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## **IMF Bilateral Surveillance on Reserves**

Angana Banerji and Andrew Martinez

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Abstract

This paper examines the quality of the IMF's policy advice on reserves in its bilateral surveillance during 2000–11. In light of country experiences in the aftermath of the global crisis, it finds that the IMF's advice was somewhat complacent. Although the IMF was supportive of the precautionary need for reserves in emerging market economies, its focus on the benefits of a flexible exchange rate regime sometimes preempted its advice on reserve adequacy. Moreover, policy judgments were largely based on a pro forma reliance on a few traditional indicators and analytical approaches that were insufficiently embedded with country-specific information. The global crisis has shown the need to reframe the discussion of reserves in terms of the availability of foreign currency liquidity for the economy as a whole. Policy advice on reserve adequacy needs to include deeper analyses of the potential vulnerabilities built into the structure of balance sheets of the private sector (including the financial sector). Assessing the nature and complexities of capital inflows would be crucial for understanding a country's need for reserves. The potential need for reserve buffers in some advanced countries cannot be ignored.

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## ABBREVIATIONS

ARA Metric	Assessing Reserve Adequacy Metric
AREAER	<i>Annual Report on Exchange Arrangements and Exchange Restrictions</i>
BPM6	<i>Balance of Payments and International Investment Position Manual</i> , sixth edition
BIS	Bank for International Settlements
BSA	Balance Sheet Approach
CCL	Contingent Credit Lines
COFER	Currency Composition of Foreign Exchange Reserves
ECB	European Central Bank
EWE	Early Warning Exercise
FCL	Flexible Credit Line
FSB	Financial Stability Board
GFA	Gross Foreign Assets
GIR	Gross International Reserves
IEO	Independent Evaluation Office
IFS	<i>International Financial Statistics</i>
IMF	International Monetary Fund
IIP	International Investment Position
JEDH	Joint External Debt Hub
NFA	Net Foreign Assets
NIR	Net International Reserves
Reserves Template	Data Template of International Reserves and Foreign Currency Liquidity
SDDS	Special Data Dissemination Standard
SDR	Special Drawing Rights
SWFs	Sovereign Wealth Funds
TSR	Triennial Surveillance Review
UFR	Use of Fund Resources
VEE	Vulnerability Exercise for Emerging Market Economies
VEA	Vulnerability Exercise for Advanced Economies
WEO	<i>World Economic Outlook</i>



## EXECUTIVE SUMMARY

This paper examines the quality of the IMF's policy advice on reserves in its bilateral surveillance, focusing particularly on countries that were large accumulators of reserves. It assesses whether the IMF's advice was consistent with the main objective of bilateral surveillance, namely to promote external stability in member countries. It evaluates whether the IMF used appropriate analytical frameworks to make judgments about reserve adequacy, and whether its advice was useful to country authorities. The evaluation was conducted with the benefit of hindsight. It triangulates evidence from documents, country and IMF staff perspectives, and actual outcomes during the global crisis. It finds:

During the evaluation period, 2000–11, the IMF's advice seems to have been somewhat complacent. Prior to the global crisis, the IMF did not focus sufficiently on whether or not there was a need for some advanced economies to hold reserve buffers. Its assessments instead focused largely on emerging market economies, given their history of balance of payments crises. Advanced country officials considered this emphasis to be appropriate at that time, but some have now changed their minds in light of their experience during the global crisis.

The global crisis has shown the need to reframe the analysis of reserve adequacy in terms of the availability of foreign currency liquidity for the economy as a whole, together with deeper analyses of the potential vulnerabilities built into the structure of balance sheets of different sectors of the economy. Assessing the nature and complexities of capital inflows is important for understanding the need for reserves: in several countries in the aftermath of the crisis, private sector exposure to derivatives, local currency liabilities to non-residents, wholesale funding of financial sectors, and qualitative information on cross-border resolution mechanisms implied the need for additional reserve buffers.

Several factors contributed to the complacency in the IMF's advice. While the IMF supported reserve accumulation for precautionary purposes in emerging market economies, its emphasis on the benefits of a flexible exchange rate regime at times preempted considerations of reserve adequacy. This tended to be the case in countries where the Fund assessed reserve levels to be high or comfortable, but there were also examples in which it failed to draw attention to declining reserve coverage while being supportive of the lack of intervention taking place in the foreign exchange market. Some country authorities perceived the IMF's emphasis on exchange rate flexibility as driven by its multilateral concerns about global current account imbalances and the role of exchange rate flexibility in facilitating adjustments. In addition, the IMF's policy judgments were largely based on a perfunctory analysis of a few traditional indicators of reserve adequacy and on analytical approaches that were insufficiently embedded with country-specific circumstances. All of these factors also led country authorities to view the IMF's advice on reserves as largely pro forma and of uncertain value.

During 2009–11, the IMF launched some useful initiatives, improved its analysis of reserves in several areas, and, to some extent, rebalanced its emphasis to support the need for greater

reserve buffers. In this regard, a new reserve adequacy metric that the Fund introduced in 2011 constitutes a step forward but does not adequately address the policy concerns that were evident in the aftermath of the crisis. Moreover, an inflexible implementation of this methodology could potentially be problematic.

Going forward, the IMF's advice could be improved, notably by paying greater attention to the choice of analytical approaches, being more mindful of comprehensive data on reserves and external exposures, and incorporating more country-specific elements. The IMF should develop a holistic analytical framework for assessing reserve adequacy in relation to other tools in a policymaker's arsenal, including macro-prudential measures and policies to manage the capital account. Such an approach could build on the liquidity management framework that IMF staff developed in the aftermath of the Asian financial crisis. Implementing such an approach in practice will be challenging, not least in its information requirements, and will not be feasible without the cooperation of member countries. The IMF membership should be encouraged to provide more data on reserves and external exposures.



## I. CONTEXT<sup>1</sup>

1. The IMF’s policy discussions with member countries in the course of bilateral surveillance include assessments of their international reserves in the context of their external stability. According to the 2007 Surveillance Decision, the IMF’s bilateral surveillance shall assess developments in a member’s balance of payments against the background of a number of elements, including reserves.<sup>2</sup> IMF staff has been instructed that the adequacy of reserves is “often a critical element in the assessment of external stability” (IMF, 2010f).

2. This paper examines the IMF’s policy advice to its member countries during a decade in which global reserves grew rapidly. The increase in reserves was partly due to the precautionary needs of a number of emerging market economies following the balance of payments and banking crises of the previous decade. It was also the outcome of other policy objectives: ensuring competitiveness, preventing excessive volatility in the exchange rate, and saving the windfall that accrued from rising commodity prices, in order to foster balanced growth and intergenerational equity.

3. The global financial crisis and the ensuing economic and financial uncertainty have spurred both the IMF and some country authorities to rethink the benefits of reserve buffers. Emerging market economies that had accumulated reserves in the past felt vindicated by their policy choices which, their authorities believe, helped them to weather the crisis better. The IMF has acknowledged this, but it has also cautioned against giving too much credit to the role of reserves in mitigating the impact of the crisis (e.g., see IMF, 2009d; 2010c; and 2011c). Several countries that have not traditionally emphasized the need for international reserves, including some advanced economies, are evaluating the role of reserves in crisis mitigation and management, and have started accumulating reserves in the aftermath of the global crisis.

4. In contrast, since the global crisis, statements by high-level IMF officials have emphasized the costs of excessive reserve accumulation to both the domestic economy and the international monetary system. For example, IMF senior staff noted in 2009 that reserve accumulation that far surpasses a country’s needs is a policy that “is not without costs—for

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<sup>1</sup> We are grateful to Jack Boorman, Shinji Takagi, and IEO staff for their comments on preliminary drafts of this paper. In particular, we would like to thank Roxana Pedraglio and Chris Monasterski for their contributions on the IMF’s legal and policy frameworks and in distilling the views of interviewees, respectively. We appreciate the input of the evaluation team to the process of collecting the underlying data, Rachel Weaving for editorial assistance, and to Arun Bhatnagar and Mari Lantin for administrative and general assistance.

<sup>2</sup> The 2007 Surveillance Decision (paragraph 12) and the operational guidance for its implementation defines bilateral surveillance to “include an evaluation of the developments in the member’s balance of payments, including the size and sustainability of capital flows, *against the background of its reserves* (emphasis added), the size and composition of its other external assets and its external liabilities, and its opportunities for access to international capital markets” (IMF, 2009a).

the holder of the reserves and also for the stability of the international monetary system” (IMF, 2009f). And a speech by the IMF Managing Director in 2011 expressed concern about the impact of “large and volatile capital flows, exchange rate pressures, and rapidly growing excess reserves” on the stability of the international monetary system (IMF, 2011f).<sup>3</sup>

5. Recent initiatives to retool IMF surveillance have focused on reserve policies from the perspective of the external stability of member countries and the international monetary system. IMF Management’s concern about the impact of excessive reserve accumulation on international monetary stability coincided with the IMF’s elaboration of a strategy to reduce the demand for international reserves by “collaborating on reserve adequacy” (IMF, 2010e). It was proposed that this collaboration would involve countries agreeing on an adequate level of reserves for precautionary purposes, and be underpinned by IMF “guidance on desirable ranges of precautionary reserve levels given country circumstances,” which “countries could agree to align their reserve accumulation policies to.” This guidance was developed in the form of a new metric for reserve adequacy in IMF (2011c). Subsequently, the IMF’s 2011 Triennial Surveillance Review recommended a renewed emphasis on external stability, including by regularly publishing a multilaterally consistent assessment of external balances, which would also report on the new reserve adequacy metric. In response, an External Sector Report was published on a pilot basis in July 2012 (IMF, 2012d).

6. Against this background, this paper examines the nature and quality of the IMF’s policy advice on reserves in the context of bilateral surveillance, especially of large accumulators of reserves. It documents the IMF’s approach to its members’ reserve policies. It assesses whether or not the IMF’s advice on reserve policies helped achieve the main objective of bilateral surveillance, namely to promote external stability in member countries. It evaluates whether the IMF used appropriate analytical frameworks to make judgments about reserve adequacy, and whether its advice was useful to country authorities.

7. The paper is organized as follows. Section II describes the evaluation framework. Section III evaluates the IMF’s policy advice on reserves on the basis of events that materialized during the global crisis. Section IV elaborates on key aspects of the IMF’s approach to reserve adequacy assessments that might need to be improved upon in order to address some of the lessons learnt from the global crisis, and to enhance the effectiveness and usefulness of IMF advice to country authorities in general. Section V summarizes the main conclusions and provides recommendations.

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<sup>3</sup> See Dhar (2012) for an in-depth discussion of the evolution and analytical underpinnings of the IMF’s concerns about the impact of reserves on global financial stability.

## II. EVALUATION FRAMEWORK

### A. Scope

8. The paper focuses on a sample of 43 countries during 2000–11. This translates into a total of 454 Article IV consultations and reviews of IMF programs and arrangements (referred to as ‘instances’ of surveillance in the remainder of the paper). The size and pace of reserve accumulation were important criteria in selecting the sample countries.<sup>4</sup> Overall, countries in the sample accounted for some 89 percent of total global international reserves at end-2011, and for 94 percent of total reserve accumulation globally since the financial crisis in 2008.<sup>5</sup> The sample characteristics limit the extent to which the findings of the paper can be generalized across the IMF’s membership.<sup>6</sup>

9. The analysis is informed by interviews with country authorities, IMF Executive Board members, IMF staff and Management, and market participants. It is also based on country desk reviews of documents for bilateral surveillance and IMF programs and arrangements (including selected issues papers analyzing reserve policies) that are publicly available or were made available to the IEO evaluation team for all the countries in the evaluation sample during 2000–11. It also relies on IEO (2007) and IEO (2011).

### B. Methodology

#### **Absence of institutional and conceptual benchmarks**

10. It is difficult to identify absolute standards—institutional or conceptual—against which to judge the quality of the IMF’s policy advice on reserves. According to country authorities who were interviewed for this study, the amount of reserves that a country ought to hold ultimately depends on the degree of risk aversion on the part of policymakers, the manner and extent to which they choose to adjust to external shocks (e.g., their tolerance for exchange rate volatility), and the availability of alternative sources of liquidity.<sup>7</sup> In addition, reserve accumulation, while sometimes a function of the initial level of reserves, is largely a by-product of other policies.

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<sup>4</sup> Annex 1, paragraphs 1–3, provides additional information on the sample selection.

<sup>5</sup> The figures refer to IFS data on official reserves excluding gold (see Annex 1 paragraph 10 for definition).

<sup>6</sup> This paper does not discuss the IMF’s advice on reserve management and sovereign wealth funds (SWFs) as these were generally not central to bilateral surveillance discussions.

<sup>7</sup> These differences imply that each country perceives its need for reserves in the context of a unique set of circumstances. Therefore, benchmarking IMF advice to countries in the sample against a baseline group of comparator countries was not considered feasible.

11. The IMF's mandate and policy framework on reserves leaves room for discretion in how it formulates its policy advice on reserves.<sup>8</sup> The IMF's ability to discuss cross-border spillovers from its members' reserve policies is limited. There is no Executive Board-endorsed policy guidance to IMF staff on reserves, and formal Management-issued guidance has not existed for part of the evaluation period. Such formal guidance as has been issued<sup>9</sup> tends to enumerate checklists of methodologies for assessing reserve adequacy rather than to describe policy considerations and vulnerabilities that might affect reserve adequacy assessments,<sup>10</sup> though it is these considerations and vulnerabilities that proved to be more important for preserving external stability as the global crisis started. For all the above reasons, this paper does not assess the quality of IMF policy advice against IMF guidance notes.

12. Conceptual frameworks for thinking about reserve adequacy have their own limitations.<sup>11</sup> As aptly highlighted in IMF (2011c), traditional metrics, while simple and useful, tend to be somewhat ad hoc in nature and call for judgment regarding the magnitude of risks to insure against. Estimates of the demand for reserves exploit countries' revealed preferences for reserves, but they can be misleading if a country's reserves are a function of other policy objectives and do not necessarily reflect its precautionary demand for reserves. Furthermore, cost-benefit models to determine 'optimal' reserves are sensitive to parameter specification.

### **Benchmarking against actual outcomes**

13. This paper therefore assesses IMF policy advice with the benefit of hindsight, taking into account country experiences during the global financial crisis. These experiences could be considered the most relevant indication of whether or not the IMF's advice on reserves was consistent with the objective of bilateral surveillance, namely promoting external stability in member countries.

14. The global crisis brought to the fore many balance sheet and liquidity considerations that policymakers have had to consider in forming assessments about the need for reserves. These considerations are similar to the lessons from past crises, which were reflected in a

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<sup>8</sup> Mandate refers to the IMF's power and authority to focus on various aspects of a country's policies, as defined by its Articles of Agreement. Policy framework refers to formal instructions provided by either the IMF's Executive Board or Management on the assessment of members' policies. See Annex 2 for more information.

<sup>9</sup> IMF (2005, 2009c, and 2010f).

<sup>10</sup> For example, IMF (2010f) notes "In analyzing the adequacy of reserves, staff should take into account country characteristics and vulnerabilities. Standard reserve adequacy indicators include ratios of reserves to imports, short-term external debt (remaining maturity), and broad money. Staff is also encouraged, where relevant and feasible, to explore other indicators (such as ratio of reserves to gross external liabilities) and analyze the optimal level of reserves needed to cushion the impact of a sudden stop in capital flows."

