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When It Rains, It Pours: Procyclical Capital Flows and Macroeconomic Policies

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1. Introduction

Any expert on financial crises in emerging markets could cite ample anecdotal evidence to support the view that macroeconomic policies are highly procyclical, at least in moments of extreme duress. At the time that economic activity is contracting (often markedly) amidst a crisis, the fiscal authority cuts budgets deficits while the central bank raises interest rates—possibly exacerbating the economic contraction. Procyclical policies, however, do not appear to be limited to crisis periods in many developing countries. In fact, the roots of most of the debt crises in emerging markets are all too often found in governments that go through bouts of high spending and borrowing when the times are favorable and international capital is plentiful.[1]

Gavin and Perotti (1997) first called attention to the phenomenon of procyclical fiscal policy by showing that fiscal policy in Latin America tends to be expansionary in good times and contractionary in bad times. Talvi and Végh (2000) argued that, far from being a phenomenon peculiar to Latin America, procyclical fiscal policy seems to be the norm in the developing world just as fiscal policy is acyclical in the advanced economies. Using a different econometric approach, Braun (2001) reaches a similar conclusion for developing countries, though he finds evidence that fiscal policy is countercyclical in OECD countries. Lane (2003) also provides evidence on the procyclical nature of fiscal policy in developing countries compared to OECD countries.

Several explanations have been advanced to explain the procyclical nature of fiscal policy in developing countries compared to industrial countries. Gavin and Perotti (1997), among others, have argued

that developing countries face credit constraints that prevent them from borrowing in bad times. Hence, they are "forced" to repay in bad times, which requires a contractionary fiscal policy. In contrast, Tornell and Lane (1999) develop a political economy model in which competition for a common pool of funds among different units (ministries, provinces) leads to the so-called voracity effect, whereby expenditure could actually exceed a given windfall. Taking as given such a political distortion, Talvi and Végh (2000) show how policymakers would find it optimal to run smaller primary surpluses in good times by increasing government spending and reducing tax rates. Last, Riascos and Végh (2003) show how incomplete markets could explain procyclical fiscal policy as the outcome of a Ramsey problem without having to impose any additional frictions.

In terms of monetary policy, the impression certainly exists that developing countries often tighten the monetary strings in bad times (see Lane, 2003), but systematic empirical work is scant.[2] This is probably due to the notorious difficulties (present even for advanced countries) in empirically characterizing the stance of monetary policy.[3]

Relying on data for 104 countries for the period 1960–2003, this paper revisits the evidence on the procyclical nature of fiscal policy and, as far as we know, presents a first systematic effort to document empirically the cyclical properties of monetary policy in developing countries. It departs from earlier efforts investigating fiscal policy cycles in several dimensions. First, it provides an analytical framework for interpreting the behavior of a broad variety of fiscal indicators, which leads to a reinterpretation of some earlier results in the literature. Second, it analyzes countries grouped by income levels to capture the fact that while wealthier countries have continuous access to international capital markets, low-income countries are almost exclusively shut out at all times, and middle-income countries have a precarious and volatile relationship with international capital. Third, it examines closely the interaction among the business cycle, international capital flows, and macroeconomic policy.[4] Our premise is that the capital flow cycle is tied to the business cycle and may even influence macroeconomic policies, particularly in middle income countries. Fourth, it offers an eclectic approach toward defining good and bad times and measuring the stance of fiscal and monetary policy by employing a broad range of indicators. Fifth, it disaggregates the sample along a variety of dimensions, by (1) differentiating crises episodes from tranquil periods, (2) treating the more rigid exchange rate arrangements separately from

the more flexible ones, and (3) comparing earlier and more recent periods to assess whether the degree of capital market integration has altered cyclical patterns and relationships. Last, the analysis offers more comprehensive country coverage than earlier efforts.

The paper proceeds as follows. The next section discusses the underlying conceptual framework used to interpret the data on capital flows and fiscal and monetary policy, and describes the approach followed to define business cycles. Section 3 presents a broad view of our main findings; Section 4 provides greater detail on the main stylized facts by grouping countries according to income per-capita levels, type of exchange rate arrangement, and other relevant subsamples. Section 5 contains concluding remarks.

2. Conceptual Framework

This section lays out the conceptual framework used to interpret our empirical findings in the following sections. Specifically, we will discuss how to think about the cyclical properties of capital flows, fiscal policy, and monetary policy. A thorough reading of the blossoming literature on the cyclical nature of policy in developing countries reveals a somewhat loose approach to defining basic concepts, which often renders the discussion rather imprecise. For instance, countercyclical fiscal policy is often defined as running fiscal deficits in bad times and surpluses in good times (i.e., as a positive correlation between changes in output and changes in the fiscal balance). As we will argue, however, this is an unfortunate way of defining the concept since running a fiscal deficit in bad times may be consistent with rather different approaches to fiscal stabilization. In the same vein, considering fiscal variables as a proportion of GDP—as is most often done in this literature—could yield misleading results since the cyclical stance of fiscal policy may be dominated by the cyclical behavior of output.

In light of these critical conceptual issues—and at the risk of perhaps appearing sometimes obvious—we will be very specific as to how we define countercyclicality, procyclicality, and acyclicality.

2.1 Capital Flows

We define the cyclical properties of capital flows as follows (Table 1):

1. Capital flows into a country are said to be countercyclical when the correlation between the cyclical components of net capital inflows and

Table 1
Capital flows: theoretical correlations with the business cycle

	Net capital inflows	Net capital inflows/GDP
Countercyclical	−	−
Procyclical	+	−/0/+
Acyclical	0	−

output is negative. In other words, the economy borrows from abroad in bad times (i.e., capital flows in) and lends/repays in good times (i.e., capital flows out).

2. Capital flows are procyclical when the correlation between the cyclical components of net capital inflows and output is positive. The economy thus borrows from abroad in good times (i.e., capital flows in) and lends/repays in bad times (i.e., capital flows out).

3. Capital flows are acyclical when the correlation between the cyclical components of net capital inflows and output is not statistically significant. The pattern of international borrowing and lending is thus not systematically related to the business cycle.

While this may appear self-evident, the mapping between the cyclical properties of net capital inflows as a share of GDP (a commonly used measure) and the business cycle is not clear cut. As the second column of Table 1 indicates, in the case of countercyclical capital inflows, this ratio should also have a negative correlation with output since in good (bad) times, net capital inflows fall (increase) and GDP increases (fall). In the case of procyclical net capital inflows, however, this ratio could have any sign since in good (bad) times, net capital inflows increase (fall) and GDP also increases (falls). In the acyclical case, the behavior of the ratio is dominated by the changes in GDP and therefore has a negative correlation. Thus, the ratio of net capital inflows to GDP will only provide an unambiguous indication of the cyclicality of net capital inflows if it has a positive sign (or is zero) in which case it would be indicating procylical capital flows. If it has a negative sign, however, it does not allow us to discriminate among the three cyclical patterns.

Our definition of the cyclical properties of capital flows thus focuses on whether capital flows tend to reinforce or stabilize the business cycle. To fix ideas, consider the standard endowment model of a small

open economy (with no money). In the absence of any intertemporal distortion, households want to keep consumption flat over time. Thus, in response to a temporary negative endowment shock, the economy borrows from abroad to sustain the permanent level of consumption. During good times, the economy repays its debt. Saving is thus positively correlated with the business cycle. Hence, in the standard model with no investment, capital inflows are countercyclical and tend to stabilize the cycle. Naturally, the counterpart of countercyclical borrowing in the standard real model is a procyclical current account.

Conversely, if the economy borrowed during good times and lent during bad times, capital flows would be procyclical because they would tend to reinforce the business cycle. In this case, the counterpart would be a countercyclical current account. Plausible theoretical explanations for procyclical capital flows include the following. First, suppose that physical capital is added to the basic model described above and that the business cycle is driven by productivity shocks. Then, a temporary and positive productivity shock would lead to an increase in saving (for the consumption smoothing motives described above) and to an increase in investment (as the return on capital has increased). If the investment effect dominates, then borrowing would be procyclical because the need to finance profitable investment more than offsets the saving effect.

A second explanation—particularly relevant for emerging countries—would result from intertemporal distortions in consumption imposed by temporary policies (like inflation stabilization programs or temporary liberalization policies; see Calvo, 1987; Calvo and Végh, 1999). An unintended consequence of such temporary policies is to make consumption relatively cheaper during good times (by reducing the effective price of consumption), thus leading to a consumption boom that is financed by borrowing from abroad. In this case, saving falls in good times, which renders capital flows procyclical.[5]

A third possibility—also relevant for emerging countries—is that the availability of international capital varies with the business cycle. If foreign investors respond to the evidence of an improving local economy by bidding down country risk premiums (perhaps encouraged by low interest rates at financial centers), residents of the small economy may view this as a temporary opportunity to finance consumption cheaply and therefore dissave.[6] We should remember that the consumption booms financed by capital inflows in many emerging market economies in the first part of the 1990s were seen at the time as

an example of the capital inflow problem, as in Calvo, Leiderman, and Reinhart (1993, 1994).

Finally, notice that, in practice, movements in international reserves could break the link between procyclical borrowing and current account deficits (or countercyclical borrowing and current account surpluses) that would arise in the basic real intertemporal model. Indeed, recall the basic balance of payments accounting identity:

Change in international reserves

$$= \textit{current account balance} + \textit{capital account balance}$$

Hence, positive net capital inflows (a capital account surplus) would not necessarily be associated with a negative current account balance if international reserves were increasing. Therefore, the cyclical properties of the current account are an imperfect indicator of those of capital flows.

2.2 *Fiscal Policy*

Since the concept of policy cyclicality is important to the extent that it can help us understand or guide actual policy, it makes sense to define policy cyclicality in terms of policy instruments as opposed to outcomes (i.e., endogenous variables). Hence, we will define the cyclicality of fiscal policy in terms of government spending (g) and tax rates (τ) (instead of defining it in terms of, say, the fiscal balance or tax revenues). Given this definition, we will then examine the cyclical implications for important endogenous variables such as the primary fiscal balance, tax revenues, and fiscal variables as a proportion of GDP. We define fiscal policy cyclicality as follows (see Table 2):

1. A countercyclical fiscal policy involves lower (higher) government spending and higher (lower) tax rates in good (bad) times. We call

Table 2
Fiscal indicators: theoretical correlations with the business cycle

	g	τ	Tax revenues	Primary balance	g/GDP	Tax revenues/ GDP	Primary balance/ GDP
Countercyclical	−	+	+	+	−	−/0/+	−/0/+
Procyclical	+	−	−/0/+	−/0/+	−/0/+	−/0/+	−/0/+
Acyclical	0	0	+	+	−	−/0/+	−/0/+

such a policy countercyclical because it would tend to stabilize the business cycle (i.e., fiscal policy is contractionary in good times and expansionary in bad times).

2. A procyclical fiscal policy involves higher (lower) government spending and lower (higher) tax rates in good (bad) times. We call such a policy procyclical because it tends to reinforce the business cycle (i.e., fiscal policy is expansionary in good times and contractionary in bad times).[7]

3. An acyclical fiscal policy involves constant government spending and constant tax rates over the cycle (or more precisely, for the case of a stochastic world, government spending and tax rates do not vary systematically with the business cycle). We call such a policy acyclical because it neither reinforces nor stabilizes the business cycle.

The correlations implied by these definitions are shown in the first two columns of Table 2.

We next turn to the implications of these cyclical definitions of fiscal policy for the behavior of tax revenues, the primary fiscal balance, and government expenditure, tax revenues, and primary balance as a proportion of GDP.[8] In doing so, we will make use of the following two definitions:

$$\textit{Tax revenues} = \textit{tax rate} \times \textit{tax base}$$

$$\textit{Primary balance} = \textit{tax revenues} - \textit{government expenditures (excluding interest payments)}$$

Consider first an acyclical fiscal policy. Since the tax rate is constant over the cycle and the tax base increases in good times and falls in bad times, tax revenues will have a positive correlation with the business cycle. This, in turn, implies that the primary balance will also be positively correlated with the cycle. The ratio of government expenditure (net of interest payments) to GDP will be negatively correlated with the cycle because government expenditure does not vary and, by definition, GDP is high (low) in good (bad) times. Given that tax revenues are higher (lower) in good (bad) times, the correlation of the ratio of tax revenues to GDP with the cycle is ambiguous (i.e., it could be positive, zero, or negative, as indicated in Table 2). As a result, the correlation of the primary balance as a proportion of GDP with the cycle will also be ambiguous.

Consider procyclical fiscal policy. Since by definition the tax rate goes down (up) in good (bad) times but the tax base moves in the opposite direction, the correlation of tax revenues with the cycle is ambiguous. Since g goes up in good times, the correlation of g/GDP can, in principle, take on any value. Given the ambiguous cyclical behavior of tax revenues, the cyclical behavior of tax revenues as a proportion of GDP is also ambiguous. The behavior of the primary balance as a proportion of GDP will also be ambiguous.

Last, consider countercyclical fiscal policy. By definition, tax rates are high in good times and low in bad times, which implies that tax revenues vary positively with the cycle. The same is true of the primary balance since tax revenues increase (fall) and government spending falls (increases) in good (bad) times. The ratio g/GDP will vary negatively with the cycle because g falls (increases) in good (bad) times. Since tax revenues increase in good times, the behavior of tax revenues as a proportion of GDP will be ambiguous and, hence, so will be the behavior of the primary balance as a proportion of GDP.

Several important observations follow from Table 2 regarding the usefulness of different indicators in discriminating among the three cases:

1. From a theoretical point of view, the best indicators to look at would be government spending and tax rates. By definition, these indicators would clearly discriminate among the three cases. As Table 2 makes clear, no other indicator has such discriminatory power. In practice, however, there is no systematic data on tax rates (other than perhaps the inflation tax rate), leaving us with government spending as the best indicator.

2. The cyclical behavior of tax revenues will be useful only to the extent that it has a negative or zero correlation with the business cycle. This would be an unambiguous indication that fiscal policy is procyclical. It would signal a case in which the degree of procyclicality is so extreme that in, say, bad times, the rise in tax rates is so pronounced that it either matches or dominates the fall in the tax base.

3. The cyclical behavior of the primary balance will be useful only to the extent that it has a negative or zero correlation with the business cycle. This would be an unambiguous indication that fiscal policy is procyclical. It would indicate a case in which, in good times, the rise in government spending either matches or more than offsets a possible increase in tax revenues or a case in which a fall in tax revenues in

good times reinforces the effect of higher government spending on the primary balance. Given our definition of fiscal policy cyclicality, it would be incorrect to infer that a primary deficit in bad times signals countercyclical fiscal policy. A primary deficit in bad times is, in principle, consistent with any of three cases.[9]

4. The cyclical behavior of the primary balance as a proportion of GDP will never provide an unambiguous reading of the cyclical stance of fiscal policy. Most of the literature (Gavin and Perotti, 1997; Braun, 2001; Dixon, 2003; Lane, 2003a; and Calderon and Schmidt-Hebbel, 2003) has drawn conclusions from looking at this indicator. For instance, Gavin and Perotti (1997) find that the response of the fiscal surplus as a proportion of GDP to a one-percentage-point increase in the rate of output growth is not statistically different from zero in Latin America and take this as an indication of procyclical fiscal policy. Calderon and Schmidt-Hebbel (2003), in contrast, find a negative effect of the output gap on deviations of the fiscal balance from its sample mean and interpret this as countercyclical fiscal policy. Given our definitions, however, one would not be able to draw either conclusion (as the last column of Table 2 makes clear).

