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New Evidence on the Cyclicality of Fiscal Policy

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Abstract

This paper presents new evidence on the patterns of cyclicality in the fiscal policy stance of developing and industrialized countries over a period of more than three decades covering 180 countries during 1980–2012. First, the paper considers issues of robustness in the choice of the proxy for fiscal cyclicality by using alternative filtering methods to check whether this influences the results and leads to any differences in a country's reported within-period average, and across-period changes in fiscal stance. Second, a country-specific approach is used to split the sample into sub-periods based on a test for structural break in the series of real gross domestic product per capita. Third, the paper investigates the extent to which countries behave pro-cyclically or counter-cyclically in different phases of the business cycle. In line with earlier findings in the literature, the analysis confirms that there is a causal link running from stronger institutions to less pro-cyclical fiscal policy, even after controlling for the endogeneity of institutions and other determinants of fiscal policy.

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Produced by the Research Support Team

New Evidence on the Cyclicality of Fiscal Policy*

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1. Introduction

A large and growing literature has argued that industrialized and developing countries behave very differently in relation to their fiscal policy stances over the business cycle. In that context, a significant number of authors have documented a more pro-cyclical behavior of fiscal policy in developing countries as opposed to industrial countries.[1] That is, developing countries tend to orient government consumption and investment in the same direction as that of the cycle in general economic activity. In doing so, they tend to amplify upswings and worsen recessions – what Kaminsky, Reinhart, and Vegh (2004) termed as the "when it rains, it pours" phenomenon. Industrialized countries, on the other hand, tend to behave largely in a countercyclical or at worst acyclical fashion. The most recent evidence of this pattern has been put forward by Frankel, Vegh, and Vuletin (2013) who have found additional support to the when-it-rains-it-pours idea, but also evidence regarding developing countries moving away from pro-cyclicality.

Evidence on the pro-cyclical pattern of fiscal policy in developing countries was first found by Gavin and Perotti (1997) who showed that Latin American tended to adopt policies that were expansionary in good times and contractionary in bad times. Talvi and Vegh (2000) then showed that such behavior was far from being a trademark of Latin America alone, as many other developing countries across the world espoused a pro-cyclical fiscal policy stance. There are various different explanations as to why developing countries tend to behave in that fashion *vis à vis* industrialized economies. Some of the reasons most commonly found in the literature include credit constraints faced by developing countries, which would prevent them from raising money in international capital markets in bad times and would force them to adopt a contractionary fiscal policy in downturns (Gavin and Perotti (1997)). Political economy considerations would also seem to play a role, as good times could encourage fiscal profligacy (Tornell and Lane (1998), Alesina and Tabellini (2005)).

From a theoretical point of view, the pro-cyclicality of fiscal policy remains a puzzle, as from either a Keynesian or neoclassical perspective it does not seem to be optimal to exacerbate the business cycle by adopting an expansionary fiscal policy in booms and a contractionary fiscal stance in a downturn. In neoclassical models, the optimal fiscal policy stance is either acyclical (Barro (1979)) or countercyclical (Baxter and King (1993)). In Keynesian models, on the other hand, with the presence of sticky prices or wages, the optimal fiscal policy stance is countercyclical (Christiano et al. (2011) and Nakata (2011)). A number of papers have argued that a pro-cyclical fiscal policy stance is the result of weak and underdeveloped institutions (e.g., Calderon and Schimdt-Hebel (2008), and Frankel et al. (2013)).

From a risk management point of view, a countercyclical fiscal policy can be useful for at least three compelling reasons (see World Bank (2014)). First, by leaning against the wind, governments can continue to provide goods and services and to maintain public investment even in the event of a drop in public revenues. Second, in a downturn, a

[1] See, for example, Gavin and Perotti (1997), Tornell and Lane (1998), Alesina and Tabellini (2005), Ilzetzki and Vegh (2008), and Park (2012).

countercyclical fiscal policy can help governments increase social assistance and insurance to a large number of citizens affected by more adverse macroeconomic conditions. Third, as witnessed during the global financial crisis of 2008-09, a countercyclical fiscal policy can help countries stimulate the economy and cope better with the effects of a prolonged recession. In that regard, as argued by Mollick et al. (2011), in the aftermath of the global financial crisis it became clear that the countries that weathered the effects of the crisis better were those that had followed some sort of concerted macro-fiscal responses that helped them build resilience to exogenous shocks. When the crisis hit, these countries were able to have more favorable access to credit in international financial markets, and resist speculative attacks. They not only had stronger fundamentals entering the crisis, which allowed them to quickly deploy countercyclical fiscal policies, they were also better positioned to adopt exit strategies faster by raising interest rates, controlling domestic credit growth and reverting to more orthodox fiscal policies.

In this paper, we provide new evidence on the cyclicality of fiscal policy across industrialized and developing countries. Our sample includes 180 countries, of which 134 are developing countries and 46 are high income over the period 1980-2012. We follow the methodology of Frankel et al. (2013) but at the same time introduce three innovations to the empirical approach. First, we subject the proxy for fiscal cyclicality to alternative filtering methods to account for potential differences in a country's reported within-period average, and across-period changes in fiscal stance. Second, given the sensitivity of cyclicality outcomes to the choice of period, we rely on a country-specific approach to split our sample in sub-periods. Acknowledging the difficulties of carrying out such an exercise when working with a large sample of countries, we suggest a first approximation for breaking the sample across countries based on a test for structural break in the series of real GDP per capita – we believe that this could be a better indicator of shifts in a country's overall economic policy, including its fiscal policy stance. Third, we investigate the extent to which countries behave pro-cyclically or counter-cyclically in different phases of the business cycle with the objective of assessing the empirical relevance of the when-it-rains-it-pours phenomenon when considering a larger sample of countries in comparison to earlier studies in the literature.

The paper is organized as follows. After this Introduction, Section 2 discusses issues associated with the choice of filter to smooth the proxy variable for fiscal cyclicality while Section 3 estimates our own "graduating class" under different filtering methods and a country-specific approach to split the sample in two sub-periods. Section 4 presents an analysis of how the countries in our sample behave over the business cycle. Section 5 discusses our findings on the empirical determinants of fiscal cyclicality while Section 6 explores endogeneity issues. Section 7 presents concluding remarks confirming earlier findings in the literature on the causal link between institutional quality and a less pro-cyclical fiscal stance.

2. Alternative Filtering Methods

Filtering, or statistical smoothing, is an exercise conducted in order to separate trend from cycle components in economic time series (De Jong and Sakarya (2013)). Such exercise is not restricted to the realm of the social sciences. It is, in fact, a concept imported from engineering (Baum (2006)) with applications in diverse fields such as acoustics,

electronics, meteorology and neuroscience, to name just a few. In all cases, the exercise implies the application of so-called *pass filters*. These are processes under which a certain variable –an economic time series, wind patterns in atmospheric sciences, an audio signal in acoustics or an electric current in electronics – is broken down in components following some given *cutoff* criteria. Depending on the field, the cutoff criteria refer to issues such as the periodic behavior of economic time series, wind speeds, the frequency of radio waves or an electric current voltage. Economic time series, in particular, can be broken down based on data frequencies that have some economic significance, such as, for example, trends that can help identify cycles in the data.[2] In economics, one may be also interested in higher rather than medium-term frequencies (intra-annual, quarterly or monthly) that are associated with the seasonal behavior of the series. Any remaining value that cannot be imputed as trends, the business cycle or a seasonal component is considered a result of shocks or noise in the data. Pass filters are normally applied to separate the trend from the business cycle.[3]

Overall, there exist 3 groups of pass filters: low pass, high pass and band pass filters. For a better understanding Baum (2006) presents an intuitive example on how these filters work by associating them with the audio controls from a stereo, recalling that *treble* controls strengthen or weaken the high frequencies and *bass* controls affect the low frequencies. In listening to music one has the possibility of accentuating, strengthening the high frequencies (by "passing", or giving preponderance to the "treble") or, alternatively, accentuating the low frequencies (passing or giving preponderance to the "bass"). In turn, a band pass filter would pass only frequencies within a certain frequency band (generally in between the high and low pass). In economics, choosing a low pass (high-cut or treble-cut) filter implies that we are giving preponderance to lower frequency (longer cycles or the trend) while by choosing a high pass (low-cut or bass-cut) filter we are giving preponderance to higher frequencies (the cycle).

Alternative filtering methods used in economic analysis have been reported in Baum (2006) and Drukker (2011). They include, besides the Hodrick-Prescott (HP) filter, the Baxter–King filter (Baxter & King (1995)); the Christiano-Fitzgerald random walk band pass filter (Christiano & Fitzgerald (1999)); and the Butterworth square wave high pass filter (Butterworth, 1930). We compute those in addition to an unobserved component model, as proposed by Harvey (1989).

The HP is a high-pass filter. To see this one needs to recall that the HP filter removes a smooth trend τ_t from a time series x_t by solving the minimization problem with respect to a variable τ_t:

$$\boldsymbol{min} \sum_{t=1}^{T} \left[(x_t - \tau_t)^2 + \lambda \times \left((\tau_{t+1} - \tau_t) - (\tau_t - \tau_{t-1}) \right)^2 \right] \qquad \textbf{(1)}$$

[2] There is no clear-cut distinction between the medium-term associated to a business cycle and the long term in economics. In the U.S., the National Bureau of Economic Research keeps track of US business cycle expansions and contractions, identifying a total of 33 cycles between 1859 and 2009, which implies an average duration of 4.7 years per cycle. See: http://www.nber.org/cycles.html

[3] When a filter such HP is applied to separate a trend component from a series, the remaining component will, in fact correspond to a blend of the business cycle, seasonality and the noise.

Where $z_t = x_t - \tau_t$ is interpreted as the business component (Baum, 2006). λ is a user-defined parameter that penalizes fluctuations in second differences of x_t. A higher λ implies a higher penalty for trying to "approximate" the trend τ_t to x_t -under time varying x_t- and hence a smoother trend (and a more pronounced cycle). Agreed upon values for λ in annual, quarterly and monthly data series are 6.25, 1,600 and 129,600, respectively (Ravn & Uhlig, 2010). The HP removes the trend and leaves high-frequency components in z_t.

In turn, Baxter-King (BK) is a band-pass filter that allows suppressing both the low frequency trend components and the high frequency components in an economic series. The key criteria used to define the BK filter are as follows: 1) it should not modify the properties of the extracted component; 2) it should not create "phase shift", or alter the timing relationships in the series; 3) it should be an optimal approximation to the ideal band-pass filter; 4) it should be applicable to I(1) or I(2) data, as well as to series exhibiting a quadratic trend; 5) it should provide constant (non-time-varying) coefficients in the MA representation of the filter; and, 6) it should be operational. The first two criteria imply that a moving average of the data with symmetric weights on leads and lags must be defined. This in turn implies that the filter will drop observations on both ends of the original series.

Christiano & Fitzgerald (1999) explain that the application of the ideal band pass filter "requires substantially more data than is available in typical macroeconomic time". The authors, however, identify one approximation that is optimal when the raw series is a random-walk process. It also works well for processes that are close to being random walks or random walks plus drift. While the BK filter minimizes the error between the filter coefficients and the ideal band-pass filter coefficients, the Christiano-Fitzgerald (CF) filter, in turn minimizes the mean squared error between the estimated component and the true component.

Finally, the nature of the Butterworth (BU) filter as applied in economics is explained by Pollock (1999). BU filters can be derived from some axioms that specify properties we would like a filter to have. While the BU and BK filters share the properties of symmetry and phase neutrality, the coefficients of Butterworth filters do not need to sum to 0.

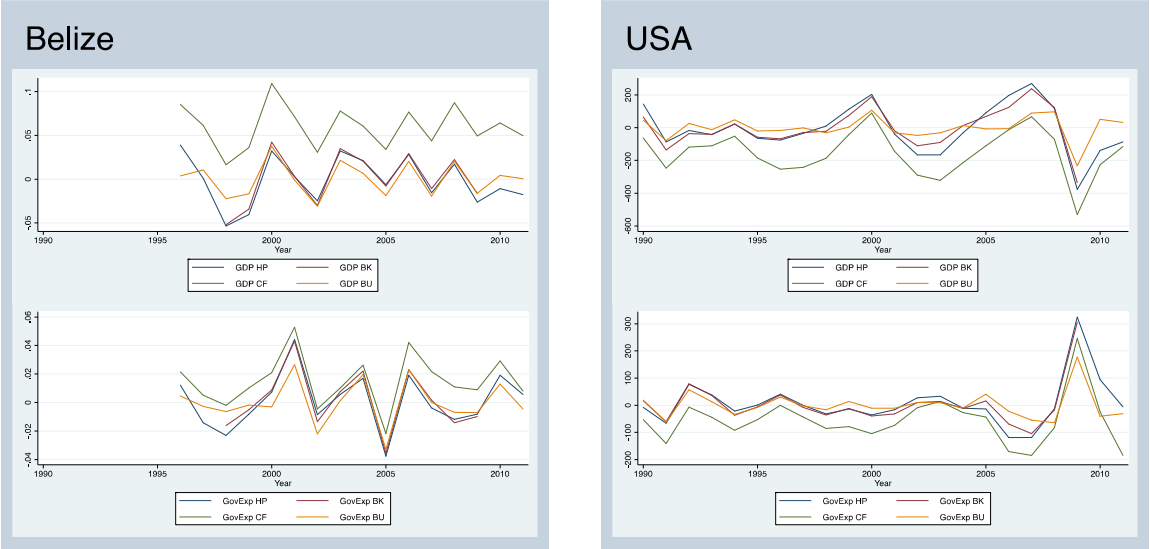
Figure 1 compares results of filtering the time series for real government expenditure for the United States and Belize. We report the ratio of the cyclical component relative to the value of the series, by year, for the period 1990-2011. One can observe how a high-pass filter such as Hodrick-Prescott yields a higher ratio than the low-pass Butter filter. The band-pass Baxter-King filter yields results generally in between those for HP and BU.[4]

There is no specific reason to prefer, a priori, one type of filter over another. In any case, one's preference for a particular filtering technique should be connected to the

[4] The results of any filtering exercise are dependent on parameter specification. As explained above, the HP filter requires a definition of a smoothing parameter λ, which we have set at 6.25 following Ravn and Uhlig (2010). We have also used values of parameters for BK, CF and BU, as recommended by Baum (2006).

reasons why one is conducting a filtering exercise in the first place. In addition, one should be able to provide good reasons when using values of parameters under specific techniques that diverge from those recommended in the literature (say, when one does not use a λ=6.25 for the analysis of annual times series).

Figure 1 : Real Government Expendtures. Ratio of Cyclical Component to Series Value for the USA and Belize. Alternative Filters. 1990-2013



Source: Authors' calculations based on IMF, WEO, October 2014.

3. Fiscal Cyclicality under Alternative Filtering Methods

In a recent paper, Frankel et al. (2013) documented a movement away from pro-cyclicality for a sizeable number of developing countries in the 2000s. The authors used a sample of 94 countries (21 developed and 73 developing) over a period of 49 years (1960-2009).[5] Using a proxy for fiscal cyclicality based on correlation coefficients for time series of real government expenditures and real GDP smoothed by the Hodrick-Prescott filter, the authors were able to classify the countries according to their "ability to graduate" from fiscal pro-cyclicality. A negative (positive) correlation coefficient between the cyclical component of government spending and GDP indicates a countercyclical (pro-cyclical) fiscal policy stance. From comparing two subsequent periods using Boolean logic the authors grouped countries based on their correlation coefficients and classified them in four different categories ("graduating classes"):

i) *Established graduates* (EG) as those with countercyclical fiscal policies in the first and second periods;

[5] Their full sample was split in two sub-periods for comparison purposes (1960-1999 and 2000-2009). The series of real government expenditures was defined as central government expenditures and net lending deflated by the GDP deflator (data from International Monetary Fund, World Economic Outlook database). As explained by Frankel, Vegh, & Vuletin (2013) fiscal pro-cyclicality is studied by focusing on government spending because "tax receipts are endogenous with respect to the business cycle" (p. 32).

ii) *Recent graduates* (RG) as those with pro-cyclical policies in the first period and countercyclical in the second;
iii) *Still in school* (SS) as those with pro-cyclical fiscal policies in the first and second periods; and,
iv) *Back to school* (BS) as those with countercyclical fiscal policies in the first period and pro-cyclical in the second.

In generating graduating classes, Frankel et al. (2013) compared results on cyclicality for the period 1960-1999 versus the period 2000-2009. We are interested in understanding how the results on the number of countries classified as pro-cyclical or countercyclical may differ if one chooses a different smoothing filter or changes the window period, even by one year. The latter is based on the knowledge that the Hodrick-Prescott filter yields results (cyclical component and trend of a time series) that are notoriously affected by end-point values. In investigating these effects, we first compute fiscal cyclicality indicators under alternative approaches to the Hodrick-Prescott (HP) filter: Baxter-King (BK), Christiano-Fitzgerald (CF), Butterworth (BW) and the Harvey unobserved component model (HU). We also move the window period by one year forward and backward for all filtering techniques. As will be explained below, end-point data limitations in using the Frankel, Vegh, and Vuletin (2013) sample prevented us from replicating the filtering exercise moving the period window by one year. Hence, for this step we use an alternative dataset for real government expenditures and real GDP covering 180 countries for the period 1980-2013. Second, we apply a criterion for splitting the sample, by country, at potentially different points in time based on potential structural breaks in (per capita GDP) data. The intuition is that changes in macroeconomic policies and performance generally reflect on changes in per capita income. A structural break on the series for the latter may be indicative of changes in fiscal stance. We apply a Quandt likelihood ratio test for structural break following Quandt (1960).

In order to include a larger number of countries in the analysis, we have expanded the number of countries in our sample as compared to that in Frankel et al. (2013). Our sample includes 180 countries in total with 134 developing countries and 46 developed ones. We use data from the IMF's *World Economic Outlook* (WEO) for real GDP and for real government expenditures over the period 1980-2013.[6] With our larger sample, we compute fiscal cyclicality indicators (correlation coefficients of cyclical components of real government expenditures and real GDP) and classify countries according to their graduating class under alternative filtering methods. We divide our sample in two sub-periods (1990-2000 and 2000-2013) with the objective of observing changes in the cyclical behavior of fiscal policy over our total sample period (1980-2013).[7] Out of the 180 countries in our sample, we were able to compute fiscal policy stance proxies for both sub-periods for only 147 economies (104 developing and 43 developed). Our full results are

[6] However, we note that in the latter case, the information reported by WEO refers to General Government Net Lending (GGXCNL) defined as the difference between General Government's revenues and expenditures.
[7] We use a sub-period, 1990-2010, from the overall 1980-2013 dataset because for many countries, data on real government expenditures and / or on GDP are missing, mostly for the early 1980s. Also, some filtering techniques discard endpoint values based on user-defined parameter specification.

reported in Appendix 1 that shows the fiscal cyclicality indicator and graduating class across selected methods. Results by selected groups of countries (full sample, high income, developing) are presented in Table 1.

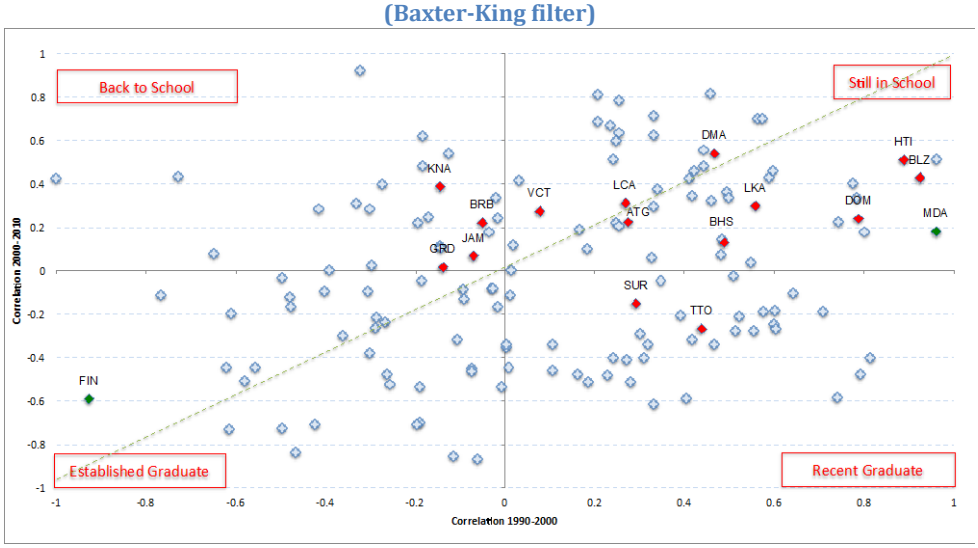
Table 1 : Number of Countries by Graduating Class for Selected Filtering Methods. From 1990-2000 vs 2000-2010 Sample

		Baxter-King		Hodrick-Prescott		Christiano-Fitzgerald		Butterworth
Full sample		**147**		**147**		**147**		**147**
Established Graduates		37		34		32		32
Recent Graduates		37		43		45		49
Back to School		24		21		22		24
Still in School		49		49		48		42
(No data in both periods)	*32*		*32*		*32*		*32*	
High Income (with data)		**43**		**43**		**43**		**43**
Established Graduates		19		16		16		12
Recent Graduates		13		12		11		18
Back to School		6		5		7		5
Still in School		5		10		9		8
(No data in both periods)	*3*		*3*		*3*		*3*	
Developing (with data)		**104**		**104**		**104**		**104**
Established Graduates		18		18		16		20
Recent Graduates		24		31		34		31
Back to School		18		16		15		19
Still in School		44		39		39		34
(No data)	*29*		*29*		*29*		*29*	
Caribbean		**14**		**14**		**14**		**14**
Established Graduates		0		0		0		0
Recent Graduates		2		3		2		5
Back to School		4		1		2		3
Still in School		8		10		10		6
(No data in both periods)	*1*		*1*		*1*		*1*	

Source: Authors' calculations based on IMF, WEO

In line with the findings of Frankel et al. (2013), our results show that irrespective of the filtering method, developing countries represent the larger share of *recent graduates* – ranging from two-thirds to three-quarters of the total of graduates (i.e., those moving from a pro-cyclical fiscal stance in the period 1990-2000 to countercyclical in the period 2000-2010). Since the number of countries moving to countercyclical fiscal policies (for all filtering methods) exceeds the number of countries classified as *back to school* (i.e., those moving from countercyclical to pro-cyclical, also for all filtering methods) the overall share of countries with countercyclical policies now rises to something between 50 and 55 percent for the sample of countries with data in both sub-periods (1990-2000 and 2000-2010).

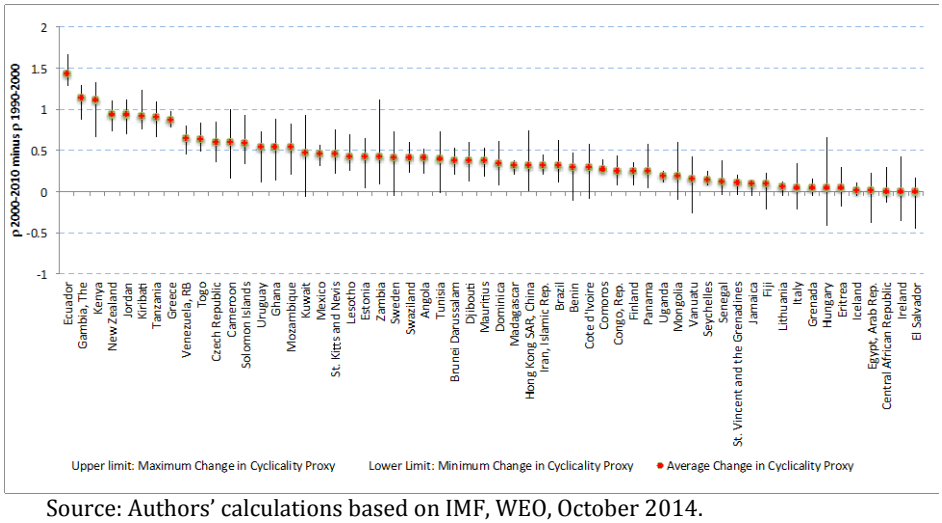
Figure 2 : Cyclicality of Real Government Expenditures. 1990-2000 vs 2000-2010. (Baxter-King filter)



Source: Authors' calculations based on IMF, WEO, October 2014.

