

CHAPTER 25

Monetary Policy in Emerging Markets[☆]

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1. INTRODUCTION

Thirty years ago, the topic of macroeconomics or monetary economics for developing countries hardly existed¹ beyond a few papers regarding devaluation and² the term “emerging markets” was nonexistent. Certainly it was not appropriate at that time to

¹ The field apparently did not get a comprehensive textbook of its own until Agénor and Montiel (1st edition 1996, 2nd edition 1999).

² Two seminal papers on devaluation in developing countries were Diaz-Alejandro (1963) and Cooper (1971).

1 apply to such countries the models that had been designed for industrialized countries, 1
2 with their assumption of financial sectors that were highly market-oriented and open to 2
3 international flows. To the contrary, developing countries typically suffered from 3
4 “financial repression” under which the only financial intermediaries were uncompeti- 4
5 tive banks and the government, which kept nominal interest rates artificially low (often 5
6 well below the inflation rate) and allocated capital administratively rather than by mar- 6
7 ket forces.³ Capital inflows and outflows were heavily discouraged, particularly by cap- 7
8 ital controls, and were thus largely limited to foreign direct investment and loans from 8
9 the World Bank and other international financial institutions. 9

10 Over time, the financial sectors of most developing countries — at least those 10
11 known as emerging markets — have gradually become more liberalized and open. 11
12 The globalization of their finances began in the late 1970s with the syndicated bank 12
13 loans that recycled petrodollars to oil-importers. Successive waves of capital inflow fol- 13
14 lowed after 1990 and again after 2003. The largest outpouring of economic research 14
15 was provoked not so much by the capital booms as by the subsequent capital busts: 15
16 the international debt crisis of 1982–1989, the emerging market crises of 1995–2001, 16
17 and perhaps the global financial crisis of 2008–2009. 17

18 In any case, the literature on emerging markets now occupies a very large share of 18
19 the field of international finance and macroeconomics. International capital flows are 19
20 central to much of the research on macroeconomics in developing countries. This 20
21 includes both efficient-market models that were originally designed to describe 21
22 advanced economies and market-imperfection models that have been designed to allow 22
23 for the realities of default risk, procyclicality, asymmetric information, imperfect prop- 23
24 erty rights, and other flawed institutions. 24

25 In the latter part of the nineteenth century most of the vineyards of Europe were 25
26 destroyed by the microscopic aphid *Phylloxera vastatrix*. Eventually a desperate last 26
27 resort was tried: grafting susceptible European vines onto resistant American root stock. 27
28 Purist French vintners initially disdained what they considered compromising the 28
29 refined tastes of their grape varieties. But it saved the European vineyards, and did 29
30 not impair the quality of the wine. The New World had come to the rescue of the 30
31 Old World. 31

32 In 2007–2008, the global financial system was grievously infected by so-called toxic 32
33 assets originating in the United States. Many ask what fundamental rethinking will be 33
34 necessary to save macroeconomic theory. Some answers may lie with models that have 34
35 been applied to fit the realities of emerging markets and models that are at home with 35
36 the financial market imperfections that have now unexpectedly turned up in 36
37

38 ³ McKinnon (1973); Shaw (1973); King and Levine (1993); and Levine, Loayza, and Beck (2000), using data for 38 Au22
39 80 and 74 countries, respectively, conclude that domestic financial development is conducive to growth. Rajan and
40 Zingales (1998a) support the causal interpretation by means of data on disaggregated industrial sectors and their
dependence on external finance. 39
40

1 industrialized countries. Purists will be reluctant to seek salvation from this direction. 1
2 But they should not fear. The hardy root stock of emerging market models is incom- 2
3 compatible with fine taste. 3
4 4

5 **2. WHY DO WE NEED DIFFERENT MODELS FOR EMERGING MARKETS?** 5 6 6

7 At a high enough level of abstraction, it could be argued, one theory should apply for 7
8 all. Why do we need separate models for developing countries? What makes them dif- 8
9 ferent? We begin the chapter by considering the general structural characteristics that 9
10 tend to differentiate these countries as a group, although it is important also to 10
11 acknowledge the heterogeneity among them. 11

12 Developing countries tend to have less developed institutions (almost by definition), 12
13 and specifically to have lower central bank credibility, than industrialized countries.⁴ 13
14 Lower central bank credibility usually stems from a history of price instability, including 14
15 hyperinflation in some cases, which in turn is sometimes attributable to past reliance on 15
16 seignorage as a means of government finance in the absence of a well-developed fiscal 16
17 system. Another common feature is an uncompetitive banking system, which is again 17
18 in part attributable to a public finance problem: a traditional reliance on the banks 18
19 as a source of finance, through a combination of financial repression and controls on 19
20 capital outflows. 20

21 Another structural difference is that the goods markets of small developing countries 21
22 are often more exposed to international influences than those of, say, Europe or Japan. 22
23 Although their trade barriers and transport costs have historically tended to exceed 23
24 those of rich countries, these obstacles to trade have come down over time. Further- 24
25 more developing countries tend to be smaller in size and more dependent on exports 25
26 of agricultural and mineral commodities than industrialized countries. Even such 26
27 standard labor-intensive manufactured exports as clothing, textiles, shoes, and basic 27
28 consumer electronics are often treated on world markets as close substitutes across sup- 28
29 pliers. Therefore these countries are typically small enough to be regarded as price- 29
30 takers for tradable goods on world markets, hence the “small open economy” model. 30

31 Developing countries tend to be subject to more volatility than rich countries.⁵ 31
32 Volatility comes from both supply shocks and demand shocks. One reason for the 32
33 greater magnitude of supply shocks is that primary products (agriculture, mining, for- 33
34 estry, and fishing) make up a larger share of their economies. These activities are vul- 34
35 nerable both to extreme weather events domestically and to volatile prices on world 35
36 markets. Droughts, floods, hurricanes, and other weather events tend to have a much 36
37 37

38 ⁴ See Fraga, Goldfajn, and Minella (2003). 38

39 ⁵ Hausmann, Panizza, and Rigobon (2006) found that real exchange rate volatility is three times higher in developing 39
40 countries than in industrialized countries (but that the difference is not attributable to larger shocks) as in De Santis 40
and Imrohoroğlu (1997). 40

1 larger effect on GDP in developing countries than industrialized ones. When a hurri- 1
2 cane hits a Caribbean island, it can virtually wipe out the year's banana crop and tourist 2
3 season, thus eliminating the two biggest sectors in some of those tropical economies. 3
4 Moreover, the terms of trade are notoriously volatile for small developing countries, 4
5 especially those dependent on agricultural and mineral exports. In large rich countries, 5
6 the fluctuations in the terms of trade are both smaller and less likely to be exogenous. 6

7 Volatility also arises from domestic macroeconomic and political instability. 7
8 Although most developing countries in the 1990s brought under control the chronic 8
9 pattern of runaway budget deficits, money creation, and inflation, experienced in the 9
10 preceding two decades, most have still been subject to monetary and fiscal policy 10
11 that is procyclical rather than countercyclical. Often income inequality and populist 11
12 political economy are deep fundamental forces. 12

13 Another structural difference is the greater incidence of default risk.⁶ Even government 13
14 officials who sincerely pursue macroeconomic discipline, may face debt-intolerance: 14
15 global investors will demand higher interest rates in response to increases in debt that would 15
16 not worry them coming from a rich country. The explanation may be the reputational 16
17 effects of a long history of defaulting or inflating away debt.⁷ The reputation is captured, 17
18 in part, by agency ratings.⁸ 18

19 Additional imperfections in financial markets can sometimes be traced to underdevel- 19
20 oped institutions, such as poor protection of property rights, bank loans made under 20
21 administrative guidance or connected lending, and even government corruption.⁹ With 21
22 each round of financial turbulence, however, it has become harder and harder to attribute 22
23 crises in emerging markets solely to failings in the macroeconomic policies or financial 23
24 structures of the countries in question. Theories of multiple equilibrium and contagion 24
25 reflect that not all the volatility experienced by developing countries arises domestically. 25
26 Much of the volatility comes from outside from global financial markets. 26

27 The next section of this chapter considers goods markets and concludes that the 27
28 small open economy model is probably most appropriate for lower and middle-income 28
29 countries: prices of traded goods are taken as given on world markets. Two key variants 29
30 feature roles for nontraded goods and contractionary effects of devaluation. The 30
31

32 ⁶ Blanchard (2005) explored implications of default risk for monetary policy. 32

33 ⁷ The term "debt intolerance" comes from Reinhart, Rogoff, and Savastano (2003). They argued that countries with a 33 Au24
34 poor history of default and inflation may have to keep their ratios of external debt to GDP as low as 15% to be safe 34
35 from the extreme duress of debt crises, levels that would be easily managed by the standards of advanced countries. 35
36 The tendency for budget deficits to push interest rates up more quickly in debt-intolerant countries than in advanced 36
37 countries helps explain why fiscal multipliers appear to be substantially lower in developing countries (see Ilzetzi, 37
38 Mendoza, & Vegh, 2009). Trade openness is another reason. 38

39 ⁸ Rigobon (2002) found that Mexico's susceptibility to international contagion diminished sharply, after it was 39
40 upgraded by Moody's in 2000. Eichengreen and Mody (2000, 2004) confirmed that ratings and default history are 40
reflected in the interest rates that borrowers must pay.

⁹ See La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997); Johnson, La Porta, Lopez-de-Silanes, and Shleifer
(2000); and Wei (2000), among many others.

1 subsequent three sections focus on monetary policy per se. They explore, respectively, 1
2 the topics of inflation (including high-inflation episodes, stabilization, and central bank 2
3 independence), nominal anchors, and exchange rate regimes. The last three sections of 3
4 this chapter focus on the boom-bust cycle experienced by so many emerging markets. 4
5 They cover, respectively, procyclicality (especially in the case of commodity exporters), 5
6 capital flows, and crises. 6

8 **3. GOODS MARKETS, PRICING, AND DEVALUATION** 8

9
10 As already noted, because developing countries tend to be smaller economically than 10
11 major industrialized countries, they are more likely to fit the small open economy 11
12 model: they can be regarded as price-takers, not just for their import goods, but for 12
13 their export goods as well. That is, the prices of their tradable goods are generally taken 13
14 as given on world markets.¹⁰ It follows that a devaluation should push up the prices of 14
15 tradable goods quickly and in proportion. 15

16 **3.1 Traded goods, pass-through, and the law of one price** 16

17
18 The traditional view has long been that developing countries, especially small ones, 18
19 experience rapid pass-through of exchange rate changes into import prices, and then 19
20 to the general price level. There is evidence in the pass-through literature that 20
21 exchange rate changes are indeed reflected in imports more rapidly when the market 21
22 is a developing country than when it is the United States or another industrialized 22
23 country.¹¹ The pass-through coefficient represents to what extent a devaluation has 23
24 been passed through into higher prices of goods sold domestically, say, within the first 24
25 year. Pass-through has historically been higher and faster for developing countries than 25
26 for industrialized countries. For simplicity, it is common to assume that pass-through to 26
27 import prices is complete and instantaneous. 27

28 This assumption appears to have become somewhat less valid, especially in the big 28
29 emerging market devaluations of the 1990s. Pass-through coefficients appear to have 29
30 declined in developing countries, although they remain well above those of industrialized 30
31 economies.¹² 31

32
33 ¹⁰ The price-taking assumption requires three conditions: intrinsic perfect substitutability in the product as between 33
34 domestic and foreign, low trade barriers, and low monopoly power. Saudi Arabia, for example, does not satisfy the 34
35 third condition, due to its large size in world oil markets. 35

36 ¹¹ High pass-through especially characterizes developing countries that are (unofficially) dollarized because a high 36
37 percentage of assets and liabilities are denominated in dollars. See Reinhart, Rogoff, and Savastano (2003b). 37

38 ¹² Burstein, Eichenbaum, and Rebelo (2003, 2005) found that the price indexes are kept down by substitution away 38
39 from imports toward cheaper local substitutes. Frankel, Parsley, and Wei (2005) are among those finding that pass- 39
40 through to prices of narrowly defined import products is indeed higher for developing countries, but that it has 40
declined since 1990, and they are investigating the reasons. Loayaza and Schmidt-Hebbel (2002) found a decline in
pass-through for Latin America. One explanation for the decline since the 1980s is an environment of greater price
stability (Choudhri & Hakura, 2006).

Au25

Au26

Au27

1 On the export side, agricultural and mineral products, which remain important 1
2 exports in many developing countries, tend to face prices that are determined on world 2
3 markets. Because they are homogeneous products, arbitrage is able to keep the price of 3
4 oil or copper or coffee in line across countries, and few producers have much monop- 4
5 oly power. The situation is less clear, however, regarding the pricing of manufactures 5
6 and services. Clothing products or call centers in one country may or may not be treated 6
7 by customers as perfect substitutes for clothing or call centers in another country. 7

8 **3.2 When export prices are sticky** 9

10 There is good empirical evidence that an increase in the nominal exchange rate defined 10
11 as the price of foreign currency (i.e., a devaluation or depreciation of the domestic cur- 11
12 rency) causes an increase in the real exchange rate.¹³ There are two possible approaches 12
13 to such variation in the real exchange rate. First, it can be interpreted as evidence of 13
14 stickiness in the nominal prices of traded goods, especially noncommodity export 14
15 goods, which in turn requires some sort of barriers to international arbitrage, such as 15
16 tariffs or transportation costs. Second, it could be interpreted as a manifestation that 16
17 nontraded goods and services, which by definition are not exposed to international 17
18 competition, play an important role in the price index. Both approaches are fruitful, 18
19 because both elements are typically at work.¹⁴ 19

20 If prices of exports are treated as sticky in domestic currency, then traditional text- 20
21 book models of the trade balance are more relevant. Developing countries tend to face 21
22 higher price-elasticities of demand for their exports than industrialized countries. Thus 22
23 it may be easier for an econometrician to find the Marshall-Lerner condition satisfied, 23
24 although one must allow for the usual lags in quantity response to a devaluation, such as 24
25 producing a J-curve pattern in response to the trade balance.¹⁵ 25

26 **3.3 Nontraded goods** 27

28 The alternative approach is to stick rigorously to the small open economy assumption — 28
29 that prices of all traded goods are determined on world markets — but to introduce a 29
30 second category: nontraded goods and services. Define Q to be the real exchange rate: 30
31

32 ¹³ See Edwards (1989); Taylor (2002); and Bahmani-Oskooee, Hegerty, and Kutan (2008). In other words, although 32
33 some real exchange rate fluctuations are exogenous — and would show up in prices if the exchange rate were fixed — 33
34 some are not. 34

35 ¹⁴ Indeed, the boundary between the two approaches is not as firm as it used to seem. On the one hand, even highly 35
36 tradable goods have a nontraded component at the retail level (the labor and real estate that go into distribution costs 36
37 and retail sales; see Burstein, Eichenbaum, & Rebelo (2005); Burstein, Neves, and Rebelo, 2003). On the other 37
38 hand, even goods that have been considered nontraded can become tradable if, for example, productivity reduces 38
39 their costs below the level of transport costs and makes it profitable to export them (see Bergin, Glick, & Taylor, 39
40 2006; Ghironi & Melitz, 2005). This is a promising area of research. 40

¹⁵ Two empirical studies of trade elasticities for developing countries are Marquez (2002) and Bahmani-Oskooee and 39
40 Kara (2005). 40

$$Q \equiv \frac{E(CPI^*)}{(CPI)} \quad (1)$$

where $E \equiv$ the nominal exchange rate, in units of domestic currency per foreign, $CPI \equiv$ the domestic Consumer Price Index, and $CPI^* \equiv$ the world Consumer Price Index.

Assume that the price indices, both at home and abroad, are Cobb–Douglas functions of two sectors, tradable goods (TG) and nontradable goods (NTG), and that for simplicity the weight on the nontradable sector, α , is the same at home and abroad:

$$\begin{aligned} Q &\equiv \frac{E(P_{TG}^{*1-\alpha} P_{NTG}^{*\alpha})}{(P_{TG}^{1-\alpha} P_{NTG}^{\alpha})} \\ &\equiv \frac{(EP_{TG}^*) P_{TG}^{*\alpha} P_{NTG}^{*\alpha}}{(P_{TG}) P_{TG}^{-\alpha} P_{NTG}^{\alpha}} \end{aligned}$$

We observe the real exchange vary, including sometimes in apparent response to variation in the nominal exchange rate. The two possible interpretations are (1) variation in the relative price of traded goods (EP_{TG}^*/P_{TG}), which is the case considered in the preceding section, or (2) variation in the within-country relative price of nontraded goods (i.e., the price of nontraded goods relative to traded goods). In this section, to focus on the latter, assume that international arbitrage keeps traded goods prices in line: $P_{TG} = EP_{TG}^*$. Then the real exchange depends only on the relative price of nontraded goods.

$$Q \equiv \frac{(P_{NTG}^*/P_{TG}^*)^{\alpha}}{(P_{NTG}/P_{TG})^{\alpha}} \quad (2)$$

If the relative price of nontraded goods goes up in one country, that country’s currency will exhibit a real appreciation.¹⁶

Two sources of variation in the relative price of nontraded goods make this simple equation useful and interesting, particularly for developing countries. They are very different in character: one is best thought of as monetary in origin and short-term in duration, the other as real and long-term.

We will begin with the latter: the famous Balassa (1964)–Samuelson (1964) effect. An empirical regularity that shows up robustly in long-term data samples, whether cross-section or time series, is that when a country’s per capita income is higher and its currency is stronger in real terms. This real appreciation can in turn be associated

¹⁶ There was a time when some economists working in developing countries insisted that the proper *definition* of the term “real exchange rate” was the price of traded goods relative to nontraded goods (see Harberger, 1986).

1 with an increase in the relative price of nontraded goods, as per the Eq. (2). The elas- 1
2 ticity coefficient is estimated at around .4.¹⁷ Balassa and Samuelson identified the causal 2
3 mechanism as productivity growth that happens to be concentrated in the tradable 3
4 good sector. (Bergin, Glick, & Taylor, 2006 and Ghironi & Melitz, 2005, have shown 4
5 theoretically why this may be no coincidence.) Regardless of the mechanism, the 5
6 empirical regularity is well-established.¹⁸ 6

7 Still, individual countries can deviate very far from the Balassa-Samuelson line, 7
8 especially in the short run. There has been an unfortunate tendency, among those 8
9 papers that invoke the Balassa-Samuelson relationship, to try to assign it responsibility 9
10 for explaining *all* variation in the relative price of nontraded goods and therefore in the 10
11 real exchange rate, even in the short run. A more sensible approach would be to 11
12 recognize the large temporary departures of the real exchange rate from the 12
13 Balassa-Samuelson line, and to think about what causes them first to appear and then 13
14 disappear gradually over time. 14

15 Fortunately, we have long had some simple models of how monetary factors can 15
16 explain large temporary swings in the real exchange rate. A monetary expansion in a 16
17 country with a currency peg will show up as inflation in nontraded goods prices, and 17
18 therefore as real appreciation, in the short run. A devaluation will rapidly raise the 18
19 domestic price of traded goods, reducing the relative price of nontraded goods and 19
20 showing up as a real depreciation. The Salter-Swan model originally showed these 20
21 effects, and their implications for internal balance (attaining the desired trade balance) 21
22 and external balance (attaining the desired point on a tradeoff between output and price 22
23 level acceleration).¹⁹ 23

24 Dornbusch (1973, 1980) extended the nontraded goods model in research on the 24
25 case of pegged countries that was once as well-known as his famous overshooting 25
26 model for the case of floating countries. The extension was to marry Salter-Swan with 26
27 the monetary approach to the balance of payments. No flexible-price assumptions were 27
28 harmed in the making of this model; the nominal price of nontraded goods was free to 28
29 adjust. But, in the aftermath of a devaluation or in the aftermath of a domestic credit 29
30 contraction, the levels of reserves and money supply would lie below their long-run 30
31 equilibria. Only via a balance of payments surplus could reserves flow in over time, 31
32 gradually raising the overall money supply and nontraded goods prices in tandem. 32
33 In the long run all prices and quantities, including the real exchange rate, would be 33
34 back to their equilibrium values — but *only* in the long run. Movements in the relative 34
35 price of nontraded goods that arise from money factors in the short run and from 35
36 36
37 37
38 38

38 ¹⁷ See Rogoff (1996).

39 ¹⁸ See Kravis and Lipsey (1988); De Gregorio, Giovannini, and Wolf (1994); and Choudhri and Khan (2005).

40 ¹⁹ See Salter (1959), Swan (1963), and Corden (1994).