5. The cyclical behavior of the ratio g/GDP will be useful only to the extent that it has a positive or zero correlation with the business cycle. This would be an unambiguous indication that fiscal policy is procyclical. In other words, finding that this ratio is negatively correlated with the cycle does not allow us to discriminate among the three cases. Once again, this suggests caution in interpreting some of the existing literature that relies on this indicator for drawing conclusions.

6. Last, the cyclical behavior of the ratio of tax revenues to GDP will not be particularly useful in telling us about the cyclical properties of fiscal policy since its theoretical behavior is ambiguous in all three cases.

In sum, our discussion suggests that extreme caution should be exercised in drawing conclusions on policy cyclicality based either on the primary balance or on the primary balance, government spending, and tax revenues as a proportion of GDP. In light of this, we will rely only on indicators that, given our definition of procyclicality, provide an unambiguous measure of the stance of fiscal policy: government spending and—as a proxy for a tax rate—the inflation tax rate.[10]

From a theoretical point of view, various models could rationalize different stances of fiscal policy over the business cycle. Countercyclical

fiscal policy could be rationalized by resorting to a traditional Keynesian model (in old or new clothes) with an objective function that penalizes deviations of output from trend since an increase (reduction) in government spending and/or a reduction (increase) in tax rates would expand (contract) output. An acyclical fiscal policy could be rationalized by neoclassical models of optimal fiscal policy that call for roughly constant tax rates over the business cycle (see Chari and Kehoe, 1999). If government spending is endogeneized (by, say, providing direct utility), it would optimally behave in a similar way to private consumption and hence would be acyclical in the presence of complete markets (Riascos and Végh, 2003). Procyclical fiscal policy could be rationalized by resorting to political distortions (Tornell and Lane, 1999; Talvi and Végh, 2000), borrowing constraints (Gavin and Perotti, 1997; Aizeman, Gavin, and Hausmann, 1996), or incomplete markets (Riascos and Végh, 2003).

2.3 *Monetary Policy*

Performing the same conceptual exercise for monetary policy is much more difficult because (1) monetary policy instruments may depend on the existing exchange rate regime and (2) establishing outcomes (i.e., determining the behavior of endogenous variables) requires the use of some (implicit) model.

For our purposes, it is enough to define two exchange rate regimes: fixed or predetermined exchange rates and flexible exchange rates (which we define as including any regime in which the exchange rate is allowed some flexibility). By definition, flexible exchange rate regimes include relatively clean floats (which are rare) and dirty floats (a more common type, as documented in Reinhart and Rogoff, 2004).

Under certain assumptions, a common policy instrument across these two different regimes would be a short-term interest rate. The most prominent example is the federal funds rate in the United States, an overnight interbank interest rate that constitutes the Federal Reserve's main policy target. From a theoretical point of view, under flexible exchange rates, monetary policy can certainly be thought of in terms of some short-term interest rate since changes in the money supply will directly influence interest rates. Under fixed or predetermined exchange rates, the only assumption needed for a short-term interest rate to also be thought of as a policy instrument is that some imperfect substitution exist between domestic and foreign assets (see Flood and

Table 3
Monetary indicators: theoretical correlations with the business cycle

	Short-term interest rate	Rate of growth of central bank domestic credit	Real money balances (M1 and M2)	Real interest rate
Countercyclical	+	−	−/0/+	−/0/+
Procyclical	−	+	+	−
Acyclical	0	0	+	−

Jeanne, 2000; Lahiri and Végh, 2003). In fact, it is common practice for central banks to raise some short-term interest rate to defend a fixed exchange rate.

In principle, then, observing the correlation between a policy-controlled short-term interest rate and the business cycle would indicate whether monetary policy is countercyclical (the interest rate is raised in good times and reduced in bad times, implying a positive correlation), procyclical (the interest rate is reduced in good times and increased in bad times, implying a negative correlation), or acyclical (the interest rate is not systematically used over the business cycle, implying no correlation), as indicated in Table 3.

The expected correlations with other monetary variables are more complex. In the absence of an active interest rate policy, we expect real money balances (in terms of any monetary aggregate) to be high in good times and low in bad times (i.e., positively correlated with the business cycle), and real interest rates to be lower in good times and high in bad times (i.e., negatively correlated with the cycle).[11] A procyclical interest rate policy would reinforce this cyclical pattern.[12] A countercyclical interest rate policy would in principle call for lower real money balances and higher real interest rates relative to the benchmark of no activist policy. In principle, this leaning-against-the wind policy could be so effective as to render the correlation between real money balances and output zero or even negative, and the correlation between real interest rates and the cycle zero or even positive (as indicated in Table 3). In sum—and as Table 3 makes clear—the cyclical behavior of real money balances and real interest rates will only be informative in a subset of cases:

1. A negative or zero correlation between (the cyclical components of) real money balances and output would indicate countercyclical

monetary policy. In this case, real money balances would fall in good times and rise in bad times. In contrast, a positive correlation is, in principle, consistent with any monetary policy stance.

2. A positive or zero correlation between (the cyclical components of) the real interest rate and output would indicate countercyclical monetary policy. In this case, policy countercyclicality is so extreme that real interest rates increase in good times and fall in bad times. In contrast, a negative correlation is, in principle, consistent with any monetary policy stance.

In practice, however, even large databases typically carry information on overnight or very short-term interest rates for only a small number of countries. Hence, the interest rates that one observes in practice are of longer maturities and thus include an endogenous cyclical component (for instance, the changes in inflationary expectations, term premiums, or risk premiums over the cycle). To the extent that the inflation rate tends to have a small positive correlation with the business cycle in industrial countries and a negative correlation with the business cycle in developing countries, there will be a bias toward concluding that monetary policy is countercyclical in industrial countries and procyclical in developing countries. To reduce this bias, we will choose interbank/overnight rates whenever possible.

A second policy instrument under either regime is the rate of growth of the central bank's domestic credit. Naturally, how much a given change in domestic credit will affect the monetary base and hence interest rates will depend on the particular exchange rate regime. Under predetermined exchange rates and perfect substitution between domestic and foreign assets, the monetary approach to the balance of payments tells us that the change in domestic credit will be exactly undone by an opposite change in reserves. Under imperfect substitution between domestic and foreign assets, however, an increase in domestic credit will have some effect on the monetary base. The same is true under a dirty floating regime, because the change in reserves will not fully offset the change in domestic credit.

In this context, a countercyclical monetary policy would imply reducing the rate of domestic credit growth during good times, and vice versa (i.e., a negative correlation). A procyclical monetary policy would imply increasing the rate of domestic credit growth during good times, and vice versa (i.e., a positive correlation). An acyclical policy would not systematically vary the rate of growth of domestic

Table 4
Taylor rules

Nature of monetary policy	Expected sign on β_2
Countercyclical	+ and significant
Procyclical	− and significant
Acyclical	Insignificant

credit over the business cycle.[13] Of course, changes in domestic credit growth can be seen as the counterpart of movements in short-term interest rates, with a reduction (an increase) in domestic credit growth leading to an increase (reduction) in short-term interest rates.

In addition to computing the correlations indicated in Table 3, we will attempt to establish whether monetary policy is procyclical, acyclical, or countercyclical by estimating Taylor rules for every country for which data are available (see Taylor, 1993). Following Clarida, Galí, and Gertler (1999), our specification takes the form:

$$i_t = \alpha + \beta_1(\pi_t - \underline{\pi}) + \beta_2 y_t^c, \tag{1}$$

where i_t is a policy-controlled short-term interest rate; $\pi_t - \underline{\pi}$ captures deviations of actual inflation from its sample average, $\underline{\pi}$, and y_t^c is the output gap, measured as the cyclical component of output (i.e., actual output minus trend) divided by actual output. The coefficient β_2 in equation (1) would indicate the stance of monetary policy over the business cycle (see Table 4) over and above the monetary authority's concerns about inflation, which are captured by the coefficient β_1.

Several remarks are in order regarding equation (1). First, we are assuming that current inflation is a good predictor of future inflation. Second, we are assuming that the mean inflation rate is a good representation of some implicit/explicit inflation target on the basis that central banks deliver on average the inflation rate that they desire. Third, given potential endogeneity problems, the relation captured in equation (1) is probably best interpreted as a long-run cointegrating relationship. Fourth, since our estimation will be based on annual data, equation (1) does not incorporate the possibility of gradual adjustments of the nominal interest rate to some target interest rate. Fifth, by estimating equation (1), we certainly do not mean to imply that every country in our sample has followed some type of Taylor rule throughout the sample. Rather, we see it as a potentially useful way of

characterizing the correlation between a short-term interest rate and the output gap once one controls for the monetary authority's implicit or explicit inflation target.

By now, numerous studies have estimated Taylor rules, though most are limited to developed countries. For example, for the United States, Japan, and Germany, Clarida, Galí and Gertler (1997) report that, in the post-1979 period, the inflation coefficient is significantly above 1 (indicating that in response to a rise in expected inflation, central banks raised nominal rates enough to raise real rates) and the coefficient on the output gap is significantly positive except for the United States. In other words—and using the terminology spelled out in Table 4—since 1979 Japan and Germany have pursued countercyclical monetary policy (lowering interest rates in bad times and increasing them in good times), but monetary policy in the United States has been acyclical. In the pre-1979 period, however, the Federal Reserve also pursued countercyclical monetary policy (see Clarida, Gertler, and Galí, 1999). For Peru, Moron and Castro (2000) use the change in the monetary base as the dependent variable and add an additional term involving the deviation of the real exchange rate from trend; they find that monetary policy is countercyclical. For Chile, Corbo (2000) finds that monetary policy does not respond to output (i.e., is acyclical).

In terms of the theoretical literature, there has been extensive work on how to theoretically derive Taylor-type rules in the context of Keynesian models (see, for example, Clarida, Gertler, and Galí, 1999). This literature would rationalize countercyclical monetary policy on the basis that increases (decreases) in the output gap call for higher (lower) short-term interest rates to reduce (boost) aggregate demand. Acyclical monetary policy could be rationalized in terms of neoclassical models of optimal monetary policy which call for keeping the nominal interest rate close to zero (see Chari and Kehoe, 1999). Collection costs for conventional taxes could optimally explain a positive—but still constant over the cycle—level of nominal interest rates (see Calvo and Végh, 1999 and the references therein). Some of the stories put forward to explain procyclical fiscal policy mentioned above could also be used to explain procyclical monetary policy if the nominal interest rate is part of the policy set available to the Ramsey planner. Nonfiscal-based explanations for procyclical monetary policy might include the need for defending the domestic currency under flexible exchange rates (Lahiri and Végh, 2004)—which in bad times would call for higher interest rates to prevent the domestic currency from depreciat-

ing further—and models in which higher interest rates may provide a signal of the policymaker's intentions (see Drazen, 2000). In these models, establishing credibility in bad times may call for higher interest rates.

2.4 *Measuring Good and Bad Times*

Not all advanced economies have as clearly defined business cycle turning points as those established by the National Bureau of Economic Research (NBER) for the United States. For developing economies, where quarterly data for the national income accounts is at best recent and most often nonexistent, even less is known about economic fluctuations and points of inflexion. Thus, to pursue our goal of assessing the cyclical stance of capital flows and macroeconomic policies, we must develop some criterion that breaks down economic conditions into good and bad times. Taking an eclectic approach to sort out this issue, we will follow three different techniques: a nonparametric approach and two filtering techniques commonly used in the literature.

The nonparametric approach consists in dividing the sample into episodes where annual real GDP growth is above the median (good times) and those times where growth falls below the median (bad times). The relevant median or cutoff point is calculated on a country-by-country basis. We then compute the amplitude of the cycle in different variables by comparing the behavior of the variable in question in good and bad times. We should notice that, although growth below the median need not signal a recession, restricting the definition of recession to involve only periods where GDP growth is negative is too narrow a definition of bad times for countries with rapid population growth (which encompasses the majority of our sample), or rapid productivity growth, or countries that have seldom experienced a recession by NBER standards. This approach is appealing because it is nonparametric and free from the usual estimation problems that arise when *all* the variables in question are potentially endogenous.

The other two approaches consist of decomposing each time series into its stochastic trend and cyclical component using two popular filters—the ubiquitous Hodrick-Prescott (HP) filter and the bandpass filter developed in Baxter and King (1999). After decomposing each series into its trend and cyclical component, we report a variety of pairwise correlations among the cyclical components of GDP, net capital

inflows, and fiscal and monetary indicators for each of the four income groups. These correlations are used to establish contemporaneous comovements, but a fruitful area for future research would be to analyze potential temporal causal patterns.

3. The Big Picture

This section presents a visual overview of the main stylized facts that we have uncovered, leaving the more detailed analysis of the results for the following sections.[14] Our aim here is to contrast OECD and developing (i.e., non-OECD) countries, and synthesize our findings in terms of key stylized facts. It is worth stressing that we are not trying to identify underlying structural parameters or shocks that may give rise to these empirical regularities, but merely trying to uncover reduced-form correlations hidden in the data. Our findings can be summarized in terms of four stylized facts.

Stylized fact 1. Net capital inflows are procyclical in most OECD and developing countries.

This is illustrated in Figure 1, which plots the correlation between the cyclical components of net capital inflows and GDP. As the plot makes clear, most countries exhibit a positive correlation, indicating that countries tend to borrow in good times and repay in bad times.

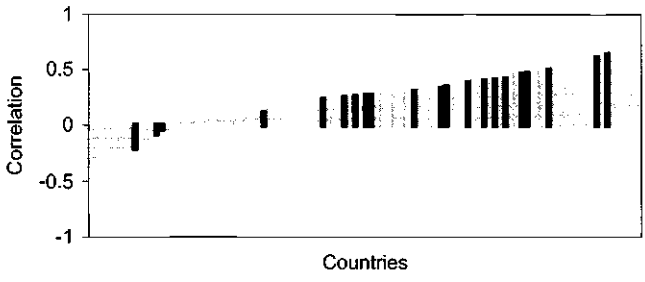

Figure 1
Country correlations between the cyclical components of net capital inflows and real GDP, 1960–2003
Notes: Dark bars are OECD countries and light ones are non-OECD countries. The cyclical components have been estimated using the Hodrick-Prescott filter. A positive correlation indicates procyclical capital flows.
Source: IMF, *World Economic Outlook*.

Stylized fact 2. With regard to fiscal policy, OECD countries are, by and large, either countercyclical or acyclical. In sharp contrast, developing countries are predominantly procyclical.

Figures 2 through 4 illustrate this critical difference in fiscal policy between advanced and developing economies. Figure 2 plots the correlation between the cyclical components of real GDP and real government spending. As is clear from the graph, most OECD countries have a negative correlation, while most developing countries have a positive correlation. Figure 3 plots the difference between the percentage change in real government spending when GDP growth is above the median (good times) and when it is below the median (bad times). This provides a measure of the *amplitude* of the fiscal policy cycle: large negative numbers suggest that the growth in real government spending is markedly higher in bad times (and thus policy is strongly countercyclical), while large positive numbers indicate that the growth in real government spending is markedly lower in bad times (and thus policy is strongly procyclical). In our sample, the most extreme case of procyclicality is given by Liberia, where the growth in real government spending is 32.4 percentage points higher in good times compared to bad times. The most extreme cases of countercyclicality are Sudan and Denmark, where real government spending growth is over 7 percentage points lower during expansions. In addition to a more volatile cycle—and as Aguiar and Gopinath (2004) show for some of the larger emerging markets—the trend component of output is itself highly

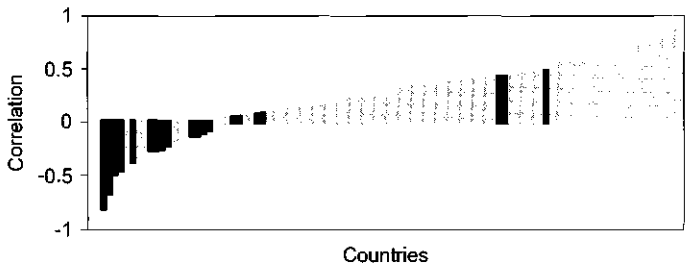

Figure 2
Country correlations between the cyclical components of real government expenditure and real GDP, 1960–2003
Notes: Dark bars are OECD countries and light ones are non-OECD countries. The cyclical components have been estimated using the Hodrick-Prescott filter. A positive correlation indicates procyclical fiscal policy. Real government expenditure is defined as central government expenditure deflated by the GDP deflator.
Source: IMF, *World Economic Outlook*.