<sup>11</sup> See Aizenman and Genberg (2012) for further analysis of conceptual frameworks for reserve adequacy.

broad approach to assessing reserve adequacy assessments—henceforth referred to as the ‘liquidity management framework’—that IMF staff developed in a series of policy papers during 2000–04 (Box 1).

**Box 1. The ‘Liquidity Management Framework’: IMF Staff Proposals (2000–04)<sup>1</sup>**

Following the financial crises of the late 1990s, it became clear that the appropriate level of reserves could not be determined without reference to the capital account. IMF staff issued several papers dealing with broader issues of reserve adequacy assessments, applying a ‘liquidity management framework’ for such assessments. The main points of these papers were:

**Indicators as a starting point**

Import- and money-based measures of reserve adequacy are not good predictors of crises in emerging markets but have a role in countries with no or limited access to capital markets. Money-based measures are useful indicators of the potential impact of capital flight, especially in countries with weak banking systems, when supplemented with an analysis of other possible sources of capital flight. For countries with significant but uncertain access to capital markets, the ratio of reserves to short-term external debt by remaining maturity is the single most important indicator of reserve adequacy. However, indicators should serve only as a starting point.

**Comprehensive approach focusing on balance sheets and institutions**

Reserves should not be analyzed in isolation but rather in the context of the asset-liability structure of the economy. The analysis should take into account the microeconomic conditions that affect the functioning of the private sector (e.g., taxes, implicit and explicit guarantees, banking supervision, the bankruptcy regime) because these conditions can result in moral hazard, distort institutions’ financing structure, and make the economy more vulnerable to external shocks. Reserves should reflect the state of domestic balance sheets as well as the soundness of domestic institutions, although it is not the case that more reserves are always better.

**Taking measurement issues into account**

On the asset side, contingent credit lines could be added to gross reserves provided these lines are truly usable. Foreign assets held by the private sector could be included in the concept of usable reserves. On the liabilities side, claims on reserves from derivative positions materializing immediately should be included. Domestic currency liabilities of the government to the domestic private sector and non-residents could also be a drain on reserves, absent capital controls. Furthermore, the currency composition and interest rate structure of foreign debt could have important implications for balance sheets and reserves and should be monitored.

<sup>1</sup>This box draws primarily on IMF (2000b), IMF (2001c), and IMF (2004).

15. The liquidity management framework discussed three interrelated concepts: reserve adequacy assessments, public sector debt management, and private sector liability management. It stressed the need to go beyond the calculation of a single indicator such as the ratio of reserves to short-term debt, even if such indicators could serve as a useful starting point. In addition to relevant macroeconomic factors, it proposed that international reserve levels should reflect the state and soundness of domestic balance sheets (though not necessarily implying that more reserves are always better). It emphasized the need to take into account relevant microeconomic conditions, policies, and institutions that affect the functioning of the private sector by distorting incentives and financing structures. These factors include tax regimes, implicit and explicit state guarantees, and the quality of banking supervision, the bankruptcy regime, and corporate governance.

16. Illustratively, this paper often contrasts the IMF’s policy advice with the recommendations of the liquidity management framework, mainly as a reminder that several policy considerations that became relevant during the global crisis were not new—although perhaps broader in scale, scope, and complexity.

### **Triangulation**

17. The analysis in this paper relies on triangulation, a common evaluation technique, to examine the information gathered from IMF documents, IMF staff, and country perspectives. It took concurrence in findings as validation. Outlier views and responses were scrutinized further, and were discarded unless additional supporting evidence was found.<sup>12</sup>

### **III. THE IMF’S ADVICE ON RESERVES: HOW APPROPRIATE?**

18. This section highlights the strengths and weaknesses of the IMF’s advice on reserves, pointed out with the benefit of hindsight on the basis of country experiences during the global financial crisis. To the extent possible, issues are highlighted with country examples in order to facilitate learning.

#### **A. An Appropriate Focus on External Stability, But...**

19. Bilateral surveillance discussions have appropriately focused on reserve policies from the perspective of a country’s external stability. As noted earlier, this is entirely consistent with the main objective of IMF bilateral surveillance as elaborated in the 2007 Surveillance Decision.

20. IMF staff reports almost never focused on the cross-border implications of a country’s reserves.<sup>13</sup> In contrast to IMF Management’s recent warnings about the impact of excessive reserve accumulation on the international monetary system, the IMF’s reserve adequacy assessments at the bilateral level, including application of the new reserve adequacy metric (IMF, 2011c), have supported the accumulation of additional reserve buffers in several countries after the global crisis.

21. Barring a few exceptions, most IMF staff teams and country officials indicated that they did not think that IMF Management’s recent warnings about the cross-border spillovers

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<sup>12</sup> Quotes from IMF staff, country authorities, and documents are used for expositional purposes when they reflect views shared by several interviewees.

<sup>13</sup> There were a few exceptions including China (2005), where the Fund referenced reserve accumulation in the context of the country’s contribution to global imbalances, and Singapore (2010), where staff drew the authorities’ attention to the effect of reserves on “the global allocation of resources.” More recently, in 2011, staff noted the impact that a shift in China’s foreign exchange holdings could have on bond yields in other countries.

from reserve policies were relevant in their countries. Several country authorities readily accepted that their countries' reserves were much larger than their domestic needs, but they did not think that these reserves were large enough in a global context to pose a threat to international monetary stability. IMF staff working on those countries tended to agree. Indeed, the global crisis revealed that it was in the area of its members' external stability that the IMF's policy advice on reserves could have been more effective (see Section IIIB below). Moreover, the evaluation team could not identify analytically coherent conceptual frameworks that could underpin IMF policy advice to countries focusing on cross-border spillovers from reserves (see Dhar, 2012 for more analysis).

22. At times, IMF Executive Directors, rather than staff, raised the issue of possible externalities stemming from countries' high reserve holdings. For example, during the Board discussion of the 2010 Article IV consultation for an emerging market economy in Latin America, one Executive Director argued for a "more multilateral perspective on the assessment of reserve adequacy" and asked staff to consider "the global externalities associated with reserve accumulation beyond appropriate precautionary levels."

23. It must be noted that several staff members and country authorities believed that the IMF's advice on reserves was implicitly influenced by its global concerns. Since 2003, the IMF has been concerned about global current account imbalances, and the need for flexible exchange rates in emerging markets as part of a solution to mitigate a disorderly adjustment of these imbalances. Several country authorities indicated that these concerns were a subtext to the IMF's dialogue with its member countries on reserves. They understood the IMF's policy advice on reserves as a "diplomatic way" of talking about exchange rate policy.

### **B. ... Reserve Adequacy Assessments were Somewhat Complacent**

24. The liquidity shortages that countries faced in the aftermath of the crisis made them reassess the probable availability of foreign exchange liquidity—including in the form of international reserves—in a crisis. Several advanced and emerging market economies used their reserves to backstop their financial and corporate sectors during the liquidity crunch that materialized at the onset of the global crisis (Annex 3 provides more information). These considerations became relevant in both small advanced and emerging market economies, including those that the IMF perceived as having high reserves before the crisis.

25. In particular, the global crisis drove home the need for policymakers to take into account a more comprehensive view of external liabilities, given the implications of these liabilities for a country's financial stability. As noted earlier, similar themes had been

highlighted in the liquidity management framework (Box 1), given that it drew lessons from earlier crises.<sup>14</sup>

### Advanced economies: “financial stability matters”

26. The IMF held no in-depth discussions of reserve adequacy in advanced economies before the global crisis (Table 1).

According to some IMF staff, reserves were “off the radar screen” in advanced countries in general because of an assumption that these countries would always have access to financial markets or bilateral swap arrangements with large central banks. There was also a presumption that these countries would let their flexible exchange rates adjust in response to external shocks, and that the private sector was appropriately hedged against currency and maturity mismatches, given these countries’ access to deep and liquid financial markets. Some staff members believed that the Fund’s failure to assess reserve adequacy in advanced countries was due to a “lack of imagination,” which prevented staff from seeing that advanced countries, not just emerging market countries, could be subject to sudden stops of capital.

	All Countries	Advanced Economies	Emerging Markets
Evaluation Period, 2000–11	42	6	59
Pre-crisis, 2000–07	41	0	60
Crisis and after, 2008–11	44	16	57

Sources: Authors’ calculations based on a review of IMF documents for bilateral surveillance and discussions of IMF programs and arrangements for sample countries, 2000–11.

<sup>1</sup>Sample reflects the 190 instances where documents contained a ‘discussion’ of reserve adequacy. See Annex 1, paragraph 4 for how discussions were classified. Neither the rows nor the columns sum to a 100 percent because of different sample sizes in each category.

27. In hindsight, the IMF could usefully have raised awareness that reserves were low in relation to the external liabilities of the banking sector—although not necessarily to recommend a need for additional reserves. These liabilities partly reflected significant cross border inflows of wholesale funding into large banking systems.

28. To illustrate why reserves became an important policy consideration during the global crisis, the reserve to short-term debt indicator was calculated for some advanced countries in the sample. The calculations were done on the basis of data from the Joint External Debt Hub (JEDH) because of its easy accessibility and the absence of data on short-term external liabilities in the relevant staff reports or in the IMF’s IIP database; indeed some IMF staff teams also had to take recourse to this database (e.g., IMF, 2011e).<sup>15</sup>

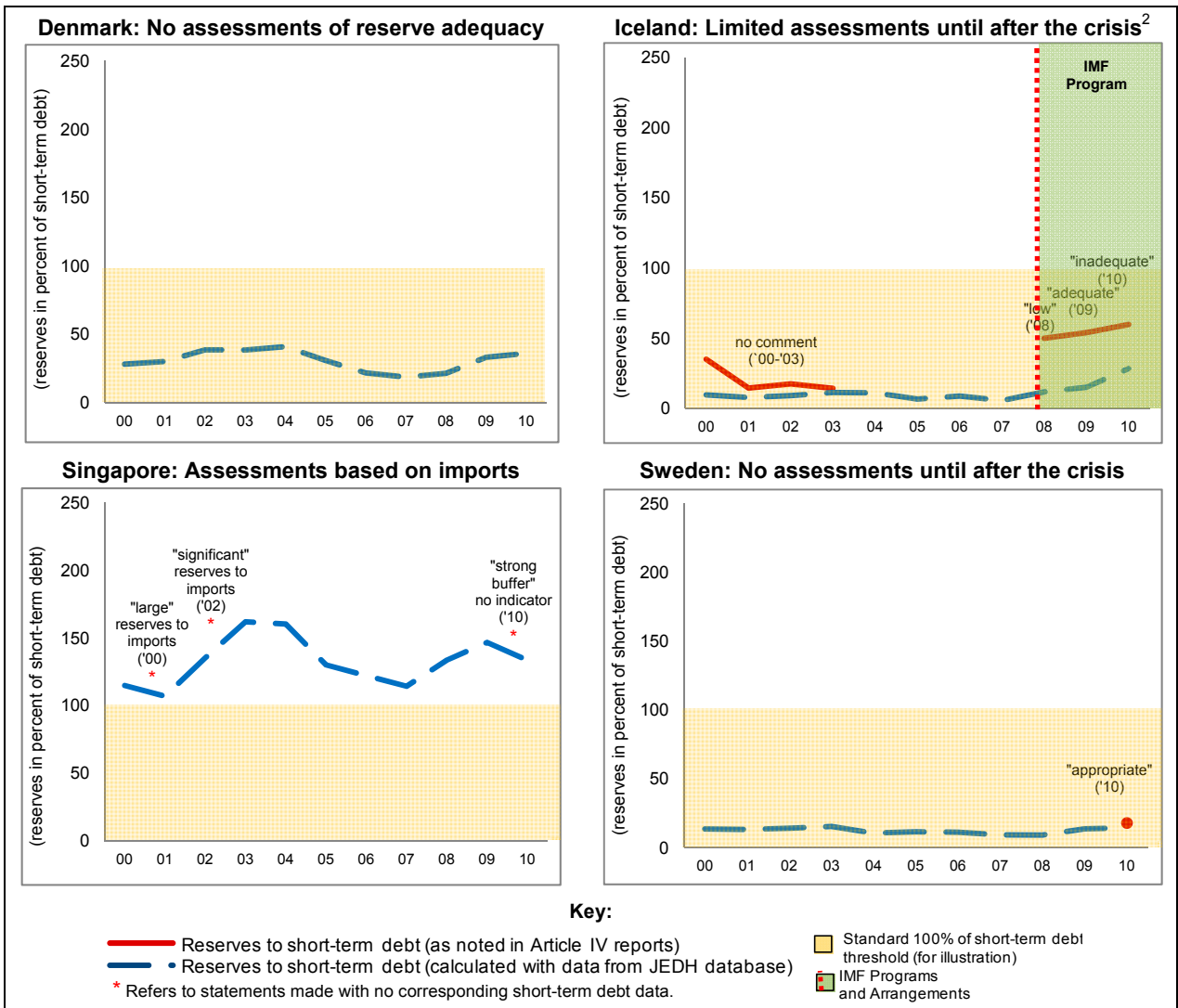
<sup>14</sup> For example, IMF (2004: 11) noted that “contrasting with a key premise of the Lawson doctrine, international experience demonstrates that authorities do often back the external debts of domestic private entities—either directly through bailouts and foreign currency liquidity support, or indirectly by intervening in the foreign exchange market.” “... The Lawson doctrine envisages institutional arrangements in which the private sector is fully responsible for the consequences of its financing decisions, so that there is no need for the government to cover private foreign exchange exposures.”

<sup>15</sup> This database was established after the crises of the 1990s. The use of this database should not be taken to imply that this database is preferable to the data provided by country authorities.



29. The results of this illustrative exercise are highlighted in Figure 1, with the blue line in all panels indicating the calculations based on the standard definition of short-term debt from the JEDH database, and the red lines indicating the IMF's analysis—or the lack thereof—as recorded in IMF Article IV documents (Annex 1 paragraph 11 provides detailed definitions.)

Figure 1. IMF Statements on Reserve Adequacy in Selected Advanced Economies<sup>1</sup>



Sources: Documents for IMF bilateral surveillance and IMF programs and arrangements, 2000–10; Joint External Debt Hub.

<sup>1</sup> Staff statements and data come from annual IMF staff reports. See Annex 1, paragraph 11 for definition of short-term debt based on the JEDH database. The standard 100 percent short-term debt threshold has been demarcated for illustrative purposes.

<sup>2</sup> Data from the JEDH data base may overstate short-term debt estimates depending on their treatment of obligations of failed banks.

30. IMF staff reports did not point out that in a number of small advanced economies, reserves seem to have been very low in relation to short-term external liabilities throughout the evaluation period. For instance, in the case of Iceland, reserve adequacy was hardly discussed even though the private sector was building up large foreign liabilities and the country authorities had actively begun considering options for increasing their access to foreign

currency liquidity for the banking system in 2005–06. Reserve accumulation subsequently became an important policy goal under the IMF-supported program that Iceland put in place in 2008. The case of Singapore is also interesting, in that the commentary on reserve adequacy was based on the ratio of reserves to imports (indicated by red stars in Figure 1), although the authorities themselves were focusing on the ratio of reserves to external liabilities.

