

Capital Flows and Balance of Payments

Pressures—Tailoring Policy Responses*

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Abstract

Although capital inflows are generally beneficial to recipient countries, they also pose significant challenges to the conduct of economic policy. This paper proposes a conceptual taxonomy to guide the design of policy responses in the face of capital flows. We explore how responses to capital surges should be differentiated based on the source of balance of payments pressures, and empirically examine whether policy reactions of countries conform to this taxonomy while underscoring the importance of country-specific factors, such as balance sheet effects and cyclical positions. For the most part, we find correspondence between the proposed taxonomy and observed policy choices, especially in more recent years.

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I. INTRODUCTION

1. While capital inflows are beneficial to recipient countries, they can impose significant challenges for the conduct of economic policy. Indeed, it is not uncommon for the high investment-high growth that follows a surge in capital inflows—through their effect at reducing interest rates and relaxing financing constraints—to be accompanied by deteriorations in the external accounts and upward pressures on goods and assets prices. This overheating strains the balance between the *benefits* of inflows in terms of higher investment and growth and the *risks* they imply for macroeconomic stability. Moreover, even when a country's policy response is sound, capital inflows might increase the vulnerability to a sudden change in market sentiment and the reversal of capital flows. Further complicating matters, policymakers need to stay abreast with competing policy objectives and financial innovations that affect the effectiveness of the policy toolkit at their disposal.
2. Such challenges are of particular importance during periods of growing global liquidity—as the one experienced from early 2003 until mid-2007.¹ The period preceding the recent financial instability was characterized not only by abundant global liquidity, but also by the emergence of current account surpluses that have resulted in positive balance of payments pressures in many (though clearly not all) emerging market economies (EMEs).
3. Indeed, recognizing the importance of policy responses to capital flows, the International Monetary and Finance Committee has called for work on the Fund's policy advice to emerging market economies in the design of policy responses in the face of large

¹ Periods of high global liquidity are identified based on the indicators discussed in the *World Economic Outlook* (April 2007).

capital inflows (*IMFC Communiqué*, October 2007). The IMF's Executive Board has also called for additional research to provide guidance on policy choices.²

4. Among recent studies of capital flows, the October 2007 *WEO* examines the macroeconomic impacts of different policy measures based on a large sample of developing, emerging markets, and advanced economies during surges in capital flows. It concludes that allowing the nominal exchange rate to appreciate and exercising fiscal restraints during periods of large inflows can help limit real currency appreciation and foster better growth outcomes in the aftermath of such episodes. Likewise, the October 2007 *GFSR* looked at the relationship between capital flows, market depth, and liquidity.

5. This paper builds on the insights of the recent *WEO* and *GFSR* chapters to consider how the specific circumstances facing the country help refine the general policy prescriptions. A first question is of course whether the capital inflows or balance of payments (BOP) pressures (i.e., a tendency for the nominal exchange rate to appreciate or reserves to accumulate) indeed present a policy problem. This, in turn, depends upon a number of factors of which two are worth noting. First, is the country's external indebtedness or net foreign asset position evolving sustainably and is the financial system in sound condition? For instance, for many capital-poor developing and emerging market countries, it may be desirable to receive capital inflows as long as debt sustainability and financial soundness are maintained; conversely, a country may wish to build up savings abroad because its population is aging or because its exports are based on nonrenewable resources. Second, what is the cyclical position of the economy and, in particular, are there inflationary pressures amidst a growing risk of asset price bubbles?

² The Chair's Concluding Remarks on "Globalization, Financial Markets, and Fiscal Policy" (BUFF/08/23).

6. These are not, however, the only factors to take into account in designing policy responses. For instance, the nature of capital flows—official versus private; FDI versus portfolio flows; fixed income versus equity—and their duration—persistent or temporary (e.g., they might correspond to a privatization program of state-owned assets)—are also key aspects of assessing the appropriate policy response to capital flows. In addition, the structure of domestic balance sheets—e.g., are currency or maturity mismatches being exacerbated by capital flows and what is the adequacy of a country’s foreign exchange reserves—are also pertinent to tailoring policy responses appropriately. This is also the case for other institutional factors, such as financial market depth and the exchange rate regime.

7. Against this background, this paper proposes a conceptual taxonomy that can guide policy responses, while recognizing that specific recommendations must take account of country-specific factors. It bears emphasizing that the taxonomy helps nuance the general policy recommendation—not overturn them. Thus, ultimately, in the face of sustained positive balance of payments pressures, countries may have to allow nominal and real exchange rate appreciation. Likewise, they would be well advised to tighten fiscal policies and reduce public debt during these periods of high capital inflows if only to have the scope for fiscal expansion during outflows. Nevertheless, the extent and urgency with which to implement these general recommendations may depend on the country’s position in the taxonomy. Against this background, the paper attempts to answer three questions:

- How should the policy response to capital surges be differentiated based on the BOP pressure position as well as the source of these pressures?
- Do countries respond to inflows as the taxonomy would suggest, controlling for differences in balance sheets, cyclical positions, and institutional factors?

- Finally, how do macroeconomic outcomes—as measured by the real exchange rate—relate to the policy responses described by the taxonomy?

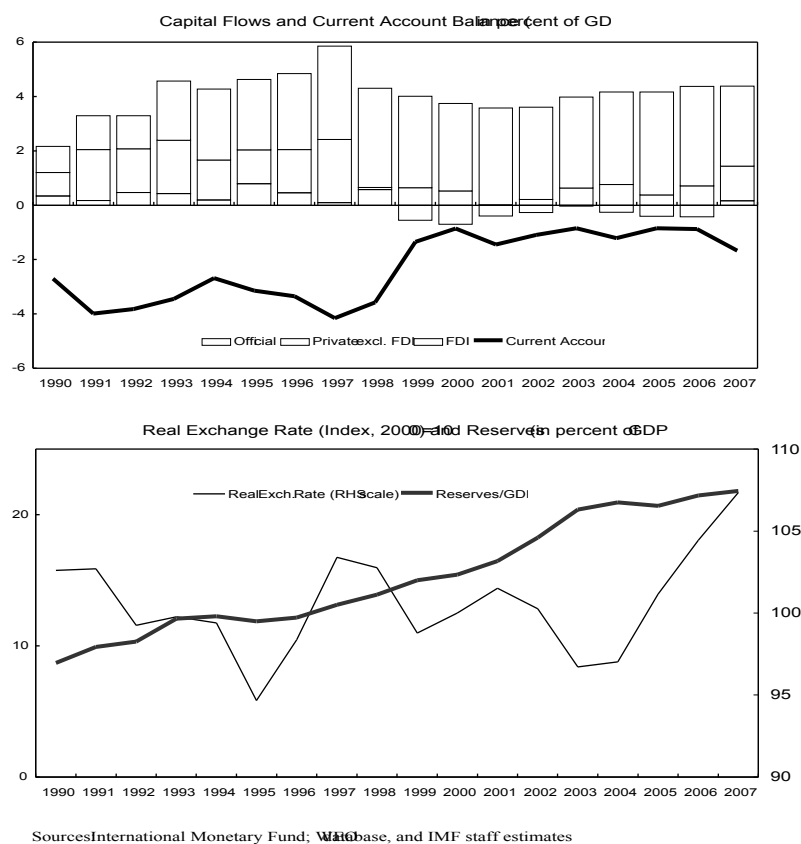
8. The remainder of this paper is organized as follows. Section II discusses some stylized facts on recent capital flows to EMEs. Section III presents a conceptual taxonomy based on the differences in the nature and source of BOP pressures and discusses the appropriate policy responses for each category. Section IV first examines whether observed policy responses are consistent with the taxonomy's predictions after controlling for country-specific factors. It then examines how these policy responses are related to the macroeconomic outcomes in these countries. Section V concludes.

II. RECENT CAPITAL FLOWS IN EMERGING MARKET ECONOMIES—STYLIZED FACTS

9. Over the past couple of decades, capital flows to emerging markets have followed several cycles, with a generally rising trend until end-2007 (Figure 1).³ As discussed in the October 2007 *WEO* chapter, there have been two episodes of large inflows in the past couple of decades. The first began in the early 1990s and peaked prior to the 1997 East Asian financial crisis. The second episode has been building up since 2002; e.g., during 2004–06, annual net capital inflows to emerging economies averaged more than 4 percent of GDP.

