Explaining The Procyclicality of Fiscal Policy in Developing Countries

by

Håvard Halland

Wolfson College, University of Cambridge

Michael Bleaney

School of Economics, University of Nottingham

Abstract

The procyclicality of fiscal policy that is prevalent in developing countries and emerging markets is well known. Its explanation is less clear. Recently, social inequality and the combination of corruption and democracy have been suggested as alternatives to the traditional explanation of these countries' exposure to boom-bust cycles in international credit markets. Differences in methodological approach are also partly responsible for diverging empirical results. In this paper, competing hypotheses are tested on a comprehensive set of measures of the cyclicality of fiscal policy.   The evidence for corruption and democracy is stronger than for social inequality or net foreign debt, but the interpretation of this result is less obvious, since the index of corruption is closely correlated with poor credit ratings. In OECD countries, by contrast, the cyclicality of fiscal policy largely reflects the strength of automatic stabilizers.

Keywords: fiscal cyclicality, fiscal policy, business cycles, fiscal space, foreign debt, income inequality.

_____

CREDIT Research Paper

Explaining The Procyclicality of Fiscal Policy in Developing Countries

by

Håvard Halland
Wolfson College, University of Cambridge

Michael Bleaney
School of Economics, University of Nottingham

_____

1.   **Introduction**

The tendency for fiscal policies in developing countries and in many emerging markets to be pro-rather than countercyclical is a well-established empirical phenomenon that is not explainable by neo-classical or by Keynesian theory. A growing literature has identified possible causes of these apparently sub-optimal policies, such as institutional weaknesses, social tensions and boom-bust cycles in international credit markets, but empirical studies, such as those of Alesina *et al*. (2008) and Woo (2009), have few explanatory variables in common and come to radically different conclusions.

The objective of this paper is to test the validity of competing hypotheses about the causes of fiscal procyclicality, with a focus on developing countries. The study improves on previous work in various ways. Firstly, we estimate a model that encompasses previous ones and provides a direct test of competing hypotheses. Secondly, we consider four alternative measures of cyclicality, and provide a systematic account of how the choice of measure affects hypothesis tests. Thirdly, we recognise that the determinants of cyclicality differ between developing and OECD countries.

Our results indicate that in developing countries the most important determinants of procyclicality are corruption and democracy, as first suggested by Alesina *et al*. (2008), but not the combination of the two, as they find. The roles of net foreign debt and social inequality as measured by the GINI index are less certain, since their coefficients tend to hover around the 10% significance level. Amongst OECD countries these factors are irrelevant, and procyclicality is declining in the size of government, which probably reflects the role of automatic stabilisers, and in per capita GDP.

The debate on the causes of fiscal procyclicality is related to the more general discussion on policies versus institutions as the main causes of macroeconomic volatility and crises. In that respect this study provides some support for the view that macroeconomic variables are merely mediating channels for institutional effects (Acemoglu *et al*. (2003), Easterly (2004)).

In the next section we discuss theoretical aspects of fiscal cyclicality; Section Three considers evidence, and Section Four causes. Section Five discusses different measures of fiscal cyclicality. Section Six contains our main empirical results, and Section Seven concludes.

2.   Theoretical Aspects of Fiscal Cyclicality

In Keynesian theory, sticky prices and/or wages imply incomplete immediate price adjustment in response to demand fluctuations. A countercyclical fiscal policy helps the economy to adjust more completely, and more rapidly, to such fluctuations. Fiscal policy should therefore actively smooth the business cycle by lowering taxes and increasing expenditure in bad times, thereby increasing aggregate demand, while reducing expenditure and increasing savings in good times. The social insurance component of fiscal policy is normally countercyclical by design, although this is probably less relevant for developing countries, where social safety networks are less developed (Thornton, 2008).

From a neoclassical perspective, fiscal policy should aim to minimize distortions. As stated in Barro's (1979) tax smoothing hypothesis, tax rates should be held constant over the business cycle as long as spending shocks or shocks to the tax base are temporary. It follows that the budget balance should be positively correlated with output, as it absorbs changes to tax revenues generated by shocks to the tax base, as well as changes in other revenues and expenditures (Fatás and Mihov, 2009, Chari, *et al*., 1994). Neoclassical theory has less precise recommendations on the cyclical pattern of fiscal expenditure, typically assuming that it is exogenously determined (Blanchard and Fischer, 1989; Lane, 2003). Ilzetzki and Végh (2008) observe that, from a neoclassical viewpoint, a smooth consumption path is optimal if government consumption enters the utility function separately. Conversely, consumption is optimally countercyclical (procyclical) if government consumption is a substitute (complement) for private consumption. They argue that substitutability can be expected to be reflected in transfers, and complementarity in public investment. Since neither of these categories is included in government consumption, this consumption should in a neo-classical world be acyclical.

In conclusion, a procyclical fiscal policy is sub-optimal both by Keynesian and by neoclassical standards. Ilzetzki and Vegh (2008) furthermore suggest a set of fiscal rules to show that, whether using a contemporaneous, a lagged or an expectational rule, a countercyclical fiscal policy is optimal.

In a model with political distortions, fiscal procyclicality can be interpreted as evidence of such distortion.

3.   Evidence on Fiscal Cyclicality

The literature provides evidence on differentials in fiscal cyclicality between regions (Gavin and Perotti, 1997), between rich and poor countries (Kaminsky *et al*. (2004), Talvi and Végh (2005), Ilzetzki and Végh (2008)), or across time for the same group of countries (Fatás and Mihov (2009)). Gavin and Perotti (1997) provide the earliest evidence of the difference in fiscal cyclicality between industrialized and developed countries. These authors observe that, while fiscal policy in the OECD is countercyclical or acyclical, it is procyclical in Latin-America. Kaminsky *et al*. (2004), using various measures of cyclicality in a study of 104 countries for the period 1960-2003, confirm the countercyclicality or acyclicality of the OECD economies, while finding fiscal procyclicality in developing countries. Similarly, Talvi and Végh (2005) observe that fiscal procyclicality, rather than being a predominantly Latin American feature, is the rule in all of the 36 developing countries of their sample. Thornton (2008), in a study of 37 African countries over the period 1960-2004, finds real government consumption in 32 of these countries to be "overwhelmingly procyclical", with half of the countries having a government spending response to output fluctuations even above proportionality. A note of caution is provided by Manasse (2006), who uses non-linear methods to generate cyclicality estimates, and finds similar but considerably less pronounced results. He concludes from this that the observed difference in fiscal cyclicality between developing and developed countries is at least partly due to the higher severity of the shocks that hit developing countries.