1 Balassa-Samuelson in the long run remain a good way to think about real exchange 1
2 rates in developing countries. 2

3 3.4 Contractionary effects of devaluation 3 4

5 Devaluation is supposed to be expansionary for the economy, in a “Keynesian 5
6 approach to the trade balance”; that is, in a model where higher demand for domestic 6
7 goods, whether coming from domestic or foreign residents, leads to higher output 7
8 rather than higher prices. Yet, in currency crises that afflict developing countries, 8
9 devaluation often seems to be associated with recession rather than expansion. 9

10 3.4.1 Political costs of devaluation 10 11

12 In a widely quoted statistic, Cooper (1971) found that political leaders often lose office 12
13 in the year following devaluation. Frankel (2005) updated the estimate and verified sta- 13
14 tistical significance: A political leader in a developing country is almost twice as likely 14
15 to lose office in the six months following a currency crash as otherwise. Finance min- 15
16 isters and central bank governors are even more vulnerable. The political unpopularity 16
17 of devaluations in developing countries helps explain why policymakers often postpone 17
18 devaluations until after elections.²⁰ 18

19 Why are devaluations so unpopular? It is often thought that they have adverse 19
20 distributional effects. But the urban elites that are most important to the political pro- 20
21 cess in most developing countries are more likely to benefit from the relative price 21
22 effects of devaluation (an increase in the price of agricultural products relative to ser- 22
23 vices) than is the rural population. One possibility is that devaluations act as a proxy 23
24 for unpopular IMF austerity programs or other broad reform packages. IMF-associated 24
25 austerity programs have often resulted in popular unrest.²¹ I also tested the proposition 25
26 that devaluations are acting as a statistical proxy for unpopular IMF austerity programs 26
27 by conditioning the previous calculation on the adoption of IMF programs. The IMF 27
28 program variable does not seem to raise the frequency of leader job loss, relative to 28
29 devaluations that did not involve an IMF program.²² There is more support for the 29
30 hypothesis that finance ministers and central bankers are likely to lose their jobs when 30
31 a devaluation is perceived as violating previous public assurances to the contrary, but 31

32 32
33 ²⁰ Stein and Streb (1998). 33

34 ²¹ For example, riots following food-subsidy cutbacks contributed to the overthrow of President Nimeiri of Sudan in 34
35 1985. Edwards and Santaella (1993) reported nine cases of post-devaluation coup attempts in a study that looks at the 35
36 role of IMF presence along with various measures of political instability in determining whether devaluations from 36
37 1950 to 1971 were economically successful. Lora and Olivera (2004) found that voters punish presidents for pro- 36 **Au28**
37 market policies and for increases in the rate of inflation, but not for exchange rate policies per se. For an earlier 37
38 summary of the political consequences of IMF-type austerity programs, see Bienen and Gersovitz (1985). 38

39 ²² Conditioning on the IMF dummy variable has no discernible effect on the frequency of leader turnover. With or 39
40 without an IMF program, the frequency of job loss following devaluations is about 20%, almost double the rate in 40
normal times.

1 this only explains part of the effect. The dominant reason appears to be that devalua- 1
2 tions are indeed contractionary. 2

3 3.4.2 Empirical studies 3

4 Edwards (1986) and Acar (2000) found that devaluation in developing countries is 4
5 contractionary in the first year, but then expansionary when exports and imports have had 5
6 time to react to the enhanced price competitiveness. (In the very long run, devaluation is 6
7 presumed neutral, as prices adjust and all real effects disappear.) Bahmani-Oskooee and 7
8 Miteza (2006) also found some evidence of contractionary effects. For the countries hit 8 ^{Au1}
9 by the East Asia crisis of 1997–1998, Upadhyaya (1999) found that devaluation was at 9
10 best neutral in the long run, while Chou and Chao (2001) found a contractionary effect 10
11 in the short run. Ahmed, Gust, Kamin, and Huntley (2002) found that contractionary 11
12 devaluations are a property of developing countries. Rajan and Shen (2006) found that 12
13 devaluations are only contractionary in crisis situations, which they attribute to debt 13
14 composition issues. 14

15 Connolly (1983) and Kamin (1988) did not find contractionary effects. Nunnen- 15
16 kamp and Schweickert (1990) rejected the hypothesis of contraction on a sample of 16 ^{Au2}
17 48 countries, except during the first year in the case of manufactured exports (as opposed 17
18 to agricultural). Some who find no negative correlation attribute the findings of those 18
19 who do to the influence of third factors such as contemporaneous expenditure-reducing 19
20 policies. 20

21 Confirming a new phenomenon, Calvo and Reinhart (2001) found that exports do 21
22 not increase after a devaluation, but rather fall for the first eight months. Perhaps firms 22
23 in emerging market crises lose access to working capital and trade credit even when 23
24 they are in the export business. 24
25

26 3.4.3 Effects via price pass-through 26

27 Through what channels might devaluation have contractionary effects? Several of the 27
28 most important contractionary effects of an increase in the exchange rate are hypothe- 28
29 sized to work through a corresponding increase in the domestic price of imports or of 29
30 some larger set of goods. Indeed, rapid pass-through of exchange rate changes to the 30
31 prices of traded goods is the defining assumption of the “small open economy model,” 31
32 which has always been thought to apply fairly well to emerging market countries. The 32
33 contractionary effect would then follow in any of several ways. The higher prices of 33
34 traded goods could, for example, reduce real incomes of workers and therefore real 34
35 consumption.²³ They could also increase costs to producers in the nontraded goods 35
36 sector, coming from either higher costs of imported inputs such as oil or higher labor 36
37 37

38 ²³ Diaz-Alejandro (1963) identified a loss in aggregate demand coming from a transfer of income from (low-saving) 38
39 urban workers who consume traded goods to (high-saving) rich owners of agricultural land. Barbone and Rivera- 39
40 Batiz (1987) point the finger at profits of firms owned by foreign investors. 40

1 costs if wages are indexed to the cost of living.²⁴ Krugman and Taylor (1978) added 1 Au3
2 increased tariff revenue to the list of ways in which devaluation might be contraction- 2
3 ary.²⁵ The higher price level could also be contractionary through the “real balance 3
4 effect,” which is a decline in the real money supply. The tightening of real monetary 4
5 conditions, which typically shows up as an increase in the interest rate, could then exert 5
6 its contractionary effect either via the demand side or via the supply side.²⁶ 6

7 These mechanisms were not evidence in the currency crashes of the 1990s. This is 7
8 because the devaluations were not rapidly passed through to higher prices for imports, 8
9 for domestic competing goods, or to the CPI in the way that the small open economy 9
10 model led us to believe. The failure of high inflation to materialize in East Asia after the 10
11 1997–1998 devaluations, or even in Argentina after the 2001 devaluation, was good 11
12 news. Still, it called for greater scrutiny of the assumption that developing countries 12
13 were subject to complete and instantaneous pass-through.²⁷ 13

14 **3.4.4 Balance sheet effect from currency mismatch** 14

15 Balance sheet effects have easily become the most important of the various possible 15
16 contractionary effects of devaluation. Banks and other firms in emerging markets often 16
17 incur debt denominated in foreign currency, even while much of their revenues are in 17
18 domestic currency. This situation is known as currency mismatch. When currency 18
19 mismatch is combined with a major devaluation, otherwise solvent firms have trouble 19
20 servicing their debts. They may have to lay off workers and close plants or go bankrupt 20
21 altogether. Such weak balance sheets have increasingly been fingered in many models, 21
22 not only as the major contractionary effect in a devaluation, but also as a fundamental 22
23 cause of currency crises in the first place.²⁸ 23
24

25 A number of empirical studies have documented the balance sheet effect, in partic- 25
26 ular the finding that the combination of foreign-currency debt plus devaluation is 26
27 indeed contractionary. Cavallo, Kisselev, Perri, and Roubini (2004) found that the 27
28

29 ²⁴ References include Corbo (1985) for the context of Chile in 1981, Solimano (1986) on wage indexation, Agénor 29
30 (1991) on intermediate inputs, and Hanson (1983) on both imported inputs and indexed wages. 30

31 ²⁵ Cooper (1971) provided the original compendium of ways in which devaluation could be contractionary. Montiel 31
32 and Lizondo (1989) and Morley (1992) presented analytical overviews. 32

33 ²⁶ Williamson (1991) argued that Poland’s “shock therapy” of 1990 was an example of the contractionary effect of 33
34 devaluation on demand. Van Wijnbergen (1986) introduced a contractionary effect on the supply side: firms in 34
35 developing countries are known often to be dependent on working capital as a factor of production, and devaluation 35
36 reduces the availability of that working capital. 36

37 ²⁷ Burstein et al. (2005) located the slow adjustment to the overall price level in the nontraded sector. Burstein et al. 37
38 (2005) attributed slow adjustment to the insulation between dock prices of imported goods and retail prices created 38
39 by distribution costs. 39

40 ²⁸ The analytical literature on balance sheet effects and output contraction includes, but is not limited to, Caballero and 40
41 Krishnamurthy (2002); Calvo, Izquierdo, and Talvi (2003); Céspedes, Chang, and Velasco (2000, 2003, 2004); Au29, 30
42 Chang and Velasco (1999); Christiano, Gust, and Roldos (2002); Cook (2004); Dornbusch (2001, 2002); Jeanne and Au31, 32, 33
43 Zettelmeyer (2005); Kiyotaki and Moore (1997); Krugman (1999); Mendoza (2002); and Schneider and Tornell Au31, 32, 33
44 (2004). 44

1 magnitude of recession is related to the product of dollar debt and percentage devaluation
2 tion. Bebczuk, Galindo, and Panizza (2006) found that devaluation is only contraction-
3 ary for the one-fifth of developing countries with a ratio of external dollar debt to GDP
4 in excess of 84%; it is expansionary for the rest.²⁹

5 Why do debtor countries develop weak balance sheets in the first place? What is the
6 origin of the currency mismatch? There are four theories.

- 7 1. *Original sin*: Investors in high-income countries are unwilling to acquire exposure
8 in the currencies of developing countries.³⁰
- 9 2. *Adjustable currency pegs*: An apparently fixed exchange rate lulls borrowers into a false
10 sense of security and into incurring excessive unhedged dollar liabilities.³¹
- 11 3. *Moral hazard*: Borrowing in dollars is a way for well-connected locals to put the risk
12 of a bad state of nature onto the government to the extent the authorities have
13 reserves or other claims to foreign exchange.³²
- 14 4. *Procrastination of adjustment*: When the balance of payments turns negative, shifting
15 to short-term and dollar-denominated debt are ways the government can retain
16 the affections of foreign investors and thus postpone adjustment.³³

17 These mechanisms, along with running down reserves and staking ministerial cred-
18 ibility on holding a currency peg, are part of a strategy that is sometimes called “gam-
19 bling for resurrection.” What they have in common, beyond achieving the desired
20 delay, is helping to make the crisis worse when or if it comes.³⁴ It is harder to restore
21 confidence after a devaluation if reserves are near zero and the ministers have lost
22 personal credibility. Further, if the composition of the debt has shifted toward the short
23 term, in maturity, and toward the dollar, in denomination, then restoring external bal-
24 ance is likely to wreak havoc with private balance sheets regardless of the combination
25 of increases in interest rate versus increases in exchange rate.

28 ²⁹ Calvo, Izquierdo, and Mejia (2004), using a sample of 32 developed and developing countries, found that openness,
29 understood as a large supply of tradable goods, reduces the vulnerability of a given current account deficit, so that
30 lack of openness coupled with liability dollarization are key determinants of the probability of sudden stops. Calvo
31 et al. (2003) and Cavallo and Frankel (2008), also stressed that the required change in relative prices is larger the more
32 closed an economy is in terms of its supply of tradable goods.

33 ³⁰ This phrase was coined by Ricardo Hausmann, and was intended to capture the frustrating position of a policymaker
34 whose policies had been fated by history to suffer the curse of currency mismatch before he even took office (see
35 Eichengreen & Hausmann, 1999); Hausmann & Panizza (2003). Velasco (2001) was skeptical of the position that
36 original sin deprives policymakers of monetary independence regardless of the exchange rate regime. Goldstein and
37 Turner (2004) pointed out things countries can do to reduce currency mismatch.

38 ³¹ Hausmann and Panizza (2003), however, found no empirical support for an effect of exchange rate regime on
39 original sin, only country size.

40 ³² See Dooley (2000a), Krugman (1999), and Wei and Wu (2002).

³³ In other words, a country without a serious currency mismatch problem may develop one just after a sudden stop in
capital inflows but before the ultimate currency crash (e.g., Frankel, 2007).

³⁴ This helps explain why the ratio of short-term foreign debt to reserves appears so often and so robustly in the
literature on early warning indicators for currency crashes (Discussed in Section 9 of the chapter).

Au4

Au34

Au35

1 We return to these issues when considering emerging market financial crises in 1
2 Section 8. 2

3 4 **4. INFLATION** 4

5 **4.1 High inflation episodes** 6

7 Hyperinflation is defined by a threshold in the rate of increase in prices of 50% per 7
8 month by one definition, 1000% per year by another.³⁵ The first two clusters of hyper- 8
9 inflationary episodes in the twentieth century came at the ends of World War I and 9
10 World War II, respectively. The third could be said to have come at the end the Cold 10
11 War and occurred in Latin America, Central Africa, and Eastern Europe.³⁶ 11

12 Receiving more scholarly attention, however, have been the numerous episodes of 12
13 inflation that, while quite high, did not qualify as hyperinflation. As Fischer, Sahay, and 13
14 Vegh (2002) wrote: 14

15 *Since 1947, hyperinflations ... in market economies have been rare. Much more common have 15*
16 *been longer inflationary processes with inflation rates above 100 percent per annum. Based on 16*
17 *a sample of 133 countries, and using the 100 percent threshold as the basis for a definition of 17*
18 *very high inflation episodes, ... we find that (i) close to 20 percent of countries have experi- 18*
19 *enced inflation above 100 percent per annum; (ii) higher inflation tends to be more unstable; 19*
20 *(iii) in high inflation countries, the relationship between the fiscal balance and seigniorage is 20*
21 *strong ... (iv) inflation inertia decreases as average inflation rises; (v) high inflation is associated 21*
22 *with poor macroeconomic performance; and (vi) stabilizations from high inflation that rely on 22*
23 *the exchange rate as the nominal anchor are expansionary.* 23

24 Dornbusch and Fischer (1993), after the distinction between hyperinflation and high 24
25 inflation, also made a distinction between high inflation episodes and moderate infla- 25
26 tion episodes. The dividing line between moderate and high inflation is drawn at 26
27 40%. The traditional hypothesis is that monetary expansion and inflation elicit higher 27
28 output and employment, provided the expansion is an acceleration from the past or 28
29 a departure from expectations. In any case, at high rates of inflation this relationship 29
30 breaks down, and the detrimental effects of price instability on growth dominate, per- 30
31 haps via a disruption of the usefulness of price signals for the allocation of output.³⁷ 31
32 Bruno and Easterly (1998) found that periods during which inflation is above the 32
33 40% threshold tend to be associated with significantly lower real growth. 33

34 Why do countries choose policies that lead to high inflation, given the detrimental 34
35 effects? Seigniorage or the inflation tax is one explanation. Dynamic inconsistency (low 35
36 credibility) of government pledges to follow noninflationary rates of money growth is 36
37 another. 37

38 ³⁵ See Dornbusch, Sturzenegger, and Wolf (1977) and Sachs (1987). 38

39 ³⁶ See Dornbusch and Fischer (1986). 39

40 ³⁷ See Fischer (1991, 1993). 40

1 As Edwards (1994) pointed out, the modeling approach has shifted away from start- 1
2 ing with an exogenous rate of money growth, and instead seeks to endogenize mone- 2
3 tary policy by means of political economy and public finance. According to 3
4 Cukierman, Edwards, and Tabellini (1992), for example, countries with polarized 4
5 and unstable political structure find it hard to collect taxes, so they are more likely to 5
6 have to resort to seignorage. Fischer (1982) found that some countries collect seignor- 6
7 age worth 10% of total government finance. The public finance problem is worsened 7
8 by the Olivera-Tanzi effect; where there are lags in tax collection, disinflation reduces 8
9 the real value of tax receipts. Catao and Terrones (2005) found evidence for the infla- 9 Au5
10 tion tax view: developing economies display a significant positive long-run effect on 10
11 inflation of the fiscal deficit when it is scaled by narrow money (the inflation tax base). 11
12 Easterly, Mauro, and Schmidt-Hebbel (1995) pursued the Cagan logic that high infla- 12
13 tion arises when the needed revenue exceeds that corresponding to the seignorage- 13
14 maximizing rate of money growth. 14

15 **4.2 Inflation stabilization programs** 15

16 In almost all developing countries, inflation came down substantially during the 1990s, 16
17 although many countries had previously undergone several unsuccessful attempts at sta- 17
18 bilization before succeeding. High inflation countries often had national indexation of 18
19 wages and other nominal variables; removing the indexation arrangements was usually 19
20 part of the successful stabilization programs.³⁸ 20

21 In theoretical models that had become popular with monetary economists in the 21
22 1980s, a change to a credibly firm nominal anchor would fundamentally change expect- 22
23 tations so that all inflation, in both traded and nontraded goods, would disappear 23
24 without loss of output in the transition. This property has not been the historical 24
25 experience, however, as stabilization is usually difficult.³⁹ 25

26 Where excessive money growth is rooted in the government's need to finance itself 26
27 by seignorage, one reason stabilization attempts are likely to fail is because they do not 27
28 address the underlying fiscal problem.⁴⁰ Inflation inertia is another explanation. Calvo 28
29 and Vegh (1998) reviewed the literature on attempts to stabilize from high inflation and 29
30 why they so often failed. Exchange-rate based stabilization attempts generally show a 30 Au6
31 lot of inflation inertia.⁴¹ As a result of the inertia, producers gradually lose price 31
32 competitiveness on world markets in the years after the exchange rate target is adopted. 32
33 Calvo and Vegh (1994) thus found that the recessionary effects associated with disinfla- 33
34 tion appear in the late stages of exchange-rate-based programs. This is in contrast with 34
35 35
36 36

37 ³⁸ See Fischer (1986, 1988). 37

38 ³⁹ See Dornbusch (1991). 38

39 ⁴⁰ See Cukierman (2008) and Burnside, Eichenbaum, and Rebelo (2006). Sachs (1987) argued that Bolivia's 1985 39 Au36,37
stabilization achieved credibility because the budget gap was closed.