³ The discussion is based on simple averages for a sample of 50 emerging market countries; see Appendix I for the list of market access EMEs used in this paper.

Figure 1. Selected Emerging Market Countries: Balance of Payments Developments



10. The recent surge of capital to EMEs that began in late 2002 differs from previous ones in at least three respects. First, in many countries, they are occurring against a backdrop of current account surpluses. Second, private capital is playing a more dominant role. Third, FDI accounts for a greater share of total flows. More generally, the macroeconomic situation in most recipient EMEs is stronger—public sector deficits are smaller, exchange rate regimes are more flexible, inflation is lower, and foreign exchange reserves are larger (Figure 2).⁴

11. Regional differences are also noticeable, with the largest increases in reserves being in the Middle East (8 percent of GDP), followed by Asia (4 percent of GDP), Central and South America (2 percent of GDP) and Europe (1 percent of GDP). The real exchange rate

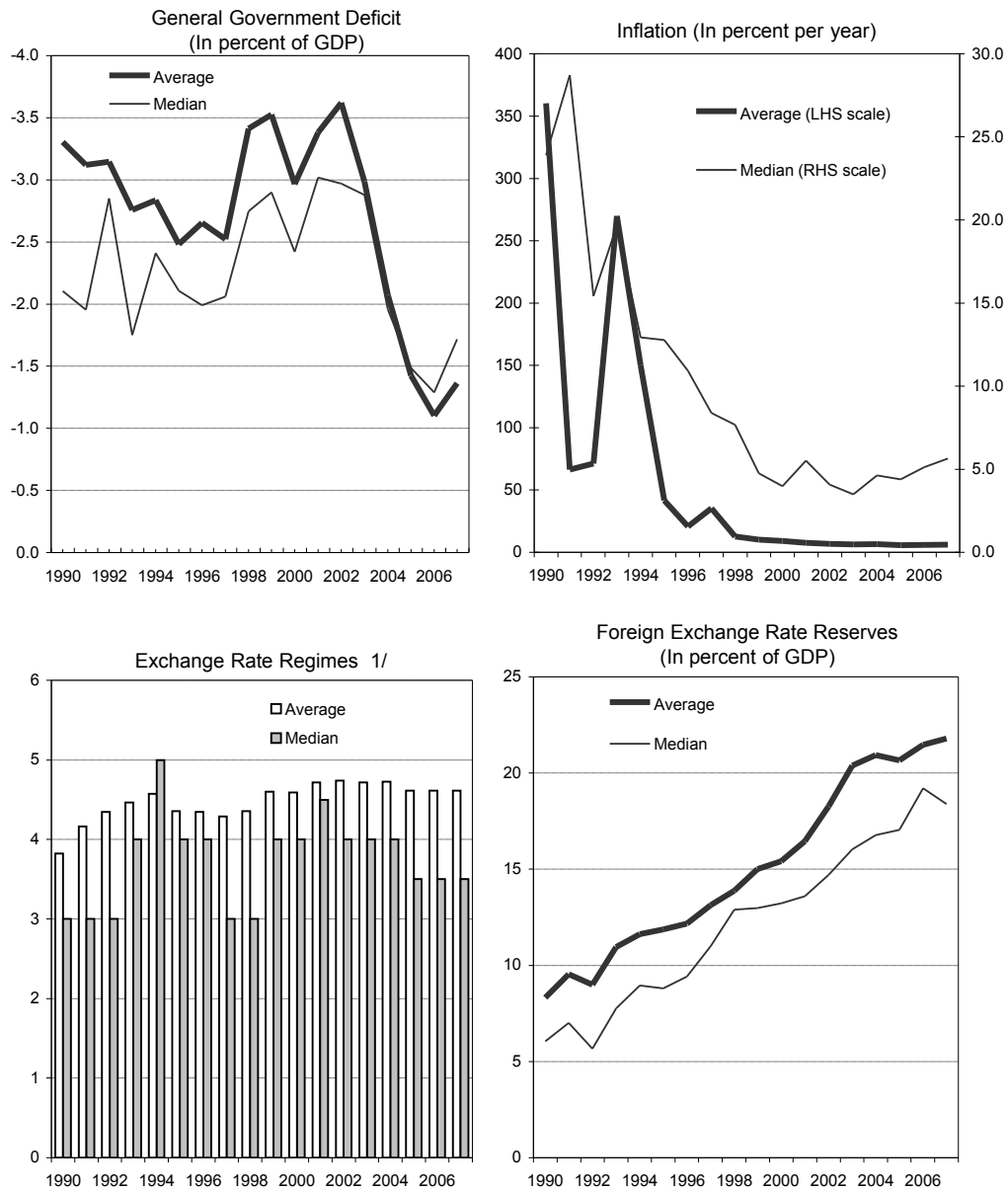
⁴ See *World Economic Outlook* (October 2007) for more details.

appreciation has been the smallest in the Middle East (almost zero),⁵ followed by Asia and the Central and South American countries (7 percent), and Europe (12 percent). Moreover, while all regions experienced real exchange rate appreciations, in Asia, the Middle East, and Central and South American countries this took the form of higher inflation against a depreciation of the nominal effective exchange rate (1–3 percent per year). In Europe, by contrast, reserve accumulation has been slow, nominal exchange rates have appreciated and, correspondingly, inflation differentials have been small.

12. Breaking down the sample of EMEs by region also suggests differences in terms of the characteristics of capital flows (of course, these averages still mask important differences across countries). In Asia, the 1997–98 financial crisis marked a sharp turning point from the current account: from deficits of about 3 percent of GDP to surpluses of the same magnitude (Figure 3). With the exception of FDI, private capital flows have been negative, as have official flows with the repayment of official financing provided during the crisis. European countries, by contrast, have large and growing current account deficits. These deficits were financed by FDI until 2001; since then, non-FDI flows have grown in importance and now account for about one-half of the total external financing. In the Western Hemisphere and Middle Eastern countries, current account balances have improved—though, on average, they remain in deficit—and most capital inflows have taken the form of FDI.

⁵ It is worth noting that the sample of Middle East countries excludes most oil producers; see Appendix I.

Figure 2. Macroeconomic Developments, 1990–2007



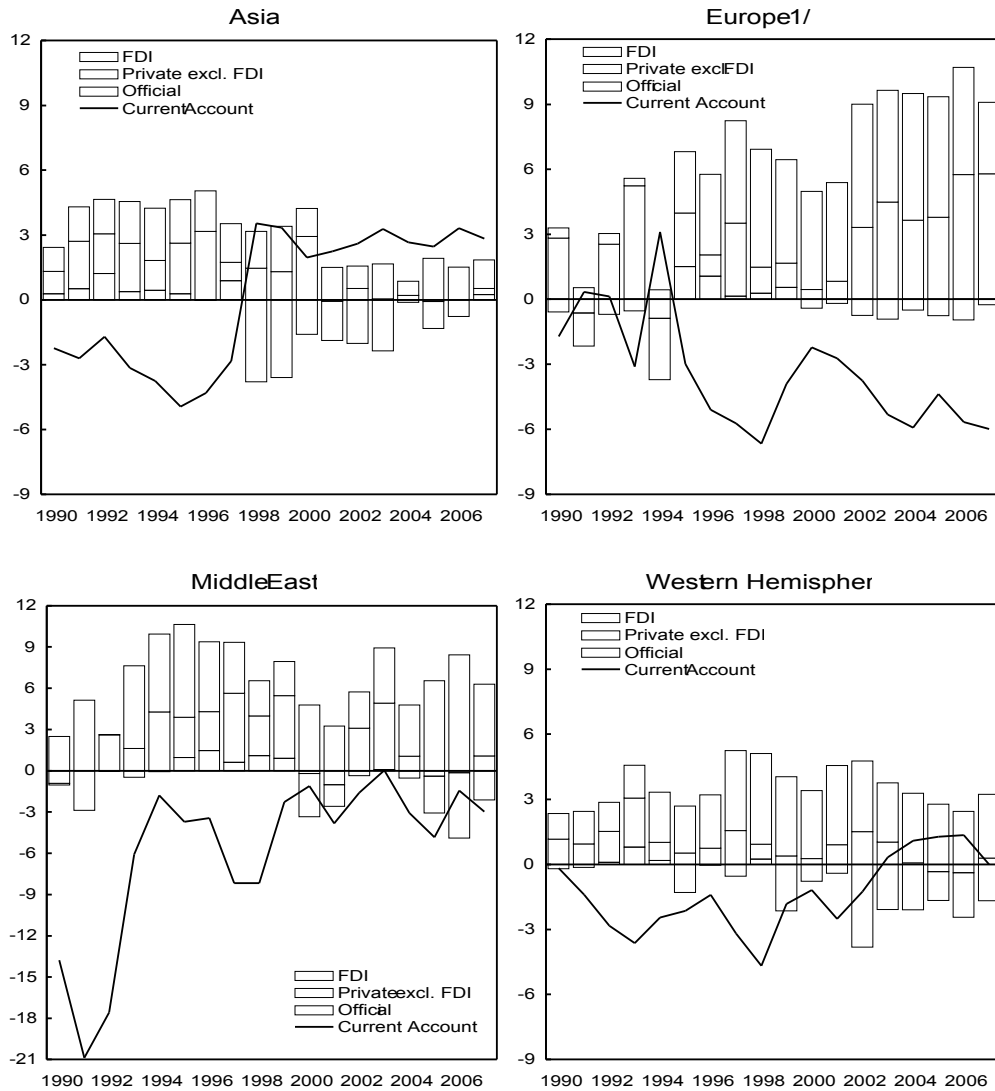
Source: International Monetary Fund; WEO database, AREAER, and IMF staff estimates.

