestic absorption are in logs. Net exports are expressed as a share of GDP. Correlations are derrived from the

Table 2. Correlations between absorption, output and fiscal aggregates

| | Pairwise correlations | | | |
|---|---|---|---|---|
| | **Revenues and output** | **Revenues and absorption** | **Spending and revenues** | **Spending and absorption** |
| Argentina | 0.2 | 0.2 | 0.4 | 0.4 |
| Australia | 0.6 | 0.5 | 0.3 | 0.3 |
| Austria | -0.2 | -0.1 | -0.4 | -0.2 |
| Belgium | -0.3 | -0.2 | -0.6 | -0.3 |
| Bosnia and Herzegovin | 0.0 | -0.2 | 0.1 | -0.1 |
| Brazil | 0.1 | 0.1 | -0.3 | -0.1 |
| Bulgaria | 0.7 | 0.8 | -0.4 | -0.2 |
| Canada | -0.2 | -0.2 | -0.6 | -0.5 |
| China | -0.3 | -0.3 | -0.4 | -0.3 |
| Colombia | 0.1 | 0.2 | -0.1 | 0.1 |
| Costa Rica | 0.5 | 0.5 | -0.7 | -0.6 |
| Croatia | 0.7 | 0.7 | -0.4 | -0.3 |
| Cyprus | 0.2 | 0.2 | -0.2 | -0.2 |
| Czech Republic | 0.4 | 0.3 | -0.3 | -0.3 |
| Denmark | 0.1 | -0.1 | -0.9 | -0.7 |
| Dominican Republic | 0.5 | 0.6 | 0.1 | 0.1 |
| Egypt | 0.6 | 0.6 | 0.4 | 0.4 |
| Estonia | -0.1 | -0.2 | -0.4 | -0.5 |
| Finland | -0.4 | -0.4 | -0.7 | -0.7 |
| France | 0.1 | 0.0 | -0.8 | -0.7 |
| Germany | -0.2 | -0.1 | -0.7 | -0.5 |
| Greece | 0.0 | 0.2 | 0.2 | 0.3 |
| Guatemala | 0.4 | 0.7 | -0.1 | -0.1 |
| Honduras | 0.5 | 0.7 | -0.5 | -0.3 |
| Hong Kong | 0.4 | 0.2 | -0.5 | -0.5 |
| Hungary | -0.2 | -0.1 | 0.3 | 0.2 |
| Iceland | 0.5 | 0.7 | -0.5 | -0.7 |
| India | 0.2 | 0.2 | -0.2 | -0.2 |
| Indonesia | -0.1 | -0.1 | -0.3 | -0.2 |
| Ireland | -0.4 | -0.4 | -0.5 | -0.4 |
| Israel | 0.1 | 0.2 | -0.3 | -0.1 |
| Italy | -0.2 | -0.3 | -0.3 | -0.3 |
| Japan | 0.6 | 0.6 | -0.6 | -0.5 |
| Korea | 0.0 | 0.0 | -0.3 | -0.3 |
| Latvia | 0.2 | 0.2 | -0.1 | -0.2 |
| Lithuania | 0.3 | 0.2 | -0.3 | -0.3 |

(continued)

(continued)

| | | | | |
|---|---|---|---|---|
| Luxembourg | -0.4 | -0.3 | -0.8 | -0.6 |
| Macedonia | 0.1 | -0.1 | -0.6 | -0.1 |
| Malta | -0.2 | -0.1 | -0.5 | -0.4 |
| Mexico | -0.1 | -0.1 | -0.4 | -0.4 |
| Morocco | -0.1 | 0.1 | -0.2 | -0.1 |
| Netherlands | 0.3 | 0.1 | -0.5 | -0.4 |
| New Zealand | 0.0 | 0.1 | -0.7 | -0.5 |
| Norway | 0.3 | -0.2 | -0.7 | 0.2 |
| Pakistan | 0.0 | -0.2 | 0.4 | 0.6 |
| Paraguay | 0.1 | 0.0 | -0.3 | -0.2 |
| Peru | 0.7 | 0.6 | -0.2 | -0.1 |
| Philippines | 0.2 | 0.2 | -0.3 | -0.1 |
| Poland | 0.0 | 0.1 | -0.3 | -0.3 |
| Portugal | 0.5 | 0.2 | 0.1 | -0.1 |
| Romania | 0.2 | 0.2 | 0.1 | -0.1 |
| Slovenia | 0.1 | 0.1 | -0.5 | -0.5 |
| Spain | 0.3 | 0.4 | -0.4 | -0.4 |
| Sweden | -0.2 | -0.2 | -0.6 | -0.6 |
| Switzerland | 0.0 | -0.1 | -0.7 | -0.3 |
| Tunisia | -0.4 | -0.2 | -0.6 | -0.4 |
| Turkey | 0.5 | 0.5 | -0.8 | -0.8 |
| United Kingdom | 0.5 | 0.5 | -0.4 | -0.4 |
| United States | 0.7 | 0.7 | -0.6 | -0.6 |
| Uruguay | 0.1 | 0.1 | -0.6 | -0.6 |

Source: WEO and IMF Staff estimates. Coefficients represent simple pairwise correlations. Fiscal aggregates are expressed as a share of GDP and output and absorption are presented as gaps, in percentage of their respective potential values.