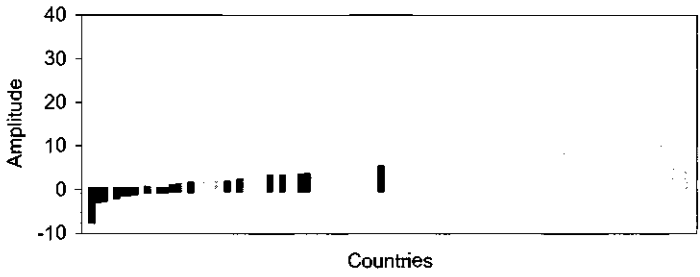

Figure 3
Amplitude of the fiscal policy cycle, 1960–2003
Notes: Dark bars are OECD countries and light ones are non-OECD countries. The amplitude of the fiscal policy cycle is captured by the difference (in percentage points) between the growth of real government expenditure in good times and bad times. Real government expenditure is defined as central government expenditure deflated by the GDP deflator. Good (bad) times are defined as those years in which GDP growth is above (below) the median. A positive correlation indicates procyclical fiscal policy.
Source: IMF, *World Economic Outlook*.

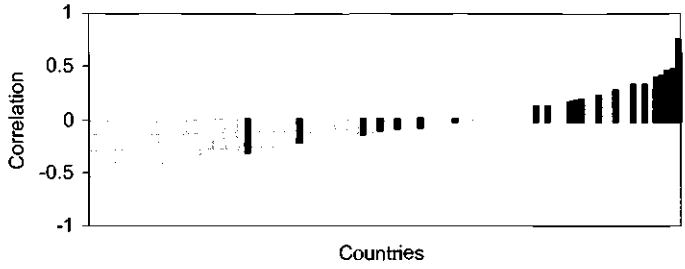

Figure 4
Country correlations between the cyclical components of the inflation tax and real GDP, 1960–2003
Notes: Dark bars are OECD countries and light ones are non-OECD countries. The cyclical components have been estimated using the Hodrick-Prescott filter. A positive correlation indicates countercyclical fiscal policy.
Sources: IMF, *World Economic Outlook* and *International Financial Statistics*.

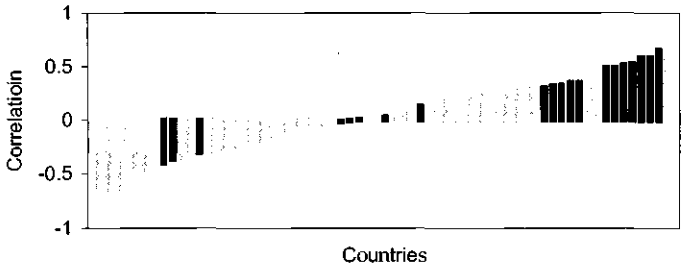

Figure 5
Country correlations between the cyclical components of the nominal lending interest rate and real GDP, 1960–2003
Notes: Dark bars are OECD countries and light ones are non-OECD countries. The cyclical components have been estimated using the Hodrick-Prescott filter. A positive correlation indicates countercyclical monetary policy.
Sources: IMF, *World Economic Outlook* and *International Financial Statistics*.

volatile, which would also be captured in this measure of amplitude. Finally, Figure 4 plots the correlation between the cyclical components of output and the inflation tax. A negative correlation indicates procyclical fiscal policy because it implies that the inflation tax rate is lower in good times. Figure 4 makes clear that most OECD countries exhibit a positive correlation (countercyclical policy) while most developing countries exhibit a negative correlation (procyclical policy).

Stylized fact 3. With regard to monetary policy, most OECD countries are countercyclical, while developing countries are mostly procyclical or acyclical.

This is illustrated in Figure 5 for nominal lending rates. This holds for other nominal interest rates (including various measures of policy rates), as described in the next section. We plot the lending rate because it is highly correlated with the policy rates but offers more comprehensive data coverage.

Stylized fact 4. In developing countries, the capital flow cycle and the macroeconomic policy cycle reinforce each other (we dub this positive relationship as the "when it rains, it pours" phenomenon).

Put differently, macroeconomic policies are expansionary when capital is flowing in, and they are contractionary when capital is flowing out. This is illustrated in Figures 6 through 8. Figure 6 shows that most developing countries exhibit a positive correlation between the cyclical

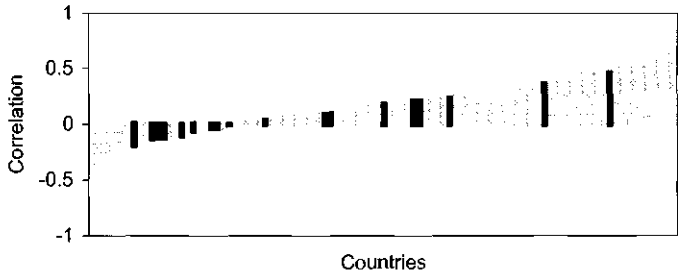

Figure 6
Country correlations between the cyclical components of real government expenditure and net capital inflows, 1960–2003
Notes: Dark bars are OECD countries and light ones are non-OECD countries. The cyclical components have been estimated using the Hodrick-Prescott filter. Real government expenditure is defined as central government expenditure deflated by the GDP deflator.
Source: IMF, *World Economic Outlook*.

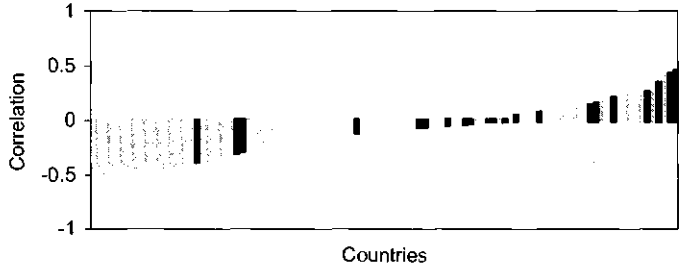

Figure 7
Country correlations between the cyclical components of the inflation tax and net capital inflows
Notes: Dark bars are OECD countries and light ones are non-OECD countries. The cyclical components have been estimated using the Hodrick-Prescott filter.
Source: IMF, *World Economic Outlook*.

components of government spending and net capital inflows, but there does not seem to be an overall pattern for OECD countries. In the same vein, Figure 7 shows that in developing countries, the correlation between the cyclical components of net capital inflows and the inflation tax is mostly negative, while no pattern is apparent for OECD countries. Last, Figure 8 shows a predominance of negative correlations between the cyclical components of net capital inflows and the nominal lending rate for developing countries, suggesting that the capital flow and the monetary policy cycle reinforce each other. The opposite appears to be true for OECD countries.

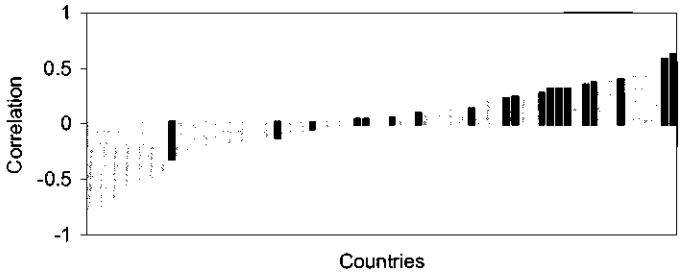

Figure 8
Country correlations between the cyclical components of the nominal lending interest rate and net capital inflows, 1960–2003
Notes: Dark bars are OECD countries and light ones are non-OECD countries. The cyclical components have been estimated using the Hodrick-Prescott filter.
Source: IMF, *World Economic Outlook*.

4. Further Evidence on Business, Capital Flows, and Policy Cycles

This section examines the four stylized facts presented in the preceding section in greater depth by looking at alternative definitions of monetary and fiscal policy; using different methods to define the cyclical patterns in economic activity, international capital flows, and macroeconomic policies; and splitting the sample along several dimensions. In particular—and as discussed in Section 2—we will use three different approaches to define good and bad times: a nonparametric approach that allows us to quantify the *amplitude* of the cycles and two more standard filtering techniques (the Hodrick-Prescott filter and the bandpass filter).

4.1 Capital Flows

Tables 5 through 7 present additional evidence on *stylized fact 1* (i.e., net capital inflows are procyclical in most OECD and developing countries). Table 5 shows that net capital inflows as a proportion of GDP tend to be larger in good times than in bad times for all groups of countries, which indicates procyclical net capital inflows. (Recall from Table 1 that a positive correlation between capital inflows as a proportion of GDP and real GDP implies procyclical net capital inflows).[15,16] The decline in capital inflows as a proportion of GDP in bad times is largest for the middle-high income economies (1.4 percent of GDP). This should come as no surprise because this group of countries is

Table 5
Amplitude of the capital flow cycle

Countries	Net capital inflows/GDP		
	Good times (1)	Bad times (2)	Amplitude (1) − (2)
OECD	0.5	0.4	0.1
Middle-high income	4.4	3.0	1.4
Middle-low income	4.2	3.0	1.2
Low income	3.9	3.6	0.3

Notes: Capital inflows/GDP is expressed in percentage terms. Good (bad) times are defined as those years in which GDP growth is above (below) the median.
Source: IMF, *World Economic Outlook*.

Table 6
International credit ratings

Countries	Institutional investor ratings		
	Good times (1)	Bad times (2)	Amplitude (1) − (2)
OECD	78.5	78.4	0.1
Middle-high income	42.2	40.4	1.8
Middle-low income	32.9	30.8	2.1
Low income	24.2	24.2	0.0

Good (bad) times are defined as those years in which GDP growth is above (below) the median.
Sources: *Institutional Investor* and IMF, *World Economic Outlook*.

Table 7
International credit ratings and real GDP: descriptive statistics

Statistics	Countries			
	OECD	Middle-high income	Middle-low income	Low income
	Institutional Investor Index: 1979–2003			
Coefficient of variation	0.06	0.22	0.23	0.18
Mean	79.9	41.5	32.0	21.8
	Real GDP Growth: 1960–2003			
Coefficient of variation	0.80	1.20	1.20	1.60
Mean	3.90	4.90	4.70	3.30

Sources: *Institutional Investor* and IMF, *World Economic Outlook*.

Table 8
Correlations between the cyclical components of net capital inflows and real GDP

Countries	Correlations	
	HP filter	Bandpass filter
OECD	0.30*	0.25*
Middle-high income	0.35*	0.26*
Middle-low income	0.24*	0.20*
Low income	0.16*	0.10*

Note: An asterisk denotes statistical significance at the 10 percent level.
Sources: IMF, *International Financial Statistics* and *World Economic Outlook.*

noted for having on-and-off access to international private capital markets, partly due to a history of serial default.[17]

The behavior of international credit ratings, such as the Institutional Investor Index (III), also provides insights on capital market access.[18] As discussed in Reinhart, Rogoff, and Savastano (2003), at very low ratings (the low-income countries), the probability of default is sufficiently high that countries are entirely shut out of international private capital markets, while ratings at the high end of the spectrum are a sign of uninterrupted market access. These observations are borne out in Tables 6 and 7. Table 6 shows that there is essentially no difference in credit ratings during good and bad times for the wealthy OECD economies and the low-income countries. The largest difference in ratings across good and bad times is for the middle-income countries, where ratings are procyclical (i.e., high in good times and low in bad times).

This U-shaped pattern is also evident in the volatility of the credit ratings. Table 7 presents basic descriptive statistics for growth and the Institutional Investor ratings. Not surprisingly, ratings are far more stable for OECD economies (the coefficient of variation is 0.06), but so is growth, with a coefficient of variation of 0.8. Despite the fact that output is the most volatile for the group of low-income economies (with a coefficient of variation is 1.6, or twice the level of the OECD group), its international ratings (0.18) are more stable than those of middle-income countries (with coefficients of variation of 0.22 and 0.23).

Finally, Table 8 presents correlations (using our two different filters) between the cyclical components of real GDP and net capital inflows.[19] The correlations are positive and significant for all four groups of

Table 9
Amplitude of the fiscal policy cycle

Fiscal indicators	Increase in the fiscal indicator		
	Good times (1)	Bad times (2)	Amplitude (1) – (2)
	OECD countries		
Central government:			
Expenditure (WEO)	3.4	3.1	0.3
Current expenditure minus interest payments	4.2	2.8	1.4
Expenditure on goods and services	3.0	2.0	1.0
Expenditure on wages and salaries	2.6	1.3	1.3
General or consolidated government:			
Expenditure (WEO)	3.6	3.2	0.4
Current expenditure minus interest payments	4.1	3.5	0.6
Inflation tax, $\pi/(1+\pi)$	4.5	5.4	−0.9
	Middle-high-income countries		
Central government:			
Expenditure (WEO)	8.1	0.0	8.1
Current expenditure minus interest payments	9.6	−0.1	9.7
Expenditure on goods and services	8.1	−0.3	8.4
Expenditure on wages and salaries	8.3	0.4	7.9
General or consolidated government:			
Expenditure (WEO)	6.9	−0.1	7.0
Current expenditure minus interest payments	7.6	1.8	5.8
Inflation tax, $\pi/(1+\pi)$	10.9	13.1	−2.2
	Middle-low-income countries		
Central government:			
Expenditure (WEO)	6.7	2.7	4.0
Current expenditure minus interest payments	9.3	3.1	6.2
Expenditure on goods and services	9.7	3.6	6.1
Expenditure on wages and salaries	8.9	4.2	4.7
General or consolidated government:			
Expenditure (WEO)	6.4	2.5	3.9
Current expenditure minus interest payments	8.5	−2.1	10.6
Inflation tax, $\pi/(1+\pi)$	8.7	10.1	−1.4
	Low-income countries		
Central government:			
Expenditure (WEO)	8.3	−0.2	8.5
Current expenditure minus interest payments	5.0	0.5	4.5
Expenditure on goods and services	5.1	0.6	4.5
Expenditure on wages and salaries	4.0	0.8	3.2

Table 9
(continued)

General or consolidated government:			
Expenditure (WEO)	7.3	−0.5	7.8
Current expenditure minus interest payments	5.7	−0.4	6.1
Inflation tax, $\pi/(1+\pi)$	9.4	12.4	−3.0

Notes: All data are from International Monetary Fund, *Government Financial Statistics*, unless otherwise noted. The increase for the fiscal spending indicators is the average annual real rate of growth expressed in percentage terms. The inflation tax figure is multiplied by one hundred. The increase in the inflation tax denotes the average change in this indicator. Good (bad) times are defined as those years with GDP growth above (below) the median.
Sources: IMF, *Government Financial Statistics* and *World Economic Outlook* (WEO).

countries and for both filters. Not surprisingly, the correlations are the highest for OECD and middle-high income countries and the lowest for low-income countries. These results thus strongly support the idea that capital inflows are indeed procyclical for both industrial and developing countries.