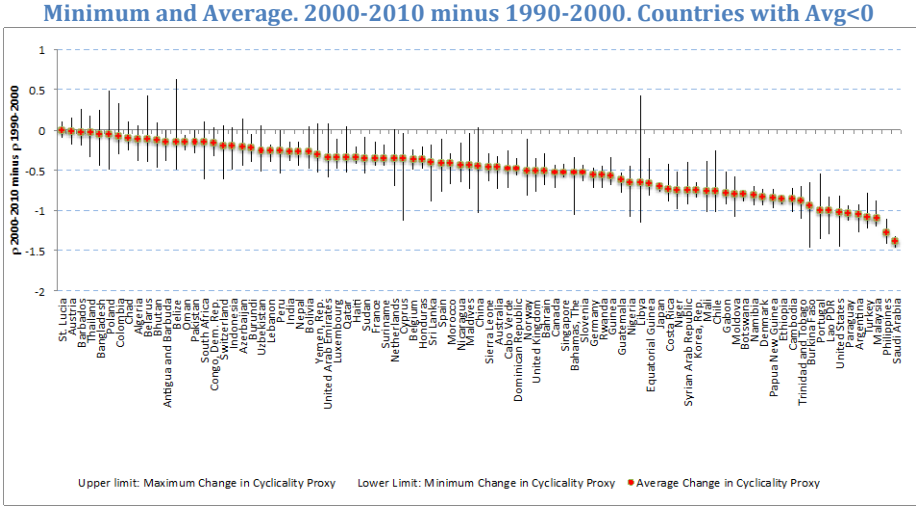
A problem with the classification of countries by graduating class is that this approach does not allow one to gauge the relative progress (regression) of countries towards a more countercyclical (pro-cyclical) fiscal stance. For instance, according to our results, Moldova made great progress in moving away from pro-cyclicality but remains classified as *still in school* in 3 of the 4 filtering methods only because of an initial (1990-2000) very high value of the correlation coefficient between the cyclical component of real government expenditures and real GDP. On the other hand, with less impressive progress in fiscal stance, Suriname became a *recent graduate* under every filtering method. Almost half of the Caribbean countries that remain pro-cyclical across periods (*still in school*) were in fact less so in the 2000-2010 decade (Figure 2).

Figure 3 : Change in Fiscal Cyclicality Proxy Across Selected Methods: Maximum, Minimum and Average. 2000-2010 minus 1990-2000. Countries with Avg>0



Source: Authors' calculations based on IMF, WEO, October 2014.

Figure 4 : Change in Fiscal Cyclicality Proxy Across Selected Methods: Maximum, Minimum and Average. 2000-2010 minus 1990-2000. Countries with Avg<0



Source: Authors' calculations based on IMF, WEO, October 2014.

In Figure 3 we order the countries that showed an increase (decrease) in correlation coefficient between sub-periods 1990-2000 and 2000-2010, that is, a worsening (improvement) of their fiscal stance. The figures show the maximum, minimum and average change in fiscal cyclicality across filtering methods.[8] Many countries that showed a worsening (improvement) in their fiscal stance are in fact countercyclical (pro-cyclical). In particular we note that a country that was highly countercyclical (pro-cyclical) in the first period, such as Finland (Moldova) would have very little room to become even more countercyclical (pro-cyclical) given the range of possible values for the correlation coefficient (-1, 1) used as proxy for a country's fiscal stance. This is an issue we come back to in analyzing determinants of changes in fiscal stance for a panel of countries.

By looking at changes in the value of the correlation coefficient of real government expenditures and real GDP in 2000-2010 versus 1990-2000 (instead of graduating classes) we see that 59 out of 104 developing countries (56.7 percent) with data for both sub-periods improved their fiscal stance. In addition, 30 out of 43 developed countries (69.7 percent) also improved their fiscal stance. This shows a greater *relative* progress towards counter-cyclicality among developed economies compared to developing countries. Nevertheless, our results show that both developing *and* developed economies have moved away from pro-cyclicality.

In the Caribbean, we observe a worsening in fiscal stance for countries such as St. Kitts and Nevis, Dominica, St. Vincent and the Grenadines, Jamaica and Grenada (Appendix 1).[9] An improvement in fiscal stance is registered, under all filtering methods,

[8] The average corresponds to the mean value of the correlation coefficient between periods. It has no particular significance and is used as a loose criterion to separate countries that made progress in fiscal stance.

[9] In the first two cases a worsening of the fiscal stance is registered under all filtering methods. For the rest, a worsening is recorded for 3 out of 4 methods.

for Antigua and Barbuda, The Bahamas, Dominican Republic, Haiti, Suriname and Trinidad and Tobago.

The evidence we have assembled shows how the results on graduating class differ across methods (see Figures 3 and 4) From the sample of 147 countries with data on cyclicality for both periods (1990-2000 and 2000-2010) only about half fall under the same graduation class for every filtering method. In a few countries, more than 2 graduating classes are reported.[10] In several cases, significant differences in correlation coefficient values, by country and periods, are reported across methods. In view of this, we turn next to the definition of a set of objective criteria that could be followed to avoid this ambiguity.

The choice of one method over another is an empirical question that needs to be answered based on the primary reason as to why we are conducting a filtering exercise in the first place, and how this relates to the nature of the filtering technique. In the present case, we wish to extract cyclical components of two macroeconomic series, and to compute correlation coefficients of the two cyclical components over selected periods of time. Based on period results, countries are then classified based on their degree of fiscal policy cyclicality. Now, even though it is natural to expect a change in the resulting country classification by moving the selected period even by one year, we would like the changes to be associated with "true" shifts of cyclical trends of real government expenditures in relation to real GDP. From a given filtering technique it is not possible to tell whether the changes in correlation coefficients occur as a result of the choice of filter or any other reason. In that regard, we argue that the following empirical properties should be observed when selecting alternative filtering methods:

1) Persistence or inertia of correlation results: In the case of a very small change in the period window (1-year), one should prefer the method with higher inertia. That is, the one that yields the highest correlation for the set of pairs of values of fiscal stance indicators (the correlation coefficients of cyclical components of real government expenditures and real GDP).[11] This is shown in Table 2.

Table 2 : Correlation of Correl. Coeff. between Gov't Exp and GDP across countries, by Method

	Hodrick Prescott	Baxter King	Christiano-Fitzgerald	Butterworth
1990-2011 vs 1991-2012	0.960	0.975	0.957	0.959
1990-2011 vs 1989-2010	0.946	0.973	0.946	0.955
1990-2000 vs 1991-2001	0.879	0.941	0.874	0.855
1990-2000 vs 1989-1999	0.911	0.934	0.895	0.901
2000-2010 vs 2001-2011	0.926	0.952	0.850	0.908
2000-2010 vs 1999-2009	0.856	0.944	0.903	0.836

Source: Authors' calculations based on IMF, WEO

2) By the same token, one should prefer the method that registers the lowest (absolute) change in country correlation coefficient from moving the period window by one year. This

[10] Such as, for example, Bangladesh, Bhutan, Eritrea and Uganda

[11] Note we are referring to the following: $\rho_{\rho_{T_0-T_t},\rho_{T_1-T_{t+1}}}$

is shown in Table 3.

Table 3 : Largest (absolute) change in Country Correl. Coefficient of Gov't Exp. And GDP, by

	Hodrick Prescott	Baxter King	Christiano-Fitzgerald	Butterworth
1990-2011 vs 1991-2012	0.705	0.419	0.702	0.493
1990-2011 vs 1989-2010	0.962	0.480	1.045	0.576
1990-2000 vs 1991-2001	1.055	0.574	0.960	1.116
1990-2000 vs 1989-1999	0.602	0.536	0.799	0.677
2000-2010 vs 2001-2011	0.645	0.591	1.541	1.076
2000-2010 vs 1999-2009	1.567	0.786	0.723	0.955

Source: Authors' calculations based on IMF, WEO

3) Furthermore, we would also like to see some inertia in the graduating class from moving the period window by one year, that is, we should prefer a method with the lowest number of countries changing their graduating class by moving the period window by one year. Results are shown in Table 4.

Table 4 : Number of Countries Changing Graduating Class, by Method

	Baxter-King	Hodrick-Prescott	Christiano-Fitzgera	Butterworth
1990-2000 / 2000-2010 vs 1989-1999 / 1999-2009	30	33	43	41
1990-2000 / 2000-2010 vs 1991-2001 / 2001-2011	21	41	44	37

Source: Authors' calculations based on IMF, WEO

The exercises reported in Tables 2-4 give an idea of the sensitivity of the results on fiscal cyclicality to changes in method and time periods and provide the empirical basis for selecting a more desirable filtering method for empirical analysis on the determinants of cyclicality. In all cases, we acknowledge, we are favoring the hypothesis that changes in correlation coefficients from moving the window period by one year are more linked to differences in the ability of filtering methods to separate noise from cyclical and trend components in data; and not differences in their intrinsic ability to quickly pick changes in the cycle. Based on this premise, we observe that the Baxter-King filtering method yields more desirable outcomes.

These results are not coincidental and not really unexpected. By construction one can expect more inertia of results for the Baxter King filter, mainly for two reasons: first, because being a band pass filter, BK is able to subtract noise from the cyclical component of the series; second, because the method of computing BK involves discarding endpoint values of the series.[12] This can be seen as an advantage when the noise and endpoint values could be reason of changes in cyclical components and in the trend.

3.1 Splitting the sample based on country-specific information

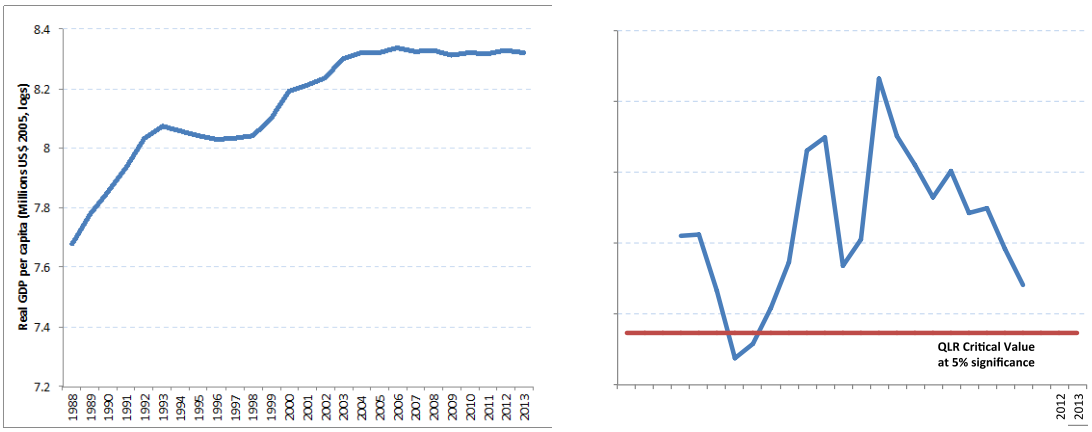
Our next objective is to take into account country-specific information in the choice of the sub-periods that we use to calculate the correlation coefficients. We believe that there is a gain in accuracy by choosing a country-specific criterion for splitting the series of government expenditures and GDP in different sub-periods for comparison purposes. Ideally, one should be familiar with a country's socio-economic performance and policies over the relevant period of time in such a way that it would

[12] Two or three depending on user criteria.

allow the researcher to make a more informed decision as to what would be the rationale to split the sample. Such country-specific, informed decisions, however, tend to be well beyond the scope of empirical work that deals with a large number of economies. Yet, one may be able to use a more specific criterion that avoids an *ad hoc* approach that simply splits the sample at the same point in time for all countries.

Our proposed criterion is to use tests for structural breaks in the series of real GDP per capita. Our premise is that structural breaks in that series may be associated with significant changes in economic policy, an external or internal socio-economic shock, or some other event that could involve a shift in a country's fiscal stance. To test for the structural breaks in the real GDP per capita series we apply the Quandt likelihood ratio (QLR) test. The QLR or sup-Wald statistic is a modified version of the Chow test used for identifying break dates.[13] As an example, Figure 5 shows the evolution of the series of real GDP per capita for Belize over the period 1988-2013 and the QLR test values and critical value at 5%, following Andrews (1993) and Andrews & Plogeber (1994). A maximum (and significant) value for the test is found at year 2002. This is used as cutoff criteria for breaking the series of real government expenditure and real GDP and computing correlation coefficients and the country's graduating class. The same procedure was applied for all countries in our sample.[14]

Figure 5 : Belize: Real GDP per capita, in logs, 1988-2013 (left) and Quandt Likelihood Ratio for Real GDP per capita, in logs, 1988-2013 (right)



Source: Authors' calculations based on World Bank, WDI, and Andrews & Plogeber (1994).

The results on the status of the fiscal policy stance and graduating class based on a country-specific approach to split the sample in different sub-periods are discussed next. We first look at changes in the cyclicality stance across country-

[13] Likelihod ratio tests are applied to the specification: $lypc_t = \alpha_0 + \alpha_1 \times lypc_{t-1}$ at every point in time for the period 1990-2013 for a particular country ($lypc_t$ is a country's per capita real GDP in year t, in logs) . Structural breaks correspond to the years that yield the maximum value for the QLR test. Comprisons to critical values are made based on Andrew (1993) and Andrews & Plogeber (1994).

[14] A practical problem emerges when structural breaks according to the QLR test are found in early late years of the series, which implies a very small number of observations for computing sub-period correlation coefficients. In these cases, we applied the following criteria for the 1988-2013 series: when a country's structural break occur in year 1995 or earlier (2006 or later), we use 1995 (2006) as the cutoff year.

specific sub-periods, following the classification proposed by Frankel et al. (2013). Next, we move on to a more generic appraisal of changes in the countries' fiscal stance, also across country-specific sub-periods. Finally, we introduce an alternative way of looking at the countries' fiscal stance by differentiating how countries perform at different stages of the business cycle.

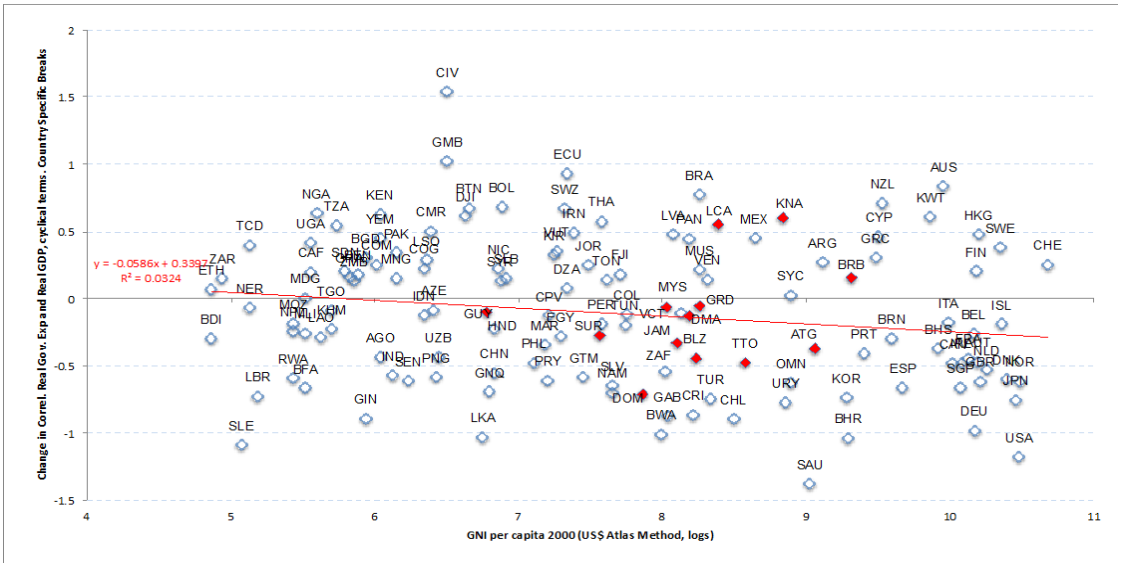
As in Frankel et al. (2013), we were able to document that a sizable number of developing countries are graduating from fiscal policy pro-cyclicality. This is based on the number of developing countries shifting from a pro-cyclical to a countercyclical fiscal stance between country-specific defined periods (between 22-25 percent of developing countries, depending on the filtering method), relative to the number of countries falling back into pro-cyclical fiscal policies (17-19 percent of developing countries classified as *back to school*). However, our evidence on developing countries graduating from pro-cyclicality is weaker now than when the sample is divided uniformly (same year) for all countries. This is visible by comparing results in Table 5 with those reported in Table 1. In fact, based on the criterion that splits the series on a country-specific basis, the ratio of developed countries graduating from pro-cyclicality (in the range of 26-34 percent of high income countries with data, depending on the filtering method) is higher than that of developing economies. Figure 6 supports that observation.

Table 5 : Graduating Class for Selected Filtering Methods. Country-Specific Series Break

		Baxter-King	Hodrick-Prescott	Christiano-Fitzgerald	Butterworth
Full sample		**140**	**140**	**140**	**140**
Established Graduates		30	28	26	33
Recent Graduates		37	35	34	39
Back to School		23	22	22	24
Still in School		50	55	58	44
(No data in both periods)	*39*	*39*	*39*	*39*	
High Income (with data)		**38**	**38**	**38**	**38**
Established Graduates		13	14	14	15
Recent Graduates		13	10	11	13
Back to School		3	3	4	4
Still in School		9	11	9	6
(No data in both periods)	8	*8*	*8*	*8*	
Developing (with data)		**102**	**102**	**102**	**102**
Established Graduates		17	14	12	18
Recent Graduates		24	25	23	26
Back to School		20	19	18	20
Still in School		41	44	49	38
(No data)	*31*	*31*	*31*	*31*	
Caribbean		**15**	**15**	**15**	**15**
Established Graduates		1	1	1	3
Recent Graduates		4	4	4	3
Back to School		1	2	3	2
Still in School		9	8	7	7
(No data in both periods)	*0*	*0*	*0*	*0*	

Source: Authors' calculations based on IMF, WEO

Figure 6 : Midpoint GNI per capita (2000) vs Avg. Change in Fiscal Cyclicality. Country Specific Breaks.

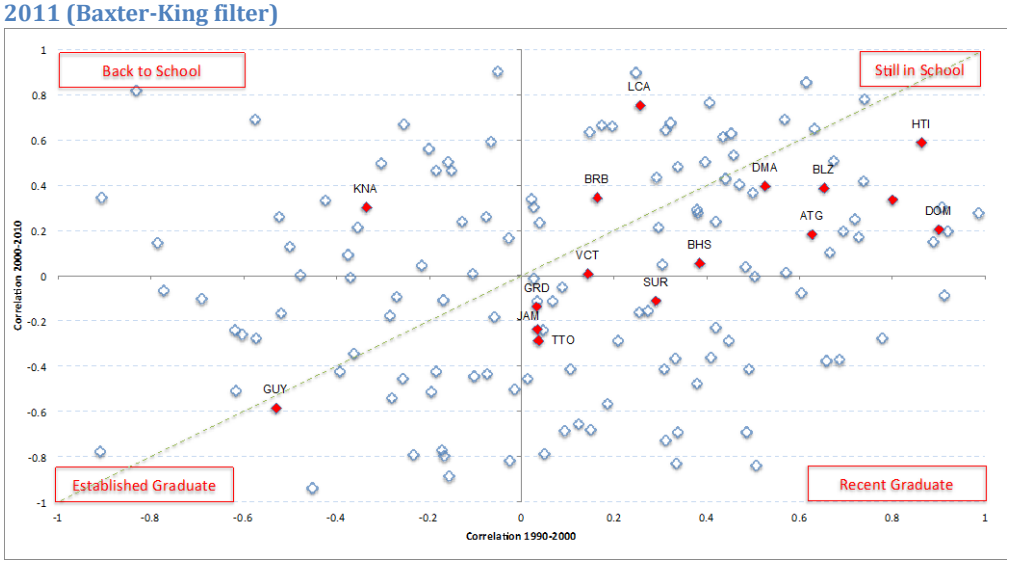


Note: The chart plots changes in the fiscal cyclicality proxy across countries based on country-specific breaks. We subtract the value for the final period from the value for the initial period, so a positive change is indicative of a movement towards pro-cyclicality. *Source*: Authors' calculations based on IMF, WEO and World Bank, WDI

Regarding the Caribbean countries, this approach yields one country actually classified as an *established graduate* (Guyana, according to all filtering methods) and 3-4 countries moving away from pro-cyclical to countercyclical policies, compared to 1-3 countries falling back into pro-cyclical fiscal policies.[15] When one looks at changes in correlation coefficients (not the Boolean classification of countries in graduating classes), the evidence on Caribbean countries moving away from pro-cyclical fiscal policies is more compelling under this country-specific approach. Twelve out of fifteen economies show a declining correlation coefficient for the fiscal stance proxy based on the Baxter-King filter (see Figure 7).

[15] Only Jamaica and Trinidad and Tobago are *recent graduates* under all filtering methods; and only St. Kitts and Nevis is consistently *back in school* for all methods.

Figure 7 : : Cyclicality of Real Government Expenditures. Country-SpecificYear Breaks. 1990-2011 (Baxter-King filter)



Source: Authors' calculations based on IMF, WEO, October 2014.

4. Does it really pour when it rains?

An idea put forward by Kaminsky, Reinhart, & Végh (2004) was that, for developing countries, and in particular for upper middle-income countries, macroeconomic policies and in special fiscal policy tend to reinforce the business cycle (the when-it-rains-it-pours syndrome). They found evidence in support of that by looking at a sample of 104 countries over the period 1960-2003 and were able to show that in contrast to that behavior OECD countries seemed to orient their macroeconomic policies at stabilizing the business cycle. We now turn our attention to the same empirical question and with the objective of assessing if the when-it-rain-it-pours phenomenon remains relevant over the most recent period.

We make two implicit assumptions as to why countries change their fiscal stance. First, we consider that changes are generally not random. That they are mostly associated to policy shifts within given administrations, which may or may not be politically motivated (as incumbent administrations tend to spend more ahead of elections), or across administrations after elections, influenced by ideological principles. Second, we assume that they are generally driven or motivated by observed trends in economic activity and not the other way around.[16] This assumption is not uncontroversial. For instance, Rigobon (2004) argues that fiscal policy shocks drive output and not the other way around, while Ilzetzki & Vegh (2008), on the other hand, find causality running both ways.