Table 3. Standard vs. absorption-augmented fiscal stance estimates

| | (% of potential GDP) | |
|---|---|---|
| Average difference | 0.0 | |
| Min. difference | -5.4 | |
| Max. difference | 1.7 | |
| | Avg. change in output gap | Avg. change in absorption gap |
| Difference between methodologies larger than 0.5 percent of potential GDP | 0.4 | -4.4 |
| Difference between methodologies larger than -0.5 percent of potential GDP | -0.7 | 5.8 |

Sources: WEO and IMF Staff estimates.

Table 4A – Fiscal reaction function with output and absorption gaps

| VARIABLES | (1) standard | (2) filter | (3) filter-Ygap | (4) filter-ABSgap | (5) MB | (6) MB Ygap | (7) MB ABSgap |
|---|---|---|---|---|---|---|---|
| $\Delta Ygap_t$ | -0.10 | 0.95* | -0.36 | | 0.65 | -0.36 | |
| | (0.21) | (0.52) | (0.24) | | (0.51) | (0.24) | |
| $\Delta ABSgap_t$ | | 0.99*** | | 0.50*** | | | |
| | | (0.35) | | (0.15) | | | |
| $D_{t-1}$ | 0.01** | 0.01** | 0.01** | 0.01** | 0.01** | 0.01** | 0.01** |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) |
| $\Delta MB\_ABSgap_t$ | | | | | -1.31** | | 0.77*** |
| | | | | | (0.55) | | (0.24) |
| Constant | -0.76** | -0.76** | -0.77** | 0.81*** | 0.74*** | -0.77** | 0.78*** |
| | (0.29) | (0.29) | (0.29) | (0.29) | (0.28) | (0.29) | (0.28) |
| Observations | 1020 | 1020 | 1020 | 1020 | 1020 | 1020 | 1020 |
| R-squared | 0.01 | 0.07 | 0.02 | 0.05 | 0.06 | 0.02 | 0.05 |
| Number of ifscode | 59 | 59 | 59 | 59 | 59 | 59 | 59 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Fund staff calculations

Table 4B – With lag dependent variable

| VARIABLES | (1) standard | (2) filter | (3) filter ypag | (4) filter agap | (5) MB | (6) MB ygap | (7) MB agap |
|---|---|---|---|---|---|---|---|
| $FS_{t-1}$ (filter) | | 0.03 | -0.00 | 0.03 | | | |
| | | (0.04) | (0.04) | (0.04) | | | |
| $\Delta Ygap_t$ | -0.11 | 1.01* | -0.36 | | 0.70 | -0.36 | |
| | (0.20) | (0.52) | (0.23) | | (0.51) | (0.23) | |
| | | | | -0.53*** | | | |
| $\Delta ABSgap_t$ | | -1.05*** | | | | | |
| | | (0.35) | | (0.14) | | | |
| $D_{t-1}$ | 0.01** | 0.01** | 0.01** | 0.01** | 0.01* | 0.01** | 0.01** |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) |
| $FS_{t-1}$ | 0.01 | | | | | | |
| | (0.04) | | | | | | |
| $FS_{t-1}$ (macro-balance approach) | | | | | 0.02 | 0.00 | 0.03 |
| | | | | | (0.04) | (0.04) | (0.04) |
| | | | | | | | -0.81*** |
| $\Delta CAgap_t$ | | | | | -1.39** | | |
| | | | | | (0.55) | | (0.23) |
| | | | | -0.84** | | | -0.81** |
| Constant | -0.79** | -0.78** | -0.82** | | -0.76** | -0.81** | |
| | (0.32) | (0.32) | (0.33) | (0.33) | (0.30) | (0.33) | (0.31) |
| Observations | 976 | 976 | 976 | 976 | 976 | 976 | 976 |
| R-squared | 0.01 | 0.08 | 0.02 | 0.06 | 0.06 | 0.02 | 0.05 |
| Number of ifscode | 59 | 59 | 59 | 59 | 59 | 59 | 59 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Fund staff calculations

