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PROCYCLICALITY OF FISCAL POLICY IN EMERGING COUNTRIES: THE CYCLE IS THE TREND

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Abstract

This paper uses the Aguiar and Gopinath (2007) methodology in order to estimate whether "the cycle is the trend" in 23 emerging markets and 22 OECD economies. These estimates are then used to test whether procyclical fiscal policy in emerging countries is due to persistent shocks to per-capita GDP. We find support for this hypothesis. While both developed and emerging countries have a procyclical policy for investment expenditure, procyclicality is evident in emerging countries also for government consumption and transfers. Over the period of increasing globalization after the 1990s, these are signs of a reduction in the extent of procyclical expenditure policy in emerging countries. We also find that, in countries with high levels of foreign direct investment, procyclicality is milder.

Resumen

Este trabajo utiliza la metodología de Aguiar y Gopinath (2007) para estimar si "el ciclo es la tendencia" en 23 economías emergentes y 22 países de la OCDE. Se utilizan estas estimaciones para probar si la política fiscal procíclica en las economías emergentes se debe a *shocks* persistentes al PIB per cápita, encontrando evidencia a favor de esta hipótesis. Mientras se encuentran políticas de gasto en inversión procíclicas tanto en las economías emergentes como en las desarrolladas, la prociclicalidad es también evidente en las transferencias y del consumo de gobierno de las economías emergentes. Después de los noventa, período caracterizado por una creciente globalización, existen señales de reducción de la intensidad de la política de gasto procíclica en economías emergentes. Finalmente, se encuentra que en los países con mayores niveles de inversión extranjera directa, la prociclicalidad es más suave.

This paper was presented during the XIV Annual Conference of the Central Bank of Chile, "Fiscal Policy and Macroeconomic Performance," held on 21-22 October 2010 in Santiago. We thank to our discussant Sofía Bauducco, the editors, and participants of the Conference for helpful comments. Also, we are thankful to Gila Weinberger for outstanding research assistance. Strawczynski: Research Department, Bank of Israel, email: michel.strawczynski@boi.org.il. Zeira: Department of Economics, Hebrew University, Jerusalem, Israel, email: mszeira@mscc.huji.ac.il ..

1. Introduction

In recent years economic research on fiscal policy has shown that while developed economies tend to run countercyclical fiscal policies, Latin American countries had been characterized by procyclical policies. Some of the explanations given to this phenomenon is that high external debt causes severe constraints on the capability of achieving new loans, and consequently countries are constrained to cut budget deficits. Other explanations are related to optimal behavior against political constraints (Talvi and Vègh, 2005). In this paper we test a different channel, related to the characteristics of business cycles. Aguiar and Gopinath (2007) found that in developing countries "the cycle is the trend"; i.e., in these countries business cycles turn to become persistent, and determine the fundamentals of economic performance of those countries. In particular, one possible channel is fiscal policy: in times of recessions (booms) the erratic character of the crisis (good times) forces developing economies to cut (increase) expenditures, acting procyclically. This procyclical behavior may characterize other sectors of the economy, far beyond fiscal policy reaction (Kaminsky, Reinhart, and Vègh, 2004).

The recent renewed interest in cyclicality of fiscal policy is mainly empirical. This new empirical literature began with Galí (1994), Fiorito and Kollintzas (1994), and Fiorito (1997), who found that fiscal expenditures are counter-cyclical or a-cyclical in developed countries. In contrast Gavin and Perotti (1997) found that fiscal policy is highly pro-cyclical in Latin American countries. These findings led to much research that re-examined these findings and corroborated them to a large extent.

Lane (2003) shows that cyclicality of fiscal policy varies significantly across categories and also across OECD countries, but in most advanced economies they are counter-cyclical. Arreaza, Sørensen, and Yosha (1999), Galí and Perotti (2003) and Strawczynski and Zeira (2009) find further support for counter-cyclical fiscal policy in EU and in OECD countries. Galí (2005) even finds that fiscal policy is counter-cyclical in all industrialized countries and that counter-cyclicality even intensified after 1991. Darby and Melitz (2007) find that social expenditures account for the vast majority of countercyclical fiscal policy. Fatás and Mihov (2001) find that most of the counter-cyclicality of deficits in developed countries is a result of the automatic stabilizers. As mentioned above, the findings in developing countries are very different. Talvi and Vègh (2005) show, based on a large sample of less developed countries, that government spending and taxes are highly pro-cyclical. This finding is also corroborated by Akitoby et al. (2004), by Alesina and Tabellini (2005), and by Ilzetzki and Vègh (2008). The main explanation for this difference in fiscal policy between developed and less developed countries is that governments in less developed countries face credit constraints, which force them to cut expenditures during recessions. Recently other explanations were offered, based on political economy, as in Talvi and Vègh (2005), Alesina and Tabellini (2005) and Ilzetzki (2008).

The paper is organized as follows. In section 2 we characterize procyclicality of government expenditure against per-capita gross domestic product (GDP) shocks and describe the methodology for assessing whether "the cycle is the trend". In section 3 we show empirical results on the relationship between "the cycle is the trend" variable and government expenditure, expenditure cuts during recessions and government expenditure composition (consumption, transfers and investment); we also test for a change in behavior after the nineties. In this section we additionally check whether procyclicality is milder for countries with high foreign direct investment (FDI), high international

reserves, low public debt and inclusion in emerging markets stock exchange index. Section 4 concludes and the appendices present our method for choosing the length of random walk component and moving averages of GDP per capita, sensitivity for the use of different instrumental variables under generalized methods of moments (GMM), Granger causality tests, sensitivity to country fixed effects, an Arellano-Bond type of specification, and a summary of our sources and definitions.

2. Procyclicality of Government Expenditure Against Permanent Shocks

In order to study the impact of permanent shocks on fiscal policy variables we will concentrate mainly on expenditure. Ideally we would like to test also the impact on taxes and on the deficit. However, the straight interaction between the cycle and tax revenues, and thus the deficit, makes this mission difficult. Furthermore, the unavailability of data on statutory tax rates deters us from studying the impact on taxes.

Similarly to Barro (1979), we consider output and real interest rate to be exogenous. However, opposed to Barro's model we take the tax rate as given and assume that government expenditure is endogenous. The government chooses G_t (real government expenditure) in all periods ($t=1,2,...$) so as to maximize a utility function (with decreasing marginal utility in government consumption):

$$\max \sum_{t=1}^{\infty} \frac{1}{(1+r)^{t-1}} \left[-(g^* - g_t)^2 \frac{Y_t}{2} \right], \tag{1}$$

where r is an exogenous interest rate, Y is the exogenous level of output, g^* is the maximum level of government expenditure over output (G/Y), and g is its actual level.[1] The inter-temporal budget constraint is given by:

$$\sum_{t=1}^{\infty} \frac{1}{(1+r)^{t-1}} (\tau_t - g_t) Y_t + (1+r) Y_0 b_0 = 0, \tag{2}$$

where τ is the exogenous statutory tax rate and b_0 is the ratio of initial general government debt to output. The Lagrangian of this problem is:

$$\ell = \sum_{t=1}^{\infty} \frac{1}{(1+r)^{t-1}} \left[-(g^* - g_t)^2 \frac{Y_t}{2} \right] - \lambda \left[\sum_{t=1}^{\infty} \frac{1}{(1+r)^{t-1}} (\tau_t - g_t) Y_t + (1+r) Y_0 b_0 \right], \tag{3}$$

and the first order conditions are:

$$\begin{aligned} g^* - g_1 &= \lambda \\ &\dots \\ g^* - g_\infty &= \lambda \end{aligned} \tag{4}$$

[1] This specification is parallel to Barro (1979), who stresses the tractability of choosing an homogeneous function for maximization, since g is expressed as percent of GDP.

The optimal solution deriving from equation 4 is to choose a smooth g in all periods.

Before writing the solution, let us define the permanent value of a variable X (with supra-index ˜) as follows:

$$\sum_{i=1}^{\infty} \frac{\tilde{X}}{(1+r)^{i-1}} = X_1 + \frac{X_2}{1+r} + \frac{X_3}{(1+r)^2} + ... \tag{5}$$

Plugging the optimal smooth value of G in the inter-temporal budget constraint, and taking the permanent value of output as defined in equation 5, we get:

$$\tau \tilde{Y} = \tilde{G} + (1+r)B_0 . \tag{5'}$$

This equation states that the tax rate is set to finance the permanent level of expenditure and the initial debt using the permanent level of output as the tax base.

If there is an exogenous permanent shock on output, and given that debt and real interest rate are exogenous, the single way of restoring the equality would be to adjust government expenditure.[2] In a recession (expansion) the equality requires cutting (rising) expenditure; i.e. – procyclical fiscal policy. It is worth to note that this policy shall be similar for both developed and emerging economies. However, the difference among them may be based on: (i) the degree of permanent shocks: in emerging markets cycles may become persistent ("the cycle is the trend"), while in developed economies these shocks maybe purely transitory. If this is the case we expect fiscal policy to be acyclical (or countercyclical)[3] in developed economies, and procyclical in emerging markets; (ii) a different response to these shocks – which may differ as a consequence of the risk perception by economic agents.