Keeping these assumptions in mind we proceed to re-compute correlation coefficients for the fiscal cyclicality proxy for the period 1990-2011 by differentiating what happens in fiscal policy in different parts of the business cycle. It may be the case that a country's average fiscal stance within a period differs during years of expansion compared to that adopted in years of downturn in economic activity. Countries that are, on average, pro-

[16] See, for instance, Kaminsky, Reinhart, & Végh (2004).

cyclical in booms and downturns, would tend to exacerbate their business cycle; those that are countercyclical in both, booms an downturns, have a fiscal policy that contributes to stabilize the cycle.[17]

But countries may not be always pro-cyclical or countercyclical. Whenever a country exhibits an average countercyclical fiscal stance in booms, and a pro-cyclical stance in downturns, other things equal, it will likely improve its medium to long term fiscal sustainability profile.[18] A country that is pro-cyclical in booms and countercyclical in downturns would, *ceteris paribus*, deteriorate its fiscal sustainability profile. Figure 8 plots the value of the fiscal stance proxy in periods of expansion (when the cyclical component of real GDP are positive) versus that registered in downturns. High-income countries are those in red while developing economies are in blue.[19] By quadrants, we identify four groups of countries:

- Upper right quadrant: Those that exhibit pro-cyclical fiscal policies in both booms and downturns. Other things equal, such stance contributes to exacerbate output volatility. Not surprisingly, one finds many resource-rich economies in this category. In addition, many upper middle-income countries appear in prominently in that group.
- Upper left quadrant: Those that exhibit countercyclical fiscal policies in booms and pro-cyclical fiscal policies in downturns. Other things equal, such fiscal behavior improves a country's fiscal sustainability profile.
- Lower left quadrant: Those that exhibit countercyclical fiscal policies in both booms and downturns. Other things equal, such stance contributes to stabilize output around its long-term trend. Expectedly, most of high-income countries fall under this category.
- Lower right quadrant: Those that exhibit pro-cyclical fiscal policies in booms and countercyclical fiscal policies in downturns. Other things equal, such behavior deteriorates a country's fiscal sustainability profile.

A simple visual inspection of Figure 8 seems to lend support to the when-it-rains-it-pours phenomenon. Most of the countries in the upper and lower right quadrants of the chart are developing economies (in blue) and most importantly upper middle-income countries and many resource-rich countries. In contrast to that, most of the high income countries appear on the upper and lower left quadrants with fiscal stances that largely contribute to long-term fiscal sustainability. Appendix 3 summarizes the fiscal cyclicality proxy in booms and downturns based on the Baxter-King filter, together with country

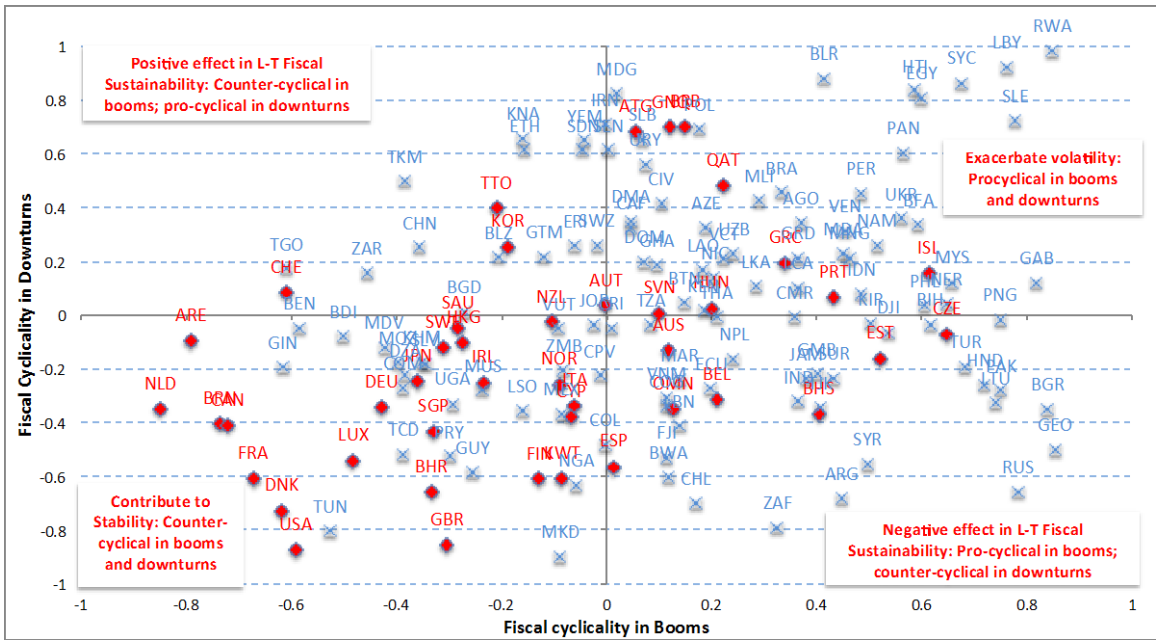
[17] Of course, there are other sources of volatility, so a country with countercyclical fiscal policies may experience a higher output volatility than that of fiscally pro-cyclical economies.

[18] As explained in Villafuerte, Lopez-Murphy, & Ossowski (2010) analyses of fiscal sustainability often focus on a comparison between the observed cyclically-adjusted primary balance against a debt-stabilizing primary balance. This approach is combined with a "reasonable" objective for the debt to GDP ratio (debt tolerance). Of course, the idea that a country improves its fiscal balance by being countercyclical in booms and pro-cyclical in downturns implicitly assumes a more than proportional change in government revenues to changes in GDP (Buoyancy).

[19] World Bank classification. The sample includes 156 countries after dropping countries with less than 5 observations available when the cyclical component of real GDP is >0 or less than 5 observations available when the cyclical component of real GDP is <0.

classifications (by region, income group and fiscal stance around the cycle) for 156 countries.

Figure 8 : Fiscal Cyclicality in Booms and Downturns (1990-2011, based on Baxter-King Filter)



Source: Authors' calculations based on IMF, WEO, October 2014.

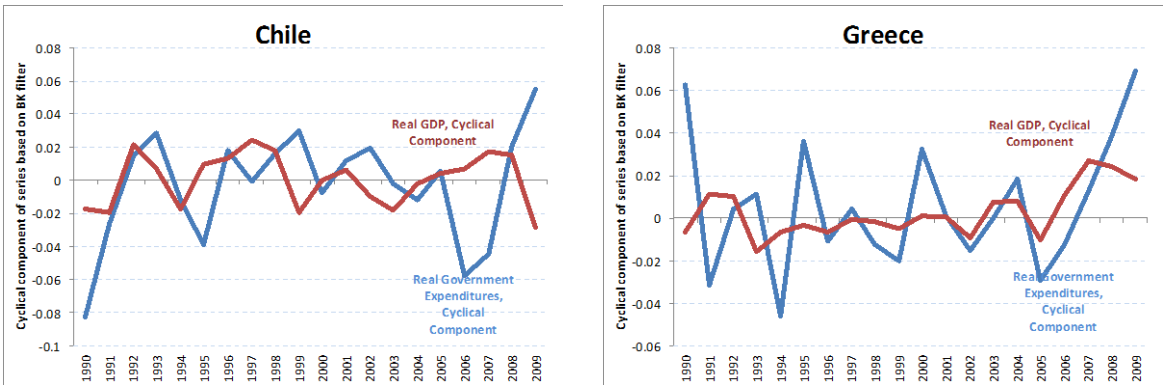
Some of the results in Figure 8 may seem counter-intuitive. For instance, one may be surprised to see Chile, a country that has earned a reputation of fiscal prudency and good overall macro management, in the fourth quadrant of Figure 8, which indicates risks to fiscal sustainability. As it turns out, Chile is, on average, for the period 1990-2011, moderately pro-cyclical in booms (based on the Baxter-King filter; but when one uses the Hodrick–Prescott filter it is counter-yclical) and markedly anti-cyclical in downturns. Their ability to sustain a strong fiscal position arises from having a system of buoyant tax revenues and the great contribution of the private sector to economic activity, so the country is able to register solid, positive fiscal balances both in booms and recessions with marked improvements in its overall fiscal stance (Table 6). So Chile remains pretty much among the good guys. Compare this performance with that for Greece, for example, especially during the post-financial crisis period when it showed deteriorating fiscal balances, faster increase in expenditures relative to revenues, and poor economic performance, with an exacerbated contribution to volatility derived from a more pro-cyclical fiscal stance. In addition, Figure 9 plots the cyclical component of real government expenditures and GDP for selected countries shows Chile becoming actually countercyclical in booms in the 2000s, after formalizing in 2001 a fiscal rule that "has become a model for other countries".[20] Greece, on the other hand remained pro-cyclical and even more so in the 2000s.With this, there is no doubt that Greece has yet to earn enough stars to join the same status as Chile's.

The bottom line is that fiscal stance proxies, alone, and together with other fiscal

[20] See IMF (2014).

indicators, provide initial insights on fiscal sustainability. In many cases, the countries macro fiscal story is fully represented by the former (Austria, China and France, in Table 6); in few others such as Brazil and República Bolivariana de Venezuela more elements (such as the role of savings and investment for growth, in the former, and the acute dependency on oil revenues, in the latter) need to be brought into the picture.

Figure 9 : Cyclical Components of Real Government Expenditures and GDP. Chile and Greece



Source: Authors' calculations based on IMF, WEO, October 2014.

Table 6 : Government Revenues, Expenditures, Balance, Graduating Class, Change in Fiscal Stance and GDP growth by periods[1]

	Year of	First Period (1990 to Year of Break)				Second Period (Year of Break+1 to 2011)				Graduating	Change in Fiscal
Country	Break*	Gov. Revenues	Gov. Expend.	Balance	GDP growth	Gov. Revenues	Gov. Expend.	Balance	GDP growth	Class	Stance Proxy(**)
Austria	2005	50.5	53.3	-2.9	1.9	48.2	50.6	-2.4	1.05	RG	-0.47
Brazil	2005	33.7	38.4	-4.7	2.6	36.0	38.9	-2.9	4.08	BS	0.95
Chile	2005	22.7	21.8	0.9	4.1	24.7	21.9	2.7	3.08	RG	-1.03
China	1995	13.6	14.7	-1.1	10.4	17.7	19.0	-1.3	8.58	EG	-0.20
France	2005	49.1	52.5	-3.4	1.3	50.2	54.6	-4.4	0.18	EG	-0.49
Greece	2005	36.6	44.1	-7.5	2.3	40.5	49.4	-8.9	-2.17	SS	0.27
Venezuela, RB	2003	29.6	31.1	-1.5	-1.5	30.4	35.2	-4.8	4.38	SS	0.17

(*) Based on structural break of real GDP series in logs (test of break for real GDP growth rate)
(**) Using the Baxter-King filter.
(1) Revenue consists of taxes, social contributions, grants receivable, and other revenue (Line GGR_NGDP in WEO). Total expenditure consists of total expense and the net acquisition of nonfinancial assets (Line GGX_NGDP in WEO).
Source: IMF, World Economic Outlook and Authors' calculations.

However informative our results are, they are not sufficient to identify the main determinants of a country's change in fiscal cyclical stance over time. A number of authors have tried to address this in the literature for different country samples, using different cyclicality proxies and different time periods, with –expectedly- mixed results (Alesina & Tabellini (2005), Park (2012), Mpatswe, Tapsoba, & York (2011), Villafuerte, Lopez-Murphy, & Ossowski (2010)). More recently, Frankel, Vegh, and Vuletin (2013) have considered several alternative theories regarding the cyclicality of fiscal policy and investigated the role played by institutional quality on a country's ability to graduate from pro-cyclicality. Controlling for potential endogeneity problems in the relationship between institutional quality and a country's fiscal stance, they found evidence suggesting that the quality of institutions is an important determinant of fiscal cyclicality even after controlling for other possible determinants including financial depth, financial integration, variability of tax revenues, political fragmentation, and the effect of reserves and imports ratios on fiscal behavior.

5. Empirical Determinants of Fiscal Cyclicality

Following the approach proposed by Frankel, Vegh, & Vuletin (2013), we turn now to the investigation of the determinants of cyclicality under alternative methods for measuring the degree of cyclicality of a country's fiscal stance under different specifications.[21] In doing so, we are in fact checking the robustness of Frankel et al.'s results, which we fortunately have been able to confirm. We are also interested in checking whether such robust results hold for our expanded and more up to date sample of countries, as well as for the cases in which the series are split based on our country-specific (per capita GDP) criterion. Finally, as will be explained below, we introduce an alternative proxy for institutional quality based on Kunčič (2013), in addition to that proposed by Frankel, Vegh, & Vuletin (2013). Our objective is to observe whether their empirical results hold under these alternative proxies as well.

The econometric specifications under consideration are:[22]

$$g^c_{i,t} = \alpha_1 + \alpha_2 \times y^c_{i,t} + \alpha_3 \times \left(y^c_{i,t} \times IQ_{i,t}\right) + IQ_{i,t} + \eta_i + \varepsilon_{i,t} \qquad (1)$$

This is a country panel fixed effects specification (country "i" and year "t") linking the cyclical component of real government expenditures ($g^c_{i,t}$) to the cyclical component of real GDP ($y^c_{i,t}$) and a proxy for institutional quality ($IQ_{i,t}$). The interaction variable is meant to show how institutional quality increases (a positive sign for α_3, in the event of $\alpha_2>0$) or decreases ($\alpha_3<0$, in the event of $\alpha_2>0$) fiscal pro-cyclicality.

$$g^c_{i,t} = \alpha_1 + \alpha_2 \times y^c_{i,t} + \alpha_3 \times \left(y^c_{i,t} \times IQ^{initial}_{i,t}\right) + \alpha_4 \times \left(y^c_{i,t} \times \Delta IQ_{i,t}\right) + \alpha_5 \times IQ^{initial}_{i,t} + \alpha_6 \Delta IQ_{i,t} + \eta_i + \varepsilon_{i,t} \qquad (1)$$

In this panel case, the role of initial institutional quality ($IQ^{initial}_{i,t}$) and changes of the variable ($\Delta IQ_{i,t}$) are assessed separately. One expects both signs of the parameters of the interaction terms included in the equation, α_3 and α_4, to be negative and significant in explaining the relationships between cyclical components of real government expenditures and real GDP (in the event of $\alpha_2>0$).

$$g^c_{i,t} = \alpha_1 + \alpha_2 \times y^c_{i,t} + \alpha_3 \times \left(y^c_{i,t} \times IQ_{i,t}\right) + IQ_{i,t} + \alpha_q \times Z_q + \eta_i + \varepsilon_{i,t} \qquad (2)$$

This panel equation includes a vector Z of "q" additional controls for looking at possible omitted variable bias problems. One expects to observe significant values for the institutional quality variable after controlling for the variables included in Z_q vector.

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[21] We would like to acknowledge that the authors have kindly shared their dataset so that we could use it in this exercise.

[22] In as much as possible we try to keep the same notation as in Frankel, Vegh, & Vuletin (2013) to ease the comparability of methodologies and results.

$$\rho_i^{avg} = \alpha_1 + \alpha_2 \times IQ_i^{avg} + \alpha_q \times Z_q + \eta_i + \varepsilon_i \quad (3)$$

Equation 3 is a cross section specification where the dependent variable (ρ_i^{avg}) is the correlation coefficient of real government expenditures and real GDP for a given time period. The specification is first computed including the average value of the institutional quality variable (IQ_i^{avg}) for the same period as sole control, and then adding additional explanatory variables (vector Z). Again, the value for α_2 is expected to be negative and statistically significant.

In all cases, the exercises are conducted for the alternative definitions of fiscal cyclicality, namely, using the Hodrick-Prescott, Baxter-King, Christiano-Fitzgerald and Butterworth filters.

The specifications are applied for the following periods and samples:

i) First, for the period 1984-2009, using the Frankel, Vegh, & Vuletin (2013) sample of real government expenditures and real GDP, as well as the set of controls identified by the authors, including the institutional quality proxy, based on International Country Risk Guide (ICRG) data.[23] Results are summarized in Appendixes 3-5.

ii) Next, for the period 1990-2011, using a sample of 180 countries and including the same controls defined by Frankel, Vegh, & Vuletin (2013). A problem we find is that of availability of data for the ICRG variable. In particular, the source includes information for 138 countries up to 2010. To get around this limitation, we include econometric results using an alternative proxy for IQ based on Kunčič (2013), which is available for 193 economies for the period 1990-2011. This is also motivated out of our interest to test whether results found by Frankel, Vegh, & Vuletin (2013) are robust to the choice of IQ variable and hold for a different (larger) country sample.[24] These results are summarized in Appendixes 6-8.

iii) Third, we present results for additional specifications, not included in Frankel, Vegh, & Vuletin (2013), and consider additional controls, to be defined and explained below. Results are presented in Appendixes 9 and 10.

In what follows, we report the results of a robustness analysis for Frankel, Vegh, & Vuletin (2013). We note that while the sample of real government expenditures and real GDP covers the period 1960-2009 (with different data availability per country) the econometric analysis must be restricted to the period 1984-2009 for which data on the IQ variable is available. Our results confirm the

[23] While the data on real government expenditures and real GDP was kindly provided by Frankel, Vegh, & Vuletin (2013), we compiled the remaining information from the original sources.

[24] An additional reason for using the Kunčič (2013) dataset is that it includes data on the IQ proxy for 14 out of 15 Caribbean countries that are of special interest in this research, whereas ICRG data only covers 6 of those countries.

findings by Frankel, Vegh, & Vuletin (2013) regarding the sign and significance of the institutional quality variable, considering alternative definitions of fiscal cyclicality, either on average for the full period 1984-2009 (Equation 1, Appendix 3), or for both, initial and changes in institutional quality (Equation 2, Appendix 3). The institutional quality variable remains significant even after including other controls (Equation 3, Appendix 4). Our analysis also confirms the significance of institutional quality in explaining the value of the fiscal cyclicality proxy for the period 1984-2009 under the cross-country specification in (Equation 4, Appendix 5) for alternative filtering methods.

Now we investigate whether the empirical results by Frankel, Vegh, & Vuletin (2013) hold for a larger sample of countries and a longer time period. Appendix 7 summarizes results for panel specifications about the role of institutional quality on the relationship between the cyclical component of real expenditure and real GDP (Equation 1), as well the differential impact of initial institutional quality and changes in institutional quality compared to the initial value of the variable, by country (Equation 2). One can observe that IQ is strongly significant as an explanatory variable of movements away from cyclicality for all specifications using ICRG as a proxy for IQ and for all but one specification that rely on the Kunčič (2013) dataset, following Equation 1. When we separate the effects of initial IQ from changes in IQ (Equation 2) we observe that the former variable is strongly significant under all filtering methods when using ICRG as proxy for IQ, but less so in the specifications using Kunčič (2013) data. On the other hand, the latter specifications show higher statistical significance for the changes in IQ compared to the former.

Appendix 8 summarizes results for the same panel specification now expanded to account for the role of additional controls (Equation 3). One can observe how robust the significance of IQ is when ICRG is used as a proxy under all filtering methods. Appendix 9 presents cross-country results for the period 1990-2011 correlation between cyclical components of real government expenditures and real GDP as a function of average IQ and average values for other controls, as in Frankel, Vegh, & Vuletin (2013) following Equation 4. This specification also shows robust results for institutional quality under all filtering methods and for alternative IQ definitions.

5.1 An alternative specification

In an innovation to the empirical approach of Frankel et al. (2013), we include "q" additional controls (Vector Z_q), as shown in Equation 4 below.

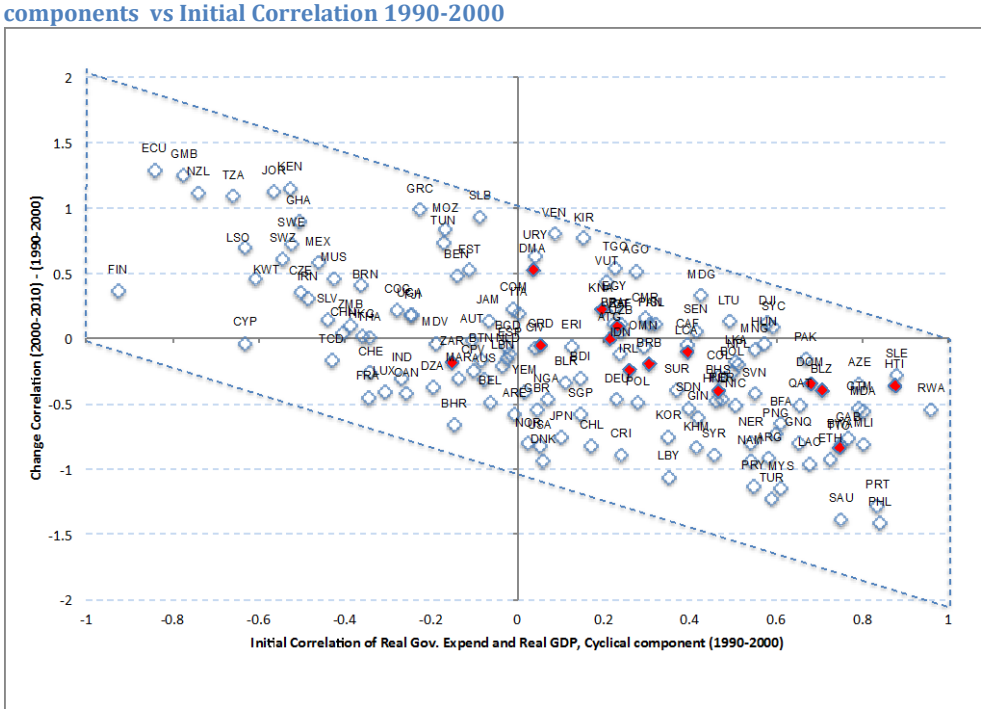
$$g^c_{i,t} = \alpha_1 + \alpha_2 \times y^c_{i,t} + \alpha_3 \times \left(y^c_{i,t} \times IQ^{initial}_{i,t}\right) + \alpha_4 \times \left(y^c_{i,t} \times \Delta IQ_{i,t}\right) + \alpha_5 \times IQ^{initial}_{i,t} + \alpha_6 \Delta IQ_{i,t} + \boldsymbol{\alpha_q} \times \boldsymbol{Z_q} + \eta_i + \varepsilon_{i,t} \quad (4)$$

Results are shown in Appendix 9, again for alternative filtering methods and alternative IQ variables and confirm the role institutional quality as a robust determinant of fiscal counter-cyclicality.