Table 4C - Boom Years with Positive Absorption Gaps

| VARIABLES | (1) standard | (2) filter | (3) MB |
|---|---|---|---|
| $FS_{t-1}$ (filter) | | 0.01 | |
| | | (0.05) | |
| $\Delta Ygap_t$ | -0.34 | 0.94** | 0.50 |
| | (0.35) | (0.44) | (0.44) |
| $\Delta ABSgap_t$ | | -1.74*** | |
| | | (0.35) | |
| $D_{t-1}$ | 0.01 | 0.00 | 0.00 |
| | (0.00) | (0.00) | (0.00) |
| $FS_{t-1}$ | -0.00 | | |
| | (0.05) | | |
| $FS_{t-1}$ (macro-balance approach) | | | -0.02 |
| | | | (0.05) |
| $\Delta CAgap_t$ | | | -1.98*** |
| | | | (0.46) |
| Constant | -0.44 | -0.02 | -0.15 |
| | (0.26) | (0.31) | (0.29) |
| Observations | 525 | 525 | 525 |
| R-squared | 0.01 | 0.11 | 0.06 |
| Number of ifscode | 59 | 59 | 59 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Fund staff calculations

Table 4D - Bust Years with Negative Absorption Gaps

| VARIABLES | (1) bust standard | (2) bust filter | (3) bust MB |
|---|---|---|---|
| $FS_{t-1}$ (filter) | | 0.10 | |
| | | (0.07) | |
| $\Delta Ygap_t$ | -0.03 | 1.07 | 0.72 |
| | (0.37) | (0.72) | (0.67) |
| $\Delta ABSgap_t$ | | -1.13** | |
| | | (0.54) | |
| $D_{t-1}$ | 0.02* | 0.03* | 0.03** |
| | (0.01) | (0.01) | (0.01) |
| $FS_{t-1}$ | 0.07 | | |
| | (0.07) | | |
| $FS_{t-1}$ (macro-balance approach) | | | 0.11 |
| | | | (0.07) |
| $\Delta CAgap_t$ | | | -1.37* |
| | | | (0.70) |
| Constant | -1.35* | -1.58** | -1.45** |
| | (0.72) | (0.73) | (0.68) |
| Observations | 451 | 451 | 451 |
| R-squared | 0.04 | 0.08 | 0.07 |
| Number of ifscode | 59 | 59 | 59 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Fund staff calculations

Table 4E Robustness - Pre-2008 Period

| VARIABLES | (1) pre-2008 standard | (2) pre-2008 filter | (3) pre-2008 MB |
|---|---|---|---|
| $FS_{t-1}$ (filter) | | 0.04 | |
| | | (0.04) | |
| $\Delta Ygap_t$ | -0.19 | 1.00* | 0.66 |
| | (0.27) | (0.50) | (0.51) |
| $\Delta ABSgap_t$ | | -1.12*** | |
| | | (0.31) | |
| $D_{t-1}$ | 0.01** | 0.01** | 0.01** |
| | (0.01) | (0.00) | (0.00) |
| $FS_{t-1}$ | 0.02 | | |
| | (0.04) | | |
| $FS_{t-1}$ (macro-balance approach) | | | 0.03 |
| | | | (0.04) |
| $\Delta CAgap_t$ | | | -1.44** |
| | | | (0.56) |
| Constant | -0.73*** | -0.69** | -0.68*** |
| | (0.27) | (0.26) | (0.25) |
| Observations | 858 | 858 | 858 |
| R-squared | 0.02 | 0.09 | 0.07 |
| Number of ifscode | 59 | 59 | 59 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Fund staff calculations

Table 4F Robustness – Boom Years with Positive Absorption Gaps (Pre-2008 Period)

| VARIABLES | (1) boom standard | (2) boom filter | (3) boom MB |
|---|---|---|---|
| $FS_{t-1}$ (filter) | | 0.03 | |
| | | (0.05) | |
| $\Delta Ygap_t$ | -0.26 | 1.06*** | 0.61 |
| | (0.34) | (0.34) | (0.37) |
| $\Delta ABSgap_t$ | | -1.79*** | |
| | | (0.30) | |
| $D_{t-1}$ | 0.01 | 0.01 | 0.01 |
| | (0.01) | (0.01) | (0.01) |
| $FS_{t-1}$ | 0.00 | | |
| | (0.06) | | |
| $FS_{t-1}$ (macro-balance approach) | | | 0.01 |
| | | | (0.05) |
| $\Delta CAgap_t$ | | | -2.11*** |
| | | | (0.37) |
| Constant | -0.54* | -0.09 | -0.20 |
| | (0.30) | (0.33) | (0.31) |
| Observations | 475 | 475 | 475 |
| R-squared | 0.01 | 0.13 | 0.08 |
| Number of ifscode | 59 | 59 | 59 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Fund staff calculations