4.2 *Fiscal Policy*

With regard to *Stylized fact 2* (i.e., fiscal policy in OECD countries is, by and large, either countercyclical or acyclical, while in developing countries fiscal policy is predominantly procyclical), Table 9 provides a measure of the amplitude of the fiscal policy cycle by showing—for six different measures of government spending—the difference between the change in real government spending when GDP growth is above the median and when it is below the median. Under this definition, a positive amplitude indicates procyclical government spending. The inflation tax is also included as the remaining fiscal indicator, with a negative amplitude denoting a procyclical tax rate. As argued in Section 2, government spending and the inflation tax rate provide the best indicators to look at in terms of their ability to discriminate among different cyclical policy stances (recall Table 3). Other indicators—such as fiscal balances or tax revenues—convey less information.

The striking aspect of Table 9 is that, as shown in the last column, the amplitude of the fiscal spending cycle for non-OECD countries is considerably large for all measures of government spending. This suggests that, in particular for the two middle income groups, fiscal policy is not only procyclical, but markedly so. In contrast, while positive, the

analogous figures for OECD countries are quite small, suggesting, on average, an acyclical fiscal policy.

Based on the country-by-country computations of the amplitude of the fiscal spending cycle underlying Table 9 (which are illustrated in Figure 3), the conclusion that non-OECD countries are predominantly procyclical is overwhelming. For instance, for real central government expenditure, 94 percent of low-income countries exhibit a positive amplitude. For middle-low income countries this figure is 91 percent. Every single country in the middle-high income category registers as procyclical. In contrast, when it comes to OECD countries, an even split exists between procyclical and countercyclical countries.

Turning to the inflation tax rate, $\pi/(1+\pi)$, it registers as procyclical in all of the four groups. The amplitude is the largest for the low-income group (3 percentage points) and the smallest for OECD countries (0.9 percentage point).[20] Not surprisingly, the increase in the inflation tax rate is the highest during recessions (13.1 percent) for the middle-high-income countries (which include chronic high inflation countries like Argentina, Brazil, and Uruguay) and lowest for the OECD, at 5.4 percent.

Table 10 presents the pairwise correlations for the expenditure measures shown in Table 9 as well as for the inflation tax rate. With regard to the correlations between the cyclical components of GDP and government expenditure, the most salient feature of the results presented in Table 10 is that for the three developing country groups, all of the 36 correlations reported in the table (18 correlations per filter) are positive regardless of the expenditure series used or the type of filter. By contrast, all of the 12 correlations reported for the OECD are negative (though low). This is not to say that the relationship between the fiscal expenditure and business cycle is an extremely tight one; several entries in Table 10 show low correlations that are not significantly differently from zero—consistent with an acyclical pattern as defined in Table 2. When one examines these results, however, it becomes evident that for non-OECD countries (at least according to this exercise), fiscal policy is squarely procyclical.[21]

In terms of the inflation tax, the results for both filters coincide; the correlation between the cyclical components of GDP and the inflation tax is positive and significant for OECD countries (indicating countercyclical fiscal policy) and negative and significant for all groups of developing countries (indicating procyclical fiscal policy).

Table 10 also presents evidence on the relationship between capital inflows and fiscal policy. Our premise is that the capital flow cycle may affect macroeconomic policies in developing countries, particularly in the highly volatile economies that comprise the middle-high-income countries. To this end, we report the correlations (using both the HP and bandpass filters) of the cyclical components of the fiscal variables and net capital inflows. Remarkably, all but one of the 36 correlations (18 per filter) for non-OECD countries are positive with 21 of them being significantly different from zero. This provides clear support for the idea that the fiscal spending cycle is positively linked to the capital flow cycle (*stylized fact* 4.) The evidence is particularly strong for middle-high-income countries (with 10 out of the 12 positive correlations being significant). We do not pretend, of course, to draw inferences on causality from pairwise correlations, but it is not unreasonable to expect that a plausible causal relationship may run from capital flows to fiscal spending—an issue that clearly warrants further study. More surprising is the evidence suggesting that the relationship between the fiscal spending cycle and capital flows is also important for low income countries (most of which have little access to international capital markets). It may be fruitful to explore to what extent this result may come from links between cycles in commodity prices and government expenditure.[22] In sharp contrast to developing countries, the correlations for OECD countries are—with only one exception—never significantly different from zero, which suggests that there is no link between the capital flow cycle and fiscal spending.

Table 10 also indicates that the inflation tax is significantly and negatively correlated with the capital flow cycle for all developing countries (and both filters). Our conjecture is that inflation provides a form of alternative financing when international capital market conditions deteriorate. For OECD countries, this correlation is not significantly different from zero.

4.3 *Monetary Policy*

To document *stylized fact* 3 (i.e., monetary policy is countercyclical in most OECD countries while it is mostly procyclical in developing ones), we perform the same kind of exercises carried out for the fiscal indicators, but we also estimate variants of the Taylor rule, as

Table 10
Correlations between fiscal policy, real GDP, and net capital inflows

Countries	Central government				General government expenditure	Consolidated government expenditure minus interest payments	Inflation tax
	Expenditure	Expenditure minus interest payments	Expenditure on goods and services	Expenditure on wages and salaries			
				HP Filter			
				Correlation with real GDP			
OECD	−0.13*	−0.05	−0.06	−0.15*	−0.06	−0.07	0.16*
Middle-high income	0.38*	0.10	0.08	0.01	0.43*	0.10	−0.15*
Middle-low income	0.22*	0.13	0.07	0.03	0.20*	0.12	−0.09*
Low income	0.38*	0.24*	0.54*	0.59*	0.37*	0.17*	−0.20*
				Correlation with net capital inflows			
OECD	0.03	0.05	0.04	0.04	0.09	0.03	0.04
Middle-high income	0.25*	0.22*	0.28*	0.27*	0.25*	0.20*	−0.31*
Middle-low income	0.16*	0.11	0.13	0.12	0.18*	0.13	−0.14*
Low income	0.20*	0.05	0.20	0.37	0.24*	−0.16	−0.09*
				Bandpass filter			
				Correlation with real GDP			
OECD	−0.05	−0.15*	−0.11	−0.20*	−0.02	−0.12	0.15*
Middle-high income	0.53*	0.19*	0.23*	0.13	0.44*	0.23*	−0.13*
Middle-low income	0.29*	0.29*	0.26*	0.23*	0.23*	0.23*	−0.10*
Low income	0.46*	0.42*	0.53*	0.59*	0.34*	0.32*	−0.16*

	Correlation with net capital inflows						
OECD	0.07	0.08	0.05	0.04	0.14*	0.00	0.02
Middle-high income	0.19*	0.12	0.28*	0.25*	0.16*	0.09	−0.25*
Middle-low income	0.14*	0.08	0.05	0.10	0.16*	0.11	−0.10*
Low income	0.19*	0.25*	0.27*	0.39*	0.22*	0.13	−0.07*

Notes: An asterisk denotes statistical significance at the 10 percent level.
Source: IMF, *World Economic Outlook*.

Table 11
Amplitude of the monetary policy cycle

Interest rate	Increases in nominal interest rates		
	Good times (1)	Bad times (2)	Amplitude (1) − (2)
	OECD countries		
Interbank rate	0.3	−0.7	1.0
Treasury bill rate	0.2	−0.4	0.6
Discount rate	0.5	−0.5	1.0
Lending rate	0.0	−0.3	0.3
Deposit rate	0.1	−0.3	0.4
	Middle-high-income countries		
Interbank rate*	−2.2	2.3	−4.5
Treasury bill rate	−2.6	−1.5	−1.1
Discount rate	−1.5	2.7	−4.2
Lending rate	−4.0	2.1	−6.1
Deposit rate*	0.7	1.0	−0.3
	Middle-low-income countries		
Interbank rate	−0.8	−0.1	−0.7
Treasury bill rate	−0.7	1.1	−1.8
Discount rate	0.5	0.5	0.0
Lending rate	−1.0	0.4	−1.4
Deposit rate	−0.5	−0.5	0.0
	Low-income-countries		
Interbank rate	−1.3	1.5	−2.8
Treasury bill rate	−1.0	0.5	−1.5
Discount rate*	−0.8	0.2	−1.0
Lending rate	−4.7	0.2	−4.9
Deposit rate*	−1.6	0.2	−1.8

Notes: Increases in interest rates are defined as the average annual change in interest rates (with interest rates expressed in percentage points). Good (bad) times are defined as those years with GDP growth above (below) the median.
*The median is reported in lieu of the average because the average is distorted by one or more very high inflation (or hyperinflation) episodes.
Sources: IMF, *World Economic Outlook* and *International Financial Statistics*.

described in Section 2. Table 11 presents the same exercise performed in Table 9 for the five nominal interest rate series used in this study. As discussed in Section 2, a short-term policy instrument, such as the interbank rate (or in some countries the T-bill or discount rate), is the best indicator of the stance of monetary policy. In this case, a negative amplitude denotes procyclical monetary policy. The difference between the OECD countries and the other groups is striking. For the OECD countries, interest rates decline in recessions and increase in expansions (for example, the interbank interest rate falls on average 0.7 percent or 70 basis points during recessions). In sharp contrast, in non-OECD countries, most of the nominal interest rates decline in expansions and increase in recessions (for instance, interbank rates in middle-high-income countries rise by 2.3 percent or 230 basis points in recessions). Thus, the pattern for the non-OECD group is broadly indicative of procyclical monetary policy.[23]

Table 12 presents the correlations of the cyclical components of real GDP, capital inflows, and the five nominal interest rates introduced in Table 11. In terms of the cyclical stance of monetary policy, the evidence seems the most compelling for OECD countries (countercyclical monetary policy), where all 10 correlations are positive and seven significantly so. There is also evidence to suggest procyclical monetary policy in middle-high-income countries (all ten correlations are negative and four significantly so). The evidence is more mixed for the other two groups of countries where the lack of statistical significance partly reflects the fact that they have relative shorter time series on interest rates.[24]

Turning to the correlations between net capital inflows and interest rates in Table 12, the evidence is strongest again for the OECD countries (with all 10 correlations significantly positive), clearly indicating that higher interest rates are associated with capital inflows. For middle-high-income countries, 8 out of the 10 correlations are negative but not significantly different from zero (again, shorter time series are an important drawback). Still, we take this as suggestive evidence of the when-it-rains-it-pours syndrome.

Given the notorious difficulties (present even for advanced countries such as the United States) in empirically characterizing the stance of monetary policy, we performed a complementary exercise as a robustness check for all income groups. Specifically, we estimated the Taylor rule specified in Section 2. Table 13 reports the results for the three

Table 12
Correlations between monetary policy, real GDP, and net capital inflows

Countries	Nominal interest rates				
	Interbank	T-bill	Discount	Lending	Deposit
			HP filter		
			Correlation with real GDP		
OECD	0.28*	0.39*	0.37*	0.23*	0.21*
Middle-high income	−0.24*	−0.09	−0.02	−0.24*	−0.21*
Middle-low income	0.02	0.00	0.04	0.07	0.01
Low income	−0.12	−0.02	0.04	−0.02	−0.10
			Correlation with net capital inflows		
OECD	0.14*	0.25*	0.20*	0.19*	0.11*
Middle-high income	−0.11	−0.24	0.11	−0.13	−0.09
Middle-low income	0.04	0.03	0.07	0.05	0.00
Low income	0.01	0.06	0.03	−0.11	0.05
			Bandpass filter		
			Correlation with real GDP		
OECD	0.12	0.13*	0.23*	0.01	0.06
Middle-high income	−0.23	−0.14	−0.10	−0.10	−0.13*
Middle-low income	0.19*	0.00	−0.03	0.03	−0.03
Low income	−0.09	−0.04	−0.07	−0.07	−0.08
			Correlation with net capital inflows		
OECD	0.16*	0.28*	0.19*	0.16*	0.13*
Middle-high income	−0.05	−0.17	0.08	−0.18	−0.11
Middle-low income	0.30*	−0.03	0.11	0.00	−0.07
Low income	0.12	0.07	0.02	−0.11	0.04

Notes: An asterisk denotes statistical significance at the 10 percent level.
Sources: IMF, *World Economic Outlook* and *International Financial Statistics*.

nominal interest rates that are, at least in principle, more likely to serve as policy instruments (interbank, T-bill, and discount.) Recalling that countercyclical policy requires a positive and significant β_2, the main results are as follows.[25] First, monetary policy in OECD countries appears to be countercyclical (as captured by positive and significant coefficients in two out of the three specifications). Second, there is some evidence of monetary policy procyclicality in middle-income countries (as captured by the negative and significant coefficients for the T-bill regressions). This overall message is thus broadly consistent with that of Tables 11 and 12.

Table 13
Taylor rules

Regression $i_t = \alpha + \beta_1(\pi_t - \bar{\pi}) + \beta_2 y_t^c + u_t$
i_t = Short term interest rate. Definitions of the rates are given below
$\pi_t - \bar{\pi}$ = Inflation rate minus sample mean
y_t^c = Cyclical component of real GDP (HP filter) divided by actual output

Dependent variable (number of observations)	β_1	β_2	R^2
		OECD countries	
Interbank rate (663)	0.56*	0.02	0.27
T-bill rate (503)	0.60*	0.12*	0.39
Discount rate (758)	0.49*	0.15*	0.25
		Middle-high income countries	
Interbank rate (187)	4.84*	−0.31	0.48
T-bill rate (152)	0.32*	−0.12*	0.04
Discount rate (413)	0.43*	−0.11	0.01
		Middle-low income countries	
Interbank rate (250)	0.81*	−0.19	0.34
T-bill rate (218)	0.44*	−0.27*	0.11
Discount rate (686)	1.21*	0.26	0.42
		Low income countries	
Interbank rate (282)	0.38*	0.18*	0.09
T-bill rate (258)	0.29*	0.11	0.17
Discount rate (951)	6.03*	1.59	0.22

Notes: The equations have been estimated using panel data with fixed effects.
*Denotes significance at the 10 percent level.
Sources: IMF, *World Economic Outlook* and *International Financial Statistics*.

4.4 Exchange Rate Arrangements, Capital Market Integration, and Crises

In the remainder of this section, we divide the sample along three different dimensions to assess whether our results are affected by the degree of capital mobility in the world economy, the existing exchange rate regime, and the presence of crises. First, to examine whether the increased capital account integration of the more recent past has affected the cyclical patterns of the variables of interest, we split our sample into two subperiods (1960–1979 and 1980–2003) and performed all the exercises described earlier in this section. Second, we break up the sample according to a rough measure of the de facto degree of exchange rate flexibility. Last, we split the sample into

currency crisis periods and tranquil periods. This enables us to ascertain whether our results on procyclicality are driven to some extent by the more extreme crises episodes. The results for each of these partitions—which are presented in Table 14—will be discussed in turn.[26]

4.4.1 1960–1979 Versus 1980–2003

The four main results that emerge from dividing the sample into 1960–1979 and 1980–2003 are the following. First, capital flows are consistently procyclical in both periods, with the correlation increasing in the latter period for middle-high-income countries. Second, the cyclical stance of government spending does not appear to change across periods for non-OECD countries (i.e., fiscal policy is procyclical in both periods) but OECD countries appear to have been acyclical in the pre-1980 period and turn countercyclical in the post-1980 period. Third, the inflation tax appears to be essentially acyclical in the pre-1980 period only to turn significantly countercyclical for OECD countries and procyclical for the rest of the groups in the post-1980 period. Fourth, monetary policy seems to have switched from acyclical to countercyclical for OECD countries. Lack of data for developing countries precludes a comparison with the earlier period.