Finally, we include another specification based on the observation that changes in a country's fiscal stance are dependent on initial conditions. A country that is highly pro-cyclical (countercyclical) in a given time period has more room to become countercyclical (pro-cyclical) than to become even more pro-cyclical. Specifically, since a correlation coefficient is by definition limited to a variation in the range [-1,1], countries that have extreme initial correlation values ($|\rho_0| \to 1$) can observe large subsequent changes in their fiscal stance ($|\Delta\rho|$ can take values up to 2) relative to countries that are nearly a-cyclical [$\rho_0 \sim 0$]. The latter would be able to register a $|\Delta\rho|$ not much larger than 1. Figure 10 shows changes in the fiscal stance across periods in relation to initial correlation of real government expenditures and GDP across countries. We include a 2-period panel for the change in the value of the proxy for fiscal stance. In this case, the fiscal stance proxy is computed for two sub-periods (with country-specific breaks). This is shown in Equation 5 below. Results are shown in Appendix 10 and confirm that initial institutional quality still matters. The evidence for the relevance of changes in IQ is less compelling.

$$\Delta\rho_i = \alpha_1 + \alpha_2 \times \rho_i^{initial} + \alpha_3 \times IQ_i^{initial} + \alpha_4 \times \Delta IQ_i + \alpha_q \times Z_q^{initial} + \beta_q \times Z_q + \eta_i + \varepsilon_i \qquad (5)$$

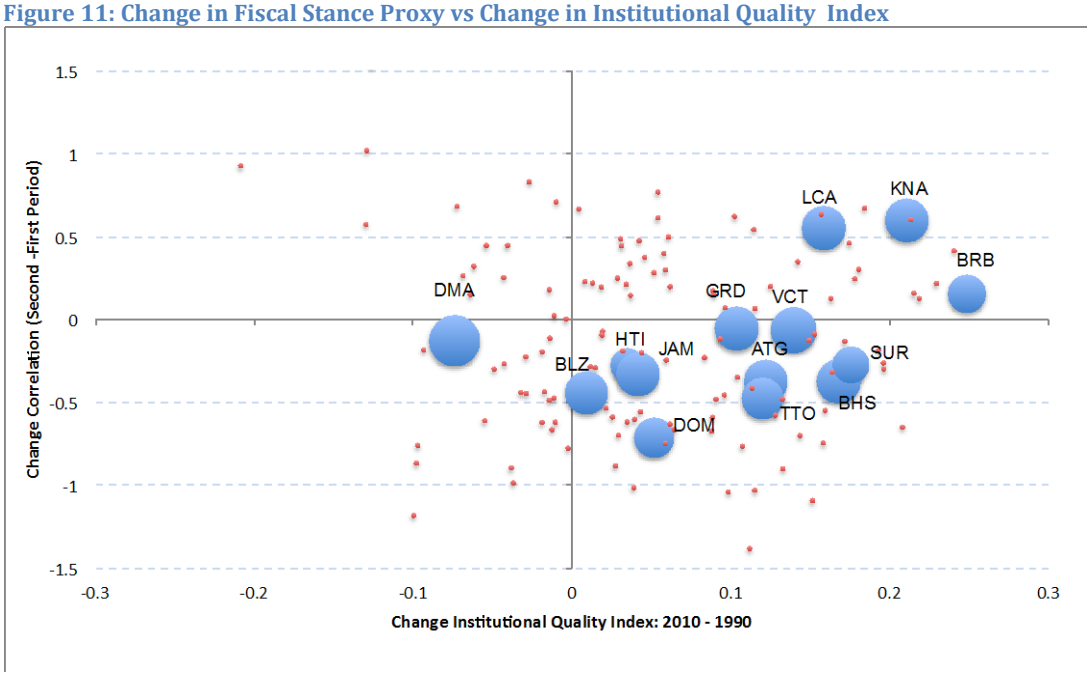
Figure 10 : Change in Correlation Real Gov. Expenditures and Real GDP, Cyclical components vs Initial Correlation 1990-2000



Note: A negative change in the change in correlation coefficient indicates a move towards a countercyclical stance. *Source*: Authors' calculations based on IMF, WEO, October 2014

Overall, our findings confirm the relevance of institutional quality (and especially of *initial* high quality of institutions) for a country's ability to move to countercyclical fiscal policies in the larger, updated sample. However, for the sub-sample of Caribbean countries, the evidence in that regard is more mixed. The three Caribbean countries that became more pro-cyclical (St. Kitts and Nevis, St. Lucia and Barbados) are among those with the highest improvement in institutional quality (see Figure 11).[25]

Figure 11: Change in Fiscal Stance Proxy vs Change in Institutional Quality Index



Note: A positive change in correlation indicates the country has become more pro-cyclical. The size of the bubbles indicate the initial quality of institutions. *Source*: Authors' calculations based on IMF, WEO, and Kuncic (2013).

6. Endogeneity Test

Endogeneity concerns are common in the context of causality analysis involving institutional quality and other macroeconomic variables. The work by Acemoglu, Johnson, & Robinson (2001) provided an excellent framework for the analysis of institutional quality on current economic performance, by tracing historical relationships of European settler mortality to the type of settlements and quality of early institutions in former colonies, to current quality of institution and level of income. From their methodological point of view, the authors were able to

[25] Compare an average institutional quality index, based on the Kunčič (2013) dataset, equal of 0.54 (in a 0-1 scale; with higher values indicating better institutions) for the Caribbean countries relative to an average index equal to 0.39 for the sample of lower middle income countries and 0.56 for the sample of upper middle income countries in the period 1990-2000. The variance for Caribbean countries is 0.01. All countries, except Haiti have an initial IQ index of 0.4 or higher, and 10 out of 15 have initial IQ of 0.5 or higher.

identify a source of exogenous variation in institutions that affected a country's current per capita income.

We follow the same approach for addressing endogeneity concerns on the relationship between institutional quality and fiscal stance. In order to look for potential endogeneity problems, we use Equation 4, a cross-country specification for the impact of average institutional quality and other controls, over the fiscal stance proxy, using an instrumental variable specification. Alternative definitions of institutional quality (ICRG and Kunčič (2013)) and alternative fiscal stance proxies are used. Instruments for institutional quality are European settlers' mortality rates (in logs) and latitude, following Acemoglu, Johnson, & Robinson (2001) and Frankel, Vegh, & Vuletin (2013). Appendix 12 compares results of OLS versus Instrumental Variable specifications under the alternative IQ and fiscal stance proxies. In all cases we find evidence of causality running from IQ to fiscal stance. Appendix 13 adds a set of controls, following Equation 4, including financial depth, financial integration, debt to GDP ratios, government accountability, output volatility and the reserves to import ratio. We note that the sample for IV estimation is reduced considering the availability of information of settler mortality by former colony.[26]

7. Concluding Remarks

We have confirmed earlier findings in the literature showing that a number of developing countries have graduated from fiscal policy pro-cyclicality (c.f., Frankel et al. (2013)). In comparison with industrialized countries, however, developing countries tend to behave in a way that contributes to exacerbate the effects of the business cycle; that is, they tend to exhibit more often than industrialized economies pro-cyclical fiscal policies in both booms and downturns, contributing to exacerbate output volatility. This result coincides with the findings from Kaminsky et al. (2004) and represent additional evidence in support of the "when-it-rains-it-pours" phenomenon. This finding is robust to the choice of different filters to smooth the proxy of fiscal policy cyclicality over time and to a country-specific criterion based on a test for structural break that we have used to split our sample in sub-groups for comparison purposes.

We have also found evidence in support of the idea that institutional quality is an important determinant of a country's fiscal stance. This is an important result that suggests that efforts to graduate from fiscal policy pro-cyclicality need to be accompanied by policy reforms that seek to strengthen the ability of countries to save in good times to generate fiscal buffers that could be used in bad times. In that regard, initiatives such as the establishment of fiscal councils and the adoption of fiscal rules, the development of sound debt management strategies that reinforce fiscal discipline, and the strengthening of macro prudential regulations appear to be necessary conditions for graduation from pro-cyclicality.

[26] The number of observations fall from 122 in the OLS cross country regression down to 71 under the IV estimation.

Appendix 1

Correlation Coefficient of Real Government Expenditures and Real GDP and Graduating Class Under Alternative Filtering Methods. Periods 1990-2000 vs 2000-2010[1] (1/2)

	Baxter-King*		Hodrick-Prescott*		Christiano-Fitzgerald*		Butterworth*		Graduating Class			
Country	ρ 1990-2000	ρ 2000-2010	ρ 1990-2000	ρ 2000-2010	ρ 1990-2000	ρ 2000-2010	ρ 1990-2000	ρ 2000-2010	Baxter-King	Hodrick-Pres	Christiano-Fi	Butterworth
Afghanistan	.	0.09	.	0.13	.	0.23	.	0.58	.	.	.	.
Angola	0.33	0.71	0.27	0.79	0.23	0.73	0.32	0.54	SS	SS	SS	SS
Albania	.	0.63	.	0.70	.	0.68	.	0.44	.	.	.	.
United Arab Emirates	-0.25	-0.53	-0.01	-0.59	0.03	-0.53	-0.42	-0.34	EG	EG	RG	EG
Argentina	0.79	-0.48	0.58	-0.34	0.64	-0.37	0.36	-0.64	RG	RG	RG	RG
Armenia	.	0.20	.	0.56	.	0.52	.	-0.35	.	.	.	.
Antigua and Barbuda	0.27	0.22	0.21	0.21	0.20	0.08	0.17	-0.20	SS	SS	SS	RG
Australia	0.01	-0.45	-0.08	-0.39	0.02	-0.33	0.28	-0.45	RG	EG	RG	RG
Austria	-0.03	-0.08	-0.11	-0.12	-0.01	-0.20	0.01	0.16	EG	EG	EG	SS
Azerbaijan	0.59	0.42	0.79	0.44	0.78	0.34	0.30	0.44	SS	SS	SS	SS
Burundi	-0.09	-0.13	0.15	-0.16	0.08	-0.33	-0.27	-0.42	EG	RG	RG	EG
Belgium	-0.07	-0.45	-0.06	-0.55	-0.27	-0.61	-0.24	-0.49	EG	EG	EG	EG
Benin	-0.17	0.25	-0.14	0.34	-0.04	0.39	-0.15	-0.26	BS	BS	BS	EG
Burkina Faso	0.71	-0.19	0.61	-0.04	0.76	0.00	0.83	-0.64	RG	RG	SS	RG
Bangladesh	-0.14	0.11	-0.02	-0.09	0.29	-0.15	0.04	0.11	BS	EG	RG	SS
Bulgaria	.	0.63	.	0.80	.	0.77	.	0.75	.	.	.	.
Bahrain	-0.42	-0.71	-0.15	-0.81	-0.01	-0.69	0.00	-0.44	EG	EG	EG	EG
Bahamas, The	0.48	0.14	0.47	0.06	0.43	0.09	0.63	-0.41	SS	SS	SS	RG
Bosnia and Herzegovina	.	0.74	.	0.79	.	0.64	.	0.78	.	.	.	.
Belarus	0.35	-0.05	0.11	-0.22	0.13	-0.02	-0.24	0.19	RG	RG	RG	BS
Belize	0.92	0.43	0.71	0.31	0.66	0.35	-0.12	0.52	SS	SS	SS	BS
Bolivia	0.44	0.48	0.50	0.23	0.54	0.06	0.70	0.29	SS	SS	SS	SS
Brazil	-0.04	0.18	0.22	0.33	0.09	0.38	-0.14	0.48	BS	SS	SS	BS
Barbados	-0.05	0.22	0.31	0.11	0.34	0.25	0.43	0.33	BS	SS	SS	SS
Brunei Darussalam	-0.30	-0.09	-0.36	0.04	-0.49	0.05	-0.37	0.01	EG	BS	BS	BS
Bhutan	-0.29	-0.26	-0.08	-0.25	0.09	-0.37	-0.03	0.06	EG	EG	RG	BS
Botswana	0.64	-0.11	0.75	-0.07	0.71	-0.04	0.69	-0.21	RG	RG	RG	RG
Central African Republic	0.49	0.36	0.39	0.34	0.42	0.32	0.26	0.55	SS	SS	SS	SS
Canada	-0.19	-0.70	-0.26	-0.68	-0.17	-0.61	-0.02	-0.73	EG	EG	EG	EG
Switzerland	-0.58	-0.51	-0.34	-0.60	-0.49	-0.49	0.16	-0.44	EG	EG	EG	RG
Chile	0.40	-0.59	0.17	-0.65	0.34	-0.68	-0.15	-0.40	RG	RG	RG	EG
China	-0.30	-0.38	-0.40	-0.37	0.21	-0.54	0.28	-0.75	EG	EG	RG	RG
Cote d'Ivoire	-0.30	0.28	0.04	-0.04	-0.24	-0.06	-0.75	-0.26	BS	RG	EG	EG
Cameroon	0.26	0.63	0.30	0.45	-0.21	0.66	-0.31	0.69	SS	SS	BS	BS
Congo, Rep.	-0.29	-0.22	-0.28	-0.07	-0.40	-0.10	-0.41	0.02	EG	EG	EG	BS
Colombia	0.33	0.06	0.47	0.17	0.27	0.20	-0.34	-0.01	SS	SS	SS	EG
Comoros	0.03	0.42	-0.01	0.22	0.04	0.29	-0.11	0.10	SS	BS	SS	BS
Cabo Verde	0.30	-0.29	-0.10	-0.35	0.19	-0.53	-0.01	-0.33	RG	EG	RG	EG
Costa Rica	0.28	-0.52	0.24	-0.66	0.30	-0.51	0.34	-0.08	RG	RG	RG	RG
Cyprus	-0.50	-0.73	-0.63	-0.67	-0.57	-0.62	0.41	-0.71	EG	EG	EG	RG
Czech Republic	-0.76	-0.12	-0.50	-0.15	-0.57	-0.02	-0.89	-0.02	EG	EG	EG	EG
Germany	0.31	-0.41	0.23	-0.24	0.30	-0.16	0.30	-0.26	RG	RG	RG	RG
Djibouti	0.21	0.81	0.58	0.70	0.46	0.87	0.56	0.93	SS	SS	SS	SS
Dominica	0.47	0.54	0.04	0.56	-0.15	0.47	0.38	0.53	SS	SS	BS	SS
Denmark	-0.11	-0.85	0.06	-0.88	-0.02	-0.87	-0.04	-0.81	EG	RG	EG	EG
Dominican Republic	0.79	0.24	0.68	0.33	0.81	0.32	0.81	0.26	SS	SS	SS	SS
Algeria	-0.36	-0.30	-0.20	-0.57	-0.38	-0.43	-0.28	-0.36	EG	EG	EG	EG
Ecuador	-1.00	0.42	-0.84	0.45	-0.87	0.47	-0.96	0.71	BS	BS	BS	BS
Egypt, Arab Rep.	0.25	0.22	0.23	0.46	0.31	0.52	0.70	0.31	SS	SS	SS	SS
Eritrea	0.02	0.12	0.13	0.07	0.12	-0.07	-0.46	-0.17	SS	SS	RG	EG
Spain	0.16	-0.48	-0.02	-0.14	-0.10	-0.22	0.06	-0.70	RG	EG	EG	RG
Estonia	-0.33	0.31	-0.11	0.41	-0.12	0.37	-0.11	-0.07	BS	BS	BS	EG
Ethiopia	0.60	-0.25	0.72	-0.20	0.71	-0.12	0.43	-0.43	RG	RG	RG	RG
Finland	-0.93	-0.59	-0.93	-0.56	-0.90	-0.67	-0.51	-0.44	EG	EG	EG	EG
Fiji	-0.19	0.05	0.24	-0.07	-0.31	-0.07	-0.09	0.29	EG	EG	EG	EG
France	-0.46	-0.84	-0.35	-0.80	-0.39	-0.81	-0.63	-0.76	EG	EG	EG	EG
Gabon	0.74	0.23	0.77	0.00	0.77	-0.15	0.79	-0.14	SS	RG	RG	RG
United Kingdom	-0.19	-0.54	0.05	-0.50	-0.01	-0.41	0.17	-0.60	EG	RG	EG	RG
Georgia	.	0.30	.	0.61	.	0.53	.	0.23	.	.	.	.
Ghana	-0.02	0.24	-0.51	0.39	-0.46	0.38	0.17	0.31	BS	BS	BS	SS
Guinea	0.27	-0.42	0.42	-0.19	0.35	-0.29	0.29	-0.05	RG	RG	RG	RG
Gambia, The	-0.73	0.43	-0.77	0.47	-0.79	0.51	-0.65	0.23	BS	BS	BS	BS
Guinea-Bissau	.	0.00	.	0.17	.	0.19	.	0.11	.	.	.	.
Equatorial Guinea	0.58	-0.19	0.65	-0.16	0.63	-0.15	0.20	-0.14	RG	RG	RG	RG
Greece	-0.18	0.62	-0.23	0.75	-0.19	0.75	-0.22	0.56	BS	BS	BS	BS
Grenada	-0.14	0.01	0.05	0.00	-0.01	0.03	0.12	0.17	BS	RG	BS	SS
Guatemala	0.80	0.18	0.79	0.26	0.82	0.29	0.78	-0.01	SS	SS	SS	RG
Guyana	.	-0.48	.	-0.48	.	-0.46	.	-0.55	.	.	.	.
Hong Kong SAR, China	-0.48	-0.12	-0.36	-0.34	-0.52	-0.37	-0.61	0.13	EG	EG	EG	BS
Honduras	0.48	0.07	0.46	-0.01	0.50	0.12	0.42	0.21	SS	RG	SS	SS
Croatia	.	0.74	.	0.78	.	0.78	.	0.61	.	.	.	.
Haiti	0.89	0.51	0.88	0.51	0.88	0.47	0.91	0.70	SS	SS	SS	SS
Hungary	-0.27	0.40	0.57	0.53	0.49	0.44	0.59	0.18	BS	SS	SS	SS
Indonesia	0.42	0.46	0.24	0.12	0.29	0.08	0.67	0.17	SS	SS	SS	SS
India	-0.26	-0.48	-0.27	-0.58	-0.25	-0.64	-0.18	-0.33	EG	EG	EG	EG
Ireland	0.00	-0.36	0.26	0.02	0.09	0.29	0.40	0.82	RG	SS	SS	SS
Iran, Islamic Rep.	-0.50	-0.04	-0.49	-0.18	-0.48	-0.27	-0.52	-0.25	EG	EG	EG	EG
Iraq	.	-0.16	.	-0.06	.	-0.07	.	0.39	.	.	.	.
Iceland	0.41	0.42	0.32	0.43	0.45	0.44	0.57	0.53	SS	SS	SS	SS
Israel	.	-0.06	.	-0.19	.	-0.08	.	0.16	.	.	.	.
Italy	0.01	-0.12	0.01	0.20	-0.06	0.29	0.07	-0.15	RG	SS	BS	RG
Jamaica	-0.07	0.07	-0.07	0.06	0.04	0.18	0.00	-0.04	BS	BS	SS	RG
Jordan	-0.41	0.28	-0.57	0.55	-0.62	0.41	-0.61	0.27	BS	BS	BS	BS
Japan	0.19	-0.52	0.10	-0.66	0.05	-0.63	0.07	-0.58	RG	RG	RG	RG
Kazakhstan	.	0.28	.	0.28	.	0.24	.	0.36	.	.	.	.
Kenya	-0.12	0.54	-0.53	0.62	-0.65	0.68	-0.71	0.59	BS	BS	BS	BS
Kyrgyz Republic	.	0.15	.	0.10	.	0.05	.	0.11	.	.	.	.
Cambodia	0.23	-0.48	0.42	-0.43	0.55	-0.36	0.32	-0.69	RG	RG	RG	RG
Kiribati	-0.32	0.92	0.15	0.92	0.07	0.92	0.08	0.92	BS	SS	SS	SS
St. Kitts and Nevis	-0.14	0.39	0.19	0.42	0.15	0.46	-0.15	0.60	BS	SS	SS	BS
Korea, Rep.	0.32	-0.34	0.35	-0.41	0.45	-0.39	0.23	-0.55	RG	RG	RG	RG
Kuwait	-0.03	-0.09	-0.61	-0.16	-0.56	0.02	-0.67	0.28	EG	EG	BS	BS
Lao PDR	0.56	-0.28	0.68	-0.28	0.69	-0.26	0.65	-0.63	RG	RG	RG	RG
Lebanon	-0.11	-0.32	-0.03	-0.25	-0.08	-0.48	-0.40	-0.58	EG	EG	EG	EG
Liberia	.	0.59	.	0.61	.	0.48	.	0.69	.	.	.	.
Libya	0.24	0.67	0.35	-0.71	0.48	-0.66	0.56	-0.30	SS	RG	RG	RG
St. Lucia	0.27	0.31	0.39	0.29	0.41	0.34	0.06	0.17	SS	SS	SS	SS
Sri Lanka	0.56	0.30	0.51	0.33	0.52	0.23	0.30	-0.60	SS	SS	SS	RG
Lesotho	-0.61	-0.20	-0.63	0.07	-0.66	-0.31	-0.66	-0.41	EG	BS	EG	EG
Lithuania	0.34	0.37	0.49	0.62	0.47	0.60	0.33	0.28	SS	SS	SS	SS
Luxembourg	-0.61	-0.74	-0.31	-0.72	-0.25	-0.72	-0.13	-0.46	EG	EG	EG	EG

(1) Correlation coefficient between cyclical component of real GDP and Real Government Expenditures, based on Alternative Filters.
(*) BK filter uses plo=2, phi=8, k=2; HP filter uses parameter λ=6.25; CF uses plo=2, phi=8; BU uses freq=5, order=2.
Source: Authors' calculations based on IMF, WEO

Correlation Coefficient of Real Government Expenditures and Real GDP and Graduating Class Under Alternative Filtering Methods. Periods 1990-2000 vs 2000-2010[1] (2/2)