The above-mentioned studies focus on government expenditure. Because of the scarcity of data on tax revenues and rates for developing countries, less work has been done on government revenue. Talvi and Végh (2005) address this problem by considering the inflation tax as a proxy for all taxes, and find that, while economic upturns in industrialized countries are associated with higher inflation, the opposite is the case for developing countries, where inflation peaks during economic busts. They explain this finding by assuming the existence of political pressures that dictate tax-breaks in good

times, so that governments will find it optimal to reduce both conventional taxes and the inflation tax during booms. Alesina *et al.* (2008), using an unbalanced panel of 86 countries over the period 1960-2003, find that both government revenues and government expenditures contribute to higher fiscal procyclicality in developing countries, but that spending shows the clearest evidence of procyclicality.

4.   The Causes of Fiscal Procyclicality

Various hypotheses have been put forward to explain cross-country differentials in fiscal cyclicality, particularly the differences between industrialized and developing countries. Essentially three types of explanations have been suggested: i) restrictions on access to domestic (Caballero and Khrisnamurthy (2004)) and/or international credit markets (Gavin and Perotti (1997), Calderón and Schmidt-Hebbel (2008)), ii) institutions or political structures (Lane (2003), Talvi and Végh (2005), Alesina et al. (2008)), and iii) the polarization of preferences associated with social inequality (Woo, 2009).

According to the credit restrictions hypothesis, developing countries are less able to smooth the business cycle because limited access to international credit markets prevents them from borrowing during bad times. This explanation was first suggested by Gavin and Perotti (1997), who found fiscal procyclicality in Latin America to be particularly severe during recessions. They also found that access to IMF emergency credit was higher in these periods, and that fiscal cyclicality was robustly determined by the initial fiscal deficit. They interpreted these findings as signs that investors restrict credit to countries where they fear that high fiscal deficits may become unmanageable. These results are consistent with the observation that "sudden stops" in capital flows to emerging markets are associated with sharp real depreciations, collapse of investment and sharp fiscal retrenchment as the country is cut off from international financial markets (Kaminsky *et al*., 2004). Similarly Calderón and Schmidt-Hebbel (2008), using the ratio of foreign liabilities to GDP as their measure for financial openness, find that wider access to domestic and foreign capital markets enables countries to run countercyclical policies. In another version of this argument, Caballero and Khrisnamurthy (2004) and Riascos and Végh (2004) contend that limited financial depth, as measured respectively by

domestic credit to the private sector, and homogeneity in the type of financial assets, impedes the implementation of countercyclical fiscal policy.

According to institutional and political economy types of explanations for fiscal cyclicality, sets of institutional and political incentives exist that determine the cyclical properties of fiscal policy. The literature proposes various mechanisms and variables through which such effects may take place. The argument is implicit in Tornell and Lane's (1999) concept of a 'voracity effect', whereby competition among interest groups for publicly controlled resources leads to a more than proportional redistribution effect when output increases. Although the issue of fiscal policy cyclicality is not directly addressed in their model, it follows that with available resources increasing during economic upturns, government spending will be prone to procyclicality. Gavin and Perotti (1997) refer to the voracity effect as a likely second main source of fiscal procyclicality in Latin America, together with credit restrictions.

Tornell and Lane's (1999) theoretical argument leads on to Talvi and Végh (2005), who find evidence for their proposition that large fluctuations in fiscal revenues are in themselves the cause of pro-cyclical fiscal policies, because such fluctuations distort political incentives. These authors assume that the political pressure to spend from a budget surplus is an increasing convex function of the size of that surplus. When there are large fluctuations in the tax base, as is often the case for developing countries, the political pressures to spend will be high during the upturns, so that high tax-base variability generates more procyclical fiscal expenditure policies. The implicit low propensity to save in good times translates into contractionary fiscal policy in bad times, since there are less savings available for smoothing the business cycle, thereby accentuating fiscal procyclicality. As Calderón and Schmidt-Hebbel (2008) point out, this model predicts a positive correlation between output volatility and procyclicality, since a high volatility of output will generate a high tax-base variability, a correlation also confirmed by Lane (2003).

Alesina *et al*. (2008) develop a model in which voters observe the state of the economy but cannot verify how much of government revenues are appropriated as rents by the state apparatus. The voters

do not expect budget surpluses to accrue primarily to national savings, but rather to be squandered on rents. As a consequence, voters push for increased expenditures (tax cuts, higher government spending or transfers) in good times, so as to be able as far as possible to 'get their piece of the cake'. This public pressure forces the government into procyclical public spending, and even borrowing. Their empirical results support the hypothesis that fiscal policy is more procyclical in countries where corruption is more widespread. They also find some evidence that fiscal policy is most procyclical in corrupt democracies, that is where a high level of corruption is combined with some level of accountability to voters.

Woo (2009) presents a somewhat different public choice argument. In his theoretical model, greater heterogeneity of preferences of different social groups causes fiscal policy to be more procyclical. He treats income inequality, as measured by the Gini coefficient, as an indicator of the divergence of preferences, and this variable is consistently significant in his cross-country tests of fiscal procyclicality, whereas variables that represent the historical frequency of sovereign default and the volatility of capital flows are not.