1/ A 1 represents a fixed exchange rate and an 8 is a freely floating regime; AREAER classification.

13. The consequence of this surge of capital flows is positive balance of payments pressures on the economy. On average, CPI-based real exchange rates have appreciated by 4 percent over the period 2002–06, and reserves have increased from about 18 percent of GDP at end-2002 to 21½ percent of GDP by end-2006. While economic activity has

remained above potential in many EMEs, inflationary pressures were subdued for much of the decade, though this has gradually changed owing to the pick up in commodity prices.

Figure 3. Regional Capital Flows in Emerging Market Countries (In percent of GDP)



Sources: International Monetary Fund database, and IMF staff estimates

1/ Turkey only until 1994. Includes transition economies from 1995 onwards.

III. CAPITAL FLOWS AND BALANCE OF PAYMENTS PRESSURES—A TAXONOMY

14. The above discussion suggests some important differences in the nature and source of balance of payments pressures. This section presents a simple conceptual taxonomy to

highlight these differences and their implications for a country's policy response. Before doing so, however, it bears emphasizing that the appropriate policy response should also depend on factors not explicitly included in the taxonomy. Indeed, country experiences should not necessarily be thought of belonging definitively to one category versus another; rather, it is a matter of the degree that depends on country-specific factors such as balance sheet variables, cyclical position, and financial and institutional characteristics.

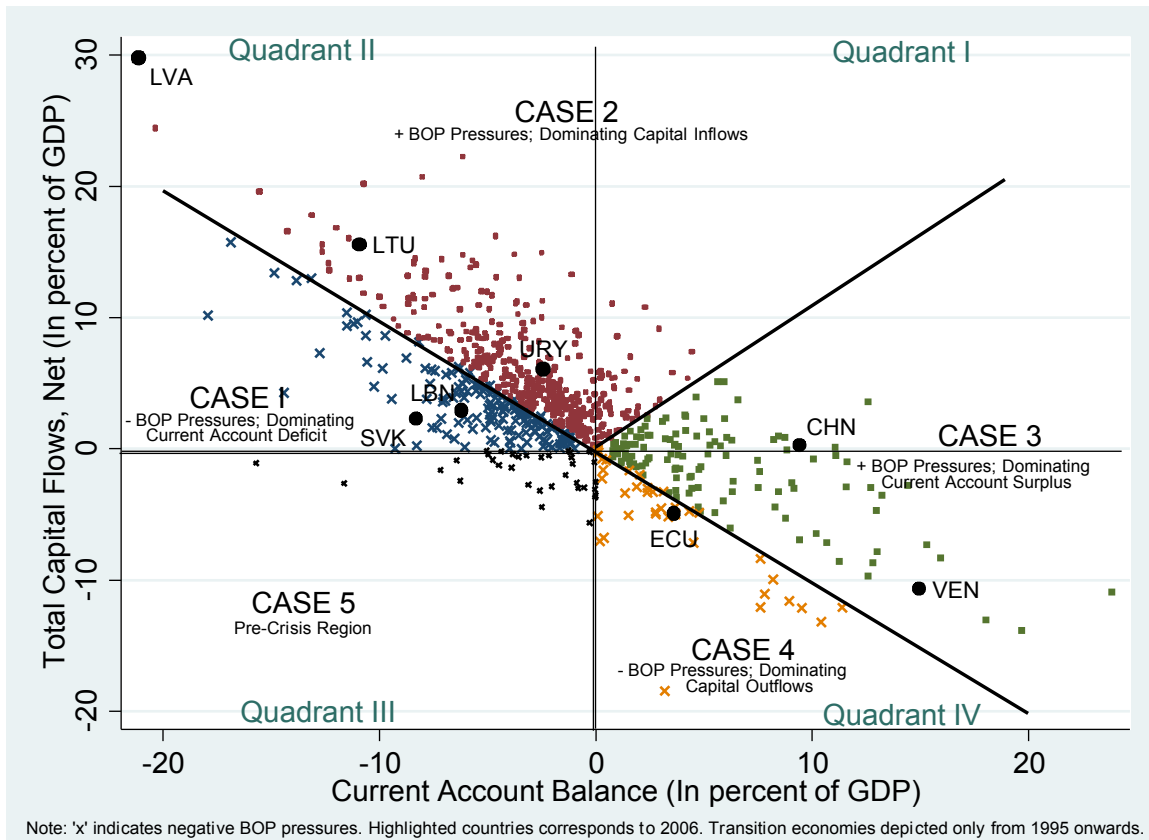
15. The analysis begins by noting that, while many EMEs face positive BOP pressures, the appropriate policy response depends on the source of these pressures. To develop a taxonomy of cases, it is useful to consider a two-dimensional representation of net capital flows (vertical axis)—where capital flows excludes transactions in reserves—and current account balances (horizontal axis), which can be segmented into five cases:

- **Case 1. Capital Inflows Responding to Current Account Financing Needs (Quadrant II below the 45 degree line).** Capital flows are helping to finance the country's current account deficit. Although the net BOP pressure (defined as net total capital flows plus the current account balance) is negative, the dependency on capital flows might raise concerns about debt sustainability and the country's exposure to the risk of sudden stops (particularly if these are non-FDI flows). The premise is that capital flows are *responding* to the country's demand for external savings. Thus, if there are concerns about capital inflows, economic policies should a priori be geared to reducing the current account imbalance and cooling the economy.
- **Case 2. Capital Inflows in Search of Yield (Quadrant I and II above the respective 45 degree lines).** In contrast to Case 1, here the "tail wags the dog"—rather than

responding to the country's current account financing needs, net total capital flows are assumed to be determined mainly by supply-side factors (namely, abundant liquidity in search of yield). If the country has a current account deficit, then net total capital flows would substantially exceed this deficit. In contrast, if the current account is in surplus, it would still be the case that the BOP pressures are dominated by the magnitude of total capital inflows. Either way, such inflows are complicating macroeconomic management and policies would need to be geared toward selectively reducing these capital inflows and even encouraging outflows.

- **Case 3. BOP Pressures from Current Account Surplus (Quadrant I below 45 degree line and Quadrant IV with positive BOP pressures).** In this case, capital inflows are assumed to be less important than the registered current account surpluses; in fact, these surpluses could be accompanied by small capital outflows and still represent positive BOP pressures. If the current account surplus is considered excessive (for instance, in terms of the evolution of the country's NFA position), then policies should seek to narrow it. By contrast, if the current account surplus is considered appropriate (for instance, from an intertemporal perspective), then policies to encourage capital outflows (e.g., liberalizing controls on outflows) might be useful.
- **Case 4. Current Account Surplus Offset by Outflows (Quadrant IV below 45 degree line).** Outflows offset the current account surplus—negative BOP pressures.
- **Case 5. Pre-Crisis and Crisis Region (Quadrant III).** Reflects the large capital outflows and current account imbalances that could reflect a capital account crisis.

