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## **International reserves**

International reserves are the liquid external assets (foreign currency, foreign currency bonds, and gold) under the control of the central bank. Under the Bretton Woods system, adequate reserves were measured by months of imports: the prevailing rule of thumb considered four months of imports to be reasonable coverage. This perspective fitted well in a world with limited financial integration, in which trade openness reflected a country's vulnerability to external shocks (Fischer 2001). In the absence of reserves, balance of payment deficits would have to be corrected through a reduction in aggregate expenditures, imposing macroeconomic adjustment costs, manifested in sharp contractions of investment and consumption, thereby inducing recessionary pressures. As greater trade openness increased the exposure to trade shocks, minimizing adjustment costs required higher reserve holdings. An intriguing development since the 1960s has been that, despite the proliferation of greater exchange rate flexibility, international reserves/gross domestic product (GDP) ratios have increased substantially. Reserve holdings have trended upward; at the end of 1999, reserves were about 6 percent of global GDP, 3.5 times what they were at the end of 1960 and 50 percent higher than in 1990. Practically all the increase in reserves/GDP holding has been by developing countries, mostly concentrated in East Asia (Flood and Marion 2002).

### **International Reserves as a Buffer Stock**

The earlier literature focused on using international reserves as a buffer stock, part of the management of an adjustable-peg or managed-floating exchange-rate regime. Accordingly, optimal reserves balance the macroeconomic adjustment costs incurred in the absence of reserves with the opportunity cost of holding reserves (Frenkel and Jovanovic 1981). The buffer stock model predicts that average reserves depend negatively on adjustment costs, the opportunity cost of reserves, and exchange rate flexibility, and positively on GDP and reserve volatility, driven frequently by the underlying volatility of international trade. Overall, the literature of the 1980s supported these predictions (see Flood and Marion 2002).

Post 1998 trends in hoarding reserves, especially the large increase in hoarding international reserves in East Asia, stirred lively debate among economists and financial observers. Although useful, the buffer stock model has a limited capacity to account for the

recent development in hoarding international reserves—the greater flexibility of the exchange rates exhibited post 1990 should work in the direction of reducing reserve hoarding, in contrast to the trends reported earlier. As an indication of excess hoarding, some observers noted that developing countries frequently borrow at much higher interest rates than what they earn on reserves.

### **International Reserves and Self-Insurance**

The recent literature provided several interpretations for these puzzles, focusing on the observation that the deeper financial integration of developing countries has increased exposure to volatile short-term inflows of capital (dubbed “hot money”), subject to frequent sudden stops and reversals (see Calvo 1998; Edwards 2004). Looking at the 1980s and 1990s, the magnitude and speed of the reversal of capital flows throughout the 1997–98 East Asian financial crisis surprised most observers (Aizenman and Marion 2003). Most viewed East Asian countries as less vulnerable to the perils associated with hot money than Latin American countries. After all, East Asian countries were more open to international trade, had sounder fiscal policies, and showed much stronger growth performance. In retrospect, the 1997–98 crisis exposed hidden vulnerabilities of East Asian countries, forcing the market to update the probability of sudden stops affecting all countries.

These observations suggest that hoarding international reserves can be viewed as a precautionary adjustment, reflecting the desire for self-insurance against exposure to future sudden stops. Self-insurance has several interpretations. The first focuses on precautionary hoarding of international reserves needed to stabilize fiscal expenditure in developing countries (see Aizenman and Marion 2004). Specifically, a country characterized by volatile output, inelastic demand for fiscal outlays, high tax collection costs, and sovereign risk may want to accumulate both international reserves and external debt [Sovereign risk is the added risk assumed by investors with funds invested in foreign countries, like default of sovereign governments on debts, and nationalization.]. External debt allows the country to smooth consumption when output is volatile. International reserves that are beyond the reach of creditors would allow such a country to smooth consumption in the event that adverse shocks trigger a default on foreign debt.

Another version of self-insurance and precautionary demand for international reserves views international reserves as output stabilizers (Ben-Bassat and Gottlieb 1992; Aizenman and Lee 2007). Accordingly, international reserves can reduce the probability of an output drop induced by a sudden stop and/or the depth of the output collapse when the sudden stop materializes. This argument is in line with the Guidotti-Greenspan rule of thumb of the 1990s—countries should hold liquid reserves equal to their foreign liabilities coming due within a year. This rule reflects the shifting focus from reserve adequacy measured in terms of trade flows of goods to flows of assets.