To calculate the variable representing the phenomenon "the cycle is the trend" we use the methodology adopted by Aguiar and Gopinath (2007). While they used this methodology for Canada and Mexico, we extend the calculation to 22 developed economies and to 23 emerging countries.[4]

The methodology is based on looking at the variability of output over long horizons:

$$\sigma^2_{\Delta K} = K^{-1} \operatorname{var}(y_t - y_{t-K}), \tag{6}$$

[2] Hercowitz and Strawczynski (2004) consider the case in which both the tax rate and government expenditure are endogenous.

[3] When shocks are transitory, it is easy to show that the optimal policy against these shocks is to run a countercyclical policy, which acts as an optimal device for smoothing. This point is formally shown in Strawczynski and Zeira (2009).

[4] The list of countries is shown in appendix F. There is no single accepted definition for emerging markets. Some well-known definitions are based on indexes (MSCI and FTSE) that include different lists of countries, and on *The Economist* list. In our sample 17 out the 22 countries are included in these lists, and 5 countries are not.

where $y_t = \log(GDP)$ per capita at time t and K is the amount of lagged differences. We then correct the sample variance for small sample bias, by including a degree of freedom correction term $T/(T-K+1)$:

$$\sigma^2_{\Delta K} = \frac{T}{K(T-K+1)} \mathrm{var}(y_t - y_{t-K}). \quad (7)$$

For each K we calculate:

$$C_K = \frac{\sigma^2_{\Delta K}}{\sigma^2_{\Delta y}}, \quad (8)$$

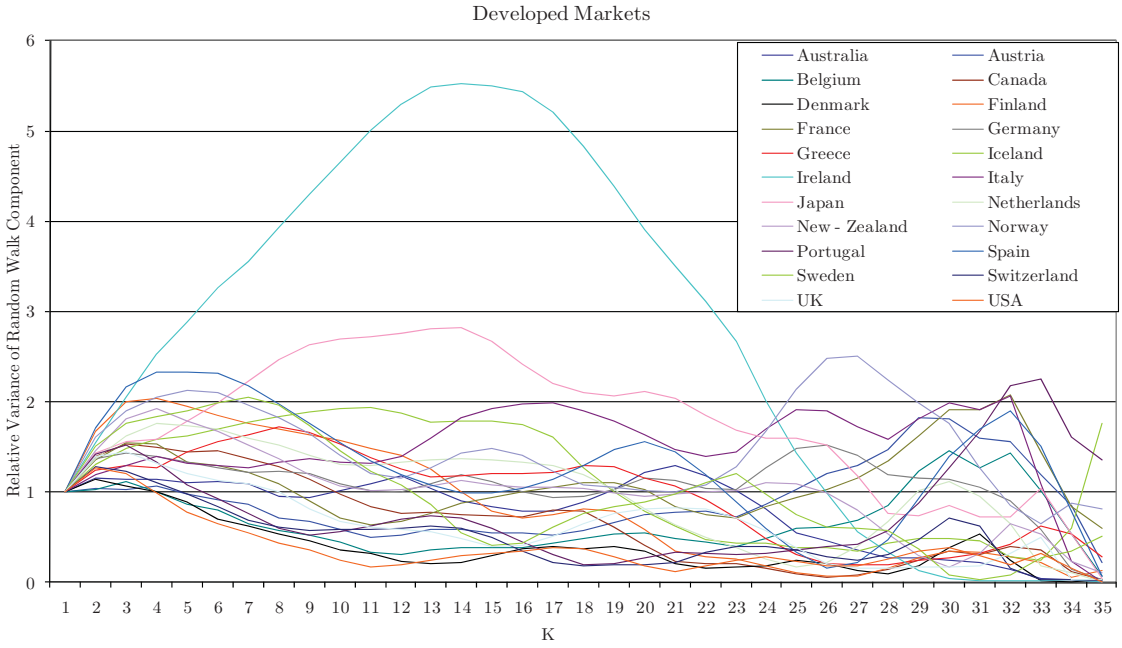
where $\sigma^2_{\Delta y}$ is the value of $\sigma^2_{\Delta K}$ where $K=1$. Thus, for all countries the value of equation 8 at $K=1$ is 1.

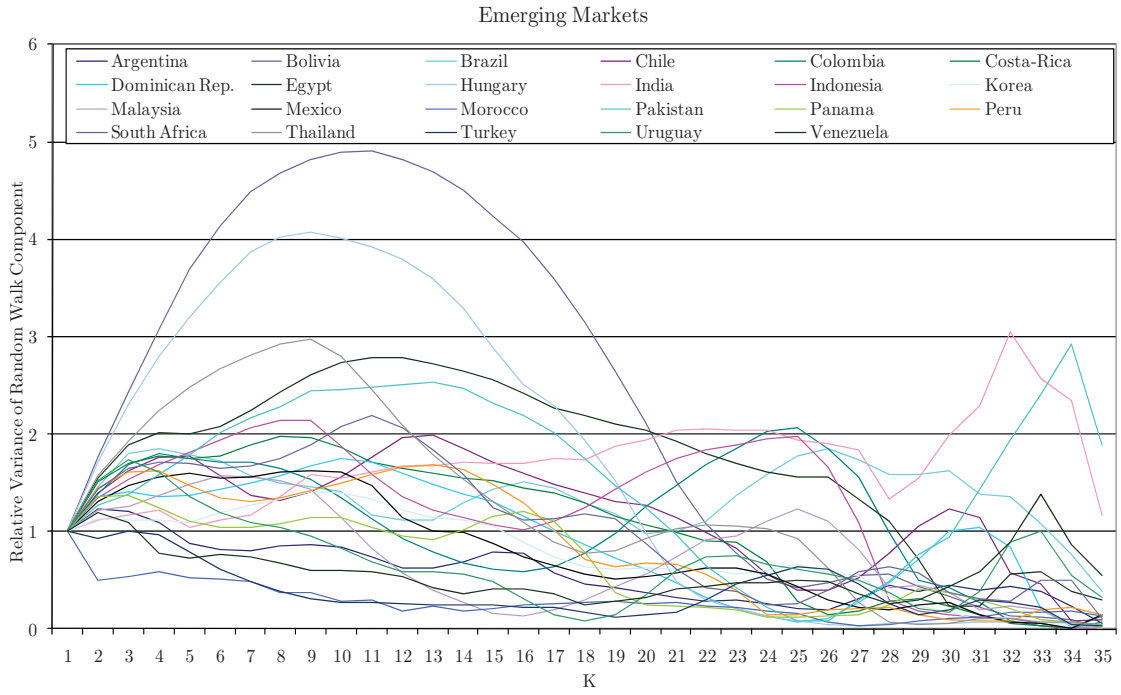
This value is giving us the ratio between the long-term variability of output compared to the short term one, and thus it is providing us with measure of to what extent "the cycle is the trend". The higher this coefficient, the higher countries are expected to be affected by changes in output. Figure 1 shows the result of this measure for the different countries.

In order to compare the results internationally, we take the average value of this measure for each country (see appendix A for a discussion of this choice). We expect the value for developed markets to be lower than for emerging markets.[5]

[5] In figure 1 we see that the pattern of procyclicality changes with K. It turns out that the pattern of procyclicality in emerging markets is very pronounced when K is between 9 and 11 (see figure A1 in appendix A for K=11).

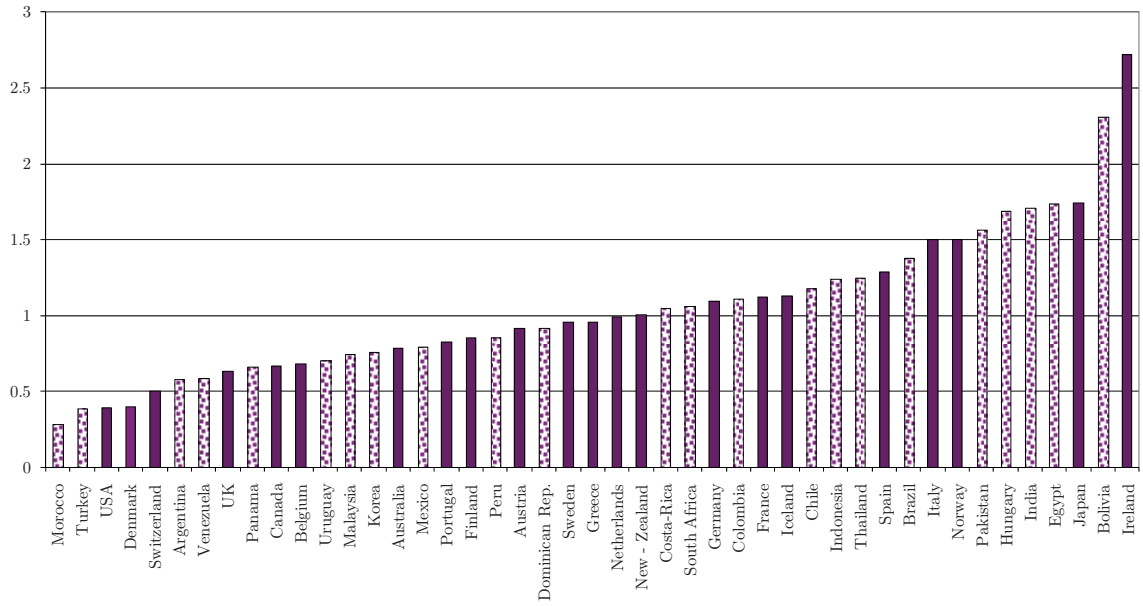
Figure 1. "The Cycle is the Trend" – Developed and Emerging Countries, 1960-2006.