4.4.2 Fixed Versus Flexible Exchange Rates

This partition assesses whether the cyclical patterns in net capital inflows and macroeconomic policies differ across exchange-rate regimes (broadly defined). To this effect, we split the sample into three groups (a coarser version of the five-way de facto classification in Reinhart and Rogoff, 2004). The fixed-exchange-rate group comprises the exchange rate regimes labeled 1 and 2 (pegs and crawling pegs) in the five-way classification just mentioned. The flexible-exchange-rate group comprises categories 3 (managed floating) and 4 (freely floating). Those labeled freely falling by the Reinhart and Rogoff classification (category 5) were excluded from the analysis altogether.

The main results to come out of this exercise are as follows. First, there are no discernible differences in the correlations between net capital inflows and real GDP cycles across the two groups. Second, no differences are detected either for government spending. Third, the inflation tax appears to be more countercyclical for OECD countries and more procyclical for non-OECD countries in flexible regimes. Last, monetary policy is more countercyclical for the OECD group under flexible rates.

Table 14
Cyclical characteristics of net capital inflows, fiscal policy, and monetary policy

	Correlation with real GDP							
			Fiscal policy				Monetary policy	
Countries	Net capital inflows		Central government expenditure		Inflation tax		Lending rate	
	Pre-1980	Post-1980	Pre-1980	Post-1980	Pre-1980	Post-1980	Pre-1980	Post-1980
OECD	n/a	0.38*	−0.19	−0.14*	0.11	0.22*	0.04	0.25*
Middle-high income	0.25*	0.38*	0.43*	0.33*	−0.04	−0.16*	n/a	−0.23*
Middle-low income	0.28*	0.26*	0.39*	0.19*	−0.01	−0.12*	n/a	0.03
Low income	0.20*	0.17*	0.43*	0.38*	−0.08	−0.23*	n/a	0.03
	Fix	Flex	Fix	Flex	Fix	Flex	Fix	Flex
OECD	0.35*	0.40*	−0.09	−0.19	0.11	0.26*	0.13	0.38*
Middle-high income	0.39*	0.35*	0.39*	0.22*	−0.15*	−0.26*	−0.12	−0.06
Middle-low income	0.21*	0.34*	0.24*	0.31*	0.04	−0.15*	0.06	0.29*
Low income	0.27*	0.20*	0.40*	0.28*	−0.13*	−0.21*	−0.01	0.01
	Crisis	Tranquil	Crisis	Tranquil	Crisis	Tranquil	Crisis	Tranquil
OECD	n/a	0.37*	n/a	−0.13*	n/a	0.17*	n/a	0.23*
Middle-high income	0.56*	0.36*	0.38*	0.41*	−0.41*	−0.14*	n/a	−0.22*
Middle-low income	0.57*	0.28*	0.05	0.24*	−0.15	−0.06*	n/a	0.08
Low income	0.14	0.14*	0.30*	0.32*	−0.09	−0.09*	n/a	−0.06

Notes: All correlations were computed using the HP filter. Pre-1980: Includes observations from 1960 to 1979. Post-1980: Includes observations from 1980 to 2003. Fix: Includes years with pegs and crawling pegs. Flex: Includes years with managed floating and freely floating. Crisis: Includes years with a 25 percent or higher monthly depreciation that is at least 10 percent higher than the previous month's depreciation as well as the two years following the devaluation. Tranquil: Includes years not defined as crisis years. An asterisk denotes statistical significance at the 10 percent level.
Sources: IMF, *World Economic Outlook* and *International Financial Statistics*.

4.4.3 Crisis Versus Tranquil Periods

We define currency crashes as referring to a 25 percent or higher monthly depreciation that is at least 10 percent higher than the previous month's depreciation. Those years (as well as the two years following the crisis) are treated separately from tranquil periods. The idea is to check whether our main results are driven by the presence of crises. Table 14 suggests that this is definitely not the case. Indeed, our results appear to hold also as strongly—if not more—in tranquil times. We thus conclude that the paper's message does not depend on our having crises periods in our sample.

5. Concluding Remarks

We have studied the cyclical properties of capital flows and fiscal and monetary policies for 104 countries for the period 1960–2003. Much more analysis needs to be undertaken to refine our understanding of the links among the business cycle, capital flows, and macroeconomic policies, particularly across such a heterogeneous group of countries and circumstances (and especially in light of endemic data limitations). With these considerations in mind, our main findings can be summarized as follows:

1. Net capital inflows are procyclical in most OECD and developing countries.

2. Fiscal policy is procyclical for most developing countries and markedly so in middle-high income countries.

3. Though highly preliminary, we find some evidence of monetary policy procyclicality in developing countries, particularly for the middle-high-income countries. There is also some evidence of countercyclical monetary policy for the OECD countries.

4. For developing countries—and particularly for middle-high-income countries—the capital flow cycle and the macroeconomic cycle reinforce each other (the when-it-rains-it-pours syndrome).

From a policy point of view, the implications of our findings appear to be of great practical importance. While macroeconomic policies in OECD countries seem to be aimed mostly at stabilizing the business cycle (or, at the very least, remaining neutral), macroeconomic policies in developing countries seem mostly to reinforce the business cycle, turning sunny days into scorching infernos and rainy days into torren-

tial downpours. While there may be a variety of frictions explaining this phenomenon (for instance, political distortions, weak institutions, and capital market imperfections), the inescapable conclusion is that developing countries—and in particular emerging countries—need to find mechanisms that would enable macro policies to be conducted in a neutral or stabilizing way. In fact, evidence suggests that emerging countries with a reputation of highly skilled policymaking (the case of Chile immediately comes to mind) are able to graduate from the procyclical gang and conduct neutral/countercyclical fiscal policies (see Calderon and Schmidt-Hebbel, 2003). In the particular case of Chile, the adoption of fiscal rules specifically designed to encourage public saving in good times may have helped in this endeavor.

Table 15
Data sources

Indicator	Source
1. External	
Financial account (net capital inflows)	IMF, *World Economic Outlook* (WEO)
Institutional Investor Ratings	*Institutional Investor*
2. Fiscal	
Central government:	
Expenditure	IMF, WEO
Current expenditure, current expenditure minus interest payments, expenditure on goods and services, expenditure on wages and salaries	IMF, *Government Financial Statistics* (GFS)
General or consolidated government:	
Expenditure	IMF, WEO
Current expenditure, current expenditure minus interest payments, expenditure on goods and services, expenditure on wages and salaries	IMF, GFS
Inflation tax, $\pi/(1+\pi)$	IMF, *International Financial Statistics* (IFS)
3. Monetary	
Domestic credit, M0, M1, M2, interbank rate, treasury bill rate, discount rate, lending rate, deposit rate	IMF, IFS
4. Other	
Real GDP	IMF, WEO
GDP deflator	IMF, WEO
Consumer price index	IMF, IFS

Note: WEO uses the concept of central and general government expenditure, while GFS uses central government budgetary accounts and consolidated government accounts.

Table 16
Countries in the sample

Low-income countries (40)	Middle-low-income countries (25)	Middle-high-income countries (18)	OECD countries (21)
Angola	Algeria	Argentina	Australia
Bangladesh	Bolivia	Botswana	Austria
Benin	Cape Verde	Brazil	Belgium
Burma (now Myanmar)	China	Chile	Canada
Cambodia	Colombia	Costa Rica	Denmark
Cameroon	Dominican Republic	Gabon	Finland
Central African Republic	Ecuador	Korea, Republic of	France
Chad	Egypt	Lebanon	Germany
Comoros	El Salvador	Malaysia	Greece
Congo (Republic of)	Guatemala	Mauritius	Japan
Côte d'Ivoire	Honduras	Mexico	Ireland
The Gambia	Iran	Oman	Italy
Ghana	Iraq	Panama	Netherlands
Haiti	Jamaica	Saudi Arabia	New Zealand
India	Jordan	Seychelles	Norway
Indonesia	Morocco	Trinidad and Tobago	Portugal
Kenya	Paraguay	Uruguay	Spain
Laos	Peru	Venezuela	Sweden
Liberia	Philippines		Switzerland
Madagascar	South Africa		United Kingdom
Mali	Sri Lanka		United States
Mauritania	Syria		
Mongolia	Thailand		
Mozambique	Tunisia		
Nepal	Turkey		
Nicaragua			
Niger			
Nigeria			
Pakistan			
Rwanda			
Senegal			
Sierra Leone			
Sudan			
Tanzania			
Togo			
Uganda			
Vietnam			
Yemen			
Zambia			
Zimbabwe			

Note: The total number of countries is 104. Iceland and Luxembourg are not included in our sample of OECD countries and Korea is included in the middle-high income countries.

Finally, it is worth emphasizing that our empirical objective has consisted in computing reduced-form correlations in the data (in the spirit of the real business cycle literature) and *not* in identifying policy rules or structural parameters. The types of friction that one would need to introduce into general equilibrium models to explain the when-it-rains-it-pours syndrome identified in this paper should be the subject of further research. In sum, we hope that the empirical regularities identified in this paper will stimulate theoreticians to reconsider existing models that may be at odds with the facts and empiricists to revisit the data with more refined techniques.

6. Appendix

Table 15 shows the data sources for our data set. Table 16 lists the countries included in our study.

Notes

Kaminsky was visiting the International Monetary Fund (IMF) Institute and Végh was Senior Resident Scholar at the IMF's Research Department when this paper was written. They both gratefully acknowledge the IMF's hospitality. Kaminsky and Végh also wish to thank the Institute of Public Policy at George Washington University and the UCLA Senate, respectively, for financial support. The authors wish to thank Peter Benczur, Mark Gertler, Gita Gopinath, Ayhan Kose, Pablo Lopez Murphy, Attila Raftai, Raghu Rajan, Alessandro Rebucci, Vincent R. Reinhart, Roberto Rigobon, Kenneth S. Rogoff, Evan Tanner, and Guillermo Tolosa for useful comments and suggestions and Eric Bang and especially Ioannis Tokatlidis for excellent research assistance. This paper was prepared for the NBER's nineteenth conference on Macroeconomics, organized by Mark Gertler and Kenneth S. Rogoff. The views expressed here are the authors' own and not those of the IMF.

1. See Reinhart, Rogoff, and Savastano (2003) for an analysis of borrowing/default cycles.

2. Of course if bad times are defined exclusively as currency or banking crises, then there is a small but growing theoretical literature on monetary policy in general and interest rate defenses in particular. See, for instance, Aghion, Bacchetta, and Banerjee (2001) and Lahiri and Végh (2003). The empirical evidence in this area is, however, rather inconclusive.

3. For a discussion of some of the challenges in estimating monetary policy rules for industrial countries, see Clarida, Galí, and Gertler (1999).

4. Throughout this paper, business cycle refers to the real gross domestic product (GDP) cycle.

5. Lane and Tornell (1998) offer some empirical evidence to show that saving in Latin American countries has often been countercyclical (i.e., saving falls in good times, and vice versa).

6. Section 4 presents evidence in support of this hypothesis. See also Neumeyer and Perri (2004), who examine the importance of country risk in driving the business cycle in emerging economies.

7. It is important to notice that, under this definition, a procyclical fiscal policy implies a *negative* correlation between tax rates and output over the business cycle. Our terminology thus differs from the one in the real business cycle literature in which any variable positively (negatively) correlated with the output cycle is referred to as procyclical (countercyclical).

8. It is worth emphasizing that, in deriving the theoretical correlations below, the only assumption made is that the tax base (output or consumption) is high in good times and low in bad times. This is true by definition in the case of output and amply documented for the case of consumption. Aside from this basic assumption, what follows is an accounting exercise that is independent of any particular model.

9. By the same token, it would also seem unwise to define procyclical fiscal policy as a negative correlation between output and the fiscal balance (as is sometimes done in the literature) since a zero or even positive correlation could also be consistent with procyclical fiscal policy, as defined above.

10. We are, of course, fully aware that there is certainly no consensus on whether the inflation tax should be thought of as just another tax. While the theoretical basis for doing so goes back to Phelps (1973) and has been greatly refined ever since (see, for example, Chari and Kehoe, 1999), the empirical implications of inflation as an optimal tax have received mixed support. See Calvo and Végh (1999) for a discussion.

11. A negative correlation between real interest rates and output would arise in a standard endowment economy model (i.e., a model with exogenous output) in which high real interest rates today signal today's scarcity of goods relative to tomorrow. In a production economy driven by technology shocks, however, this relationship could have the opposite sign. In addition, demand shocks, in and of themselves, would lead to higher real interest rates in good times and vice versa. Given these different possibilities, any inferences drawn on the cyclical stance of monetary policy from the behavior of real interest rates should be treated with extreme caution.

12. If, as part of a procyclical monetary policy, policymakers lowered reserve requirements, this should lead to even higher real money balances.

13. In practice, however, using domestic credit to measure the stance of monetary policy is greatly complicated by the fact that inflation (especially in developing countries) tends to be high and variable. Hence, a large growth rate does not always reflect expansionary policies. For this reason, in the empirical section, we will restrict our attention to short-term nominal interest rates as a policy instrument.

14. Our data set covers 104 countries for the period 1960–2003 (the starting date for each series varies across countries and indicators). See Table 14 for data sources and Table 15 for the list of countries (both tables are in the appendix).

15. Based on data for 33 poor countries over a 25-year period, Pallage and Robe (2001) conclude that foreign aid has also been procyclical, which is consistent with our overall message.

16. We also found that for both groups of middle-income countries, the current account deficit is larger in good times than in bad times, which is consistent with procyclical capital flows.

17. See Reinhart, Rogoff, and Savastano (2003).

18. The Institutional Investor Index (II) ratings, which are compiled twice a year, are based on information provided by economists and sovereign risk analysts at leading global banks and securities firms. The ratings grade each country on a scale from 0 to 100, with a rating of 100 given to countries perceived as having the lowest chance of defaulting on government debt obligations.

19. Tables 8, 10, 12, and 14 report the average country correlation for the indicated group of countries. We use a standard t-test to ascertain where the average is significantly different from 0.

20. Figures on the inflation tax are multiplied by 100.

21. In terms of the country-by-country computations underlying Table 10, it is worth noting that for, say, real central government expenditure, 91 percent of the correlations for developing countries are positive (indicating procyclical fiscal policy), whereas 65 percent of the correlations for OECD countries are negative (indicating countercyclical fiscal policy), as illustrated in Figure 2.

22. In this regard, see Cuddington (1989).

23. Appendix Tables 3 and 4 in the working paper version of this paper show results analogous to those in Table 11 for real interest rates and real monetary aggregates, respectively. Broadly speaking, real rates for OECD countries show a positive correlation with the cycle (i.e., they generally rise in good times and fall in bad times). This is, in principle, consistent with countercyclical monetary policy (recall Table 3). In contrast, for middle-high and middle-low-income countries, real interest rates appear to be negatively correlated with the cycle. These results are consistent with those reported in Neumeyer and Perri (2004). The results for low-income countries are harder to interpret as they are more similar to those for OECD countries. The results for real money balances in Appendix Table 4 are in line with our priors—with real money balances rising more in good times than in bad times. This positive correlation, however, does not allow us to draw any inference on the stance of monetary policy (recall Table 3).

24. It is important to warn the reader that the data on interest rates for non-OECD countries is spotty and rather incomplete. Our results should thus be interpreted with caution and as merely suggestive.

25. As an aside, notice that the coefficient on the inflation gap is always positive and significant.

26. To conserve on space, Table 14 presents results for only one measure of government spending and one interest rate using the HP filter. The remaining results are available upon request from the authors.