40 ⁴¹ See Kiguel and Liviatan (1992) and Uribe (1997). 40

1 money-based programs, in which recessionary effects show up early as a result of tight 1
2 monetary policy. 2

3 A third explanation for failed stabilization attempts is that the declaration of a 3
4 money target or an exchange rate peg is not a completely credible commitment: the 4
5 policy can easily be changed in the future. Thus the proclamation of a rule is not a suf- 5
6 ficient solution to the dynamic consistency problem.⁴² Some attribute inertia of infla- 6
7 tion and the loss of output during the transitions to the imperfect credibility of such 7
8 targets, and thus urge institutional restrictions that are still more binding; for example, 8
9 dollarization in place of Argentina's failed quasi-currency-board. But there can be no 9
10 more credibly firm nominal anchor than full dollarization. Yet when Ecuador gave 10
11 up its currency in favor of the dollar, neither the inflation rate nor the price level con- 11
12 verged rapidly to U.S. levels, instead, inflationary momentum continued. 12

13 4.3 Central bank independence 13

14 The characteristics of underdeveloped institutions and low inflation-fighting credibility 14
15 that are common afflictions among developing countries regularly lead to two prescrip- 15
16 tions for monetary policy: (1) that their central banks should have independence⁴³ and 16
17 (2) that they should make regular public commitments to a transparent and monitor- 17
18 able nominal target. These two areas, independence and targets, are considered in this 18
19 and subsequent sections, respectively. 19
20

21 A number of emerging market countries have followed the lead of industrialized 21
22 countries and given their central banks legal independence. In Latin America the trend 22
23 began in the 1990s with Chile, Colombia, Mexico, and Venezuela.⁴⁴ The Bank of 23
24 Korea was made independent in 1998 following that country's currency crisis. Many 24
25 other developing countries have moved in the same direction.⁴⁵ 25

26 Does institutional insulation of the central bank from political pressure help to bring 26
27 down inflation at lower cost to output? Cukierman, Webb, and Neyapti (1992) laid 27
28 out three measures of central bank independence (CBI) and presented the resultant 28
29 indices for 72 countries. As with currency regimes (Section 6.4 of the chapter), it is 29
30 not necessarily enough to look at whether the central bank has *de jure* or legal indepen- 30
31 dence. The three indices are legal independence, turnover of governors of central 31
32 banks, and an index derived from a questionnaire that the authors had asked monetary 32
33 policymakers to fill out. The authors find that *de jure* status is sufficient — legal mea- 33
34 sures are important determinants of low inflation — in developed countries, but *not* 34
35 *in developing countries*. Conversely, turnover of central bank governors is strongly 35
36

37 ⁴² The originators of the dynamic consistency analysis are Barro and Gordon (1983), Calvo (1988), and Kydland and 37
38 Prescott (1977). 38

39 ⁴³ See Cukierman et al. (2002). 39

40 ⁴⁴ Junguito and Vargas (1996). 40

41 ⁴⁵ Arnone, Laurens, and Segalotto (2006). 41

1 correlated with inflation in developing countries. The implication is that independence 1
2 is important for all, but the distinction between *de jure* independence and de facto inde- 2
3 pendence is necessary in developing countries. Haan and Kooi (2000), in a sample of 3
4 82 countries in the 1980s, including some with very high inflation, found that CBI 4
5 as measured by governor turnover can reduce inflation. Cukierman, Miller, and 5
6 Neyapti (2002) reported that the countries in transition out of socialism in the 1990s 6
7 made their central banks independent, which eventually helped bring down inflation. 7

8 Crowe and Meade (2008) examined CBI in an updated data set with a broad sam- 8
9 ple of countries. They found that increases in CBI tended to occur in more democratic 9
10 countries and in countries with high levels of past inflation. Their study has a time 10
11 series dimension, beyond the usual cross section, and uses instrumental variable estima- 11
12 tion to address the thorny problem that CBI might not be causally related to low infla- 12
13 tion if both result from a third factor (political priority on low inflation). They found 13
14 that greater CBI is associated with lower inflation. Gutiérrez (2003) and Jácome and 14
15 Vázquez (2008) also found a negative statistical relationship between CBI and inflation 15
16 among Latin American and Caribbean countries. Haan, Masciandaro, and Quintyn 16
17 (2008) found that central bank independence lowers the mean and variance of inflation 17
18 with no effect on the mean and variance of output growth. 18

19 There are also some skeptics, however. Mas (1995) argued that CBI would not be 19
20 helpful if a country's political economy dictates budget deficits regardless of monetary 20
21 policy. Landström (2008) found little effect from CBI. 21

22 23 **5. NOMINAL TARGETS FOR MONETARY POLICY** 23

24 The principle of commitment to a nominal anchor says nothing about what economic 24
25 variables are best suited to play that role. In a nonstochastic model, any nominal vari- 25
26 able is as good a choice for monetary target as any other nominal variable. But in a sto- 26
27 chastic model, not to mention the real world, it makes quite a difference what nominal 27
28 variable the monetary authorities publicly commit to in advance.⁴⁶ Should it be the 28
29 money supply? Exchange rate? CPI? Other alternatives? The ex ante choice will carry 29
30 big ex post implications for such important variables as real income. 30
31

32 Inflation, the exchange rate, and the money supply are all well represented among 32
33 the choices of nominal targets by developing countries.⁴⁷ The choice of what variable 33
34 should serve as a nominal anchor is explored next. 34

35 35
36 36
37 37
38 ⁴⁶ Rogoff (1985) may be the best reference for the familiar point that the choice of nominal target ex ante makes a big 38
39 difference in the presence of ex post shocks. 39

40 ⁴⁷ Mishkin and Savastano (2002). 40

1 5.1 The move from money targeting to exchange rate targeting 1

2 Inflation peaked in the median emerging market country around 1990, about 10 years 2
3 behind the peak in industrialized countries. Many developing countries attempted to 3
4 bring down high inflation rates in the 1980s, but most of these stabilization programs 4
5 failed. Some were based on orthodox money growth targets. Enthusiasm for monetar- 5
6 ism largely died out by the end of 1980, perhaps because M1 targets had recently 6
7 proven unrealistically restrictive in the largest industrialized countries. Even from the 7
8 viewpoint of the proverbial conservative central banker who cares only about inflation, 8
9 public promises to hit targets that cannot usually be fulfilled subsequently will do little 9
10 to establish credibility. The Bundesbank had enough credibility that a long record of 10
11 proclaiming M1 targets and then missing them did little to undermine its conservative 11
12 reputation or expectations of low inflation in Germany. Developing countries in gen- 12
13 eral do not enjoy the same luxury. 13

14 When improved price stability was finally achieved in countries that had undergone 14
15 very high inflation and repeated failed stabilization attempts in the 1980s, the exchange 15
16 rate was usually the nominal anchor around which the successful stabilization programs 16
17 were built.⁴⁸ Examples include Chile's tablita, Bolivia's exchange rate target, Israel's 17
18 stabilization, Argentina's convertibility plan, and Brazil's real plan. (The advantages, and 18
19 disadvantages of fixed exchange rates for emerging markets are discussed in Section 6.) 19

20 Subsequently, matters continued to evolve. 20
21

22 5.2 The move from exchange rate targeting to inflation targeting 22

23 The series of emerging market currency crises that began in December 1994 and ended 23
24 in January 2002 all involved the abandonment of exchange rate targets in favor of more 24
25 flexible currency regimes, if not outright floating. In many countries, the abandonment 25
26 of a cherished exchange rate anchor for monetary policy took place under the urgent 26
27 circumstances of a speculative attack (including Mexico and Argentina). A few 27
28 countries made the jump to floating preemptively, before a currency crisis could hit 28
29 (Chile and Colombia). Only a very few smaller countries responded to the ever 29
30 rougher seas of international financial markets by moving in the opposite direction to 30
31 full dollarization (Ecuador) or currency boards (Bulgaria). 31

32 From the longer term perspective of the four decades since 1971, the general 32
33 trend has been in favor of floating exchange rates.⁴⁹ But if the exchange rate is not 33
34 the nominal anchor, then some other variable will have to play this role.⁵⁰ 34
35

36
37
38 ⁴⁸ Atkeson and Kehoe (2001) argued that money targeting does not allow the public to monitor central bank behavior 38
as well as exchange rate targeting does.

39 ⁴⁹ See Collins (1996), Larrain and Velasco (2001), and Chang and Velasco (2000). 39

40 ⁵⁰ Bailliu, Lafrance, and Perrault (2003) and Svensson (2000) emphasized this point. 40

1 With exchange rate targets tarnished by the end of the 1990s, monetarism out of 1
2 favor, and the gold standard having been relegated to the scrap heap of history, there 2
3 was a clear vacancy for the position of preferred nominal anchor. The regime of infla- 3
4 tion targeting (IT) was a fresh young face, coming with an already impressive resumé of 4
5 recent successes in wealthier countries (New Zealand, Canada, UK, and Sweden). IT 5
6 got the job. Brazil, Chile, Colombia, and Mexico switched from exchange rate targets 6
7 to IT in 1999⁵¹ and the Czech Republic, Hungary, and Poland switched at about the 7
8 same time as well as Israel, Korea, South Africa, and Thailand. Mexico followed in 8
9 2000, then Indonesia and Romania in 2005 and Turkey in 2006.⁵² 9

10 In many ways, IT has functioned well. It apparently anchored expectations and 10
11 avoided a return to inflation in Brazil despite two severe challenges: the 50% deprecia- 11
12 tion of early 1999, as the country exited from the real plan, and the similarly large 12
13 depreciation of 2002, when a presidential candidate who at the time was considered 13
14 anti-market and inflationary pulled ahead in the polls.⁵³ 14

15 One might argue, however, that the events of 2007–2009 strained the IT regime in 15
16 the way that the events of 1994–2001 had earlier strained the regime of exchange rate 16
17 targeting. Three other kinds of nominal variables, beyond the CPI, have forced their 17
18 way into the attention of central bankers. One nominal variable, the exchange rate, 18
19 never really left as evidenced in the smaller countries. A second category of nominal 19
20 variables, prices of agricultural and mineral products, is particularly relevant for many 20
21 developing countries. The greatly heightened volatility of commodity prices in the 21
22 2000s, culminating in the spike of 2008, resurrected arguments about the desirability 22
23 of a currency regime that accommodates terms of trade shocks. A third category, prices 23
24 of assets such as equities and real estate, has been especially relevant in industrialized 24
25 countries, but not just there.⁵⁴ The international financial upheaval that began in 25
26 mid-2007 with the U.S. sub-prime mortgage crisis has forced central bankers every- 26
27 where to re-think their exclusive focus on inflation to the exclusion of asset prices. 27

28 Proponents of IT have always left themselves the loophole of conceding that central 28
29 banks should pay attention to other variables such as exchange rates, asset prices, and 29
30 commodity prices to the extent that they portend future inflation. In many of the last 30
31 century's biggest bubbles and crashes, however, monetary policy that in retrospect had 31
32 been too expansionary pre-crisis never showed up as goods inflation, only as asset infla- 32
33 tion. Central bankers tend to insist that it is not the job of monetary policy to address 33
34 34

35
36 ⁵¹ See Loayza and Soto (2002) and Schmidt-Hebbel and Werner (2002). Chile started announcing inflation targets
earlier, but kept a BBC exchange rate regime until 1999.

37 ⁵² See Rose (2007).

38 ⁵³ See Giavazzi, Goldfajn, and Herrera (2005).

39 ⁵⁴ Caballero and Krishnamurthy (2006); Edison, Luangaram, and Miller (2000); Aizenman and Jinjark (2009); and
40 Mendoza and Terrones (2008) explored how credit booms lead to rising asset prices in emerging markets, often
preceded by capital inflows and followed by financial crises.

1 asset prices; for example, De Gregorio (2009) made the point that asset bubbles can be 1 [Au7](#)
2 addressed with tools other than monetary policy. 2

3 Fraga, Goldfajn, and Minella (2003) found that inflation-targeting central banks in 3
4 emerging market countries miss their declared targets by far more than industrialized 4
5 countries. Most analysis of IT is better suited to large industrialized countries than to 5
6 developing countries for several reasons.⁵⁵ First, the theoretical models usually do not 6
7 feature a role for exogenous shocks in trade conditions or difficulties in the external 7
8 accounts. The theories tend to assume that countries need not worry about financing 8
9 trade deficits internationally, presumably because international capital markets function 9
10 well enough to smooth consumption in the face of external shocks. But for developing 10
11 countries, international capital markets often *exacerbate* external shocks. Booms, featur- 11
12 ing capital inflows, excessive currency overvaluation, and associated current account 12
13 deficits are often followed by busts, featuring sudden stops in inflows, abrupt deprecia- 13
14 tion, and recession.⁵⁶ An analysis of alternative monetary policies that did not take into 14
15 account the international financial crises of 1982, 1994–2001 or 2008–2009, would not 15
16 be useful to policy makers in emerging market countries. 16

17 Capital flows are prone to exacerbate fluctuations particularly when the source of 17
18 the fluctuations is trade shocks. This observation leads us to the next relevant respect 18
19 in which developing countries differ from industrialized countries. 19

20 IT can be vulnerable to the consequences of supply shocks, which tend to be larger 20
21 for developing countries for reasons already noted in Section 2. As has been shown by a 21
22 variety of authors, IT (defined narrowly) is not robust with respect to supply shocks.⁵⁷ 22
23 Under strict IT, to prevent the price index from rising in the face of an adverse supply 23
24 shock, monetary policy must tighten so much that the entire brunt of the fall in nomi- 24
25 nal GDP is borne by real GDP. Most reasonable objective functions would, instead, tell 25
26 the monetary authorities to allow part of the temporary shock to show up as an increase 26
27 in the price level. Of course this is precisely the reason why many IT proponents favor 27
28 *flexible* inflation targeting, often in the form of the Taylor rule, which does indeed call 28
29 for the central bank to share the pain between inflation and output.⁵⁸ It is also a reason 29
30 for pointing to the “core” CPI rather than “headline” CPI. 30
31

32 ⁵⁵ This is not to forget the many studies of inflation targeting for emerging market and developing countries, most of 32
33 them favorable. Savastano (2000) offered a concise summary of much of the research as of that date. Amato and 33 [Au39, 40](#)
34 Gerlach (2002) and Masson, Savastavano, and Sharma (1997) argued that IT can be good for emerging markets, but 34 [Au41](#)
35 only after certain conditions such as freedom from fiscal dominance are satisfied. Batini and Laxton (2006) argued 35
36 that preconditions have not been necessary. Laxton and Pesenti (2003) concluded that because central banks in 36 [Au42](#)
37 emerging market countries (such as Czechoslovakia) tend to have lower credibility, they need to move the interest 37
38 rate more aggressively in response to movements in forecasted inflation than a rich country would. Others studies 37 [Au43](#)
38 include Debelle (2001); De Gregrio (2009); Gonçalves and Salles (2008); Goodfriend and Prasad (2007); Hammond, 38 [Au44, 45, 46](#)
39 Kanbur, Prasad (2009); Jonas and Mishkin (2005); Mishkin (2000, 2008); and Mishkin and Schmidt-Hebbel (2007).
39 ⁵⁶ See Kaminsky, Reinhart, and Vegh (2005); Reinhart and Reinhart (2009); and Gavin, Hausmann, Perotti and Talvi (1997).
40 ⁵⁷ Other examples include Frankel (1995) and Frankel, Smit, and Sturzenegger (2008). 39 [Au47](#)
⁵⁸ See Svensson (2000). 40

5.3 “Headline” CPI, core CPI, and nominal income targeting

In practice, inflation-targeting central bankers usually respond to large temporary shocks in import prices for oil and other agricultural and mineral products by trying to exclude them from the measure of the targeted CPI.⁵⁹ Central banks have two ways to do this. Some explain *ex ante* that their target for the year is inflation in the core CPI, a measure that excludes volatile components, usually food and energy products. The virtue of this approach is that the central banks are able to abide by their commitment to core CPI when the supply shock comes (assuming the supply shock is located in the farm or energy sectors; it does not work if the shock is labor unrest or power failures that shut down urban activity). The disadvantage of declaring core CPI as the official target is that the person in the street is less likely to understand it, compared to the simple CPI. Transparency and communication of a target that the public can monitor are the original reasons for declaring a specific nominal target in the first place.

The alternative approach is to talk about the CPI *ex ante*, but then in the face of an adverse supply shock explain *ex post* that the increase in farm or energy prices is being excluded due to special circumstances. This strategy is questionable from the standpoint of credibility. The people in the street are told that they should not be concerned by the increase in the CPI because it is “only” occurring in the prices of filling up their car fuel tanks and buying their weekly groceries. Either way, *ex ante* or *ex post*, the effort to explain away supply-induced fluctuations in the CPI undermines the credibility of the monetary authorities. This credibility problem is especially severe in countries where there are grounds for suspecting that government officials already manipulate CPIs for political purposes.

One variable that fits the desirable characteristics of a nominal target is nominal GDP. Nominal income targeting is a regime that has the attractive property of taking supply shocks partly as P and partly as Y , without forcing the central bank to abandon the declared nominal anchor. It was popular with macroeconomists in the 1980s.⁶⁰ Some claimed it was less applicable to developing countries because of long lags and large statistical errors in measurement. But these measurement problems are smaller than they used to be. Furthermore, the fact that developing countries are more vulnerable to supply shocks than industrialized countries suggests that the proposal to target nominal income is *more* applicable to them, not less, as McKibbin and Singh (2003) have pointed out.

In any case, and for whatever reason, nominal income targeting has not been seriously considered since the 1990s by rich or poor countries.

⁵⁹ Devereux, Lane, and Xu (2006) showed theoretically the advantages of targeting nontraded goods to the extent that exchange rate pass-through is high (as in Section 3.1).

⁶⁰ It was easier to see the superiority of nominal GDP targeting when the status quo was M1 targeting. (The proposal for nominal income targeting might have been better received by central banks if it had been called Velocity-Shift-Adjusted Money Targeting.)

6. EXCHANGE RATE REGIMES

Many inflation-targeting central banks in developing countries have put more emphasis on the exchange rate than they officially admitted. This tendency is the famous Fear of Floating of Reinhart (2000) and Calvo and Reinhart (2000, 2002).⁶¹ When booming markets for their export commodities put upward pressure on countries' currencies (2003–2008), they intervene to dampen appreciation. Then, when crisis hits, the country may intervene to dampen the depreciation of their currencies. Central banks still do, and should, pay a lot of attention to their exchange rates. The point applies to the entire spectrum from managed floaters to peggers. Fixed exchange rates are still an option to be considered for many countries, especially small ones.⁶²

6.1 The advantages of fixed exchange rates

For very small countries, full dollarization remains one option, or joining the euro, for those in Europe. The success of European Monetary Union EMU has inspired regional groupings of developing countries in various parts of the world to discuss the possibility of trying to follow a similar path.⁶³

Fixed exchange rates have many advantages, in addition to their use as a nominal anchor for monetary policy. They reduce transactions costs and exchange risk, which in turn facilitates international trade and investment. This is especially true for institutionally locked-in arrangements, such as currency boards⁶⁴ and dollarization.⁶⁵ Influential research by Rose (2000) and others over the last decade has shown that fixed exchange rates and, especially, monetary unions for developing countries, increase trade and investment substantially. In addition fixed exchange rates avoid the speculative bubbles to which floating exchange rates are occasionally subject.

6.2 The advantages of floating exchange rates

Of course fixed exchange rates have disadvantages too. Most important, to the extent financial markets are integrated, a fixed exchange rate means giving up monetary independence; the central bank cannot increase the money supply, lower the interest rate, or devalue the currency in response to a downturn in demand for its output.

It has been argued that developing countries have misused monetary discretion more often than they have used it to achieve the textbook objectives. But a second

⁶¹ Among the possible reasons for aversion to floating, Calvo and Reinhart (2002) emphasized high pass-through and contractionary depreciations.

⁶² Meanwhile, in response to the global financial crisis of 2007–2009, small countries on the periphery of Europe felt newly attracted to the idea of rapid adoption of the euro (Iceland and some Central European countries).

⁶³ Bayoumi and Eichengreen (1994) and Levy-Yeyati and Sturzenegger (2000) applied OCA criteria to a number of relevant regions. Bayoumi and Eichengreen (1999) and Goto and Hamada (1994) applied it to Asia.

⁶⁴ See Ghosh et al. (2000), Hanke and Schuler (1994) and Williamson (1995).

⁶⁵ See Calvo (2002) and Schmitt-Grohe and Uribe (2001).

1 disadvantage of a fixed rate presupposes no discretionary abilities: it means giving
2 up the automatic accommodation to supply shocks that floating allows,⁶⁶ especially trade
3 shocks: a depreciation when world market conditions for the export commodity weaken,
4 and vice versa.⁶⁷ Berg, Borensztein, and Mauro (2003) say it well:

4 Au8.9

5 *Another characteristic of a well-functioning floating exchange rate is that it responds appropri-*
6 *ately to external shocks. When the terms of trade decline, for example, it makes sense for the*
7 *country's nominal exchange rate to weaken, thereby facilitating the required relative price*
8 *adjustment. Emerging market floating exchange rate countries do, in fact, react in this way*
9 *to negative terms of trade shocks. In a large sample of developing countries over the past three*
10 *decades, countries that have fixed exchange rate regimes and that face negative terms of trade*
11 *shocks achieve real exchange rate depreciations only with a lag of two years while suffering*
12 *large real GDP declines. By contrast, countries with floating rates display large nominal and real*
13 *depreciations on impact and later suffer some inflation but much smaller output losses.*

14 Besides the inability to respond monetarily to shocks, there are three more disadvan-
15 tages of rigidity in exchange rate arrangements. It can impair the central bank's lender
16 of last resort capabilities in the event of a crisis in the banking sector, as Argentina
17 demonstrated in 2001. It entails a loss of seignorage, especially for a country that goes
18 all the way to dollarization. For a country that stops short of full dollarization, pegged
19 exchange rates are occasionally subject to unprovoked speculative attacks (of the
20 "second-generation" type⁶⁸).

21 Some who see costly speculative attacks as originating in the maturity mismatch
22 problem suggest that exchange rate variability is beneficial because it forces borrowers
23 to confront the risks of foreign-currency-denominated debt. The warning is that the
24 choice of an adjustable peg regime, or other intermediate exchange rate regime, leads
25 to dangerously high unhedged foreign-currency borrowing. It is argued that a floating
26 regime would force borrowers to confront explicitly the existence of exchange rate
27 risk, reducing unhedged foreign-currency borrowing.⁶⁹ This sounds like an argument
28 that governments should introduce gratuitous volatility because private financial agents
29 underestimate risk. But some models establish this advantage of floating, even with
30 rational expectations and only uncertainty that is generated only by fundamentals.⁷⁰

31 6.3 Evaluating overall exchange rate regime choices 31

32 Econometric attempts to discern what sort of regime generically delivers the best eco-
33 nomic performance across countries — firmly fixed, floating, or intermediate — have
34

35 ⁶⁶ Ramcharan (2007) found support for the advantage of floating in response to supply shocks in the case of natural
36 disasters.