Source: Own elaboration.

Figure 2. Relative Variance of Random Walk component at $K = \bar{K}$.



Source: Own elaboration.

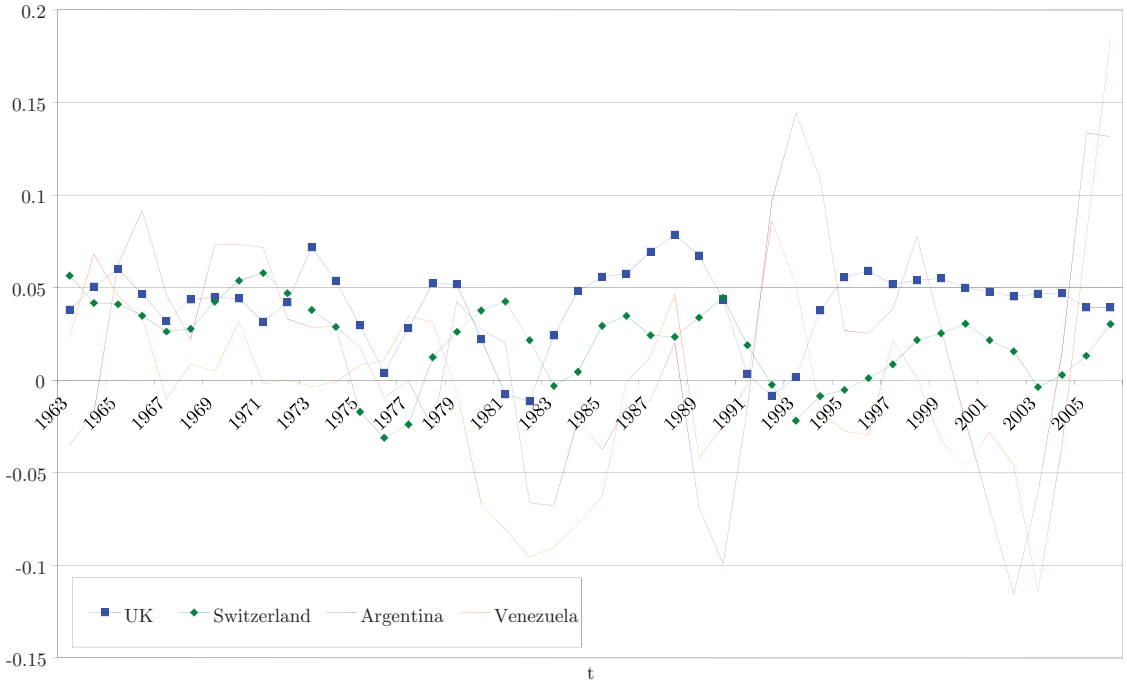
In general, we see in figure 2 that emerging countries have a higher value of the random walk component: 12 countries are over the median (which equals 0.957), while 11 are below. In developed countries: 12 countries are below the median and 10 above it. The average of all developed countries is 1.01 (and 0.95 excluding Ireland), compared to 1.07 for emerging countries.

This value is then multiplied with the sum of growth over three years (the reason for choosing three years is explained in appendix A):

$$CIIT_t = (C_{K=\bar{K}}) \sum_{n=t}^{t-3} \text{dlog}(y_t). \tag{9}$$

Figure 3 shows this formula applied for two developed countries and for two emerging countries. All four countries have similar and relatively (to other countries) low variance of the random walk component. Nevertheless, the erratic behavior in emerging markets is evident in the graph.

Figure 3. "The Cycle is The Trend" and Three-year Changes in Output.



Source: Own elaboration.

In the regressions below we will use *CITT* as an independent variable in regressions on total government expenditure, government consumption, social transfers and subsidies, and capital expenditure.

3. Data and Empirical Results

3.1 Data

For estimating the *CITT* variable we use per-capita GDP at constant prices. Data for developed countries was taken from OECD Economic Outlook and OECD Historical Statistics. Data for emerging markets is taken from the Government Financial Statistics. Data relates to the General Government. See appendix F for a detailed description of our sources and definitions.

3.2 Empirical Specifications for Total Expenditure

We estimate the following types of regressions:

$$\text{dlog}(G) = \beta_1 + \beta_2 CITT + \beta_3 RATIO + \beta_4 \text{dlog}(POP) + \beta_5 (POP15 + POP65) + \beta_6 \bar{K} + \beta_7 HyperInfl + \varepsilon,$$

and,

$$\text{dlog}(G) = \beta_1 + \beta_2 CITT + \beta_3 EMERGING + \beta_4 CITT \times EMERGING + \beta_5 RATIO + \beta_6 \text{dlog}(POP) + \beta_7 (POP15 + POP65) + \beta_8 \bar{K} + \beta_9 HyperInfl + \varepsilon,$$

where G is real government expenditure, deflated by GDP prices; *CITT* is "the cycle is the trend" variable as defined above; *dlog(POP)* is the population growth rate; *POP15* and *POP65* are the populations under 15 and over 65 years old, respectively, as a percentage of total population; $\bar{K}$ is the average of the random walk component as explained above; *RATIO* refers to the ratio between GDP per capita (in PPP values) of the country and the GDP per capita (in PPP values) of USA; *EMERGING* is a dummy variable which equals 1 for emerging countries and 0 otherwise; *HyperInfl* is a dummy variable which equals 1 when yearly inflation is over 100% over two or more consecutive years.

We repeat these regressions in the framework of three panel models: a simple ordinary least squares regression with period fixed effects, an autoregressive model (AR) and a GMM model (with an AR process). Furthermore, we examine these models for different lengths of moving average of output (1 to 4 periods). For space considerations the tables below show only the results for three periods moving average of output using the GMM approach.

The implementation of a GMM model requires choosing an instrumental variable that is correlated with the *CITT* variable and it is not correlated with government expenditure. For this purpose we use real exports, and additionally check the sensitivity of results to other instrumental variables (see appendix C).

3.2.1 Budget Cuts

Since in emerging countries fiscal policy is procyclical in hard times, it is particularly interesting to learn about budget cuts. Table 1 summarizes the number of budget cuts and whether they followed a recession period (which would indicate procyclical behavior), the amount of persistent budget cuts, and the depth of the budget cuts.

We will estimate the following regression:

$$\begin{aligned}\mathrm{dlog}(G) = {} & \beta_1 + \beta_2 CITT + \beta_3 EMERGING + \beta_4 (G^- \times Y^-) + \beta_5 EMERGING \times CITT + \\ & \beta_6 (CITT \times EMERGING \times G^- \times Y^-) + \beta_7 RATIO + \beta_8 \mathrm{dlog}(POP) + \beta_9 (POP15 + POP65) + \\ & \beta_{10} \bar{K} + \beta_{11} HyperInfl + \varepsilon,\end{aligned}$$

where G^- and Y^- are dummy variables that take the value 1 when government consumption and real GDP, respectively, have a negative growth rate.

Table 1. Budget Cuts (*).

	Developed Economies	Emerging Economies
Average number of observations with a government budget cut.	5.7	6.8
Average number of events (when real government expenditure was cut) as percent of total years available.	12.7	25.6
Average number of persistent events (when government expenditure was cut two consecutive years or more) as percent of total years available (**).	5.5	10.2
Average number of persistent events (two years or more) as percent of total number of events.	43.2	39.9
Average number of persistent events (when government expenditure was cut three consecutive years or more) as percent of total years available.	2.4	4.1
Average number of persistent events (three years or more) as percent of total number of events.	19.2	16.1
Average number of events with parallel reduction in growth as percent of total number of events.	6.4	30.1
Average number of events with one period lagged reduction in growth as percent of total number of events.	15.2	20.3
Average cut in government expenditure (percent).	-2.2	-6.8
Average cut in government expenditure when there was a parallel reduction in growth (percent).	-4.0	-10.3
Parallel reduction in growth – average percent of change in GDP.	-2.0	-5.2

(*) Number of emerging countries in which data for total government expenditure is available and consistent. (**) Each year in the group of consecutive years is counted as an event. Source: OECD and Government Financial Statistics.

3.2.2 A Change in Policy after The 90s

Another feature is to examine whether there was a change in the emerging markets government behavior after the 90s, when the globalization increased, allowing the emerging countries governments to be exposed to international markets. This is indeed an important point: in order to cause a change in behavior and avoid emerging countries to be "on their own" (by cutting expenditure), agents must be convinced that in hard times there will be some kind of insurance through aid from other countries. If the stock exchange is exposed to citizens from other countries, and if there is confidence that countries will recover in the future, the low prices at the stock exchange during

hard times will be perceived as an investment opportunity and may provide such a mechanism.

For this purpose we define a dummy variable (*D90*) that takes the value of 1 after 1990, and 0 otherwise. We multiply this dummy to the fiscal variables explained above.