Figure 4. Taxonomy based on Total Capital Flows and Current Account Balances
(In percent of GDP; annual data 1989–2007)



16. The above flows-based conceptual taxonomy provides **definitions** of different circumstances under which a country might be facing capital inflows (or outflows) and/or balance of payments pressures. Whether—or to what extent—a country fits into any single case will be a matter of judgment that depends on a country's own circumstances, including the balance sheet and cyclical position of the economy. In fact, capital flows in a Case 2 country are not only financing and responding to the country's current account deficit but also helping to fuel that deficit by causing a consumption boom and overheating the economy (as happened in East Asia prior to the 1997–98 crisis); thus, the country could be considered to be closer to a Case 1 and the policy response would change accordingly. In

sum, the classification in Figure 4 is an **illustration** of how countries' circumstances can be mapped to the taxonomy based on total capital flows and current account balances.

17. Despite its simplicity (and limitations), a classification based on *flows* alone is quite revealing. For instance, according to Figure 4, Lebanon and Slovakia would be classified as Case 1 countries in 2006 (*capital inflows responding to financing needs*)—if the volume of capital inflows is of concern because of rising vulnerabilities, then the priority should be to tackle the current account deficits. By contrast, some East Asian countries—such as China—are Case 3 countries in 2006: *current account surplus-driven BOP pressures*. Latin American countries like Uruguay would be classified as Case 2 (*inflows in search of yield*) during 2006, but others (Argentina, not shown) would be classified as Case 3. Overall, the classification according to capital flows and current account balances can be refined to estimate the degree to which a country in any given year should be categorized as one case or another by using the distance from the central definition of each case—more precisely, how far an observation might be from a neighboring case. For example, Venezuela is probably a combination of Case 3 and Case 4. (Table 1 presents descriptive statistics for each case.)

Table 1. Descriptive Statistics, 1989–2007 (In percent of GDP)

	1989-2007			1999-2007		
	Current account balance	Total capital flows	BOP pressures	Current account balance	Total capital flows	BOP pressures
	Case 1			Case 1		
Number of observations	181	181	181	81	81	81
Mean	-6.8	3.9	-2.9	-5.5	3.8	-1.8
Standard deviation	7.5	4.1	6.4	4.0	3.1	2.2
	Case 2			Case 2		
Number of observations	447	447	447	223	223	223
Mean	-3.7	7.0	3.3	-4.1	7.7	3.5
Standard deviation	4.3	5.7	3.6	5.3	6.1	3.2
	Case 3			Case 3		
Number of observations	158	158	158	112	112	112
Mean	6.3	-1.8	4.5	7.0	-2.1	4.9
Standard deviation	5.3	4.2	3.4	5.7	4.6	3.5
	Case 4			Case 4		
Number of observations	38	38	38	20	20	20
Mean	3.6	-5.8	-2.1	5.1	-7.3	-2.2
Standard deviation	3.2	4.2	2.8	3.5	5.0	3.3
	Case 5			Case 5		
Number of observations	36	36	36	14	14	14
Mean	-3.1	-1.7	-4.8	-1.6	-1.8	-3.3
Standard deviation	3.4	1.4	3.4	1.5	1.7	1.7

Source: IMF, *World Economic Outlook* and staff calculations.

18. Before getting into the details of each policy response, however, two caveats should be noted. First, although each policy option is discussed separately, the policy response to capital flows should really be considered as a *package* of measures, including the mix of various policy instruments and the structure of inflows. Second, the discussion of policy responses below is based on an analysis of flows and, thus, as previously noted, it does not account for how the policy options might be affected by other factors, such as balance sheet positions, state of financial markets and the evolving nature of financial instruments, and a host of other macroeconomic variables (including a country's existing policies and cyclical position).

A. Combinations of Policy Responses

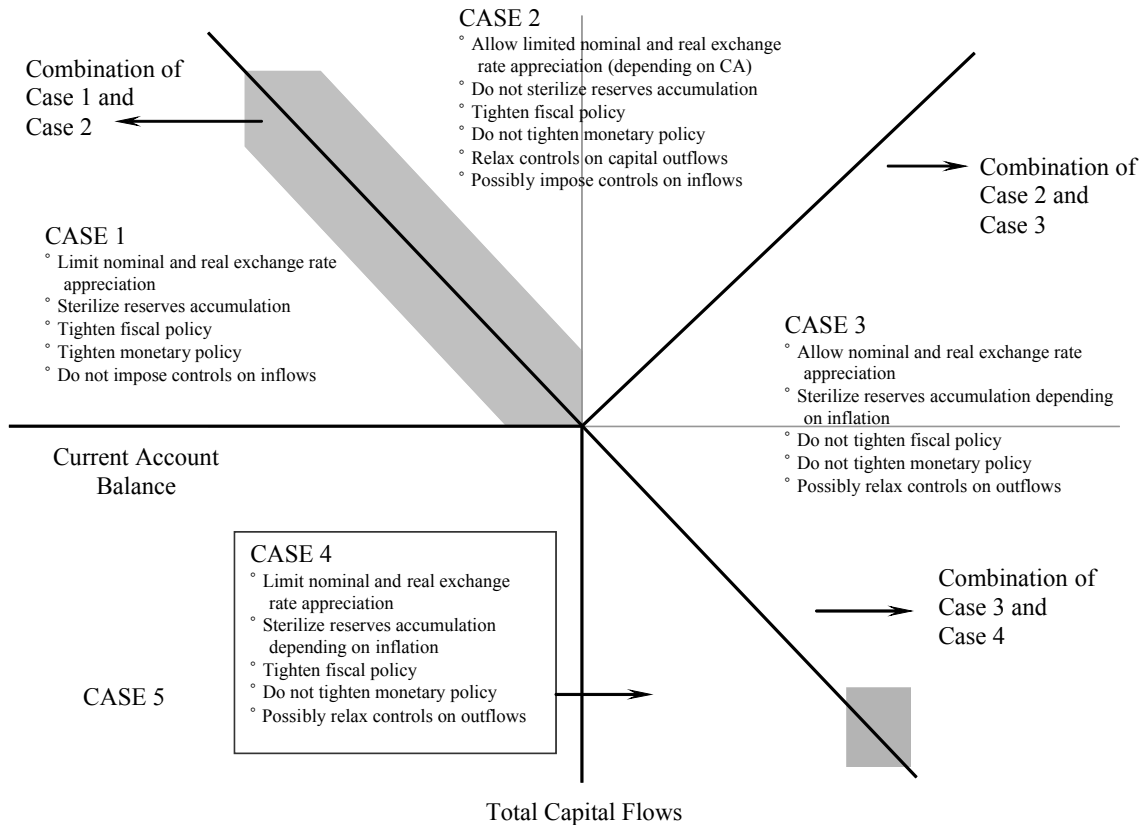
19. Figure 5 summarizes the available policy choices for each case, subject of course to the caveats previously discussed (Case 5, which relates to pre-crisis and crisis episodes, is not discussed). It should be noted that the exposition does not discuss what could be characterized as *unorthodox* policy responses; e.g., the possible role of specific tax policies not only in tightening fiscal policy, but also in terms of their effect on resource allocation.⁶

Exchange Rate Flexibility

20. Faced by positive balance of payments pressures, the first decision is whether to accumulate foreign exchange reserves, thereby resisting a nominal (and perhaps real) exchange rate appreciation, or to allow the exchange rate to absorb the BOP pressures. Although the *prospect* of an appreciation is likely to encourage further capital inflows, a sufficiently large appreciation will make investment more expensive, lowering the yield and the attractiveness of the investment. An appreciation, however, could be damaging to exports.

⁶ The less traditional (or unorthodox) policy responses refer, primarily, to tax policy measures; these are not formally part of the taxonomy in this paper (Heller, 1997). The orthodox response is to tighten fiscal policy when there are large capital inflows to prevent the economy from overheating, but this is less helpful in lowering the volatility of capital flows or affecting the composition of these flows. Some tax measures have been proposed that could be useful to reduce the volatility. There may be other somewhat unorthodox tax measures for consideration that could target certain types of capital flows—as opposed to targeting all capital inflows—and that could have negative externalities (for example, real estate investment). The merits of such specific tax measures are two-fold: targeting overheating in a specific economic activity and reducing broader speculative activity and volatility. The demerits, however, are also two-fold: they might lead to distortions in resource allocation, and they act as the equivalent of capital controls, with the usual attendant costs.

