
Introduction

In financial markets today, sovereigns, banks, nonfinancial firms, and households make and receive payments not only in domestic but also in foreign currency. Similarly, the currency composition of their assets and liabilities may differ. When an entity's net worth or net income (or both) is sensitive to changes in the exchange rate, it is called a "currency mismatch."¹ The "stock" aspect of a currency mismatch is given by the sensitivity of the balance sheet (net worth) to changes in the exchange rate, and the "flow" aspect is given by the sensitivity of the income statement (net income) to changes in the exchange rate. The greater the degree of sensitivity (of net worth/net income) to exchange rate changes, the greater the extent of the currency mismatch.

Suppose an individual raises a mortgage to buy an apartment in London and then rents it out. Suppose also that he borrows in dollars instead of pounds. He then is faced with a currency mismatch. The stock aspect of the mismatch is that his asset (apartment) is denominated in pounds but his liability (mortgage) is in dollars. The flow aspect is that the rental income from the apartment is denominated in pounds but mortgage payments are in dollars. The consequence of this currency mismatch is that the owner of the apartment gains or loses as the dollar falls or rises against the pound even if the key parameters of his investment (i.e., apartment price and rent) do not change. In short, the net present value of his investment project has become sensitive to changes in the dollar-pound exchange rate.

1. This definition of currency mismatch is close to the one the Financial Stability Forum (2000) has proposed.

Borrowers in many emerging economies have at times faced currency mismatches on a massive scale. Foreign currency–denominated liabilities have frequently financed local-currency activities in emerging economies, and, too often, the stock of foreign currency–denominated assets has been comparatively limited. In such cases, a large depreciation of the domestic currency can destroy much of the net worth of firms and households and initiate a wave of insolvencies, a financial crisis, and a steep fall in economic growth. Indeed, research has shown that currency mismatches not only have been a major element in almost every major financial crisis in emerging economies during the past decade but also have made such crises very costly to resolve (Allen et al. 2002 and Cavallo et al. 2001). Moreover, large currency mismatches can severely handicap the conduct of monetary policy in a crisis and hinder the working of the exchange rate mechanism. No wonder then that Alan Greenspan (2001) characterized extensive currency and maturity mismatches of financial intermediaries in emerging economies as “tinder awaiting conflagration” and that the September 2003 Statement of G-7 Finance Ministers and Central Bank Governors in Dubai called on the International Monetary Fund (IMF) to identify currency mismatches in emerging economies as a key part of its efforts to improve the effectiveness and persuasiveness of Fund surveillance.

Currency mismatches pose a serious threat to financial stability and sustainable economic growth in emerging economies; as such, it has become important to understand how to measure currency mismatch, identify its causes, and decide how best to control it—the key issues examined in this book.

We argue that a good measure of the extent of currency mismatch has to consider the asset as well as the liability sides of balance sheets. It also ought to take account of the potential response of noninterest flows (like exports) to an exchange rate change. And it should pay attention to the ability of countries to not only borrow abroad in local currency but also borrow at home in the domestic currency. The latter is particularly relevant since domestic bond markets in developing countries (which are denominated mainly in domestic currency) now represent the single largest source of financing—larger than domestic bank loans and far larger than international bonds. We construct a new measure of aggregate effective currency mismatch (AECM) that has these attributes and improves upon earlier measures. We also analyze how the AECM measure has performed over the 1994–2002 period for a group of 22 emerging economies.

We see the origins of currency mismatch primarily in past and present weaknesses in economic policies and institutions in emerging markets themselves rather than in imperfections in international capital markets.²

2. De Nìcolo, Honohan, and Ize (2003) share our view in their recent study on dollarization of domestic bank deposits. They conclude (p. 3) that “absolute pessimism with regard to the degree to which dollarization can be influenced by policy is not warranted: we show that

These national weaknesses include (1) inadequate incentives to hedge against currency risk, linked to fixed exchange rate regimes and poorly designed official safety nets; (2) shortcomings in national macroeconomic policies—especially monetary policies—and the legacy of poor inflation performance, which impedes the development of a local domestic currency-denominated bond market; (3) inadequate public information on the extent and sectoral composition of currency mismatches, which has undermined market discipline; (4) poor credit assessment by banks in the extension of foreign currency-denominated loans to corporate customers with little foreign-currency revenue; (5) problems with the design and/or enforcement of the regulatory regime operating on banks, especially as regards effective limits on banks' true exposure to exchange rate changes; (6) ill-advised debt management policies, especially excessive recourse to foreign currency-indexed debt when inflation-indexed debt would be a better transitional vehicle toward fixed-rate debt; and (7) according too low a priority to developing domestic bond markets, to encouraging the availability of hedging instruments, and to reducing barriers to the entry of foreign-owned banks.