Table 4G - Bust Years with Negative Absorption Gaps (Pre-2008 period)

| VARIABLES | (1) bust standard | (2) bust filter | (3) bust MB |
|---|---|---|---|
| $FS_{t-1}$ (filter) | | 0.11* | |
| | | (0.07) | |
| $\Delta Ygap_t$ | 0.08 | 1.31 | 0.86 |
| | (0.59) | (0.82) | (0.82) |
| $\Delta ABSgap_t$ | | -1.34** | |
| | | (0.51) | |
| $D_{t-1}$ | 0.02** | 0.03** | 0.02** |
| | (0.01) | (0.01) | (0.01) |
| $FS_{t-1}$ | 0.10 | | |
| | (0.06) | | |
| $FS_{t-1}$ (macro-balance approach) | | | 0.11 |
| | | | (0.06) |
| $\Delta CAgap_t$ | | | -1.38 |
| | | | (0.93) |
| Constant | -1.17* | -1.43** | -1.26** |
| | (0.61) | (0.60) | (0.59) |
| Observations | 383 | 383 | 383 |
| R-squared | 0.04 | 0.11 | 0.07 |
| Number of ifscode | 58 | 58 | 58 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Fund staff calculations

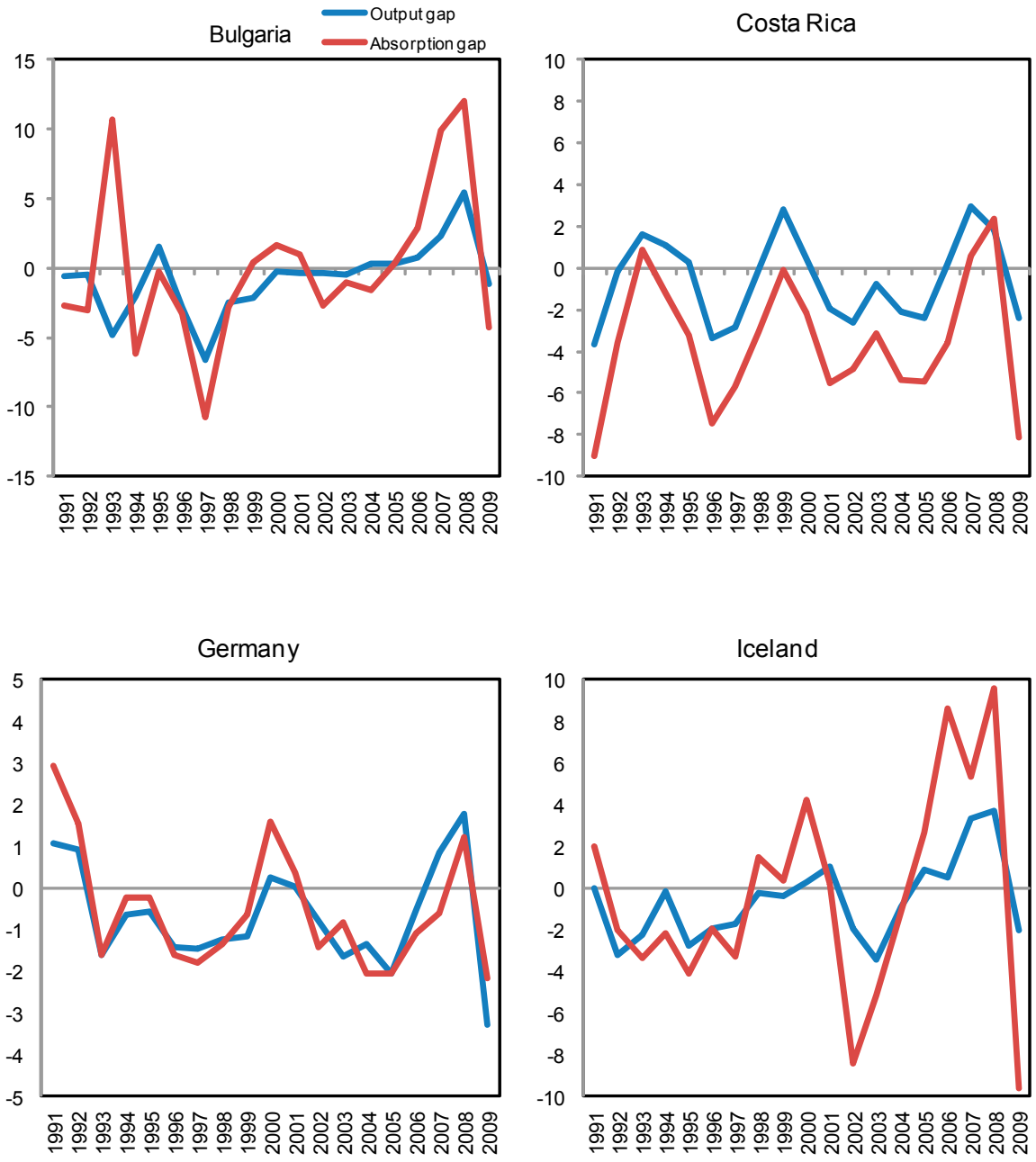
Table 4H – Fiscal reaction functions by country type