Figure 5. Policy Responses—Flow Approach



21. In this context, allowing the nominal exchange rate to appreciate would therefore be most appropriate for countries with positive current account balances, such is the case in Case 3.⁷ Conversely, in Case 1, an exchange rate appreciation would worsen the current account balance and, inasmuch as capital flows are responding to the current account deficit, result in greater inflows. Case 2 is more ambiguous since it encompasses both current account surpluses and deficits—and, in contrast to Case 3, the BOP pressures are assumed not to come from the current account surplus; as such, there may be greater reluctance to allow exchange rate appreciation. On the other hand, since capital flows in Case 2 are assumed to be responding to supply-side factors, they may be especially sensitive to the

⁷ In Case 3 countries, if exports are mainly of nonrenewable resources and there are hysteresis effects of an appreciation on nontraditional exports, then it is likely that the authorities might seek to limit appreciation.

prospect of an exchange rate appreciation. Thus, once such expectations are entrenched, allowing the exchange rate to appreciate may be unavoidable.

22. Comparing the various cases, therefore, countries in Case 3 should—*ceteris paribus*—allow greater nominal exchange rate appreciation (rather than reserves accumulation) than countries in Case 1 and Case 2; Case 4 would limit appreciation. To what extent should they do so? The decision to allow the nominal exchange rate to appreciate will depend on a variety of other factors, including the exchange rate regime, the level of central bank's reserves and its ability to sterilize the monetary impact of reserve accumulation, the cyclical position of the economy, and the response to other policy instruments. The combination of these factors are examined in the empirical section.

Monetary and Sterilization Policy

23. Given the accumulation of foreign exchange reserves, a further decision is whether or not to sterilize its monetary impact. Central banks sometimes try to offset BOP pressures through sterilized intervention, although most studies find that such intervention has little impact on the nominal exchange rate, let alone the real exchange rate. In terms of the conceptual taxonomy, sterilizing foreign exchange purchases may be particularly unsuitable for countries in Case 2 because, in this case, capital flows are assumed to be driven mainly by supply-side factors, including a search for yield. In fact, sterilization of capital inflows, by perpetuating higher interest rates, is likely to foster continued capital inflows.

24. More generally, how should monetary policy respond in each case to BOP pressures? To be sure, inflationary factors and the cyclical position of the economy would be at the fore of any central banks' policy reaction function. That aside, in Case 1, tightening may be

required as this will dampen economic activity, narrow the current account deficit and hence capital flows. In Case 2, by contrast, monetary policy is more likely to be loosened since a tighter stance—by raising interest rates—is likely to attract even larger capital inflows. Monetary policy should also be loosened in Case 3 and Case 4—to reduce the current account surplus by stimulating activity and to encourage capital outflows by lowering interest rates—both of which should help relieve the BOP pressures; this also depends on inflationary expectations that have been low in recent years but that have recently picked up. Of course, non-flow country-specific characteristics also need to be taken into account. For instance, a country with large current account deficits financed by large inflows might have accumulated liabilities to a degree that warrant a classification nuanced by its Case 1 features. Also, as noted previously, the policy response needs to account for inflationary expectations.

Fiscal Policy

25. Another major policy instrument for dealing with balance of payments pressures is fiscal policy. The taxonomy suggests that countries in Case 1 should tighten fiscal policy to help correct the current account deficit (and, thus, the need for external financing) followed by Case 2 countries (where fiscal tightening would lower interest rates, reducing capital inflows—unless perceptions of a more “prudent” fiscal policy leads to a larger decline in the risk premium demanded by investors).⁸ Case 3 countries would have the least need to tighten (and could even loosen) fiscal policy, followed by Case 4 (where part of the current account

⁸ Schadler et al. (1993) argue that fiscal consolidation was an important factor attracting capital flows to developing and emerging market countries in the late 1980s and early 1990s.

surplus is already offset by net capital outflows). In practice, however, few countries in the end implement such fiscal policy restraint when global liquidity is high.⁹

Prudential Measures and Controls

26. A discussion of policy responses would clearly be incomplete without a discussion of prudential measures and controls. While prudential measures seek to regulate risk taking by financial institutions and are typically intended to improve the long-term soundness of the banking system, in some cases they take the form of controls that restrict international capital movements by discriminating between international and domestic capital transactions.¹⁰ To achieve success with prudential rules, the authorities should have the capacity not only to set the rules but also to enforce them. As financial innovations take hold in EMEs, greater monitoring of these innovations and capital surges are required by supervisors and regulators.

27. Could controls on inflows (or removing controls on outflows) be useful? For Case 1 countries, neither imposing controls on inflows nor removing controls on outflows makes much sense without first tackling the current account deficit.¹¹ For Case 3 and Case 4, the balance of payments pressures do not come from net capital inflows, but removing or relaxing controls on capital outflows could help relieve some of the balance of payments

⁹ A recent *World Economic Outlook* chapter on capital inflows (October 2007) shows that fiscal restraint works well as a policy response to large inflows. Schadler et al. (1993) show that while fiscal restraint was advisable to prevent overheating and appreciation, but only one country (Thailand) out of the six in their study did so.

¹⁰ Prudential frameworks typically prescribe minimum standards, both quantitative and qualitative, covering capital adequacy, asset concentration, risk management, liquidity and internal controls, and take the form of laws, regulations, and officially sanctioned policies or procedures designed to protect the financial system.

¹¹ In some cases, the capital inflow is fueling the current account deficit—making the country more of a “blend” between Cases 1 and 2 in the taxonomy above—in which case, reducing the availability of foreign savings (by imposing controls) or tightening prudential regulations on bank lending (if this is the source of external finance) could play a useful role.

pressures. It is thus for Case 2 countries that imposing controls on inflows could be useful—although experience to date suggests their effectiveness is limited and their administrative and economic costs potentially large. Two of the countries that have experimented in recent years with controls on capital inflows; Thailand (Case 2) and Colombia (Case 1) are worth mentioning, though there are several other countries in the same category who have not imposed capital controls. Also, whether controls would be appropriate depends, *inter alia*, on the vulnerability of domestic balance sheets due to existing maturity and currency mismatches, the nature of the capital flows, and the scope for monetary and fiscal policy responses—as well as the exact form of the proposed capital control.

B. Illustrations of More Complex Policy Decision Trees

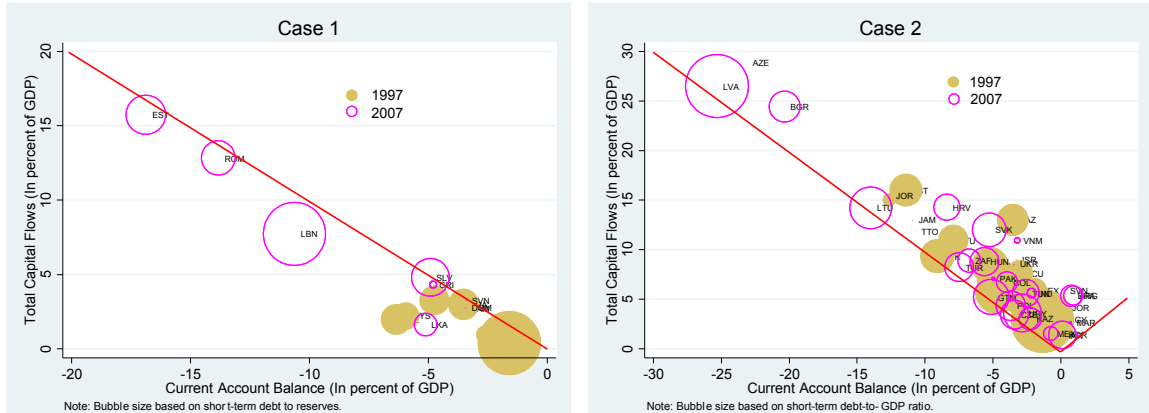
28. The policy discussion thus far has focused only on the flow characteristics of the economy, even though in reality an array of other factors (from balance sheet variables to other macroeconomic, financial, and institutional factors) could also play a role in choosing policy responses. In fact, the taxonomy is purposely kept simple because a more complex policy decision tree rapidly becomes intractable. For instance, Figure 6 (Panel A) depicts the BOP pressures data for Case 1 and Case 2 together with short-term debt-to-reserves ratios (larger bubbles represent larger ratios). These charts show that Case 1 countries had low liquidity in 1997 (non-hollow circles), and many still faced liquidity problems in 2007 (hollow circles), but there is no pattern among Case 2 countries. As for economic activity, Case 1 countries experience overheating; in fact, the circles for countries below potential output are almost nonexistent in either 1997 or 2007 (Panel B—the bubbles reflect the size

of the output gap). By contrast, such result is present in Case 2 countries only in 2007 (Panel C).