	Baxter-King*		Hodrick-Prescott*		Christiano-Fitzgerald*		Butterworth*		Graduating Class			
Country	ρ 1990-2000	ρ 2000-2010	ρ 1990-2000	ρ 2000-2010	ρ 1990-2000	ρ 2000-2010	ρ 1990-2000	ρ 2000-2010	Baxter-King	Hodrick-Pres	Christiano-Fi	Butterworth
Latvia	.	0.61	.	0.78	.	0.75	.	0.57	.	.	.	.
Morocco	-0.07	-0.47	-0.14	-0.45	-0.13	-0.42	0.06	-0.60	EG	EG	EG	RG
Moldova	0.96	0.18	0.80	0.24	0.83	0.09	0.99	-0.10	SS	SS	SS	RG
Madagascar	0.46	0.82	0.43	0.75	0.41	0.79	0.67	0.88	SS	SS	SS	SS
Maldives	0.42	-0.32	-0.19	-0.23	-0.08	-0.41	-0.01	-0.61	RG	EG	EG	EG
Mexico	-0.40	-0.09	-0.46	0.12	-0.50	0.08	-0.35	0.04	EG	BS	BS	BS
Macedonia, FYR	.	-0.37	.	-0.34	.	-0.36	.	-0.07				
Mali	0.78	0.40	0.80	-0.01	0.81	-0.05	0.74	-0.28	SS	RG	RG	RG
Malta	.	0.50	.	0.48	.	0.50	.	0.59	.	.	.	.
Montenegro	.	0.82	.	0.76	.	0.75	.	0.66	.	.	.	.
Mongolia	0.56	0.70	0.55	0.46	0.43	0.53	0.15	0.75	SS	SS	SS	SS
Mozambique	-0.02	0.34	-0.17	0.66	-0.01	0.71	0.15	0.36	BS	BS	BS	SS
Mauritius	-0.30	0.02	-0.43	0.03	-0.46	0.07	-0.44	-0.25	BS	BS	BS	EG
Malawi	.	0.78	.	0.69	.	0.79	.	0.87	.	.	.	.
Malaysia	0.61	-0.27	0.61	-0.53	0.67	-0.53	0.55	-0.61	RG	RG	RG	RG
Namibia	0.46	-0.34	0.54	-0.41	0.57	-0.23	0.27	-0.43	RG	RG	RG	RG
Niger	0.55	0.04	0.54	-0.26	0.52	-0.17	0.35	-0.64	SS	RG	RG	RG
Nigeria	0.24	-0.40	0.07	-0.40	0.01	-0.43	0.24	-0.84	RG	RG	RG	RG
Nicaragua	0.50	0.33	0.51	0.00	0.50	-0.15	0.56	0.17	SS	RG	RG	SS
Netherlands	0.11	-0.46	-0.02	-0.18	-0.18	-0.16	0.11	-0.59	RG	EG	EG	RG
Norway	-0.20	-0.71	0.02	-0.78	-0.10	-0.71	-0.42	-0.53	EG	RG	EG	EG
Nepal	0.46	0.32	0.51	0.30	0.51	0.21	0.64	0.20	SS	SS	SS	SS
New Zealand	-0.65	0.08	-0.74	0.37	-0.66	0.28	-0.56	0.40	BS	BS	BS	BS
Oman	0.18	0.10	0.29	0.22	0.28	0.11	0.30	0.04	SS	SS	SS	SS
Pakistan	0.60	0.46	0.67	0.51	0.74	0.45	0.59	0.59	SS	SS	SS	SS
Panama	0.24	0.51	0.31	0.42	0.34	0.38	0.15	0.72	SS	SS	SS	SS
Peru	-0.09	-0.09	0.48	0.01	0.36	-0.19	-0.10	-0.11	EG	SS	RG	EG
Philippines	0.82	-0.40	0.84	-0.58	0.81	-0.54	0.67	-0.44	RG	RG	RG	RG
Papua New Guinea	0.52	-0.21	0.60	-0.14	0.73	-0.20	0.64	-0.33	RG	RG	RG	RG
Poland	-0.62	-0.44	0.28	-0.22	0.18	-0.19	-0.71	-0.22	EG	RG	RG	EG
Portugal	0.51	-0.03	0.83	-0.45	0.87	-0.49	0.65	-0.17	RG	RG	RG	RG
Paraguay	0.33	-0.61	0.55	-0.58	0.42	-0.54	0.34	-0.76	RG	RG	RG	RG
Qatar	0.49	0.13	0.65	0.14	0.66	0.13	0.12	0.17	SS	SS	SS	SS
Romania	.	0.74	.	0.87	.	0.84	.	0.79	.	.	.	.
Russian Federation	.	-0.34	.	-0.10	.	-0.02	.	-0.48	.	.	.	.
Rwanda	0.96	0.51	0.96	0.41	0.97	0.42	0.97	0.25	SS	SS	SS	SS
Saudi Arabia	0.74	-0.58	0.75	-0.64	0.78	-0.60	0.78	-0.68	RG	RG	RG	RG
Sudan	0.42	0.34	0.40	-0.14	0.30	-0.20	0.19	-0.08	SS	RG	RG	RG
Senegal	0.33	0.29	0.41	0.47	0.31	0.41	0.22	0.59	SS	SS	SS	SS
Singapore	-0.01	-0.53	0.15	-0.44	0.10	-0.48	-0.07	-0.48	EG	RG	RG	EG
Solomon Islands	0.25	0.59	-0.09	0.85	0.08	0.81	0.12	0.46	SS	BS	SS	SS
Sierra Leone	0.78	0.34	0.88	0.59	0.91	0.45	0.73	0.08	SS	SS	SS	SS
El Salvador	0.11	-0.34	0.44	-0.30	-0.51	-0.37	-0.49	-0.32	RG	EG	EG	EG
Serbia	.	-0.13	.	-0.07	.	0.09	.	0.00	.	.	.	.
Sao Tome and Principe	.	0.14	.	-0.10	.	0.03	.	0.24	.	.	.	.
Suriname	0.29	-0.15	0.37	-0.03	0.38	-0.01	0.06	-0.11	RG	RG	RG	RG
Slovak Republic	.	-0.40	.	-0.09	.	-0.37	.	-0.46	.	.	.	.
Slovenia	0.39	-0.21	0.55	0.12	0.53	0.06	0.61	-0.02	RG	SS	SS	RG
Sweden	-0.39	0.00	-0.52	0.20	-0.51	0.07	0.08	0.02	BS	BS	BS	SS
Swaziland	-0.19	0.22	-0.54	0.06	-0.41	-0.02	-0.10	0.12	BS	BS	EG	BS
Seychelles	0.57	0.70	0.59	0.68	0.65	0.74	0.49	0.75	SS	SS	SS	SS
Syrian Arab Republic	0.52	-0.28	0.46	-0.44	0.55	-0.38	0.26	-0.13	RG	RG	RG	RG
Chad	-0.56	-0.45	-0.43	-0.60	-0.49	-0.56	-0.42	-0.68	EG	EG	EG	EG
Togo	0.21	0.69	0.23	0.76	0.12	0.78	-0.18	0.65	SS	SS	SS	BS
Thailand	-0.27	-0.24	-0.34	-0.34	-0.45	-0.28	0.20	-0.14	EG	EG	EG	RG
Tajikistan	.	-0.09	.	-0.10	.	-0.24	.	-0.46	.	.	.	.
Turkmenistan	.	-0.21	.	-0.27	.	-0.54	.	-0.28	.	.	.	.
Timor-Leste	.	0.42	.	0.35	.	0.20	.	0.40	.	.	.	.
Tonga	.	0.39	.	0.43	.	0.27	.	0.44	.	.	.	.
Trinidad and Tobago	0.44	-0.27	0.75	-0.09	0.66	-0.22	0.79	-0.31	RG	RG	RG	RG
Tunisia	0.01	0.00	-0.17	0.56	-0.19	0.53	0.21	0.36	RG	BS	BS	SS
Turkey	0.60	-0.18	0.59	-0.64	0.68	-0.54	0.63	-0.45	RG	RG	RG	RG
Tanzania	-0.18	0.48	-0.66	0.43	-0.73	0.37	-0.69	0.05	BS	BS	BS	BS
Uganda	-0.14	0.10	-0.25	-0.07	-0.06	0.04	0.21	0.45	BS	EG	BS	SS
Ukraine	.	0.79	.	0.89	.	0.87	.	0.89				
Uruguay	0.44	0.55	0.04	0.67	0.05	0.78	-0.09	0.60	SS	SS	SS	BS
United States	-0.06	-0.87	0.05	-0.77	0.13	-0.87	0.50	-0.95	EG	RG	RG	RG
Uzbekistan	0.26	0.20	0.24	0.29	0.38	-0.11	0.60	0.08	SS	SS	RG	SS
St. Vincent and the Grenadines	0.08	0.27	0.23	0.33	0.21	0.17	-0.13	0.04	SS	SS	SS	BS
Venezuela, RB	0.26	0.78	0.09	0.88	0.06	0.86	0.23	0.69	SS	SS	SS	SS
Vietnam	.	-0.36	.	-0.40	.	-0.37	.	-0.25	.	.	.	.
Vanuatu	0.33	0.62	0.21	0.64	0.25	0.42	0.15	-0.11	SS	SS	SS	RG
Samoa	.	-0.19	.	-0.04	.	-0.03	.	0.17	.	.	.	.
Yemen, Rep.	0.00	-0.34	0.02	-0.39	0.13	-0.40	0.18	0.25	RG	RG	RG	SS
South Africa	-0.02	-0.17	0.24	0.34	0.06	0.11	-0.03	-0.63	EG	SS	SS	EG
Congo, Dem. Rep.	0.16	0.19	-0.15	-0.34	-0.11	-0.28	0.07	-0.25	SS	EG	EG	RG
Zambia	-0.48	-0.17	-0.39	-0.29	-0.63	-0.48	-0.76	0.37	EG	EG	EG	BS
Zimbabwe	.	0.53	.	0.76	.	0.74	.	0.70	.	.	.	.

(1) Correlation coefficient between cyclical component of real GDP and Real Government Expenditures, based on Alternative Filters.
(*) BK filter uses plo=2, phi=8, k=2; HP filter uses parameter λ=6.25; CF uses plo=2, phi=8; BU uses freq=5, order=2.
Source: Authors' calculations based on IMF, WEO

Appendix 2

Correlation Coefficient of Real Government Expenditures and Real GDP and Graduating Class Under Alternative Filtering Methods. Country Specific Periods (1/2)

Country[**]	Break Dates		Baxter-King[*]		Hodrick-Prescott[*]		Christiano-Fitzgerald[*]		Butterworth[*]		Graduating Class			
	Used for ρ	QLR Test	ρ 1st period	ρ 2nd period	ρ 1st period	ρ 2nd period	ρ 1st period	ρ 2nd period	ρ 1st period	ρ 2nd period	Baxter-King	nick-Prescott	no-Fitzgerald	Butterworth
Angola	1995	1993	0.80	0.34	0.68	0.35	0.65	0.16	0.65	0.29	SS	SS	SS	SS
United Arab Emirates	2005	2005	0.02	-0.82	0.02	0.79	0.03	0.81	0.13	-0.82	EG	EG	EG	EG
Argentina	2005	2008	0.29	0.43	0.08	0.27	0.05	0.31	-0.07	0.38	SS	SS	SS	BS
Antigua and Barbuda	1995	1991	0.63	0.18	0.55	0.21	0.48	0.24	0.58	0.10	SS	SS	SS	SS
Australia	1995	1992	-0.78	0.14	-0.79	0.10	-0.57	0.12	-0.76	0.05	BS	BS	BS	BS
Austria	2005	2010	0.02	-0.46	-0.19	-0.49	0.09	-0.51	0.30	-0.20	RG	EG	RG	RG
Azerbaijan	2005	2005	0.38	0.28	0.47	0.64	0.49	0.43	0.40	0.06	SS	SS	SS	SS
Burundi	2005	2005	-0.10	-0.45	0.02	-0.28	0.02	-0.40	-0.22	-0.35	EG	RG	RG	EG
Belgium	2005	2008	-0.19	-0.52	-0.16	-0.53	-0.18	-0.49	-0.32	-0.38	EG	EG	EG	EG
Benin	1995	1994	-0.42	0.33	0.35	0.44	0.30	0.50	0.35	0.00	BS	SS	SS	SS
Burkina Faso	1995	1994	0.73	0.17	0.59	0.32	0.82	0.05	0.94	-0.14	SS	SS	SS	RG
Bangladesh	2005	2007	-0.08	0.26	-0.25	0.18	-0.02	0.15	0.09	0.37	BS	BS	BS	SS
Bahrain	1995	1993	0.19	-0.57	0.56	-0.57	0.55	-0.61	0.58	-0.52	RG	RG	RG	RG
Bahamas, The	2005	2009	0.38	0.05	0.47	0.03	0.32	0.28	0.49	-0.19	SS	SS	SS	RG
Belize	2002	2002	0.65	0.39	0.58	-0.03	0.57	-0.07	0.32	0.06	SS	RG	RG	SS
Bolivia	1995	1991	-0.20	0.56	-0.31	0.49	-0.22	0.61	0.16	0.51	BS	BS	BS	SS
Brazil	2005	2009	0.05	0.90	0.21	0.89	0.30	0.87	0.01	0.89	BS	SS	SS	SS
Barbados	2005	2008	0.16	0.34	0.01	0.29	-0.04	0.24	0.37	0.25	SS	SS	BS	SS
Brunei Darussalam	2005	2007	-0.18	-0.42	-0.03	-0.52	-0.20	-0.56	-0.19	0.29	EG	EG	EG	EG
Bhutan	2005	2009	-0.50	0.13	-0.49	0.30	-0.55	0.08	-0.49	0.15	BS	BS	BS	BS
Botswana	1995	1994	0.91	-0.09	0.88	-0.05	0.82	-0.22	0.91	-0.17	RG	RG	RG	RG
Central African Republic	2005	2010	0.51	0.00	0.39	0.85	0.43	0.82	0.30	0.74	RG	SS	SS	SS
Canada	2005	2009	-0.17	-0.77	-0.28	-0.79	-0.15	-0.70	-0.36	0.66	EG	EG	EG	EG
Switzerland	2005	2009	-0.60	-0.26	-0.68	-0.33	-0.53	-0.29	-0.39	-0.30	EG	EG	EG	EG
Chile	2005	2009	0.34	-0.69	0.21	0.76	0.12	0.72	0.30	0.45	RG	RG	RG	RG
China	1995	1992	-0.25	-0.46	-0.39	-0.32	0.84	-0.03	0.48	-0.73	EG	EG	RG	RG
Cote d'Ivoire	1995	1994	-0.83	0.82	-0.62	0.81	0.75	0.79	-0.82	0.71	BS	BS	BS	BS
Cameroon	1995	1993	0.34	0.48	0.15	0.41	-0.08	0.39	-0.51	0.61	SS	SS	BS	BS
Congo, Rep.	2005	2009	-0.28	-0.18	-0.29	-0.26	0.45	-0.16	-0.59	-0.13	EG	EG	EG	EG
Colombia	2002	2002	0.30	0.05	0.36	0.15	0.22	0.04	-0.23	-0.05	SS	SS	SS	EG
Comoros	2001	2001	0.02	0.34	0.10	0.26	0.02	0.34	0.02	0.23	SS	SS	SS	SS
Cabo Verde	1995	1991	-0.17	-0.11	-0.02	-0.05	0.37	0.01	0.00	-0.19	EG	EG	SS	EG
Costa Rica	1995	1991	0.49	-0.41	0.47	-0.61	0.35	-0.51	0.55	-0.07	RG	RG	RG	RG
Cyprus	2005	2010	-0.61	-0.51	-0.66	0.18	-0.80	0.16	-0.61	-0.67	EG	BS	BS	EG
Germany	2005	2005	0.31	-0.73	0.26	-0.73	0.36	-0.74	0.29	-0.52	RG	RG	RG	RG
Djibouti	1995	1991	-0.57	0.69	0.44	0.68	-0.08	0.79	0.58	0.67	BS	SS	BS	SS
Dominica	2005	2008	0.53	0.40	0.51	0.56	0.42	0.27	0.48	0.21	SS	SS	SS	SS
Denmark	2005	2008	-0.15	-0.89	-0.14	-0.71	0.21	-0.61	-0.08	-0.77	EG	EG	EG	EG
Dominican Republic	1995	1991	0.90	0.20	0.86	0.19	0.95	0.30	0.87	0.03	SS	SS	SS	SS
Algeria	2000	2000	-0.36	-0.35	-0.51	-0.40	0.44	-0.25	-0.19	-0.20	EG	EG	EG	EG
Ecuador	2005	2010	-0.25	0.67	-0.27	0.39	-0.44	0.57	-0.24	0.88	BS	BS	BS	BS
Egypt, Arab Rep.	2005	2010	0.27	-0.16	0.24	0.06	0.37	0.11	0.51	0.36	RG	RG	SS	SS
Spain	2005	2008	0.15	-0.68	0.39	-0.36	0.27	-0.30	-0.02	-0.53	RG	RG	RG	EG
Ethiopia	2003	2003	0.43	0.61	0.52	0.48	0.48	0.54	0.29	0.36	SS	SS	SS	SS
Finland	2005	2008	-0.91	-0.78	-0.93	-0.69	-0.92	-0.64	-0.78	-0.63	EG	EG	EG	EG
Fiji	2005	2009	-0.22	0.04	-0.27	0.19	0.34	0.01	0.05	0.40	BS	BS	BS	EG
France	2005	2010	-0.45	-0.94	-0.52	-0.89	-0.39	-0.83	-0.44	-0.91	EG	EG	EG	EG
Gabon	2005	2009	0.69	-0.37	0.55	0.17	0.54	0.05	0.76	0.40	RG	RG	RG	RG
United Kingdom	2005	2007	-0.17	-0.80	-0.21	-0.76	-0.11	-0.76	-0.13	-0.77	EG	EG	EG	EG
Ghana	2005	2010	-0.03	0.17	0.08	0.39	0.03	0.35	0.45	0.11	BS	BS	SS	SS
Guinea	1996	1996	0.66	-0.38	0.79	-0.36	0.52	-0.34	0.35	-0.18	RG	RG	RG	RG
Gambia, The	1995	1993	-0.91	0.34	-0.70	0.18	-0.68	0.31	-0.64	0.32	BS	BS	BS	BS
Equatorial Guinea	1995	1991	0.89	0.15	0.82	0.23	0.90	0.23	0.74	-0.05	SS	SS	SS	RG
Greece	2005	2007	0.03	0.30	0.19	0.61	0.20	0.74	-0.11	-0.15	SS	SS	SS	EG
Grenada	2005	2008	0.03	-0.14	-0.04	0.24	-0.20	0.01	0.28	-0.25	RG	BS	BS	RG
Guatemala	2005	2005	0.60	-0.08	0.63	0.04	0.56	0.14	0.55	-0.09	RG	SS	SS	RG
Guyana	2005	2008	-0.53	-0.59	-0.23	-0.49	-0.13	-0.33	-0.65	-0.53	EG	EG	EG	EG
Hong Kong SAR, China	2003	2003	-0.48	0.00	-0.42	-0.15	-0.47	-0.13	-0.54	0.28	EG	EG	EG	BS
Honduras	2005	2009	0.42	0.24	0.26	0.22	0.54	0.12	0.31	0.05	SS	SS	SS	SS
Haiti	2005	2010	0.86	0.59	0.86	0.36	0.87	0.63	0.88	0.80	SS	SS	SS	SS
Indonesia	1999	1999	0.44	0.43	0.32	0.51	0.35	0.35	0.66	-0.02	SS	SS	SS	RG
India	2005	2009	-0.23	-0.79	-0.21	-0.58	-0.20	-0.82	0.02	-0.73	EG	EG	EG	RG
Ireland	2005	2010	0.11	-0.41	0.12	0.50	0.07	0.46	0.28	0.10	RG	RG	EG	RG
Iran, Islamic Rep.	2001	2001	-0.37	-0.01	-0.36	0.26	-0.39	0.26	-0.14	0.18	EG	BS	BS	BS
Iceland	1995	1995	0.74	0.42	0.55	0.32	0.37	0.26	0.61	0.49	SS	SS	SS	SS
Italy	1995	1992	0.09	-0.05	0.15	0.02	0.32	0.06	0.00	-0.20	RG	SS	SS	RG
Jamaica	2005	2010	0.03	-0.24	0.11	-0.30	0.12	-0.42	-0.02	-0.12	RG	RG	RG	EG
Jordan	1995	1992	-0.52	0.26	0.25	0.22	0.17	0.08	-0.20	0.12	BS	SS	SS	BS
Japan	2003	2003	0.13	-0.65	-0.01	-0.68	0.09	-0.61	0.28	-0.59	RG	EG	RG	RG
Kenya	2005	2009	-0.06	0.59	-0.05	0.57	0.00	0.51	-0.10	0.60	BS	BS	SS	BS
Cambodia	1995	1994	0.07	-0.11	-0.01	0.15	0.11	-0.02	0.40	-0.28	RG	EG	EG	RG
Kiribati	2005	2010	0.17	0.66	0.36	0.62	0.30	0.66	0.41	0.60	SS	SS	SS	SS
St. Kitts and Nevis	1995	1991	-0.33	0.30	-0.27	0.43	-0.23	0.42	-0.02	0.40	BS	BS	BS	BS
Korea, Rep.	1998	1998	0.33	-0.37	0.27	-0.43	0.45	-0.43	0.26	-0.44	RG	RG	RG	RG
Kuwait	1996	1996	-0.10	0.00	-0.78	-0.11	-0.77	-0.09	-0.84	0.11	BS	EG	EG	BS
Lao PDR	1995	1991	0.48	0.04	0.15	-0.06	0.05	-0.03	0.31	-0.11	SS	RG	RG	RG
Liberia	2004	2004	0.92	0.19	0.91	0.39	0.83	0.12	0.91	-0.05	SS	SS	SS	RG
Libya	1995	1992	0.61	0.85	0.57	0.74	0.45	0.72	0.61	0.85	SS	SS	SS	SS
St. Lucia	2005	2008	0.26	0.75	0.25	0.60	0.31	0.84	-0.04	0.80	SS	SS	SS	BS
Sri Lanka	2005	2009	0.49	-0.69	0.53	-0.50	0.47	-0.35	0.41	-0.68	RG	RG	RG	RG
Lesotho	1999	1999	-0.62	-0.24	-0.50	-0.01	-0.48	-0.21	-0.59	-0.59	EG	EG	EG	EG
Latvia	2005	2010	0.15	0.63	0.49	0.66	0.35	0.56	-0.46	0.58	SS	SS	SS	BS
Morocco	2000	2000	-0.07	-0.44	-0.15	-0.42	-0.20	-0.51	-0.02	-0.47	EG	EG	EG	EG
Madagascar	2005	2008	0.74	0.78	0.65	0.61	0.69	0.70	0.75	0.74	SS	SS	SS	SS
Maldives	1996	1996	0.21	-0.29	0.06	-0.22	0.43	-0.37	-0.22	-0.46	RG	RG	RG	EG
Mexico	1995	1994	-0.69	-0.10	-0.56	0.07	0.63	-0.37	-0.44	0.01	EG	EG	EG	BS
Mali	1996	1996	0.67	0.51	0.74	0.39	0.65	0.45	0.65	0.33	SS	SS	SS	SS
Mongolia	1995	1993	0.57	0.69	0.67	0.51	0.56	0.73	0.33	0.80	SS	SS	SS	SS
Mozambique	2005	2005	0.03	-0.02	-0.11	-0.23	0.03	-0.42	0.29	0.14	RG	EG	RG	SS
Mauritius	2005	2009	-0.27	-0.09	-0.33	0.18	0.38	0.01	0.21	-0.42	EG	BS	BS	EG
Malaysia	1996	1996	0.30	0.21	0.18	0.12	0.64	0.33	0.17	0.19	SS	SS	SS	SS
Namibia	2005	2010	0.41	-0.36	0.45	-0.50	0.47	-0.31	0.10	0.20	RG	RG	RG	RG
Niger	1995	1991	0.47	0.40	0.44	0.40	0.41	0.42	0.37	0.18	SS	SS	SS	SS
Nigeria	2002	2002	-0.16	0.50	-0.32	0.43	-0.36	0.34	-0.16	0.27	BS	BS	BS	BS
Nicaragua	1995	1993	-0.15	0.47	0.23	0.45	0.54	0.50	0.43	0.51	BS	SS	SS	SS
Netherlands	1995	1993	0.26	-0.16	0.27	0.02	0.43	-0.38	0.18	-0.48	RG	SS	RG	RG
Norway	1997	1997	-0.28	-0.54	0.01	-0.59	0.55	-0.70	-0.11	-0.48	EG	RG	RG	EG
Nepal	2005	2007	0.50	0.36	0.47	0.50	0.44	0.29	0.57	-0.15	SS	SS	SS	RG
New Zealand	1995	1991	-0.77	-0.07	-0.80	-0.29	-0.75	-0.17	-0.81	0.22	EG	EG	EG	BS
Oman	1995	1991	0.67	0.10	0.81	0.08	0.78	0.05	0.59	0.10	SS	SS	SS	SS
Pakistan	2003	2003	0.41	0.76	0.33	0.70	0.38	0.71	0.43	0.73	SS	SS	SS	SS
Panama	2005	2010	0.20	0.66	0.22	0.43	0.19	0.58	0.01	0.73	SS	SS	SS	SS
Peru	1995	1992	-0.06	-0.18	0.37	-0.13	0.20	0.09	0.02	0.01	EG	RG	SS	SS
Philippines	1995	1991	0.91	0.30	0.86	0.31	0.85	0.42	0.63	0.29	SS	SS	SS	SS
Papua New Guinea	2005	2006	0.45	-0.29	0.33	-0.22	0.52	-0.01	0.47	-0.07	RG	RG	RG	RG
Portugal	1995	1994	0.57	0.01	0.66	0.15	0.55	0.10	0.34	0.21	SS	SS	SS	SS
Paraguay	1995	1991	0.05	-0.24	0.42	-0.21	0.32	-0.37	0.36	-0.49	RG	RG	RG	RG
Qatar	1995	1993	0.72	0.25	0.71	0.36	0.68	0.32	0.17	0.08	SS	SS	SS	SS
Rwanda	1995	1995	0.99	0.27	0.97	0.21	0.98	0.67	0.98	0.38	SS	SS	SS	SS
Saudi Arabia	2005	2010	0.51	-0.84	0.54	-0.82	0.52	-0.88	0.53	-0.88	RG	RG	RG	RG
Sudan	1995	1991	0.46	0.53	0.46	0.60	0.43	0.56	-0.01	0.45	SS	SS	SS	BS
Senegal	2005	2009	0.42	-0.23	0.40	-0.15	0.42	-0.13	0.42	-0.28	RG	RG	RG	RG
Singapore	2005	2009	0.05	-0.79	0.14	-0.70	0.12	-0.77	-0.25	-0.57	RG	RG	EG	EG
Solomon Islands	1995	1991	0.40	0.50	0.42	0.65	0.35	0.56	0.22	0.28	SS	SS	SS	SS
Sierra Leone	2002	2002	0.78	-0.28	0.75	-0.14	0.81	-0.47	0.74	-0.39	RG	RG	RG	RG
El Salvador	2005	2010	0.09	-0.69	0.20	-0.68	0.17	-0.67	-0.52	-0.63	RG	RG	RG	EG
Suriname	2001	2001	0.29	-0.11	0.28	-0.13	0.23	-0.01	0.05	0.01	RG	RG	RG	SS
Sweden	2005	2010	-0.37	0.09	-0.48	0.29	-0.22	0.10	-0.03	-0.08	BS	BS	BS	EG
Swaziland	1995	1991	-0.30	0.50	-0.10	0.50	-0.17	0.44	-0.17	0.48	BS	BS	BS	BS