Back of the envelope estimation suggests that the expected benefits of following a Guidotti-Greenspan rule is about 1 percent of gross domestic product (GDP). This would be the case if a country holding reserves equal to its short-term debt reduces the annual probability of experiencing a sharp reversal in capital flows by 10 percent on average (in line with Rodrik and Velasco 1999, see Rodrik 2006) and if the output cost of a financial crisis is about 10 percent of GDP, as found by Hutchison and Noy (2002). Similar results have been obtained using more elaborated models (see Garcia and Soto 2004; Jeanne and Ranciere 2005). These authors concluded that self-insurance against sudden stops plays an important role in accounting for recent hoarding of international reserves.

While the Guidotti-Greenspan-IMF rule focused on the ratio of reserves to short-term debt, Kim et al. (2005) looked at a more flexible rule, based on the behavior of different types of capital flows during currency crises. Application to selected Asian countries leads them to conclude that the countries affected by the East Asian crisis held excessive reserves by 2003—the affected countries have already built up more than adequate reserve levels to handle a repeat of the actual capital outflows that occurred during the 1997–98 crises scaled up to 2003 values. One may note, however, that the rapidly changing structure of the developing countries' financial integration implies that future possible crises would not resemble the previous ones. For example, Korea, one of the countries affected by the 1997–98 crisis, lifted restrictions on foreign equity ownership in the aftermath of the crisis. In response, foreigners' shareholding as a percentage of the total market capitalization has risen from 12 percent in 1997, to 40 percent by 2003. Arguably, the sizable accumulation of reserves by Korea during that period may reflect the wish to cover short-term external debt plus some portion of foreigners' shareholdings, in the desire to reduce possible real exchange rate repercussion of future reversals of capital flows.

**International Reserves: Precaution versus Mercantilism**

The Korean policy suggests another angle associated with international reserves—the possibility that international reserves management may lower real exchange rate volatility, which in turn may allow a smoother output and potentially higher growth rate. To put this topic in broader context, note that the literature of the 1990s identified large adverse effects of exogenous volatility on the GDP and economic growth in developing countries. An important channel that may explain such negative levels and growth effects of volatility are capital market imperfection and low levels of financial development (Aghion et al. 2006).

The views linking the large increase in hoarding reserves to growing exposure to sudden stops associated with financial integration face a well-known contender in a modern incarnation of mercantilism (Dooley et al. 2003). According to this interpretation, reserves accumulation is a by-product of promoting exports, which is needed to create better jobs, thereby absorbing abundant labor in traditional sectors. Though intellectually intriguing, this interpretation remains debatable—the history of Japan and Korea suggests the near absence of mercantilist hoarding of international reserves during the phase of fast growth, and the prevalence of export promotion by preferential financing in targeted sectors. Floundering economic growth led to the onset of large hoarding of reserves both in Japan and Korea, probably due to both mercantilist motives and self-insurance to deal with growing fragility of the banking system. These perspectives suggest that the massive hoarding of reserves by China is a hybrid of the mercantilist and self-insurance motives (Aizenman and Lee 2006). Yet mercantilist hoarding by one country may induce competitive hoarding by other countries to preempt any competitive advantage gained by the first country, a reaction that would dissipate most competitiveness gains. This view is supported by the interdependence of the demand for international reserves among ten East Asian countries (Cheung and Qian 2006).

Overall, greater exposures of developing countries to sudden stops and reversals of hot money, growing trade openness, and the desire to improve competitiveness and to reduce real exchange rate volatility go a long way toward accounting for the observed increase in the rapid and massive stockpiling of international reserves by developing markets.

*See also* Bretton Woods system; currency crisis; dollar standard; dominant currency; exchange rate regimes; exchange rate volatility; financial crisis; foreign exchange intervention; global imbalances; gold standard, international; hot money and sudden stops; international liquidity; mercantilism; real exchange rate; reserve currency; sterilization; vehicle currency

### **Further Reading**

Aghion, Philippe, Philippe Bacchetta, Romain Ranciere, and Kenneth Rogoff. 2006. "Exchange Rate Volatility and Productivity Growth: The Role of Financial Development." NBER Working paper No. 12117. Cambridge, MA : National Bureau of Economic Research.  
Evidence that real exchange rate volatility is associated with lower productivity growth.