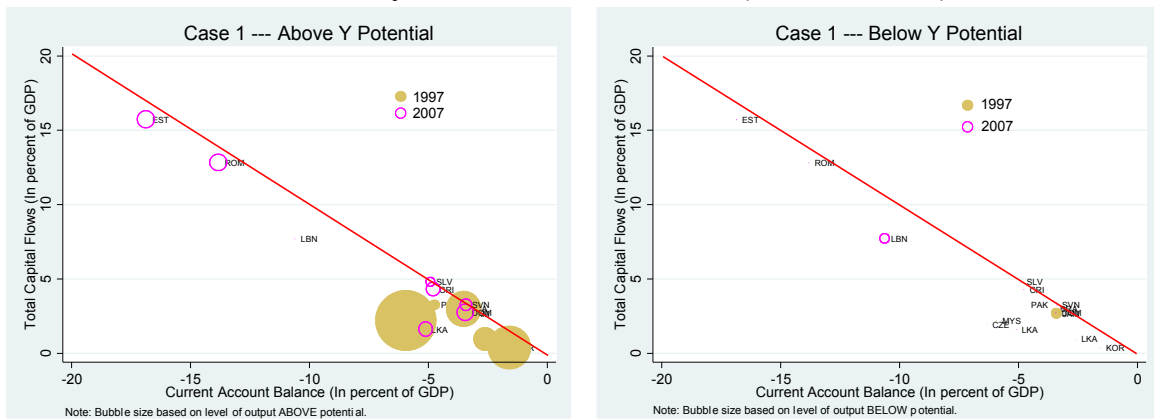
29. For illustrative purposes, the complexities of these additional layers of economic factors can be examined for Case 2 (large capital inflows in search of high yield). *Ceteris paribus*, the authorities might follow the policies suggested above (i.e., limited exchange rate appreciation, no sterilization, some fiscal tightening, no tightening of monetary policy). Now suppose this country is overheating, facing inflationary pressures, has a high short-term debt-to-GDP ratio, a large exposure in foreign currency denominated debt, and a weak financial sector. How do the policy options change for such a country? In this case, the country may need to consider monetary tightening to brake the overheating cycle. However, if this leads to a higher interest rate and further capital inflows, then sterilization might be required to limit inflationary pressures. In addition, the country might have to consider measures that would alter the composition and duration of capital inflows so that the balance sheet vulnerabilities are not exacerbated. Moreover, if the weak financial sector is unable to successfully intermediate all the inflows, the country would need regulations to monitor what conduits are being used for the capital to flow through, what risks they pose, and how to enforce rules that will address these concerns. In sum, as an increasing number of economic factors are added, the policy decision becomes more complex; Section IV attempts to control for these factors.

Figure 6. The Role of Balance Sheets and Cyclical Positions

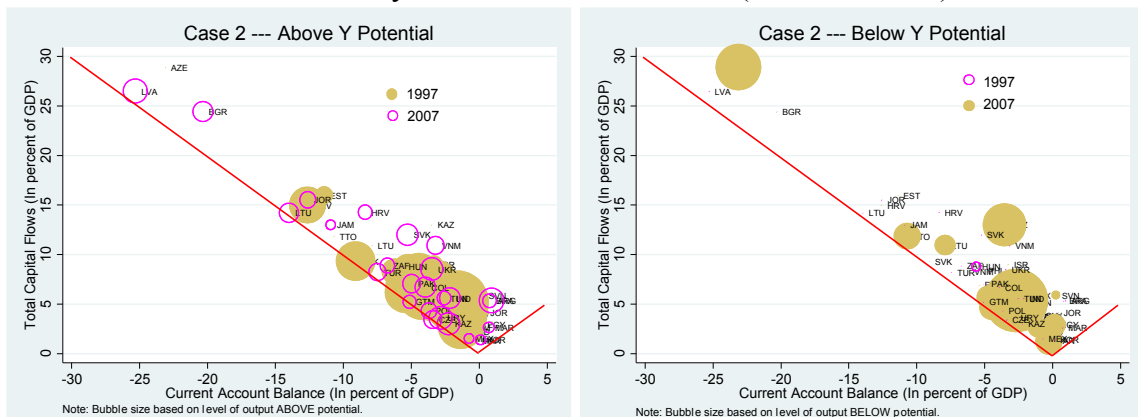
Panel A. Balance Sheet Characteristics—Case 1 and Case 2 (1997 and 2007)



Panel B. Cyclical Position for Case 1 (1997 and 2007)



Panel C. Cyclical Position for Case 2 (1997 and 2007)



IV. EMPIRICAL EVIDENCE

A. On Policy Responses

30. To what extent do countries respond to capital flows and positive balance of payments pressures as the taxonomy would suggest? This section explores this question. The exercise is positive rather than normative: even if the empirical work finds that countries do not behave as the taxonomy would suggest, this does not imply that they should not. Conversely, even if it is found that countries do behave as the taxonomy suggests they should, it would not necessarily follow that the taxonomy is correct—though it would suggest that the taxonomy’s policy implications have found resonance with national authorities.

31. In applying the taxonomy to derive policy recommendations for individual countries, it would be important to take into account specific circumstances in determining which case (or cases) best describes a country’s own situation. This is precisely the empirical challenge pursued here by controlling for country-specific factors. Indeed, notwithstanding the existing data limitations, it is worth examining the policy response observed in each of the cases (Case 1 through Case 3) after controlling for balance sheet vulnerabilities (both solvency and liquidity), a country’s cyclical position, and key institutional characteristics (e.g., a country’s exchange rate regime).¹² As noted above, policies should not be considered in isolation, but as a package aimed at stemming BOP pressures. The regressions should be viewed as a convenient way of summarizing policy responses across the various cases rather than as formal hypothesis testing, as it is difficult to find valid instruments to control for the

¹² Given the small sample size of Case 4 and Case 5 (see Table 1), these are excluded from the econometric estimations. Moreover, Case 1 through Case 3 are the most interesting for the purposes of this paper as they represent either cases with positive BOP pressures and/or cases with positive capital flows.

potential endogeneity of the BOP pressures. It is not clear, however, that such endogeneity should bias the results regarding appropriate policy responses across the various cases.

32. The empirical work uses an unbalanced panel dataset of 50 EMEs using annual data over the periods 1990–2007 and 1999–2007. Data subsets are also examined to assess whether policy responses have varied with the increased globalization of financial markets. Specifically, periods of low or high global liquidity and periods with low and high economic activity (country-specific) are considered for the period 1999–2007.¹³ The goal is to estimate policy reaction functions for each case under the above taxonomy and examine whether countries have responded to capital inflows as would be suggested by the taxonomy; while results for both periods are reported, the discussion centers only on the period 1999–2007.

33. The policy reaction functions have as dependent variables various policy instruments; fiscal policy measures, monetary policy and sterilization variables, and measures of both exchange rate volatility and exchange rate flexibility. The key explanatory variable is the BOP pressure (as measured by the sum of net capital flows and the current account balance or, in the case of the sterilization regression, by the change in central bank NFA) *interacted* with a dummy for the case to which each observation belongs. What is of interest is the differential response “per unit” of balance of payments pressure across the different cases. Other variables in the regressions are lagged values of the other policy variables, and controls for the country’s cyclical position—its debt-to-GDP ratio, its short-term debt-to-reserves ratio, inflation, and exchange rate regime; time dummies are also included. The estimation is carried out for the sub-samples described.

¹³ The activity index is constructed by combining inflation rates and output gaps into one index, where each component enters the constructed index with mean 0 and variance 1.