On the other hand, in a study that appears to contest the results mentioned so far, Thornton (2008) finds that, in contrast to Alesina *et al.* (2008), less corruption actually leads to more procyclicality in the sample of 37 African countries that he studies. His suggested explanation for this non-intuitive result is that, if corruption leads to lower levels of tax collection, generating lower government expenditure, then better governance may be positively correlated with fiscal procyclicality if it increases the tax revenues available for fiscal expenditure.

5.   Measuring Fiscal Cyclicality

Empirical work on fiscal cyclicality uses a range of different cyclicality indicators, and there is no consensus on how fiscal cyclicality should be measured. As Fatás and Mihov (2009) point out, the disparity of findings on the causes of fiscal procyclicality may well be a reflection of this diversity in the way that the measure of cyclicality is defined. This Section discusses cyclicality measures from the literature, to arrive upon a set of measures to be used in the empirical part of our study.

The simplest measure is the correlation between the cyclical component of output and that of the fiscal variable (e.g. Kaminsky *et al.*, 2004 and Talvi and Végh, 2005). However, as argued by Lane (2003) and Woo (2009), regression-based measures can be considered more precise. To generate a regression-based cyclicality indicator, a measure of fiscal policy is regressed on a measure of output and control variables, and the coefficient on the output variable is considered as the measure of fiscal cyclicality.

There is a great deal of variety also within regression-based cyclicality measures. The differences in the specification of such measures are essentially of three types. Firstly, the two main variables of interest, output and fiscal policy, appear in different forms. Secondly, the type of fiscal data used to represent fiscal policy differs between studies, although the budget balance and general government consumption expenditure are the most common. Thirdly, the control variables are not necessarily the same.

Starting with the first of these three points, the measure of fiscal policy is either the growth rate of the fiscal variable G_t, defined as the first difference of the logarithmic value, or the first difference of the fiscal variable as a share of GDP. As observed by Kaminsky *et al.* (2004), measuring fiscal variables as a proportion of GDP tends to shift the measure for all countries in the direction of less procyclicality, because of the presence of GDP in the denominator.

Output also appears in different forms. Here, the contest is between the growth rate of real GDP, and the output gap, defined as the deviation from a Hodrick-Prescott (HP) trend. Fatás and Mihov (2009), in a study of fiscal cyclicality in the Euro-zone, use both of these variables, and find that the resulting cyclicality coefficients differ considerably.

The second point concerns the type of fiscal data used to generate the fiscal cyclicality indicator. We shall limit our discussion to the types of data that are available in reliable estimates for a wide range of countries; general government spending and consumption, as well as the primary and overall budget balance. We follow Kaminsky et al. (2004), in preferring a measure of government expenditure for the empirical analysis. However, it can be argued that interest payments, included in

total central government spending, add noise to this measure. This can be avoided by using government consumption expenditure (e.g. Woo, 2009), as we shall do here. A counter-argument for using the budget balance is that the breakdown of government expenditure into consumption and investment components may be unreliable (Alesina *et al*., 2008).

The third point to make about the specification of cyclicality regressions concerns the type of control variables used. Different authors include different control variables. Apart from a lag of the dependent variable, included in most of the regressions, the control variables commonly used are the debt share of GDP (or some other measure of borrowing constraints), terms of trade, initial GDP, and a trend. The share of cyclicality that remains to be accounted for when the response to external conditions has been controlled for is then the part responding purely to domestic output.

Given these variations in the way that the cyclicality coefficient is estimated, it is appropriate to ask to what extent empirical studies are comparing like with like. For the purpose of investigating this question, we specify four different generic measures and investigate the relationship between them. We follow Woo (2009) in using the logarithm of general government final consumption expenditure, taken from the World Development Indicators, as our variable for government spending. The two control variables are a lag of government consumption expenditure, allowing for long-term mean reversion consistent with fiscal sustainability, and a time trend. Given the already quite wide scope of our study, and the lack of obviously appropriate instruments, we follow Thornton (2008) and Woo (2009) in using OLS to estimate the cyclicality coefficients.

Our first specification is similar to the ones used by Lane (2003), Woo (2009) and Thornton (2008). This is the measure defined by equation (1).

$$\Delta log G_t = \alpha + \beta^A \Delta log RGDP_t + \gamma log G_{t-1} + \delta T_t + \varepsilon_t \quad (1)$$

Where G_t is government consumption, $RGDP_t$ is real GDP and T_t refers to a time trend. The measure of fiscal cyclicality is defined as the $\square$ from each country-by-country regression. We use the superscripts A, B, C and D to refer to the estimated cyclicality coefficients from regressions 1, 2, 3 and 4, respectively.

Our next measure is based on Alesina *et al*. (2008), who regress the first difference of the fiscal variable on an estimate of the output gap (*OUT_GAP*), defined as the log deviation of GDP from its HP trend, and a lag of the fiscal variable.[1] As before, we add a time trend and estimate:

$$\Delta logG_t = \alpha + \beta^B OUT\_GAP + \gamma logG_{t-1} + \delta T_t + \varepsilon_t \quad (2)$$

We also estimate a new cyclicality measure, generated by regressing the logarithm of government expenditure on the logarithm of real output and a quadratic time trend. The distinctive feature of this measure is that both government expenditure and output are in levels. Because this estimation does not include a lag of the fiscal variable to correct for first-order autocorrelation, we estimate it using the Prais-Wisten procedure. We estimate:

$$logG_t = \alpha + \beta^C logRGDP_t + \delta T_t + \varphi T_t^2 + \varepsilon_t \quad (3)$$

Finally, a fourth measure is introduced, which is a variation of the first one but includes a lag of output, as given by equation (4).

$$\Delta logG_t = \alpha + \beta^D \Delta logRGDP_t + \gamma logG_{t-1} + \delta logRGDP_{t-1} + \delta T_t + \varepsilon_t \quad (4)$$