37 ⁶⁷ Among peggers, terms-of-trade shocks are amplified and long-run growth is reduced when compared to flexible-rate
38 countries, according to Edwards and Yeyati (2005). Also see Broda (2004).

39 ⁶⁸ See Chang and Velasco (1997). The generations of speculative attack models are explained in the next section.

39 ⁶⁹ See Céspedes et al. (2004) and Eichengreen (1999, p. 105).

40 ⁷⁰ See Chamon and Hausmann (2005), Chang and Velasco (2004), Jeanne (2005), and Pathak and Tirole (2004).

40 Au48.49.50

1 not been successful. To pick three, Ghosh, Gulde, and Wolf (2000) found that firm fix- 1
2 ers perform the best, Levy-Yeyati and Sturzenegger (2003) found that floaters do the 2 Au10
3 best, and Reinhart and Rogoff (2004) found that intermediate managed floats work 3 Au11
4 the best. Why the stark discrepancy? One reason is differences in how the studies clas- 4
5 sify de facto exchange rate regimes (to be discussed in the next section). But another 5
6 reason is that the virtues of alternative regimes depend on the circumstances of the 6
7 country in question. No single exchange rate regime is right for all countries. 7

8 A list of optimum currency area criteria that qualify a country for a relatively firm fixed 8
9 exchange rate, versus a more flexible rate, should include these eight characteristics:⁷¹ 9

- 10 **1.** Small size. 10
- 11 **2.** Openness. As reflected, for example, in the ratio of tradable goods to GDP.⁷² The 11
12 existence of a major-currency partner with whom bilateral trade, investment, and 12
13 other activities are already high, or are hoped to be high in the future, would also 13
14 work in favor of a fixed rate. 14
- 15 **3.** “Symmetry of shocks.” High correlation of cyclical fluctuations (particularly 15
16 demand shocks) in the home country and in the country that determines policy 16
17 regarding the money to which pegging is contemplated. This is important because, 17
18 if the domestic country is to give up the ability to follow its own monetary policy, 18
19 it is better if the interest rates chosen by the larger partner are more often close to 19
20 those that the domestic country would have chosen anyway.⁷³ 20
- 21 **4.** Labor mobility.⁷⁴ When monetary response to an asymmetric shock has been pre- 21
22 cluded, it is useful if workers can move from the high-unemployment country to 22
23 the low-unemployment countries. This is the primary mechanism of adjustment 23
24 across states within the monetary union of the United States. 24
- 25 **5.** Countercyclical remittances. Emigrant’s remittances (i) constitute a large share of 25
26 foreign exchange earnings in many developing countries, (ii) are variable, and (iii) 26
27 appear to be countercyclical.⁷⁵ That remittances apparently respond to the differ- 27
28 ence between the cyclical positions of the sending and receiving country, makes 28
29 it a bit easier to give up the option of responding to shocks by setting monetary 29
30 policies different from those of the partner. 30

31
32
33 ⁷¹ Four surveys offering a more complete discussion of the choice of exchange rate regime and further references are 33
34 Edwards (2002), Edwards and Savastano (1999), Frankel (2004), and Rogoff (2004). 34 Au51, 52, 53

35 ⁷² The classic reference is McKinnon (1963). 35

36 ⁷³ See Mundell (1961) and Eichengreen (1999). 36

37 ⁷⁴ The classic reference is Mundell (1961). 37

38 ⁷⁵ Only the countercyclicity is in need of documentation. Clarke and Wallstein (2004) found that remittance 37
38 receipts go up in response to a natural disaster. Kapur (2003) found that they go up in response to an economic 38
39 downturn. Yang and Choi (2007) found that they respond to rainfall-induced economic fluctuations. Frankel (2009) 39 Au54
40 found that bilateral remittances respond to the differential in sender-receiver cyclical conditions. Some other 40
41 authors, however, do not find evidence of such countercyclicity.

- 1 6. Countercyclical fiscal transfers. Within the United States, if one region suffers an economic downturn, the federal fiscal system cushions it; one estimate is that for every dollar fall in the income of a stricken state, disposable income falls by only an estimated 70 cents. Such fiscal cushions are largely absent at the international level, with the possible exception of the role of France in the *Communauté Financière Afrique*. (Even where substantial transfers exist, they are rarely countercyclical.)
- 7 7. Well-developed financial system.⁷⁶
- 8 8. Political willingness to give up some monetary sovereignty. Some countries look on their currency with the same sense of patriotism with which they look on their flag.

6.4 Categorizing exchange rate regimes

It is by now well-known that attempts to categorize countries' choice of regime (into fixed, floating, and intermediate) in practice differ from the official categorization. Countries that say they are floating, in reality often are not.⁷⁷ Countries that say they are fixed, in reality often are not.⁷⁸ Countries that say they have a Band Basket Crawl (BBC) regime, often do not.⁷⁹

There are a variety of attempts to classify *de facto* regimes. Some seek to infer the degree of exchange rate flexibility around the anchor; others seem to infer what the anchor is.⁸⁰ Pure *de facto* studies look only at the times series of exchange rates and reserves;⁸¹ others pay more attention to other information, including what the country says.⁸² Less well-known is that the *de facto* classification regimes do not agree among themselves. The correlation of *de facto* classification attempts in each study is generally as low as the correlation with the IMF's official classification scheme.⁸³

Indeed, neat categorization may not be possible at all. That Argentina was in the end forced to abandon its currency board in 2001 also dramatizes the lesson that the choice of exchange rate regime is not as permanent or deep as had previously been thought. The choice of exchange rate regime is more likely endogenous with respect to institutions, rather than the other way around.⁸⁴

⁷⁶ Husain, Mody, and Rogoff (2005) and Aghion, Bacchetta, Ranciere, and Rogoff (2009) found that countries appear to benefit by having increasingly flexible exchange rate systems as they become richer and more financially developed.

⁷⁷ See Calvo and Reinhart (2002).

⁷⁸ See Obstfeld and Rogoff (1995).

⁷⁹ See Frankel, Schmukler, and Servén (2000) and Frankel and Wei (2007).

⁸⁰ See Frankel and Wei (2008).

⁸¹ These include Calvo and Reinhart (2000, 2002), Levy-Yeyati and Sturzenegger (2001, 2003a,b, 2005), and Shambaugh (2004).

⁸² These include Ghosh, Gulde, and Wolf (2000, 2002) and Reinhart and Rogoff (2003, 2004).

⁸³ See Benassy et al. (2004) and Frankel (2004).

⁸⁴ See Alesina and Wagner (2003) and Calvo and Mishkin (2003).

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Au57, 58, 59, 60

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6.5 The corners hypothesis

The “corners hypothesis” — that countries are, or should be, moving away from the intermediate regimes, in favor of either the hard peg corner or the floating corner — was proposed by Eichengreen (1993) and rapidly became the new conventional wisdom with the emerging market crises of the late 1990s.⁸⁵ But it never had a good theoretical foundation,⁸⁶ and subsequently lost popularity. Perhaps it is another casualty of the realization that no regime choice is in reality permanent, and that investors know this.⁸⁷ In any case, many countries continue to follow intermediate regimes such as BBC, and do not seem any the worse for it.

7. PROCYCLICALITY

As noted in the introduction of this chapter, one structural feature that tends to differentiate developing countries from industrialized countries is the magnitude of cyclical fluctuations. This is in part due to the role of factors that “should” moderate the cycle, but in practice seldom do. If anything, they tend to exacerbate booms and busts: procyclical capital flows, procyclical monetary and fiscal policy, and the related Dutch disease. The hope that improved policies or institutions might reduce this procyclicality makes this one of the most potentially fruitful avenues of research in emerging market macroeconomics.

7.1 The procyclicality of capital flows in developing countries

According to the theory of intertemporal optimization, countries should borrow during temporary downturns to sustain consumption and investment, and should repay or accumulate net foreign assets during temporary upturns. In practice, it does not tend to work this way. Capital flows are more often procyclical than countercyclical.⁸⁸ Most theories to explain this involve imperfections in capital markets, such as asymmetric information or the need for collateral. Aguiar and Gopinath (2006, 2007), however, demonstrated that the observation of procyclical current accounts in developing countries might be explained in an optimizing model if shocks take the form of changes in the permanent trend of productivity rather than temporary cyclical deviations from trend.

⁸⁵ See Fischer (2001), Council on Foreign Relations (1999), and Meltzer (2000).

⁸⁶ The feeling that an intermediate degree of exchange rate flexibility is inconsistent with perfect capital mobility is a misinterpretation of the principle of the impossible trinity. Krugman (1991) shows theoretically that a target zone is entirely compatible with uncovered interest parity. Williamson (1996, 2001) favors intermediate exchange rate regimes for emerging markets.

⁸⁷ See Reinhart and Reinhart (2003).

⁸⁸ See Kaminsky, Reinhart, and Vegh (2005); Reinhart and Reinhart (2009); Perry (2009); Gavin, Hausmann, Perotti, and Talvi (1996); and Mendoza and Terrones (2008).

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1 One interpretation of procyclical capital flows is that they result from procyclical
2 fiscal policy: when governments increase spending in booms, some of the deficit is
3 financed by borrowing from abroad. When they are forced to cut spending in down-
4 turns, it is to repay some of the excessive debt that incurred during the upturn. Another
5 interpretation of procyclical capital flows to developing countries is that they pertain
6 especially to exporters of agricultural and mineral commodities such as oil. We consider
7 procyclical fiscal policy in the next subsection, and the commodity cycle (Dutch dis-
8 ease) in the one after.

9 **7.2 The procyclicality of demand policy in developing countries**

10 **7.2.1 The procyclicality of fiscal policy**

11 Various authors have documented that fiscal policy tends to be procyclical in develop-
12 ing countries in comparison with industrialized countries.⁸⁹ Most studies look at the
13 procyclicality of government spending, because tax receipts are particularly endogenous
14 with respect to the business cycle. Indeed, an important reason for procyclical spending
15 is precisely that government receipts from taxes or royalties rise in booms, and the
16 government cannot resist the temptation or political pressure to increase spending
17 proportionately, or even more than proportionately.

19 **7.2.2 The political business cycle**

20 The political business cycle is the hypothesized tendency of governments to adopt
21 expansionary fiscal policies, and often monetary policies as well, in election years. In
22 this context, the fiscal expansion takes the form of tax cuts as easily as spending
23 increases. The theory was originally designed with advanced countries in mind. Some
24 comprehensive empirical studies find evidence that the political budget cycle is present
25 in both developed and less developed countries, but developing countries are thought
26 to be even more susceptible to the political business cycle than advanced countries.⁹⁰

27 One interpretation is that institutions such as constitutional separation of powers in
28 the budget process are necessary to resist procyclical fiscal policy, and these institutions
29 are more often lacking in developing countries.⁹¹ Brender and Drazen (2005) offer
30 another interpretation: the finding of a political budget cycle in a large cross-section of
31 countries is driven by the experience of “new democracies” — most of which are devel-
32 oping or transition countries — where fiscal manipulation by the incumbent government
33

34
35
36
37 ⁸⁹ See Gavin and Perotti (1997); Lane and Tornell (1999); Tornell and Lane (1999); Kaminsky, Reinhart, and Vegh
(2004); Talvi and Vegh (2005); Alesina, Campante, and Tabellini (2008); and Mendoza and Oviedo (2006).

38 ⁹⁰ Persson and Tabellini (2003, Chapter 8) used data from 60 democracies from 1960 to 1998. Shi and Svensson (2006)
39 used data from 91 countries from 1975 to 1995. See also Schuknecht (1996). Drazen (2001) offers an overview.

40 ⁹¹ See Saporiti and Streb (2003). Alesina, Hausmann, Hommes, and Stein (1999) studied fiscal institutions.

1 succeeds politically because voters are inexperienced with elections. They find that once 1
2 these countries are removed from the larger sample, the political fiscal cycle disappears. 2

3 4 **7.2.3 The procyclicality of monetary policy** 4

5 Countercyclical monetary policy is difficult to achieve, particularly because of lags and 5
6 uncertainty. For this reason, it is often suggested that the advantages of discretion in 6
7 monetary policy are not large enough to outweigh disadvantages, such as the inflation 7
8 bias from dynamic inconsistency, especially for developing countries. Hence the sup- 8
9 port for the tying of hands and committing to a nominal target. 9

10 However, taking as given some degree of commitment to a nominal target, it 10
11 would seem to be self-defeating to choose a nominal target that could build unneces- 11
12 sary procyclicality into the automatic monetary mechanism. But this is what inflation 12
13 targeting does in the case of supply shocks. Again, where terms of trade fluctuations 13
14 are important, it would be better to choose a nominal anchor that accommodates terms 14
15 of trade shocks rather than to exacerbate them. 15

16 **7.3 Commodities and the Dutch disease** 16

17 Clear examples of countries with very high export price volatility are those specialized 17
18 in the production of oil, copper, or coffee, which periodically experience swings in 18
19 world market conditions that double or halve their prices. 19
20

21 Dutch disease refers to some possibly unpleasant side effects of a boom in petroleum 21
22 or other mineral and agricultural commodities.⁹² It arises when a strong, but perhaps 22
23 temporary, upward swing in the world price of the export commodity causes the fol- 23
24 lowing pattern: a large real appreciation in the currency, an increase in spending (in 24
25 particular, the government increases spending in response to the increased availability 25
26 of tax receipts or royalties⁹³), an increase in the price of nontraded goods relative to 26
27 nonexport-commodity traded goods, a resultant shift of resources out of nonexport- 27
28 commodity traded goods, and a current account deficit. When the adversely affected 28
29 tradable goods are in the manufacturing sector, the feared effect is deindustrialization. 29
30 In a real model, the reallocation of resources across tradable sectors may be the inevi- 30
31 table consequence of a global increase in the real commodity price. But the movement 31
32 into nontraded goods is macroeconomic. That it is all painfully reversed when 32
33 the world price of the export commodity goes back down is what makes this a disease, 33
34 particularly if the complete cycle is not adequately foreseen. 34

35 Other examples of the Dutch disease arise from commodity booms due to the dis- 35
36 covery of new deposits or some other expansion in supply, leading to a trade surplus via 36
37 exports or a capital account surplus via inward investment to develop the new resource. 37
38

39 ⁹² See Corden (1984). Frankel (2010) has a survey of Dutch disease and the more general natural resource curse. 39

40 ⁹³ See Lane and Tornell (1998). 40

1 In addition, the term is also analogous for other sorts of inflows such as the receipt of 1
2 transfers (foreign aid or remittances) or a stabilization-induced capital inflow. In all 2
3 cases, the result is real appreciation and a shift into nontradables and away from (non- 3
4 commodity) tradables. The real appreciation takes the form of a nominal appreciation if 4
5 the exchange rate is flexible, and inflation if the exchange rate is fixed. 5

6 A wide variety of policy measures have been proposed, and some adopted, to cope 6
7 with the commodity cycle.⁹⁴ Some of the most important measures are institutions 7
8 to ensure that export earnings are put aside during the boom time, into a commodity 8
9 saving fund, perhaps with the aid of rules governing the cyclically adjusted budget 9
10 surplus.⁹⁵ Other proposals include using futures markets to hedge the price of the 10
11 commodity and indexing debt to the price. 11

12 **7.4 Product-oriented choices for price index by inflation targeters** 12

13 Of the possible price indices that a central bank could target, the CPI is the usual 13
14 choice. The CPI is indeed the logical candidate to be the measure of the inflation 14
15 objective for the long term, but it may not be the best choice for intermediate target 15
16 on an annual basis. We have already noted that IT is not designed to be robust with 16
17 respect to supply shocks. If the supply shocks are trade shocks, then the choice of 17
18 CPI to be the price index on which IT focuses is particularly inappropriate. 18
19

20 Proponents of inflation targeting may not have considered the implications of the 20
21 choice between the CPI and production-oriented price indices in light of terms of 21
22 trade shocks. One reason may be that the difference is not, in fact, as important for 22
23 large industrialized countries as it is for small developing countries, especially those that 23
24 export mineral and agricultural commodities. 24

25 A CPI target, if implemented literally, can be destabilizing for a country subject to 25
26 of trade volatility. It calls for monetary tightening and currency appreciation when the 26
27 price of the imported good goes up on world markets, but not when the price of the 27
28 export commodity goes up on world markets — precisely the opposite of the desired 28
29 pattern of response to terms of trade movements. The alternative to the choice of CPI 29
30 as a price target is an output-based price index such as the PPI, the GDP deflator, or an 30
31 index of export prices. The important difference is that imported goods show up in the 31
32 CPI, but not in the output-based price indices and vice versa for exported goods: they 32
33 show up in the output-based prices but much less in the CPI. 33

34 Terms of trade shocks for small countries can take two forms: a fluctuation in the 34
35 nominal price (i.e., dollar price) of export goods on world markets and a fluctuation 35
36 in the nominal price of import goods on world markets. Let us consider each in turn. 36
37

38 ⁹⁴ See Sachs (2007). 38

39 ⁹⁵ See Davis, Ossowski, Daniel, and Barnett (2001). Chile's rule adjusts the budget surplus for the deviation of the 39 **Au67**
40 copper price from its long-run value as well as GDP from potential with two panels illustrating the determination. 40

1 **7.4.1 Export price shocks** 1

2 A traditional textbook advantage of floating exchange rates particularly applies to com- 2
3 modity exporters. When world demand for the export commodity falls, the currency 3
4 tends to depreciate, thus ameliorating the adverse effect on the current account balance 4
5 and output. When world demand for the export commodity rises, the currency tends 5
6 to appreciate, thus ameliorating the inflationary impact. One possible interpretation of 6
7 the emerging market crises of the 1990s is that declines in world market conditions for 7
8 oil and consumer electronics, exacerbated by a procyclical falloff in capital flows into 8
9 emerging market countries that exported these products, eventually forced the aban- 9
10 donment of exchange rate targets. The same devaluations could have been achieved 10
11 much less painfully if they had come automatically, in tandem with the decline in com- 11
12 modity export prices. 12

13 It is evident that a fixed exchange rate necessarily requires giving up the automatic 13
14 accommodation of terms of trade shocks. A CPI target requires giving up accommoda- 14
15 tion of trade shocks as well, but needlessly so. A form of inflation targeting that focused 15
16 on an export price index or PPI would experience an automatic appreciation in 16
17 response to an increase in the world price of the export commodity. In the absence 17
18 of such an appreciation, the price index would rise, requiring the monetary authorities 18
19 to tighten. Thus the succinct argument for targeting a product-oriented index is that it 19
20 offers the best of both worlds — the automatic accommodation of terms of trade 20
21 shocks that floating promises as well as the nominal anchor that an exchange rate target 21
22 or inflation target promise. 22

23
24 **7.4.2 Do inflation targeters react perversely to import price shocks?** 24

25 For countries that import rather than export oil, a major source of trade fluctuations 25
26 takes the form of variation in world oil prices. As Section 5 noted, there is a danger that 26
27 CPI targeting, if interpreted too literally by central bankers, would force them to 27
28 respond to an increase in the dollar price of their import goods by contracting their 28
29 money supply enough to appreciate their currencies proportionately. 29

30 Given the value that most central bankers place on transparency and their reputa- 30
31 tions, it would be surprising if their public emphasis on the CPI did not lead them 31
32 to be at least a bit more contractionary in response to adverse supply shocks, and 32
33 expansionary in response to favorable supply shocks, than they would be otherwise. 33
34 In other words, it would be surprising if they felt able to take full advantage of the 34
35 escape clause offered by the idea of core CPI. There is some reason to think that this 35
36 is indeed the case. A simple statistic shows that the exchange rates of IT countries 36
37 (in dollars per national currency) are positively correlated with the dollar price on 37
38 world markets of their import baskets. Why is this fact so revealing? The currency 38
39 should not respond to an increase in world prices of its imports by appreciating, to 39
40

1 the extent that these central banks' target core CPI (and to the extent that the com- 1
2 modities excluded by core CPI include all imported commodities that experience 2
3 world price shocks, which is a big qualifier). If anything, *floating currencies should depreci-* 3
4 *ate in response to such an adverse trade shock.* When these IT currencies respond by appreci- 4
5 ating instead, it suggests that the central bank is tightening monetary policy to reduce 5
6 upward pressure on the CPI. 6

7 Every one of the inflation targeters in Latin America shows a monthly correlation 7
8 between dollar prices of imported oil and the dollar values of their currencies that 8
9 was both positive over the period 2000–2008 and greater than the correlation during 9
10 the pre-IT period.⁹⁶ The evidence supports the idea that inflation targeters — in 10
11 particular, Brazil, Chile and Peru — tend to react to the positive oil shocks of the past 11
12 decade by tightening monetary policy and appreciating their currencies. The implica- 12
13 tion seems to be that the CPI they target does not, in practice, entirely exclude oil 13
14 price shocks. 14

15 What is wanted as a candidate for nominal target is a variable that is simpler for the 15
16 public to understand ex ante than core CPI, and yet that is robust with respect to sup- 16
17 ply shocks. Being robust with respect to supply shocks means that the central bank 17
18 should not have to choose ex post between two unpalatable alternatives: an unneces- 18
19 sary economy-damaging recession or an embarrassing credibility-damaging violation 19
20 of the declared target. 20

21 **7.4.3 PEP and PP targeting** 21

22 The idea of producer price targeting (PPT) is a moderate version of a more exotic 22
23 proposed monetary regime called peg the export price (PEP). Under the PEP proposal, 23
24 a copper producer would peg its currency to copper, an oil producer would peg to oil, 24
25 a coffee producer to coffee, etc.⁹⁷ 25

26 How would PEP work operationally? Conceptually, one can imagine the govern- 26
27 ment holding reserves of gold or copper or oil and buying and selling the commodity 27
28 whenever necessary to keep the price fixed in terms of local currency. Operationally, a 28
29 more practical method would be for the central bank each day to announce an 29
30 exchange rate vis-à-vis the dollar, following the rule that the day's exchange rate target 30
31 (dollars per local currency unit) moves precisely in proportion to the day's price of gold 31
32 or copper or oil on the New York market (dollars per commodity). Then the central 32
33 bank could intervene via the foreign exchange market to achieve the day's target. 33
34 The dollar would be the vehicle currency for intervention — precisely as it has long 34
35 been when a small country defends a peg to some nondollar currency. Either way, 35
36 the effect would be to stabilize the price of the commodity in terms of local currency, 36
37 37

38
39 ⁹⁶ See Frankel (2009b).