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Comment

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This paper is an extremely nice effort at documenting and contrasting certain features of the business cycle for a large set of countries. The authors focus on the cyclical properties of capital flows, fiscal policy, and monetary policy. They contrast the behavior of these variables across groups of countries defined to be OECD, middle-high, middle-low, and low-income countries. The middle-high-income countries are the so-called emerging markets (EM). Based on their analysis, the authors identify a striking feature that appears to characterize EMs. That is, in good times (when output is above trend), EMs receive above-average levels of capital flow from the rest of the world at the same time as fiscal and monetary policies are strongly expansionary. This feature, which the authors describe as when it rains, it pours, is either not true or less true of other countries in the sample. We are then presented with a seemingly unique feature of EMs that seeks an explanation. This paper is a nice source for facts on EMs that will discipline future theoretical research and call for further empirical research on the facts themselves.

In my comments, I will briefly examine and summarize the evidence and then proceed to present a perspective on emerging markets that will help us in interpreting the facts. My main comment will be to emphasize that what we call the business cycle in an EM is very different from the cycle in a developed economy. In the case of the latter, we typically think of the output process as characterized by a fairly stable trend and transitory fluctuations around this trend. In the case of EMs, in contrast, the trend is highly volatile and this dominates the volatility of transitory shocks. This characterization captures the frequent switches in regimes that EMs endure, often associated with clearly defined changes in government policy, including dramatic

changes in monetary, fiscal, and trade policies. There is a large literature on the political economy of emerging markets in general, and the tensions behind the sporadic appearance of progrowth regimes in particular, that is consistent with a volatile trend (see, for example, Dornbusch and Edwards, 1991). Once we recognize this difference in the business cycle, several features of the data that this paper documents appear to be less puzzling. It also informs our inference of causation between variables. Most of my comments arise from work I have done jointly with Mark Aguiar (Aguiar and Gopinath, 2004a; Aguiar and Gopinath, 2004b).

1. Empirical Findings

The main empirical findings are the following. First, capital flows into developing countries tend to be more strongly procyclical than in the case of OECD countries. Second, several measures of government fiscal policy appear to be markedly procyclical in developing countries compared to OECD countries. Ideally, one would like to examine *jointly* several measures of fiscal policy to examine the stance of fiscal policy. It is possible, for instance, that even if income tax rates stay unchanged, governments might try harder to fight tax evasion in good times (as a part of reform), implying a tighter fiscal policy. The only tax measure the authors employ is the inflation tax rate, mainly restricted by data availability. A fruitful exercise will be to put together evidence on other measures of taxation and alternate fiscal instruments.

The third finding is that in the case of EMs, the fiscal spending cycle is positively linked to the capital flow cycle. However, the magnitude of these correlations appear to be sensitive to the filtering procedure used and in some cases are quite small. The last finding relates to monetary policy. As the authors acknowledge, measuring the policy component of monetary aggregates is a tricky problem. The evidence that the authors find is that short-term interest rates are negatively correlated with the business cycle in EMs. This contrasts with interest rates in OECD countries, which are positively correlated with the cycle. The behavior of domestic interest rates in EMs is strikingly similar to the behavior of interest rates at which EMs borrow from the rest of the world. Neumeyer and Perri (2004) document a strong negative correlation between interest rates on dollar-denominated debt and the business cycle in EMs. This behavior of interest rates is consistent with the market response to changing default probabilities over the business

cycle. I will say more about this later. The main point, however, is that for the evidence on monetary policy more empirical work must be done to provide conclusive evidence on the stance of monetary policy.

2. Emerging Market Business Cycles: The Cycle Is the Trend

The question of what is the business cycle in emerging markets is explored here. A standard representation of the production function is

$$Y_t = e^{z_t} K_t^{\alpha} (\Gamma_t L_t)^{(1-\alpha)}$$

where K_t is the level of the capital stock and L_t is the labor input. The variable z_t represents transitory shocks to productivity and follows an AR(1) process.

$$z_t = \rho_z z_{t-1} + \varepsilon_t^z$$

$\varepsilon_t^z \sim N(0, \sigma_z^2)$, $|\rho_z| < 1$. Γ_t represents the stochastic trend productivity; g_t is the growth rate of trend output.

$$\Gamma_t = g_t \Gamma_{t-1}$$

$$\ln(g_t) = (1 - \rho_g) \ln(\mu_g) + \rho_g \ln(g_{t-1}) + \varepsilon_t^g$$

$\varepsilon_t^g \sim N(0, \sigma_g^2)$, $|\rho_g| < 1$.

In Aguiar and Gopinath (2004b), we document that the ratio of volatility of trend shocks to level shocks, (σ_g/σ_z), is higher in an EM, such as Mexico, compared to a developed small open economy such as Canada. That is, unlike developed markets, fluctuations at business cycle frequencies in EMs are driven primarily by trend shocks as opposed to transitory level shocks. Figure 1 plots log GDP for three small open economies (SOE)—Canada, Mexico, and Argentina. The plot for each economy includes the log level of GDP (where we have extracted any significant seasonal component) and the stochastic trend. The latter was calculated using the methodology of King, Plosser, Stock, and Watson (1991). To be precise, the trend is obtained by setting the transitory shocks to zero and feeding only the permanent shock through the system. This should not be confused with equating the trend to the random walk component à la Beveridge and Nelson (1981). Casual observation of the plots suggests that Canada, our benchmark developed SOE, experiences relatively small fluctuations around a stable trend. On the other hand, Mexico and particularly Argentina display a volatile trend that mirrors movements in GDP at

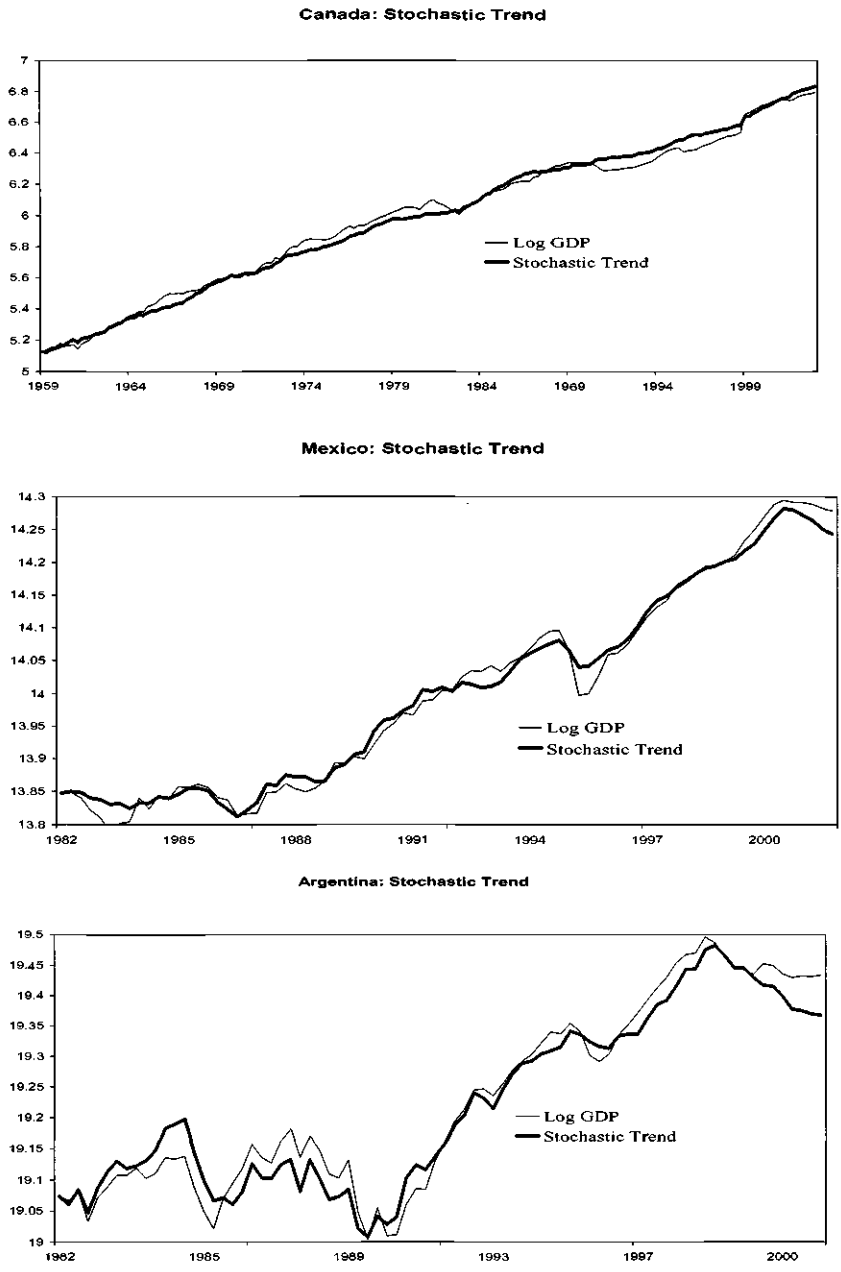

Figure 1
Stochastic trends estimated using the KPSW (1991) methodology

high frequencies. We find that at business-cycle frequencies (12 quarters), the fraction of output variance explained by permanent shocks in the case of Canada is around 50%, while the same number for Mexico is 82%, supporting the view that the cycle is the trend for these markets.

3. Capital Flows, Interest Rates, and Macroeconomic Policies

The first empirical finding in the paper that capital flows (current accounts) are more strongly procyclical (countercyclical) in EMs is then a natural implication of a standard real business cycle model wherein the stochastic trend is the main shock. The current account (negative of capital flows) is the difference between national saving and national investment. In response to a positive transitory shock to productivity (z), investment rises. All else being equal, this will cause the current account to worsen. In response to a transitory shock, however, savings also rise since agents wish to smooth consumption. The savings effect then counters the investment effect and the current account is less countercyclical or acyclical. For developed markets, where we view the trend to be stable, one would expect little cyclicality of the current account. On the other hand, the response to a positive trend shock, g, will be for savings to fall on impact. Agents experience higher income following this shock but expect income to increase even more in the future (as they enter a new growth regime). Consequently, savings will fall on impact. Now, the current account will be more strongly countercyclical, as the authors find in this paper for EMs. Figure 2 plots the current account against the standard deviation of the growth rate of real GDP for 28 small open economies. There is a clear negative relation between the trade balance (as a ratio of GDP) and the volatility of the growth rate. Countries with more volatile growth rates (in the group of middle- and high-income small open economies), the EMs, tend to have more countercyclical trade balances.

Our view on the role of the trend in EMs also resonates in evidence that this paper documents on the behavior of international credit ratings in Tables 6 and 7. The authors find that it is precisely the middle-income countries that experience the biggest swings in ratings across good and bad states of nature. Since credit ratings incorporate the probability of default, a switch from a high-growth regime to a low-growth regime will have dramatic negative effects on the countries'

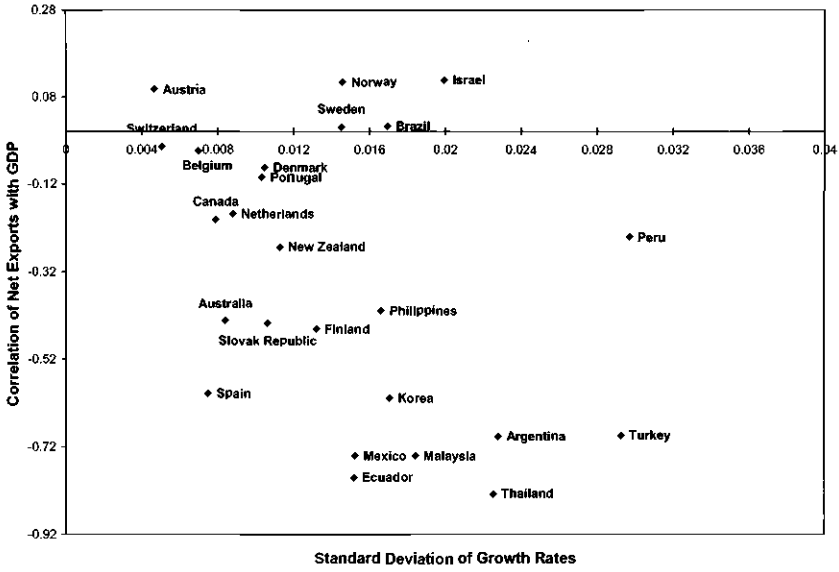

Figure 2

ability to repay and consequently should affect ratings more substantially compared to transitory shocks.

The question then is, What underlies the regime switches we observe in EMs? One can argue for the role of government policy here. Argentina's adoption of the currency board at the start of 1990 that brought an end to years of hyperinflation in the economy is one such regime switch. In this case, interpreting any causal link running from capital flows to fiscal policy becomes tricky. The finding that inflation tax rates are countercyclical (Table 9) could precisely be the regime change that then attracts capital flows into the economy. The negative correlation between capital flows and inflation tax for EMs is consistent with this. Other forms of regime switches involve privatizations and nationalizations that can dramatically affect productivity. For instance, Restuccia and Schmitz (2004) provide evidence of a 50% drop in productivity in the petroleum industry in Venezuela within five years of its nationalization in 1975. Similarly, Schmitz and Teixeira (2004) document almost a doubling of productivity in the Brazilian iron-ore industry following its privatization in 1991.

Last, I will comment on the countercyclicality of interest rates and the positive correlation between interest rates and the current account.

As mentioned earlier, strong evidence suggests the countercyclicality of dollar interest rates at which EMs borrow from the rest of the world. This same literature documents that dollar interest rates and the current account are positively correlated. That is, EMs borrow more in good times and at lower interest rates. In Aguiar and Gopinath (2004a), we describe a model of sovereign default and show that this relation among interest rates, current account, and GDP follows directly when an economy is subject to trend shocks. Put simply, in a high-growth regime, agents wish to borrow (as they face an upward-sloping income profile). All else being equal, this should raise interest rates because higher levels of debt raise the probability of default. In an economy subject to trend shocks, however, the positive trend shock has the effect of lowering interest rates at all levels of debt. Consequently, it is possible that the economy pays a lower interest rate on its borrowing. We show that this is a more likely scenario in an economy subject primarily to trend shocks as opposed to transitory shocks around a stable trend.

To conclude, this paper presents us with interesting business-cycle features of EMs that tend to contrast with the experience of developed markets. While this paper significantly enhances our knowledge of the fiscal and monetary cycles in countries, more empirical work remains to be done in further documenting these facts. In interpreting these facts, it is important to bear in mind that the underlying income process in EMs and developed markets are quite different. Once this is taken into account, contrasting features of EMs appear to be less puzzling.

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Comment

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1. Introduction

The classical literature points to countercyclical policy responses as means to moderate the cost of business cycles. While the prescription of the theory is clear, this behavior is rarely observed in practice. Kaminsky, Reinhart, and Végh's (KRV) paper documents, quite convincingly, that emerging markets suffer from acute procyclical policies—hence their title "When It Rains, It Pours." Although this behavior had been highlighted before in the case of fiscal policy, KRV extend the years, number of countries, and variables included in the analysis, and they find, overwhelmingly, that procyclical behavior is a generalized feature of emerging markets. An important contribution of KRV is the analysis of which macroeconomic indicators are appropriate to the measurement of the procyclical behavior. However, is the procyclical behavior a reflection of different shocks hitting the economies, or is it the outcome of wrong choices by policymakers? If it is the first, then it is unclear why we should care about procyclicality. Nevertheless, if it is the second, then something could—or should—be done.

The preliminary evidence shown in these comments is that most of the differences across countries is due to the dissimilar shocks hitting them and not to their diverse responses to the same shocks. In other words, emerging markets are more procyclical because they are usually hit by shocks that create positive comovement among the variables of interest.