Aizenman, Joshua, and Jaewoo Lee. 2007. "International Reserves: Precautionary versus Mercantilist Views, Theory and Evidence." *Open Economies Review* 18 (2), pp. 191-214.  
Evidence and a model of the relative importance of the precautionary and mercantilist views of international reserves.

———. 2006 "Financial versus Monetary Mercantilism—Long-run View of Large International Reserves Hoarding." NBER Working Paper No. 12718. Cambridge, MA: National Bureau of Economic Research.  
A key instrument of the East Asian development strategy has been subsidizing the cost of capital; hoarding international reserves tend to occurred in the aftermath of floundering growth; defines and explains competitive hoarding.

Aizenman, Joshua, and Nancy P. Marion. 2003. "The High Demand for International Reserves in the Far East: What's Going On?" *Journal of the Japanese and International Economies* 17: 370–400.

Explains the higher demand for reserves using the precautionary demand and downside risk aversion motives.

———. 2004. "International Reserves Holdings with Sovereign Risk and Costly Tax Collection." *Economic Journal* 114: 569–91.

Models precautionary use of reserves by developing countries and the negative impact of political instability on international reserves.

Ben-Bassat, Avraham, and Daniel Gottlieb. 1992. "Optimal International Reserves and Sovereign Risk." *Journal of International Economics* 33: 345–62.

Explains and estimates the importance of sovereign risk and the cost of default as a major determinant of the demand for international reserves.

Calvo, Guillermo. 1998. "Capital Flows and Capital-market Crises: The Simple Economics of Sudden Stops." *Journal of Applied Economics* 1: 35–54.

Explains mechanisms through which a sudden stop in international credit flows may bring about financial and balance of payments crises, and examines factors triggering sudden stops.

Cheung, Yin-Wong, and Xing Wang Qian. 2006. "Hoarding of International Reserves: Mrs. Machlup's Wardrobe and the Joneses." Manuscript. Santa Cruz: University of California at Santa Cruz.

Shows the interdependence of the demand for international reserves among 10 East Asian countries.

Dooley, P. Michael, David Folkerts-Landau, and Peter Garber. 2003. "An Essay on the Revived Bretton Woods System." NBER Working Paper No. 9971. Cambridge, MA : National Bureau of Economic Research.

The use of fixed exchange rate in Asia has reestablished the United States as the center country in the modified Bretton Woods system; links it to an export-led growth supported by undervalued exchange rates strategy of East Asia.

Edwards, S. 2004. "Thirty Years of Current Account Imbalances, Current Account Reversals, and Sudden Stops." *IMF Staff Papers* 51 (special issue): 1–49.

Major reversals in current account deficits have been associated to sudden stops of capital inflows; the probability of a reversal depends on external debt/GDP, international reserves/GDP and debt services. More open countries suffer less in a reversal.

Fischer, Stanley. 2001. "Opening Remarks." IMF/World Bank International Reserves: Policy Issues Forum. Washington, DC.

Overview of the changing patterns of hoarding international reserves.

Flood, Robert, and Nancy P. Marion. 2002. "Holding International Reserves in an Era of High Capital Mobility." In *Brookings Trade Forum 2001*, edited by S. Collins and D. Rodrik. Washington, DC: Brookings Institution Press.

Buffer-stock reserve models work about as well in the modern floating-rate period as they did during the Bretton Woods regime. During both periods models' fundamentals explain only about 15 percent of reserves volatility.

Frenkel, Jacob, and Boyan Jovanovic. 1981. "Optimal International Reserves: A Stochastic Framework." *Economic Journal* 91: 507–14.

Adjustment cost model of the demand for international reserves, highlighting the role of uncertainty.

Garcia, Pablo, and Claudio Soto. 2004. "Large Holdings of International Reserves: Are They Worth It?" Central Bank of Chile Working Papers No. 299 (December). Santiago: CBC. Estimate crisis probabilities and apply it to evaluate the optimal stock of reserves, concluding that observed stocks of reserves for most of the cases are consistent with an optimal self-insurance policy.

Hutchison, M. Michael, and Ilan Noy. 2006. "Sudden Stops and the Mexican Wave: Currency Crises, Capital Flow Reversals, and Output Loss in Emerging Markets." *Journal of Development Economics* 79 (1): 225–48.