Our action plan to reduce currency mismatches follows from this diagnosis of policy and institutional shortcomings and stresses the following eight recommendations:

- The 20 or so largest emerging economies that are heavily involved with private capital markets (and that are not already committed to joining the euro area) should opt for a managed floating exchange rate policy. Such a policy would produce an awareness of currency risk as well as the incentive to keep currency mismatches under control. Special care should also be taken to avoid policies that can contribute to overvalued exchange rates: experience suggests that crisis vulnerability is highest when large currency mismatches persist against the backdrop of a significantly overvalued exchange rate.
- A monetary policy framework of inflation targeting should be paired with a managed floating regime to provide a good nominal anchor against inflation. Such a framework should also contribute to stability in longer-term inflation expectations necessary to underpin healthy development of a domestic bond market.
- Banks in emerging economies should step up their monitoring of currency mismatches on the part of their loan customers and apply

policy does matter." Surveying the theoretical literature on explanations for currency mismatching, Jeanne (2001) places the explanations into the following categories: lack of monetary credibility by the sovereign; implicit or explicit government bailouts of mismatch borrowers; lack of domestic financial development; a commitment or signaling device for the government; and an insurance policy on the part of domestic firms in an emerging economy.

tighter credit limits on foreign currency–denominated loans to customers that do not generate foreign-currency revenues.

- Banking supervisors in emerging economies should strengthen the prudential oversight of currency mismatching by their banks, ensuring in particular that banks effectively monitor their clients' foreign exchange exposures. Even if ongoing innovations in capital markets mean that these regulations do not catch some open foreign exchange positions, determined efforts to limit exposures to a specified share of bank capital should help reduce losses to a tolerable level.
- To help harness the forces of market discipline, the IMF should regularly publish data on currency mismatches at the economywide and sectoral levels and should draw attention to those mismatches regarded as excessive. In this connection, we have constructed the AECM index, which includes foreign-currency assets as well as foreign-currency liabilities. The index takes account of the currency composition of domestic bonds and banks' loans (as well as those of their international counterparts) and normalizes net foreign-currency positions for cross-country and time-series variation in export openness.
- To reduce public-sector bailouts of losses stemming from currency mismatching by banks, more emerging economies should make "prompt corrective action" and "least-cost resolution" key elements of their bank supervisory and closure regimes, along the lines laid out in the Federal Deposit Insurance Corporation Improvement Act (FDICIA) of 1991 in the United States (Benston and Kaufman 1988). In addition, every request for an IMF loan should contain data on, or estimates of, currency mismatches at the economywide and sectoral levels, an IMF staff analysis of the sustainability of these mismatches, and explicit conditions for reducing the mismatch (if the existing or prospective mismatch is judged to be too large).
- Emerging economies should review their debt and reserve management policies to ensure that they are prudent enough to meet the realities of today's volatile global environment. More specifically, emerging economies with relatively high shares of public debt denominated in (or indexed to) foreign currency should adopt a medium-term objective of reducing that share; greater use of inflation-indexed bonds (as a transition device) should facilitate that objective. Emerging economies that do not have usable foreign exchange reserves sufficient to meet all repayments and interest on foreign debt falling due over the subsequent year should consider whether they should aim for higher reserve holdings.
- Emerging economies should accord higher priority to developing domestic bond markets, to encouraging the availability of hedging

instruments, and to reducing barriers to entry of foreign-owned banks. Efforts to lengthen the maturity of government debt, develop benchmark securities that are highly liquid, broaden the investor base for government bonds (including fostering the development of pension funds), and remove outdated accounting rules that both inhibit active trading by institutional investors and bias decisions toward foreign currency-denominated borrowing would pay high dividends.

Original Sin Hypothesis

The principal challenge to our view of balance-sheet problems in emerging economies—that national policies matter most—has been put forward by Barry Eichengreen, Ricardo Hausmann, and Ugo Panizza in a series of papers (Eichengreen and Hausmann 1999, 2003a–c; Eichengreen, Hausmann, and Panizza 2002, 2003a–e; and Hausmann and Panizza 2002, 2003). They focus on the difficulties that emerging economies face when attempting to borrow abroad in their own currencies. They call this phenomenon “original sin”—a catchy metaphor meant to capture the idea of an innate weakness that is not due to past behavior but that limits what developing countries can achieve on their own merits. We refer to their line of argument as the original sin hypothesis (OSH). The OSH has attracted considerable attention.