We generate the cyclicality estimates on a sample of 85 industrialised and developing countries with a complete series of data over the 25 years 1980-2004. Although both Alesina *et al*. (2008) and Woo (2009) use an apparently much longer data series back to 1960, only a minority of countries actually have data for many years before 1980. Note also that our minimum criterion for inclusion (25 years of data) is much higher than that of Alesina *et al*. (16 years). Table 1 shows some basic statistics for these estimators. Two features stand out. One is that procyclicality is higher on average, with a much wider range of variation, in developing countries than in OECD countries. The other is that $\hat{\beta}^B$ is something of an outlier, with a relatively low correlation with the other measures and a much higher standard deviation. This is probably because, unless $\square\square$ in equation (2) is close to one, $\hat{\beta}^B$ is

---

[1]   We follow the recommendation of Ravn and Uhlig (2002) for annual data, and set the Hodrick-Prescott filter's parameter for smoothness equal to 6.25.

estimated from an equation relating the *change* in government expenditure to the *level* of output (albeit relative to trend), rather than from one that uses either the change in both (as in equations (1) and (4)) or the level of both (as in equation (3)). Since the theory of the cyclicality of fiscal policy concerns how the *level* of a fiscal measure varies with the *level* of the deviation of output from trend, equations (1), (3) and (4) seem more consistent with the theory than equation (2).

The second stage of the process is to treat each of the four estimated measures of fiscal procyclicality as the dependent variable in a cross-country regression of the form:

$$\hat{\beta} = a + b\,POL + c\,CREDIT + d\,INEQ + e\,CONTROLS + u \qquad (5)$$

where *POL* represents a vector of measures of political structure, *CREDIT* represents variables that capture international credit constraints, *INEQ* is a measure of social inequality, and *CONTROLS* represents other standard control variables. The measures of political structure are: the POLITY2 index of democracy from the Polity IV dataset (Marshall and Jaggers, 2005); Kaufmann *et al*.'s (2009) index of corruption; and the index of political instability constructed by Woo (2009) as the principal component of five indicators in Banks (2009). For credit constraints, we use net foreign debt as a share of GDP, and we also tested other measures that include non-debt assets and liabilities, as well as the historical default frequency calculated by Reinhart *et al*. (2003). It should be noted that the index of corruption can also be interpreted as a credit constraint variable, because of its high correlation with sovereign risk.[2] Social inequality is captured by the Gini coefficient for consumption expenditure as given in World Development Indicators. The control variables are real PPP per capita GDP in 1980 and the size of government as measured by the ratio of government consumption

---

[2] The correlation between corruption and the share of net foreign debt in GDP is 0.39. To quote Alesina *et al*. (2008, p. 1027), "The correlation coefficient between the variables *S&P Rating* and *Control_of_Corruption* is 0.90.....In fact, these variables are correlated by construction. For instance Standard and Poor's may look (directly or indirectly) to perception of corruption as one of their inputs in assigning ratings to countries, and perceptions of corruption may in turn be influenced by foreigners' views of a country's credit-worthiness. As a result, it is very hard to disentangle the effects of one versus the other."

expenditure to GDP. In the case of the latter, larger expenditures are likely to imply greater social welfare expenditure, which is to some extent endogenous to GDP.

Table 1. Basic statistics for the estimates of fiscal procyclicality (beta)

	$\hat{\beta}^A$	$\hat{\beta}^B$	$\hat{\beta}^C$	$\hat{\beta}^D$
Developing countries (63)				
Mean	0.400	0.594	0.579	0.517
St. Dev.	0.705	1.267	0.678	0.646
Minimum	-1.048	-2.047	-0.961	-1.350
Maximum	3.165	5.076	3.122	2.568
OECD countries (22)				
Mean	0.100	0.373	0.159	0.199
St. Dev.	0.273	0.407	0.271	0.297
Minimum	-0.255	-0.099	-0.198	-0.168
Maximum	0.684	1.176	0.651	0.879
Correlation coefficients				
$\hat{\beta}^A$	1			
$\hat{\beta}^B$	0.670	1		
$\hat{\beta}^C$	0.774	0.679	1	
$\hat{\beta}^D$	0.856	0.640	0.857	1

Notes. OECD countries are those that were members in 1975.
The estimated betas are generated from equations (1) to (4) separately for each country over the period 1980-2004.

6.   Empirical Results

In Section Four we saw that there are three main explanations of fiscal procyclicality on offer: exposure to fluctuating credit constraints (Gavin and Perotti, 1997); electoral pressure on corrupt governments (Alesina *et al*., 2008); and social inequality (Woo, 2009). Our aim is to test these hypotheses jointly on a common dataset, with a common set of cyclicality estimators. Our results for the pooled sample (OECD and developing countries together) are shown in Table 2.

Table 2. Determinants of fiscal procyclicality in the full sample of countries

Dependent variable:	$\hat{\beta}^A$	$\hat{\beta}^B$	$\hat{\beta}^C$	$\hat{\beta}^D$
Independent variables				
Constant	-1.574	-2.82	-0.292	-0.815
	(-1.45)	(-1.46)	(-0.28)	(-0.82)
Ln 1980 PPP GDPpc	0.143	0.309	0.0440	0.0858
	(1.35)	(1.59)	(0.41)	(0.87)
Government size	-0.0122	-0.0663**	-0.0188	-0.0209*
	(-0.98)	(-2.34)	(-1.33)	(-1.73)
Gini coefficient	0.0143**	0.0289**	0.0105	0.0147*
	(2.12)	(2.20)	(1.65)	(1.92)
Democracy	0.0305**	0.0639**	0.0363***	0.0286*
	(2.17)	(2.98)	(2.93)	(1.97)
Corruption	0.193*	0.152	0.199**	0.160
	(1.97)	(0.98)	(2.12)	(1.60)
Net foreign debt/GDP	0.429*	0.699	0.355	0.342*
	(1.79)	(1.62)	(1.47)	(1.78)
Sample size	83	83	83	83
Standard error	0.555	0.969	0.534	0.512
R-squared	0.307	0.310	0.322	0.320
Chow F(7, 69) [*p*-value]	3.87*** [0.001]	3.20*** [0.005]	3.27*** [0.005]	2.17** [0.047]

Notes. Figures in parentheses are heteroscedasticity-robust *t*-statistics. *,**,*** denote significantly different from zero at the 10, 5 and 1% significance levels respectively. The estimated betas are generated from equations (1) to (4) separately for each country over the period 1980-2004. The Chow F-statistic is a test of the null hypothesis of identical coefficients for OECD and developing countries.