40 ⁹⁷ See Frankel (2003, 2005).

1 or perhaps, since these commodity prices are determined on world markets, a better 1
2 way to express the same policy is stabilizing the price of local currency in terms of 2
3 the commodity. 3

4 The argument for the export targeting proposal, relative to an exchange rate target, 4
5 can be stated succinctly: It delivers one of the main advantages that a simple exchange 5
6 rate peg promises (a nominal anchor), while simultaneously delivering one of the main 6
7 advantages that a floating regime promises (automatic adjustment in the face of fluctua- 7
8 tions in the prices of the countries' exports on world markets). Textbook theory says 8
9 that when there is an adverse movement in the terms of trade, it is desirable to accom- 9
10 modate it via a depreciation of the currency. When the dollar price of exports rises, 10
11 under PEP the currency per force appreciates in terms of dollars. When the dollar price 11
12 of exports falls, the currency depreciates in terms of dollars. Such accommodation 12
13 of trade shocks is precisely what is wanted. In past currency crises, countries that have 13
14 suffered a sharp deterioration in their export markets have often eventually been forced 14
15 to give up their exchange rate targets and devalue anyway. The adjustment was far 15
16 more painful — in terms of lost reserves, lost credibility, and lost output — than if 16
17 the depreciation had happened automatically. 17

18 The desirability of accommodating terms of trade shocks is also a particularly good 18
19 way to summarize the attractiveness of export price targeting relative to the reigning 19
20 champion, CPI targeting. Consider again the two categories of adverse terms of trade 20
21 shocks: a fall in the dollar price of the export in world markets and a rise in the dollar 21
22 price of the import on world markets. In the first case, one wants the local currency to 22
23 depreciate against the dollar. As already noted, PEP delivers that result automatically, 23
24 but CPI targeting does not. In the second case, the terms-of-trade criterion suggests 24
25 that one again one might want the local currency to depreciate. Neither regime deli- 25
26 vers that result.⁹⁸ But CPI targeting actually has the implication that the central bank 26
27 tighten monetary policy to *appreciate* the currency against the dollar by enough to pre- 27
28 vent the local currency price of imports from rising. This implication — reacting to 28
29 adverse terms of trade shock by appreciating the currency — is perverse. It can be 29
30 expected to exacerbate swings in the trade balance and output. 30

31 **7.4.4 Product price index** 31

32 A way to render the proposal far more moderate is to target a broad index of all domes- 32
33 tically produced goods, whether exportable or not. An index of product prices is supe- 33
34 rior to the GDP deflator because it can easily be collected monthly (just like CPI). Even in 34
35 a poor small country with very limited capacity to gather statistics, government workers 35
36 36

37 37
38 38
39 ⁹⁸ There is a reason for that. In addition to the goal of accommodating terms of trade shocks, there is also the goal of 39
40 resisting inflation, but to depreciate in the face of an increase in import prices would exacerbate price instability. 40

1 can survey a sample of firms every month to construct a primitive index of product prices 1
2 as easily as they can survey a sample of retail outlets to construct a primitive CPI. 2

3 If a broad index of export or product prices was to be the nominal target, it would 3
4 be impossible for the central bank to hit the target exactly, in contrast to the possibility 4
5 of exactly hitting a target for the exchange rate, the price of gold, or even the price of a 5
6 basket of four or five exchange-traded agricultural or mineral commodities. There 6
7 would instead be a declared band for the export price target, which could be wide if 7
8 desired, just as with the targeting of the CPI, money supply, or other nominal variable. 8
9 Open market operations to keep the index inside the band if it threatens to stray out- 9
10 side could be conducted using foreign exchange or domestic securities. 10

11 12 **8. CAPITAL FLOWS** 12

13 14 **8.1 The opening of emerging markets** 14

15 The first major post-war wave of private capital flows to developing countries came after 15
16 the large oil price increases of the 1970s. The major borrowers were governments in oil- 16
17 importing countries, and the major vehicles were syndicated bank loans, often “recycling 17
18 petrodollars” from surplus OPEC countries via the London euromarket. This first epi- 18
19 sode ended with the international debt crisis that surfaced in 1982. The second major 19
20 wave began around 1989, and ended with the East Asia crisis of 1997. It featured a greater 20
21 role for securities rather than bank loans, especially in East Asia, and the capital went 21
22 mostly to private sector borrowers. The third wave began around 2003, this time includ- 22
23 ing China and India, and may have ended with the global financial crisis of 2008. 23

24 The boom-bust cycle, however, masks a long-run trend of gradually increased 24
25 opening of financial markets. We begin this part of the chapter by documenting the 25
26 extent to which emerging market countries have indeed emerged; that is, the extent 26
27 to which they have opened up to the international financial system. We then consider 27
28 the advantages and disadvantages of this financial integration. 28

29 30 **8.1.1 Measures of financial integration** 30

31 Integration into international financial markets, similar to integration into goods mar- 31
32 kets, can be quantified in three ways: direct observation of the barriers to integration, 32
33 measurements based on flow quantities, and measurements based on the inferred ability 33
34 of arbitrage to equalize returns across countries. 34

35 36 **8.1.2 Legal barriers to integration** 36

37 Most developing countries had serious capital controls as recently as the 1980s, but a 37
38 majority liberalized them subsequently, at least on paper. Many researchers use the 38
39 binary accounting of *de jure* regulations maintained by the IMF, or the higher resolu- 39
40 tion version of Quinn (1997). These measures suggest substantial liberalization, 40

1 especially in the 1990s. The drawback is that *de jure* regulations may not reflect the real- 1
2 ity. Some governments do not enforce their capital controls (lack of enforcement can 2
3 arise because the private sector finds ways around the controls, such as leads and lags 3
4 in payments for imports and exports), while others announce a liberalization and yet 4
5 continue to exercise heavy-handed “administrative guidance.” 5

6 **8.1.3 Quantities (gross or net) of capital flows** 6

7 Many researchers prefer to use measures relating to capital flow quantities, because they 7
8 reflect de facto realities. There are many possible quantity-based measures. They 8
9 include current account magnitudes, net capital flows, gross capital flows, debt/GDP 9
10 ratios, and the “saving-retention coefficient” in a regression of national investment 10
11 rates against national saving rates.⁹⁹ They also include risk-pooling estimates such as 11
12 a comparison of cross-country consumption correlations with cross-country income 12
13 correlations. Tests find that the volatility of consumption in developing countries 13
14 has, if anything, gone up rather than gone down as one would expect if free capital 14
15 flows smoothed intertemporally.¹⁰⁰ 15
16

17 One disadvantage of trying to infer the degree of capital mobility from capital flow 17
18 quantities is that they reflect not only the desired parameter but the magnitude of exog- 18
19 enous disturbances. A country with genuine capital controls may experience large cap- 19
20 ital outflows in a year of exogenously low investment, while a country with open 20
21 markets may experience no net outflows in a year when national investment happens 21
22 to approximately equal national saving. Finance experts thus often prefer to look at 22
23 prices rather than quantities. 23
24

25 **8.1.4 Arbitrage of financial market prices** 25

26 If prices of assets or rates of return in one country are observed to fluctuate in close 26
27 synchronization along with prices or returns in other countries, it is good evidence that 27
28 barriers are low and arbitrage is operating freely. 28

29 Sometimes one can test whether the price of an asset inside an emerging market is 29
30 close to the price of essentially the same asset in New York or London. This is done 30
31 by using multiple listings of the same equity on different exchanges (e.g., Telmex). 31
32 A second test is the prices of the American Depository Receipts or Global 32
33

34
35 ⁹⁹ Examples of the “Feldstein-Horioka regression” applied to developing countries include Dooley, Frankel, and 35
36 Mathieson (1987) and Holmes (2005). Even when instrumenting for the endogeneity of national savings, the 36
37 coefficient remains surprisingly high for developing countries, which throws additional doubt on whether this is 37
38 actually a measure of barriers to capital mobility. There is evidence that increases in the budget deficit are associated 38
39 with decreases in national saving (both in developing countries and others; see Giavazzi, Jappelli, and Pagano, 2000) 39
40 some theories notwithstanding.

40 ¹⁰⁰ See Prasad et al. (2003) and Levchenko (2004). Such tests are better interpreted as throwing doubt on the 40
proposition that capital flows work to smooth consumption than as tests of the degree of financial integration.

1 Depository Receipts. A third is the price of a country fund traded in New York or 1
2 London compared to the net asset value of the same basket of equities in the home 2
3 country.¹⁰¹ 3

4 The more common kind of arbitrage tests are of interest rate parity, which compare 4
5 interest rates on bonds domestically and abroad. Of course bonds at home and abroad 5
6 are often denominated in different currencies. There are three versions of interest rate 6
7 parity, quite different in their implications: closed or covered interest parity, open or 7
8 uncovered interest parity, and real interest parity. 8

9 *Covered interest differentials* are a useful measure of whether capital controls are effec- 9
10 tive; they remove the currency element by hedging it on the forward market. A grow- 10
11 ing number of emerging markets issue bonds denominated in their own currencies and 11
12 offer forward rates, but many do not, and in most cases the data do not go back very 12
13 far. A more common way of removing the currency element is to look at the *sovereign* 13
14 *spread* — the premium that the country must pay to borrow in dollars, relative to 14
15 LIBOR or the U.S. Treasury bill rate. The sovereign spread largely reflects default risk, 15
16 and remains substantial for most developing countries.¹⁰² An alternative is the *credit* 16
17 *default swap*, which became increasingly available for the larger emerging markets after 17
18 1997 and again shows substantial default risk.¹⁰³ There are some indications that 18
19 such measures may have underestimated risk during the boom phase of the credit cycle, 19
20 relative to fundamentals, even *ex ante*.¹⁰⁴ 20

21 *Equalization of expected returns* across countries is implied by perfect financial integra- 21
22 tion, *if* risk is unimportant, which is a very strong assumption. Uncovered interest par- 22
23 ity is the condition that the interest differential equals expected depreciation (which is 23
24 stronger than covered interest parity, the arbitrage condition that the interest differen- 24
25 tial equals the forward discount, because the existence of an exchange risk premium 25
26 would preclude it). Another way of testing if expected returns are equalized across 26
27 countries is to see if the forward discount equals expected depreciation. Often expected 27
28 returns are inferred from the systematic component of *ex post* movements in the 28
29 exchange rate. The rejection of the null hypothesis is consistent and strong (although 29
30 not as strong for emerging markets as in advanced countries). In financial markets, 30
31 exploitation of this forward rate bias is very popular, and goes by the name of “carry 31
32 trade”: investors go short in the low interest rate currency and long in the high interest 32
33 33

34 34
35 35
36 ¹⁰¹ Asymmetric information can characterize segmented markets. There is some evidence that domestic residents 36
37 sometimes have better information on the value of domestic assets than foreign residents; see Frankel and Schmukler 37
38 (1996) and Kim and Wei (2002). 38

39 ¹⁰² Eichengreen and Mody (2000, 2004) estimated econometrically the determinants of interest rate spreads on 39
40 individual issues. 40

¹⁰³ See Adler and Song (2009) and Ranciere (2002). 40

¹⁰⁴ See Eichengreen and Mody (2001), Kamin and Von Kleist (1999), and Sy (2002). 40

1 rate currency. Although there is always a risk that the currency will move against them, 1
2 particularly in an “unwinding” of the carry trade, on average they are able to pocket a 2
3 profit.¹⁰⁵ 3

4 Expected returns in equity markets are another way of approaching the quantifica- 4
5 tion of financial integration. The literature is surveyed by Bekaert and Harvey (2003). 5
6 Liberalization of emerging markets shows up as increased correlation between returns 6
7 locally and globally.¹⁰⁶ Meanwhile, the increased correlation reduces one of the major 7
8 benefits of investing in emerging markets in the first place: portfolio diversification.¹⁰⁷ 8

9 *Real interest rate equalization* is the third of the parity conditions. The proposition that 9
10 real interest rates are equalized across countries is stronger than uncovered interest par- 10
11 ity.¹⁰⁸ The proposition that real returns to equity are equalized is stronger still, as bonds 11
12 and equity may not be fully integrated even within one country.¹⁰⁹ Since sovereign 12
13 spreads and covered interest differentials are often substantial for developing countries, 13
14 and these would be pure arbitrage conditions, in the absence of capital controls and 14
15 transactions costs, it is not surprising that the stronger parity conditions fail as well. 15

16 **8.1.5 Sterilization and offset** 16

17 Given the progressively higher degree of capital mobility among developing countries, 17
18 particularly among those known as emerging markets, models that previously would only 18
19 have been applied to industrialized countries are now applied to them as well. This begins 19
20 with the traditional textbook Mundell–Fleming model, which is designed to show how 20
21 monetary and fiscal policy work under conditions of high capital mobility. Monetary 21
22 economists, usually with advanced countries in mind, argue that models can dispense 22
23 with the LM curve and the money supply itself on the grounds that money demand is 23
24 unstable and central banks have gone back to using the interest rate as their instrument 24
25 anyway.¹¹⁰ These concepts are still often necessary, however, when thinking about 25
26 emerging markets, because they are applicable to the question of sterilization and offset. 26
27

28 An application of interest is the principle of the impossible trinity: Are exchange 28
29 rate stability, open financial markets, and monetary independence mutually incompati- 29
30 ble? Research does seem to bear out that countries with flexible exchange rates have 30
31 more monetary independence.¹¹¹ 31

32 32
33 ¹⁰⁵ See Bansal and Dahlquist (2000); Brunnermeier, Nagel, and Pedersen (2009); Burnside, Eichenbaum, and Rebelo 33
34 (2007); Chinn and Frankel (1993); Frankel and Poonawala (2010); and Ito and Chinn (2007). 34

35 ¹⁰⁶ See Bekaert and Harvey (1997). 35

36 ¹⁰⁷ See Harvey (1995) and Goetzmann, and Jorion (1999). 36

37 ¹⁰⁸ Imperfect integration of goods markets can disrupt real interest parity even if bond markets are highly integrated; see 37
38 Dornbusch (1983). 38

39 ¹⁰⁹ Harberger (1980) looked at overall returns to capital and found them no more equalized for developing countries 39
40 than for industrialized countries. 40

41 ¹¹⁰ See Woodford (2003) and Friedman (2004).

42 ¹¹¹ See Shambaugh (2004) and Obstfeld, Shambaugh, and Taylor (2010).

1 The literature on *sterilization and offset* is one way to parameterize whether capital 1
2 mobility is so high that it has become difficult or impossible for a country with a fixed 2
3 exchange rate to pursue a monetary policy independent of the rest of the world. The 3
4 parameter of interest is the *offset coefficient*, defined as the fraction of an increase in 4
5 net domestic assets (in the monetary base) that has leaked out of the country through 5
6 a deficit in the capital account (in the overall balance of payments) after a given period 6
7 of time. The offset coefficient could be considered another entry on the list of criteria 7
8 in the preceding section for evaluating the degree of capital mobility. It is the aspect of 8
9 capital mobility that is of greatest direct interest for the conduct of monetary policy. 9

10 Econometrically, any sort of attempt to estimate the offset coefficient by regressing 10
11 the capital account or the overall balance of payments against net domestic assets is 11
12 plagued by reverse causation. If the central bank tries to sterilize reserve flows — and 12
13 the point of the exercise is to see if it has the ability to do so — then there is a second 13
14 equation in which changes in net domestic assets depend on the balance of payments. 14
15 Sorting out the offset coefficient from the sterilization coefficient is difficult.¹¹² Early 15
16 attempts to do so suggested that central banks such as the one in Mexico lose less than 16
17 half of an expansion in domestic credit to offsetting reserve outflows within one quarter 17
18 and even more in the long run.¹¹³ This is consistent with Mexico's attempt to sterilize 18
19 reserve outflows in 1994, which seemed to work for almost a year, but then ended in 19
20 the peso crisis. 20

21 Perhaps it is easier to sterilize reserve inflows than outflows; a number of emerging 21
22 market central banks in the early 1990s succeeded in doing so for a year or two by 22
23 selling sterilization bonds to domestic residents.¹¹⁴ They found this progressively more 23
24 difficult over time. Keeping the domestic interest rate above the world interest rate cre- 24
25 ated a quasi-fiscal deficit for the central bank.¹¹⁵ Eventually they gave up, and allowed 25
26 the reserve inflow to expand the money supply. After 2004 China experienced the 26
27 largest accumulation of reserves in history.¹¹⁶ Although a highly regulated banking sector 27
28 has efficiency costs, it does have advantages such as facilitating the sterilization of reserve 28
29 flows. For several years China succeeded in sterilizing the inflow.¹¹⁷ In 2007–2008, China 29
30 too had to allow the money to come in, contributing to overheating of the economy. 30
31
32
33
34
35

36 ¹¹² See Kouri and Porter (1974).

37 ¹¹³ See Cumby and Obstfeld (1983) and Kamas (1986).

38 ¹¹⁴ See Colombia, Korea, and Indonesia. See Calvo, Leiderman, and Reinhart (1993, 1994a,b, 1995); Frankel and 37
38 Okongwu (1996); and Montiel (1996).

39 ¹¹⁵ See Calvo (1991).

40 ¹¹⁶ Largely attributable to unrecorded speculative portfolio capital inflows; see Prasad and Wei (2007).

¹¹⁷ See Liang, Ouyang, and Willett (2009) and Ouyang, Rajan, and Willett (2007).