3.3 Empirical Results for Total Government Expenditure

Results for total government expenditure are shown in table 2. From column 2 we learn that while for the developed economies the coefficient of permanent shocks is insignificant, for emerging markets the coefficients is around 0.3 and significant at 1 percent. In hard times (column 4) the coefficient becomes higher: the coefficient in periods of parallel reductions in G and Y increases by 0.2. We take these results as first evidence of our main hypothesis – i.e., GDP shocks in emerging countries are associated to a procyclical reaction in government expenditure. These results are confirmed using the other methods as well.

In columns 3 and 5 we test whether there was a change in behavior in emerging countries government expenditure during the 90s, a period characterized by increasing globalization. In column 3 the coefficient is not significant but in column 5 it is significant at the 5 percent level; i.e., the emerging countries procyclical reaction in government expenditure was significantly reduced since the nineties, especially during hard times.

3.4 Government Expenditure Composition

We perform the same analysis for government consumption, transfers and subsidies and capital expenditure. In the transfers and subsidies analysis, we additionally control for the difference of the unemployment rate (*dU*), in order to control for the automatic impact of the cycle on unemployment benefits. Results are shown in tables 3, 4, and 5.

In table 3, we see that while government consumption is procyclical in both developed and emerging economies, procyclicality is considerably higher in emerging economies. As opposed to total government expenditure, the behavior does not significantly change in hard times. In table 4, we see that government transfers are procyclical in emerging economies, a pattern that was accentuated during the 90s.

A documented empirical result (Lane, 2003; and Ilzetzky and Vègh, 2008) is that capital expenditure tends to be procyclical even in a sample of developed economies. Lane (2003) summarizes both the macroeconomic and political economy factors that are on the background of this phenomenon. One possible explanation that connects between these two features would be that the fruits of investment projects is revealed many years after the initiation of a project; thus, politicians may be tempted to start investment projects only in times of abundant tax revenues, and at the same time they may find natural to cut these projects in difficult times – without any immediate consequences. In table 5 results show, as expected, that cuts in capital expenditure are procyclical in both developed and emerging economies. It is possible to see also that the procyclical behavior is not significantly different in emerging economies.

Table 2. Total Government Expenditure Regressions.

Dependent variable: *dlog(G)*	1	2	3	4	5
No. of observations (unbalanced)	1221	1221	1221	1221	1221
Sample	1971-2006				
Constant	0.06	0.03	0.03	0.02	0.03
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
dlog(POP)	1.64	1.37	1.37	1.38	1.47
	(0.44)***	(0.45)***	(0.45)***	(0.45)***	(0.45)***
POP15+POP65	-0.001	0.00001	-0.00002	0.0002	-0.0001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
RATIO	-0.004	0.001	0.001	0.001	0.003
	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)
HyperInfl	-0.05	-0.03	-0.03	-0.02	-0.02
	(0.01)***	(0.01)***	(0.01)***	(0.01)*	(0.01)
$\bar{K}$	-0.02	-0.01	-0.01	-0.01	-0.01
	(0.01)**	(0.01)	(0.01)	(0.01)*	(0.01)
EMERGING		-0.02	-0.02	-0.03	-0.02
		(0.01)	(0.01)	(0.01)*	(0.01)
$G^- \times Y^-$				-0.002	-0.01
				(0.01)	(0.01)
CITT	0.25	0.08	0.08	0.09	0.09
	(0.04)***	(0.05)	(0.05)	(0.05)*	(0.05)*
$EMERGING \times CITT$		0.31	0.31	0.35	0.43
		(0.07)***	(0.09)***	(0.07)***	(0.08)***
$EMERGING \times CITT \times D90$			-0.004		-0.15
			(0.07)		(0.07)**
$EMERGING \times CITT \times G^- \times Y^-$				0.22	0.23
				(0.11)*	(0.12)*
$EMERGING \times CITT \times G^- \times Y^- \times D90$					-0.51
					(0.25)**
Adj. R^2	0.54	0.56	0.56	0.55	0.56
Durbin-Watson	1.63	1.66	1.66	1.67	1.66

Notes. Estimation method: GMM. Standard errors in parenthesis. *** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent. Source: Own elaboration.

Table 3. Government Consumption Regressions.

Dependent variable: *dlog(GC)*	1	2	3	4	5
No. of observations (unbalanced)	1277	1277	1277	1202	1202
Sample	1971-2006				
Constant	-0.01	-0.01	-0.01	-0.03	-0.02
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
dlog(POP)	1.03	0.98	0.98	1.15	1.13
	(0.42)**	(0.42)**	(0.42)**	(0.44)***	(0.44)***
POP15+POP65	0.001	0.001	0.001	0.002	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
RATIO	0.01	0.004	0.004	0.01	0.01
	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)
HyperInfl	-0.05	-0.04	-0.04	-0.03	-0.03
	(0.01)***	(0.01)***	(0.01)***	(0.01)**	(0.01)**
$\bar{K}$	-0.01	-0.01	-0.01	-0.02	-0.02
	(0.01)**	(0.01)	(0.01)	(0.01)**	(0.01)**
EMERGING		-0.02	-0.02	-0.03	-0.03
		(0.01)	(0.01)	(0.01)**	(0.01)**
$G^- \times Y^-$				-0.003	-0.002
				(0.01)	(0.01)
CITT	0.24	0.15	0.15	0.16	0.16
	(0.03)***	(0.05)***	(0.05)***	(0.05)***	(0.05)***
$EMERGING \times CITT$		0.17	0.19	0.28	0.34
		(0.07)**	(0.08)**	(0.07)***	(0.08)***
$EMERGING \times CITT \times D90$			-0.03		-0.10
			(0.07)		(0.07)
$EMERGING \times CITT \times G^- \times Y^-$				0.08	0.09
				(0.11)	(0.12)
$EMERGING \times CITT \times G^- \times Y^- \times D90$					0.07
					(0.26)
Adj. R^2	0.56	0.57	0.57	0.57	0.57
Durbin-Watson	1.73	1.76	1.76	1.76	1.76

Notes. Estimation method: GMM. Standard errors in parenthesis. *** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent. Source: Own elaboration.

Table 4. Government Transfers and Subsidies Regressions.

Dependent variable: *dlog(GT)*	1	2	3	4	5
No. of observations (unbalanced)	1062	1062	1062	1053	1053
Sample	1971-2006				
Constant	0.05	0.02	0.01	0.02	0.004
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
dlog(POP)	1.61	1.48	1.49	1.22	1.19
	(0.64)**	(0.68)**	(0.7)**	(0.69)*	(0.7)*
POP15+POP65	-0.0003	0.0004	0.001	0.001	0.001
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
RATIO	-0.01	-0.01	-0.01	-0.01	-0.01
	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)
HyperInfl	-0.07	-0.06	-0.07	-0.05	-0.05
	(0.02)***	(0.02)***	(0.02)***	(0.02)**	(0.02)***
dU	0.01	0.01	0.01	0.01	0.01
	(0.002)***	(0.002)***	(0.002)***	(0.002)***	(0.002)***
$\bar{K}$	-0.01	0.001	-0.003	0.002	-0.001
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
EMERGING		-0.02	-0.03	-0.01	-0.02
		(0.02)	(0.02)	(0.02)	(0.02)
$G^- \times Y^-$				-0.02	-0.02
				(0.01)**	(0.01)**
CITT	0.12	-0.02	-0.01	-0.04	-0.03
	(0.06)**	(0.07)	(0.07)	(0.07)	(0.07)
$EMERGING \times CITT$		0.29	-0.01	0.30	0.09
		(0.11)***	(0.13)	(0.11)***	(0.13)
$EMERGING \times CITT \times D90$			0.49		0.33
			(0.13)***		(0.12)***
$EMERGING \times CITT \times G^- \times Y^-$				0.20	0.34
				(0.2)	(0.22)
$EMERGING \times CITT \times G^- \times Y^- \times D90$					-0.06
					(0.59)
Adj. R^2	0.43	0.45	0.43	0.45	0.44
Durbin-Watson	1.60	1.63	1.64	1.62	1.63

Notes. Estimation method: GMM. Standard errors in parenthesis. *** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent. Source: Own elaboration.

Table 5. Government Capital Expenditure Regressions.

Dependent variable: *dlog(GI)*	1	2	3	4	5
No. of observations (unbalanced)	1245	1245	1245	1177	1177
Sample	1971-2006				
Constant	0.05	0.15	0.15	0.13	0.14
	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)
dlog(POP)	3.72	4.35	4.35	4.63	4.66
	(1.16)***	(1.19)***	(1.19)***	(1.2)***	(1.21)***
POP15+POP65	-0.002	-0.002	-0.002	-0.001	-0.001
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
RATIO	0.06	-0.09	-0.09	-0.10	-0.10
	(0.04)	(0.06)	(0.06)	(0.06)*	(0.06)*
HyperInfl	-0.07	-0.06	-0.06	-0.04	-0.05
	(0.03)**	(0.03)*	(0.03)**	(0.03)	(0.03)
$\bar{K}$	-0.02	-0.03	-0.03	-0.04	-0.04
	(0.02)	(0.02)	(0.02)	(0.02)**	(0.02)**
EMERGING		-0.12	-0.11	-0.15	-0.14
		(0.04)***	(0.04)***	(0.04)***	(0.04)***
$G^- \times Y^-$				-0.01	-0.02
				(0.01)	(0.01)
CITT	0.60	0.48	0.49	0.49	0.49
	(0.09)***	(0.14)***	(0.14)***	(0.14)***	(0.14)***
$EMERGING \times CITT$		0.22	0.15	0.30	0.22
		(0.19)	(0.22)	(0.18)*	(0.22)
$EMERGING \times CITT \times D90$			0.04		0.01
			(0.18)		(0.18)
$EMERGING \times CITT \times G^- \times Y^-$				0.15	0.07
				(0.31)	(0.33)
$EMERGING \times CITT \times G^- \times Y^- \times D90$					-0.23
					(0.69)
Adj. R^2	0.54	0.54	0.54	0.54	0.55
Durbin-Watson	1.81	1.80	1.80	1.79	1.79

Notes. Estimation method: GMM. Standard errors in parenthesis. *** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent. Source: Own elaboration.