Table 2 shows that procyclicality is mildly increasing in per capita GDP, but the coefficient is never significant. As expected, government size is associated with lower procyclicality, probably because of stronger automatic stabilisers, but the effect is significant at the 5% level only in the case of $\hat{\beta}^B$. The Gini coefficient has the expected positive coefficient and is significant for $\hat{\beta}^A$ and $\hat{\beta}^B$. Democracy is the most consistently significant variable, at the 1% level in one case, at the 5% level in two cases and at the 10% level in the remaining case. Its coefficient is positive, as Alesina et al. (2008) also found, indicating that democracy increases procyclicality. Corruption also increases it, since the corruption variable has a positive coefficient that is significant at the 5% level in the case of $\hat{\beta}^C$ and at the 10% level in the case of $\hat{\beta}^A$. Finally, net foreign debt has the expected positive coefficient that reaches the 10% significance level only in the cases of $\hat{\beta}^A$ and $\hat{\beta}^D$.

A major problem with all the regressions in Table 2, as indicated by the Chow statistic at the foot of the Table, is that they are not stable over the sample. The differences between OECD and developing countries are significant at the 1% level in three cases and at the 5% level in the fourth. Since developing countries are more numerous and also have greater variance of the estimated betas, as Table 1 shows, the results in Table 2 are likely to be closer to the coefficients for the developing country sample than for the OECD. This may be seen in Table 3, which repeats the same regression for the 61 developing countries only.

In Table 3, the regression is indeed very similar to that shown in Table 2. The main difference is the somewhat higher *t*-statistics for the corruption variable, which is now significant at the 5% level for all except $\hat{\beta}^B$. The F-statistic at the foot of Table 3 shows that the three least significant variables – per capita income, government size and foreign debt – are jointly insignificant except in the case of $\hat{\beta}^B$. This suggests that more parsimonious specifications are worth exploring. Rather than present a series of tables containing regressions for all four versions of $\hat{\beta}$, we summarize them in a single table that shows the mean *t*-statistic across all four $\hat{\beta}$'s for each variable that is included in that regression specification. The results are shown in Table 4. What stands out is that democracy and

corruption always have mean *t*-statistics above two (and which tend to increase as other variables are dropped), whereas for the other variables the mean *t*-statistic is below two in every case.

These results therefore tend to support the model of Alesina *et al*. (2008), who emphasise democracy and corruption as the two main determinants of fiscal procyclicality, over that of Woo (2009), who stresses social inequality.   The interpretation of this result depends very much on whether the corruption variable is treated as a measure of corruption itself or as a proxy for sovereign risk, with which it is highly correlated. If the latter, then international credit constraints rather than the performance of the government *per se* are the important element.

Table 3. Determinants of fiscal procyclicality – developing countries only

Dependent variable:	$\hat{\beta}^A$	$\hat{\beta}^B$	$\hat{\beta}^C$	$\hat{\beta}^D$
Independent variables				
Constant	-1.94*	-3.25	-0.647	-1.01
	(-1.69)	(-1.59)	(-0.58)	(-0.97)
Ln 1980 PPP GDPpc (§)	0.170	0.327	0.082	0.077
	(1.46)	(1.54)	(0.70)	(0.72)
Government size (§)	-0.0055	-0.0776*	-0.0131	-0.0187
	(-0.38)	(-1.83)	(-0.72)	(-1.22)
Gini coefficient	0.0145*	0.0374**	0.0093	0.0191**
	(1.82)	(2.03)	(1.02)	(2.05)
Democracy	0.0285**	0.0571**	0.0365**	0.0234*
	(2.08)	(2.32)	(2.63)	(1.72)
Corruption	0.271**	0.259	0.265**	0.238**
	(2.48)	(1.31)	(2.49)	(2.16)
Net foreign debt/GDP (§)	0.450*	0.733	0.364	0.338*
	(1.77)	(1.54)	(1.46)	(1.77)
Sample size	61	61	61	61
Standard error	0.631	1.101	0.607	0.582
R-squared	0.300	0.340	0.271	0.290
Joint significance of § variables $F_{(3, 50)}$ [p-value]	1.32 [0.278]	2.86** [0.045]	0.89 [0.455]	1.62 [0.195]

Notes. Figures in parentheses are heteroscedasticity-robust *t*-statistics. *,**,*** denote significantly different from zero at the 10, 5 and 1% significance levels respectively. The estimated betas are generated from equations (1) to (4) separately for each country over the period 1980-2004. The F-test in the last row tests the null hypothesis that the coefficients of per capita income, government size and net foreign debt are all zero.

Table 4. Mean *t*-statistics across different specifications (developing country sample)

Variables	(1)	(2)	(3)	(4)	(5)
Ln 1980 PPP GDPpc	1.46	1.17			
Government size	-1.04				
Gini coefficient	1.73	1.47	1.63	1.77	
Democracy	2.19	2.24	2.65	2.49	2.86
Control of corruption	-2.11	-2.64	-2.34	-3.24	-2.38
Net foreign debt/GDP	1.64	1.52	1.32		1.18

Notes. The figure in each cell denotes the mean heteroscedasticity-robust *t*-statistic across the four regressions for the estimated betas in the regression specification shown (a constant is also included) for the sample of developing countries only. For example, column (1) relates to the specification shown in Table 3, and the figure in that column is the mean of the *t*-statistics in the relevant row of Table 3.