Sudden-stop crises have a large negative, but short-lived, impact on output growth over and above that found with currency crises. The cumulative output loss of a sudden stop is around 13–15 percent over a 3-year period.

Jeanne, Olivier, and Romain Ranciere. 2005. "The Optimal Level of International Reserves for Emerging Market Economies: Formulas and Applications." Washington, DC: IMF Research Department.

An insurance model of international reserves in the presence of sudden stop can explain reserves of the order of magnitude observed in many emerging market countries, but not the recent buildup of reserves in Asia.

Kim, Jung Sik, Jie Li, Ramkishan Rajan, Ozan Sula, and Thomas D. Willett. 2005. "Reserve Adequacy in Asia Revisited: New Benchmarks Based on the Size and Composition of Capital Flows." *Claremont-KIEP Conference Volume on Monetary and Exchange Rate Arrangements in East Asia*, Korean Institute of International Economic Policy, Seoul.



Presents new benchmarks for judging reserve adequacy and concludes that the reserve levels in East Asia are more than that needed to finance capital outflows of the severity of the 1997–98 Asian crises.

Rodrik, Dani. 2006. "The Social Cost of Foreign Exchange Reserves." *International Economic Journal* 20 (3): 253–66.

Cost-benefit analysis of hoarding international reserves using the self-insurance motive. Explaining why developing countries have not tried harder to reduce short-term foreign liabilities instead of hoarding reserves remains a puzzle.

Rodrik, Dani, and Andres Velasco. 1999. "Short-Term Capital Flows." NBER Working Paper No. 7364. Cambridge, MA : National Bureau of Economic Research.

A model of self-fulfilling crises; estimation shows that greater short-term debt/reserves ratio is a robust predictor of financial crises and is associated with more severe crises when capital flows reverse.

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## **Financial crisis**

The financial system is a set of institutions and markets that provides financial intermediation by transferring savings into productive investment. In most developing countries the bulk of financial intermediation has been done via the banking system, with the stock market gaining importance in countries with more advanced institutions. Financial intermediation entails maturity transformation—funding a longer-term tangible investment with shorter-term savings. As such, financial intermediation is exposed to financial fragility, in which heightened perceived risk may lead to liquidation, putting the financial system at risk.

*Financial crisis* refers to a rapid financial disintermediation due to financial panic. In practice, this involves a “flight to quality,” where savers attempt to liquidate assets in financial institutions due to a sudden increase in their perceived risk, moving their savings to safer assets, such as foreign currency and foreign bonds in open economies, or currency, gold, and government bonds in closed economies. The ultimate manifestation of financial crises includes bank failures, stock market crashes, and currency crises, occasionally leading to deep recessions.

The economist Hyman Minsky (1964) theorized that financial fragility—which is related to the business cycle and to leverage—is a typical feature of any capitalist economy. These considerations are at the heart of the large literature propagated by the stock market crash of 1929 and the Great Depression (Bernanke 1995).

## **Financial Crises and Financial Integration**

During the last quarter of the 20th century, observers focused attention on the growing role of international triggers for financial crises—an outcome of the collapse of the Bretton Woods system (the post–World War II framework for international trade and financial stability), the rapid increase in the importance of emerging markets in the global economy, and the growing financial integration of countries with the global financial system. The resumption of capital flows to developing countries in the early 1990s led to waves of “sudden stops” (the abrupt cessation of foreign capital inflows) and reversals of capital flows, starting with the Mexican crisis of 1994–95, continuing with the Russian and the East Asian crises in the second half of the

1990s, and culminating with the Argentinean meltdown in the early 2000s (Calvo 1998; and Edwards 2004).

Most of the financial crises in the 1990s and early 2000s affected developing and emerging markets, leading to a heated debate regarding their causes and the needed remedies. There is solid evidence that financial opening (dismantling of capital controls) increases the chance of financial crises. There is more tenuous evidence that financial opening contributes positively to long-run growth. Hence there may be a complex trade-off between the adverse intermediate run and the beneficial long-run effects of financial opening. These findings pose a challenge to policymakers: how to supplement financial opening with policies that would improve this intertemporal trade-off.