Table 2. Evidence of Tailored Policy Responses 1/

	Period		Global liquidity (1999-2007)		Economic activity (1999-2007)	
	1990-2007 [1]	1999-2007 [2]	Low [3]	High [4]	Low [5]	High [6]
Nominal exchange rate flexibility; an increase represents an appreciation						
Net flows interacted with:						
dummy for case 1	-0.013 ***	-0.003	-0.001	-0.020 **	-0.010	-0.010
dummy for case 2	0.004	0.002	0.004	0.007 *	-0.001	0.010 *
dummy for case 3	0.006 *	0.006	0.005	0.012 ***	0.004	0.021 **
R-square	0.12	0.11	0.07	0.47	0.10	0.73
Number of observations	491	305	160	145	217	88
Nominal exchange rate volatility; an increase represents greater volatility						
Net flows interacted with:						
dummy for case 1	-0.022 ***	-0.003	0.003	-0.014 **	-0.010	0.002
dummy for case 2	0.002	0.006 *	0.000	0.008 ***	0.005	0.005
dummy for case 3	0.012 ***	0.013 ***	0.012	0.009 ***	0.013 ***	0.019 ***
R-square	0.25	0.26	0.16	0.56	0.18	0.84
Number of observations	491	305	160	145	217	88
Monetary policy; an increase represents tightening						
Net flows interacted with:						
dummy for case 1	-0.514 **	0.551 *	0.288	0.416	0.647 *	1.093 **
dummy for case 2	-0.200	-0.508 ***	-0.384	-0.668 ***	-0.511 ***	-1.150 *
dummy for case 3	0.058	-0.602 **	-0.506	-0.527	-0.280	-0.510
R-square	0.15	0.17	0.20	0.26	0.20	0.65
Number of observations	626	379	205	174	281	98
Sterilization; -1 implies full sterilization and 0 implies no sterilization						
NFA interacted with:						
dummy for case 1	-0.248 ***	-0.215 *	-0.133	-0.379 **	0.128	0.306 ***
dummy for case 2	-0.003	-0.190 ***	-0.257 *	-0.170 *	-0.157	0.289
dummy for case 3	-0.126	-0.339 ***	-0.501 ***	-0.381 *	-0.279 **	0.402 *
R-square	0.13	0.19	0.21	0.31	0.17	0.75
Number of observations	593	344	172	172	273	71
Fiscal policy; an increase represents tightening						
Net flows interacted with:						
dummy for case 1	-0.125 **	0.398 **	0.523 *	0.375 **	0.418	0.536 ***
dummy for case 2	0.022	-0.037	-0.054	-0.029	-0.095 *	0.105
dummy for case 3	0.188 *	0.043	0.072	0.064	0.049	-0.024
R-square	0.10	0.16	0.17	0.37	0.17	0.49
Number of observations	626	379	205	174	281	98

Source: Staff estimates.

Note: ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.

1/ Fixed effects estimation. Includes controls (lagged) for 'other' economic policies (fiscal and monetary policy, exchange rate flexibility, and sterilization). Estimation also includes controls for initial conditions; specifically, output gap, liquidity (short-term debt-to-reserves), solvency (debt-to-GDP) ratios, and exchange rate regime. Includes also time dummies.

Nominal Exchange Rate

34. As discussed above, faced by balance of payments pressures, a first decision is whether to allow the nominal exchange rate to appreciate. Countries in Case 1 should be

least willing to allow such an appreciation (as this could exacerbate their current account deficit, which is driving the capital inflows), while countries in Case 3 would be best able to allow an appreciation (as their BOP pressures stem from their current account surplus).

35. The coefficients for nominal exchange rate flexibility and volatility have the expected signs in most regressions, though not all the point estimates are statistically significant. As expected, Case 1 countries do not register much nominal exchange rate volatility in an effort to resist the appreciation pressures from capital inflows since this could worsen the current account balance; in fact, the nominal effective exchange rate appears to record some depreciation.¹⁴ By contrast, the evidence on the nominal exchange rate suggests some modest appreciation takes place among Case 2 countries, but the magnitude varies across subsamples perhaps because this case includes both countries with and without external imbalances. Similarly, Case 2 countries also record an increase in exchange rate volatility. Finally, Case 3 countries appear to experience both the largest appreciation pressures and the largest increases in volatility, and the point estimates are statistically significant. These results are consistent with the taxonomy during periods of high global liquidity or high economic activity.

Monetary Policy and Sterilization

36. Turning to monetary policy, the taxonomy would suggested the sharpest tightening for Case 1 countries to help narrow the current account deficit. For Case 2 countries, monetary tightening risks raising interest rates and attracting further inflows. Tightening would also not be appropriate for Case 3 countries inasmuch as it leads to larger current account

¹⁴ The exchange rate volatility indicator is defined as the absolute value of the monthly percentage change of the nominal exchange rate over the previous 12 months and averaged over a 12-month horizon (Ghosh and others, 2002). The flexibility indicator reflects the change in the exchange rate but without the absolute value.

surpluses. Empirically, at least in the post-East Asian crisis period, this is borne out—with evidence of tightening in Case 1 and loosening in Case 2 and 3 (regression [2]).¹⁵

Furthermore, the point estimates for monetary policy seem to be larger in the expected direction during high global liquidity episodes (regression [4]) and high economic activity periods (regression [6]).

37. A similar logic dictates the use of sterilization: in Case 2, where inflows are assumed to be responding to the search for yield, tight monetary policy or sterilization of inflows are likely to perpetuate high interest rates and exacerbate the inflows problem. The evidence is mixed. A coefficient of -1 would imply full sterilization and 0 would imply no sterilization.¹⁶ Indeed, the results indicate that an increase in NFA leads to a decline in net domestic assets but by less than -1, suggesting partial sterilization. Many of the point estimates are not statistically significant, however. While partial sterilization is the norm, the least sterilization appears to occur among Case 2 countries, a result that is broadly in line with the proposed taxonomy.

Fiscal Policy

38. By the logic of the taxonomy, Case 1 countries should undertake the most fiscal tightening to reduce the current account deficit. Case 2 countries should also tighten fiscal policy—albeit less—to help stem capital inflows responding to high interest rates. Case 3 countries should not tighten fiscal policy, as this will increase their current account surpluses.

¹⁵ Monetary policy is measured by the change in economic growth and inflation relative to the change in broad money—an increase represent a tightening of monetary conditions.

¹⁶ Sterilization is represented by the effect of the change in net foreign assets (scaled by the level of reserve money) on the change in net domestic assets (also scaled by the level of reserve money).

39. The taxonomy's implications are somewhat borne out in the post-Asian crisis period (Table 2).¹⁷ Specifically, fiscal policy was tightened in Case 1 countries (regression [2]; the result is statistically significant). The tightening among Case 1 countries is also significant and larger in magnitude during periods of high economic activity (regression [6]). By contrast, the point estimates in Case 2 and Case 3 are not statistically significant (regression [2]) and the point estimates do not always have the expected sign—the taxonomy calls for fiscal tightening in Case 2 and loosening in Case 3.

40. In conclusion, the results seem to indicate that EMEs do not resort overwhelmingly to any one policy response to capital flows. Indeed, all four policy responses discussed earlier have, to varying degrees, a role to play in dealing with capital flows. More importantly, however, the reaction functions are broadly consistent with the priors described by the conceptual taxonomy. Although the results are not always statistically significant and vary across sub-samples, they suggest that the policy emphasis seems to vary from case-to-case. Furthermore, for each case, countries' policy responses appear to vary over time—in particular, the results seem quite different between the pre- and post-East Asian crisis.

B. On Macroeconomic Outcomes

41. As discussed before, economic policies should not be considered in isolation but rather as a package of measures to help stem BOP pressures. A key “summary statistic” of the overall effect of policies is, in this regard, the real exchange rate.¹⁸ What conclusions can be

¹⁷ Fiscal policy is represented by the fiscal impulse; that is, the change in the difference between the regular and the cyclically-adjusted general government balance—an increase represents a tightening of fiscal conditions.

¹⁸ The exchange rate volatility indicator is defined as the absolute value of the monthly percentage change of the real exchange rate over the previous 12 months and averaged over a 12-month horizon. The flexibility indicator also reflects the change in the real exchange rate but without the absolute value.

derived? In Case 1 countries, the goal is to limit the appreciation of the real exchange rate and reduce exchange rate volatility; indeed a different result would likely worsen the current account deficit and the need for capital inflows. By contrast, in Case 3 (where the current account surpluses play a more crucial role), a real exchange rate appreciation would reduce the current account surplus and therefore help relieve BOP pressures; thus, policymakers should be less concerned with allowing an increase in exchange rate volatility. In between these two extremes is Case 2. But for these countries, the implications are more ambiguous. If there is a current account surplus, the appreciation could help relieve the BOP pressures—unless it portends further (nominal and real) appreciation, which could attract more inflows. However, this case also includes countries with current account deficits, where limiting appreciation might be advisable.