Eichengreen, Hausmann, and Panizza measure the degree to which original sin affects a country by (one minus) the percentage of its international bonds and cross-border bank loans that are denominated in the domestic currency. They find that the vast majority of developing countries suffer from high levels of original sin and that original sin changes little over time. In their empirical work, they report that higher levels of original sin are associated, *inter alia*, with higher volatility of real output and international capital flows, with greater management of exchange rates, and with lower creditworthiness. Until very recently (September 2003), they seemed to suggest that measures of original sin were a good indicator of a country’s aggregate currency mismatch,³ that an effort to build deep and liquid domestic financial markets in emerging economies as a solution to the currency mismatch problem would take too long and would be increasingly difficult to achieve in a world of liberalized

3. In Eichengreen and Hausmann (1999) and Eichengreen, Hausmann, and Panizza (2002, 2003a, 2003b), the terms original sin and currency mismatch were frequently used interchangeably, relying on the proposition that “countries with original sin that have net foreign debt—as developing countries are expected to have—will have a currency mismatch on their national balance sheet” (Eichengreen, Hausmann, and Panizza 2002, 10). Also, in none of those earlier papers was there any statement that aggregate currency mismatch was not a necessary consequence of original sin for a net debtor developing country (see appendix B).

financial markets and floating exchange rates (Eichengreen, Hausmann, and Panizza 2002), and that domestic policies and institutions had little influence on original sin (and currency mismatch) relative to factors largely beyond the control of the individual country, such as network externalities, transactions costs, and imperfections in global capital markets.⁴ Since original sin and currency mismatch were not viewed as primarily the fault of emerging economies, they rejected solutions based on national policy initiatives in favor of an “international” solution. Specifically, they contended that the best hope for solving the currency mismatch problem was to create a new basket index of emerging-market currencies, to encourage the international financial institutions (IFIs) and the G-10 countries to issue debt denominated in the index, and to arrange swaps between the IFIs and the G-10 countries on the one hand and the emerging economies on the other.

If the Eichengreen-Hausmann-Panizza diagnosis of original sin were applied to currency mismatch more generally, developing countries would find it hard to reduce their financial fragility. Efforts to strengthen their macroeconomic and exchange rate policies and to improve their institutional arrangements would either be ineffective or take too long to solve the currency mismatch problem. Furthermore, almost all developing countries would be in the same boat. If support for an international initiative to create and promote a new currency basket index were not forthcoming or if that initiative were not to deliver as promised, these countries would seem destined to suffer financial crises whenever their currencies depreciated significantly.

Fortunately, our analysis suggests that the original sin conclusions of Eichengreen, Hausmann, and Panizza were far too pessimistic. Moreover, in their most recent writings on original sin, currency mismatch, and debt intolerance—presumably written in part in response to criticisms of their earlier work by us (Goldstein and Turner 2003) and by Carmen Reinhart, Kenneth Rogoff, and Miguel Savastano (2003b)—Eichengreen, Hausmann, and Panizza (2003e) and Eichengreen and Hausmann (2003b) appear to have modified significantly their earlier views in at least three notable respects.⁵ First, they now acknowledge explicitly that aggregate currency

4. Three quotes from the earlier papers are sufficient to convey their view: “Neither cross-country nor time-series evidence supports the view that efforts to strengthen policies and institutions at the national level will suffice to ameliorate the problem over the horizon relevant for practical policy decisions” (Eichengreen, Hausmann, and Panizza 2002, 42); “Yet evidence for the presumption that the incidence of original sin reflects the instability of policies and the weakness of market-supporting institutions is meagre. It is based more on presumption and anecdote than fact” (Eichengreen, Hausmann, and Panizza 2003a, 2); and “Even emerging markets that have made major investments in strengthening their policies and institutions have made relatively little headway in solving the mismatch problem” (Eichengreen, Hausmann, and Panizza 2003a, 24).

5. Eichengreen, Hausmann, and Panizza (2003e) contend that they have *not* changed their view from that expressed in their earlier papers on original sin; instead, they maintain that

mismatch is not a necessary consequence of original sin (since a net debtor country may respond to original sin with a large reserve accumulation), that original sin is not the only thing that matters for currency mismatches, and that authors concerned with currency mismatch versus original sin are attempting to measure different things. Second, they acknowledge that a growing number of emerging economies are showing an ability to surmount the difficulties of developing domestic bond markets and that no emerging economy has been able to escape from original sin without first developing a domestic currency-denominated bond market.⁶ And third, they now acknowledge that domestic policies and institutions are important for the ability of countries not only to borrow domestically in their own currency but also to borrow abroad in their own currency. They still maintain that original sin is at the heart of financial vulnerability in emerging economies, that good domestic policies and institutions are not sufficient to overcome original sin, and that an international initiative for a new currency basket index provides the best chance of achieving redemption from original sin. They also emphasize that building up international reserves or limiting international capital flows to reduce or eliminate currency mismatch is also costly. A summary of the evolution of the OSH is presented in appendix B.