1 **8.1.6 Capital controls** 1

2 Most developing countries retained capital controls even after advanced countries 2
3 removed theirs, and many still do.¹¹⁸ Although there are many ways to circumvent 3
4 controls,¹¹⁹ it would be a mistake to think that they have little or no effect. 4

5 There are many different varieties of capital controls. An obvious first distinction is 5
6 between controls that are designed to keep out inflows and those that work to block 6
7 outflows. 7

8 *Controls on inflows*¹²⁰ are somewhat more likely to be enforceable. It is easier to 8
9 discourage foreign investors than to block up all the possible channels of escape. 9
10 Furthermore controls on outflows tend to discourage inflows and can fail on net.¹²¹ 10

11 Chile famously deployed penalties on short-term capital inflows in the 1990s, 11
12 which succeeded in shifting the maturity composition of inflows, considered more 12
13 stable, without evidently reducing the total.¹²² Controls on inflows do come with 13
14 disadvantages,¹²³ and Chile removed its controls subsequently. After the global financial 14
15 crisis of 2008–2009, Brazil revived the policy. 15

16 *Controls on capital outflows* receive less support from scholars, but are still used by 16
17 developing countries, especially under crisis conditions. When Malaysia imposed con- 17
18 trols on outflows in 1998 to maintain its exchange rate, the result was not the disaster 18
19 predicted by many economists.¹²⁴ Magud and Reinhart (2007) found that capital 19 Au13

20 controls in other countries have been less successful at reducing the volume of flows. 20

21 **8.2 Does financial openness improve welfare?** 21

22 A large literature is re-evaluating whether financial integration is beneficial, especially 22
23 for developing countries. For a country deciding whether to open up to international 23
24 capital flows, the question is whether advantages of financial integration outweigh the 24
25 disadvantages. Important surveys and overviews include Fischer (1997); Obstfeld 25
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30 ¹¹⁸ Dooley (1996) surveyed the subject. A variety of country experiences were considered by Edison and Reinhart 30
31 (2001) and in Edwards (2007) and Larrain (2000). 31

32 ¹¹⁹ Capital controls become harder to enforce if the trade account has already been liberalized. Exporters and importers 32
33 can use leads and lags in payments, and over- and under-invoice. See Aizenman (2008). 33

34 ¹²⁰ See Reinhart and Smith (1998). 34

35 ¹²¹ International investors are less likely to put their money into a country if they are worried about their ability to take 35
36 the principal, or even the returns, out again; see Bartolini and Drazen (1997). 36

37 ¹²² See Edwards (1999); De Gregorio, Edwards, and Valdes (2000); and Agosin and French-Davis (1996). Colombia had 37
38 somewhat similar controls against short-term capital inflows; see Cardenas and Barrera (1997). 38

39 ¹²³ Forbes (2007) found that Chile's famous controls on capital inflows raised the cost of capital for small firms in 39
40 particular. For Reinhart and Smith (2002) the main problem is being able to remove the controls at the right time. 40

39 ¹²⁴ Rodrik and Kaplan (2002) found that Malaysia's decision to impose controls on outflows helped it weather the Asia 39 Au69
40 crisis. But Johnson and Mitton (2001) found that Malaysian capital controls mainly worked to provide a screen 40
41 behind which politically favored firms could be supported. 41

(1998, 2009); Edison, Klein, Ricci, and Sloek (2004); Henry (2007); Kose, Prasad, Rogoff, and Wei (2009); Prasad, Rogoff, Wei, and Kose (2003, 2010); and Rodrik (1998).¹²⁵

8.2.1 Benefits to financial integration, in theory

In theory, financial liberalization should carry lots of benefits. Potential gains from international trade in financial assets are analogous to the gains from international trade in goods. Financial liberalization:

1. Enables rapidly developing countries to finance their investment more cheaply by borrowing from abroad than if they were limited to domestic savings.
2. I Allows consumption smoothing in response to adverse shocks.
3. Allows diversification of assets and liabilities across countries.
4. Facilitates emulation of foreign banks and institutions.
5. Promotes discipline on macro policy.

8.2.2 Increasing doubts, in practice

Financial markets do not work quite as smoothly in practice as some of the textbook theories suggest. There are three salient anomalies: capital often flows “uphill” rather than from rich to poor, capital flows are often procyclical rather than counter cyclical, and severe debt crises do not seem to fit the model.

Capital flows uphill. Countries that have lower income usually have lower capital/labor ratios. In a neoclassical model, with uniform production technologies, it would follow that they have higher returns to capital and, absent barriers to capital mobility, should on average experience capital inflows. But capital seems to flow from poor to rich as often as the reverse, as famously pointed out by Lucas (1990).¹²⁶

Procyclicality. As already noted, rather than smoothing short-term disturbances such as fluctuations on world markets for a country’s export commodities, private capital flows are often procyclical — pouring in during boom times and disappearing in recessions.

Debt crises. Financial liberalization has often been implicated in the crises experienced by emerging markets over the last ten years. Certainly a country that does not borrow from abroad cannot have an international debt crisis. Beyond that, there are concerns that (a) international investors sometimes abruptly lose enthusiasm for emerging markets, unexplained by any identifiable change in fundamentals or

¹²⁵ Other useful contributions to this large literature include Eichengreen and Leblang (2003), Mishkin (2007), and Rodrik and Subramanian (2009).

¹²⁶ See Prasad, Rajan, and Subramanian (2007); Alfaro, Kalemli-Ozcan and Volosovych (2008); Reinhart and Rogoff (2004); Gourinchas and Jeanne (2009); Kalemli-Ozcan, Reshef, Sorensen, and Yosha (2009); and Dominguez (2009). The general consensus-answer to the paradox is that inferior institutions in many developing countries prevent potential investors from capturing the high expected returns that a low capital/labor ratio would in theory imply.

1 information at hand, (b) that contagion sometimes carries the crises to countries 1
2 with strong fundamentals, and (c) that the resulting costs, in terms of lost output, 2
3 often seem disproportionate to any sins committed by policymakers.¹²⁷ The sever- 3
4 ity of the 2008–2009 crisis inevitably raised the question of whether modern liberal- 4
5 ized financial markets are more of a curse than a blessing.¹²⁸ Sometimes the doubts 5
6 are phrased as a challenge to the “Washington consensus” generally in favor of free 6
7 markets.¹²⁹ 7

8 **8.2.3 Tests of overall benefits** 8

9 Some empirical studies have found evidence that these benefits are genuine.¹³⁰ Some, 9
10 more specifically, have found that opening up equity markets facilitates the financing of 10
11 investment.¹³¹ Others have less sanguine results.¹³² The theoretical prediction that 11
12 financial markets should allow efficient risk-sharing and consumption-smoothing is 12
13 not borne out in many empirical studies.¹³³ 13
14

15 **8.2.4 Conditions under which capital inflows are likely beneficial** 15

16 A blanket indictment (or vindication) of international capital flows would be too sim- 16
17 plistic. Quite a lot of research argues that financial liberalization is more likely to be 17
18 beneficial under some particular circumstances, and less so under others. A recurrent 18
19 theme is that the aggregate size of capital inflows is not as important as the conditions 19
20 under which they take place. 20
21

22 Some recent papers suggest that financial liberalization is good for economic perfor- 22
23 mance if countries have reached a certain level of development, particularly with respect 23
24 to institutions and the rule of law.¹³⁴ One specific claim is that financial opening lowers 24
25

26
27 ¹²⁷ Barro (2002) estimated that the combined currency and banking crises in East Asia from 1997 to 1998 reduced 26
27 economic growth in the affected countries over a five-year period by 3% per year. 27

28 ¹²⁸ See Kaminsky (2008). 28

29 ¹²⁹ See Estevadeordal and Taylor (2008). 29

30 ¹³⁰ Gourinchas and Jeanne (2006) estimated the gains from international financial integration at about 1%, which they 30
31 considered small. Hoxha, Kalemli-Ozcan, and Vollrath (2009) found relatively large gains from financial integration. 31

32 ¹³¹ Bekaert and Harvey (2002), Chari and Henry (2004, 2008), Edison and Warnock (2003), Henry (2000a,b, 2003), 32
33 and Bekaert and Harvey (2005) showed that when countries open their stock markets, the cost of capital facing 32
33 domestic firms falls (stock prices rise), with a positive effect on their investment and on economic growth. Others 33
34 who have given us before-and-after studies of the effects of stock market openings include Claessens and Rhee 34
34 (1994). Henry and Sasson (2008) found that real wages benefit as well. 34

35 ¹³² Cross-country regressions by Edison et al. (2002) and Prasad and Rajan (2008) suggested little or no connection 35
36 from financial openness to more rapid economic growth for developing countries and emerging markets. 36

37 ¹³³ See Kose, Prasad, and Terrones (2009). 37

38 ¹³⁴ Kose, Prasad, and Taylor (2009) found that the benefits from financial openness increasingly dominate the 37
38 drawbacks once certain identifiable threshold conditions in measures of financial depth and institutional quality are 38
39 satisfied. Similarly, Aizenman, Chinn, and Ito (2008) found that greater financial openness with a high level of 39
40 financial development can reduce or increase output volatility, depending on whether the level of financial 39
40 development is high or low. See also Bekaert, Harvey, and Lundblad (2009). 40

1 volatility¹³⁵ and raises growth¹³⁶ only for rich countries, and is more likely to lead to mar- 1
2 ket crashes in lower income countries.¹³⁷ A second claim is that capital account liberaliza- 2
3 tion raises growth only in the absence of macroeconomic imbalances, such as overly 3
4 expansionary monetary and fiscal policy.¹³⁸ A third important finding is that institutions 4
5 (such as shareholder protection and accounting standards) determine whether liberaliza- 5
6 tion leads to development of the financial sector,¹³⁹ and in turn to long-run growth.¹⁴⁰ 6
7 The cost-benefit trade-off from financial openness improves significantly once some 7
8 clearly identified thresholds in financial depth and institutional quality are satisfied.¹⁴¹ 8
9 A related finding is that corruption tilts the composition of capital inflows toward the 9
10 form of banking flows (and away from FDI), and toward dollar denomination (vs. 10
11 denomination in domestic currency), both of which have been associated with crises.¹⁴² 11
12 Inadequacies in the financial structures of developing countries probably explain the find- 12
13 ings that financial opening in those countries does not produce faster long-run growth as 13
14 it does in industrial countries. The implication is that financial liberalization can help 14
15 if institutions are strong and other fundamentals are favorable, but can hurt if they 15
16 are not.¹⁴³ 16

17 All of these findings are consistent with the longstanding conventional lesson about 17
18 the sequencing of reforms: that countries will do better in the development process if 18
19 they postpone opening the capital account until after other institutional reforms. The 19
20 reasoning is that it is dangerous for capital flows to be allowed to respond to faulty sig- 20
21 nals.¹⁴⁴ The observable positive correlation between the opening of capital markets and 21
22 economic growth could be attributable to reverse causation —rich countries liberalize 22
23 as a result of having developed, not because of it. Edison, Levine, Klein, Ricci, and 23
24 Sloek (2002), however, conclude from their own tests that this is not the case. 24

25
26
27
28 ¹³⁵ See Biscarri, Edwards, and Perez de Gracia (2003). Aghion, Bacchetta, and Banerjee (2004) and Bacchetta and van 28
29 Wincoop, (2000) argued theoretically that volatility is higher for countries at an intermediate level of financial 29
development than for those who have not yet liberalized.

30 ¹³⁶ Edwards (2001) and Klein and Olivei (2008).

31 ¹³⁷ Martin and Rey (2002) found that financial globalization may make emerging market financial crashes more likely. Au72 31
32 But Ranciere, Tornell, and Westermann (2008) found that countries experiencing occasional financial crises grow 32
33 faster, on average, than countries with stable financial conditions. Kaminsky and Schmukler (2008) found that 33
34 financial liberalization is followed in the short run by more pronounced boom-bust cycles in the stock market, but 34
leads in the long run to more stable markets.

35 ¹³⁸ Arteta, Eichengreen, and Wyplosz (2003) rejected the claim that it is the level of development that matters. 35

36 ¹³⁹ See Chinn and Ito (2002). Au73, 74 36

37 ¹⁴⁰ See Klein (2003), Chinn and Ito (2005), and Obstfeld (2009). 37

38 ¹⁴¹ See Kose et al. (2009). 38

39 ¹⁴² See Wei and Wu (2002). 39

40 ¹⁴³ See Prasad et al. (2007). 40

¹⁴⁴ The results of Edwards (2008) indicate that relaxing capital controls increases the likelihood of experiencing a 40
sudden stop if it comes ahead of other reforms. Contributions on sequencing include Edwards (1984), McKinnon 40
(1993), and Kaminsky and Schmukler (2003). Au75, 76

8.3 Capital inflow bonanzas

With each episode of strong capital inflows to emerging markets, everyone would like to believe that the flows originate in good domestic fundamentals, such as macroeconomic stabilization and microeconomic reforms. Some research, however, indicates that external factors are at least as influential as domestic fundamentals. Low U.S. interest rates are often identified as a major influence.¹⁴⁵ This research is important because during booms the authors are often among the few offering the warning that if inflows result from easy U.S. monetary policy more than in domestic fundamentals, outflows are likely to follow in the next phase of the cycle. Even preceding the 2008 global financial crisis, much of the research on the carry trade implied that capital flows from low interest rate countries (United States, Japan, and Switzerland) to high interest rate countries (Iceland, New Zealand, and Hungary) could rapidly unwind. Earlier, Calvo, Leiderman, and Reinhart (1993, 1994a,b, 1996) were prescient with respect to the 1994 Mexican peso crisis.¹⁴⁶ Reinhart and Reinhart (2009) again found that global factors, such as U.S. interest rates, have been a driver of the global capital flow cycle since 1960. These papers also shed important light on how emerging market authorities manage the inflows such as between currency appreciation, sterilized foreign exchange intervention, unsterilized intervention, and capital controls.

9. CRISES IN EMERGING MARKETS

The boom phase is often followed by a bust phase.¹⁴⁷ We begin with an enumeration and definition of the various concepts of external crises in the literature.

9.1 Definitions: Reversals, stops, attacks, and crises

Current account reversals are defined as a reduction within one year of the current account deficit of a certain percentage of GDP. Typically a substantial current account deficit disappears, and is even converted into a surplus.¹⁴⁸ An observed switch from current account deficit to surplus could, however, be due to an export boom, which is quite different from the exigent circumstance that most have in mind. More refined concepts are needed.

¹⁴⁵ Arora and Cerisola (2001); Borensztein, Zettelmeyer, and Philippon (2001); and Frankel and Okongwu (1996) are among those finding significant effects of U.S. interest rates on emerging market spreads.

¹⁴⁶ See also Fernandez-Arias (1996) and Montiel and Reinhart (2001). Eichengreen and Rose (2000), analyzing data for more than 100 developing countries during 1975 to 1992, found that banking crises are strongly associated with adverse external condition, in particular, high interest rates in northern countries.

¹⁴⁷ Overviews of crises in emerging markets that ended the 1990s boom include Fischer (2004), Kenen (2001), and Desai (2003).

¹⁴⁸ See Edwards (2004a,b) and Milesi-Ferretti and Razin (1998, 2000).

Au14

1 “Sudden stops” is an expression first used by Dornbusch, Goldfajn, and Valdes 1
2 (1995). They are typically defined as a substantial unexpected reduction in net capital 2
3 inflows. The first theoretical approach to the problem of sudden stops is Calvo 3
4 (1998), and a large theoretical literature followed.¹⁴⁹ 4

5 Operationally, the Calvo, Izquierdo, and Mejia (2004) criterion for sudden stop is a 5
6 sudden cut in foreign capital inflows (a worsening of the financial account, at least two 6
7 standard deviations below the sample mean) that is not the consequence of a positive 7
8 shock (a trade shock), but rather is accompanied by a costly reduction in economic 8
9 activity.¹⁵⁰ Another way to restrict the episodes to reductions in deficits that cannot 9
10 result from a boom such as rising exports and income is to add the criterion that they 10
11 are accompanied by an abrupt reduction in international reserves. 11

12 An important variety of sudden stops is called “systemic,” that is, threatening the 12
13 international financial system, not just a single country.¹⁵¹ To isolate episodes of capital 13
14 account reversals related to systemic events of an external origin, Calvo et al. (2004) 14
15 defined crises as periods of collapsing net capital inflows that are accompanied with 15
16 skyrocketing emerging markets bond spreads. 16

17 “Speculative attacks” are defined as a discrete increase in demand for foreign cur- 17
18 rency by speculators (i.e., market participants betting on a devaluation) in exchange 18
19 for domestic currency. The precise date of the speculative attack may come later than 19
20 the sudden stop; for example if the central bank is able to prolong the status quo after 20
21 the loss of capital inflows by running down reserves for a period of time. In typical 21
22 models, the speculative attack is successful, because the central bank runs out of 22
23 reserves on that same day and is forced to devalue the way speculators anticipated. 23
24 But there is also a notion that there can be unsuccessful speculative attacks in which 24
25 the authorities fight the speculation by raising interest rates sharply or paying out 25
26 reserves, and ultimately are able to maintain the parity, versus successful speculative 26
27 attacks, in which they are ultimately forced to devalue.¹⁵² The latter is sometimes 27
28 defined as a currency crash, which occurs if the devaluation is at least 25% and it 28
29 exceeds the rate of depreciation in preceding years by at least 10%.¹⁵³ 29
30
31
32
33

34 ¹⁴⁹ References include, among many others, Arellano and Mendoza (2003); Calvo (2003); Calvo, Izquierdo, and Talvi 34
35 (2003, 2006); Calvo and Reinhart (2001); Guidotti, Sturzenegger and Villar (2004); and Mendoza (2002, 2006). 35

36 ¹⁵⁰ See also Edwards (2004b). 36

37 ¹⁵¹ See Calvo, Izquierdo, and Loo-Kung (2006). 37

38 ¹⁵² Guidotti et al. (2004) distinguished between sudden stops that lead to current account reversals and those that do 38
39 not. In the latter case, presumably the country found an alternative source of financing such as reserve depletion or 39
40 exceptional funding from an international financial institution. 40

39 ¹⁵³ See Frankel and Rose (1996). A “currency crisis” is defined as a sharp increase in exchange market pressure that 39
40 shows up *either* as a 25% devaluation or as a loss of reserves that is a commensurate proportion of the monetary base. 40

1 **9.1.1 Generations of models of speculative attacks** 1

2 The leading theoretical framework for currency crises is built around models of specu- 2
3 lative attacks. The literature is often organized into a succession of several generations. 3
4 In each case, the contribution made by the seminal papers was often the ability to say 4
5 something precise about the date when the speculative attack occurred. But the gen- 5
6 erations can be distinguished according to whether the fundamental problem is seen 6
7 as an overly expansionary monetary policy, a multiple equilibria, or structural problems 7
8 associated with moral hazard and balance sheet effects. 8

9 The first generation models began with Krugman (1979) and Flood and Garber 9 Au15
10 (1984).¹⁵⁴ The government was assumed to be set on an exogenous course of rapid 10
11 money creation, perhaps driven by the need to finance a budget deficit. A resulting bal- 11
12 ance of payments deficit implies that the central bank will eventually run out of 12
13 reserves and need to devalue. But under rational expectations, speculators will antici- 13
14 pate this, and will not wait as long to sell their domestic currency as to suffer capital 14
15 loss. They also will not attack the currency as early as the original emergence of the 15
16 deficit. Instead, the speculative attack falls on the date when the reserves left in the 16
17 vault of the central bank are just barely enough to cover the discontinuous fall in 17
18 demand for domestic currency that result from the shift from a situation of a steady 18
19 exchange rate and prices to a new steady state of depreciation and inflation. 19

20 The second generation of models of speculative attacks argue that more than one 20
21 possible outcome (crisis or no crisis) can be consistent with equilibrium, even if there 21
22 has been no change in fundamentals. In a self-fulfilling prophecy, each market partici- 22
23 pant sells the domestic currency if he or she thinks the others will sell. The seminal 23
24 papers are by Obstfeld (1986b, 1996).¹⁵⁵ One branch of the second generation models 24
25 focuses on the endogeneity of monetary policy: the central bank may genuinely intend 25
26 not to inflate, but may be forced into it when, for example, labor unions win higher 26
27 wages.¹⁵⁶ Many of the models build on the theories of bank runs (Diamond & Dybvig, 27 Au16
28 1983)¹⁵⁷ and the prisoners' dilemma (where speculators each try to figure out whether 28
29
30

31 ¹⁵⁴ Obstfeld (1986a) did it in an optimizing model. 31

32 ¹⁵⁵ Attacks occur deterministically if fundamentals such as reserves are weak, and do not occur if they are strong. 32
33 Multiple equilibria arise in a third case: intermediate levels of fundamentals. See also Sachs, Tornell, and Velasco 33
(1996a).

34 ¹⁵⁶ See Obstfeld (1996) and Jeanne (1997). 34 Au77

35 ¹⁵⁷ Among the authors applying the bank runs theory to emerging market crises are Chang and Velasco (1997, 1999a,b, 35
36 2001). The fundamental problem of bank illiquidity is exacerbated by financial liberalization. Under fixed exchange 36
37 rates, a run on banks becomes a run on the currency if the central bank attempts to act as a lender of last resort. 37
38 Kaminsky and Reinhart (1999) documented the frequency with which banking crises and currency crises come 38
39 together. See also Diamond and Rajan (2001); Hausmann and Rojas-Suárez (1996); and Burnside, Eichenbaum, 39
40 Goldberg, and Kinney (2000) found that foreign ownership of banks is not the problem. Radelet and Sachs (1998) 40
suggested that the East Asia crisis of 1997–1998 was essentially an international version of a bank run.