42. Empirically, this pattern is largely borne out. Case 1 countries record a decline in real exchange rate volatility in response to positive BOP pressures, both in the full as well as what will be referred to as the reduced sample (regressions [2] and [3] in the upper and lower panels of Table 3).¹⁹ Case 2 countries experience an increase in volatility in all of the estimated equations, but this is statistically significant only in some cases (e.g., regression [2] and [4] of the full sample). Some of the regressions in both the full and reduced samples also show that Case 2 countries experience appreciation pressures. Finally, results for Case 3 are the most consistent with the taxonomy. Indeed, these countries have a statistically significant increase in exchange rate volatility across most sub-samples. This increase is particularly important during periods of increased global liquidity or high economic activity.

¹⁹ The reduced sample is intended to focus the empirical work on the “most extreme” observations for each case. To this end, one-third of the observations that are farther away from any neighboring cases are picked. In effect, as noted in Figure 5, the reduced sample drops observations that are at either side of the diagonals or close to the origin because these observations could be construed as representing “combined” cases.

Also, Case 3 countries experience appreciation pressures and this result holds across subsamples and for both the full sample and the reduced sample; again, the results are particularly strong during periods of increased global liquidity or during periods in which economic activity picks up.

V. CONCLUSIONS

43. Until 2007, the resurgence of capital flows to emerging market countries and the emergence of current account surpluses resulted in significant balance of payments pressures. Depending upon such factors as the evolution of the country's net foreign asset position, the central bank's holdings of foreign exchange reserves, the form of the capital flows and the structure of domestic balance sheets, and the cyclical position of the economy, these positive pressures need not pose a problem—and indeed may be welcome for enhancing growth prospects. To the extent that they do, however, some policy response is required.

Table 3. Macroeconomic Outcomes 1/

	Period		Global liquidity (1999-2007)		Economic activity (1999-2007)	
	1990-2007 [1]	1998-2007 [2]	Low [3]	High [4]	Low [5]	High [6]
FULL SAMPLE						
Real exchange rate flexibility; an increase represents an appreciation						
Net flows interacted with:						
dummy for case 1	-0.023 ***	-0.006	0.002	-0.021 **	-0.010	-0.005
dummy for case 2	0.005 *	0.004	0.004	0.008 **	0.001	0.005
dummy for case 3	0.012 ***	0.012 ***	0.013	0.013 ***	0.011 ***	0.019 **
R-square	0.27	0.28	0.21	0.46	0.29	0.75
Number of observations	491	305	160	145	217	88
Real exchange rate volatility; an increase represents greater volatility						
Net flows interacted with:						
dummy for case 1	-0.028 ***	-0.006	0.006	-0.017 **	-0.011	0.003
dummy for case 2	0.003	0.008 *	0.000	0.009 ***	0.005	0.002
dummy for case 3	0.018 ***	0.018 ***	0.017	0.011 ***	0.018 ***	0.019 **
R-square	0.29	0.35	0.27	0.55	0.31	0.82
Number of observations	491	305	160	145	217	88
REDUCED SAMPLE 2/						
Real exchange rate flexibility; an increase represents an appreciation						
Net flows interacted with:						
dummy for case 1	-0.022 ***	-0.016 **	-0.015 ***	-0.016 *	-0.013	-0.003
dummy for case 2	0.006 **	0.007 **	0.008 *	0.000	0.003	-0.003
dummy for case 3	0.015 ***	0.020 ***	-0.001	0.012 **	0.017 *	0.027 ***
R-square	0.63	0.54	0.85	0.85	0.43	0.97
Number of observations	170	107	47	60	65	42
Real exchange rate volatility; an increase represents greater volatility						
Net flows interacted with:						
dummy for case 1	-0.027 ***	-0.008	-0.011 **	-0.011 *	-0.012 *	0.006
dummy for case 2	0.005	0.005	0.002	0.001	0.001	-0.007
dummy for case 3	0.025 ***	0.023 ***	0.012	0.007 *	0.003	0.026 ***
R-square	0.62	0.46	0.81	0.75	0.51	0.97
Number of observations	170	107	47	60	65	42

Source: Staff estimates.

Note: ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.

1/ Fixed effects estimation.

2/ One-third of the “most extreme” observations in each case; that is, the farther away from neighboring cases. Actual number of observations might be slightly smaller than one-third owing to data used in the econometric estimation.

44. This paper develops a simple conceptual taxonomy to identify the circumstances under which various policy responses might be appropriate. In large measure, the implications of the taxonomy are a matter of degree: as such, the framework can help inform judgments about the correct policy response, but cannot of course replace the need for such judgment.

While the taxonomy is largely founded on flow factors (current account and total capital

flows), the empirical work attempts to control for a number of other factors, including balance sheet vulnerabilities and cyclical positions, the role of institutional factors and the importance of sample periods chosen (and sub-samples within the post-Asian crisis period).

45. In general, there is some correspondence between the policy implications of the analytical taxonomy and observed policy choices of EMEs since the East Asian crisis. But while the *pattern* is broadly consistent, this does not necessarily imply that actual policies have responded appropriately to the BOP pressures. As the taxonomy would predict, Case 1 countries have—to a greater degree than the other cases—tightened fiscal policy in response to BOP pressures, but this does not mean that the fiscal stance is necessarily correct: in “level” terms, it may be too tight or too loose. Similarly, Case 2 and Case 3 have experienced in the post-Asian crisis period significant monetary policy loosening, in line with the policy responses suggested by the taxonomy. This is also the case for sterilization, which is large (and statistically significant) in Case 1 and Case 3, but less strong among Case 2 countries. The results in terms of nominal exchange rate flexibility and exchange rate volatility are quite convincing across most cases; reduced volatility and some depreciation pressures among Case 1 countries and increased appreciation pressures and volatility among Case 3 countries—less clear is the evidence for Case 2 countries. As to the results regarding the real exchange rate, which can be interpreted as a summary statistic of all economic policies, these are broadly in line with the taxonomy—increased depreciation pressures and reduced volatility in Case 1 and increased appreciation pressures and increased volatility in Case 3, with Case 2 countries experiencing a weaker version of Case 3.

46. In applying this framework to draw policy prescriptions, therefore, four challenges remain. First, is to determine the right “level” at which to pitch policies, not just the pattern across cases. Second, is to anticipate where the country will be in terms of the taxonomy over the relevant planning horizon. Indeed, it would be interesting to examine what we can learn from the transition experienced by countries over consecutive years. The third challenge relates to taking account of the country-specific factors that are not captured by the general taxonomy and have not yet been included among the controls in the empirical work (e.g., financial soundness indicators). Fourth, while the taxonomy has discussed the possible role of capital controls, this remains an area for research; in particular, their possible decline in effectiveness in the period that has followed the post-East Asian crisis—the period of rapid financial innovation and globalization—needs to be examined. In conclusion, though capital flows pose formidable challenges and the appropriateness of policy responses is tied to country-specific factors, the conceptual framework developed here provides useful guidance on how best to deal with capital inflows and other BOP pressures.

47. **Appendix I. Market Access Developing Countries in Sample**

<u>Country name</u>	<u>Country code</u>	<u>Country name</u>	<u>Country code</u>
Argentina	ARG	Korea	KOR
Azerbaijan, Rep. of	AZE	Latvia	LVA
Brazil	BRA	Lebanon	LBN
Bulgaria	BGR	Lithuania	LTU
Chile	CHL	Malaysia	MYS
China, P. R.	CHN	Mexico	MEX
Colombia	COL	Morocco	MAR
Costa Rica	CRI	Pakistan	PAK
Croatia	HRV	Peru	PER
Czech Republic	CZE	Philippines	PHL
Dominican Republic	DOM	Poland	POL
Ecuador	ECU	Romania	ROM
Egypt	EGY	Russia	RUS
El Salvador	SLV	Slovak Republic	SVK
Estonia	EST	Slovenia	SVN
Guatemala	GTM	South Africa	ZAF
Hong Kong	HKG	Sri Lanka	LKA
Hungary	HUN	Thailand	THA
India	IND	Trinidad and Tobago	TTO
Indonesia	IDN	Tunisia	TUN
Iran, I. R. of	IRN	Turkey	TUR
Israel	ISR	Ukraine	UKR
Jamaica	JAM	Uruguay	URY
Jordan	JOR	Venezuela, Rep. Bol.	VEN
Kazakhstan	KAZ	Vietnam	VNM

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