The interaction of democracy and corruption

A second point made by Alesina *et al*. (2008) is that corruption only matters in democratic countries (when the POLITY2 measure of democracy is positive) and not in undemocratic ones. They show that the corruption effect is small and insignificant when the democracy variable is negative.[3] It is to be noted that their study relies on the $\hat{\beta}^B$ measure of fiscal procyclicality, which is both theoretically questionable and something of an outlier compared with alternative measures, as discussed above.

Table 5 shows what happens when we add an interaction variable between democracy and corruption to a parsimonious regression that includes only these two variables and the Gini coefficient. For $\hat{\beta}^B$, the coefficient of the interaction variable is positive, as Alesina *et al*. (2008) find, but with a *t*-statistic of only 1.28. For the other three estimates of beta this coefficient is actually negative. If instead we add the interaction variable to the regression shown in Table 3, the coefficient is negative for $\hat{\beta}^C$ and $\hat{\beta}^D$, and positive for $\hat{\beta}^A$ and $\hat{\beta}^B$, but with *t*-statistics of 0.13 and 0.91 respectively. Thus Alesina et al.'s result seems to lack robustness.

---

[3] It is also the case that they get this result only when estimating beta and its determinants simultaneously in a panel regression, and not with the two-stage procedure used by most other authors (and here).

Table 5. The interaction of democracy and corruption

Dependent variable:	$\hat{\beta}^A$	$\hat{\beta}^B$	$\hat{\beta}^C$	$\hat{\beta}^D$
Independent variables				
Constant	-0.602	-1.08	-0.763	-0.520
	(-1.51)	(-1.27)	(-0.20)	(-1.24)
Gini coefficient	0.0189**	0.0332**	0.0110	0.0197**
	(2.06)	(1.65)	(1.22)	(2.09)
Democracy	0.0330**	0.0610**	0.0406***	0.0276**
	(2.30)	(2.42)	(3.14)	(2.22)
Corruption	0.292***	0.282	0.344***	0.320***
	(2.91)	(1.62)	(4.60)	(4.21)
Democracy X corruption	-0.0021	0.0517	-0.0100	-0.0079
	(-0.11)	(1.28)	(-0.58)	(-0.49)
Sample size	61	61	61	61
Standard error	0.669	1.178	0.627	0.601
R-squared	0.186	0.216	0.192	0.214

Notes. Figures in parentheses are heteroscedasticity-robust *t*-statistics. *,**,*** denote significantly different from zero at the 10, 5 and 1% significance levels respectively. The estimated betas are generated from equations (1) to (4) separately for each country over the period 1980-2004.

OECD countries

For OECD countries, which generally have better data, it should be possible to construct improved measures of discretionary fiscal policy that take account of tax changes as well. Nevertheless, for the sake of completeness, and to show how they differ from developing countries, we present some results for the 22 OECD countries. To preserve degrees of freedom, we retain only the significant variables. Table 6 shows the resulting regression, which contains only initial per capita income and government expenditure as a share of GDP. Both have significant negative coefficients, although the results are least clear-cut in the case of $\hat{\beta}^B$. The negative coefficient on government expenditure no doubt reflects the effect of automatic stabilisers, which are stronger in countries with more generous social safety nets. The negative coefficient of per capita GDP contrasts with the positive coefficient of this variable in the regressions for developing countries.

Table 6. Determinants of fiscal procyclicality – OECD countries only

Dependent variable:	$\hat{\beta}^A$	$\hat{\beta}^B$	$\hat{\beta}^C$	$\hat{\beta}^D$
Independent variables				
Constant	6.85***	7.85*	5.69**	6.69***
	(3.53)	(2.02)	(2.40)	(3.26)
Ln 1980 PPP GDPpc	-0.602***	-0.693*	-0.499*	-0.557**
	(-3.05)	(-1.75)	(-2.07)	(-2.67)
Government size	-0.0422***	-0.0337	-0.0317**	-0.0515***
	(-3.82)	(-1.52)	(-2.35)	(-4.41)
Sample size	22	22	22	22
Standard error	0.187	0.375	0.229	0.198
R-squared	0.576	0.235	0.358	0.600

Notes. Figures in parentheses are *t*-statistics. *,**,*** denote significantly different from zero at the 10, 5 and 1% significance levels respectively. The estimated betas are generated from equations (1) to (4) separately for each country over the period 1980-2004.

Explaining the higher degree of procyclicality in developing countries

It is interesting to use the regressions for the full sample in Table 2 to analyse which factors are mainly responsible for the higher degree of procyclicality of fiscal policy in developing countries relative to OECD countries, by multiplying the difference in mean values of the relevant variable in the two sets of countries by the regression coefficient. In Table 7 the results of this exercise are shown for $\hat{\beta}^D$.

It can be seen that the most important factor is corruption, whose higher level in developing countries entirely accounts for the difference in mean values of the dependent variable. Other factors more or less cancel each other out, the negative influence of lower per capita income and less democracy being offset by lower government expenditure , greater inequality and more debt.

Table 7. Contribution of individual variables to explaining the differences between developing and OECD countries

Variable	Difference in mean (A)	Coefficient (B)	Estimated contribution (A x B)
Ln 1980 PPP GDPpc	-1.72	0.0858	-0.148
Government size	-5.4	-0.0209	+0.113
Gini coefficient	13.7	0.0147	+0.201
Democracy	-8.37	0.0286	-0.239
Corruption	2.061	0.160	+0.330
Net foreign debt/GDP	0.354	0.342	+0.121
Dependent variable	0.318		

Notes. The table is based on the regression for $\hat{\beta}^D$ shown in the final column of Table 2.