These comments are organized as follows. First, I reproduce the stylized facts in KRV (using their data) but presenting the results in a different fashion. Second, I try to address the reasons behind the procyclical behavior. I explore first the issues of endogeneity and then the

more general problem of the different mixture of shocks. Finally, I present some concluding remarks.

2. Procyclical Policies

Although KRV study several dimensions of procyclical policy—monetary, fiscal, etc.—in these comments, I concentrate entirely on fiscal policy, and in particular on real expenditures. This is a small part of the analysis performed by KRV, but I believe it is enough to provide the intuition, and highlight the issues, that I would like to concentrate on.

Standard macroeconomic theory implies that government consumption should be smoothed through the business cycle to lessen the severity of the macroeconomic fluctuations. In this sense, therefore, it should be expected that fiscal policies follow a countercyclical pattern. A closer look at the data suggests that reality is far from this theoretical paradigm.

Using yearly data on real gross domestic product (GDP) and real total expenditures for more than 100 countries from 1960s to today (same data as KRV), I computed the correlation between output and total expenditures country by country. In the original version of KRV, they mostly concentrated on the average of such correlation, which is what most of the literature does. To clarify the points behind my discussion, I have preferred to look at the estimate country by country, sorting the data from the lowest to the largest coefficient.[1] The results are shown in Figure 1. The countries in light gray are the developed economies, while the countries in dark gray are the developing countries.

As can be seen, not all developed economies have a negative correlation, although they are mostly located on the left side of the graph. Indeed, if we were to compute the average correlation in the sample, we would find that it is easy to accept the hypothesis that the correlation of developed countries is statistically smaller than that of developing countries. This is exactly what KRV do.

This result is also confirmed if, instead of using the level of expenditure, I compute the correlation of output and expenditure share (defined as the total expenditures as a percentage of GDP). In this case, the pattern is not exactly the same, but the final message is identical. In Figure 2, the same figure as before is reproduced, but expenditure shares are used instead of total expenditures. Again, developed economies are mostly located in the left part of the figure, suggesting

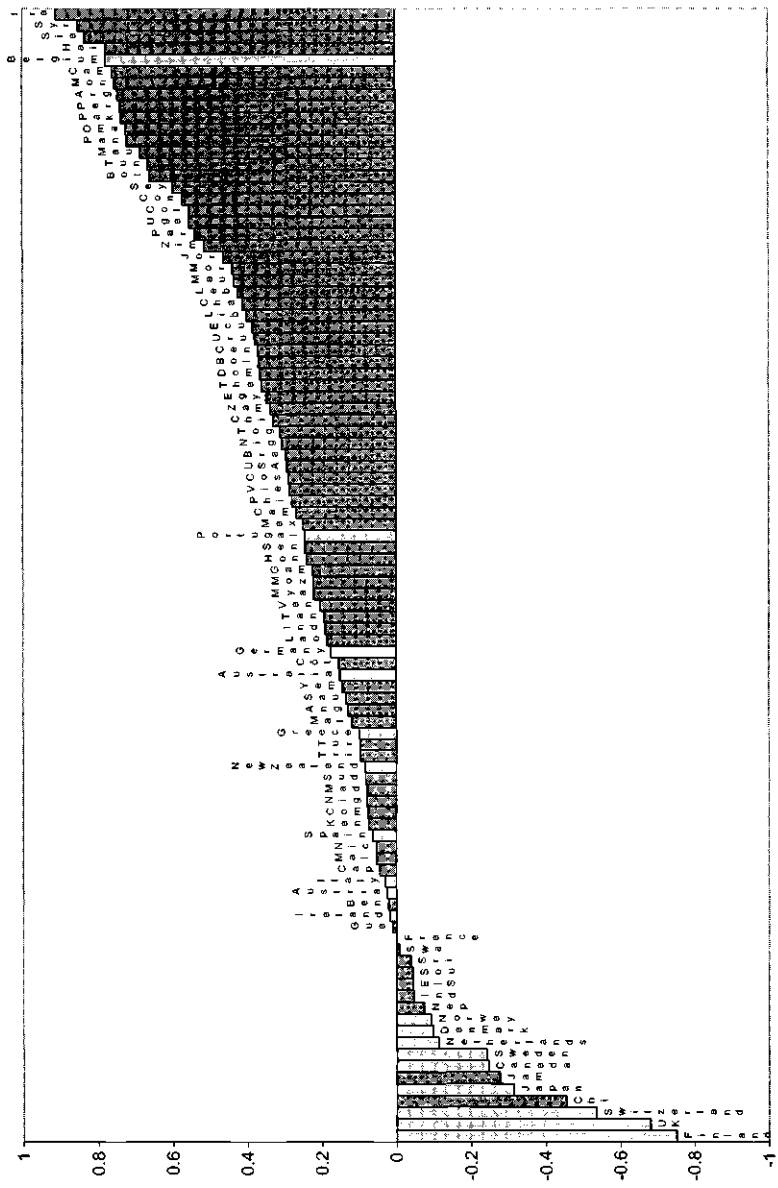

Figure 1
Simple correlation: output and total expenditures

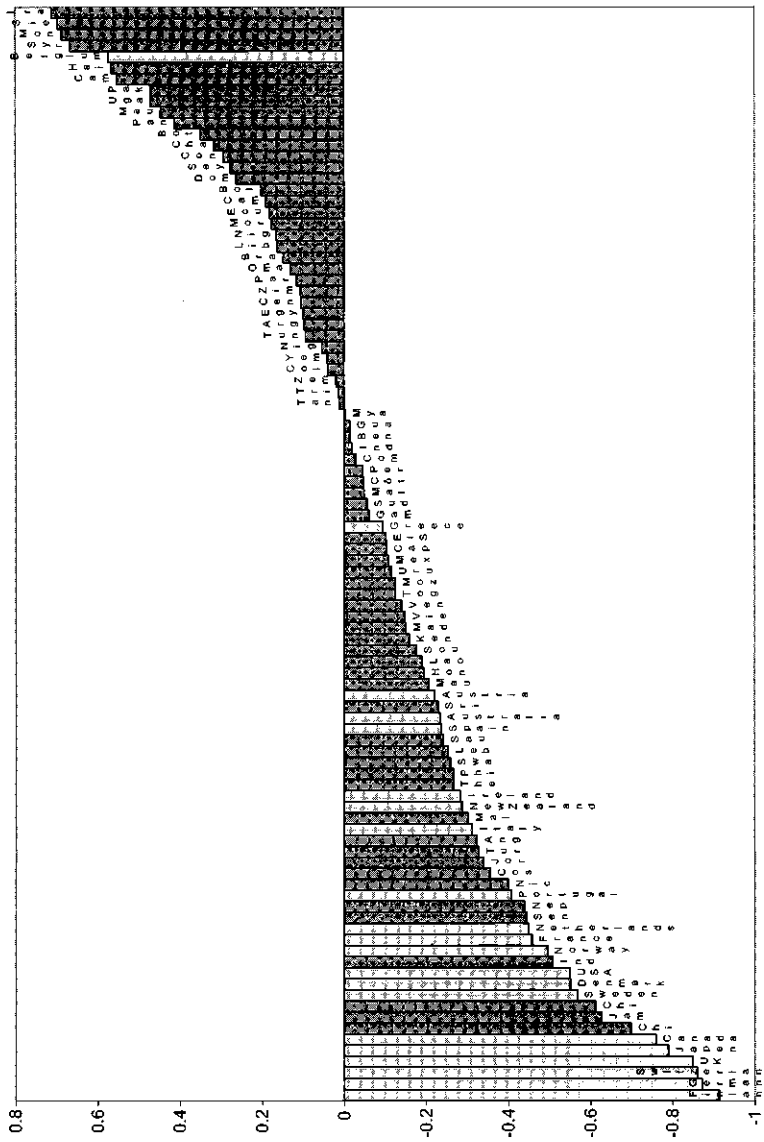

Figure 2
Simple correlation: output and expenditure share

that their fiscal policies are less procyclical than those in developing countries.

This pattern is so strong that it is found not only in correlations—as has been done here and in KRV—but it is also found using other measures of comovement. For example, estimating the simple regression $g_t = \alpha y_t + \varepsilon_t$ country by country and plotting the OLS coefficients produces exactly the same pattern. Figure 3 presents the results. As can be seen, the pattern across all three figures is almost identical. Developed economies are always located to the left of the figure, regardless of how the comovement is computed. These figures confirm what KRV find formally in the comparisons of simple correlations across groups.

3. What Does This Mean?

3.1 Endogeneity

It is important to clarify that even though the correlations have different signs, it does not imply that countries react differently to output shocks, which is usually the claim in the literature. In other words, this pattern of correlations can be explained either because the endogenous response of fiscal policy to output shocks is different between developed and developing countries, or because the shocks that hit these economies are by themselves dissimilar. Although, this point should be trivial, unfortunately, most of the empirical literature favors the first interpretation and gives little attention to the second.[2] Starting from the original contribution by Gavin and Perotti (1997), the literature is mostly devoted to the argument that the *coefficients* in the policy reaction functions of developing economies are *different* from those of developed economies. Assume that equation (1) represents the fiscal policy reaction function. Then the discussion of procyclicality centers around the signs of the coefficient α.

$$g_t = \alpha y_t + \varepsilon_t \tag{1}$$

The claim—or implicit argument—is that developed economies have countercyclical policies, i.e., α is negative, while developing economies have procyclical policies and α is negative.

Certainly this has been underscored in the literature. First, the voracity effect of Lane and Tornell (1996) is one of the theories in which the difference between emerging and developed economies is in the

Figure 3
OLS coefficient country by country

sign of the coefficients. In this case, the political process does not allow for savings to take place during booms; therefore, fiscal policy moves with external shocks or output. Second, the theory based on credit-constrained governments indicates that a positive correlation exists between expenditures and output because during booms, the constraint is relaxed. As before, this theory has a direct implication on the size and sign of the coefficients in equation (1).

Although a different sign on the coefficients is a distinct possibility, this is not the conclusion that should be extracted from the evidence. Not at all! For example, regarding the relationship between fiscal expenditures and output, it can be claimed that equation (1) is only one side of the economy. It describes the decision of the fiscal authority in reaction to a transitory movement of output, and the residuals of that equation represent the fiscal shocks to which the economy is subjected. However, it should also be clear that an output equation, where fiscal expenditures affect output, exists as well:

$$y_t = \beta g_t + \eta_t \tag{2}$$

The residuals in equation (2) represent, for instance, productivity shocks. We have plenty of evidence that $\beta > 0$.

If these two equations describe the economy, it should be obvious that it is possible to obtain very different correlations even though the parameters remain the same. In other words, it is possible that a country could have a positive correlation between fiscal expenditures and output, even with $\alpha < 0$. The reason is simply because that country could be subjected to mostly fiscal shocks. A simple exploration of these two equations provides a clearer view of the importance of the relative variances as a source of the counter- and procyclical policies in developed and emerging markets. Equations (1) and (2) imply a reduced form given by

$$g_t = \frac{1}{1 - \alpha\beta}(\varepsilon_t + \alpha\eta_t)$$

$$y_t = \frac{1}{1 - \alpha\beta}(\beta\varepsilon_t + \eta_t)$$

If $\beta > 0$ and $\alpha < 0$, then the productivity shocks create negative correlations, while the fiscal shocks produce positive correlations.

Can the different variance of the shocks be the explanation of the observed pattern of correlations in the data? To evaluate the

importance of this explanation, we must solve the problem of endogeneity. Nevertheless, without further assumptions, the problem cannot be solved. However, there is a proxy. We can compute the relative variances of expenditures and output, and compare them. Under the assumption that the absolute value of both coefficients is smaller than 1, then a higher ratio of volatility of fiscal shocks to productivity shocks should be accompanied by a larger ratio between the variances of expenditures to output.

I show this ratio in Figure 4. I computed the proportion between output volatility and expenditures volatility. The conjecture is that countries subject to larger productivity shocks will experience negative correlations between expenditures and output, while countries that experience primarily fiscal shocks will have positive correlations. As can be seen in Figure 4, developed economies have variance-of-output to variance-of-expenditure ratios that are much larger than those in developing countries.[3] This is in line with the conjecture that countries with negative correlation experience it because they are subject to a higher share of output shocks than are those that have positive correlations.

This is the ratio of the endogenous variables and not the ratio of the variances of the structural shocks. To answer the question fully, further analysis and the resolution of the simultaneous equations problem are required. One alternative is to find an instrument to estimate equation (1) properly. To be valid, however, this instrument has to be correlated with output but not with government expenditures. Few variables indeed satisfy these requirements. Two come to mind: terms of trade (TOT) and output of major trading partners.

Both variables are subject to critique. On the one hand, TOT might enter the expenditure equation directly, making it a bad instrument. The reason is that several countries in the sample are heavy commodity exporters, and a sizable proportion of the government revenues come from that sector. In those circumstances, an improvement in the TOT increases government revenues and likely will increase expenditures as well. TOT has been weakly correlated historically with output; hence, even if it does not enter the expenditure equation, it still suffers from the weak instruments problem. On the other hand, the output of major trading partners term has its own problems. First, the relationship between the output of trading partners and domestic output is unclear. It depends on the degree of substitubility of the exports and on the elasticity of exports to foreign demand. There is no reason why

Figure 4
Variance of output divided by variance of expenditures

these effects should be the same across countries; not even their signs should be the same. In the end, assuming that the model has constant coefficients will make the variable a weak instrument.

Galí and Perotti (2004) have studied the implications of using output from trading partners as an instrument. They indeed find that most of the differences in correlations are due to changes in the mixture of shocks and not to different coefficients. They study only European countries, and we expect them to be similar to start with; thus, their results cannot be extrapolated to the rest of the world. Nevertheless, they are suggestive.

In this section, I concentrate on the TOT. As I have already mentioned it is a weak instrument and therefore the results should be taken cautiously. Estimating equation (1) using the TOT as instrument and sorting the coefficients, we find that there is no pattern between the coefficients and the countries. Figure 5 presents the results. Notice that the developed countries (the light gray bars) are spread all over, and the pattern we found in previous exercises is lost.

This evidence suggests that the difference across the two groups—developing versus developed countries—is mainly in the relative variance of the shocks and not in the average coefficients. Indeed, the hypothesis that the average coefficients in the instrumental variables estimation are different across the two groups cannot be rejected.

3.2 *Latent Factors*

In the previous subsection, I concentrated entirely on the problem of simultaneous equations. However, this should be only a small part of the problem, assuming that only two types of shocks are hitting the economy: productivity and fiscal. In reality, expenditures and output are driven by a much more complex set of factors that can affect positive comovement. In this section, I explore a different model. I allow for several factors explaining output and expenditures. The model is as follows:

$$g_t = \sum_{i=1}^{n} \gamma_i z_{i,t} - \sum_{i=n+1}^{m} \gamma_i z_{i,t}$$

$$y_t = \sum_{i=1}^{n} z_{i,t} + \sum_{i=n+1}^{m} z_{i,t}$$

Figure 5
IV estimates using TOT

where all $\gamma > 0$ and it has been assumed that expenditure and output are driven by m different shocks. The first n creates positive comovement, and the later ones create a negative correlation. Notice that this model encompasses the simultaneous equation model discussed before. The questions we are interested are twofold: can we explain the different patterns of correlations across countries by appealing only to the heteroskedasticity of the shocks and keeping the coefficients constant among the two groups of countries? And if not, how different are the coefficients?