3.5 Other Issues to Consider

So far we found that fiscal policy in emerging countries is procyclical, with some signs of a change in behavior after the nineties. In this sub-section we explore other issues that may shed lights on the mechanism underlying this process.

3.5.1. Foreign Direct Investment and International Reserves

One possibility for the improved performance in the nineties is that countries are less "on their own" and the need for cutting expenditure in hard times has been reduced in countries increasingly exposed to investors around the world. One possible indicator of this exposure is the level of Foreign Direct Investments (FDI). Thus, we expect that countries that have a high level of FDI will be characterized by milder procyclical fiscal policy. Table 6 shows the average levels of FDI for developed and emerging countries.

Table 6. Average Net FDI Inflows as Percent of GDP.

	1970s	1980s	1990s	2000-2006
Developed countries	0.74	0.75	1.97	3.78
Emerging countries	0.83	0.84	2.53	2.96
All countries	0.79	0.79	2.26	3.36

Source: UNCTAD, May 2010.

One clear feature arising from this table is that after the nineties there was a huge increase in globalization compared to the 70s and 80s, with a more than double (quadruple) FDI level in the 90s (2001-06) for developed economies, and more than triple (quadruple in 2001-06) for emerging markets. Another interesting feature of FDI flows is their high variance, with some developing countries being "discovered" by foreign investors only in the last decade.

In table 7 we check whether the level of FDI has some explanatory power for procyclical fiscal policy in emerging countries. For this purpose we perform two regressions: (i) using an interaction variable between $CITT$ and FDI (column 1); (ii) using an interaction between $CITT$ and a dummy variable ($\bar{D}(FDI)$) that takes the value of 1 when FDI is higher than the median for each group of countries in each decade or 0 otherwise (column 2). Results are significant and in the expected direction; for emerging countries with high levels of FDI the coefficient of procyclicality decreases from 0.42 to 0.14 (column 2).

Kandil and Morsy (2010) found that international reserves help for performing countercyclical policy in emerging countries. We use their methodology for testing the role of international reserves and build a dummy variable ($D(\text{Reserves})$) that takes the value 1 if the international reserves at the end of the year are higher than the sum of 3 months of imports (using average monthly imports of the corresponding year). Columns 3 and 4 show that the coefficients have the expected sign and are significant at 10 percent.

Table 7. Total Government Expenditure Regressions with FDI and International Reserves.

Dependent variable: *dlog(G)*	1	2	3	4
No. of observations (unbalanced)	1130	1170	1195	1195
Sample	1973-2006		1971-2006	
Constant	0.06	0.05	0.04	0.04
	(0.04)	(0.05)	(0.04)	(0.04)
dlog(POP)	1.55	1.40	1.45	1.45
	(0.5)***	(0.49)***	(0.45)***	(0.45)***
POP15+POP65	-0.001	-0.001	-0.0003	-0.0003
	(0.001)	(0.001)	(0.001)	(0.001)
RATIO	-0.003	-0.003	-0.003	-0.003
	(0.02)	(0.03)	(0.02)	(0.02)
HyperInfl	-0.03	-0.03	-0.03	-0.03
	(0.01)**	(0.01)**	(0.01)***	(0.01)***
$\bar{K}$	-0.01	-0.01	-0.01	-0.01
	(0.01)	(0.01)	(0.01)*	(0.01)*
EMERGING	-0.02	-0.02	-0.02	-0.02
	(0.01)	(0.02)	(0.01)*	(0.01)*
FDI/GDP	-0.001			
	(0.001)			
$\bar{D}(FDI)$		-0.0002		
		(0.01)		
D(Reserves)			0.01	0.01
			(0.003)*	(0.003)*
CITT	0.06	0.09	0.10	0.10
	(0.05)	(0.05)	(0.05)**	(0.05)**
$EMERGING \times CITT$	0.39	0.42	0.38	0.38
	(0.08)***	(0.09)***	(0.09)***	(0.09)***
$(FDI/GDP) \times EMERGING \times CITT$	-0.04			
	(0.02)***			
$EMERGING \times CITT \times \bar{D}(\text{FDI})$		-0.28		
		(0.09)***		
$EMERGING \times CITT \times D(\text{Reserves})$			-0.13	-0.13
			(0.07)*	(0.08)*
$EMERGING \times CITT \times D(\text{Reserves}) \times D90$				0.01
				(0.08)
Adj. R^2	0.55	0.54	0.55	0.55
Durbin-Watson	1.68	1.67	1.66	1.66

Notes. Estimation method: GMM. Standard errors in parenthesis. *** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent. Source: Own elaboration.

3.5.2 Government Debt

As mentioned in the literature survey, government debt is considered as one of the main explicators for procyclical fiscal policy in developing countries. Two stylized facts are that in many emerging countries the levels of debt are high, and that there is a high variability of debt levels among different countries.

In table 8 we estimate regressions that include the level of debt as an independent variable ($DEBT/GDP$), and a dummy variable ($\bar{D}(Debt)$) that takes the value of 1 when the debt is higher than the median for each group of countries in each decade or 0 otherwise (column 3). Column 1 shows that the coefficient of debt as a percent of GDP is negative and significant, which means that countries with high debt

tend to reduce government expenditure. This means that debt can be considered as an alternative explanation for government expenditure. Consequently, we include debt as an additional variable in our basic specification, and we further create an interaction variable between *CITT* and debt. *Ex-ante* we do not have a clear expectation about the sign of the coefficient: a high level of debt may imply an international pressure to cut, and thus we shall expect a negative coefficient; on the other hand, a high level of debt may represent the ability of countries to access international capital markets, which implies a positive coefficient. In columns 2 and 3 we see that the coefficients tend to be negative but in the second specification it is not significant.

Table 8: Total Government Expenditure Regressions with Debt.

Dependent variable: *dlog(G)*	1	2	3
No. of observations (unbalanced)	900	894	963
Sample	1973-2006		
Constant	0.07	0.04	-0.01
	(0.04)	(0.04)	(0.04)
dlog(POP)	0.46	0.65	1.05
	(0.48)	(0.46)	(0.48)**
POP15+POP65	-0.0002	0.0002	0.0001
	(0.001)	(0.001)	(0.001)
RATIO	-0.02	0.002	0.04
	(0.02)	(0.02)	(0.02)
HyperInfl	-0.02	-0.01	-0.01
	(0.02)	(0.02)	(0.02)
$\bar{K}$		0.01	0.001
		(0.01)	(0.01)
EMERGING	0.04	-0.01	0.02
	(0.02)**	(0.01)	(0.01)
DEBT/GDP	-0.0004	-0.0004	
	(0.0001)***	(0.0001)***	
$\bar{D}$(*Debt*)			-0.003
			(0.004)
CITT		0.01	0.05
		(0.04)	(0.05)
EMERGING × *CITT*		0.39	0.25
		(0.1)***	(0.08)***
(*DEBT / GDP*) × *EMERGING*	-0.001		
	(0.0002)***		
(*DEBT / GDP*) × *EMERGING* × *CITT*		-0.004	
		(0.002)**	
EMERGING × *CITT* × $\bar{D}$(Debt)			-0.13
			(0.100)
Adj. R^2	0.59	0.59	0.58
Durbin-Watson	1.66	1.59	1.53

Notes. Estimation method: GMM. Standard errors in parenthesis. *** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent. Source: Own elaboration.

3.5.3 Emerging vs Developing

In our sample there are five markets that are not considered "Emerging Markets" by either the MSCI or FTSE emerging markets index (see appendix F for further information of the countries included in these indices). Table 9 repeats the regressions reported in table 3 excluding the following countries: Bolivia, Costa Rica, Dominican

Republic, Panama and Uruguay. Interestingly, we found the coefficient of procyclicality is lower for the restricted sample.

Table 9. Total Government Expenditure Regressions Excluding Five Developing Markets Not Included in the "Emerging Markets Index".