31. Prior to the crisis, officials of some advanced countries considered the IMF’s approach to reserve assessments appropriate. They cautioned against “mechanically using reserve-based indicators that are designed for emerging market countries that could lose market access” and are much less relevant in the context of an advanced country that can issue debt in its own currency and operates a floating exchange rate regime (IMF, 2001b). They also noted that using standard short-term debt indicators could be misleading in the case of financial centers. Indeed, this pushback from some advanced-country authorities could be one reason why a few IMF surveillance teams did not focus on the ratio of reserves to short-term external liabilities.

32. These views appear to have changed following the emergence of liquidity shortages in the interbank market at the onset of the global crisis. Several officials from both large and small advanced economies reported that the crisis had had an “enormous impact” on their thinking about reserves. The crisis showed them that “it is much better to have liquidity centralized” because the liquidity that was available during the crisis was being hoarded by the private sector and could not be reallocated. In one advanced economy the central bank, which held reserves mainly for the purpose of intervening in the foreign exchange market to preserve the value of the currency, found itself facing the prospect of large-scale financial instability during the crisis; banks faced major funding gaps in dollars and euros; there were large capital outflows; and the country’s access to U.S. dollar swaps had matured. Officials from this central bank noted that they had learnt the following lessons about the need for reserves: “Size matters. Liquidity matters. International cooperation matters. Financial stability matters. Capital market access is not certain.”

### **Emerging market economies: private sector liabilities “an eye opener”**

33. Excluding special cases like China and oil exporting countries,<sup>16</sup> the IMF conducted reserve adequacy assessments in most of the emerging markets in the sample (93 percent), in recognition of the greater historical tendency of such countries to experience balance of payments difficulties (Table 2). Most of the emerging market country authorities who were interviewed for this evaluation considered this degree of focus to have been appropriate. In interviews, both IMF staff and country authorities indicated that discussions of reserve adequacy were more frequent than documented in surveillance reports. However, the

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<sup>16</sup> Assessments were conducted less frequently for some specific emerging market economies (including oil producers) whose reserve holdings vastly exceeded traditional indicators. In these cases, assessments were judged not to be high on the agenda for Article IV consultations since both staff and authorities agreed that reserves were greater than precautionary needs.

evaluation team also came across cases where Fund staff refrained from discussions due to sensitivities of the authorities (especially in countries whose external vulnerability was considered to be limited) and cases where country authorities preferred to avoid discussions of reserves because they considered these to be implicitly discussions of exchange rate policies.<sup>17</sup>

	Discussion	Limited Discussion	No Discussion
All Countries	42	25	33
Advanced Economies	6	14	80
Emerging Markets	59	30	11
Excl China & Oil Exporters	70	23	7
o/w not in IMF Programs	60	31	9

Sources: Authors' calculations based on a review of documents for IMF bilateral surveillance and IMF programs and arrangements for sample countries, 2000–11.  
<sup>1</sup>Sample reflects all 454 instances. See Annex 1, paragraph 4 for how discussions were classified. The rows sum to 100 percent.

34. IMF analyses appropriately emphasized the short-term debt indicator but its assessment of reserve adequacy was more sanguine than warranted in a number of cases. In some countries, the IMF did not draw attention to the declining reserve coverage of short-term debt even as this dipped below standard thresholds. In other cases, surveillance reports took an unduly positive view of reserve adequacy because staff had not taken a sufficiently comprehensive view of a country's external liabilities. The crisis exposed channels of vulnerability and contagion that had not previously been taken into account. In particular, it revealed large external exposures due to derivatives in the corporate sector in a number of countries (almost a third of the emerging markets in the sample), as well as calls on reserves due to non-resident investments in equities and domestic bonds, including bonds denominated in local currencies. These exposures took both country authorities and the IMF by surprise, and raised actual or potential concerns about lack of sufficient reserves including in countries whose reserves had previously been categorized by the IMF as "high." Country officials, though, generally did not fault IMF surveillance for their advice on international reserves, because the crisis revealed new information and constraints that they themselves had not been cognizant of.<sup>18</sup>

35. Data to underpin a comprehensive measurement of external exposures are hard to come by. However, some information on nonresident liabilities is available in the External Wealth of Nations database (Annex 4) and has begun to be used by IMF staff recently (e.g., in IMF, 2010a and 2010d) to determine countries' exposures to non-residents.

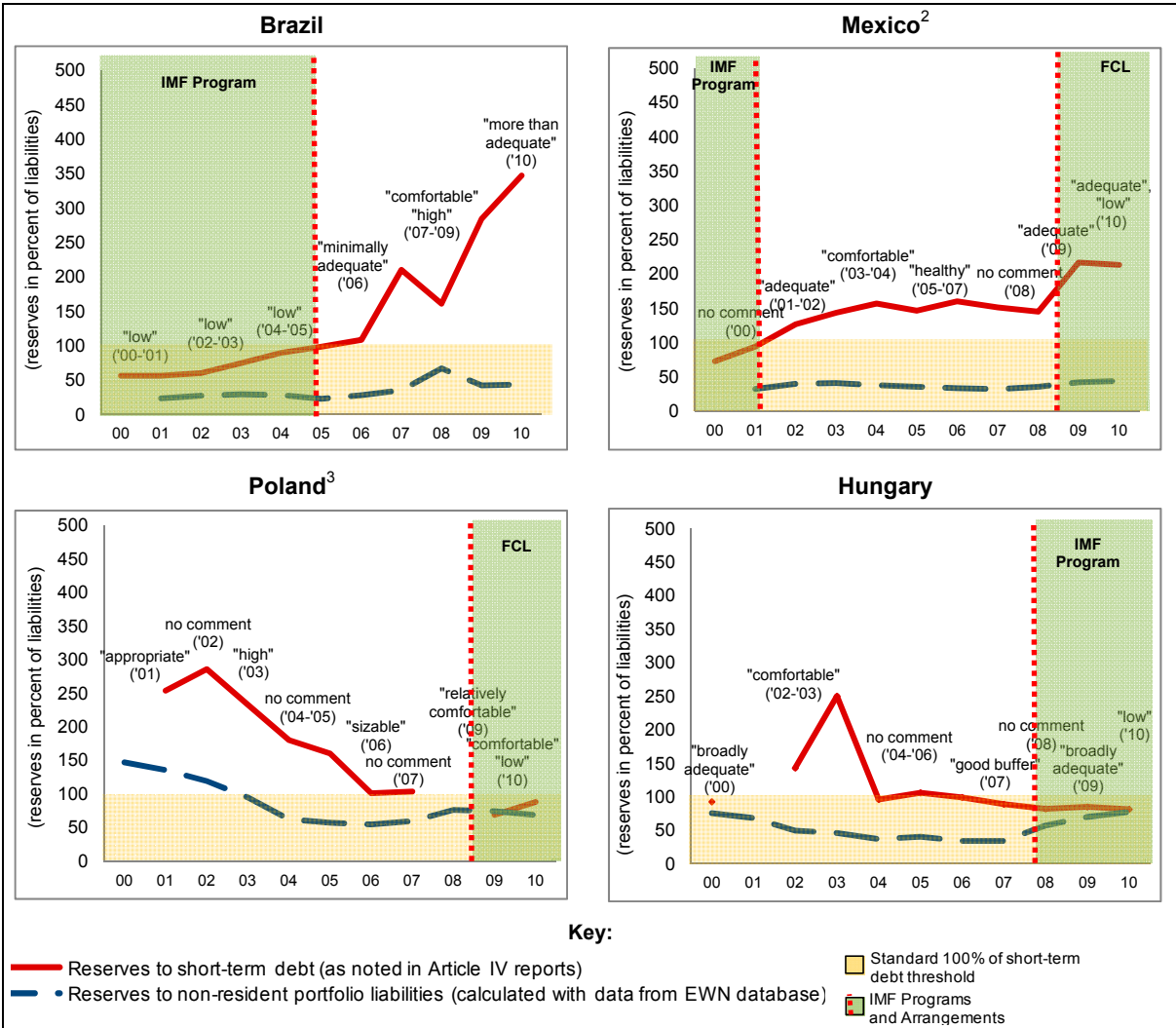
36. For illustrative purposes, Figure 2 indicates how the reserves coverage of such nonresident liabilities might have looked in a select group of countries. For lack of a better alternative, these calculations were done using data on total nonresident liabilities taken from

<sup>17</sup> Not surprisingly, reserve adequacy assessments were always done in countries with IMF-supported programs and arrangements. Assessments of reserve adequacy are central to the IMF's policy discussions with member countries in the event of use of IMF resources (Annex 2).

<sup>18</sup> IMF (2000b: 17) argues that the measure of short-term external debt used to assess reserve adequacy should be "a comprehensive measure of external debt (i.e., the non-equity elements of external liabilities), regardless of instrument or currency denomination."

the External Wealth of Nations database (as indicated by the blue lines in all panels in Figure 2). In comparison, the assessment of reserve buffers based on the standard definition of short-term debt in IMF staff reports in the corresponding years (as indicated by the red lines in Figure 2) paints a more optimistic picture, suggesting a need to look more deeply at external liabilities.<sup>19</sup>

Figure 2. IMF Statements on Reserve Adequacy in Selected Emerging Market Economies<sup>1</sup>



Sources: Documents for IMF bilateral surveillance and IMF programs and arrangements, 2000–10; External Wealth of Nations database.

<sup>1</sup> Staff statements and short-term debt data come from annual IMF staff reports. See Annex 1, paragraph 11 for definition of non-resident portfolio liabilities. The standard 100 percent short-term debt threshold has been demarcated for illustrative purposes.

<sup>2</sup> The staff report (IMF, 2010b) stated that reserves were adequate for normal times but low for periods of severe external stress relative to key balance sheet exposures.

<sup>3</sup> No staff reports were available for Poland in 2000 and 2008.

<sup>19</sup> A similar picture emerges when an enhanced definition of short-term debt (including debt securities held by non-residents and cross-border deposits with BIS banks) is used from the JEDH database.

37. In the case of Poland (third panel in Figure 2), not only did the IMF not take into account local currency exposures to nonresidents, it also remained sanguine about reserve adequacy despite the sharp decline over time in the ratio of reserves to external liabilities that were already known at that time. The IMF did not sufficiently emphasize the need to increase reserves until after the crisis when Poland requested an FCL arrangement from the IMF to shore up market confidence. Similarly, staff assessments of reserve adequacy for Hungary (indicated by the red lines in the fourth panel in Figure 2, respectively) seem to have been too sanguine given the decline in the reserves to short-term debt ratio over time.

38. As documented in IEO (2011), the IMF's Vulnerability Exercise for Emerging Market Economies (VEE) was more cognizant of risks (Annex 5), especially for emerging market economies in Europe. The VEE analysis tended to highlight concerns about reserves much more clearly than did bilateral surveillance reports. For example, in 2005 and 2006, it classified half of the emerging markets in the sample (15 countries) as either high or medium risk in terms of reserve adequacy.

39. However, in bilateral surveillance documents for the corresponding years, several of these countries had either no discussion of reserves or discussions highlighted positive views on reserve adequacy.<sup>20</sup> The messages from the VEE did not filter through to Article IV consultations due to an understatement of vulnerabilities by IMF staff.<sup>21</sup> Senior IMF staff noted that this was because in several emerging European countries current account deficits were seen as "a sign of strength" since they meant that countries could attract the massive capital inflows they needed to achieve convergence quickly. In hindsight, this proved to have been overoptimistic.

#### **IV. THE IMF'S APPROACH TO RESERVE ADEQUACY: NEED FOR DEEPER ASSESSMENT OF VULNERABILITIES**

40. This section highlights key lessons learnt in the aftermath of the global crisis by both the IMF and, sometimes, country authorities. It illustrates some problems in the IMF's pre-crisis approach to thinking about reserves that led to complacency in the IMF's assessments of the need for reserve buffers. It also distills the main reasons why country authorities considered IMF advice to be "pro forma" and of uncertain value more generally, to the extent these views could also be corroborated on the basis of evidence from documents and staff interviews.

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<sup>20</sup> Financial market participants, too, seemed to be more aware of the risks. Market analysts and rating agencies emphasized the use of country-specific information, balance sheet considerations, and qualitative information about a number of institutional factors to form their assessments of reserve adequacy (Annex 6). In interviews, country officials in one emerging market economy reported learning about derivative exposures of corporate sectors from investment banks who had sold these products to the private sector in the first place.

<sup>21</sup> See also Banerji (2010) and Wagner (2010).

### A. Overemphasis on Exchange Rate Flexibility

41. In hindsight, the IMF’s focus on exchange rate flexibility was sometimes to the detriment of its assessment of reserve adequacy. Typically, the IMF discussed reserves in the context of exchange rate and monetary policies, and capital flows. IMF staff reports frequently made the case that flexible exchange rates facilitated the absorption of external shocks, were conducive to the development of domestic financial markets, and helped to discourage speculative capital inflows and excessive risk taking by the private sector. They argued that interventions could undermine confidence in the inflation targeting frameworks of countries that did not have a long track record of credible inflation targeting. To discourage intervention, the IMF sometimes emphasized the high cost of holding excess reserves and the overall ineffectiveness of intervention in stemming capital inflows. A former senior staff member in the IMF’s Asian region noted that the IMF advised countries that they did not need to accumulate large reserves, basing its advice largely on the benefits of allowing the exchange rate to appreciate as compared to the inefficiencies and costs of holding excessive reserves.

42. While seeing reserves as providing useful insurance for external stability, once reserves were beyond a certain threshold the IMF tended to emphasize the precautionary benefits to a lesser degree than did country authorities.<sup>22, 23</sup> A common message from the IMF to emerging market economies was that their reserve holdings were “comfortable” or “high” (Table 3).<sup>24</sup> However, several countries in the sample that received this message in 2007–08 had to resort to balance of payments financing at the onset of the global crisis, either through IMF precautionary or non-precautionary financing, or bilateral swaps.

	All Countries	Advanced Economies	Emerging Markets
“Low”	38	2	36
“Comfortable”	104	6	98
“High”	71	6	65
“Excessive”	6	0	6
No Comment	86	15	71

Sources: Authors’ calculations based on a review of documents for IMF bilateral surveillance and IMF programs and arrangements for sample countries, 2000–11.  
<sup>1</sup> Sample reflects the 305 instances where there was some discussion on reserve adequacy. See Annex 1, paragraph 5 on how different statements were classified into the five categories.

43. Moreover, sometimes the IMF appeared to see a freely floating exchange rate as a virtue in and of itself. In several cases (e.g., Poland, as discussed earlier), the IMF did not

<sup>22</sup> IEO (2007: 16) concluded that the IMF has generally advised against accumulating reserves aimed at containing the appreciation of the exchange rate in the event of strained competitiveness. However, such advice was deemed “highly judgmental” as it was unaccompanied by an “explicit analysis of an adequate level of precautionary reserves (linked to the exchange rate regime, nature of shocks, and country conditions).”

<sup>23</sup> Some IMF staff and policymakers from both advanced and emerging market economies believe that the IMF should have provided a tougher message to countries on the need to stop holding excessive reserves. They noted that staff analysis was geared toward conveying a “politically more convenient message” to authorities who were sensitive to criticisms of their reserve policies, namely that reserves were at appropriate levels at the moment, but could become too high going forward.

<sup>24</sup> Not surprisingly, assessments that reserves were “low” were most frequent in countries with IMF-supported programs or arrangements in place.

draw attention to the declining ratio of reserves to external debt while being supportive of the policy of non-intervention in the foreign exchange market. The liquidity management framework did emphasize flexible exchange rates as one of many factors that limit the need for reserves, but it also noted that “in practice a flexible rate does not negate the need for reserves” (IMF, 2004: 4).