To place this issue in a broader context, the debate about financial opening is a reincarnation of the earlier immiserizing growth literature in economics. In particular, while financial opening increases a country's overall welfare when the only distortion is restricting intertemporal trade across countries, financial opening may be welfare-reducing in the presence of other distortions [an economic distortion occurs when an inefficiency prevents reaching the full potential of the economy]. An example of such a distortion is moral hazard, which frequently acts as an implicit subsidy to borrowing and investment, ultimately leading to overborrowing and crisis (McKinnon and Pill 1999; and Dooley 2000). Moral hazard arises when investors believe that they will be bailed out of their bad investments by the taxpayer and, therefore, have little incentive to undertake proper monitoring of their investments. This bailing out may be carried out by the treasury, the central bank, or by international agencies. In these circumstances, the taxpayer subsidizes the investment. A frequent rationale for the bailing out is the "too big to fail" doctrine—the fear that allowing large borrowers to go under will trigger a systemic crisis.

Key factors contributing to an exposure to financial crises are balance-sheet features in the form of maturity and currency mismatches between the assets and the liabilities of the banking system, leading to financial fragility. A currency mismatch occurs when residents of the country are not adequately hedged against a change in the exchange rate. This is frequently the case in countries with few foreign assets, serving large external debt denominated in foreign currency, so that a large depreciation generates a large increase in the domestic valuation of the foreign liability, inducing a fall in the economy's net worth, usually accompanied by a large fall in output and insolvencies on the part of firms and banks. Maturity mismatch occurs when the

average duration of the liabilities differs from that of the assets. Frequently, banks' liabilities have shorter maturity than banks' assets; hence large withdrawals by consumers may lead to bank-run. Developing countries are more susceptible to balance sheet fragilities and are characterized by debt intolerance: the inability of emerging markets to manage levels of external debt that are manageable for developed, high income countries (Reinhart, Rogoff, and Savastano 2003).

This literature has led to a spirited debate concerning the wisdom of unrestricted capital mobility between high income countries and emerging markets. Advocates of financial liberalization in the early 1990s argued that external financing would alleviate the scarcity of savings in developing countries, inducing higher investment and thus higher growth rates. The 1990s experience with financial liberalization suggests that the gains from external financing are overrated—the bottleneck inhibiting economic growth has less to do with the scarcity of saving and more to do with other factors, such as the scarcity of good governance (Rodrik 1998; Gourinchas and Olivier 2003).

Notwithstanding this debate, the strongest argument for financial opening is the pragmatic one. Like it or not, greater trade integration erodes the effectiveness of restrictions on capital mobility (see Aizenman 2004). Hence, for successful emerging markets that engage in trade integration, financial opening is not a question of if, but of when and how. Instead, the hope is that proper sequencing of policies (see McKinnon 1991) and improved coordination will reduce the severity of financial crises, thereby improving the odds of a positive long-run welfare effect of financial opening.

### **Financial Opening and Financial Crises: The Evidence**

The recent research has two common themes: it validates empirically the assertion “Good-bye financial repression, hello financial crash” (Diaz-Alejandro 1985). Yet it also has found tenuous evidence that financial liberalization tends to increase growth over time. Both observations suggest an intertemporal trade-off. In the short-run, the fragility induced by financial opening leads frequently to crises. Yet, if these crises force the country to deal with its structural deficiencies, financial opening may induce a higher growth rate in the long run (see Ranciere, Tornell, and Westermann 2005).

Kaminsky and Reinhart (1999) found that problems in the banking sector typically precede a currency crisis; that a currency crisis deepens the banking crisis, activating a vicious spiral; and that financial liberalization often precedes banking crises. Glick and Hutchison (1999) investigated a sample of 90 countries during 1975–97, covering 90 banking crises, 202 currency crises, and 37 twin crises. They found that banking and twin crises have occurred mainly in developing countries, and their number increased in the 1990s. Twin crises are mainly concentrated in financially liberalized emerging-market economies. The costs of these crises are substantial—currency (banking) crises are very costly, reducing output by about 5 percent–8 percent (8–10 percent) over a two- to four-year year period (Hutchison and Noy 2005).