In order to answer these questions, we are forced to make strong assumptions. The model, as it is, is not identified. I will make the following assumptions: (1) four groups of countries (as in KRV) are ordered by their degree of development; (2) the countries in each of the groups share the same coefficients, but I allow the coefficients to be different across groups; (3) heteroskedasticity exists in the data; and (4) within each group, all latent factors affect positively or negatively the same coefficient.

The first two assumptions are relatively uncontroversial. The first one is the dimension we are interest in studying. The second one is implicitly assuming that we should concentrate on the average coefficient within each group. The third assumption is easily checked in the data and therefore we will do so. The fourth assumption, on the other hand, is perhaps the strongest one. It is indeed assuming that the model to be estimated is the following:

$$g_t = \tilde{\gamma}_1 \sum_{i=1}^{n} z_{i,t} - \tilde{\gamma}_2 \sum_{i=n+1}^{m} z_{i,t}$$

$$y_t = \sum_{i=1}^{n} z_{i,t} + \sum_{i=n+1}^{m} z_{i,t}$$

In other words, to be able to estimate this model, we have to summarize all the factors that create positive comovement within one single factor, as well as collapsing the factors that create negative comovement in a single factor. Therefore, the changes in the coefficients are part of the residuals of each of these equations. The model to be estimated is then:

$$g_t = \tilde{\gamma}_1 \sum_{i=1}^{n} z_{i,t} - \tilde{\gamma}_2 \sum_{i=n+1}^{m} z_{i,t} + e_{g,t}$$

$$y_t = \sum_{i=1}^{n} z_{i,t} + \sum_{i=n+1}^{m} z_{i,t}$$

$$\varepsilon_{g,t} = \sum_{i=1}^{n} (\gamma_i - \tilde{\gamma}_1) z_{i,t} - \sum_{i=n+1}^{m} (\gamma_i - \tilde{\gamma}_2) z_{i,t}$$

If we assume that $(\gamma_i - \tilde{\gamma}_1)$ and $(\gamma_i - \tilde{\gamma}_2)$ are orthogonal to the factors, then we can estimate the model using identification through heteroskedasticity.[4] The idea of the procedure is to use the heteroskedasticity in the data to generate enough equations to solve the problem of identification.

The idea is that we have to estimate:

$$q_t = \gamma_1 \varepsilon_t - \gamma_2 \eta_t$$

$$y_t = \varepsilon_t + \eta_t$$

where, ε_t and η_t are the factors in the previous equations. In this model, the only statistic we can compute from the sample is the covariance matrix of the observable variables. However, this covariance matrix is explained by four unknowns: γ_1, γ_2, and the variances of ε_t and η_t. This is the standard identification problem in simultaneous equations—there are fewer equations (moments in this case) than the number of unknowns. Algebraically, the covariance matrix of the reduced form is:

$$\Omega = \begin{bmatrix} \gamma_1^2 \sigma_\varepsilon^2 + \gamma_2^2 \sigma_\eta^2 & \gamma_1 \sigma_\varepsilon^2 - \gamma_2 \sigma_\eta^2 \\ & \sigma_\varepsilon^2 + \sigma_\eta^2 \end{bmatrix}$$

where the lefthand side can be estimated in the data, and in the right-hand side we have the theoretical moments. Assume that the data can be split in two sets according to the heteroskedasticity of the residuals, i.e., that the residuals in these two sets have different variances. Remember that in the original model, we have already stipulated that the coefficients are the same across all observations. In these two subsamples, we can estimate two variance-covariance matrices:

$$\Omega_1 = \begin{bmatrix} \gamma_1^2 \sigma_{\varepsilon,1}^2 + \gamma_2^2 \sigma_{\eta,1}^2 & \gamma_1 \sigma_{\varepsilon,1}^2 - \gamma_2 \sigma_{\eta,1}^2 \\ & \sigma_{\varepsilon,1}^2 + \sigma_{\eta,1}^2 \end{bmatrix}$$

$$\Omega_2 = \begin{bmatrix} \gamma_1^2 \sigma_{\varepsilon,2}^2 + \gamma_2^2 \sigma_{\eta,2}^2 & \gamma_1 \sigma_{\varepsilon,2}^2 - \gamma_2 \sigma_{\eta,2}^2 \\ & \sigma_{\varepsilon,2}^2 + \sigma_{\eta,2}^2 \end{bmatrix}$$

This implies that now six moments can be estimated in the sample, which are explained by six coefficients: the two parameters of interest and four variances. Notice that there are as many equations as there are unknowns. In the standard literature on system of equations, this means that the system satisfies the *order* conditions. To solve the problem fully then, we have to verify that the six equations are linearly independent—which is known as the *rank* condition. Under our assumptions, we know that both coefficients of interest are positive. Obviously, the estimation requires the existence of heteroskedasticity. The sufficient conditions are discussed in Sentana and Fiorentini (2001) and Rigobon (2003a).

The countries were divided in the four groups studied by KRV. The idea is to estimate the coefficient for each group and then compare the coefficients. One advantage of the methodology is that the coefficients *and*, but also the variances are estimated, and hence a comparison between the relative variances of the groups can be performed.

When the groups were split, group 1 did not exhibit enough heteroskedasticity to be estimated. Instead of pooling the countries into group 2—which clearly is a possibility—I decided just to drop the countries because this will make for a better comparison with the paper. The results from the estimation are as follows:

Groups		2	3	4
γ^1	Point	1.159	1.170	1.064
	Standard deviation	0.169	0.173	0.151
γ^2	Point	0.832	0.828	0.732
	Standard deviation	0.193	0.189	0.548

The first set of rows shows the coefficient for the factors that create positive comovement. The first row is the point estimate, and the second row is the standard deviation. As can be seen, for groups 2, 3, and 4, the point estimates are very well estimated (the t-stats are large for all of them), but the point estimates are close among the groups. Indeed, we cannot reject the hypothesis that they are the same. Group 4 (the developed economies) has a smaller coefficient, but the difference is not statistically significant.

The second set of rows estimates the coefficient on the factor that creates negative comovement. As before, the first row is the point

estimate, and the second row is the standard deviation. The estimates are also precise, although the coefficient on group 4 is not statistically significant. As in the case of the previous coefficient, it is impossible to reject the hypothesis that the coefficients are the same across groups.

This evidence should suggest that the reason for the different correlations in the sample is mainly due to changes in the relative importance of the shocks. Indeed, comparing the ratio of positive to negative shocks across the sample, we find that in group 4, the shocks that create positive comovement have a variance that is 2.08 times larger than negative comovement factors. However, groups 2 and 3 have a relative variance of 4.47 and 4.55, respectively, indicating that the sources of positive comovement are clearly more important in groups 2 and 3 than in developed countries.

Last, as a source of additional evidence that the relative variance is what explains the pattern of correlations observed in the data, let me compute the correlation in developed countries (only) using rolling windows of 10 years. These correlations are shown in Figure 6. As can be seen, the time-series variation of the correlations is as strong as the cross-country variation we have shown before. If we were to ask ourselves what explains the changing pattern of correlations in the time series, we would say that different variances are at stake. Indeed, this would be the first choice. And if this is the first choice for the time series, why have we neglected it as the first choice for the cross-section?

4. Conclusion

Clear evidence supports the strong procyclical behavior in fiscal and monetary policy in emerging markets. This is confirmed in KRV, and I can substantiate it with another 100 regressions. The purpose of KRV is to document these facts, and they have done a superb job. On the other hand, the purpose of this comment has been to indicate or guide toward possible explanations behind those facts. Are emerging markets more procyclical because their economies are subject to a different mixture of shocks, or because they react differently to them?

The preliminary evidence in this paper (which coincides with Galí and Perotti, 2004) is that the most important source of the differences is in the variances and not the coefficients. Obviously, in the process I have made a lot of sometimes unreasonable assumptions. Future research should be devoted to study these aspects further.

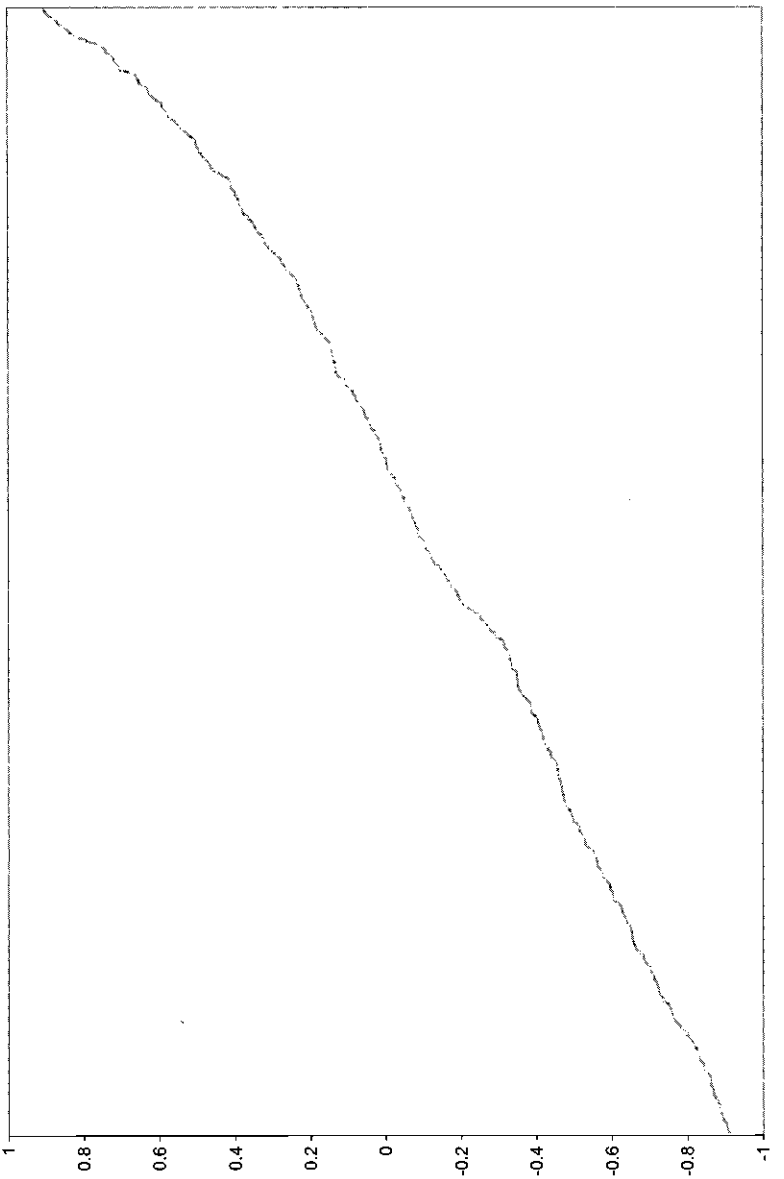

Figure 6
Rolling correlation on developed countries

Notes

1. Indeed, Section 4 in the paper now has adopted this procedure to highlight the patterns in the data.

2. There are some notable exceptions, such as Galí and Perotti (2004), which indeed make this exact same point within the procyclical policies of European countries.

3. Indeed, Galí and Perotti (2004) make a similar point for the case of European countries.

4. For the theoretical derivations, see Rigobon (2003a), Sentana (1992), and Sentana and Fiorentini (2001). Applications where the heteroskedasticity is modeled as a GARCH process are found in Caporale et al. (2002a), Rigobon (2002b), Rigobon and Sack (2003b). Applications where the heteroskedasticity is described by regimes shifts are found in Rigobon (2002a, 2003b), Rigobon and Sack (2003a), and Caporale et al. (2002b). Applications to event study estimation are developed by Rigobon and Sack (2002) and Evans and Lyons (2003). Finally, several application to panel data can be found in the literature. Hogan and Rigobon (2002) apply the method to a very large panel data to estimate the returns to education. Rigobon and Rodrik (2004) study instead the impact of institution on income, and how the different types of institutions are affected by income levels and the degree of openness of the country. Klein and Vella (2003) also use heteroskedasticity to estimate the returns to education. Broda and Weinstein (2003) use the inequality constraints, together with the heteroskedasticity, to estimate the elasticities of substitution in models of trade to evaluate the gains from variety. Pattillo, Poirson, and Ricci (2003) use the identification through heteroskedasicity method to identify the impact of external debt on growth. Hviding, Nowak, and Ricci (2003) investigate the impact of official reserves on exchange-rate volatility. Lee, Ricci, and Rigobon (2004) estimate the impact of openness on growth.

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Discussion

Several of the participants commented on Roberto Rigobon's point regarding the distinction between the endogenous and exogenous components of fiscal policy. Jordi Galí pointed out that one instrument that had proven useful in estimating these fiscal policy rules was the gross domestic product (GDP) of a large trading partner because it is not correlated to domestic fiscal shocks and there is some common component in the cycle. Galí remarked that in a recent paper he co-authored with Roberto Perotti, the use of this instrument showed that most of the acyclical or procyclical behavior responded to the exogenous component, while the endogenous component was largely countercyclical. Alan Stockman added that it was important to look at the GDP of a country in relation to the GDP of the world and of its trading partners rather than at the GDP alone. Michael Woodford said that if one looked at permanent innovation in real GDP and assumed that exogenous changes responded necessarily to something other than monetary or fiscal policy, one could determine to what extent the correlation was in fact due to endogenous responses of monetary or fiscal policy to the level of real activity. He believed that by using this instrument, one could conclude that developing countries had a procyclical policy.

Mark Gertler also agreed with Rigobon that it was important to distinguish between impulse and propagation, but he expressed reservations in considering that big fiscal adjustments were purely exogenous. He believed that important fiscal adjustments did not take place for reasons completely unrelated to what was happening in the economy, and he said that it would be interesting to consider the institutions of these countries. As an example, he cited the exchange regime and the importance of distinguishing between fixed and floating

regimes to analyze policy responses. If a country were on a fixed regime, it would not be able to use monetary policy and this might be one factor leading to a big fiscal adjustment.

The participants also commented on the differences between the policies of developed and developing countries. David Backus disagreed with the suggestion that there was a need to look at the recent period as different from the 1970s, and rather we could look as far back as the data could go to show that developed countries in the nineteenth century had more volatility in output and much more countercyclical net exports. He suggested analyzing the fiscal policy behavior of these countries then and looking for similarities with developing countries today. Harald Uhlig suggested looking at the different roles of government in OECD countries and emerging market economies. While Rigobon's argument could lead to the conclusion that governments used fiscal policy as a stabilizer—in other words, that a government spent more on unemployment during a recession, for example—governments in emerging market economies had to spend on building infrastructure such as roads, telephone systems, new buildings, etc.

Fabrizio Perri suggested that in counties such as Argentina, procyclical fiscal policies might respond to the fact that these countries needed to attract capital flows. During a financial crisis, these flows dry out, and countries cut government expenditures because it is the only way to attract capital. The fact that they had limited access to capital markets might be part of the driving force of fiscal reactions to cyclical variations.

In response to the comments, Carmen Reinhart welcomed the suggestion of a break in the recent period as very useful and acknowledged that although the authors were constrained in their data, they were aware of the differences before and after financial liberalization periods. She said that they were very confident that the only thing that came close to identifying a more structured approach was their estimation of the Taylor rules. She recognized that they were aware that on the fiscal side, they had only come to establish a set of correlations and did not really address what types of shocks were driving these correlations. She disagreed with Rigobon on the need to look for a three-way relationship that included capital flows when trying to identify the shocks. She argued that they did not consider capital flows to be exogenous. In the paper, it was explained how capital flows could be

driven by exogenous shocks and affected by factors such as exchange rates, among others.

Reinhart acknowledged that finding an appropriate instrument was a major challenge. She also explained that at this stage, they did not intend to estimate policy feedback rules, which she believed was the next step, but rather to establish the striking differences.