44. The emphasis on reserve buffers differed between IMF staff and country authorities because of a difference in perspective on how policies should respond to capital inflows. The IMF saw a greater role for the exchange rate in a country’s adjustment to capital inflows. In the view of IMF senior staff, exchange rate flexibility was “the least bad option when it came to achieving the ‘impossible trinity’ of containing inflation, allowing capital inflows, and maintaining exchange rate stability.” Policymakers in emerging markets, on the other hand, noted that the history of capital flows indicates that they are like tsunamis and come and go in waves, with cycles often lasting a long time. They noted that the size and composition of the capital flows into the country have a strong bearing on the amount of reserves it needs to hold.

45. Some country authorities also noted that flexible exchange rate regimes can be consistent with reserve accumulation as long as intervention strategies are designed in a manner that does not interfere with the market determination of exchange rate levels. The IMF too has been supportive of reserve accumulation in the context of such intervention strategies in several countries in the sample. However, in some other countries, its policy advice has not taken into account the fact that reserve accumulation to build precautionary buffers might be possible without compromising the flexibility of the exchange rate.

46. More generally, there is a common view among officials from many emerging market economies that the IMF focuses too much on the benefits of exchange rate flexibility and not enough on the benefits of holding reserves (Annex 3). In thinking about the tradeoff between the costs and benefits of reserves, country officials often mentioned a range of benefits that were important in their own assessments but not easily incorporated into either single indicators or formal models. In addition to precautionary self-insurance (also emphasized by the Fund), reserves provide the important advantages of reliable access to funds in a crisis; policy autonomy to act independently, quickly, flexibly, and counter-cyclically; and, as was evident during the global crisis, a “bazooka” that instills confidence. Country authorities also saw a role for reserves in fostering financial stability. The IMF’s bilateral surveillance reports generally contained little discussion of the costs and benefits of holding reserves. Instead, their analyses focused on the benefits of exchange rate flexibility.

## B. A Mechanical Approach

### Pre-crisis focus on traditional indicators

47. The IMF’s policy advice and judgments on reserve adequacy largely relied quite narrowly and perfunctorily on traditional indicators (Tables 4 and 5). Assessments were most often based on only one or two criteria (Table 5), often comprising only the traditional indicators. Countries were generally considered to have high or comfortable reserves if their ratios of reserves to debt and imports exceeded the standard rules of 100 percent of short-term debt and 3–4 months’ import coverage respectively.

Table 4. Use of Different Methodologies in Bilateral Surveillance <sup>1</sup> (In percent of sample)				Table 5. Number of Criteria Used as Basis for Staff Statements and Judgments on Reserve Adequacy <sup>1</sup> (In percent of sample)	
	All Countries	Advanced Economies	Emerging Markets		
Traditional Metrics:					
Imports	56	38	58	1 Criterion	22
Short-term External Debt	62	38	64	2 Criteria	25
Monetary Aggregates	22	14	23	3 Criteria	17
Combo Rules	14	0	16	More than 3 Criteria	28
Scenario Analysis	20	10	21	No Indication of Criteria Used	8
Cross-country Comparisons	30	14	31		
Model-based Estimates	7	3	8		
Sources: Authors’ calculations based on a review of documents for IMF bilateral surveillance and IMF programs and arrangements for sample countries, 2000–11.				Sources: Authors’ calculations based on documents for IMF bilateral surveillance and IMF programs and arrangements for sample countries, 2000–11.	
<sup>1</sup> Sample reflects the 305 instances where there was some discussion of reserve adequacy in documents for surveillance and IMF programs and arrangements. Only those methods are counted that were actually referred to in policy discussions. Neither the rows nor columns add up to 100 percent because staff analysis relied on various combinations of the above methodologies.				<sup>1</sup> Sample reflects the 222 instances where there was some discussion of, as well as explicit statements on, reserve adequacy in documents for bilateral surveillance and IMF programs and arrangements.	

48. IMF staff judgments on reserves seem to have placed most emphasis on the short-term debt indicator. For assessments in emerging market economies, this emphasis was understandable; it reflected the lessons from crises of the 1990s, and the emphasis on the short-term debt indicator as an early warning signal of exchange market stress. Indeed, as seen in Section III above, the ratio of reserves to short-term debt did signal emerging problems before the global crisis. But, as also noted above, there was little discussion of this indicator for advanced countries, even when their banks were borrowing heavily abroad, as happened in Iceland.<sup>25</sup>

<sup>25</sup> In this regard, it should be noted that the liquidity management framework had emphasized that the short-term debt indicator was the single most useful predictor of crises, but that it “should be regarded, at most, as only an ‘amber light,’ suggesting the need for further investigation,” (IMF, 2000a). The framework had also stressed the use of a comprehensive measure of external debt “regardless of instrument or currency denomination,” and that “debt to nonresidents [should be] included, and debt to residents excluded, regardless of the currency of denomination,” (IMF, 2000b: 17). It also noted the need to take into account the external

(continued)



49. The use of the import coverage indicator also appears to have been fairly widespread and in several cases provided the sole basis for the Fund’s assessments (Table 4). This indicator was also reported in statistical tables in the case of large financial centers such as the United States and Switzerland. While reliance on the import coverage indicator could be deemed consistent with recent IMF Bilateral Surveillance Guidance Notes, it runs counter to the IMF’s analysis in 2000–04 that the import indicator was of value mainly in countries that have no or limited access to capital markets—not a description that fits the advanced or most of the emerging markets in the evaluation sample.

50. The frameworks chosen to analyze reserve adequacy were not always well justified. One senior staff member noted that Article IV teams knew they needed to look at the reserve indicators, but that it “was not clear what they were supposed to do with these indicators” unless the indicators showed that reserves were too low. The lack of clarity is not surprising since, despite stating the need to take into account “country characteristics and vulnerabilities” (see IMF, 2010f for example), the Bilateral Surveillance Guidance Notes did not elaborate much on the circumstances under which it might be useful to use one indicator over another.

51. The choice of frameworks appears to have been based on a number of ad hoc considerations and subject to inertia. In interviews, staff indicated that the availability of data, easily replicated computer programs, and the methodologies used by peers and predecessors were important considerations. For instance, once model-based reserve estimates had been calculated for a country, the odds significantly increased that this approach would be applied subsequently. Similarly, the same cross-country comparators tended to be selected every year despite changes in country circumstances. Analytical work produced by IMF staff also tended to be replicated (Box 2).

### **Deeper analysis after the crisis**

52. In a marked reversal of their earlier stance, officials of some advanced countries are now looking for IMF analyses on appropriate reserve levels following their experience during the global crisis. A senior official in one advanced country noted: “The IMF should have a view on reserve adequacy in advanced countries. The world has learnt the hard way that markets are at their worst when they are needed the most.”

53. In response to authorities’ requests, IMF staff has started thinking more about reserves in advanced countries (Table 2, Figure 1 panel on Sweden, and Annex 7). Both staff and country authorities expressed frustration with the lack of conceptual frameworks within and outside the IMF to guide their thinking about the role of reserves in providing financial stability. Absent IMF guidance or analyses on these issues, some staff teams have started

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vulnerability of the corporate and financial sectors, including off-balance sheet items such as derivatives, even though it acknowledged that the necessary data might be hard to get.

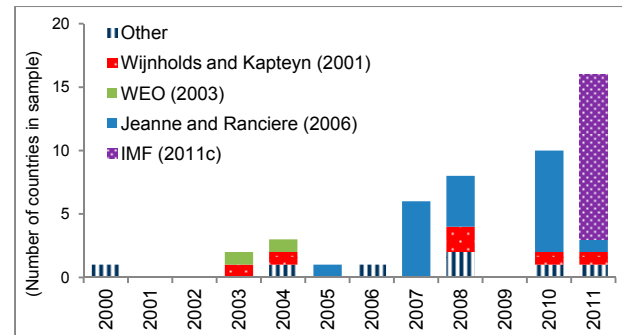
developing alternative frameworks to address these concerns (see Annex 7 on Sweden). Other IMF teams are using standard short-term debt indicators (Figure 1 panel on Iceland).<sup>26</sup>

### Box 2. Influence of IMF Staff Research on Bilateral Surveillance<sup>1</sup>

Assessments of reserve adequacy in IMF bilateral surveillance have been increasingly influenced by various analytical papers produced by IMF staff (Figure). The methodology of research papers such as Wijnholds and Kapteyn (2001) were applied throughout the evaluation period, although to a limited extent.

Papers discussed at the IMF Board tended to have a bigger impact. For instance, following the publication of a *WEO* chapter (IMF, 2003) that utilized a multivariate regression model to explain the demand for reserves, this methodology was replicated in several selected issues papers and other background research for bilateral surveillance. Jeanne and Rancière (2006) which featured in a policy paper (IMF, 2006) that was discussed informally by the IMF Board, and introduced a new analytical approach to infer the “optimal precautionary, buffer stock” reserve levels, had an even bigger impact on reserve adequacy assessments in bilateral surveillance. Although still early, use of the new reserve adequacy metric (IMF, 2011c) has already had a significant impact on reserve adequacy assessments in bilateral surveillance and its influence is expected to grow further with its application in the new External Sector Report.

Figure. Use of Select IMF Methodologies in Bilateral Surveillance, 2000–2011<sup>1</sup>



Source: Authors' calculations based on a review of IMF bilateral surveillance and program documents for sample countries, 2000–11.

<sup>1</sup> Countries are counted more than once if multiple methodologies were applied to them in a year. 'Other' refers to other methodologies of estimating the demand for reserves that were developed by IMF staff but were used infrequently.

<sup>1</sup> For a comprehensive view of IMF-developed methodologies on reserve adequacy, see Aizenman and Genberg (2012).

54. To its credit, the IMF shifted its stance on reserve adequacy in several emerging market cases following the onset of the global crisis. One IMF senior staff member indicated that staff had “learnt one lesson from the crisis,” namely the need to place greater value on higher insurance, especially in countries with highly open capital accounts and liquid financial markets that had not yet overcome “original sin.”<sup>27</sup> There is now an acknowledgment of the need for a fuller assessment of balance sheets and structures of the economy, balance sheet drains, and flows in the international investment position, although giving policy advice is still a matter of judgment and fraught with difficulty. As countries experienced difficulties during the financial crisis, the IMF’s statements on reserve adequacy

<sup>26</sup> Some assessments are also being carried out as part of the Vulnerability Exercise for Advanced Economies (VEA), as noted in Annex 5.

<sup>27</sup> This term was first mentioned in this context in Eichengreen and Hausmann (1999) to describe “a situation in which the domestic currency cannot be used to borrow abroad or to borrow long term, even domestically.”

became more pessimistic, even as countries increased their reserves coverage beyond pre-crisis highs.

55. Since the onset of the crisis, IMF staff has also started looking more closely at corporate sector exposures and vulnerabilities. The IMF has acknowledged the lack of data on cross-border foreign exchange derivatives and exposures of nonfinancial and financial corporations, and is working to fill this gap.<sup>28</sup> IMF senior staff members noted that still more data are needed to analyze these “known unknown” exposures.

56. Country authorities indicated that the IMF needs to pay more attention to the role of reserves in preserving financial stability. They believed that the declining reserve coverage of the financial liabilities of the financial sector should have been on the IMF’s radar screen, and that a country’s level of reserves should take into account the size of its financial sector. They noted that IMF surveillance, in general, does not put the necessary emphasis on the domestic role of the reserves as part of the toolkit for “backstopping the financial sector,” and they wanted the IMF to push the discussion of reserves in this direction.

57. However, policymakers did not suggest that countries should or do rely first and foremost, and only on reserves to preserve financial stability. Indeed, citing concerns about moral hazard, authorities from several countries reported actively limiting or monitoring the external exposures of private sector entities through a variety of prudential measures. Some countries chose to put limits on derivative positions and to make sure that there were “no hidden financial skeletons” in the financial and corporate sectors.

### **The new reserve adequacy metric: does not go far enough**

58. The new reserve adequacy metric (IMF, 2011c) improves on the traditional short-term debt indicator in a number of ways.<sup>29</sup> Specifically, it combines short-term debt, other portfolio liabilities, the stock of broad money, and exports in a composite gauge of potential foreign exchange pressure. The relative weights of each of these factors are determined by the size of the drains they caused in past periods of stress in the market.

59. Although the Executive Board has asked for further clarification in a number of areas, this metric is considered by many IMF staff to be the new “marching orders” on how to assess reserve adequacy. Staff members who were interviewed indicated that there is a strong institutional push to incorporate this tool into bilateral surveillance. The use of the

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<sup>28</sup> The IMF has started to address these issues by working with the Bank for International Settlements and the Financial Stability Board to improve measurement and monitoring of exposures by creating an inventory of cross-border positions and making these available to the public (see IMF 2009e, 2010b, and 2011d). The Corporate Vulnerability Utility, developed by staff in the IMF Research Department in 2005, was updated in 2011 to cover 74 countries and has been integrated into the Vulnerability Exercise.

<sup>29</sup> For deeper analysis of the new metric, see Aizenman and Genberg (2012).

methodology in IMF (2011c) has been facilitated by an internal website promoting its application, although the 2012 Bilateral Surveillance Guidance Note (IMF, 2012a) merely “encourages” its use.<sup>30</sup>

60. The lessons from the global crisis indicate that this metric, while a step forward, does not go far enough. IMF staff and country authorities noted that the new reserve adequacy metric, while useful as an additional measure of balance of payments drain does not focus sufficiently on the issues that came to light in the aftermath of the global crisis. Nor does it provide a conceptual framework to assess reserve adequacy in advanced countries and financial centers. Moreover, by focusing on historical shocks, it is not very helpful in addressing the complexities involved in assessing the need for reserve buffers in large emerging markets with rapidly evolving institutions and large cross-border capital flows.

61. Several officials of emerging market countries reported that, having “learnt their lessons” from past crises, they take a comprehensive approach to assessing reserve adequacy. Though they use the methodologies listed in Table 4, they see their reserves policies as an integral component of a broader approach of asset-liability and liquidity management at the national level. A key objective is to preserve financial stability. Several countries conduct stress tests and do sensitivity analysis on their international reserve portfolios, including scenario analysis on the banking sector. While there is some evidence of this broader approach in recent IMF staff reports, its use by the IMF has been fairly limited overall.

### **C. Greater Country Specificity**

62. Country authorities argued for an approach to assessing reserves that pays more attention to country characteristics. In particular, they noted the need to take into account the depth of foreign currency markets, the nature of capital flows, and the capacity of the private sector, especially the financial sector, to respond to capital inflows in a manner that does not endanger financial stability.