A useful survey of financial liberalization is found in Williamson and Mahar (1998), which focused on 34 countries that undertook financial liberalization between 1973 and 1996. Overall, the authors found a mixed record of financial liberalization—the gains are there, but the liberalization carries the risk of a financial crisis. Financial liberalization has yielded greater financial depth and increased efficiency in the allocation of investment. Yet it has not brought the boost in saving. The main recommendations emerging from their study are akin to those in Hellman, Murdock, and Stiglitz (2000)—start with macroeconomic stabilization, improve bank supervision, while delaying capital-account convertibility to the end of the process. Maintaining high spreads may be needed in a transition until banks are able to work off the legacy of bad debt inherited from the period of financial repression, preventing moral hazard associated with “gamble for resurrection.”

The overall effect of financial opening on growth remains debatable. Rodrik (1998) failed to detect any positive effects of financial opening on investment, growth, and inflation. Bekaert, Harvey, and Lundblad (2001) found that equity market liberalizations, on average, lead to a 1 percent increase in annual real economic growth over a five-year period. The investment/gross domestic product ratio increases postliberalization, with the investment partially financed by foreign capital, inducing worsened trade balances. The liberalization effect is enhanced by a large secondary school enrollment, a small government sector, and an Anglo-Saxon legal system.

In summary, recent financial crises affecting developing countries are the outcome of financial fragilities, reflecting the downside of growing financial integration. The challenge is mitigating the pain in ways that enhance growth and economic welfare.

*See also* asymmetric information; banking crisis; Bretton Woods system; capital flight; currency crisis; deposit insurance; financial liberalization; financial repression; international reserves; lender of last resort; original sin; sequencing of financial sector reform

### **Further Reading**

Aizenman, Joshua. 2004. "Financial Opening and Development: Evidence and Policy Controversies." *American Economic Review* 94 (2): 65–70.

Greater trade integration erodes the effectiveness of restrictions on capital flow. Thus, for a country that engages in trade integration, financial opening is not a question of if, but of when and how.

Bekaert, G, C. Harvey, and R. Lundblad. 2001. "Does Financial Liberalization Spur Growth?" NBER Working Paper No. 6724. Washington, DC: National Bureau of Economic Research.

In a large sample of countries since 1980, financial liberalization leads to a 1 percent increase on average in a country's annual growth rate over a five-year period.

Bernanke, Ben S. 1995. "The Macroeconomics of the Great Depression: A Comparative Approach." *Journal of Money, Credit, and Banking* 27 (1): 1–28.

Monetary shocks as aggregate demand force behind the Depression; the induced financial crisis and sticky nominal wages are supply mechanisms by which nominal shocks had real effects.

Calvo, Guillermo A. 1998. "Capital Flows and Capital-Market Crises: The Simple Economics of Sudden Stop." *Journal of Applied Economics* 1 (1): 35–54.

Articulates mechanisms through which a sudden stop in international credit flows may bring about financial and balance of payments crises, and examines factors triggering sudden stops.

Catao, Luis, and Sandeep Kapur. 2006. "Volatility and the Debt-Intolerance Paradox." *IMF Staff Papers* 53 (2): 195–218.

Differences in macroeconomic volatility account for debt intolerance of developing countries—the ability to borrow is constrained by higher default risk that volatility engenders.

Chang R., and A. Velasco. 1999. “Financial Crises in Emerging Markets.” *Economic Review*, the Federal Reserve Bank of Atlanta 84 (2): 4–17.

A bank collapse multiplies the harmful effects of an initial shock. Under fixed exchange rates, a run on banks becomes a run on the currency if the central bank acts as a lender of last resort.

Demigüç-Kunt A., and E. Detragiache. 1998. “Financial Liberalization and Financial Fragility.” IMF Working Paper No 98/83. Washington, DC: International Monetary Fund.

Banking crises are more likely to occur in liberalized financial systems, the impact of financial liberalization on banking sector fragility is weaker where the institutional environment is strong.

Diaz-Alejandro, C. 1985. “Goodbye Financial Repression, Hello Financial Crash.” *Journal of Development Economics* 19 (1/2): 1–24.

Unintended consequences of financial liberalization: intrinsic imperfections in financial markets imply that lifting of financial repression lead frequently to financial crash.

Dooley, Michael. 2000. “A Model of Crises in Emerging Markets.” *The Economic Journal* 110 (460): 256–72.

Variety of shocks generate capital inflows to emerging markets followed by successful and anticipated speculative attacks, liquidating reserve assets accumulated as self-insurance.

Edwards, Sebastian. 2004. “Financial Openness, Sudden Stops, a Current-Account Reversals.” *American Economic Review* 94 (2): 59–64.