(1) Correlation coefficient between cyclical component of real GDP and Real Government Expenditures, based on Alternative Filters. Break up dates based on QLR Test for Structural Break in real GDP per capita growth
(*) BK filter uses plo=2, phi=8, k=2, HP filter uses parameter λ=6.25, CF uses plo=2, phi=8, BU uses beq=5, order=2.
(**) Caribbean Countries are highlighted
Source: Authors' calculations based on IMF, WEO

Correlation Coefficient of Real Government Expenditures and Real GDP and Graduating Class Under Alternative Filtering Methods. Country Specific Periods (2/)

Country(**)	Break Dates		Baxter-King(*)		Hodrick-Prescott(*)		Christiano-Fitzgerald(*)		Butterworth(*)		Graduating Class			
	Used for ρ	QLR Test	ρ 1st period	ρ 2nd period	ρ 1st period	ρ 2nd period	ρ 1st period	ρ 2nd period	ρ 1st period	ρ 2nd period	Baxter-King	nick-Prescott	ho-Fitzgerald	Butterworth
Seychelles	1995	1991	0.63	0.65	0.59	0.65	0.69	0.73	0.61	0.59	SS	SS	SS	SS
Syrian Arab Republic	2005	2009	0.25	0.90	0.35	-0.16	0.22	0.68	0.33	0.85	SS	RG	SS	SS
Chad	2003	2003	-0.57	-0.28	-0.48	-0.35	0.53	-0.10	-0.66	0.09	EG	EG	EG	BS
Togo	1995	1993	0.38	0.29	0.56	0.34	0.47	0.15	-0.05	0.21	SS	SS	SS	BS
Thailand	1996	1996	-0.52	-0.17	-0.51	-0.09	0.90	-0.15	-0.83	-0.05	EG	EG	EG	EG
Tonga	2005	2010	0.32	0.68	0.14	0.71	0.52	0.66	0.81	0.29	SS	SS	SS	SS
Trinidad and Tobago	2005	2005	0.04	-0.29	0.28	-0.09	0.19	-0.52	0.09	-0.40	RG	RG	RG	RG
Tunisia	1995	1995	0.04	-0.12	0.06	-0.13	-0.11	-0.11	0.39	-0.06	RG	RG	EG	RG
Turkey	2005	2009	0.31	-0.41	0.22	-0.54	0.39	-0.26	0.54	-0.31	RG	RG	RG	RG
Tanzania	2000	2000	-0.18	0.46	-0.22	0.48	-0.41	0.26	-0.22	-0.06	BS	BS	BS	EG
Uganda	2005	2005	-0.13	0.24	-0.19	0.27	-0.07	0.38	-0.06	0.33	BS	BS	BS	BS
Uruguay	2003	2003	0.38	-0.48	0.34	-0.34	0.35	-0.67	0.15	-0.39	RG	RG	RG	RG
United States	1995	1991	0.34	-0.83	0.11	-0.85	0.35	-0.90	0.50	-0.84	RG	RG	RG	RG
Uzbekistan	1996	1996	0.69	0.19	0.28	0.36	0.34	0.01	0.78	-0.24	SS	SS	SS	RG
St. Vincent and the Grenadines	1996	1996	0.14	0.01	0.20	0.15	0.27	0.02	-0.24	-0.05	SS	SS	SS	EG
Venezuela, RB	2003	2003	0.45	0.63	0.50	0.73	0.55	0.77	0.47	0.42	SS	SS	SS	SS
Vanuatu	2005	2010	0.31	0.64	0.47	0.74	0.24	0.51	0.16	0.69	SS	SS	SS	SS
Yemen, Rep.	1995	1991	-0.35	0.21	-0.32	0.10	0.27	0.03	-0.26	0.24	BS	BS	BS	BS
South Africa	2005	2010	-0.01	-0.50	0.24	-0.19	0.84	-0.61	-0.04	-0.66	EG	RG	RG	EG
Congo, Dem. Rep.	2001	2001	0.04	0.23	-0.11	0.22	0.07	0.16	0.00	0.01	SS	BS	SS	RG
Zambia	2002	2002	-0.39	-0.43	-0.28	-0.45	-0.47	-0.21	-0.49	-0.03	EG	EG	EG	EG

(1) Correlation coefficient between cyclical component of real GDP and Real Governmenet Expenditures, based on Alternative Filters. Break up dates based on QLR Test for Structural Break in real GDP per capita growth

(*) BK filter uses plo=2, phi=8, k=2; HP filter uses parameter λ=6.25; CF uses plo=2, phi=8; BU uses freq=5, order=2.

(**) Caribbean Countries are highlighted

Source: Authors' calculations based on IMF, WEO

Appendix 3

Country Classification According to Fiscal Cyclicality in Booms and Downturns (1/2)

Country	Fiscal cyclicality in Booms (1)	Fiscal cyclicality in Downturns (2)	Country Region (WB Classification)	Country Income Group (WB Classification)	Country Classification*			
					Thrifty	Spender	Stabilizer	Volatile
Angola	0.37	0.34	Sub-Saharan Africa	Lower middle income	0	0	0	1
United Arab Emirates	-0.79	-0.10	High Income	High income: nonOECD	1	0	0	0
Argentina	0.45	-0.68	Latin America & Caribbean	Upper middle income	1	0	0	0
Antigua and Barbuda	0.06	0.68	High Income	High income: nonOECD	0	0	0	1
Australia	0.12	-0.13	High Income	High income: OECD	1	0	0	0
Austria	0.00	0.03	High Income	High income: OECD	0	0	0	1
Azerbaijan	0.19	0.32	Europe & Central Asia	Lower middle income	0	0	0	1
Burundi	-0.50	-0.08	Sub-Saharan Africa	Low income	1	0	0	0
Belgium	0.21	-0.32	High Income	High income: OECD	1	0	0	0
Benin	-0.58	-0.05	Sub-Saharan Africa	Low income	1	0	0	0
Burkina Faso	0.59	0.33	Sub-Saharan Africa	Low income	0	0	0	1
Bangladesh	0.27	0.01	South Asia	Low income	0	0	0	1
Bulgaria	0.84	-0.35	Europe & Central Asia	Upper middle income	1	0	0	0
Bahrain	-0.33	-0.66	High Income	High income: nonOECD	1	0	0	0
Bahamas, The	0.40	-0.37	High Income	High income: nonOECD	1	0	0	0
Bosnia and Herzegovina	0.62	-0.04	Europe & Central Asia	Lower middle income	1	0	0	0
Belarus	0.42	0.88	Europe & Central Asia	Upper middle income	0	0	0	1
Belize	-0.21	0.21	Latin America & Caribbean	Upper middle income	0	0	0	1
Brazil	0.33	0.45	Latin America & Caribbean	Upper middle income	0	0	0	1
Barbados	0.15	0.70	High Income	High income: nonOECD	0	0	0	1
Brunei Darussalam	-0.74	-0.40	High Income	High income: nonOECD	1	0	0	0
Bhutan	0.15	0.04	South Asia	Lower middle income	0	0	0	1
Botswana	0.12	-0.60	Sub-Saharan Africa	Upper middle income	1	0	0	0
Central African Republic	0.05	0.32	Sub-Saharan Africa	Low income	0	0	0	1
Canada	-0.72	-0.41	High Income	High income: OECD	1	0	0	0
Switzerland	-0.61	0.08	High Income	High income: OECD	0	0	0	1
Chile	0.17	-0.70	Latin America & Caribbean	Upper middle income	1	0	0	0
China	-0.36	0.25	East Asia & Pacific	Lower middle income	0	0	0	1
Cote d'Ivoire	0.11	0.41	Sub-Saharan Africa	Low income	0	0	0	1
Cameroon	0.36	-0.01	Sub-Saharan Africa	Lower middle income	1	0	0	0
Congo, Rep.	0.11	-0.34	Sub-Saharan Africa	Lower middle income	1	0	0	0
Colombia	0.00	-0.48	Latin America & Caribbean	Lower middle income	1	0	0	0
Comoros	-0.39	-0.27	Sub-Saharan Africa	Low income	1	0	0	0
Cabo Verde	-0.01	-0.23	Sub-Saharan Africa	Lower middle income	1	0	0	0
Costa Rica	0.01	-0.05	Latin America & Caribbean	Upper middle income	1	0	0	0
Cyprus	-0.07	-0.38	High Income	High income: nonOECD	1	0	0	0
Czech Republic	0.65	-0.07	High Income	High income: OECD	1	0	0	0
Germany	-0.43	-0.34	High Income	High income: OECD	1	0	0	0
Djibouti	0.54	-0.06	Middle East & North Africa	Lower middle income	1	0	0	0
Dominica	0.05	0.35	Latin America & Caribbean	Upper middle income	0	0	0	1
Denmark	-0.62	-0.73	High Income	High income: OECD	1	0	0	0
Dominican Republic	0.07	0.20	Latin America & Caribbean	Lower middle income	0	0	0	1
Algeria	-0.38	-0.23	Middle East & North Africa	Lower middle income	1	0	0	0
Ecuador	0.20	-0.27	Latin America & Caribbean	Lower middle income	1	0	0	0
Egypt, Arab Rep.	0.60	0.81	Middle East & North Africa	Lower middle income	0	0	0	1
Eritrea	-0.06	0.26	Sub-Saharan Africa	Low income	0	0	0	1
Spain	0.01	-0.56	High Income	High income: OECD	1	0	0	0
Estonia	0.52	-0.16	High Income	High income: nonOECD	1	0	0	0
Ethiopia	-0.16	0.61	Sub-Saharan Africa	Low income	0	0	0	1
Finland	-0.13	-0.61	High Income	High income: OECD	1	0	0	0
Fiji	0.12	-0.53	East Asia & Pacific	Upper middle income	1	0	0	0
France	-0.67	-0.61	High Income	High income: OECD	1	0	0	0
Gabon	0.82	0.12	Sub-Saharan Africa	Upper middle income	0	0	0	1
United Kingdom	-0.30	-0.86	High Income	High income: OECD	1	0	0	0
Georgia	0.85	-0.50	Europe & Central Asia	Lower middle income	1	0	0	0
Ghana	0.10	0.18	Sub-Saharan Africa	Low income	0	0	0	1
Guinea	-0.62	-0.20	Sub-Saharan Africa	Low income	1	0	0	0
Gambia, The	0.40	-0.22	Sub-Saharan Africa	Low income	1	0	0	0
Equatorial Guinea	0.12	0.70	High Income	High income: nonOECD	0	0	0	1
Greece	0.34	0.19	High Income	High income: OECD	0	0	0	1
Grenada	0.36	0.21	Latin America & Caribbean	Upper middle income	0	0	0	1
Guatemala	-0.12	0.22	Latin America & Caribbean	Lower middle income	0	0	0	1
Guyana	-0.25	-0.59	Latin America & Caribbean	Lower middle income	1	0	0	0
Hong Kong SAR, China	-0.27	-0.11	High Income	High income: nonOECD	1	0	0	0
Honduras	0.72	-0.26	Latin America & Caribbean	Lower middle income	1	0	0	0
Haiti	0.59	0.83	Latin America & Caribbean	Low income	0	0	0	1
Hungary	0.20	0.02	High Income	High income: OECD	0	0	0	1
Indonesia	0.49	0.08	East Asia & Pacific	Lower middle income	0	0	0	1
India	0.37	-0.32	South Asia	Lower middle income	1	0	0	0
Ireland	-0.23	-0.25	High Income	High income: OECD	1	0	0	0
Iran, Islamic Rep.	0.00	0.71	Middle East & North Africa	Lower middle income	0	0	0	1
Iceland	0.61	0.15	High Income	High income: OECD	0	0	0	1
Italy	-0.06	-0.34	High Income	High income: OECD	1	0	0	0
Jamaica	0.38	-0.24	Latin America & Caribbean	Upper middle income	1	0	0	0
Jordan	-0.02	-0.04	Middle East & North Africa	Lower middle income	1	0	0	0
Japan	-0.36	-0.25	High Income	High income: OECD	1	0	0	0
Kenya	0.18	0.01	Sub-Saharan Africa	Low income	0	0	0	1
Cambodia	-0.35	-0.17	East Asia & Pacific	Low income	1	0	0	0
Kiribati	0.50	-0.03	East Asia & Pacific	Lower middle income	1	0	0	0
St. Kitts and Nevis	-0.16	0.66	Latin America & Caribbean	Upper middle income	0	0	0	1
Korea, Rep.	-0.19	0.25	High Income	High income: OECD	0	0	0	1
Kuwait	-0.08	-0.61	High Income	High income: nonOECD	1	0	0	0
Lao PDR	0.18	0.17	East Asia & Pacific	Low income	0	0	0	1
Lebanon	0.14	-0.41	Middle East & North Africa	Upper middle income	1	0	0	0

(1) Booms defined as events when cyclical component of GDP is above the trend

(2) Downturns defined as events where cyclical component of GDP is below the trend

(*) Binary variable. Value 1 if country belong to category. Thrifty counter-cyclicaly in booms (ρ <0) and pro-cyclical in downturns (ρ >0); Spenders pro-cyclical in booms (ρ >0) and counter-cyclical in downturn (ρ <0); Stabilizer: always counter-cyclical (ρ <0); Volatile: always pro-cyclical(ρ>0)

Source: Authors calculations based on WEO data

Country Classification According to Fiscal Cyclicality in Booms and Downturns (2/2)

Country	Fiscal cyclicality in Booms [1]	Fiscal cyclicality in Downturns [2]	Country Region (WB Classification)	Country Income Group (WB Classification)	Country Classification*			
					Thrifty	Spender	Stabilizer	Volatile
Libya	0.76	0.92	Middle East & North Africa	Upper middle income	0	0	0	1
St. Lucia	0.37	0.10	Latin America & Caribbean	Upper middle income	0	0	0	1
Sri Lanka	0.28	0.10	South Asia	Lower middle income	0	0	0	1
Lesotho	-0.16	-0.36	Sub-Saharan Africa	Lower middle income	1	0	0	0
Lithuania	0.74	-0.33	Europe & Central Asia	Upper middle income	1	0	0	0
Luxembourg	-0.48	-0.54	High Income	High income: OECD	1	0	0	0
Morocco	0.14	-0.24	Middle East & North Africa	Lower middle income	1	0	0	0
Moldova	0.45	0.23	Europe & Central Asia	Lower middle income	0	0	0	1
Madagascar	0.02	0.82	Sub-Saharan Africa	Low income	0	0	0	1
Maldives	-0.42	-0.12	South Asia	Lower middle income	1	0	0	0
Mexico	-0.09	-0.37	Latin America & Caribbean	Upper middle income	1	0	0	0
Macedonia, FYR	-0.09	-0.90	Europe & Central Asia	Lower middle income	1	0	0	0
Mali	0.29	0.43	Sub-Saharan Africa	Low income	0	0	0	1
Mongolia	0.46	0.21	East Asia & Pacific	Lower middle income	0	0	0	1
Mozambique	-0.40	-0.18	Sub-Saharan Africa	Low income	1	0	0	0
Mauritius	-0.24	-0.28	Sub-Saharan Africa	Upper middle income	1	0	0	0
Malaysia	0.66	0.12	East Asia & Pacific	Upper middle income	0	0	0	1
Namibia	0.52	0.26	Sub-Saharan Africa	Lower middle income	0	0	0	1
Niger	0.65	0.04	Sub-Saharan Africa	Low income	0	0	0	1
Nigeria	-0.06	-0.63	Sub-Saharan Africa	Low income	1	0	0	0
Nicaragua	0.21	0.14	Latin America & Caribbean	Lower middle income	0	0	0	1
Netherlands	-0.85	-0.35	High Income	High income: OECD	1	0	0	0
Norway	-0.09	-0.26	High Income	High income: OECD	1	0	0	0
Nepal	0.24	-0.16	South Asia	Low income	1	0	0	0
New Zealand	-0.10	-0.03	High Income	High income: OECD	1	0	0	0
Oman	0.13	-0.35	High Income	High income: nonOECD	1	0	0	0
Pakistan	0.75	-0.28	South Asia	Low income	1	0	0	0
Panama	0.56	0.60	Latin America & Caribbean	Upper middle income	0	0	0	1
Peru	0.48	0.45	Latin America & Caribbean	Lower middle income	0	0	0	1
Philippines	0.61	0.03	East Asia & Pacific	Lower middle income	0	0	0	1
Papua New Guinea	0.75	-0.02	East Asia & Pacific	Low income	1	0	0	0
Poland	0.18	0.69	Europe & Central Asia	Upper middle income	0	0	0	1
Portugal	0.43	0.06	High Income	High income: OECD	0	0	0	1
Paraguay	-0.30	-0.53	Latin America & Caribbean	Lower middle income	1	0	0	0
Qatar	0.22	0.48	High Income	High income: nonOECD	0	0	0	1
Russian Federation	0.78	-0.66	Europe & Central Asia	Upper middle income	1	0	0	0
Rwanda	0.85	0.98	Sub-Saharan Africa	Low income	0	0	0	1
Saudi Arabia	-0.28	-0.05	High Income	High income: nonOECD	1	0	0	0
Sudan	-0.04	0.61	Sub-Saharan Africa	Lower middle income	0	0	0	1
Senegal	0.00	0.61	Sub-Saharan Africa	Low income	0	0	0	1
Singapore	-0.33	-0.43	High Income	High income: nonOECD	1	0	0	0
Solomon Islands	0.07	0.65	East Asia & Pacific	Low income	0	0	0	1
Sierra Leone	0.78	0.72	Sub-Saharan Africa	Low income	0	0	0	1
El Salvador	-0.34	-0.18	Latin America & Caribbean	Lower middle income	1	0	0	0
Suriname	0.43	-0.23	Latin America & Caribbean	Upper middle income	1	0	0	0
Slovenia	0.10	0.01	High Income	High income: nonOECD	0	0	0	1
Sweden	-0.31	-0.12	High Income	High income: OECD	1	0	0	0
Swaziland	-0.02	0.26	Sub-Saharan Africa	Lower middle income	0	0	0	1
Seychelles	0.68	0.86	Sub-Saharan Africa	Upper middle income	0	0	0	1
Syrian Arab Republic	0.50	-0.56	Middle East & North Africa	Lower middle income	1	0	0	0
Chad	-0.39	-0.52	Sub-Saharan Africa	Low income	1	0	0	0
Togo	-0.61	0.17	Sub-Saharan Africa	Low income	0	0	0	1
Thailand	0.21	-0.01	East Asia & Pacific	Lower middle income	1	0	0	0
Tajikistan	0.41	-0.35	Europe & Central Asia	Low income	1	0	0	0
Turkmenistan	-0.38	0.50	Europe & Central Asia	Lower middle income	0	0	0	1
Trinidad and Tobago	-0.21	0.40	High Income	High income: nonOECD	0	0	0	1
Tunisia	-0.52	-0.80	Middle East & North Africa	Lower middle income	1	0	0	0
Turkey	0.68	-0.19	Europe & Central Asia	Upper middle income	1	0	0	0
Tanzania	0.08	-0.04	Sub-Saharan Africa	Low income	1	0	0	0
Uganda	-0.29	-0.33	Sub-Saharan Africa	Low income	1	0	0	0
Ukraine	0.56	0.36	Europe & Central Asia	Lower middle income	0	0	0	1
Uruguay	0.07	0.56	Latin America & Caribbean	Upper middle income	0	0	0	1
United States	-0.59	-0.88	High Income	High income: OECD	1	0	0	0
Uzbekistan	0.24	0.23	Europe & Central Asia	Low income	0	0	0	1
St. Vincent and the Grenadines	0.22	0.21	Latin America & Caribbean	Upper middle income	0	0	0	1
Venezuela, RB	0.45	0.31	Latin America & Caribbean	Upper middle income	0	0	0	1
Vietnam	0.11	-0.31	East Asia & Pacific	Low income	1	0	0	0
Vanuatu	-0.09	-0.05	East Asia & Pacific	Lower middle income	1	0	0	0
Yemen, Rep.	-0.04	0.65	Middle East & North Africa	Low income	0	0	0	1
South Africa	0.33	-0.79	Sub-Saharan Africa	Upper middle income	1	0	0	0
Congo, Dem. Rep.	-0.46	0.16	Sub-Saharan Africa	Low income	0	0	0	1
Zambia	-0.08	-0.21	Sub-Saharan Africa	Low income	1	0	0	0

(1) Booms defined as events when cyclical component of GDP is above the trend

(2) Downturns defined as events where cyclical component of GDP is below the trend

(*) Binary variable. Value 1 if country belong to category. Thrifty counter-cyclicaly in booms (ρ <0) and pro-cyclical in downturns (ρ >0); Spenders pro-cyclical in booms (ρ >0) and counter-cyclical in downturn (ρ <0); Stabilizer: always counter-cyclical (ρ <0); Volatile: always pro-cyclical(ρ>0)

Source: Authors calculations based on WEO data

Appendix 4

Panel Regression: Determinants of Cyclical Component of Real Gov. Expenditures (alternative filters). Period 1984-2009

VARIABLES	(1) Cyclical Component Real Gov. Exp., HP filter	(2) Cyclical Component Real Gov. Exp., BK filter	(3) Cyclical Component Real Gov. Exp., CF filter	(4) Cyclical Component Real Gov. Exp., BU filter	(5) Cyclical Component Real Gov. Exp., HP filter	(6) Cyclical Component Real Gov. Exp., BK filter	(7) Cyclical Component Real Gov. Exp., CF filter	(8) Cyclical Component Real Gov. Exp., BU filter
Cyclical Component Real GDP, Alternative filters (x)	1.815***	1.663***	1.258***	1.984***	1.768***	1.642***	1.392***	1.938***
	(10.078)	(8.193)	(8.407)	(8.447)	(9.394)	(7.693)	(7.523)	(7.785)
Interaction Cyclical Component Real GDP Alternative filters and Institutional Quality (x)	-2.484***	-2.028***	-1.232***	-2.755***				
	(-6.777)	(-4.766)	(-4.259)	(-5.636)				
Institutional Quality Proxy	0.004	0.000	0.040*	0.006				
	(0.199)	(0.020)	(1.936)	(0.397)				
Interaction Cyclical Component Real GDP alternative filters and Initial Institutional Quality (x)					-2.381***	-1.981***	-1.573***	-2.558***
					(-5.984)	(-4.237)	(-3.926)	(-4.717)
Interaction Cyclical Component Real GDP alternative filters and Change Institutional Quality (x)					-2.552***	-1.895***	-0.993***	-3.108***
					(-4.652)	(-3.129)	(-2.829)	(-4.577)
Change in Institutional Quality					0.006	0.001	0.025	0.004
					(0.297)	(0.037)	(1.153)	(0.285)
Constant	-0.002	-0.001	-0.026**	-0.003	-0.000	-0.001	-0.005*	0.000
	(-0.209)	(-0.121)	(-2.119)	(-0.396)	(-0.110)	(-0.399)	(-1.918)	(0.025)
Observations	2,347	2,145	2,347	2,347	2,260	2,058	2,260	2,260
R-squared	0.061	0.057	0.048	0.047	0.061	0.058	0.049	0.048
Number of code1	94	94	94	94	94	94	94	94
r2_a	0.0211	0.0125	0.00789	0.00626	0.0185	0.0110	0.00683	0.00550
F	48.90	41.04	38.22	36.93	34.91	29.98	28.14	27.37

t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

(x) The filter used to compute the cyclical component of GDP is the same as that used for computing the dependent variable

source: Authors calculations

Appendix 5

Panel Regression: Determinants of Cyclical Component of Real Gov. Expenditures (alternative filters). Additional Controls. Period 1984-2009