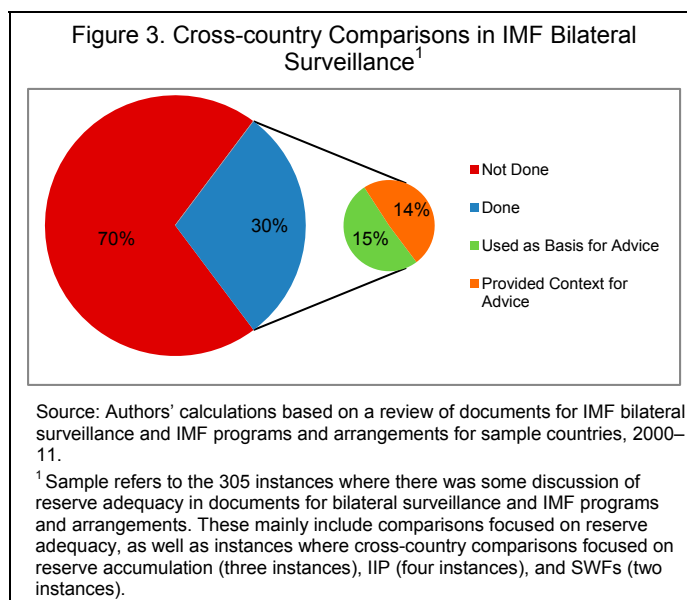
63. Country authorities remain concerned about the extent to which the new metric could be adapted to country-specific circumstances. Some IMF staff sympathize with this concern, though staff opinions differ about how flexibly the metric should be applied to different countries. Some staff members believe, like country authorities, that flexibility would make the metric more useful and relevant in country contexts. Other staff members believe that evenhandedness requires the use of a common metric for all countries and that giving country mission teams too much freedom to adjust the metric would reduce its value as a tool for cross-country comparisons.

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<sup>30</sup> The internal site is available at [www-intranet.imf.org/departments/SPR/Surveillance/Pages/ARA.aspx](http://www-intranet.imf.org/departments/SPR/Surveillance/Pages/ARA.aspx). The site applies the new reserve adequacy metric to most emerging markets and facilitates comparisons across countries.

64. The IMF’s cross-country analysis to underpin policy advice on reserves could be seen as an example of insufficient understanding of country-specific circumstances.<sup>31</sup> Country authorities argued for deeper comparisons than the IMF tends to provide.

65. Cross-country comparisons have provided either the basis or the context for the IMF’s policy advice on reserves, especially in emerging market economies (Table 4 and Figure 3). As countries became integrated in global goods and financial markets in the last decade, IMF staff increasingly saw such peer comparisons as providing useful information about countries’ relative vulnerability. Cross-country comparisons are often used by rating agencies and foreign investors (Annex 6). IMF teams have increasingly used cross-country information to gauge the appropriateness of both reserve levels and the pace of accumulation, and to justify access to IMF financing, with several analyses concluding that countries had “scope for further accumulation.”<sup>32</sup>



66. The IMF’s cross-country analyses were often broad-based rather than deep. A common example of cross-country analysis on reserves consists of one or more figures in an IMF surveillance report plotting one or more reserve adequacy indicators across a number of comparator countries with some indication of an appropriate threshold for comparison, such as a cross-country average, or the standard rules of thumb regarding adequacy thresholds.

<sup>31</sup> In this context, it must be noted that reserve adequacy indicators tended to be better adapted to country specifics in countries that had IMF programs or arrangements. For example, in Peru, which had several IMF-supported programs during the sample period and a high rate of dollarization, staff used several indicators that included foreign currency deposits. Similarly, in a number of countries with recent IMF-supported programs and arrangements, authorities reported that the IMF has been more cognizant of country-specific risks when discussing reserve adequacy. Some staff and authorities indicated that this was so because of the use of greater and more dedicated staff resources in program cases and more frequent and intensive discussions with country officials, which led to greater awareness of country-specific factors that could influence vulnerabilities.

<sup>32</sup> Recent guidance for the IMF’s Flexible Credit Line (IMF, 2012c) notes: “Staff should compare reserve levels across peer countries and according to different metrics relevant for given country-specific vulnerabilities and relevant for the exchange rate regime (e.g., the Fund’s ARA metric as well as standard metrics such as reserves-to-short term debt at remaining maturity plus current account deficit, reserves to imports coverage, reserves to M2 ratio).”

67. A comparability index was constructed for illustrative purposes. The index is a simple average of ten country-specific characteristics—equally weighted for simplicity in exposition. Most of these characteristics were identified in the liquidity management framework as important, and information on them is easily available from various IMF data bases (see Annex 1, paragraph 7–8 for more on this index).<sup>33</sup> Using the comparability index, Figure 4 highlights some examples of cross-country comparisons in the IMF’s bilateral surveillance. More than two-thirds of the cross-country comparisons found in the sample were problematic. Very often, no justification was given for the choice of comparators, or the justification was based on considerations that were less relevant for reserve adequacy. Twenty-five percent of the cross-country comparisons were to generic country groups such as “other emerging markets” or “peers.”

68. The choice of comparator countries varied widely. The number of comparators in a single cross-country comparison ranged from 1 to 70 within the sample, and the average number of comparators doubled from 10 to 20 per country over the evaluation period. For the countries featured in Figure 4, for example, most of the comparator countries chosen were not very comparable according to the index (i.e., sharing fewer than 50 percent of the same characteristics), and it was not uncommon to find comparisons between largely dissimilar countries (sharing 21–40 percent of the characteristics). Looking back on these comparisons, one senior IMF staff member characterized them as indicating “a certain lack of professionalism.”

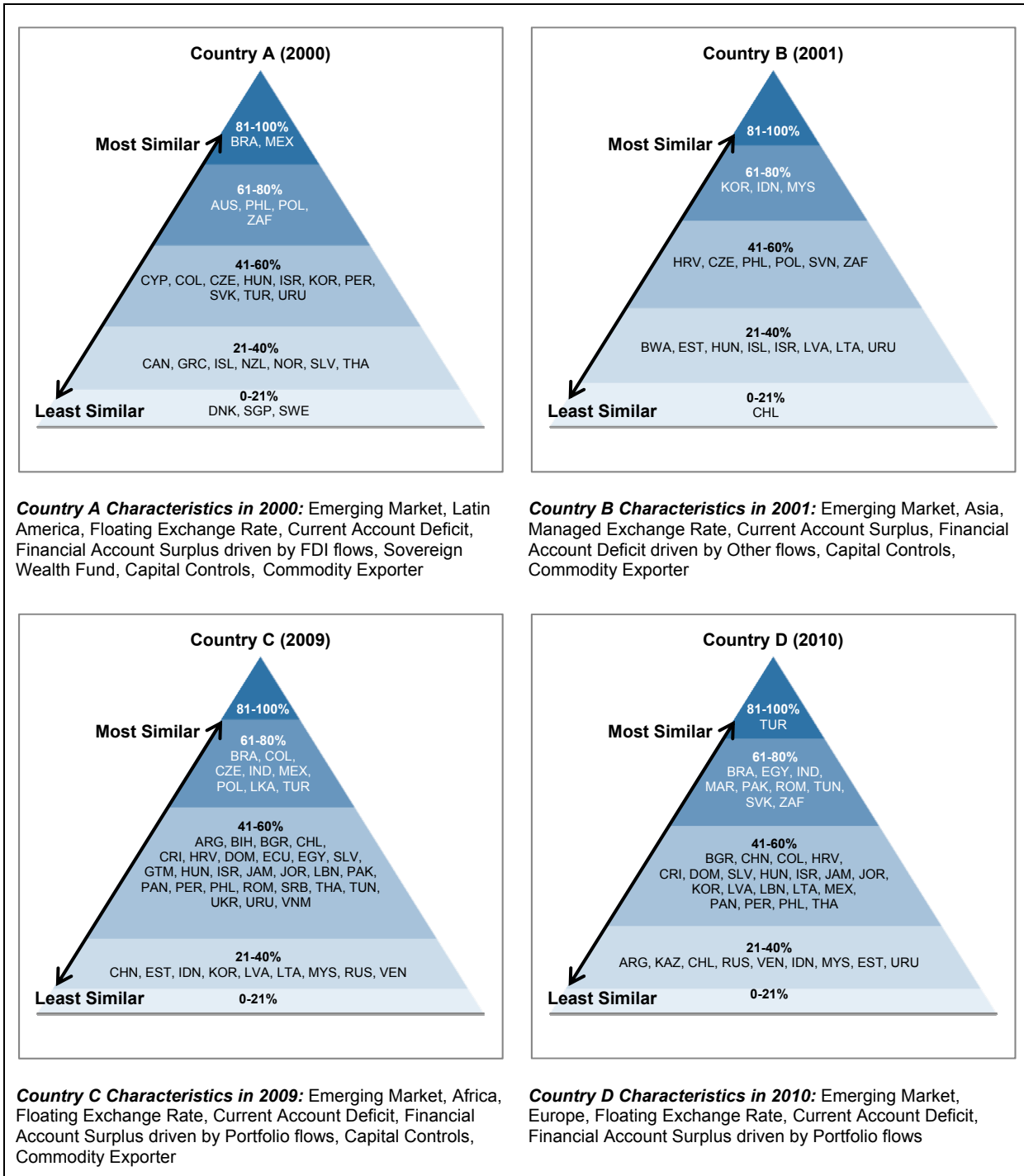
69. More generally, most IMF cross-country analyses rarely acknowledged country-specific differences in definitions and coverage of reserves, or noted whether such differences hampered comparability.<sup>34</sup> In at least 25 percent of the cases, both Korea (which includes SWF assets in its definition of reserves) and Chile (which does not) were included as comparator countries without any mention that the total foreign currency liquidity available to the authorities in some countries during a crisis might be greater than suggested by the analysis.

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<sup>33</sup> The comparability index should by no means be interpreted as the correct or only mechanism for selecting appropriate comparators. Indeed, the evaluation team also found a few examples of cross-country analyses — notably, the case of Algeria in 2011—where the choice of a disparate set of comparator countries was entirely appropriate given the specific question being examined and a clearly justified selection criterion. In this case, staff analysis examined the experience of regional oil exporters to assess the appropriate level of reserves for a country exporting exhaustible natural resources that needs to save for future generations. In addition, the analysis provided appropriate caveats (e.g., with regard to data limitations) that affected comparability.

<sup>34</sup> For example, Brazil defines trade credits as a part of its short-term debt while Chile does not; the Philippines adjusts its reserves data to exclude gold and securities pledged as collateral against short-term liabilities; and Hong Kong SAR uses data on retained imports instead of total imports.

Figure 4. Similarity of Comparators in Cross-country Comparisons<sup>1</sup>



Sources: Authors' calculations based on documents for IMF bilateral surveillance and IMF programs and arrangements for 43 sample countries, 2000–11.

<sup>1</sup> Illustrates comparator countries for a given country in a given year. Based on a comparability index created on the basis of several characteristics noted in the liquidity management framework. See Annex 1, paragraphs 7–8 for details on the methodology.

70. Cross-country comparisons did not always take account of differences in exchange rate regimes. For example, several countries with flexible exchange rate regimes were compared with Latvia and Estonia (as seen in Figure 4), even though the latter two countries had fixed exchange rates and faced significantly different external vulnerabilities. In fact, the evaluation team found that a third of the comparisons matched countries that had flexible exchange rates with countries that maintained fixed exchange rates or were in a monetary union, where countries often face a different set of external vulnerabilities. Furthermore, while some central bank governors noted that their own cross-country comparisons excluded China, which they considered a special case given its large reserve holdings (a by-product of its exchange rate policy), a third of the IMF's comparisons used China as a comparator country (Figure 4 provides some examples).

71. Reserve adequacy was sometimes assessed in comparison to countries that the IMF otherwise considered as having high or excess reserves. For instance, one large emerging market economy was used as a comparator for several countries in 2010, when, at the same time, the IMF's 2010 Article IV consultation assessed that country's reserves to be excessive. China and Russia, both of which have a large share of global reserves, are among the top 15 most frequently used comparators in the sample. The choice of these comparator countries could also lead to a lack of consistency with the IMF's messages about the impact of excess reserves on the international monetary system.

72. Interviews for this study showed that some IMF teams had a clear idea about the select group of countries that were the best comparators for their own countries even though these criteria were not often specified in staff reports. Teams identified such comparators on the basis of countries' similarities in economic development, macroeconomic characteristics and risks, comparability in the size of the economy, degree of economic integration, market access, and liquidity in financial markets, as well as the views of market participants. Given that these criteria overlap with those chosen to calculate the comparability index, there was a significant overlap between the countries chosen by IMF staff as the best comparators, and those indicated by the comparability index. In a few special cases—e.g., countries on the threshold of joining currency unions—IMF staff noted that it was not clear-cut whether the choice of comparators should be based on current or future economic considerations.

73. Some IMF staff explained that the main reason they chose a large group of comparator countries was to avoid having their analysis undermined on the grounds that they were cherry-picking their countries. They feared that country authorities might criticize them for being "selective" if they filtered the comparator countries. Thus, staff reports tended to compare a broader range of countries so as to "let the reader decide which countries were more relevant" even though actual policy discussions with authorities focused on a narrower group of more similar countries. However, the evaluation team identified several cases where there appears to have been inertia in the selection of comparator countries over the years.



#### **D. Broader View on Access to Foreign Currency Liquidity**

74. There was a widespread view among country officials that the discussion of reserve adequacy needs to be put in the broader context of a country's potential access to foreign currency liquidity in a crisis.<sup>35</sup> They noted that ensuring the availability of foreign exchange liquidity has become a key objective of central banks in the aftermath of the global crisis. In an era of high capital mobility, headline gross reserves may not be synonymous with the foreign currency liquidity available in a crisis: both the public and private sectors may have alternative options, besides reserves, for accessing foreign exchange liquidity.

75. For the public sector, additional sources of foreign currency liquidity might include the availability of contingent credit lines, bilateral swaps, access to the resources of pools of government saving (e.g., SWFs), and potentially, to regional reserve-pooling arrangements. Indeed, country officials who were interviewed noted that during the crisis many countries used their SWFs to intervene in the foreign exchange market without touching reserves, so as not to undermine market confidence—a policy that the IMF seemed to support in its bilateral surveillance.

76. IMF staff have also acknowledged that in practice the definition of reserves is inadequate in that some parts of “reserves” may not be liquid during a crisis and that some items not counted as reserves (such as assets from SWFs and unused contingent lines of credit) could actually be used as such (IMF, 2011c).<sup>36</sup> Several IMF senior staff subscribe to this line of thinking, given the rise in the number of countries that have set up SWFs or fiscal funds to manage their real and financial assets.

77. Nonetheless, the IMF's reserve adequacy assessments were usually based on the concept of gross international reserves (Figure 5). Staff reports often did not provide a precise definition of the concept of reserves used (e.g., whether or not it included gold holdings or the assets of SWFs).<sup>37</sup> Nor did they generally discuss whether reserves were usable,<sup>38</sup> although the usability of reserves was not a widespread issue during the global crisis.

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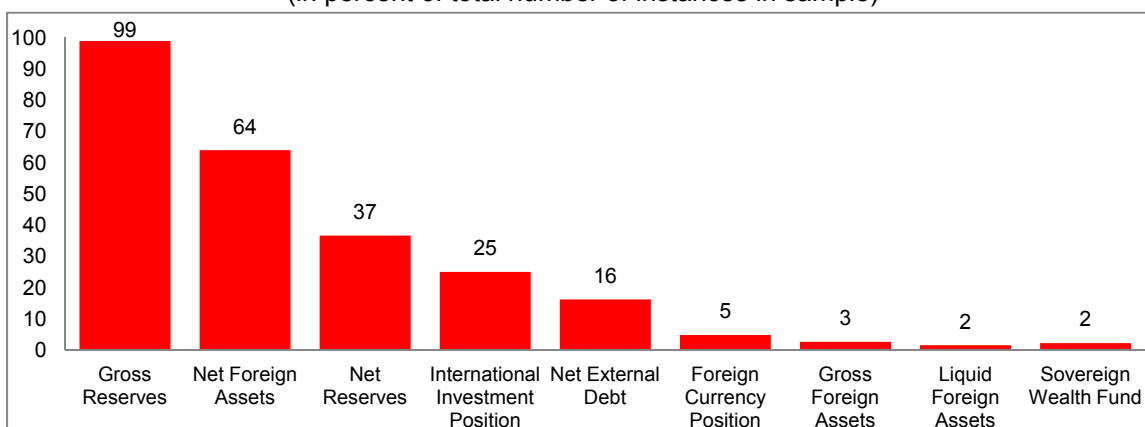
<sup>35</sup> However, country authorities did not see a need to redefine the concept of international reserves (Annex 1, paragraph 10).