Dependent variable: *dlog(G)*	1	2	3	4	5
No. of observations (unbalanced)	1107	1107	1107	1107	1107
Sample	1971-2006				
Constant	0.07	0.04	0.05	0.05	0.05
	(0.04)*	(0.04)	(0.04)	(0.04)	(0.04)
dlog(POP)	1.53	1.32	1.32	1.36	1.39
	(0.44)***	(0.46)***	(0.46)***	(0.45)***	(0.44)***
POP15+POP65	-0.001	-0.0003	-0.0003	-0.0003	-0.0004
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
RATIO	-0.01	-0.01	-0.01	-0.01	-0.01
	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)
HyperInfl	-0.06	-0.04	-0.04	-0.03	-0.03
	(0.01)***	(0.01)***	(0.01)***	(0.01)**	(0.01)**
$\bar{K}$	-0.02	-0.01	-0.01	-0.01	-0.01
	(0.01)**	(0.01)	(0.01)	(0.01)	(0.01)
EMERGING		-0.02	-0.02	-0.02	-0.02
		(0.02)	(0.02)	(0.01)	(0.01)
$G^- \times Y^-$				-0.01	-0.02
				(0.01)	(0.01)***
CITT	0.21	0.06	0.06	0.09	0.09
	(0.04)***	(0.05)	(0.05)	(0.05)*	(0.05)*
$EMERGING \times CITT$		0.29	0.28	0.25	0.31
		(0.08)***	(0.09)***	(0.07)***	(0.08)***
$EMERGING \times CITT \times D90$			-0.01		-0.08
			(0.07)		(0.07)
$EMERGING \times CITT \times G^- \times Y^-$				0.18	0.21
				(0.13)	(0.13)
$EMERGING \times CITT \times G^- \times Y^- \times D90$					-0.63
					(0.23)***
Adj. R^2	**0.55**	**0.56**	**0.56**	**0.56**	**0.56**
Durbin-Watson	**1.73**	**1.75**	**1.75**	**1.75**	**1.73**

Notes. Estimation method: GMM. Standard errors in parenthesis. *** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent. Source: Own elaboration.

4. Summary and Conclusions

This paper checks whether developed and emerging economies react differently to persistent shocks to output. Using a simple model of optimal government behavior we expect that countries that are subject to persistent shocks to per-capita GDP shall act procyclical; i.e., increase expenditure during booms and cut it during recessions. In order to assess the extent at which "the cycle is the trend" for developed and emerging economies, we adopt Aguiar and Gopinath (2007) definition of shocks, and we check the reaction of government expenditure and its components (consumption, transfers and investment) to these shocks.

We found that while government expenditure in developed economies is not affected by these shocks, emerging countries tend to pursue procyclical fiscal policy as a reaction to persistent shocks to per-capita GDP. While in line with previous findings both

developed and emerging countries act procyclical regarding investment expenditure, procyclical policy in emerging countries is particularly evident for total expenditure and is implemented also in government consumption and transfers.

After the 90s, during a period of increasing globalization, there are signs of a reduction in the extent of procyclical expenditure policy in emerging countries. Moreover, it was found that countries with a high level of FDI, and those included in Emerging Markets indices, perform milder procyclical policy.

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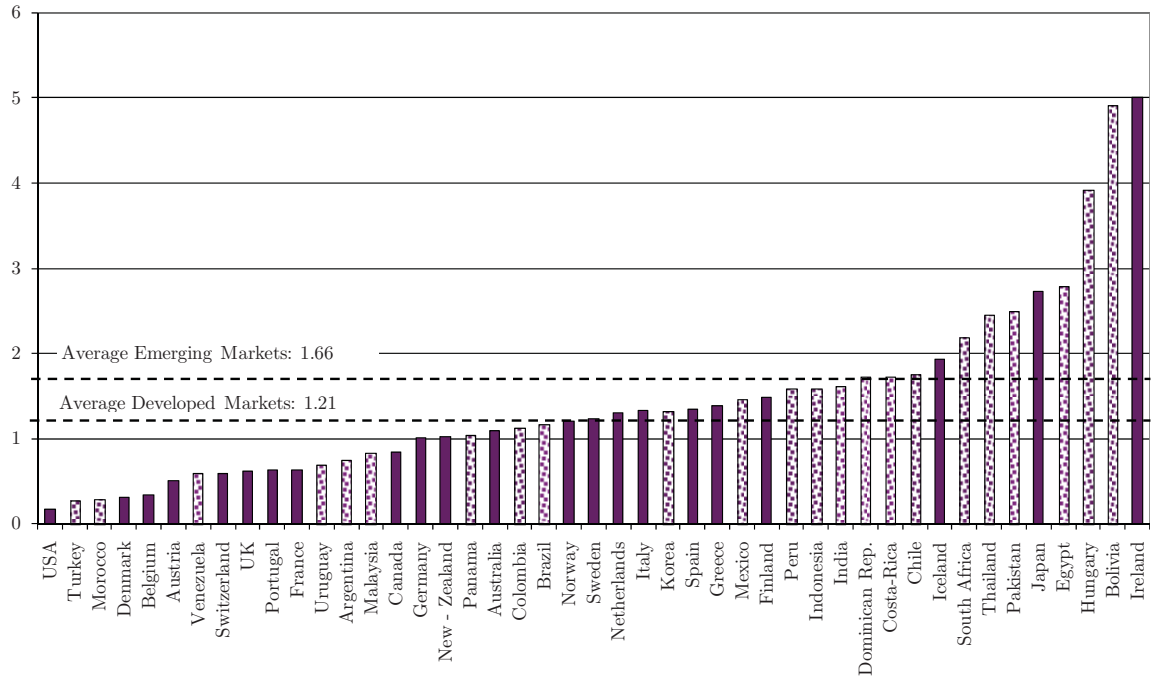
Appendix A
Choosing the Length of Shocks Affecting Government Expenditure.

The interaction between the sum of the three period shocks and "the cycle is the trend" is a central explanatory variable in our regressions. As stated in Aguiar and Gopinath (2007), there is a trade off between precision (using a small number for K) and an unbiased sample (using a large K).

Choosing different values of K implies a different pattern for the *CITT* variable. The following figure shows the relative variance of the random walk component at *K=11*. Clearly in this figure there is a sharper distinction concerning the random walk component of developed and emerging markets, compared to the one arising from figure 2 (which is based on the average K).

Figure A1: Relative Variance of Random Walk Component at *K=11*.



Source: Own elaboration.

In order to check the sensitivity of results to K we run the following regression:

$$\text{dlog}(G_t) = \beta_1 + \beta_2(C_K)\sum_{n=t}^{t-j}\text{dlog}(y_t) + \beta_3 RATIO + \beta_4 \text{dlog}(POP) + \beta_5(POP15 + POP65) + \beta_6 HyperInfl + \varepsilon,$$

where K takes different values and j goes from 1 to 4.

Results for the four different possibilities of accumulated shocks show that the best result using the *t-statistic*, adjusted R^2 and Akaike criterion occurs when *K=2*. At the same time, it is remarkable that differences between the regressions, as measured by the adjusted R^2 and Akaike criterion, are negligible. Since choosing *K=2* would clearly

increase the potential bias of our estimation, we choose the average K as an option that balances between precision and bias. It is worth to note that the *t-statistic* for the regression using average K is very high ($t=9$), and the difference in the level of significance is negligible when compared to the case in which $K=2$.

Our second choice is related to the length of the moving average of output shocks. In the three-periods accumulated shocks specification of the above equation, we get a significantly higher t-statistic of the *CITT* variable, and higher adjusted R^2 and Akaike criterion (in absolute value) compared to all other options. Therefore, we choose this option as the benchmark.

In order to check the sensibility of results to the different values of K, we show in this appendix the results of the following main regression (as presented in table 3, column 2):

$$\text{dlog}(G) = \beta_1 + \beta_2 CITT + \beta_3 EMERGING + \beta_4 CITT \times EMERGING + \beta_5 RATIO + \beta_6 \text{dlog}(POP) + \beta_7 (POP15 + POP65) + \beta_8 K + \beta_9 HyperInfl + \varepsilon.$$

For space considerations we show only the coefficients and significance of the main variables, the adjusted R^2 and Durbin-Watson value at table A1.

Table A1. Coefficients and Statistics of the Main Variables.