7.   Conclusion

The higher degree of fiscal procyclicality in developing countries has traditionally been attributed to their exposure to cycles in international credit markets. More recently Woo (2009) has proposed that fiscal procyclicality is caused by social polarisation of preferences, as measured by social inequality. In a similar vein Easterly (2001) suggests that societies that are divided into factions tend to fight over the division of the spoils, becoming redistributionist, whereas societies that are united by a common culture are more likely to be able to generate a consensus for growth, becoming developmentalist. On the other hand, Alesina et al. (2008) emphasize the role of institutional quality, or lack of it, and particularly the role of corruption. They find that the combination of democracy and corruption is particularly likely to induce procyclicality; they attribute this to electoral pressure for government spending when resources are plentiful, in order to prevent them from being corruptly appropriated.

In this paper we have analysed the relative merits of competing theories, taking account of alternative methods of estimating the cyclicality of fiscal policy and of the differences between developing and OECD countries. The results confirm the importance of corruption and democracy, as first stressed by Alesina *et al*. (2008), but we found no convincing evidence that it is the *combination* of the two, as they stress, which matters most. The evidence that income inequality and net foreign debt matter for

fiscal procyclicality in developing countries is more ambiguous; these variables typically only reach the 10% level of significance. The interpretation of these results is a matter of debate, because the index of corruption may be taken either at face value or as an indicator of investors' risk perceptions, with which it is highly correlated. Consequently its statistical significance could be interpreted either as a sign of the importance of institutional quality, or as confirmation that countries with poor credit ratings, which are most exposed to the whims of international investors, exhibit cycles in spending associated with feast and famine in international capital flows.

References

Acemoglu, Daron, Simon Johnson, James Robinson, and Yunyong Thaicharoen (2003). "Institutional Causes, Macroeconomic Symptoms: Volatility, Crises and Growth". *Journal of Monetary Economics*, Vol. 50, pp. 49-123.

Alesina, Alberto, Guido Tabellini and Filipe R. Campante (2008). "Why is Fiscal Policy Often Procyclical?" *Journal of the European Economic Association*, Vol. 6, No. 5, pp. 1006-1036.

Banks, Arthur S. (2009) Cross-National Time Series Data Archives. Center for Social Analysis at the State University of New York at Binghampton.

Barro, Robert (1979). "On the Determination of Public Debt". *Journal of Political Economy,* vol. 87. No. 5. pp. 940-971.

Blanchard, Olivier and Stanley Fischer (1989). "*Lectures in Macroeconomics*". Cambridge, MA. MIT Press.

Caballero, R. and Krishnamurthy, A. (2004). "Fiscal Policy and Financial Depth". NBER Working Paper 10532, May.

Calderón, César and Klaus Scmidt-Hebbel (2008). "Business Cycles and Fiscal Policies: The Role of Institutions and Financial Markets". Central Bank of Chile Working Paper No. 481.

Chari, Varadarajan, Lawrence Christiano and Patrick Kehoe (1994). "Optimal Fiscal Policy in a Business Cycle Model". NBER Research Paper 4490.

Easterly, William (2001). "The Elusive Quest for Growth". Cambridge, MA: MIT Press.

Easterly, William (2004). "National Policies and Economic Growth: A Reappraisal". Manuscript, New York University, New York. Retrieved 04.05.09 from http://www.nyu.edu/fas/institute/dri/Easterly/File/national%20politics%20and%20economic%20growth.pdf

Fatás, Antonio and Ilian Mihov (2009). "The Euro and Fiscal Policy". NBER Working Paper 14722

Gavin, Michael and Roberto Perotti (1997). "Fiscal Policy in Latin America". *NBER Macroeconomics Annual 1997*, edited by Ben Bernanke and Julio Rotemberg. MIT Press.

Heston, Alan, Robert Summers and Bettina Aten (2006) Penn World Table Version 6.2, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania.

Ilzetski, Ethan and Carlos A. Végh (2008). "Procyclical Fiscal Policy in Developing Countries: Truth or Fiction?" NBER Working Paper 14191.

Kaminsky, Graciela L., Carmen M. Reinhart, Carlos A. Végh (2004). "When it Rains, it Pours: Procyclical Capital Flows and Macroeconomic Policies". NBER Working Paper 10780.

Kaufmann, Daniel, Aart Kraay and Massimo Matruzzi (2009). "Governance Matters VI: Governance Indicators for 1996-2006". World Bank Policy Research Working Paper No. 4978.

Lane, Philip R. (2003)."Business Cycles and Macroeconomic Policy in Emerging Market Economies". *International Finance,* Vol. 6, No. 1, pp. 89-108.

Lane, Philip and Gian Maria Milesi-Ferretti (2007). "The External Wealth of Nations Mark II: Revised and Extended Estimates of Foreign Assets and Liabilities, 1970–2004", *Journal of International Economics* vol. 73, pp. 223-250. Updated and extended version of the External Wealth of Nations Mark II database developed by Lane and Milesi-Ferretti (2009).

Manasse, Paolo (2005). "Deficit Limits, Budget Rules and Fiscal Policy". IMF Working Paper 05/120

Marshall, Monty and Keith Jaggers (2005). Polity IV Project: Political Regime Characteristics and Transitions, 1800-2004. Center for International Development and Conflict Management, University of Maryland.

Ravn, Morten O. and Harald Uhlig (2002). "On Adjusting the Hodrick-Prescott Filter for the Frequency of Observations. *Review of Economics and Statistics,* Vol. 84, pp. 371-376.

Reinhart, Carmen M., Kenneth S. Rogoff and Miguel A. Savastano (2003). "Debt Intolerance". NBER Working Paper No. 9908.

Riascos, Álvaro and Carlos A. Végh (2004). "Procyclical Fiscal Policy in Developing Countries: The Role of Capital Market Imperfections". University of California at Los Angeles, manuscript retrieved 28.01.10 from http://www.webpondo.org/ariascos/Files/workingpapers/Riascos-alva.pdf

Talvi, Ernesto and Carlos A. Végh (2005). "Tax Base Variability and Procyclical Fiscal Policy in Developing Countries". *Journal of Development Economics,* Vol. 78, pp. 156-190.