<sup>36</sup> IMF (2011c: 12) also notes that “anecdotal evidence suggests a number of countries made use of SWF assets in place of reserves, probably out of concern that markets would be alarmed by falling reserves numbers.”

<sup>37</sup> Reports for countries with IMF-supported programs and arrangements tended to be an exception.

<sup>38</sup> Usable reserves are typically defined as gross reserves plus contingent lines of credit minus callable liabilities (IMF, 2000b).

Figure 5. Concepts of Foreign Exchange Liquidity Used in Bilateral Surveillance<sup>1</sup>  
(in percent of total number of instances in sample)



Sources: Authors' calculations based on a review of documents for IMF bilateral surveillance and IMF programs and arrangements for sample countries, 2000–11.

<sup>1</sup> Concepts are based on the statistical tables in country staff reports, and grouped into nine broad categories. See Annex 1, paragraph 9 for definitions.

78. While it is widely acknowledged that information on various aspects of reserves is not readily available,<sup>39</sup> it is also true that IMF assessments did not sufficiently exploit all the information that was available. For example, except in advanced countries, IMF assessments rarely used IIP data although these became increasingly available over the evaluation period.<sup>40</sup> Nor have many country teams used the External Wealth of Nations Database, which has broader country coverage than IIP data and which was used by IMF staff to calculate the reserve adequacy metric proposed in IMF (2011c). Data availability has become less of a constraint over time given the increasing country coverage of the IMF's Reserves Template, which includes information on a country's callable liabilities and contingent liabilities (see Annex 4).<sup>41</sup>

79. Many policymakers, including in advanced countries, noted that alternative financing arrangements like bilateral swap lines are less readily available than the IMF tends to implicitly assume when thinking about their countries' reserves (Annex 3). Authorities from

<sup>39</sup> For example, several IMF policy papers argue that usable reserves is a more useful concept than gross reserves in determining the adequacy of reserves, but that, despite its limitations, the standard definition of gross reserve assets remains the most used due to limited availability of data on usable reserves.

<sup>40</sup> Indeed, the provision of IIP data is an obligation of the members under Article VIII, Section 5.

<sup>41</sup> In bilateral surveillance, concerns about reserves data were raised only in cases where such data were considered suspect, misreported, or incomplete in IMF-supported programs for emerging market economies. These countries were encouraged to subscribe to the Special Data Dissemination Standard (SDDS). Bilateral surveillance documents rarely raised the issue of SDDS subscription with several large reserve accumulators that did not subscribe to the SDDS (Annex 4). Similarly, only Singapore was explicitly encouraged to report SWF assets, although it was not the only country in the sample that did not provide this information.

some advanced countries reported that they had not been able to draw on previously negotiated swaps and credit line agreements during the crisis. Not only did the private sector at times fail to honor their swap arrangements—even other central banks’ swaps “are not reliable” as they can be made conditional on the use of IMF resources. Swaps of large amounts could be subject to domestic political hurdles in donor countries. Even officials of countries that had received swaps from large central banks during a crisis questioned the reliability of this instrument, noting that “the only money one can safely use in a crisis is our own money.” The same sentiments were expressed by authorities from both small and large advanced countries, and especially from emerging market economies.

80. The global crisis has also shown that, given considerations of systemic stability, assessments of reserve adequacy may need to take into account the liquidity buffers available to the private sector. Liquidity arrangements (including credit lines) between parent and subsidiary companies and banks became an important channel of contagion during the crisis. As liquidity froze, central banks in several countries had to step in and provide liquidity to the banking sector by depositing their foreign currency assets in domestic banks (see Annexes 3 and 7). Country officials who were interviewed for this study perceive that the failure of large non-financial and financial private sector entities could have systemic effects and that therefore the lack of clarity in cross-border regulations and resolution mechanisms raises their countries’ needs for foreign exchange liquidity. Authorities of some emerging and advanced country authorities believe that, in practice, moral hazard concerns imply that the solution to insufficient liquidity buffers in the private sector should lie in tightening prudential regulations instead of accumulating reserves. Indeed, many countries have chosen to take this route in the aftermath of the global crisis.

## V. CONCLUSIONS AND RECOMMENDATIONS

81. The experience of countries in the aftermath of the global crisis holds important lessons for the IMF’s approach to formulating policy advice on reserves. The crisis revealed that private sector derivative exposures, financial stability concerns, and information on cross-border regulations were key to understanding the external vulnerability of several countries and their need for reserve buffers. It also showed that the reserve adequacy needs of advanced countries cannot be ignored.

82. In hindsight, the IMF’s policy advice on reserves seems to have been somewhat complacent. It was so partly because the emphasis on the benefits of exchange rate flexibility at times preempted concerns about reserve adequacy, and there was insufficient recognition of the need for adequate reserve buffers and of the costly implications of the lack of foreign currency liquidity for financial stability. In addition, the IMF’s advice was undermined by a pro forma approach to reserve adequacy assessments which emphasized a few traditional indicators and gave too little recognition to country-specific circumstances. As a result, country authorities perceived the IMF’s advice as not being sufficiently useful or adding much value to their country’s own analysis.

83. Some initiatives launched by the IMF and its country teams in the aftermath of the global crisis have been steps in the right direction. Particularly welcome are the greater attention to filling information gaps, and the efforts to rebalance the emphasis in reserve assessments toward the precautionary need for reserve buffers as opposed to seeing exchange rate flexibility as the main resort for policymakers in response to external developments.

84. This said, the Fund's new reserve adequacy metric, though a step forward, does not sufficiently take into account the broader lessons that emerged during the global crisis. In particular, it does not advance the conceptual framework for assessing the need for reserve buffers in some advanced countries and financial centers. One might posit therefore that even had it been introduced before the global crisis, its use might not have helped temper the overly sanguine advice on reserves that IMF staff provided at that time. A cookie-cutter, inflexible implementation of the metric could further undermine its contributions to gauging external stability concerns.

85. Going forward, the IMF's advice on international reserves needs to be improved, notably to pay greater attention to the rationale for choosing different analytical approaches, to be more mindful of data on foreign currency liquidity and external exposures, and to incorporate country-specific characteristics. The IMF should develop a holistic analytical framework for assessing reserve adequacy in relation to other tools in a policymaker's arsenal, including macro-prudential measures and tools to manage the capital account. Reserve adequacy assessments need to be forward looking, and made in the broader context of the potential vulnerabilities built into the balance sheets of different sectors of the economy and of a more comprehensive and thorough assessment of the availability of foreign currency liquidity. Such an approach could build on the liquidity management framework that was introduced in the aftermath of the Asian financial crisis.

86. A comprehensive analysis of the liquidity needs and external exposures across all sectors will, no doubt, be a challenging task and cannot be accomplished without the collaboration of the Fund's membership. Member countries should be encouraged to participate in this process, including by providing more comprehensive data on reserves and external exposures.

## Annex 1. Sample Characteristics and Methodology

### Country selection

1. For the evaluation sample, 43 countries were chosen to reflect a variety of characteristics that were considered important in the context of the evaluation (Table A1.1). A total of 454 Article IV consultations were conducted for the 43 countries during the twelve-year evaluation period (each consultation is referred to as an “instance” in the paper). Some countries did not have Article IV consultations every year.

Table A1.1. Countries in Evaluation Sample

Algeria	Denmark	Israel	Norway	Sweden
Argentina	Estonia	Japan	Peru	Switzerland
Australia	Euro Area	Korea	Philippines	Thailand
Botswana	Germany	Latvia	Poland	Ukraine
Brazil	Hong Kong	Libya	Romania	United Arab Emirates
Chile	Hungary	Malaysia	Russia	United Kingdom
China	Iceland	Mexico	Saudi Arabia	United States
Colombia	India	New Zealand	Singapore	
Czech Republic	Indonesia	Nigeria	South Africa	

2. The sample includes the largest international reserve holders, as determined by the absolute size of reserves relative to global reserves, the size of reserves relative to the size of the domestic economy, and the magnitude and speed of reserve accumulation during the evaluation period. The sample also includes a number of other advanced and emerging market economies that are not among the largest accumulators but whose recent experience has a bearing on the IMF’s policy advice on reserves. These and other countries have been chosen so as to reflect a number of different economic considerations, as illustrated in Table A1.2. Regional balance was also an important consideration.

Table A1.2. Country Characteristics

Development <sup>1</sup>		IMF Programs/Arrangements		Commodity Exporter		Balance of Payments <sup>3</sup>	
Advanced	14	Current <sup>2</sup>	7	Oil	10	CS / FS	6
Emerging	29	Previous	10	Other	9	CS / FD	19
Low Income	0	None	26	No	24	CD / FD	18
Region		Exchange Rate <sup>3</sup>		SWF		Financial Center	
Africa	3	Float	19	Yes	19	Yes	6
Americas	7	Managed	12	No	24	No	37
Asia	12	Fixed	9				
Europe	17	Board	2				
Middle East	4	No Separate Currency	1				

<sup>1</sup> Follows the same classification as IMF (2011c).

<sup>2</sup> ‘Current’ denotes that a country had an IMF program or arrangement in place at the end of the sample period.

<sup>3</sup> Current Account Surplus (CS), Current Account Deficit (CD), Financial Account Surplus (FS), and Financial Account Deficit (FD). For the exchange rate and balance of payments criteria, countries were classified as having a certain characteristic if they had that specific characteristic at year-end for at least 7 of the 12 years during the sample period.

3. The above classification was based on data from the IMF’s *World Economic Outlook (WEO)* and *Annual Report on Exchange Rate Arrangements and Exchange Restrictions (AREAER)* databases from 2000 to 2010. Countries were classified as having a sovereign wealth fund (SWF)

based on information from IMF (2008), supplemented with information from IMF bilateral surveillance documents, interviews with country authorities, and SWF websites.

### Classification of discussions of reserve adequacy

4. Discussions of reserve adequacy in each of the IMF bilateral surveillance reports on the sample countries were classified into three categories—Discussion, Limited Discussion, and No Discussion—according to the criteria listed in Table A1.3. In some instances, the classification relied on judgment after taking into account the overall context and tone of the discussions. For example, discussions on reserves taken up with the authorities were categorized as “discussion” while factual statements that were provided as background to the policy dialog with the authorities were categorized as “limited discussion.”

Table A1.3. Classification of Discussions of Reserve Adequacy

Discussion	Limited Discussion	No Discussion
<ul style="list-style-type: none"> <li>• Selected issues paper</li> <li>• Annex in staff report</li> <li>• Box in staff report</li> </ul>	<ul style="list-style-type: none"> <li>• Passing reference in staff report</li> <li>• Footnote in staff report</li> <li>• Generic reference in staff report without indication of further analysis</li> </ul>	<ul style="list-style-type: none"> <li>• Only staff report tables</li> <li>• No reference in staff report</li> </ul>
<ul style="list-style-type: none"> <li>• Program target</li> <li>• Indication of discussion with authorities in staff report text</li> <li>• Other indication of a deeper analysis of reserve adequacy</li> </ul>		

### Classification of statements on reserve adequacy

5. Statements on reserve adequacy from IMF staff reports, documents for the review of IMF programs and arrangements, and selected issues papers were classified into five broad categories (Table A1.4). When reports made multiple statements on reserve adequacy, the classification was based on judgment.

Table A1.4. Classification of Statements on Reserve Adequacy

No Comment	Low	Comfortable	High	Excessive
No explicit statements were made on reserve adequacy	“low”	“comfortable”	“high”	“excessive”
	“modest”	“adequate”	“large”	“well above”
	“weak”	“satisfactory”	“strong”	“extremely high”
	“inadequate”	“appropriate”	“ample”	“more than enough”
	“insufficient”	“reasonable”	“substantial”	“exceed”

### Comparing results with the Triennial Surveillance Review

6. The Fund’s 2011 Triennial Surveillance Review (TSR) analyzed discussions of reserve adequacy and the use of different methodologies in 50 Article IV staff reports during 2010–11.<sup>1</sup> A

<sup>1</sup> See IMF (2011a and b) for more information on the 2011 Triennial Surveillance Review.

number of factors complicate comparisons between the results from the TSR and this paper (Tables A1.5). First, there are substantial differences in the sample set. Only a third of the countries are common across the two samples, with the sample for this paper being more focused on large reserve accumulators.<sup>2</sup> Second, the TSR used a narrower definition of what constitutes a “discussion” of reserve adequacy as compared to Table A1.3. Third, the TSR only reviewed staff reports, while this paper bases its conclusions on all bilateral surveillance related documents including selected issues papers, many of which contain more in-depth analyses of reserves.

Table A1.5 Comparisons with Triennial Surveillance Review  
(In percent of sample)

	Discussions of Reserve Adequacy			Methodologies Used		
	TSR (2010–11) (50 Instances)	IEO (2010–11) (72 Instances)	IEO (2000–11) (454 Instances)	TSR (2010–11) (50 Instances)	IEO (2010–11) (72 Instances)	IEO (2000–11) (454 Instances)
Discussion	26	49	42	Traditional Indicators		
Limited				Imports	60	39
Discussion	38	22	25	Short-term debt	20	33
Unclear	2	0	0	Monetary aggregates	20	25
No discussion	34	29	33	Scenario analysis	6	19
				Peer comparisons	10	35
				Model-based estimates	4	12
						5

Sources: IMF (2011a) and authors' calculations based on a review of documents for IMF bilateral surveillance and IMF programs and arrangements for sample countries, 2000–11.

### Comparability index

7. The comparability index used in Figure 4 is a simple average of ten country-specific characteristics. It is constructed as follows. Countries that were used as comparators for a given country in a given year received a 1 or a 0 score depending on whether they shared, or did not share, the same characteristic with the base country in the year in which the comparison was done. For each comparator country, the values (1 or 0) for all the characteristics were summed up and expressed as a percentage of the total number of possible characteristics, i.e., 10.

8. The characteristics used to construct the comparability index were chosen on the basis of their relevance for reserve adequacy assessments (as identified in the liquidity management framework) as well as their availability.<sup>3</sup> They are: a country's relative exchange rate commitment, external balances, concentration of exports, institutional arrangements, financial and economic development, and regional location.<sup>4</sup>

- Exchange rate commitment: IMF (2004: 9) argues that “[an exchange rate] commitment generates large potential liabilities in foreign currency for the government, as reserves may be needed to cover all possible exchanges of domestic currency, or other domestic liabilities

<sup>2</sup> The 16 countries common to both samples are: Botswana, Brazil, Chile, China, Germany, Indonesia, Israel, Libya, Malaysia, Nigeria, Peru, Russia, Singapore, South Africa, Switzerland, and the United States.

<sup>3</sup> See IMF (2004) for more information.