	CITT	CITT × EMERGING	Adj. R^2	Durbin-Watson
K=2	0.02 (0.05)	0.29 (0.07)***	0.57	1.67
K=3	0.03 (0.04)	0.24 (0.06)***	0.57	1.67
K=4	0.04 (0.04)	0.2 (0.05)***	0.56	1.66
K=5	0.06 (0.04)	0.17 (0.05)***	0.56	1.66
K=6	0.06 (0.04)*	0.15 (0.05)***	0.55	1.65
K=7	0.07 (0.04)*	0.13 (0.05)***	0.55	1.65
K=8	0.07 (0.03)**	0.13 (0.04)***	0.55	1.65
K=9	0.07 (0.03)**	0.12 (0.04)***	0.55	1.65
K=10	0.06 (0.03)**	0.13 (0.04)***	0.55	1.65
K=11	0.07 (0.03)**	0.15 (0.04)***	0.55	1.65
K=12	0.07 (0.03)**	0.16 (0.04)***	0.55	1.65
K=13	0.07 (0.03)**	0.17 (0.04)***	0.55	1.66
K=14	0.07 (0.03)**	0.19 (0.05)***	0.55	1.67
K=15	0.07 (0.03)**	0.22 (0.05)***	0.56	1.67
K=16	0.08 (0.03)**	0.24 (0.05)***	0.56	1.68
K=17	0.08 (0.03)**	0.27 (0.06)***	0.55	1.67
K=18	0.08 (0.04)**	0.31 (0.07)***	0.55	1.67
K=19	0.08 (0.04)*	0.35 (0.07)***	0.54	1.66
K=20	0.09 (0.05)*	0.36 (0.08)***	0.54	1.64
K=21	0.1 (0.05)*	0.35 (0.08)***	0.53	1.63
K=22	0.1 (0.06)*	0.34 (0.08)***	0.53	1.63
K=23	0.1 (0.06)	0.34 (0.08)***	0.53	1.63
K=24	0.12 (0.07)*	0.32 (0.09)***	0.52	1.62
K=25	0.17 (0.08)*	0.28 (0.1)***	0.51	1.61
K=26	0.22 (0.09)**	0.3 (0.11)***	0.51	1.61
K=27	0.25 (0.1)**	0.39 (0.12)***	0.52	1.63
K=28	0.23 (0.1)**	0.66 (0.14)***	0.55	1.69
K=29	0.17 (0.09)*	0.64 (0.13)***	0.55	1.71
K=30	0.16 (0.08)*	0.55 (0.12)***	0.55	1.72
$K = \bar{K}$	0.08 (0.05)	0.31 (0.07)***	0.56	1.66

Notes. Standard errors in parenthesis. *** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent. Source: Own elaboration.

Similarly, we run the regressions with different number of accumulated shocks (using $K = \bar{K}$). The table A2 shows results for the specification described above.

Table A2. Regressions with Accumulated Shocks.

No. of Acc. Shocks	CITT	CITT × EMERGING	Adj. R^2	Durbin-Watson
1	-0.09 (0.09)	-0.05 (0.13)	0.50	1.65
2	-0.12 (0.07)*	0.44 (0.1)***	0.54	1.72
3	0.08 (0.05)	0.31 (0.07)***	0.56	1.66
4	0.15 (0.04)***	0.18 (0.06)***	0.53	1.71

Notes. Standard errors in parenthesis. *** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent. Source: Own elaboration.

Appendix B
Granger Causality Test

In this appendix we use Granger causality tests for the relationship between GDP per capita and government expenditure. At first, we test whether GDP per capita causes government expenditure (with three lags). Then, we test again this hypothesis after adding fixed effects for the different countries. At last, we run a full regression including all the control variables used in our paper (*dlog(POP), POP15+POP65, HyperInfl, RATIO*). The null hypothesis is that each of the coefficients of GDP per capita up to three lags equals 0. In all three specifications the null hypothesis is rejected.

To check reverse causality, we test all three specifications replacing the dependent variable by GDP per capita. The null hypothesis is that each of the coefficients of government expenditure up to three lags equals 0. The null hypothesis can not be rejected in all three specifications at 5 percent significance. The table A3 summarizes the results.

Table A3. Results of Granger Causality Tests.

	GDP per capita does not cause *G*			*G* does not cause *GDP* per capita		
Type of regression	Simple Granger causality	With cross section fixed effects	Full regression	Simple Granger causality	With cross section fixed effects	Full regression
F-statistic	14.0	11.4	14.2	1.87	1.96	2.19
Significant at	under 1%	under 1%	under 1%	14%	12%	9%
Result	The null hypnosis **can** be rejected	The null hypnosis **can** be rejected	The null hypnosis **can** be rejected	The null hypnosis **can not** be rejected	The null hypnosis **can not** be rejected	The null hypnosis **can not** be rejected

Source: Own elaboration.

Appendix C
Using Alternative Instruments

In this section we discuss the sensitivity of results to our basic instrumental variable - the logarithmic change in countries' exports at constant dollars. Since our instrumental variable is based on a three-years moving average (consistently with the length chosen for the explanatory variable), note that it is centered at a one year and a half lag. This feature avoids a contemporary endogeneity with the left-hand variable (logarithmic change of government expenditure) through the exchange-rate channel.[6] However, since the last year of the moving average is contemporary to the left-hand side variable, we check in this appendix the sensitivity of results to an alternative instrumental variable – based on the one-period lagged moving average.

Table A4 shows the results for total government expenditure, government consumption, transfers and capital expenditure – according to the regression specification shown in the last column of table 3.

The obtained results show a similar pattern compared to the ones shown in Table 3: emerging economies have a clearly more procyclical pattern for total government expenditure and government consumption than developed economies (although here the coefficient of total expenditure for this group of countries is significant), transfers are procyclical in hard times, and capital expenditure is procyclical for both groups.

In table A5 we use an alternative instrumental variable, introduced by Panizza and Jaimovich (2007) and used also by Ilzetzki and Vègh (2008). It is based on the weighted average of real GDP growth of the main export partners.[7] Since the availability of data shortens considerably our sample from 1983 and onwards, we are constrained to use the regressions shown in column 3 (i.e., excluding the dummy after the nineties) of Tables 3, 4 and 5. Also here results are fairly similar, except for a significant procyclical reaction of total government expenditure in developed countries.

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[6] This channel would be relevant to the extent that government expenditure affects the real exchange rate and that real exchange rate affects exports. Existing empirical literature on the relationship between government expenditure and real exchange rate shows a contemporary correlation between these two variables: see De Gregorio, Giovannini and Wolf (1994), Lee, Milesi-Ferretti and Ricci (2008) and Galstyan and Lane (2008); the last two papers use a dynamic specification with one-lag and one-forward period; i.e., they are centered on the contemporaneous correlation.

[7] Main export partners of a country are defined as the countries that receive at least 5% of the total exports. The second criterion requires that the main export partners comprise at least 50% of the countries exports. If countries receiving more than 5% of the exports do not account for 50% of the total exports smaller trading partners are added. For example, a country that has only one export partner that accounts for over 50 percent of its total exports (such as Canada and Mexico) will have only one main export partner in our calculation. Other countries that have less centralized export characteristics can have six or seven main trading partners, where some of them account for less then 5 percent of total exports. The weighted average of the GDP growth rate is based on the export partners weights in the total exports. We normalized the weights so the sum equals to one.

Table A4. Total Government Expenditure and its Composition.

Dependent variable:	*dlog(G)*	*dlog(GC)*	*dlog(GT)*	*dlog(GI)*
No. of observations (unbalanced)	1217	1198	1049	1173
Sample	1971-2006			
Constant	0.04	-0.02	0.003	0.18
	(0.05)	(0.04)	(0.06)	(0.12)
dlog(POP)	1.91	1.42	1.47	5.66
	(0.48)***	(0.45)***	(0.69)**	(1.31)***
POP15+POP65	-0.0003	0.001	0.001	-0.002
	(0.001)	(0.001)	(0.002)	(0.003)
RATIO	0.002	0.004	-0.004	-0.11
	(0.03)	(0.02)	(0.03)	(0.07)*
HyperInfl	-0.01	-0.01	-0.05	-0.04
	(0.01)	(0.01)	(0.02)***	(0.03)
dU			0.01	
			(0.002)***	
$\bar{K}$	-0.03	-0.03	-0.01	-0.08
	(0.01)***	(0.01)***	(0.01)	(0.02)***
EMERGING	-0.02	-0.03	-0.01	-0.14
	(0.02)	(0.01)**	(0.02)	(0.04)***
$G^{-} \times Y^{-}$	-0.01	0.001	-0.02	-0.02
	(0.01)	(0.01)	(0.01)	(0.02)
CITT	0.26	0.27	0.02	0.89
	(0.07)***	(0.06)***	(0.08)	(0.18)***
$EMERGING \times CITT$	0.38	0.36	0.08	0.01
	(0.1)***	(0.09)***	(0.13)	(0.26)
$EMERGING \times CITT \times D90$	-0.18	-0.12	0.16	-0.06
	(0.07)***	(0.07)*	(0.11)	(0.19)
$EMERGING \times CITT \times G^{-} \times Y^{-}$	0.22	0.17	0.52	-0.12
	(0.12)*	(0.12)	(0.2)***	(0.31)
$EMERGING \times CITT \times D90 \times G^{-} \times Y^{-}$	-0.62	-0.16	-0.08	-0.46
	(0.24)***	(0.24)	(0.57)	(0.64)
Adj. R^2	0.52	0.54	0.45	0.52
Durbin-Watson	1.63	1.74	1.66	1.76

Notes. Estimation method: GMM. Instrumental variable: Constant dollar exports with one year lag. Standard errors in parenthesis. *** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent. Source: Own elaboration.

Table A6. Total Government Expenditure and its Composition.