VARIABLES	(1) Cyclical Component Real Gov. Exp., HP filter	(2) Cyclical Component Real Gov. Exp., BK filter	(3) Cyclical Component Real Gov. Exp., CF filter	(4) Cyclical Component Real Gov. Exp., BU filter
Cyclical Component Real GDP, alternative filters (x)	2.899***	3.061***	1.940***	3.218***
	(8.337)	(7.631)	(7.280)	(7.273)
Interaction Cyclical Component Real GDP filter and Institutional Quality (x)	-3.021***	-3.042***	-1.319***	-3.222***
	(-5.042)	(-4.406)	(-3.218)	(-4.064)
Interaction Cyclical component of Real GDP and Chinn-Ito Index of Capital Openness (x)	0.086	0.099	0.043	0.100
	(1.440)	(1.407)	(1.106)	(1.207)
Interaction Cyclical component of Real GDP and financial depth (M2/GDP) (x)	-0.003	-0.005	-0.003*	-0.004
	(-1.230)	(-1.505)	(-1.888)	(-1.040)
Interaction Cyclical component of Real GDP and Volatility (Squared cyclical component GDP) (x)	-5.571	-5.200	17.303	-8.466
	(-0.319)	(-0.208)	(0.848)	(-0.294)
Interaction Cyclical component of Real GDP and Proxy Political Checks and Balances (x)	0.072	0.107*	0.047	0.146**
	(1.437)	(1.791)	(1.380)	(2.086)
Interaction Cyclical component of Real GDP and Debt Ratio to GDP (x)	-0.005***	-0.007***	-0.005***	-0.009***
	(-3.855)	(-4.443)	(-5.247)	(-5.527)
Interaction Cyclical component of Real GDP and Reserves Ratio to Imports (x)	-0.079***	-0.065***	-0.026**	-0.060***
	(-5.777)	(-3.833)	(-2.355)	(-3.035)
Institutional Quality Proxy	0.000	0.001	0.052*	0.014
	(0.001)	(0.049)	(1.953)	(0.823)
Chinn-Ito Index of Capital Openness	0.001	0.001	0.001	0.001
	(0.590)	(0.466)	(0.479)	(0.785)
Financial Depth (M2 Ratio to GDP)	0.000	0.000*	0.000*	0.000
	(1.513)	(1.750)	(1.904)	(1.444)
GDP volatility (Squared Cyclical Component of GDP)	-0.489	0.278	0.443	0.201
	(-0.354)	(0.193)	(0.322)	(0.183)
Proxy for Political Checks and Balances	-0.001	-0.001	-0.003	-0.000
	(-0.332)	(-0.513)	(-1.382)	(-0.262)
Debt to GDP ratio	0.000	0.000	0.000***	0.000***
	(1.136)	(1.246)	(5.493)	(4.178)
Reserves to Imports Ratio	-0.000	-0.000	0.001	0.000
	(-0.604)	(-0.849)	(1.046)	(0.008)
Constant	-0.010	-0.013	-0.060***	-0.023**
	(-0.707)	(-0.911)	(-3.534)	(-2.168)
Observations	1,952	1,768	1,768	1,768
R-squared	0.085	0.087	0.082	0.077
Number of ccode1	91	90	90	90
r2_a	0.0328	0.0302	0.0243	0.0195
F	11.41	10.60	9.863	9.272

t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

(x) The filter used to compute the cyclical component of GDP is the same as that used for computing the dependent variable

source: Authors calculations

Appendix 6

Cross country Regression. Fiscal Cyclicality Proxy under alternative filtering methods. 1984-2009. Role of Instit. Quality and Determinants

VARIABLES	(1) Correl. Cyclical Component Real Gov. Exp. And Real GDP, HP filter	(2) Correl. Cyclical Component Real Gov. Exp. And Real GDP, BK filter	(3) Correl. Cyclical Component Real Gov. Exp. And Real GDP, CF filter	(4) Correl. Cyclical Component Real Gov. Exp. And Real GDP, BU filter	(5) Correl. Cyclical Component Real Gov. Exp. And Real GDP, HP filter	(6) Correl. Cyclical Component Real Gov. Exp. And Real GDP, BK filter	(7) Correl. Cyclical Component Real Gov. Exp. And Real GDP, CF filter	(8) Correl. Cyclical Component Real Gov. Exp. And Real GDP, BU filter
Institutional Quality (from ICRG), average 1984-2009	-0.946***	-0.763***	-0.812***	-0.645***	-1.118***	-0.883***	-1.187***	-0.778***
	(-6.420)	(-5.263)	(-5.267)	(-4.318)	(-4.460)	(-3.504)	(-4.515)	(-3.165)
Chinn-Ito Index of Capital Openness, average 1984-2009					0.001	-0.001	-0.006	-0.038
					(0.023)	(-0.021)	(-0.217)	(-1.388)
Financial Depth (M2 Ratio to GDP), average 1984-2009					0.001	0.000	0.000	0.001
					(0.566)	(0.367)	(0.408)	(0.833)
GDP volatility (Squared Cyclical Component of GDP), average 1984-2009 [a]					95.657**	118.368*	3.916*	345.230**
					(2.109)	(1.975)	(1.971)	(2.294)
Proxy for Political Checks and Balances, average 1984-2009					0.029	0.027	0.038	0.061**
					(1.213)	(1.129)	(1.579)	(2.606)
Debt to GDP ratio, average 1984-2009					-0.001	-0.001	-0.002**	-0.002**
					(-1.386)	(-1.577)	(-2.292)	(-2.362)
Reserves to Imports Ratio, average 1984-2009					-0.020***	-0.013*	-0.017**	-0.014*
					(-2.706)	(-1.671)	(-2.195)	(-1.851)
Constant	0.648***	0.567***	0.587***	0.476***	0.742***	0.627***	0.844***	0.459***
	(7.502)	(6.652)	(6.492)	(5.433)	(4.921)	(4.133)	(5.852)	(3.088)
Observations	92	91	92	92	91	90	91	91
R-squared	0.314	0.237	0.236	0.172	0.413	0.313	0.364	0.334
r2_a	0.306	0.229	0.227	0.162	0.364	0.254	0.311	0.278
F	41.22	27.69	27.75	18.65	8.358	5.325	6.793	5.945

t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

(a) The filter used to compute the cyclical component of GDP is the same as that used for computing the dependent variable

source: Authors calculations

Appendix 7

Panel Regression: Determinants of Cyclical Component of Real Gov. Expenditures (alternative filters). Period 1990-2010. Institutional Quality based on ICRG dataset

VARIABLES	(1) Cyclical Component Real Gov. Exp., HP filter	(2) Cyclical Component Real Gov. Exp., BK filter	(3) Cyclical Component Real Gov. Exp., CF filter	(4) Cyclical Component Real Gov. Exp., BU filter	(5) Cyclical Component Real Gov. Exp., HP filter	(6) Cyclical Component Real Gov. Exp., BK filter	(7) Cyclical Component Real Gov. Exp., CF filter	(8) Cyclical Component Real Gov. Exp., BU filter
Cyclical Component Real GDP, Alternative filters (x)	1.685***	2.366***	0.862***	1.437***	1.852***	2.323***	1.744***	1.530***
	(12.102)	(13.469)	(10.480)	(8.759)	(11.457)	(12.082)	(10.876)	(8.294)
Interaction Cyclical Component Real GDP Alternative filters and Institutional Quality (x)	-2.342***	-3.336***	-0.584***	-1.974***				
	(-8.065)	(-9.435)	(-4.033)	(-5.574)				
Institutional Quality Proxy, based on International Country Risk Guide data	-0.002	0.024	0.096***	-0.004				
	(-0.083)	(0.944)	(2.823)	(-0.255)				
Interaction Cyclical Component Real GDP alternative filters and Initial Institutional Quality (x)					-2.644***	-3.021***	-2.538***	-2.237***
					(-8.070)	(-8.099)	(-7.625)	(-5.817)
Interaction Cyclical Component Real GDP alternative filters and Change Institutional Quality (x)					-0.479	-2.118***	0.049	0.103
					(-1.496)	(-4.788)	(0.345)	(0.304)
Change in Institutional Quality					-0.005	0.018	-0.018	-0.004
					(-0.204)	(0.731)	(-0.542)	(-0.252)
Constant	0.002	-0.013	-0.013	0.003	0.000	-0.002	0.073***	0.000
	(0.145)	(-0.912)	(-0.711)	(0.295)	(0.177)	(-0.782)	(7.350)	(0.108)
Observations	2,908	2,569	2,908	2,908	2,898	2,563	2,898	2,898
R-squared	0.075	0.101	0.050	0.049	0.075	0.097	0.065	0.054
Number of ccode1	133	133	133	133	133	133	133	133
r2_a	0.0295	0.0515	0.00405	0.00275	0.0299	0.0464	0.0191	0.00766
F	74.46	91.51	48.94	47.67	56.29	65.14	48.13	39.59

t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

(x) The filter used to compute the cyclical component of GDP is the same as that used for computing the dependent variable

source: Authors calculations

Panel Regression: Determinants of Cyclical Component of Real Gov. Expenditures (alternative filters). Period 1990-2013. Institutional Quality based on Kuncic (2013) dataset

VARIABLES	(1) Cyclical Component Real Gov. Exp., HP filter	(2) Cyclical Component Real Gov. Exp., BK filter	(3) Cyclical Component Real Gov. Exp., CF filter	(4) Cyclical Component Real Gov. Exp., BU filter	(5) Cyclical Component Real Gov. Exp., HP filter	(6) Cyclical Component Real Gov. Exp., BK filter	(7) Cyclical Component Real Gov. Exp., CF filter	(8) Cyclical Component Real Gov. Exp., BU filter
Cyclical Component Real GDP, Alternative filters (x)	1.143***	1.236***	0.942***	0.589***	1.062***	1.088***	0.823***	0.580***
	(8.165)	(8.056)	(9.530)	(3.624)	(7.099)	(6.693)	(5.648)	(3.400)
Interaction Cyclical Component Real GDP Alternative filters and Institutional Quality (x)	-1.386***	-1.324***	-1.007***	-0.513				
	(-4.537)	(-4.005)	(-5.219)	(-1.372)				
Institutional Quality Proxy, based on Kuncic (2013)	0.010	0.005	0.137***	0.005				
	(0.305)	(0.147)	(3.404)	(0.223)				
Interaction Cyclical Component Real GDP alternative filters and Initial Institutional Quality (x)					-0.974***	-0.857**	-0.657*	-0.253
					(-2.872)	(-2.360)	(-1.908)	(-0.627)
Interaction Cyclical Component Real GDP alternative filters and Change Institutional Quality (x)					-3.100***	-3.126***	-1.103***	-2.207***
					(-5.163)	(-4.673)	(-4.533)	(-2.813)
Change in Institutional Quality					-0.026	-0.019	0.129***	-0.010
					(-0.755)	(-0.539)	(2.747)	(-0.398)
Constant	-0.004	-0.002	-0.020	-0.002	0.003	0.002	0.039***	0.001
	(-0.234)	(-0.139)	(-0.941)	(-0.180)	(1.254)	(0.664)	(3.623)	(0.518)
Observations	3,157	3,045	3,157	3,157	3,017	2,921	3,017	3,017
R-squared	0.038	0.043	0.035	0.012	0.043	0.042	0.034	0.016
Number of ccode1	180	180	180	180	180	180	180	180
r2_a	-0.0207	-0.0181	-0.0242	-0.0483	-0.0191	-0.0223	-0.0281	-0.0476
F	39.29	42.64	35.77	12.17	31.64	29.86	25.16	11.51

t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

(x) The filter used to compute the cyclical component of GDP is the same as that used for computing the dependent variable

source: Authors calculations

Appendix 8

Panel Regression: Determinants of Cyclical Component of Real Gov. Expenditures (alternative filters and two alternative proxies for Instit. Quality). Additional Controls. Period 1990-2013.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Institutional Quality proxy is that of Kuncic (2013)				Institutional Quality proxy is ICRG			
	Cyclical Component Real Gov. Exp., HP filter	Cyclical Component Real Gov. Exp., BK filter	Cyclical Component Real Gov. Exp., CF filter	Cyclical Component Real Gov. Exp., BU filter	Cyclical Component Real Gov. Exp., HP filter	Cyclical Component Real Gov. Exp., BK filter	Cyclical Component Real Gov. Exp., CF filter	Cyclical Component Real Gov. Exp., BU filter
Cyclical Component Real GDP, Alternative filters [a]	1.025***	0.756**	1.151***	-0.082	1.990***	2.552***	1.211***	2.536***
	(3.853)	(2.482)	(7.510)	(-0.245)	(7.837)	(8.006)	(9.185)	(7.044)
Interaction Cyclical Component Real GDP filter and Institutional Quality, Alternative filters [a]	-0.564	0.164	-1.170***	1.366	-1.788***	-2.843***	-1.074***	-3.044***
	(-0.867)	(0.225)	(-4.279)	(1.589)	(-3.631)	(-4.538)	(-5.466)	(-4.282)
Interaction Cyclical component of Real GDP and Chinn-Ito Index of Capital Openness, Alternative filters [a]	-0.042	-0.071	-0.002	-0.056	-0.028	-0.015	0.002	-0.005
	(-0.794)	(-1.199)	(-0.090)	(-0.822)	(-0.609)	(-0.286)	(0.124)	(-0.077)
Interaction Cyclical component of Real GDP and financial depth (M2/GDP), Alternative filters [a]	-0.007***	-0.008***	-0.001	-0.009***	-0.009***	-0.004*	-0.001**	-0.003
	(-7.884)	(-3.063)	(-1.405)	(-7.871)	(-5.201)	(-1.669)	(-1.974)	(-1.058)
Interaction Cyclical component of Real GDP and Volatility (Squared cyclical component GDP), Alternative filters [a]	-3.047	-3.568	-4.516	-1.541	5.034*	7.698*	1.243	14.587***
	(-1.562)	(-0.807)	(-1.329)	(-0.327)	(1.818)	(1.712)	(0.616)	(2.820)
Interaction Cyclical component of Real GDP and Proxy Political Checks and Balances, Alternative filters [a]	0.007	-0.017	0.030**	-0.012	0.013	-0.010	0.013	0.013
	(0.145)	(-0.314)	(2.547)	(-0.197)	(0.310)	(-0.221)	(1.076)	(0.234)
Interaction Cyclical component of Real GDP and Debt Ratio to GDP, Alternative filters [a]	0.002**	0.002**	-0.000	0.004***	-0.001	-0.002*	-0.000	-0.002**
	(2.380)	(2.534)	(-0.129)	(3.437)	(-0.891)	(-1.866)	(-0.209)	(-2.004)
Interaction Cyclical component of Real GDP and Reserves Ratio to Imports, Alternative filters [a]	0.004	0.011*	0.006*	0.015**	-0.002	-0.014	0.004	-0.029**
	(0.646)	(1.672)	(1.775)	(2.488)	(-0.514)	(-1.394)	(1.129)	(-2.512)
Institutional Quality Proxy	0.010	0.017	0.187***	0.011	0.013	0.046*	0.229***	0.021
	(0.244)	(0.419)	(3.198)	(0.368)	(0.490)	(1.657)	(5.010)	(0.986)
Chinn-Ito Index of Capital Openness	0.000	0.002	0.002	0.001	-0.001	0.000	0.001	-0.000
	(0.064)	(0.757)	(0.431)	(0.312)	(-0.247)	(0.183)	(0.173)	(-0.265)
Financial Depth (M2 Ratio to GDP)	0.000***	0.000***	0.000***	0.000*	0.000**	0.000**	0.000***	0.000
	(2.856)	(2.849)	(2.594)	(1.806)	(2.383)	(2.354)	(2.588)	(1.297)
GDP volatility (Squared Cyclical Component of GDP), Alternative filters [a]	-0.804	-0.716	0.088	-0.046	1.268*	0.945	1.018*	1.284**
	(-1.485)	(-0.793)	(0.077)	(-0.067)	(1.705)	(1.275)	(1.816)	(2.145)
Proxy for Political Checks and Balances	-0.002	-0.002	-0.009***	-0.001	-0.001	-0.001	-0.005	-0.001
	(-1.067)	(-1.124)	(-2.952)	(-1.130)	(-0.366)	(-0.593)	(-1.581)	(-0.573)
Debt to GDP ratio	0.000*	0.000	0.000	0.000*	0.000***	0.000	0.000	0.000
	(1.931)	(1.291)	(1.153)	(1.850)	(2.782)	(0.648)	(1.567)	(1.474)
Reserves to Imports Ratio	-0.000	-0.000	-0.001	-0.000	-0.001	-0.000	-0.001	-0.000
	(-0.528)	(-0.687)	(-1.340)	(-0.177)	(-1.464)	(-1.020)	(-1.239)	(-0.612)
Constant	-0.019	-0.024	-0.070**	-0.014	-0.021	-0.038**	-0.108***	-0.018
	(-0.925)	(-1.085)	(-2.157)	(-0.843)	(-1.271)	(-2.157)	(-3.691)	(-1.340)
Observations	2,538	2,462	2,466	2,466	2,377	2,209	2,213	2,213
R-squared	0.069	0.057	0.060	0.029	0.115	0.114	0.099	0.088
Number of ccode1	155	154	154	154	125	124	124	124
r2_a	0.00256	-0.0120	-0.00864	-0.0420	0.0604	0.0546	0.0390	0.0270
F	11.70	9.255	9.798	4.579	19.45	17.70	15.18	13.29

t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

(a) The filter used to compute the cyclical component of GDP is the same as that used for computing the dependent variable

source: Authors calculations

Appendix 9

Cross country Regression. Fiscal Cyclicality Proxy under alternative filtering methods. 1990-2011. Role of Instit. Quality and Determinants. Instit. Quality proxy is that of Kuncic (2013)

VARIABLES	(1) Correl. Cyclical Component Real Gov. Exp. And Real GDP, HP filter	(2) Correl. Cyclical Component Real Gov. Exp. And Real GDP, BK filter	(3) Correl. Cyclical Component Real Gov. Exp. And Real GDP, CF filter	(4) Correl. Cyclical Component Real Gov. Exp. And Real GDP, BU filter	(5) Correl. Cyclical Component Real Gov. Exp. And Real GDP, HP filter	(6) Correl. Cyclical Component Real Gov. Exp. And Real GDP, BK filter	(7) Correl. Cyclical Component Real Gov. Exp. And Real GDP, CF filter	(8) Correl. Cyclical Component Real Gov. Exp. And Real GDP, BU filter
Institutional Quality, average 1990-2010. IQ Proxy from Kuncic (2013)	-0.951***	-0.767***	-0.848***	-0.699***	-0.949***	-0.604**	-0.945***	-0.658**
	(-5.789)	(-4.609)	(-5.085)	(-4.119)	(-3.172)	(-2.021)	(-3.057)	(-2.142)
Chinn-Ito Index of Capital Openness, average 1990-2011					0.002	-0.029	-0.001	-0.010
					(0.074)	(-1.120)	(-0.028)	(-0.377)
Financial Depth (M2 Ratio to GDP), average 1990-2011					-0.001	-0.001	-0.001	-0.001
					(-1.108)	(-0.874)	(-0.977)	(-1.158)
GDP volatility (Squared Cyclical Component of GDP), average 1990-2011 (x)					34.724**	37.840**	-0.445	56.727**
					(2.512)	(2.493)	(-1.035)	(2.343)
Proxy for Political Checks and Balances, average 1990-2011					0.030	0.016	0.029	0.028
					(1.176)	(0.613)	(1.105)	(1.069)
Debt to GDP ratio, average 1990-2011					-0.001	-0.001	-0.000	-0.000
					(-0.801)	(-0.998)	(-0.749)	(-0.557)
Reserves to Imports Ratio, average 1990-2011					-0.013*	-0.017**	-0.003	-0.017**
					(-1.842)	(-2.313)	(-0.453)	(-2.135)
Constant	0.601***	0.500***	0.544***	0.424***	0.644***	0.533***	0.635***	0.483***
	(6.679)	(5.475)	(5.958)	(4.568)	(4.431)	(3.675)	(4.115)	(3.233)
Observations	156	155	156	156	155	154	155	155
R-squared	0.179	0.122	0.144	0.099	0.246	0.203	0.182	0.171
r2_a	0.173	0.116	0.138	0.0934	0.210	0.165	0.143	0.132
F	33.52	21.25	25.85	16.97	6.838	5.320	4.680	4.338

t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1
(x) The filter used to compute the cyclical component of GDP is the same as that used for computing the dependent variable
source: Authors calculations

Cross country Regression. Fiscal Cyclicality Proxy under alternative filtering methods. 1990-2011. Role of Instit. Quality and Determinants. Instit. Quality proxy is ICRG

VARIABLES	(1) Correl. Cyclical Component Real Gov. Exp. And Real GDP, HP filter	(2) Correl. Cyclical Component Real Gov. Exp. And Real GDP, BK filter	(3) Correl. Cyclical Component Real Gov. Exp. And Real GDP, CF filter	(4) Correl. Cyclical Component Real Gov. Exp. And Real GDP, BU filter	(5) Correl. Cyclical Component Real Gov. Exp. And Real GDP, HP filter	(6) Correl. Cyclical Component Real Gov. Exp. And Real GDP, BK filter	(7) Correl. Cyclical Component Real Gov. Exp. And Real GDP, CF filter	(8) Correl. Cyclical Component Real Gov. Exp. And Real GDP, BU filter
Institutional Quality, average 1990-2010. IQ Proxy from ICRG	-1.149***	-0.982***	-1.033***	-0.861***	-1.057***	-0.805***	-1.077***	-0.660**
	(-7.346)	(-6.052)	(-6.310)	(-5.087)	(-4.189)	(-3.129)	(-4.011)	(-2.434)
Chinn-Ito Index of Capital Openness, average 1990-2011					-0.007	-0.034	-0.003	-0.021
					(-0.266)	(-1.320)	(-0.129)	(-0.766)
Financial Depth (M2 Ratio to GDP), average 1990-2011					-0.000	-0.000	-0.000	-0.001
					(-0.447)	(-0.108)	(-0.111)	(-0.934)
GDP volatility (Squared Cyclical Component of GDP), average 1990-2011 (x)					36.097**	42.907**	-0.424	59.247**
					(2.398)	(2.456)	(-0.993)	(2.309)
Proxy for Political Checks and Balances, average 1990-2011					-0.004	-0.012	-0.003	-0.003
					(-0.170)	(-0.529)	(-0.104)	(-0.124)
Debt to GDP ratio, average 1990-2011					-0.001	-0.001	-0.001	-0.000
					(-1.137)	(-1.317)	(-1.217)	(-0.721)
Reserves to Imports Ratio, average 1990-2011					-0.011	-0.019**	-0.001	-0.017**
					(-1.604)	(-2.412)	(-0.227)	(-2.024)
Constant	0.734***	0.637***	0.669***	0.536***	0.805***	0.731***	0.800***	0.604***
	(7.878)	(6.601)	(6.867)	(5.313)	(5.516)	(4.904)	(5.002)	(3.825)
Observations	126	126	126	126	125	125	125	125
R-squared	0.303	0.228	0.243	0.173	0.351	0.299	0.265	0.236
r2_a	0.298	0.222	0.237	0.166	0.313	0.257	0.221	0.190
F	53.96	36.63	39.82	25.88	9.055	7.135	6.034	5.167

t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1
(x) The filter used to compute the cyclical component of GDP is the same as that used for computing the dependent variable
source: Authors calculations

Appendix 10

Panel Regression: Determinants of Cyclical Component of Real Gov. Expenditures (alternative filters and two alternative proxies for Instit. Quality). Additional Controls. Period 1990-2013.