<sup>4</sup> It is important to note that for individual countries it may be of interest to include additional or alternative criteria (i.e., dollarization of the economy, size of the economy, etc.).

(including speculative positions), into foreign exchange. Controls on capital flows may alleviate this risk.” The comparability index was calculated on the basis of information on the exchange rate regime as specified in the AREAER database and cross-checked with IMF (2011c) as well as information on the use of capital controls (based on classifications in the AREAER database and cross-checked with the Chinn-Ito Index).<sup>5</sup>

- External balances: IMF (2004: 9) states that “[e]mpirical work and practical experience underscore that external imbalances—e.g., a real exchange rate misalignment or large external current account deficit—may trigger, or amplify, capital outflows and liquidity pressures.” The comparability index follows the *WEO* classifications of current and financial account surpluses and deficits, and types of capital inflows (e.g., FDI, portfolio, or other).
- Commodity exporters: IMF (2004: 8) states that a “higher level of reserves is typically sought in countries where shocks to current account flows can be particularly strong, for instance in countries where the export base is narrow and the price of the few key exports is particularly volatile or in countries where natural disasters can severely affect export capacity and import needs.” The comparability index takes into account whether oil or other commodities represented a significant share of a country’s exports (as classified in the UN Comtrade database).
- Institutions and development: IMF (2004: 12) argues that “[s]ound institutional arrangements and practices help minimize a variety of risks, such as debt rollover and currency risk that directly relate to the potential sources of pressure on reserves discussed above. They also reduce the likelihood that addressing private sector imbalances requires financial support from the authorities, including use of foreign exchange reserves.” As a proxy for differences in institutional arrangements and financial market development, the comparability index takes into account whether or not a country has a SWF (as classified by IMF (2008), supplemented with data from IMF bilateral surveillance documents, interviews with authorities, and SWF websites); whether or not the country is a financial center; and the overall development level of the country (as classified in IMF, 2011c).
- Regional focus: The comparability index also takes into account whether comparator countries belong to the same geographical region as the base country, given that this criterion was often specifically cited in staff reports to justify the choice of peers.

### **Concepts of foreign exchange liquidity used in staff reports**

9. The concepts of foreign exchange liquidity illustrated in Figure 5 are those that were used in statistical tables in IMF country staff reports and documents for the review of IMF programs and arrangements. The definition and use of concepts in country staff reports have tended to vary across countries and over time. For simplicity, concepts were grouped into several broad categories:

- Gross international reserves (GIR): (Gross) international reserves, foreign currency reserves, or foreign exchange reserves. When a definition was given, it typically stated that this concept followed the standard definition used in the Balance of Payments Manual or

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<sup>5</sup> The Chinn-Ito Index used is an updated version of Chinn-Ito (2008). The use of different measures of capital controls does not appear to significantly affect the performance of the index.



Reserves Template with different variants, e.g., including or excluding gold assets, and assets from SWFs.

- Net foreign assets (NFA): Referred to as the net foreign assets of the central bank, which is typically broader than the concept of net international reserves (see below) in that it includes both short-term and long-term drains on reserves on the liability side while the asset side includes other foreign currency assets (including more risky investments) that are not typically included in reserves.
- Net international reserves (NIR): Gross international reserves net of outstanding reserve-related liabilities. There are no standard definitions of reserve-related liabilities (usually short-term reserve-related liabilities, and at other times all reserve-related liabilities, are deducted from gross reserves).<sup>6</sup> When NIR was used in program cases there was often at least one program-specific definition.
- International investment position (IIP): International investment position, net international investment position, or international liability position. This term refers to the net stock of foreign assets and liabilities of the entire economy. Occasionally Fund documents referred to net foreign assets of the entire economy; these would also fall into this category.
- Net external debt: Net external debt or net external liabilities. Net external debt is typically defined as gross external debt minus gross international reserves. This is a slightly different concept from NFA or IIP (see above) as it usually refers to the external debt of the entire economy but only includes liquid foreign currency assets from the public sector. While surveillance documents frequently referred to net external debt as a foreign exchange liability concept, for several countries “negative net external debt” was often referred to as a foreign exchange liquidity concept.
- Foreign currency position: Foreign currency position, net open foreign currency position, international liquidity position, or the forward position. It is typically defined in staff reports as net international reserves minus net forward foreign exchange liabilities of the central bank, although various definitions exist.
- Gross foreign assets (GFA): This concept only focuses on the asset side of NFA (see above) and includes both the liquid and non-liquid foreign currency assets of the central bank.
- Liquid foreign assets: Typically includes gross international reserves plus the liquid foreign currency assets of the banking system. Some staff reports also used the term ‘usable’ reserves to refer to this concept, although typically ‘usable reserves’ refers to GIR.
- Sovereign wealth fund (SWF): Referred to as a sovereign wealth fund, oil fund, or stabilization fund. Figure 5 includes only those instances where SWFs were explicitly referred to in the context of foreign currency liquidity.

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<sup>6</sup> See IMF (2009g) for more information. The concept of reserves related liabilities is available in paragraphs 6.115–6.116 and in Box 6.5 of IMF (2009b).

### Definitions of reserves and external liabilities

10. International reserves are defined in the IMF's *Balance of Payments Manual 6* (IMF, 2009b) as those "external assets that are readily available to and controlled by monetary authorities for meeting balance of payments financing needs, for intervention in exchange markets to affect the currency exchange rate, and for other related purposes (such as maintaining confidence in the currency and the economy, and serving as a basis for foreign borrowing)."

11. The concepts of external liabilities used in Figure 1 and Figure 2 come from IMF staff reports (indicated by the red line), from the Joint External Debt Hub (JEDH, as indicated by the blue line in Figure 1), and the updated External Wealth of Nations dataset (Non-resident portfolio liabilities, as indicated by the blue line in Figure 2). The definition of short-term debt data from the JEDH includes: insured export credit exposures (short-term), liabilities to BIS banks (short-term), multilateral loans (short-term), official trade credits (nonbanks, short-term), official bilateral loans (short-term), and international debt securities (short-term). The definition of non-resident portfolio liabilities data from the External Wealth of Nations database includes all equity and debt securities from the portfolio liabilities category in the international investment position.

## Annex 2. The IMF's Mandate and Policy Framework on Reserves<sup>1</sup>

The IMF's authority to assess its members' reserve policies derives from its Articles of Agreement which provide the legal framework for the IMF's operation and dialog with its membership. Article IV forms the legal basis for the IMF's bilateral and multilateral surveillance.<sup>2</sup>

**Bilateral policy discussions of reserves:** The IMF's authority to assess reserve policies is clearly specified in the event a country needs to use IMF resources. Article V states that member countries would have to establish that they have a balance of payments need prior to the use of Fund resources. Balance of payments need could arise in the form of a need to build reserves.

The IMF's ability to discuss reserve policies in the context of bilateral surveillance is also clear. While Article IV does not refer specifically to reserves, it has been interpreted through various Surveillance Decisions to include assessment of reserves. The 1977 and 2007 Decisions considered members' reserves to be an important element against the background of which IMF surveillance should appraise the sustainability of exchange rate policies and external stability respectively.

The recently introduced metric for judging reserve adequacy (IMF, 2010e and 2011c) has raised concerns about the scope of the IMF's authority to discuss a member's reserve policies in bilateral surveillance. Specifically, IMF (2010e) proposed reducing the demand for international reserves through collaboration among the IMF's members on reserve adequacy. This collaboration would include countries agreeing to align their reserve accumulation policies to an "adequate" level of reserves for precautionary purposes, underpinned by IMF guidance. Country authorities have expressed unease about whether IMF bilateral surveillance may emphasize reserve policies in this manner. They have noted that stand-alone and potentially prescriptive assessments of reserves against a firm benchmark lies outside the scope of the IMF's bilateral surveillance because, according to the 2007 Surveillance Decision, reserves are only one of several elements that could be taken into account in assessing a member's external stability.

**Discussions of cross-border spillovers from reserves:** The Articles empower the Fund to "oversee the international monetary system in order to ensure its effective operation," but its ability to do so is limited because there are no comprehensive Executive Board decisions providing guidance on the scope and modalities for IMF multilateral surveillance. This is true for a broad range of policies, including reserve policies. The 2007 Surveillance Decision attempted to clarify how bilateral surveillance could take into account spillovers from domestic policies. However, the Decision was limited in scope as it permitted the IMF to examine outward spillovers arising from a member's domestic policies only when the spillovers are transmitted through the balance of payments; thus it implicitly excludes spillovers transmitted through other channels, including reserves. In practice, the IMF has discussed international spillovers from its members' policies on an ad hoc and voluntary basis.

**IMF policy guidance on reserves:** IMF policy guidance is generally based on policies that have been formally discussed by the IMF Executive Board, broadly endorsed, and encapsulated in a Summing

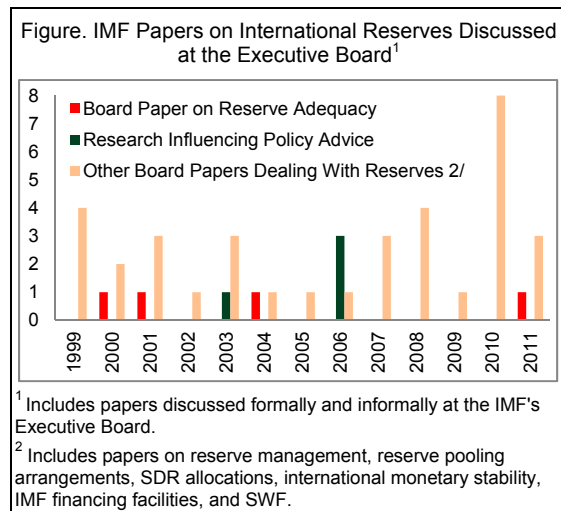
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<sup>1</sup> Prepared by Roxana Pedraglio.

<sup>2</sup> A new integrated surveillance decision encompassing both bilateral and multilateral surveillance was approved by the IMF's Executive Board in July, 2012.

Up or Board Decision. Such Board-endorsed guidelines on reserves exist only for reserves data and management.<sup>3</sup>

IMF staff have written several policy papers on reserve adequacy, typically after a major financial crisis (see Figure). However, significant reserve-related topics have been discussed unofficially in informal Board settings, in which the views of individual Board members are solicited informally and do not carry the same authority as the statements made during formal Board discussions. These policy papers have not been translated into formal policy guidance from the Board to staff. They include papers written in 2000–04 on a liquidity management framework based on a number of important lessons from the capital account crises of the 1990s that turned out to be relevant in the recent global crisis. Board members generally supported the liquidity management approach, although it was considered premature to prepare operational guidance on this basis. Staff were encouraged to pursue work in a number of analytical and operational areas, but there was no follow-up. The reserve adequacy metric proposed in IMF (2011c) was discussed formally by the IMF Executive Board, which suggested areas where further clarification was needed.



IMF Management issued operational guidance on reserve adequacy for some parts of the evaluation period. Following the Asian crisis, IMF Management issued operational guidance in 1999 focusing on rebuilding reserves to sensible minima and expanding considerations of reserve adequacy to include debt and capital account measures. This guidance was removed from the institutional repository of guidance notes in 2006 during an internal streamlining initiative. In addition, Bilateral Surveillance Guidance Notes of 2005, 2009, and 2010 have provided some information on how staff should assess reserve adequacy, listing the short-term debt, imports, and monetary indicators.

The most recent guidance to staff (IMF 2012a) notes: “The adequacy of reserves is often a critical element in the assessment of external stability. In analyzing the adequacy of reserves, staff should consider a range of approaches, while taking into account particular country characteristics and vulnerabilities. Going beyond the traditional reserve adequacy indicators such as ratios of reserves to imports, short-term external debt (remaining maturity), and broad money, staff are also encouraged to make use of the new metrics for emerging market and developing economies proposed in the IMF paper —Assessing Reserve Adequacy, while taking into account country-specific considerations. Staff are also encouraged, where relevant and feasible, to explore other approaches and indicators (such as ratio of reserves to gross external liabilities) and use scenario analysis to gauge the level of reserves needed to cushion the impact of a sudden stop in capital flows and other extreme balance of payments shocks. ... Policy advice on intervention policies should be tailored to country-specific circumstances and avoid an overly prescriptive approach. The assessment should be made against the background of the de facto exchange rate regime and the adequacy of the member’s reserves.”

<sup>3</sup> “Guidance” is usually provided by IMF Management to staff and is based on, and reflects, “policy frameworks” discussed and endorsed by the Executive Board. There may be cases where a policy framework endorsed by the Board does not translate into guidance to staff, although in those cases staff advice to IMF member countries is still guided by Board-endorsed policies.

### **Annex 3. Costs and Benefits of Holding Reserves: IMF and Country Perspectives<sup>1</sup>**

This annex draws from IMF bilateral surveillance documents and interviews with country authorities to illustrate how countries and IMF staff view the costs and benefits of holding reserves. The IMF's bilateral surveillance reports generally contained little discussion of the costs and benefits of holding reserves. Instead, analyses tended to focus on the need for exchange rate flexibility (in emerging market economies), and therefore mainly on the benefits of such flexibility. In interviews, country officials indicated that, as compared with the IMF, they take into account a broader range of considerations regarding the costs and benefits from holding reserves.

#### **Benefits of Holding Reserves**

**Precautionary motive/self-insurance:** The authorities and the IMF both emphasized the role of reserves in limiting external vulnerability. However, the authorities' desire for more reserves was driven by a higher degree of risk aversion, a "better-safe-than-sorry" mentality which took into account the "value of preventing [a crisis]." In many cases, country authorities' views were influenced by their experience of the output, financial, and political costs of previous crises. IMF staff were aware that country authorities were more risk averse, but did not account for this explicitly in their policy advice. Instead, the IMF typically saw some room for the exchange rate to absorb the impact of external shocks.

**Smoothing exchange rate volatility:** Authorities of emerging market countries emphasized the value of exchange rate stability as they believed that too much volatility could be costly. They noted that excessive volatility could occur because of thin and easily manipulated foreign exchange markets, the lack of opportunities to hedge exchange rate risks, high levels of dollarization, vulnerability to commodity price shocks, and limits to the degree to which large safe-haven capital inflows could be absorbed. IMF surveillance did not contest the role of reserves in smoothing exchange rates but discussions on this topic have been contentious at times. Both advanced and emerging market country authorities noted that the IMF tended to be dogmatic about the benefits of exchange rate flexibility and too mechanistic and model-centric in its assessment of equilibrium exchange rate levels, and that, unlike policymakers, it failed to consider market information when making judgments about exchange rate levels and the timing of interventions.

**Market confidence:** Officials from emerging market countries underscored the role of reserves in preserving market confidence. Many of them drew lessons from previous crises when increasing reserves had restored confidence in authorities' policies. Several of them had felt forced to compete in a "beauty contest" to preserve market confidence and avoid panic during the global crisis. It was also noted that higher reserves improve sovereign credit ratings. The IMF's policy advice did recognize the confidence-boosting role of reserves in some emerging market countries, especially after the global crisis, although it did so less frequently than the authorities.

**Financial stability:** Many advanced and emerging economies used reserves to manage systemic instability by providing foreign currency liquidity and guarantees to financial and non-financial

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<sup>1</sup> Prepared by Chris Monasterski.

entities during the global crisis. According to country authorities, the IMF has not been averse to the use of reserves to provide foreign currency liquidity to the private sector in a period of market stress. While IMF reports generally contained little reference to such support, staff noted in interviews that the use of such reserves was appropriate in light of the systemic considerations. A large number of emerging market country authorities stressed the role of reserves in *preventing* (emphasis added) financial instability, particularly in economies facing large capital inflows.