1 the others are going to attack).¹⁵⁸ The balance sheet problems discussed earlier also 1
2 often play a key role here. Morris and Shin (1998) made the important modification 2
3 of introducing uncertainty into the model, which can rule out multiple equilibria. 3

4 Another important category of speculative attack models do not attribute crises to 4
5 monetary fundamentals, as in the first generation, or to multiple equilibria, as in the 5
6 second generation.¹⁵⁹ The culprit, rather, is structural flaws in the financial system that 6
7 create moral hazard in the behavior of domestic borrowers vis-à-vis their government. 7
8 Certain domestic borrowers, whether banks or firms, have close connections with the 8
9 government. When the East Asia crisis hit in 1997, the problem came to be popularly 9
10 known as “crony capitalism.”¹⁶⁰ The government in turn has access to a supply of for- 10
11 eign exchange, in the form of foreign exchange reserves, and perhaps also the ability to 11
12 tax export receipts or to borrow from the IMF. Even in cases where the government 12
13 says explicitly ahead of time that domestic borrowers will not be bailed out, those that 13
14 are well connected believe (usually correctly) that they will be bailed out in the event 14
15 of a crisis. Thus they over-borrow. The speculative attack comes on the day when the 15
16 stock of international debt that has some claim on government rescue becomes as large 16
17 as the supply of reserves. (Again, rational speculators will not wait longer, because then 17
18 there would not be enough foreign currency to go around.) The ideas go back to Diaz- 18
19 Alejandro (1985). Dooley’s (2000a) “insurance model” can claim the honor of having 19 Au17
20 been written just before the East Asia crisis.¹⁶¹ Krugman (1998) is probably the most 20 Au18
21 widely cited.¹⁶² 21

22 Although it is often presumed that foreign residents, rather than domestic residents, 22
23 lead the way in pulling money out of a country during a speculative attack, there is no 23
24 presumption in theory that this is the case. Also, the empirical evidence does not seem 24
25 to support it.¹⁶³ 25
26 26
27 27

28 ¹⁵⁸ One variant of the game theory approach, motivated by concerns that a single large hedge fund could deliberately 28
29 engineer a crisis, posits a player that is larger than the others: Corsetti, Pesenti, and Roubini (2002) and Corsetti, 29
30 Dasgupta, Morris, and Shin (2004). 30

31 ¹⁵⁹ The “two generations” language originated with Eichengreen. Views vary as to what should be designated the third 31 Au78
32 generation. Krugman (1999) said that the third generation should be identified by balance sheet effects, not by 32
33 banking bailouts per se. But, to me, only bailout moral hazard considerations merit the designation of a third 33

34 ¹⁶⁰ Claessens, Djankov, and Lang (2000) statistically studied family-controlled firms in East Asia. Rajan and Zingales 34
35 (1998b) studied relationship banking. 35

36 ¹⁶¹ Likewise McKinnon and Pill (1996). 36 Au79

37 ¹⁶² Corsetti, Pesenti, and Roubini (1999a,b); Chinn, Dooley, and Shrestha (1999); and Chinn and Kletzer (2001) are 37
38 among those attributing the East Asia crisis to structural flaws in the financial system of the moral hazard type. In the 38
39 theories of Burnside, Eichenbaum, and Rebelo (2001a,b, 2004), government guarantees to banks give them an 39
40 incentive to incur foreign debt. Calvo and Mendoza (1996) saw roots of Mexico’s 1994 peso crisis in financial 40
41 globalization, anticipation of a banking-system bailout, and self-fulfilling prophecy.

42 ¹⁶³ See Choe, Kho, and Stulz (1999, 2005) and Frankel and Schmukler (1996). If anything, domestic investors have the 42
43 informational advantage. 43

9.2 Contagion

It has long been noted that when one emerging market is hit by a sudden stop, it is more likely that others will be as well. The correlation tends to be much greater within the same general geographic area.¹⁶⁴

There is no complete agreement for the definition of contagion. Some correlation across emerging markets can be explained by common external shocks.¹⁶⁵ Masson (1999) calls these monsoonal effects. They are best not called contagion, as the phrase implies transmission from one country to another; Masson calls these spillover effects. Spillover effects that can be readily interpreted as fundamentals include investment linkages, trade linkages, and competition in third markets. A number of interesting specific channels of contagion from one country to another have been identified empirically.¹⁶⁶ Finally, there is what might be called pure contagion, which runs via investor behavior in a world of imperfectly efficient financial markets. One example is information cascades: investors may react to a crisis in Thailand or Russia by revising their estimation of the value of the “Asian model” or the odds of IMF bailouts.¹⁶⁷ Another example is illiquidity in international financial markets and reduced risk tolerance, which in crises such as 2008 seem to generally induce flight from emerging markets alongside flight from high-yield corporate debt and any other assets suspected of illiquidity or risk.

9.3 Managing Emerging Market Crises

There have long been three legs to the policymaking stool of managing crises in developing countries: adjustment of national policies, “private sector involvement,” and the role of the IMF and other multilateral participation.

9.3.1 Adjustment

In the traditional orthodoxy, a crisis required adjustment of the macroeconomic policies that had gotten the country into the problem in the first place. In the old language of Harry Johnson, this meant some combination of expenditure-switching policies

¹⁶⁴ See Eichengreen, Rose, and Wyplosz (1996); Baig and Goldfajn (1999); Bae, Karolyi, and Stulz (2000); Bekaert, Harvey, and Ng (2005), Forbes and Rigobon (2000, 2002); Rigobon (2000); Kaminsky and Reinhart (2000, 2002); Kaminsky, Reinhart, and Vegh (2003); Kaminsky and Schmukler (1999); and Corsetti, Pericoli, and Sbracia (2005).

¹⁶⁵ A prominent example of a common external shock is an increase in U.S. interest rates, a factor discussed earlier (Uribe and Yue, 2003).

¹⁶⁶ Glick and Rose (1999), Forbes (2002), and Forbes and Chinn (2004) found that contagion moves along the lines of trade linkages. Kaminsky and Reinhart (2008) found that when contagion spreads across continents, it passes through major financial centers along the way. Kaminsky and Schmukler (2002) found contagion via rating agencies. Borensztein and Gelos (2003) found herding among emerging market mutual funds.

¹⁶⁷ This is not to say investors are irrational. Calvo and Mendoza (2000) demonstrated that globalization “may promote rational contagion by weakening individual incentives for gathering costly information.” Morck, Yeung, and Yu (2000) attributed the correlation among emerging markets to shared weak property rights.

Au19

Au80

Au81, 82

(in practice meaning devaluation) and expenditure reducing policies (meaning monetary and fiscal contraction) and typically a substantial doses of all of the policies.

A tightening of monetary policy is often the first response to a sudden stop. The urgent need in a currency crisis is to improve the balance of payments. Raising interest rates is thought to do this in two ways: first by making domestic assets more attractive to international investors, and second by cutting domestic expenditure, therefore improving the trade balance.

Many have analyzed the so-called interest rate defense, particularly whether or not and when it is preferable to devalue.¹⁶⁸ Furman and Stiglitz (1998) emphasized that an increase in the interest rate can decrease the attractiveness of the country's assets to foreign investors, rather than increasing it, because of the increase in default risk.¹⁶⁹ This point does not change the basic logic that some combination of monetary contraction and devaluation is called for to restore external balance, absent some international angel willing and able to make up the gap in financing. The possibility that devaluation is contractionary *does*, by contrast, interfere with the basic logic that the central bank can deploy the optimal combination of an increase in the interest rate and an increase in the exchange rate to restore external balance without losing internal balance.¹⁷⁰

9.3.2 Private sector involvement

If a crisis debtor is to compress spending and the IMF or other parts of the international financial community is to chip in with an emergency loan, the foreign exchange should not go merely to helping the countries creditors cash in and depart the scene. Private sector involvement was the term for the requirement adopted in the 1990s for "bailing in" private creditors rather than "bailing them out." The idea is that creditors agree to roll over loans as part of the complete package that includes the national government and the IMF, and that it is in their interest collectively to do so even if the free rider problem tempts each of them to get out. This process was thought to have been easier in the 1980s when the creditors were banks finite in number and susceptible to negotiation, and to have grown more difficult when the creditors constituted a larger number of widely dispersed bondholders. Still, the basic issue is the same either way.

9.3.3 International financial institutions

The international financial institutions (the IMF, the World Bank, and other multilateral development banks) and governments of the United States and other large

¹⁶⁸ See Aghion, Bacchetta, and Banerjee (2000); Flood and Rose (2002); Christiano et al. (2002); Caballero and Krishnamurthy (2001); Drazen (2003); and Eichengreen and Rose (2003).

¹⁶⁹ See also Blanchard (2005). This point is rooted in the theory of imperfect information and credit rationing (Stiglitz & Weiss, 1981). Lahiri and Vegh (2003, 2007) showed that, under certain conditions, it is feasible to delay the crisis, but raising interest rates beyond a certain point may actually hasten the crisis.

¹⁷⁰ See Frankel (2003).

Au83

Au84, 85

Au86, 87

1 economies (usually in the form of the G-7) are heavily involved in “managing” finan- 1
2 cial crises.¹⁷¹ 2

3 The IMF is not a full-fledged lender of last resort, although some have proposed 3
4 that it should be.¹⁷² It does not contribute enough money to play this role in crises, 4
5 even in the high-profile rescue programs where the loans are a large multiple of the 5
6 country’s quota. Usually the IMF is viewed as applying a “Good Housekeeping seal 6
7 of approval,” where it vouches for the remedial actions to which the country has 7
8 committed. 8

9 The IMF conditionality has been severely criticized.¹⁷³ There is a broad empirical 9
10 literature on the effectiveness of conditional IMF lending.¹⁷⁴ The better studies have 10
11 relied on large cross-country samples that allow for the application of standard statistical 11
12 techniques to test for program effectiveness, avoiding the difficulties associated with 12
13 trying to generalize from the finding of a few case studies. The overall conclusion of 13
14 such studies seems to be that IMF programs and IMF conditionality may have on bal- 14
15 ance a positive impact on key measures of economic performance. Such assessments 15
16 suggest that IMF programs result in improvements in the current account balance 16
17 and the overall balance of payments.¹⁷⁵ 17

18 The impact of IMF programs on growth and inflation is less clear. The first 18
19 round of studies failed to find any improvement in these variables. Subsequent studies 19
20 suggest that IMF programs result in lower inflation.¹⁷⁶ The impact of IMF programs 20
21 on growth is more ambiguous. Results on short-run growth are mixed; some studies 21
22 find that implementation of IMF programs leads to an immediate improvement in 22
23 growth,¹⁷⁷ while other studies find a negative short-run effect.¹⁷⁸ Studies that look at 23
24 a longer time horizon, however, tend to show a revival of growth.¹⁷⁹ This is to be 24
25 expected. Countries entering into IMF programs will often implement policy adjustments 25
26 that have the immediate impact of reducing demand, but could ultimately create the basis 26
27 for sustained growth. The structural reforms embedded in IMF programs inherently take 27
28

29 171 See Cline (1985, 1994), Eichengreen and De Long (2002), and Frankel and Roubini (2003). 29
30

31 172 See Fischer (1999). 31

32 173 See Furman and Stiglitz (1998) and Radelet and Sachs (1998). In the East Asia crises, the criticism focused not just 32
33 on the austerity of macroeconomic conditionality, but also on the perceived “mission creep” of venturing into 33
34 microeconomic reforms not conventionally associated with financial crises. 34

35 174 Including Bird and Rowlands (1997); Faini, de Melo, Senhadji-Semlali, and Stanton (1991); Joyce (1992); and 35
36 Hutchison (2003). 36

37 175 Haque and Khan (2002) provided a survey. 37

38 176 Conway (1994); Bagci and Perrudin (1997); and Dicks-Mireaux, Mecagni, and Schadler (2000) found that inflation 38
39 fell following an IMF program; the result was statistically significant only in the first two of these three studies. 39

40 177 Dicks-Mireaux et al. (2000). 40

178 Bordo and Schwartz (2000) compared countries receiving IMF assistance during crises from 1973 to 1998 with 40
countries in the same region not receiving assistance and found that the real performance (e.g., GDP growth) of the 40
former group was possibly worse than the latter.

179 See Conway (1994).

Au88, 89, 90, 91

Au92

1 time to improve economic performance. Finally, the crisis that led to the IMF program, 1
2 not the IMF program itself, is often responsible for an immediate fall in growth. 2

3 Despite such academic conclusions, there was a movement away from strict condi- 3
4 tionality subsequent to the emerging market crises of the 1990s. In part, the new 4
5 view increasingly became that the IMF could not force a country to follow the macro- 5
6 economic policy conditions written into an agreement, if the deep political forces 6
7 within the country would ultimately reject the policies.¹⁸⁰ It is necessary for the local 7
8 government to “take ownership” of the reforms.¹⁸¹ One proposal to deal with this sit- 8
9 uation was the Contingent Credit Line, which is a lending facility that screens for the 9
10 policy conditions ex ante, and then unconditionally ensures the country against exter- 10
11 nal financial turmoil ex post. The facility was reborn under the name Flexible Credit 11
12 Line in the 2008–2009 financial crisis with less onerous conditionality. Most emerging 12
13 market countries managed to avoid borrowing from the IMF this time, with the 13
14 exception of some, particularly in Eastern Europe, that were in desperate condition. 14

15 Some critics worry that lending programs by the international financial institutions 15
16 and G-7 or other major governments create moral hazard, and that debtor countries 16
17 and their creditors have little incentive to take care because they know they will be res- 17
18 cued. Some even claim that this international moral hazard is the main reason for crises, 18
19 that the international financial system would operate fine if it were not for such med- 19
20 ddling by public institutions.¹⁸² 20

21 There is a simple way to demonstrate that moral hazard arising from international 21
22 bailouts cannot be the primary market failure. Under a neoclassical model, capital 22
23 would flow from rich high capital/labor countries to lower income low capital/labor 23
24 countries; for example, from the United States to China. Instead it often flows the 24
25 opposite way, as already noted. Even during the peaks of the lending booms, the 25
26 inflows are less than would be predicted by an imperfection-free neoclassical model.¹⁸³ 26
27 Therefore any moral hazard incentive toward greater capital flows created by the inter- 27
28 national financial institutions must be less than the various market failures that inhibit 28
29 capital flows. 29

30 **9.4 Policy instruments and goals after a balance of payments shock** 31

32 Why have so many countries suffered deep recessions as part of the adjustment process 32
33 in the aftermath of a deterioration in their balance of payments? One school of thought 33
34 34

35 ¹⁸⁰ According to the influential strain of research represented by Acemoglu, Johnson, Robinson and Thaicharoen 35
36 (2003), Easterly and Levine (2002), and Hall and Jones (1999), institutions drive out the effect of policies. Evrensel 36
37 (2002) found that the IMF is not able to enforce macroeconomic conditionality. 37

38 ¹⁸¹ See Boughton (2003). 38

39 ¹⁸² See Bordo and Schwartz (2000), Calomiris (1998), Dooley and Verma (2003), and Meltzer (2000). But Lane and 39
Phillips (2001) found no evidence that country spreads react to changes in the moral hazard of international bailouts.

40 ¹⁸³ See Blanchard (1983). 40

1 is that policy has been too contractionary, perhaps because the IMF does not under- 1
 2 stand that an increase in the interest rate increases default risk.¹⁸⁴ 2

3 In this section we consider the problem of a central bank attempting to attain two 3
 4 goals (internal and external balance) by means of two policy instruments (the exchange 4
 5 rate and the interest rate).¹⁸⁵ Our interpretation of internal balance is $Y = \bar{Y}$, where 5
 6 $Y \equiv$ real income and $\bar{Y} \equiv$ potential output. 6

7 Our interpretation of external balance is that overall balance of payments $BP = 0$, 7
 8 where $BP = CA + KA$, $CA \equiv$ current account, and $KA \equiv$ capital account. One could 8
 9 just as easily choose different goals for the levels of Y and BP . 9

10 9.4.1 Internal and External Balance When Devaluation is Expansionary 10

11 Assume for now: $Y = A(i) + TB$, where $i \equiv$ domestic interest rate; and absorption, A , 11
 12 is a function of the interest rate, with $\frac{dA}{di} < 0$. 12

13 Assume that the trade balance, linearized for simplicity, is given by $TB = xE - mY$ 13
 14 where $E \equiv$ the exchange rate, defined as the price of foreign currency. 14

15 If the trade balance is derived from an elasticities approach (the country has some 15
 16 monopoly power in its export good, as in Section 3.2), then x is related to the sensi- 16
 17 tivity of export demand to relative prices. If the trade balance is derived from the traded 17
 18 goods/nontraded goods model (the country is a price-taker in all traded goods, as in 18
 19 the small open economy model of section 3.3), then x is related to sensitivity of the 19
 20 supply of traded goods to relative prices. “Sensitivity” could simply mean the elasticity 20
 21 normalized for the quantity of goods relative to E , if there were no additional effect on 21
 22 import spending or the demand for traded goods. 22

23 Assume that the capital account of the balance of payments is given by the function: 23

$$24 \quad KA = k(I - i^*), \text{ where } \frac{dk}{d(i - i^*)} > 0, \quad 25$$

26 and $i^* \equiv$ world interest rate. 26

27 First we derive the internal balance relationship, solving for Y as a function of i 27
 28 and E . 28

$$29 \quad Y = A(i) + TB \quad (3) \quad 30$$

$$31 \quad TB = xE - mY \quad (4) \quad 32$$

33 Substitute Eq. (4) into Eq. (3): 33

$$34 \quad Y = \frac{A(i) + xE}{(1 + m)} \quad (5) \quad 35$$

36 37 38 39 ¹⁸⁴ Furman and Stiglitz (1998), as discussed in the preceding subsection.

40 ¹⁸⁵ The graphical analysis is from Frankel (2003a), but the algebra has been added. 40

1 We want the relationship between i and E that gives internal balance (output equal to
 2 potential: $\bar{Y} = Y \Rightarrow$

$$3 \bar{Y} = \frac{A(i)}{(1+m)} + \frac{xE}{(1+m)}. \quad (6)$$

4 An increase in E would improve the trade balance, resulting in a rise in Y as well.
 5 To go back to the potential output, we need to increase the interest rate. Thus the
 6 graph looks like Figure 1, labeled NN .

7 We obtain the slope of the NN curve by differentiating Eq. (6):

$$8 \left. \frac{\partial E}{\partial i} \right|_{Y=\bar{Y}} = -\frac{A_i}{x} \quad (7)$$

9 As $A_i < 0$, the slope is positive, which is why we have drawn NN sloping upward.
 10 Intuitively, because a devaluation is expansionary, it would have to be offset by a con-
 11 tractionary increase in the interest rate if total output is to remain at the same level.

12 Second we derive the external balance relationship, solving for BP as a function of
 13 i and E . The balance of payments is the sum of the trade balance and the capital
 14 account:

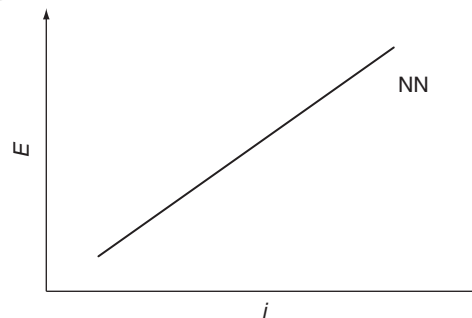
$$15 BP = TB + KA$$

$$16 BP = xE - mY + k(i - i^*) \quad (8)$$

17 We plug Eq. (5) into eq. (8) to eliminate Y , and rearrange to obtain the BP in terms of
 18 E and i . External balance is achieved when $BP = 0$; therefore

$$19 BP = \frac{xE}{1+m} - \frac{mA(i)}{1+m} + k(i) = 0 \quad (9)$$

20 We draw the relationship between i and E that gives external balance.



21 **Figure 1** Slope of internal balance curve is conventionally positive.