	Institutional Quality proxy is that of Kunčič (2013)				Institutional Quality proxy is ICRG			
VARIABLES	Cyclical Component Real Gov. Exp., HP filter	Cyclical Component Real Gov. Exp., BK filter	Cyclical Component Real Gov. Exp., CF filter	Cyclical Component Real Gov. Exp., BU filter	Cyclical Component Real Gov. Exp., HP filter	Cyclical Component Real Gov. Exp., BK filter	Cyclical Component Real Gov. Exp., CF filter	Cyclical Component Real Gov. Exp., BU filter
Cyclical Component Real GDP, Alternative filters [a]	0.893***	0.879**	0.924***	-0.237	2.649***	2.593***	2.400***	2.460***
	(2.859)	(2.338)	(3.848)	(-0.671)	(8.619)	(6.376)	(9.134)	(6.240)
Interaction Cyclical Component Real GDP alternative filters and Initial Institutional Quality [a]	-0.045	0.625	-0.596	2.093**	-3.058***	0.030	-2.697***	-2.321***
	(-0.059)	(0.684)	(-1.031)	(2.162)	(-5.527)	(1.014)	(-5.799)	(-3.391)
Interaction Cyclical Component Real GDP alternative filters and Change Institutional Quality [a]	-1.594*	-2.141*	0.040	0.528	-2.044***	-2.587***	-0.527**	-1.963***
	(-1.744)	(-1.960)	(-0.097)	(0.450)	(-3.602)	(-3.559)	(-2.299)	(-2.895)
Interaction Cyclical component of Real GDP and Initial Chinn-Ito Index of Capital Openness, Alternative filters [a]	0.002	-0.101	-0.009	-0.073	0.020	-0.004	0.001	0.026
	(0.034)	(-1.237)	(-0.149)	(-0.864)	(0.353)	(-0.050)	(0.022)	(0.368)
Interaction Cyclical component of Real GDP and initial financial depth (M2/GDP), Alternative filters [a]	-0.003	-0.004	-0.003*	-0.006	-0.006**	-0.007***	-0.006***	-0.010***
	(-0.984)	(-1.301)	(-1.706)	(-1.483)	(-2.108)	(-2.574)	(-3.219)	(-3.092)
Interaction Cyclical component of Real GDP and initial Volatility (Squared cyclical component GDP), Alternative filters [a]	-29.628***	66.944	5.088	-42.348	-9.441	66.671	-2.733	10.256
	(-2.660)	(1.525)	(1.628)	(-1.509)	(-0.845)	(1.458)	(-0.747)	(0.417)
Interaction Cyclical component of Real GDP and initial Proxy Political Checks and Balances, Alternative filters [a]	0.055	0.006	0.053	0.009	0.060	0.003	0.025	0.084
	(0.854)	(0.087)	(0.986)	(0.120)	(1.142)	(0.040)	(0.560)	(1.330)
Interaction Cyclical component of Real GDP and initial Debt Ratio to GDP, Alternative filters [a]	0.002	-0.000	0.001	0.003**	-0.002**	-0.003**	-0.001	-0.002*
	(1.575)	(-0.147)	(0.748)	(2.046)	(-2.052)	(-2.194)	(-1.439)	(-1.959)
Interaction Cyclical component of Real GDP and initial Reserves Ratio to Imports, Alternative filters [a]	-0.055***	-0.059**	-0.011	-0.025	-0.026	-0.017	-0.004	-0.055**
	(-2.786)	(-2.457)	(-0.641)	(-0.989)	(-1.417)	(-0.705)	(-0.251)	(-2.233)
Interaction Cyclical component of Real GDP and Change in Chinn-Ito Index of Capital Openness, Alternative filters [a]	-0.084	-0.124	-0.001	-0.054	-0.034	-0.059	-0.010	0.038
	(-1.303)	(-1.505)	(-0.031)	(-0.657)	(-0.590)	(-0.766)	(-0.587)	(0.555)
Interaction Cyclical component of Real GDP and change in financial depth (M2/GDP), Alternative filters [a]	-0.013***	-0.009**	-0.001*	-0.015***	-0.006*	-0.002	-0.001	-0.005
	(-4.002)	(-2.329)	(-1.654)	(-3.397)	(-1.943)	(-0.511)	(-1.021)	(-1.291)
Interaction Cyclical component of Real GDP and change in Volatility (Squared cyclical component GDP), Alternative filters [a]	0.954	-8.629*	-2.459*	9.078*	4.647	13.990	-1.084	5.329
	(0.364)	(-1.656)	(-1.900)	(1.734)	(1.336)	(1.163)	(-0.903)	(1.290)
Interaction Cyclical component of Real GDP and change in Proxy Political Checks and Balances, Alternative filters [a]	-0.011	-0.005	-0.032***	0.066	-0.030	-0.037	0.002	-0.101
	(-0.196)	(-0.069)	(-1.997)	(0.918)	(-0.567)	(-0.576)	(0.122)	(-1.554)
Interaction Cyclical component of Real GDP and change in Debt Ratio to GDP, Alternative filters [a]	0.002	-0.000	0.000	0.003***	-0.002***	-0.004**	-0.000	-0.002*
	(1.606)	(-0.250)	(0.597)	(2.341)	(-2.001)	(-2.083)	(-0.946)	(-1.651)
Interaction Cyclical component of Real GDP and change in Reserves Ratio to Imports, Alternative filters [a]	0.020**	-0.009	0.009**	0.008	0.001	-0.002	0.005**	0.010**
	(2.345)	(-0.721)	(2.063)	(0.692)	(0.158)	(-0.138)	(2.042)	(2.400)
Change in Institutional Quality Proxy	0.011	0.002	0.019	0.015	0.008	-1.884***	0.048	0.003
	(0.270)	(0.042)	(0.346)	(0.463)	(0.294)	(-2.614)	(1.440)	(0.153)
Change in Chinn-Ito Index of Capital Openness	0.002	0.003	0.003	0.001	0.000	0.002	0.001	0.001
	(0.632)	(0.942)	(1.094)	(0.639)	(0.143)	(0.845)	(0.344)	(0.471)
Change in Financial Depth (M2 Ratio to GDP)	0.000***	0.000***	0.000	0.000*	0.000***	0.000***	0.000	0.000
	(3.267)	(3.154)	(1.277)	(1.951)	(2.408)	(2.200)	(0.800)	(1.309)
Change in GDP volatility (Squared Cyclical Component of GDP), Alternative filters [a]	-1.185**	-1.679	0.031	-1.461	1.589**	0.780	0.132	0.878
	(-2.063)	(-1.443)	(0.114)	(-1.476)	(2.101)	(0.607)	(0.484)	(0.852)
Change in Proxy for Political Checks and Balances	-0.001	-0.001	-0.005**	-0.001	-0.000	-0.001	-0.001	-0.000
	(-0.607)	(-0.526)	(-2.201)	(-0.690)	(-0.142)	(-0.618)	(-0.339)	(-0.392)
Change in Debt to GDP ratio	0.000***	0.000***	0.000***	0.000***	0.000***	0.000	0.000	0.000*
	(3.650)	(2.768)	(2.770)	(2.850)	(3.474)	(0.358)	(1.548)	(1.899)
Change in Reserves to Imports Ratio	-0.000	0.000	0.001	-0.000	-0.000	-0.000	0.000	-0.000
	(-0.417)	(0.231)	(1.470)	(-0.095)	(-0.857)	(-0.445)	(0.840)	(-0.577)
Constant	0.004	0.001	0.002	0.001	0.003	-0.005	-0.006	0.000
	(1.209)	(0.204)	(0.219)	(0.398)	(0.859)	(-1.402)	(-0.791)	(0.065)
Observations	2,452	2,236	2,452	2,452	2,256	1,972	2,256	2,256
R-squared	0.077	0.062	0.061	0.035	0.133	0.087	0.105	0.070
Number of ccode1	155	153	155	155	125	124	125	125
r2_a	0.00588	-0.0176	-0.0112	-0.0401	0.0731	0.0140	0.0435	0.00565
F	8.659	6.157	6.771	3.701	14.72	7.866	11.30	7.218

t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix 11

2-period Panel Country Regression. Changes Fiscal Cyclicality Proxy under alternative filtering methods. Role of Instit. Quality and Determinants. Instit. Quality proxy is that of Kuncic (2013) (*)

VARIABLES	(1) Correl. Cyclical Component Real Gov. Exp. And Real GDP, HP filter	(2) Correl. Cyclical Component Real Gov. Exp. And Real GDP, BK filter	(3) Correl. Cyclical Component Real Gov. Exp. And Real GDP, CF filter	(4) Correl. Cyclical Component Real Gov. Exp. And Real GDP, BU filter	(5) Correl. Cyclical Component Real Gov. Exp. And Real GDP, HP filter	(6) Correl. Cyclical Component Real Gov. Exp. And Real GDP, BK filter	(7) Correl. Cyclical Component Real Gov. Exp. And Real GDP, CF filter	(8) Correl. Cyclical Component Real Gov. Exp. And Real GDP, BU filter
Initial Correlation Real Gov. Exp-GDP, alternative filters (Avg. 1990-2000) [x]	-0.937***	-0.837***	-0.978***	-1.028***	-0.968***	-0.848***	-1.010***	-1.016***
	(-10.292)	(-9.897)	(-11.085)	(-11.313)	(-10.561)	(-9.784)	(-11.300)	(-10.761)
Initial Institutional Quality (Avg. 1990-2000) based on Kuncic (2013)	-0.491**	-0.772***	-0.482**	-0.464**	-0.440	-0.681*	-0.340	-0.454
	(-2.158)	(-3.781)	(-2.122)	(-2.022)	(-1.010)	(-1.742)	(-0.783)	(-0.987)
Initial Chinn-Ito Index of Capital Openness (Avg. 1990-2000)					0.001	0.006	-0.008	0.027
					(0.025)	(0.188)	(-0.204)	(0.659)
Initial M2 Ratio to GDP (Avg. 1990-2000)					-0.002	-0.002	-0.003*	-0.002
					(-1.494)	(-1.186)	(-1.717)	(-1.375)
Initial GDP volatility (Squared Cyclical Component of GDP), alternative filters (Avg. 1990-2000) [x]					6.178	7.928	7.507	11.952
					(0.316)	(0.597)	(0.396)	(0.713)
Initial Checks and Balances (Avg. 1990-2000)					-0.013	0.000	-0.017	0.001
					(-0.376)	(0.006)	(-0.476)	(0.018)
Initial Debt to GDP ratio (Avg. 1990-2000)					0.000	0.001	-0.000	0.000
					(0.026)	(0.455)	(-0.162)	(0.045)
Initial Reserves to Imports Ratio (Avg. 1990-2000)					-0.014	-0.012	-0.016	-0.015
					(-0.901)	(-0.864)	(-1.046)	(-0.935)
Change in Institutional Quality (2000-2010 vs 1990-2000) based on Kuncic (2013)	0.224	-0.247	0.009	-0.285	0.613	0.386	0.295	0.048
	(0.323)	(-0.403)	(0.013)	(-0.397)	(0.825)	(0.584)	(0.396)	(0.061)
Change in Chinn-Ito Index of Capital Openness (2000-2010 vs 1990-2000)					-0.003	-0.006	0.002	0.073
					(-0.058)	(-0.134)	(0.053)	(1.459)
Change in M2 Ratio to GDP (2000-2010 vs 1990-2000)					-0.003	-0.004*	-0.002	-0.003
					(-1.160)	(-1.869)	(-1.077)	(-1.367)
Change in GDP Volatility, alternative filters (2000-2010 vs 1990-2000) [x]					8.767	30.415**	4.395	11.544
					(0.575)	(2.378)	(0.304)	(0.501)
Change in Checks and Balances (2000-2010 vs 1990-2000)					-0.062	-0.045	-0.058	-0.075
					(-1.265)	(-1.018)	(-1.167)	(-1.441)
Change in Debt to GDP Ratio (2000-2010 vs 1990-2000)					0.000	0.000	0.000	-0.000
					(0.148)	(0.160)	(0.251)	(-0.040)
Change in Reserves to Imports Ratio (2000-2010 vs 1990-2000)					-0.023**	-0.016**	-0.019**	-0.013
					(-2.473)	(-2.023)	(-2.188)	(-1.310)
Constant	0.212	0.368***	0.217	0.184	0.476**	0.475**	0.485**	0.368
	(1.571)	(3.036)	(1.613)	(1.367)	(2.019)	(2.237)	(2.046)	(1.490)
Observations	131	131	131	131	128	128	128	128
R-squared	0.456	0.437	0.493	0.503	0.531	0.507	0.564	0.563
r2_a	0.443	0.424	0.481	0.491	0.469	0.440	0.506	0.504
F	35.43	32.85	41.16	42.81	8.471	7.665	9.658	9.615

t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

(x) The filter used to compute the cyclical component of GDP is the same as that used for computing the dependent variable

(*) The initial period is 1990-2000 and the values reported are the period average for the variable. Changes refer to differences in the average of series for 2000-2011 minus that of 1990-2010.

source: Authors calculations

2-period Panel Country Regression. Changes Fiscal Cyclicality Proxy under alternative filtering methods. Role of Instit. Quality and Determinants. Instit. Quality proxy is ICRG (*)

VARIABLES	(1) Correl. Cyclical Component Real Gov. Exp. And Real GDP, HP filter	(2) Correl. Cyclical Component Real Gov. Exp. And Real GDP, BK filter	(3) Correl. Cyclical Component Real Gov. Exp. And Real GDP, CF filter	(4) Correl. Cyclical Component Real Gov. Exp. And Real GDP, BU filter	(5) Correl. Cyclical Component Real Gov. Exp. And Real GDP, HP filter	(6) Correl. Cyclical Component Real Gov. Exp. And Real GDP, BK filter	(7) Correl. Cyclical Component Real Gov. Exp. And Real GDP, CF filter	(8) Correl. Cyclical Component Real Gov. Exp. And Real GDP, BU filter
Initial Correlation Real Gov. Exp-GDP, alternative filters (Avg. 1990-2000) [x]	-1.046***	-0.943***	-1.082***	-1.115***	-1.057***	-0.958***	-1.088***	-1.093***
	(-10.767)	(-10.432)	(-11.725)	(-12.074)	(-10.772)	(-10.353)	(-11.492)	(-11.514)
Initial Institutional Quality (Avg. 1990-2000) based on ICRG	-0.941***	-1.105***	-0.915***	-0.900***	-0.760**	-0.958***	-0.687*	-0.909**
	(-3.850)	(-5.043)	(-3.803)	(-3.775)	(-2.033)	(-2.868)	(-1.867)	(-2.412)
Initial Chinn-Ito Index of Capital Openness (Avg. 1990-2000)					0.002	0.009	0.000	0.047
					(0.050)	(0.271)	(0.012)	(1.195)
Initial M2 Ratio to GDP (Avg. 1990-2000)					-0.003**	-0.002	-0.003**	-0.002
					(-1.809)	(-1.400)	(-2.031)	(-1.400)
Initial GDP volatility (Squared Cyclical Component of GDP), alternative filters (Avg. 1990-2000) [x]					15.344	10.073	16.268	27.406
					(0.681)	(0.647)	(0.750)	(1.284)
Initial Checks and Balances (Avg. 1990-2000)					-0.051	-0.039	-0.050	-0.029
					(-1.584)	(-1.386)	(-1.563)	(-0.863)
Initial Debt to GDP ratio (Avg. 1990-2000)					0.001	0.001	0.001	-0.000
					(0.702)	(0.747)	(0.377)	(-0.103)
Initial Reserves to Imports Ratio (Avg. 1990-2000)					-0.018	-0.016	-0.018	-0.025
					(-1.028)	(-1.086)	(-1.035)	(-1.443)
Change in Institutional Quality (2000-2010 vs 1990-2000) based on ICRG	-0.936*	-1.011**	-0.961*	-0.545	-0.606	-0.570	-0.685	-0.407
	(-1.670)	(-2.090)	(-1.734)	(-0.947)	(-0.979)	(-1.061)	(-1.112)	(-0.640)
Change in Chinn-Ito Index of Capital Openness (2000-2010 vs 1990-2000)					0.029	0.017	0.036	0.322**
					(0.596)	(0.382)	(0.740)	(2.391)
Change in M2 Ratio to GDP (2000-2010 vs 1990-2000)					-0.000	-0.002	-0.000	-0.001
					(-0.161)	(-0.873)	(-0.104)	(-0.531)
Change in GDP Volatility, alternative filters (2000-2010 vs 1990-2000) [x]					12.081	37.041***	4.148	22.177
					(0.800)	(2.780)	(0.283)	(0.999)
Change in Checks and Balances (2000-2010 vs 1990-2000)					-0.096*	-0.084**	-0.094*	-0.113**
					(-1.966)	(-1.990)	(-1.937)	(-2.241)
Change in Debt to GDP Ratio (2000-2010 vs 1990-2000)					0.001	0.001	0.001	-0.000
					(0.767)	(0.309)	(0.758)	(-0.128)
Change in Reserves to Imports Ratio (2000-2010 vs 1990-2000)					-0.022**	-0.016*	-0.016*	-0.011
					(-2.301)	(-1.877)	(-1.846)	(-1.082)
Constant	0.511***	0.590***	0.494***	0.462***	0.780***	0.777***	0.765***	0.749***
	(3.357)	(4.332)	(3.310)	(3.165)	(3.215)	(3.561)	(3.168)	(3.104)
Observations	109	109	109	109	106	106	106	106
R-squared	0.532	0.527	0.577	0.590	0.617	0.607	0.654	0.671
r2_a	0.519	0.513	0.565	0.578	0.553	0.541	0.596	0.617
F	39.79	38.99	47.70	50.31	9.648	9.251	11.35	12.25

t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

(x) The filter used to compute the cyclical component of GDP is the same as that used for computing the dependent variable

(*) The initial period is 1990-2000 and the values reported are the period average for the variable. Changes refer to differences in the average of series for 2000-2011 minus that of 1990-2010.

source: Authors calculations

Appendix 12 : OLS and Two-Stage Least Square for Instrumental Variable Estimation regarding the effect of Institutional Quality on fiscal cyclicality stance (instruments are log settler mortality following Acemoglu, Johnson, & Robinson (2001))

Dependent Variable is the Correlation Coefficient of Real Government Expenditures and Real GDP, 1990-2011 (Alternative filtering methods)

	OLS	IV	OLS	IV	OLS	IV	OLS	IV
VARIABLES	Hodrick-Prescott		Baxter-King		Christiano-Fitzgerald		Butterworth	
IQ: ICRG Avg. 1990-2010	-1.119***	-1.284***	-0.941***	-1.170***	-0.996***	-1.017***	-0.838***	-1.039***
	(-7.096)	(-4.550)	(-5.771)	(-4.112)	(-6.056)	(-3.469)	(-4.951)	(-3.305)
Constant	0.718***	0.751***	0.618***	0.701***	0.651***	0.619***	0.530***	0.596***
	(7.633)	(5.103)	(6.351)	(4.724)	(6.636)	(4.049)	(5.249)	(3.630)
Observations	123	71	123	71	123	71	123	71
R-squared	0.294	0.360	0.216	0.305	0.233	0.288	0.168	0.219
r2_a	0.288	0.351	0.209	0.295	0.226	0.277	0.162	0.207
F	50.36	20.71	33.31	16.91	36.67	12.04	24.51	10.93

t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Dependent Variable is the Correlation Coefficient of Real Government Expenditures and Real GDP, 1990-2011 (Alternative filtering methods)

	OLS	IV	OLS	IV	OLS	IV	OLS	IV
VARIABLES	Hodrick-Prescott		Baxter-King		Christiano-Fitzgerald		Butterworth	
IQ: Kuncic, Avg. 1990-2010	-0.973***	-1.429***	-0.787***	-1.292***	-0.853***	-1.233***	-0.738***	-1.143***
	(-5.805)	(-4.058)	(-4.595)	(-3.652)	(-4.998)	(-3.594)	(-4.231)	(-3.143)
Constant	0.611***	0.813***	0.509***	0.745***	0.547***	0.718***	0.455***	0.639***
	(6.642)	(4.633)	(5.405)	(4.209)	(5.844)	(4.195)	(4.749)	(3.524)
Observations	145	84	144	83	145	84	145	84
R-squared	0.191	0.130	0.129	0.065	0.149	0.128	0.111	0.084
r2_a	0.185	0.119	0.123	0.0537	0.143	0.117	0.105	0.0724
F	33.70	16.47	21.12	13.34	24.98	12.92	17.90	9.881

t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix 13 : OLS and Two-Stage Least Square for Instrumental Variable Estimation regarding the effect of Institutional Quality on fiscal cyclicality stance (instruments are log settler mortality following Acemoglu, Johnson, & Robinson (2001)) and additional controls.

Dependent Variable is the Correlation Coefficient of Real Government Expenditures and Real GDP, 1990-2011 (Alternative filtering methods)

	OLS	IV	OLS	IV	OLS	IV	OLS	IV
VARIABLES	Hodrick-Prescott		Baxter-King		Christiano-Fitzgerald		Butterworth	
IQ: ICRG Avg. 1990-2010	-1.028***	-1.650*	-0.732**	-1.178	-1.130***	-1.448	-0.697**	-1.516
	(-3.903)	(-1.926)	(-2.586)	(-1.394)	(-3.929)	(-1.602)	(-2.411)	(-1.513)
Chinn-Ito Index of Capital Openness, average 1990-2011	-0.009	0.021	-0.041	0.009	-0.001	0.005	-0.022	0.034
	(-0.348)	(0.553)	(-1.507)	(0.230)	(-0.036)	(0.106)	(-0.785)	(0.768)
Financial Depth (M2 Ratio to GDP), average 1990-2011	-0.000	0.001	0.000	-0.000	0.001	0.002	-0.000	0.002
	(-0.295)	(0.462)	(0.046)	(-0.086)	(0.477)	(0.576)	(-0.297)	(0.513)
GDP volatility (Squared Cyclical Component of GDP), average 1990-2011 (x)	36.180**	78.034	33.693	105.036**	0.376	-2.008	27.232	185.837
	(2.450)	(1.625)	(1.110)	(2.082)	(0.411)	(-1.188)	(0.607)	(1.043)
Proxy for Political Checks and Balances, average 1990-2011	-0.003	0.002	-0.011	-0.010	-0.002	-0.009	-0.006	-0.002
	(-0.132)	(0.064)	(-0.489)	(-0.377)	(-0.089)	(-0.298)	(-0.253)	(-0.063)
Debt to GDP ratio, average 1990-2011	-0.001	-0.001	-0.001	-0.002**	-0.001	-0.001	-0.000	-0.001
	(-1.106)	(-1.593)	(-1.118)	(-2.440)	(-1.142)	(-0.766)	(-0.555)	(-1.551)
Reserves to Imports Ratio, average 1990-2011	-0.012	-0.019	-0.007	-0.019*	-0.001	-0.015	-0.006	-0.024*
	(-1.595)	(-1.599)	(-1.058)	(-1.696)	(-0.221)	(-1.228)	(-0.793)	(-1.782)
Constant	0.775***	1.016**	0.616***	0.926**	0.757***	0.946**	0.550***	0.949**
	(5.223)	(2.550)	(3.694)	(2.382)	(4.793)	(2.389)	(3.361)	(2.032)
Observations	122	71	122	71	122	71	122	71
R-squared	0.342	0.428	0.258	0.432	0.249	0.349	0.187	0.296
r2_a	0.301	0.364	0.212	0.369	0.203	0.277	0.137	0.218
F	8.450	5.133	5.660	5.608	5.405	2.449	3.744	2.917

t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

(x) The filter used to compute the cyclical component of GDP is the same as that used for computing the dependent variable

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