The revisionist view of the OSH, while moving it closer to the mainstream, is not without its own difficulties. If domestic financial markets and domestic policies and institutions are assumed to be “important” after all for escaping from original sin, then an international solution may not merit first priority; alternatively, since their empirical results find practically no relationship between policy/institutional variables and original sin, accepting those results at face value leaves unexplained a conclusion that good policies and institutions are “necessary” (if not sufficient) for escaping from original sin. Most of all, if there is no tight link between original sin and aggregate currency mismatches in emerging economies—as our empirical work indicates is indeed the case—then the large output losses stemming from currency mismatches during financial crises could not be attributed to original sin. As such, the “costs” of original sin would have to come from elsewhere. In this connection, Eichengreen, Hausmann, and Panizza (2003e) point out that the costs of original sin could take the form of excessive accumulation of foreign

others (including us) have misinterpreted their earlier writings and that the most recent papers simply set the critics straight. Obviously, we disagree (see appendix B).

6. In contrast, in their 1999 paper, Eichengreen and Hausmann describe the “original sin hypothesis” as follows: “This is a situation in which the domestic currency cannot be used to borrow abroad or to borrow long term, even domestically. In the presence of this incompleteness, financial fragility is unavoidable because all domestic investments will have either a currency mismatch (projects that generate pesos will be financed with dollars) or a maturity mismatch (long-term projects will be financed with short-term loans).”

exchange reserves or welfare-damaging restrictions on foreign borrowing. But they have yet to provide estimates to suggest that the costs of excess reserve holdings or of relying less on international capital flows are of the same order of magnitude as the widely documented large costs of currency mismatches. Moreover, if countries typically responded to high levels of original sin by limiting involvement with international capital markets or by holding more international reserves or both, then such a response would not sit easily with some of the OSH authors' empirical results. If countries with more original sin restrict their international borrowing, why do their results show that these countries also experience greater volatility in international capital flows? If they hold more reserves, why do their results show that they receive lower credit ratings? In short, if original sin is not highly correlated with aggregate currency mismatch, then the transmission mechanism by which it is alleged to impose such hardships on emerging economies becomes much more elusive.

It is ultimately for others to decide whether the latest (post-August 2003) interpretation of the OSH by its authors represents a significant modification of their much bolder earlier views (as we think) or instead is merely a clarification for critics who have misinterpreted the OSH (as they argue). In the end, we think what counts for policy-relevant analysis is to forge an agreement on what constitutes an operationally useful definition of currency mismatch, understanding why shorthand proxies—such as measures of original sin—are very poor approximations to the more comprehensive measure of currency mismatch. Policymakers need to understand how macroeconomic and other policies can help limit mismatches and how institutional factors (such as the legal framework, the domestic bond market, and prudential oversight of financial institutions) that condition microeconomic incentives are of central importance. In short, our objective is to explain *why*, in light of a large and growing body of empirical evidence, better policies and institutions in emerging economies are a *sine qua non* for any serious effort to control currency mismatches.

Plan of the Book

The rest of this book takes up these issues in greater depth. Chapter 2 outlines why currency mismatches matter so much for crisis prevention and crisis management. Chapter 3 discusses the measurement of currency mismatch and explains why measures of original sin do not provide a good metric for drawing inferences about aggregate currency mismatch either across countries or over time. Chapter 4 outlines a new measure of aggregate currency mismatch based on readily available statistics. Chapter 5 turns to differences among emerging economies in their ability to cope with potential currency mismatches, underlining why we reject the contention that almost all emerging economies are alike in the intractability

of the currency mismatch problem. The roles of national macroeconomic policies (chapter 6) and of the microeconomic incentives created by institutional factors (chapter 7) in generating currency mismatches are then reviewed. Chapter 8 considers what role international solutions could play. The last chapter provides a summary of some key historical trends that reinforce the central argument that domestic policies can make a big difference in limiting currency mismatches. Two appendices elaborate on some themes contained in the main body of the book: appendix A discusses the definition and measurement of currency mismatch, and appendix B traces changes over time in the OSH.