Restricting capital mobility does not reduce the probability of experiencing a reversal; flexible exchange rate regimes are able to accommodate better shocks stemming from a reversal.

Glick R., and M. Hutchison. 1999. "Banking and Currency Crises: How Common Are Twins?" In *Financial Crises in Emerging Markets*, edited by Reuven Glick, Ramon Moreno, and Mark Spiegel. New York: Cambridge University Press, Chapter 2, pp. 35-69 .

Crisis phenomenon is most common in financially liberalized emerging markets; banking crises is a leading indicator of currency crises in emerging markets. The converse does not hold.

Gourinchas, Pierre-Olivier, and Olivier Jeanne. 2003. "The Elusive Gains from International Financial Integration." NBER Working Paper No. 9684. Washington, DC: National Bureau of Economic Research.

Welfare gains from switching from financial autarky to perfect capital mobility in neoclassical models are negligible relative to the welfare gain of a take-off in domestic productivity.

Hellmann, F. Thomas, Kevin C. Murdock, and Joseph E. Stiglitz. 2000. "Liberalization, Moral Hazard in Banking, and Prudential Regulation: Are Capital Requirements Enough?" *American Economic Review* 90 (1): 147–65.

Competition can undermine prudent bank behavior in the presence of moral hazard. Pareto-efficient outcomes can be achieved by adding deposit-rate controls as a regulatory instrument.

Hutchison, Michael, and Ilan Noy. 2005. "How Bad Are Twins? Output Costs of Currency and Banking Crises." *Journal of Money, Credit, and Banking* 37 (4): 725–52.

Currency (banking) crises are very costly, reducing output by about 5 percent to 8 percent (8%–10%) over a two- to four-year period, no additional feedbacks associated with twin crises.

Kaminsky, Graciela L., and Carmen M. Reinhart. 1999. "The Twin Crises: The Causes of Banking and Balance-of-Payments Problems." *American Economic Review* 89 (3): 473–500.

Problems in the banking sector typically precede a currency crisis; currency crisis deepens the banking crisis, activating a vicious spiral; financial liberalization often precedes banking crises.



McKinnon, Ronald. 1991. *The Order of Economic Liberalization: Financial Control in the Transition to a Market Economy*. Baltimore: Johns Hopkins University Press.

Financial control and macroeconomic stability are more critical to a successful transition than is any crash program to privatize state-owned industrial assets and the banking system.

McKinnon, Ronald, and Huw Pill. 1999. "Exchange-Rate Regimes for Emerging Markets: Moral Hazard and International Overborrowing." *Oxford Review of Economic Policy* 15 (3): 19–38.

Investigates the overborrowing syndrome. A "good" exchange rate peg stabilizes the domestic economy while limiting moral hazard in the banking system.

Minsky, M. Hyman. 1964. "Longer Waves in Financial Relations: Financial Factors in the More Severe Depressions." *American Economic Review* 54 (2): 324–35.

Firms need to finance investment spending and capital externally explains longer and deeper swings in economic experience.

Ranciere Romain, Aaron Tornell, and Frank Westermann. 2005. "Systemic Crises and Growth." NBER Working paper No. 11076. Washington, DC: National Bureau of Economic Research.

Financial liberalizations facilitate risk-taking, increasing leverage and investment, leading to higher growth, but also to a greater incidence of crises.

Reinhart, C., K. Rogoff, and M. Savastano. 2003. "Debt Intolerance." *Brookings Papers on Economic Activity* 1: 1–74.

Debt intolerance is the duress many emerging markets experience at debt levels that are manageable by advanced country standards, and is linked to default and inflation history.

Rodrik, Dani. 1998. "Who Needs Capital-Account Convertibility?" In *Should the IMF Pursue Capital Account Convertibility? Essays in International Finance No. 207* (May), edited by Peter Kenen. Princeton: Princeton University Press, pp. 55-65.

The magnitude of recent crises is not justified by changes in the fundamentals of the affected economies; capital account liberalization is not as a necessary tool for growth.

Williamson, John, and Molly Mahar. 1998. "A Survey of Financial Liberalization." *Princeton Essays in International Finance No. 211*. Princeton: Princeton University Press. Evidence that financial liberalizations lead to financial deepening and increase the efficiency of investment allocation, but frequently spawn financial crisis.

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