Dependent variable:	*dlog(G)*	*dlog(GC)*	*dlog(GT)*	*dlog(GI)*
No. of observations (unbalanced)	878	863	843	762
Sample	1983-2006			
Constant	0.11 (0.05)**	0.05 (0.06)	0.04 (0.08)	0.32 (0.14)**
dlog(POP)	1.63 (0.59)***	1.72 (0.66)***	1.37 (0.89)	4.75 (1.56)***
POP15+POP65	-0.01 (0.03)	-0.002 (0.03)	-0.01 (0.04)	-0.13 (0.07)*
RATIO	-0.02 (0.01)*	-0.04 (0.01)***	-0.06 (0.02)***	-0.03 (0.04)
dU			0.01 (0.002)***	
HyperInfl	-0.02 (0.01)**	-0.02 (0.01)**	-0.002 (0.01)	-0.06 (0.02)***
$\bar{K}$	-0.01 (0.01)	-0.004 (0.01)	-0.02 (0.01)	-0.02 (0.02)
EMERGING	-0.01 (0.02)	-0.03 (0.02)	0.0003 (0.02)	-0.11 (0.04)***
$G^{-} \times Y^{-}$	-0.01 (0.01)	-0.004 (0.01)	-0.02 (0.01)	-0.02 (0.02)
CITT	0.18 (0.06)***	0.24 (0.07)***	0.03 (0.08)	0.59 (0.15)***
$EMERGING \times CITT$	0.26 (0.08)***	0.27 (0.09)***	0.30 (0.13)**	0.23 (0.21)
$EMERGING \times CITT \times G^{-} \times Y^{-}$	-0.06 (0.13)	-0.16 (0.12)	0.11 (0.25)	-0.15 (0.38)
Adj. R^2	0.50	0.55	0.43	0.48
Durbin-Watson	1.60	1.72	1.65	1.84

Notes. Estimation method: GMM. Instrumental variable: Weighted average of real GDP growth of the main export partners (normalized so that weights sum-up to 1) multiplied by exports as percent of GDP. Standard errors in parenthesis. *** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent. Source: Own elaboration.

Appendix D
Using Country Fixed Effects

Controlling for the random walk component in the main regressions technically impedes us from using country fixed effects. In this appendix we check the sensitivity of substituting the random walk component by country fixed effects, using different values of K. This test is performed using the specification in column 5 of table 3; results shown in table A6 confirm our main hypothesis.

Table A6. Using Country Fixed Effects.

Dependent variable: *dlog(G)*	1	2	3	4
Values of K	$K=7$	$K=9$	$K=11$	$K=\bar{K}$
No. of observations	1217	1217	1217	1217
Sample	1971-2006			
Constant	-0.11 (0.06)*	-0.12 (0.06)**	-0.14 (0.06)**	-0.13 (0.06)**
dlog(POP)	1.56 (0.63)**	1.49 (0.61)**	1.44 (0.61)**	1.69 (0.65)***
POP15+POP65	0.002 (0.001)	0.002 (0.001)*	0.003 (0.001)**	0.002 (0.001)*
RATIO	0.08 (0.05)	0.08 (0.05)	0.08 (0.05)*	0.08 (0.05)
HyperInfl	-0.03 (0.01)**	-0.03 (0.01)*	-0.01 (0.02)	-0.02 (0.01)
$G^- \times Y^-$	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
CITT	0.13 (0.05)**	0.13 (0.05)**	0.11 (0.05)**	0.19 (0.08)**
$EMERGING \times CITT$	0.21 (0.08)***	0.20 (0.07)***	0.29 (0.08)***	0.46 (0.12)***
$EMERGING \times CITT \times D90$	-0.10 (0.04)**	-0.09 (0.04)**	-0.10 (0.04)**	-0.16 (0.07)**
$EMERGING \times CITT \times G^- \times Y^-$	0.16 (0.07)**	0.16 (0.07)**	0.14 (0.07)**	0.21 (0.12)*
$EMERGING \times CITT \times D90 \times G^- \times Y^-$	-0.28 (0.18)	-0.33 (0.17)**	-0.41 (0.18)**	-0.60 (0.25)**
Adj. R^2	0.53	0.53	0.52	0.53
Durbin-Watson	1.63	1.63	1.62	1.62

Notes. Estimation method: GMM. Standard errors in parenthesis. *** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent. Source: Own elaboration.

Appendix E
Arellano-Bond-type regressions

In this appendix we consider the possible endogeneity arising from the effect of government expenditure on GDP. For this purpose we estimate the regressions presented in table 3 with a dynamic Arellano-Bond method, using the dynamic instrument for the *CITT* variable (*dlog(real exports)*) with two-years lag. Results are shown in table A7 and they confirm our main results.

Table A7. An Arellano-Bond Specification.

Dependent variable: *dlog(G)*	1	2	3	4	5
No. of observations	1240	1223	1223	1223	1223
Sample	1971-2006				
dlog(POP)	1.71 (0.08)***	1.61 (0.1)***	1.49 (0.1)***	1.59 (0.12)***	1.95 (0.36)***
POP15+POP65	0.004 (0.0004)*	0.004 (0.0003)*	0.003 (0.0003)*	0.004 (0.001)**	0.003 (0.001)**
RATIO	0.08 (0.02)***	0.06 (0.04)*	0.06 (0.04)*	0.07 (0.04)*	0.07 (0.09)
HyperInfl	-0.14 (0.1)	-0.09 (0.04)**	-0.09 (0.04)**	-0.05 (0.04)	-0.17 (0.79)
CITT	0.12 (0.01)***	0.01 (0.01)	-0.001 (0.01)	0.01 (0.01)	-0.01 (0.02)
$EMERGING \times CITT$		0.26 (0.02)***	0.31 (0.02)***	0.20 (0.02)***	0.22 (0.02)***
$EMERGING \times CITT \times D90$			-0.06 (0.01)***		-0.28 (0.77)
$EMERGING \times CITT \times G^{-} \times Y^{-}$				0.58 (0.06)***	0.53 (0.01)***
$EMERGING \times CITT \times D90 \times G^{-} \times Y^{-}$					-1.83 (3.0)
Hansen J-statistic	37.32	36.47	34.62	37.44	35.71
Null Hyp.: The model is valid	Can not be rejected	Can not be rejected	Can not be rejected	Can not be rejected	Can not be rejected

Notes. Estimation method: Dynamic Arellano-Bond. Standard errors in parenthesis. *** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent. Source: Own elaboration.

Appendix F
Classification of Emerging Markets, Data Coverage and Source.

In the regressions we base our analysis on 22 developed economies (Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Netherland, New Zealand, Norway, Portugal, Spain, Sweden Switzerland, UK, USA) and 23 emerging markets (Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Egypt, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Morocco, Pakistan, Panama, Peru, South Africa, Thailand, Turkey, Uruguay and Venezuela). The choice of emerging markets is based on two indices (as defined at the end of our sample period; 2006): MSCI and FTSE.

The MSCI Emerging Markets Index includes the following countries (the countries in bold are included in our sample): **Argentina, Brazil**, **Chile,** China, **Colombia**, Czech Republic**, Egypt, Hungary, India, Indonesia,** Israel, Jordan, **Korea, Malaysia, Mexico, Morocco, Pakistan, Peru,** Philippines**,** Poland**,** Russia**, South Africa,** Taiwan**, Thailand, Turkey and Venezuela.** The countries that are not in bold (excluding Israel) are not included due to insufficient data on government expenditure for the full sample period. Israel is excluded from the sample since Israel has been "upgraded" to a "developed market" classification.[8] On the other hand, Argentina, Pakistan and Venezuela have been "downgraded" from the Emerging Markets Index since 2006, but they are still included in our sample.

The FTSE Emerging Markets Index is similar to the MSCI index except that it does not include Korea and Venezuela. Five countries are included in the sample and are not officially classified as emerging markets: Bolivia, Costa Rica, Dominican Republic, Panama and Uruguay.

The following countries were dropped from some of the regressions:

- Mexico was dropped from transfers and subsides and total expenditure because local government data was not available. For the government consumption and capital expenditure the data is available, so it was not dropped in those regressions.
- Chile was dropped from regressions on government total expenditure and for transfers and subsidies since data on transfers between governments is not available
- Colombia was dropped from the transfers and subsidies regressions since we did not have enough observations.

[8] Strawczynski and Zeira (2007) show that in fact fiscal policy in Israel has evolutes from strongly procyclical to mildly procyciclical after 1985.

Data Coverage and Source

The data used in this research is taken from several databases. In the table below we summarize the sources for the different variables used.

Variable Name		Coverage (*)	Source
Total Government Expenditure and Composition	Developed Markets	1960-2006	OECD Historical Statistics.
	Emerging Markets	1972-2006	GFS (IMF).
GDP: Gross Domestic Product		1960-2006	OECD Historical Statistics, IFS (IMF) and WDI (World Bank).
RATIO		1960-2006	The Conference Board and Groningen Growth and Development Centre, Total Economy Database (except for Panama for which data is taken from WDI for the period 1980-2006).
POP15: Population (under 15 years old).		1960-2006	WDI.
POP65: Population (above 65 years old).		1960-2006	WDI.
FDI		1970-2006	UNCTAD and IFS to supplement data for Indonesia and Panama.
Government Debt: Total, Domestic and Foreign	Developed Markets	1970-2006	GFS and OECD Historical Statistics.
	Emerging Markets in Latin America, South Africa and Pakistan.	1980-2004	Cowan et al. (2006).
	Rest of Emerging Markets	1972-2006	GFS supplemented with data from Panizza (2008).
International Reserves and Imports		1960-2006	IFS.
Exports Data	Exports as % of GDP and in Constant Dollars.	1960-2006	WDI.
	Export Partners.	1980-2006	DOTS (IMF).

(*) For some countries coverage is partial. Source: Own elaboration.

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