| VARIABLES | (1) EM | (2) AM | (3) Small | (4) G20 |
|---|---|---|---|---|
| $FS_{t-1}$ (filter) | 0.20** | 0.12** | -0.13* | 0.20** |
| | (0.08) | (0.05) | (0.07) | (0.08) |
| $\Delta Ygap_t$ | -0.04 | 0.17 | 0.23 | -0.57 |
| | (0.37) | (0.52) | (0.34) | (0.38) |
| $\Delta ABSgap_t$ | -0.17 | 0.08 | -0.30* | 0.63** |
| | (0.18) | (0.37) | (0.16) | (0.24) |
| $D_{t-1}$ | 0.01* | 0.01 | 0.02** | -0.00 |
| | (0.01) | (0.01) | (0.01) | (0.00) |
| Constant | 0.70** | -0.84* | -1.05*** | -0.07 |
| | (0.29) | (0.48) | (0.37) | (0.19) |
| Observations | 453 | 523 | 500 | 310 |
| R-squared | 0.05 | 0.04 | 0.04 | 0.05 |
| Number of ifscode | 36 | 23 | 35 | 16 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

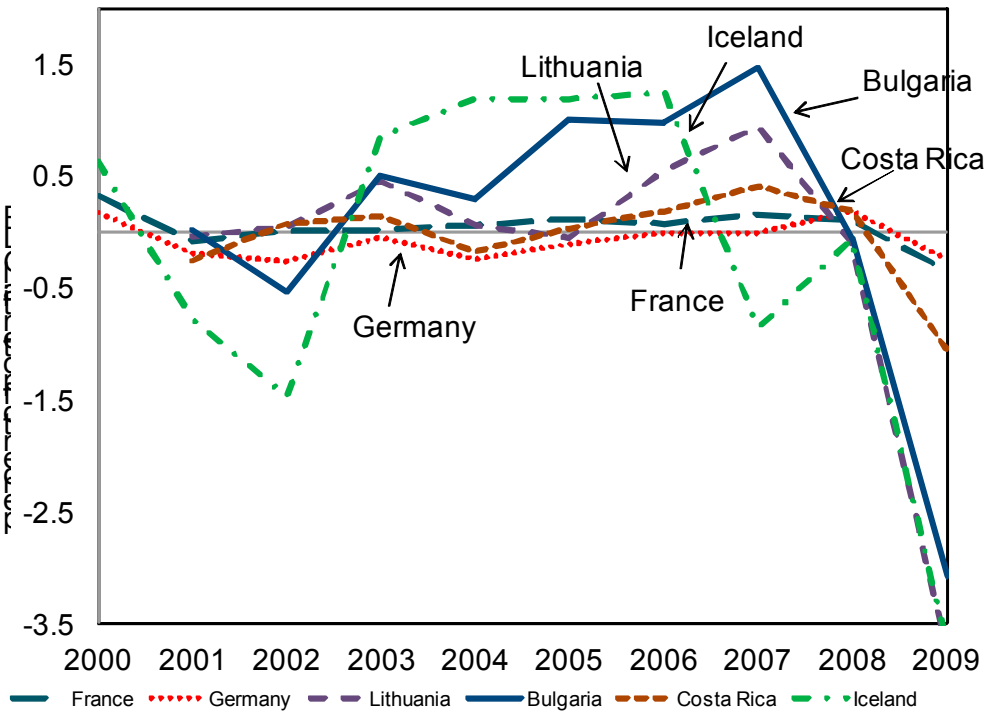
Source: Fund staff calculations

Figure 1. Output and absorption cycles in selected countries, 1991-2009




Source: WEO and IMF Staff estimates.

Figure 2. Differences in fiscal stances: standard method vs. absorption-augmented method




Source: WEO and IMF Staff estimates.