Thornton, John (2008). "Explaining Procyclical Fiscal Policy in African Countries". *Journal of African Economies*, Vol. (17), No. 3, pp. 451-464.

Tornell, Aaron and Philip R. Lane (1999). "The Voracity Effect". *American Economic Review*, Vol. 89, No. 1, pp. 22-46.

World Bank. *World Development Indicators* database, 2009.

Woo, Jaejong (2009). "Why Do More Polarized Countries Run More Procyclical Fiscal Policy?" *The Review of Economics and Statistics,* Vol. 91, No. 4, pp. 850-870.

Appendix A. Variables

Variables used in the time series regression for estimating the cyclicality coefficients:

Real government consumption. Central government final consumption expenditure in local currency units. Data source: World Development Indicators. Series identifier in the original data set: *General government final consumption expenditure (constant LCU) (NE.CON.GOVT.KN).* Yearly data for the period 1980-2004 is used. The growth rate of real government consumption is calculated as the difference in the logarithmic value.

Real GDP, real GDP growth rate and the output gap. Real GDP in constant local currency. Data source: World Development Indicators. Series identifier in the original data set: *GDP (Constant LCU) (NY.GDP.MKTP.KN).* Yearly data for the period 1980-2004 is used. The growth rate of real GDP is calculated as the difference in the logarithmic value. The output gap is estimated as the log deviation from a Hodrick-Prescott trend. The smoothness parameter of the filter is set to 6.25, following Ravn and Uhlig's (2002) recommendation for yearly data.

Variables used to estimate the cross-country equations:

Real GDP per capita in 1980. Initial per capita GDP at purchasing power parity. Source: Penn World Tables, (version 6.2). Series identifier in the original data set: *rgdpch.* We use the logarithm of this variable.

Democracy. To account for the level of democratic practices of a country, we use the variable POLITY2 from the Polity IV dataset (Marshall and Jaggers, 2005), which subtracts a country's score in an 'autocracy' index from that of a 'democracy' index. POLITY2 is increasing in the level of democracy from a minimum of -10 to a maximum of 10. Averaged over 1980-2004.

Corruption. This is the Control of Corruption index from Kaufmann, Kraay and Mastruzzi's (2009) aggregate governance indicators, multiplied by -1. The index is increasing in the degree of corruption from a minimum of -2.5 to a maximum of 2.5. Averaged over 1980-2004.

Political instability (PINSTAB). This variable is borrowed from Woo (2009), and is obtained by applying the principal component analysis to five indicators of political instability from Banks (2009). These indicators are government crises (GOVTCRIS), revolutions (REVOLS), military coups (COUPS), constitutional changes (CONSTHG), politically motivated assassinations (ASSASSIN). Following Woo (2009), PINSTAB = 0.03903GOVTCRIS + 0.23836REVOLS + 0.43633COUPS + 0.32963CONSTCHG + 0.06876ASSASSIN. Averaged over 1980-2004.

Government size. Government size is proxied for by the share of government consumption expenditure in GDP, 1980-2004 averages. Source: World Bank Development Indicators. Series identifier in the original dataset: *General government final consumption expenditure (% of GDP) (NE.CON.GOVT.ZS).* We divide by 100 to get the share instead of the percentage.

GINI. The Gini coefficient for disaggregated household consumption expenditure. Source: World Development Indicators. Series identifiers in the original data set: *GINI (SI.POV.GINI),* average of available data, 1980-2004.

Net foreign debt as a share of GDP. The difference between foreign debt assets and foreign debt liabilities, divided by GDP. Series identifier in the original dataset: *debt assets (portfolio debt + other*

investment), debt liabilities (portfolio debt + other investment), GDP. Source: Lane and Milesi-Ferretti (2006, 2009).

Appendix B. Country List

We use annual data for 85 countries with complete data over the period 1980-2004 (25 years per country). Following Alesina *et al*. (2008), we include only countries with populations above one million, since terms of trade shocks are likely to have a larger impact in very small countries. We have also excluded countries having experienced war, long-lasting internal conflict or civil war.

Some countries included in other studies (e.g. Woo, 2009) are therefore not included here. The Democratic Republic of the Congo, the Republic of the Congo and Sierra Leone are excluded by the no-war/conflict criterion. We also exclude Argentina, Chad, Nigeria, Rwanda and Turkey due to the shortness of the time series for government consumption expenditure (< 25 years). We exclude Burundi, Mauritania and Sri Lanka, where numbers for government expenditure did not fulfil the criterion of point no. 1 in the note on specification of the dataset. We exclude Barbados, Fiji and the Seychelles for being very small economies (less than one million inhabitants).

Algeria	Greece	Norway
Australia	Guatemala	Pakistan
Austria	Guinea Bissau	Panama
Bangladesh	Haiti	Papua NG
Belgium	Honduras	Paraguay
Benin	Hong Kong	Peru
Bolivia	Hungary	Philippines
Botswana	Iceland	Portugal
Brazil	India	Saudi Arabia
Burkina Faso	Indonesia	Senegal
Camreoon	Ireland	Singapore
Canada	Israel	South Africa
Centr. A. Rep.	Italy	Spain
Chile	Jamaica	Sweden
China	Japan	Switzerland
Colombia	Kenya	Syrian Arab Republic
Costa Rica	Korea, Rep.	Thailand
Côte d'Ivoire	Lesotho	Togo
Denmark	Madagascar	Trinidad and Tobago
Dom Rep	Malawi	Tunisia
Equador	Malaysia	Uganda
Egypt	Mali	United Kingdom
El Salvador	Mauritius	United States
Finland	Mexico	Uruguay
France	Morocco	Venezuela, RB
Gabon	Netherlands	Zambia
Gambia	New Zealand	Zimbabwe
Germany	Nicaragua	
Ghana	Niger	