**Policy independence:** Country authorities, including in advanced economies, noted that reserves give them autonomy in policy making by allowing them to respond rapidly and flexibly without requiring the involvement of third parties (including another government body) and the political process in the event of a shock to the economy. Many authorities cited the importance of “speed and flexibility” as well as the desire for “self-reliance” and the need to avoid the “interference in a country’s internal affairs, and a loss of sovereignty” that they associated with IMF program conditionality. In contrast, IMF discussions focused on policy independence narrowly in the context of stabilization funds, particularly in a number of oil-producing countries.

**Greater reliability of reserves:** Country authorities considered reserves to be more reliable than alternative sources of financing such as contingent credit lines and bilateral swaps. Moreover, they noted that unlike the IMF Flexible Credit Line (FCL), reserves serve a dual purpose of allowing self-insurance as well as the ability to manage exchange rates. Country authorities noted that access to the FCL lacks the flexibility, speed, and magnitude of resources that come from holding reserves and several authorities said they feared that political considerations would preclude their countries from access to the FCL. Several authorities also noted that the FCL was “non-transparent” in terms of eligibility and implementation of conditionality and doubted whether the IMF’s balance sheet was large enough to accommodate a wide use of the FCL by the membership. Bilateral swaps or credit arrangements were generally seen as helpful and even desirable, especially by many authorities in emerging markets who viewed swaps, particularly from the U.S. Federal Reserve, as a hallmark of membership in an “exclusive club.” However, access to swaps was widely considered not to be fully dependable, including by authorities from many small advanced economies who believed that swaps might not be available to their countries because they were not “systemic” enough. Some authorities of advanced countries reported that during the recent crisis they had been unable to draw on previously negotiated swaps and credit line agreements. In some cases, not only did the private sector fail to honor their swap arrangements, but even other central banks’ swaps “are not reliable” because they can be conditioned on the use of IMF resources.

**Avoiding IMF stigma:** More than a third of the emerging market economies in the sample noted that reserves helped them avoid the stigma attached to requesting IMF financing. Their experience during previous crises, in particular the loss of policy independence, influenced their thinking. IMF surveillance documents naturally did not explicitly factor this perceived stigma into the discussions of reserves, although staff remain keenly aware of the concern.

In addition, a number of authorities, particularly in oil and commodity exporting countries and countries with ageing populations, considered **intergenerational wealth distribution** to be an important objective for accumulating reserves. IMF surveillance was generally supportive of savings for intergenerational equity; discussions focused mainly on the fiscal implications. A few authorities believed their countries needed larger reserves due to **geopolitical risks**. Interviews showed that IMF

staff were cognizant of these factors, even though they seldom referred to them explicitly in documents.

### **Costs of Holding Reserves**

**Financial costs:** The financial costs of holding reserves are a key concern for both country authorities and the IMF, with the IMF's policy discussions emphasizing the large quasi-fiscal costs from sterilizing reserves. Authorities of several countries noted that they stopped accumulating reserves as their costs grew prohibitively large. Policymakers in some countries faced criticism from domestic constituencies because large international reserves represented a missed opportunity to spend on infrastructure and other necessary projects. However, others observed that the "cost of accumulating reserves, even considering the high sterilization costs, was lower than the alternative [i.e., higher interest rates and output decline during a crisis]." Many countries mitigate the costs of holding reserves through reserve management strategies, but these issues were seldom discussed by the IMF. Some countries noted that higher reserves had lowered the cost of sovereign borrowing, thereby reducing the overall cost of holding reserves. Advanced countries reported that their costs of holding reserves were minimal, and in some cases, that reserves were actually profitable.

**Central bank balance sheet:** Central bank balance sheet losses are a cause for concern for authorities because they can lead to political pressure and a loss of central bank independence. Accounting losses from exchange rate movements can be quite significant if reserves are high, eroding the capital base of the central bank which would then need to be recapitalized by the government. Authorities noted that the IMF's analysis of optimal levels of reserves was "partial" as it only considered the opportunity costs of reserves. IMF surveillance documents seldom noted issues related to central bank balance sheets, although there were instances where IMF staff noted having confidential discussions on this matter with central banks, recommending the use of credit lines with other central banks instead of reserves, and adjusting reserve requirements for the banking system.

**Moral hazard and governance concerns:** Authorities expressed concerns about the impact of large reserve holdings on the incentive for the private sector to adequately manage its own risks. Some feared that amassing public sector reserves to address potential dollar shortages in the banking system in a crisis can potentially fuel a demand for reserves. In contrast, IMF surveillance documents did not focus on the moral hazard implications of high reserves levels per se, but some did note concern that pursuing a managed exchange rate policy could weaken the incentives of the private sector to manage its risks. Separately, some authorities reported receiving pressure and scrutiny from the public as well as from other government bodies on how to manage large levels of reserves. The pressure from the public was to deliver high returns on held reserves, to avoid losses from foreign currency exposures, and to lower costs associated with holding reserves. The IMF has seldom expressed its views publicly on this matter. However, it has weighed in privately in some cases, with central banks often welcoming the IMF's input into the organizational structure of SWFs.

#### **Annex 4. IMF Initiatives on Data on International Reserves and International Liquidity**

Since the 1990s, the IMF has undertaken several initiatives to expand the provision of data on international liquidity and the composition of reserves. Most of these initiatives have been components of the Special Data Dissemination Standard (SDDS) which was also developed and implemented in the 1990s. The IMF's work on reserve-related statistics, particularly the design of the Reserves Template, received high praise from staff and country officials. However, substantial country coverage is still lacking in many cases, including in several countries in the sample that hold large reserves. Recently, the IMF has proposed introducing the "SDDS Plus" primarily for countries with systemically important financial sectors, with additional data categories in the real, fiscal, external, and financial sectors. The final version of SDDS Plus is expected by end-2012. If endorsed, countries that participate would not be obliged to report these data until end-2019.

*Data Template on International Reserves and Foreign Currency Liquidity (Reserves Template):*<sup>1</sup> In 1999, the IMF created the Reserves Template to increase disclosure of foreign currency derivatives, liabilities, and other calls on reserve assets. By mid-2011, 71 countries and the Euro Area and ECB (together accounting for slightly more than 57 percent of global reserves in 2010) reported data using this template.

*Composition of Foreign Exchange Reserves (COFER):*<sup>2</sup> In 2005, the IMF launched an initiative to publish quarterly data on the currency composition of official foreign exchange reserves (previously, annual data were published in IMF annual reports). By mid-2011, 139 countries reported to this database on a voluntary and confidential basis. Although the IMF releases aggregated information on changes in reserve composition and some IMF staff research has been done on this basis, the information available in COFER has not been incorporated in bilateral or multilateral surveillance despite concerns that reserve composition may have implications for financial stability.<sup>3</sup>

*International Investment Position (IIP):* Since the mid-1990s, countries have been reporting their IIP to the IMF, including the stock of external financial assets and liabilities for the whole economy. In mid-2011, 97 countries reported IIP data to the IMF. Recently, the IMF acknowledged that it is important to increase the number of reporting countries and the frequency of reporting from an annual to quarterly basis. Given the limited coverage of the IIP database, IMF staff have developed additional datasets such as the External Wealth of Nations Database.<sup>4</sup>

*Balance Sheet Approach (BSA):* Since the early 2000s, the IMF has had an ongoing initiative to collect information on foreign currency assets and liabilities for the financial sector for each country in standard reporting forms (SRFs). Following the global crisis, the IMF acknowledged the need to increase the use of the BSA to better identify foreign currency mismatches and vulnerabilities (IMF, 2009e; 2010b).

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<sup>1</sup> Available online at [www.imf.org/external/np/sta/ir/IRProcessWeb/index.aspx](http://www.imf.org/external/np/sta/ir/IRProcessWeb/index.aspx).

<sup>2</sup> Available online at [www.imf.org/external/np/sta/cofer/eng/index.htm](http://www.imf.org/external/np/sta/cofer/eng/index.htm).

<sup>3</sup> COFER is not part of SDDS. However, the Board generally endorsed the proposal made in IMF (2012b) to include COFER as a part of "SDDS Plus."

<sup>4</sup> The External Wealth of Nations Database is an updated and extended version of the Lane and Milesi-Ferretti (2007) dataset. It covers all IMF member countries.



## Annex 5. Assessments of Reserve Adequacy in Vulnerability Exercises<sup>1</sup>

In addition to bilateral surveillance, the IMF staff also assesses reserve adequacy for emerging market countries through internal vulnerability exercises. The Vulnerability Exercise for Emerging Markets (VEE) has been in existence since 2000 and performs an explicit assessment of international reserves for emerging market economies. More recently, advanced economies have been covered by the Vulnerability Exercise for Advanced Economies (VEA). The VEA does not specifically assess the adequacy of international reserves, but uses an international balance sheet analysis to assess foreign currency vulnerabilities.<sup>2</sup>

The VEE primarily covers countries that do not have significant net foreign asset (or positive net international investment) positions.

The methodologies used in the VEE to assess reserve adequacy have evolved over time:

- Until 2005, the VEE relied on traditional indicators, including short-term debt and foreign currency deposits.
- In 2005, the VEE started using a new indicator for determining external liquidity risk that took into account the coverage by gross reserves of short-term debt at remaining maturity plus the current account deficit and foreign currency deposits minus 75 percent of net FDI inflows.<sup>3</sup> The final risk rating was then adjusted based on country-specific input from country teams. This approach is similar to that typically used by market participants (see Annex 6).
- In 2007, an external vulnerability index was developed that included the coverage by gross reserves of short-term debt at residual maturity plus the current account deficit while still allowing for country-specific input from staff.<sup>4</sup>

Several countries in the evaluation sample were included in the VEE during the evaluation period. Of these, 15 percent (4 countries) were highlighted every year as facing high or medium vulnerabilities, while slightly more than 30 percent (9 countries) were highlighted at least once.

The VEE analysis tended to highlight concerns about reserves much more clearly than did bilateral surveillance reports. For example, in 2005 and 2006, around half of the emerging markets in the sample (15 countries) were classified as either a high or medium risk in terms of reserves. In bilateral surveillance documents for the corresponding years, several of these countries either received no discussion on reserves or discussions that highlighted positive views on reserve adequacy.

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<sup>1</sup> This annex draws primarily on IMF (2001a), IMF (2007), and internal VEE documents from 2004 to 2008.

<sup>2</sup> The recently developed Early Warning Exercise (EWE) does not look explicitly at reserve adequacy. Instead it draws from risks identified in both VEE and VEA.

<sup>3</sup> The critical points were: High risk (<60%), Medium risk (60%–120%), and Low risk (>120%).

<sup>4</sup> IMF staff tested this metric against several others and found it to be the best predictor of crises. The critical value was set at 101 percent.

## **Annex 6. How Do Market Participants Assess Reserve Adequacy?**

Financial institutions and ratings agencies reported in interviews that they assess reserve adequacy as a key component of their assessments of a country's external vulnerability.

Like the IMF, they also focus primarily on emerging market economies and use indicators and cross-country comparisons to assess reserve adequacy. When a country has reserve currency status, market participants tend to put less emphasis on reserves and standard indicators such as imports, arguing that they are “not relevant” in countries with large and liquid markets. Market participants also use cross-country comparisons to help establish benchmarks for countries and to “create buckets of risks” to differentiate among peers. The use of cross-country comparisons is especially important for credit rating agencies because it drives the relative assessments of vulnerabilities.

The depth of assessments varies substantially depending on the investment product. For example, the adequacy of reserves is of special concern in the case of credit risk pricing and foreign exchange products, where the primary focus is on whether the sovereign is “liquid enough for us to get repaid.”

However, there are several differences between the IMF and market participants in how they assess reserve adequacy.

- Market participants typically place less emphasis on standard indicators and models and, instead, highlight the importance of the country's IIP. They focus on “pain thresholds” and assess whether reserves are getting close to these levels.
- Assessments focus on usable instead of gross reserves while taking into account additional drains on reserves such as non-resident holdings of domestic debt and non-resident deposits.<sup>1</sup> Some market participants also examine the composition of reserve assets to determine how liquid these are.
- Market participants make frequent use of judgment and qualitative information in their assessments of the availability of foreign exchange liquidity. They often include SWFs in reserves when the necessary data are available. Even when these data are not reported, market participants make a judgment about whether or not the government may use these assets as reserves. They make further judgments on a case-by-case basis to determine whether or not certain private institutions will be backed by the government in the event of financial stress.

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<sup>1</sup> In Moody's (2009), the “External Vulnerability Indicator” is defined as short-term debt at remaining maturity plus total nonresident deposits over gross reserves. In S&P (2011), the “External Liquidity Measure” relies on usable instead of gross reserves and also takes into account current account payments. In FitchRatings (2011), the “international liquidity ratio” looks at total liquid assets over total liquid liabilities including the net foreign assets of the banking system, nonresident holdings of domestic debt, and nonresident bank deposits.

## **Annex 7. Reserve Adequacy Assessments in Sweden<sup>1</sup>**

The 2011 IMF bilateral surveillance staff report for Sweden (IMF, 2011e) developed a new approach to assessing the need for foreign exchange reserves. This approach took into account the systemic linkages among banks, and between banks and the sovereign. It determined possible foreign exchange needs by taking into account potential constraints on the central bank's ability to serve as a lender of last resort in foreign currency during a crisis. This approach calculated the maximum amount of foreign exchange that domestic banks may need during a potential stress event and then estimated the probability of a stress event affecting these banks.

The potential foreign exchange needs of domestic banks were approximated by the capital requirements under Basel III. The maximum amount of foreign exchange reserves needs was estimated by examining the difference between the actual and required levels of the liquidity coverage ratio and the net stable funding ratio by foreign currency. Detailed and anecdotal evidence was also used to identify funding gaps by examining domestic banks' foreign currency balance sheets.<sup>2</sup>

The probability of a stress event affecting domestic banks was then calculated using the probability of default by a bank. The approach uses Segoviano and Goodhart (2009) to calculate the probability of domestic banks being shut out of financial markets if a stress event occurs.<sup>3</sup> The probabilities for individual banks were applied to a "decision tree" structure to trace through the implications of the event on the domestic banking system. These probability estimates were then paired with the estimated funding gaps to identify the expected need for foreign exchange reserves.

The analysis was then extended to incorporate the ability of the authorities to borrow in foreign currency during a crisis, under the hypothesis that there is no need to hold precautionary international reserves as long as the central bank is able to borrow in foreign currencies. Since the recent global financial crisis illustrated that concerns about the banking system can lead to constraints on the government's ability to borrow, the government's sovereign risk was incorporated by calculating the probability of both domestic banks and the sovereign losing market access during the stress event.

The approach has been received favorably within the IMF. While it has only been applied in the case of Sweden, other country teams working on advanced economies have reportedly expressed an interest in using similar methods to assess reserve adequacy.

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<sup>1</sup> Based on IMF (2011e), Attachment III ("Reserve Adequacy").

<sup>2</sup> An extreme stress scenario was assumed in which banks were unable to borrow in foreign currencies.

<sup>3</sup> A distressed European sovereign was considered as the stress event as an example in this analysis.

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