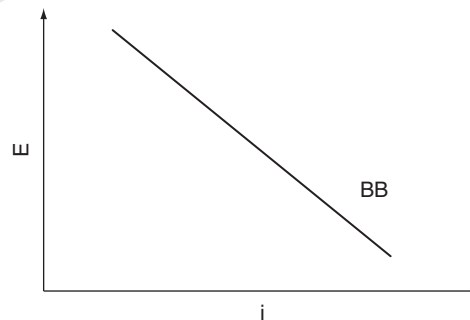
1 If E increases then the interest rate has to fall to restore external balance. Therefore, 1
2 the trade surplus created by the increase in E would be offset by the capital outflow and 2
3 increase in imports. In the graph in Figure 2 we label the external balance line BB . 3

4 To obtain the slope, we differentiate Eq. (9) to obtain: 4

$$\frac{\partial E}{\partial i} \Big|_{BP=0} = \frac{m}{x} A_i - \frac{1+m}{x} k_i \quad (10)$$

5
6
7
8 As $A_i < 0$ and $k_i > 0$, the slope is negative, which is why we have drawn BB sloping 8
9 downward. Intuitively, a devaluation improves the trade balance, which could be 9
10 financed by borrowing from abroad if the interest rate is raised. 10

11 The points below the BB curve are points of deficit. The interest rate is not high 11
12 enough to attract the necessary capital inflow. Assume an exogenous adverse capital 12
13 account shock, a rise in the world interest rate i^* , or some other downward shift in 13
14 KA as in a speculative attack. In other words, the country now finds itself in balance 14
15 of payments deficit. If the country has an adverse capital account shock, then BB curve 15
16 shifts to the right (BB') so the country finds that its location point now corresponds to a 16
17 balance of payments deficit, because it is to the left of the new BB' Schedule. At E the 17
18 objective is to reach E' where the economy is at both at internal and external balance. 18
19 In this case the policy options are clear: the central bank has to raise the interest rate 19
20 and depreciate the currency. While the increase in the interest rate attracts capital 20
21 inflows, it also causes a contraction in output. Fortunately, the country has another 21
22 instrument, the exchange rate, at hand. Devaluation will improve exports, which in 22
23 turn will pick up both the trade balance and the output. The optimal combination 23
24 of E and i will put the economy at the intersection of the two graphs, where the 24
25 new external balance constraint is satisfied, without a recession. This is harder in prac- 25
26 tice than in theory, due especially to uncertainty; but policy-makers can grope their 26
27 way to equilibrium through a tâtonnement process. 27



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40 **Figure 2** Slope of external balance curve is negative. 40

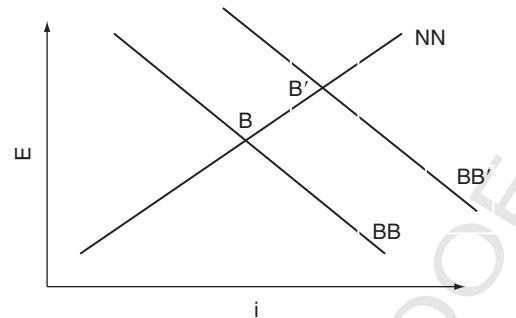


Figure 3 “Sudden stop” shifts external balance curve out.

Notice that the fundamental logic of the graph (Figure 3) does not change even if default risk means that k_i is very small. Even if the capital account does not improve, an increase in the interest rate still improves the balance of payments by reducing spending and therefore raising the trade balance.

9.4.2 Internal and external balance when devaluation is contractionary

Now assume that devaluation has a contractionary effect on domestic demand, for example because of a balance sheet effect from dollar debts, or any of the other reasons discussed in Section 3.4:

$$Y = A(i, E) + TB \frac{dA}{di} < 0, \frac{dA}{dE} < 0$$

We have the following solution for output:

$$Y = \frac{A(i, E) + xE}{(1 + m)} \quad (11)$$

Set $Y = \bar{Y}$ and differentiate to obtain the new slope of NN

$$\left. \frac{\partial E}{\partial i} \right|_{Y=\bar{Y}} = - \frac{A_i}{x + A_E}$$

We will assume that x the stimulus to net exports from a devaluation is small in the short run, because the elasticities are small, so that A_E dominates, and the devaluation is indeed contractionary overall: The slope is negative.

We again illustrate the shift in Figure 4 if there is an exogenous adverse balance of payments shock. Now both internal and external balances have negative slopes. They may not intersect at all. In this case, we are not confident in which direction the interest and the exchange rate should go. When the balance of payment goes into deficit due to a shock in the capital account (a point like D) a devaluation will restore the

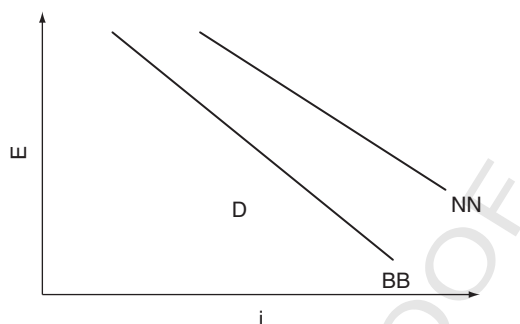


Figure 4 Balance sheet effect turns internal balance slope negative.

external balance (by improving the trade balance); but at the same time a devaluation hurts the economy as it is contractionary. Moreover, the improvement in exports may not be enough to offset the contractionary effects so the country may go into a recession. We have a situation where we may not be able restore equilibrium internally and externally, at least not at reasonable levels of E and i ; and even if we can in theory, it is not possible to say whether E should be increased a large amount and i decreased, or vice versa. Even assuming the two curves intersect somewhere, a process of tâtonnement by policymakers may take a long time to get there, and the curves may have moved again by that time. The lesson is that it is better in the first place not to develop balance sheets that are so vulnerable they put policymakers in such a difficult situation as illustrated in the Figure 4.

9.5 Default and avoiding it

One option for a country in severe payments difficulty is simply to default on its debt. Yet this action has relatively been rare during the post-war period. The big question is “why?” The following two answers are the most common.

9.5.1 Why don't countries default?

The first reason countries do not default on their debt is that they do not want to lose access to capital markets in the future. International investors will want to punish defaulters by refusing to lend to them in the future, or perhaps by lending only at severe penalty interest rates. But is that threat regarding the distant future enough to discourage countries from defaulting, and saving a great deal of foreign exchange? And, for their part, is the threat by international investors never to lend again credible because they will have the incentive to stick to it in the future? Bulow and Rogoff (1989) answered no. The threat will not sustain nondefault in a repeated game.¹⁸⁶

¹⁸⁶ Dooley and Svensson (1994), however, argued that debtors are unable to suspend debt service permanently and credibly.

1 The other common answer is that countries are afraid that if they default they will 1
2 lose trade. In one version, they are afraid of losing the trade credit, or even access to the 2
3 international payments system; even if they pay cash for an import, the cash might be 3
4 seized by a creditor in payment of an outstanding debt. The classic reference is Eaton 4
5 and Gersovitz (1981). Some persuasive empirical evidence appears to support this the- 5
6 ory.¹⁸⁷ It is also consistent with evidence that countries possessing high overall trade/ 6
7 GDP ratios suffer from fewer sudden stops.¹⁸⁸ International investors will be less likely 7
8 to pull out, because they know the country is less likely to default. Under this logic, a 8
9 higher ratio of trade is a form of “giving hostages” that makes a cut off of lending less 9
10 likely. 10

11 Another possible answer to the question of “why don’t countries default” is that 11
12 they do, but not explicitly. Countries often announce that they are unable to service 12
13 their debts under the schedule or terms to which they have contractually agreed. 13
14 A painful process usually follows in which they negotiate new terms. 14
15

16 **9.5.2 Ex ante measures for better risk-sharing** 16

17 The largest cost arising from protracted negotiations over restructuring is the disincentive 17
18 to domestic investment and output created by the debt overhang in the meantime. 18
19 Domestic firms will not seek to earn foreign exchange if they think it will be taken 19
20 away from them to service past debts.¹⁸⁹ 20

21 Reformers wishing to reduce the severity of emerging market crises have asked 21
22 whether or not there is a way for lenders and borrowers to agree ahead of time to a 22
23 more efficient way to share risk. The goal of minimizing high costs to restructuring 23
24 debt is the same as that which is thought to be achieved in the domestic context by 24
25 bankruptcy law.¹⁹⁰ One proposed solution is to establish the equivalent of an interna- 25
26 tional bankruptcy court, perhaps as a “debt workout” office of the IMF.¹⁹¹ 26

27 Collective action clauses (CACs) are one proposal that was eventually adopted in 27
28 some prominent emerging markets. The investors agree ex ante in the bond contract 28
29 that in the event a restructuring should prove necessary, a few holdouts among the 29
30

31 ¹⁸⁷ Rose and Spiegel (2004) and Rose (2005) found that bilateral debt reschedulings lead to losses of trade along 31
32 corresponding bilateral lines, estimated at 8% a year for 15 years, from which he infers that lost trade is the 32
33 motivation debtors have to avoid such defaults. Rose and Spiegel (2008) found that strong bilateral trade links are 33
34 correlated with low default probabilities.

34 ¹⁸⁸ See Calvo, Izquierdo, and Mejia (2004); Edwards (2004); and Cavallo and Frankel (2008). 34 [Au93, 94]

35 ¹⁸⁹ Krugman (1989) and Sachs (1983) argued that the efficiency burden of the debt overhang in the 1980s was 35 [Au95, 96, 97]
36 sufficiently large that forgiveness would make all better off, creditors as well as debtors, a logic that contributed to 36
37 the Brady Plan writedowns at the end of the decade. Some have suggested that the plans to forgive loans to highly 37
38 indebted poor countries might work the same way, but Henry and Arslanalp (2005) concluded that it does not. See 38 [Au98]
39 also Edwards (2002).

39 ¹⁹⁰ See Friedman (2000); Claessens, Klingebiel, and Laeven (2003); Frankel and Roubini, (2003).

40 ¹⁹¹ See Sachs (1998). One short-lived version was the proposed sovereign debt restructuring mechanism. See Krueger 39
(2003) and Shleifer (2003). 40

1 creditors will not be able to obstruct a settlement that the rest regard as beneficial. 1
2 CACs are sold as a realistic way to accomplish private sector involvement without 2
3 the worst of the moral hazard problems of IMF bailouts. The prediction of Barry 3
4 Eichengreen, that the adoption of CACs would not discourage investors in the case 4
5 of more creditworthy issuers, appears to have been accurate.¹⁹² But they have yet to 5
6 make a big difference in crisis resolution. 6

7 Ex ante provision of collateral can allow financing to take place where reputations 7
8 and other institutions are not strong enough to sustain it otherwise. Models that pre- 8
9 sume the necessity of collateral in emerging markets are some of the most promising 9
10 for possible re-importation back into the mainstream of macroeconomics in rich 10
11 countries.¹⁹³ 11

12 We have previously mentioned attractions of financing via equity, federal deposit 12
13 insurance (FDI), and commodity-indexed bonds. Each of these can be regarded as 13 Au20
14 risk-sharing arrangements that are more efficient than ordinary bonds or bank loans. 14
15 In the event of a “bad state of nature,” such as a decline in world demand for the coun- 15
16 try’s exports, the foreign investor suffers some of the losses automatically, avoiding the 16
17 need for protracted negotiations with the borrower. 17

18 9.6 Early warning indicators 18

19 Having learned to become less ambitious than attempting to estimate full structural 19
20 models of reality, some economists have tried the simpler task of testing whether eco- 20
21 nomic indicators can help predict when and where emerging market crises will 21
22 strike.¹⁹⁴ One motivation is to shed light on competing models of speculative attack 22
23 or theories of crisis origins more generally. Often the motivation is just to give policy- 23
24 makers some advanced warning of possible crises, so that the dangers can be addressed 24
25 before disaster strikes. (For this motivation, one must make sure that the relevant data 25
26 are available in real time.) 26
27

28 It is often pointed out that if reliable indicators of this sort were readily at hand, 28
29 they would induce behavior that would disrupt the relationship: either private investors 29
30 would pull out of the country at an earlier date or else policymakers would correct 30
31 imbalances in time and prevent the crisis altogether. This point is useful as a caveat 31
32 to researchers who expect that finding reliable indicators will be easy. But still you must 32
33 try. If observable imbalances get gradually worse as the probability of a crisis rises, it is 33
34 natural for the IMF (or any other party) to be at the forefront of those trying to ascer- 34
35 tain the relationships. If the research bears fruit and policymakers’ actions then succeed 35
36 in eliminating crises, then is a consummation to be wished for. More likely the IMF 36
37

38 ¹⁹² See Eichengreen and Portes (1995), Eichengreen (1999), Eichengreen and Mody (2004). 38

39 ¹⁹³ See Caballero and Krishnamurthy (2000, 2001, 2003, 2005) and Mendoza and Smith (2006). It goes back to 39
40 Kiyotaki and Moore (1997).

40 ¹⁹⁴ Berg and Pattillo (1999a,b) and Goldstein, Kaminsky, and Reinhart (2000) evaluated different approaches. 40

1 would be faced with the dilemma posed by the knowledge that announcing concerns 1
2 when the crisis probability rises to about 50%, runs the risk of precipitating a crisis that 2
3 otherwise might not have occurred. In any case, we are not in the fortunate position of 3
4 having had tremendous success in finding early warning indicators. 4

5 The studies often use panels combining a cross-section of many countries with time 5
6 series. A few studies use a cross-section of countries to see what determines which 6
7 countries suffered more and which less when hit by the common shock of a salient 7
8 global episode.¹⁹⁵ 8

9 **9.6.1 Asset prices** 9

10 Bubbles — or, perhaps it's safer to say, extreme booms — in equity markets and real 10
11 estate markets have come to be associated with high-income countries. But they can 11
12 afflict emerging markets as well, as noted earlier. Stock market prices are apparently 12
13 among the more successful early warning indicators of crises in emerging markets.¹⁹⁶ 13
14 14

15 **9.6.1.1 Reserves** 15

16 The foreign exchange reserve holding behavior of developing countries differs in some 16
17 ways from that of advanced countries. For one thing, they hold more.¹⁹⁷ Many studies 17
18 have found that reserves, sometimes expressed as a ratio to the money supply, some- 18
19 times relative to short-term debt, would have been a useful predictor of the emerging 19
20 market crises of the 1990s.¹⁹⁸ 20
21 21

22 After the emerging market crises of the 1990s, the traditional rule of thumb that 22
23 developing countries should hold enough reserves to equal at least three months of 23
24 imports was replaced by the “Guidotti rule.” This guideline determined that develop- 24
25 ing countries should hold enough reserves to cover all foreign debt that is short-term or 25
26 maturing within one year. Most emerging market countries worked to increase their 26
27 holdings of reserves strongly, typically raising the Guidotti ratio of reserves to short- 27
28 term debt from below one to above one.¹⁹⁹ The motive was precautionary to self- 28
29 ensure against the effects of future crises or the need to return to the IMF.²⁰⁰ (It would 29
30 be hard to say which they feared more.) Economists wondered whether the levels of 30
31 reserves were excessive, since most are held in the form of U.S. Treasury bills that have 31
32 32

33 ¹⁹⁵ See Sachs, Tornell, and Velasco (1996b) for the “tequila effect” of the 1994 Mexican peso crisis, and Obstfeld, 33
34 Shambaugh, and Taylor (2009, 2010) or Rose and Spiegel (2009) for the 2008 global financial crisis. 34

35 ¹⁹⁶ Rose and Spiegel (2009) found that equity prices are the *only* robustly significant indicators that can predict which 35
36 countries got into trouble in 2008. 36

37 ¹⁹⁷ It is not because developing countries are less likely to float than advanced countries; See Frenkel (1974) and Frenkel 37
38 and Jovanovic (1981). 38

39 ¹⁹⁸ Including Sachs et al. (1996b); Frankel and Rose (1996); and Kaminsky, Lizondo, and Reinhart (1998). 39

40 ¹⁹⁹ See Guidotti (2003). 40

²⁰⁰ Aizenman (2009), Aizenman and Lee (2007), Aizenman and Marion (2003), and Jeanne and Ranciere (2009) 39
concluded that reserves in emerging market countries generally can be explained by a precautionary model, 39
although reserves in a few Asian countries exceed that level. 40

1 a low rate of return.²⁰¹ This was especially true of China,²⁰² but in the global financial 1
2 crisis of 2008, it appears that the caution of most of the reserve holders was 2
3 vindicated.²⁰³ 3

4 9.6.1.2 Bank credit 4

5 Many studies find that rapid expansion of domestic bank credit is an early warning 5
6 indicator of crises. Loayza and Ranciere (2006) noted the contradiction of this finding 6
7 with the literature that uses bank credit as a proxy for the extent of intermediation and 7
8 financial development; the reconciliation is the distinction between the short and the 8
9 long run. 9

10 9.6.1.3 Composition of inflows 10

11 Some authors found that the *composition* of capital inflows matters more than the total, 11
12 when it comes to predicting the frequency and severity of crises.²⁰⁴ 12

13 International bank lending, in particular, has been implicated in most crises, usually 13
14 because of the acute problem of moral hazard created by the prospect of government 14
15 bailouts. Foreign direct investment is a less risky source of capital inflow than loans.²⁰⁵ 15
16 The same is true of equity flows.²⁰⁶ 16

17 As noted in Section 3, borrowers with a currency mismatch — foreign currency 17
18 liabilities and domestic currency revenues — suffer from an adverse balance sheet when 18
19 the currency is forced into devaluation.²⁰⁷ Analogously, borrowers with a maturity 19
20 mismatch — liabilities that are shorter term than the domestic investment projects in 20
21 which the funds were invested — suffer when interest rates are forced upward.²⁰⁸ 21
22 Conditions that make a crisis painful when it happens do not automatically imply that 22
23 crises are more likely to happen.²⁰⁹ The majority view is that poorly structured balance 23
24 24
25 25

26 ²⁰¹ See Jeanne (2007) and Summers (2006). Rodrik (2006) argued that the countries would be better off using some of 26
27 the reserves to pay down short-term debt. 27

28 ²⁰² Many, such as Goldstein and Lardy (2009), believe China's peg to the dollar is essentially mercantilist, while 28
29 McKinnon (2004) argued that it is appropriate. Dooley, Folkerts-Landau, and Garber (2003) argued that China's 29
30 tremendous amassing of reserves is not precautionary, but rather part of a deliberate and successful development 30
31 strategy. This claim is consistent with the general finding of Rodrik (2008) that currency undervaluation promotes 31

32 ²⁰³ Aizenman (2009) and Obstfeld et al. (2009, 2010) found that high reserve levels paid off after all, in the global crisis 32
33 of 2008, because those with high reserves were statistically less likely to get into trouble. Rose and Spiegel (2009), 33
34 however, did not find reserves to have been a useful predictor in 2008. 34

35 ²⁰⁴ Calvo, Izquierdo, and Mejia (2004) and Frankel and Rose (1996) found significant effects of composition measures 35
36 in probit regressions, but not for overall ratios of current account deficits or debt to GDP. 36

37 ²⁰⁵ See Lipsey (2001) and Frankel and Rose (1996). 37

38 ²⁰⁶ See Razin, Sadka, and Yuen (1998). 38

39 ²⁰⁷ See Baliño, Bennett, Borensztein (1999); Calvo, Izquierdo, and Mejia (2004); and Céspedes et al. (2003). Calvo et 39
40 al. (2003) called it “domestic liability dollarization.” 40

²⁰⁸ See Rodrik and Velasco (1999).

²⁰⁹ Some have argued that circumstances making crises more severe will also make them less likely to happen because 39
40 steps will be taken to avoid them (e.g., Dooley, 2000b). 40

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1 sheets, suffering from currency mismatch or maturity mismatch, make crises both more 1
2 likely to occur, and more severe when they do occur. Indeed, as we have seen in Sec- 2
3 tion 8, many of the latter-day models of speculative attack are based precisely on the 3
4 balance sheet problem. 4

5 Measuring mismatch is more difficult than talking about it. One proxy for currency 5
6 mismatch is the ratio of foreign liabilities of the financial sector to money.²¹⁰ An alter- 6
7 native proxy is a measure of deposit dollarization computed as “dollar deposits/total 7
8 deposits” in the financial system.²¹¹ 8

9 The ratio of short-term debt to reserves has received attention, of which the 9
10 Guidotti threshold (1.0) is one case. Perhaps because the ratio efficiently combines 10
11 two important numbers, reserves, and short-term debt, the ratio is emphasized in more 11
12 studies of early warning indicators than any other statistic.²¹² 12

14 10. SUMMARY OF CONCLUSIONS 14

15 The macroeconomics of developing countries has become a field of its own. Among 15
16 the characteristics that distinguish most developing countries from the large industria- 16
17 lized countries are greater exposure to supply shocks in general and trade volatility in 17
18 particular (especially for the commodity exporters), procyclicality of international 18
19 finance (contrary to orthodox theory), lower credibility with respect to both price 19
20 stability and default risk (due in part to a past history of financing deficits by seignorage 20
21 and default), procyclicality of fiscal policy (due in part to the imposition of austerity 21
22 in crises), and other imperfect institutions. 22

23 Some models of monetary policy originally designed for industrialized countries — 23
24 dynamic inconsistency in monetary policy and the need for central bank independence 24
25 and commitment to nominal targets — apply even more strongly to developing 25
26 countries in light of the credibility problem. But because most developing countries 26
27 are price-takers on world markets, the small open economy model, with nontraded 27
28 goods, is more often useful than the two-country two-good model. Contractionary 28
29 effects of devaluation are far more important for developing countries, particularly 29
30 the balance sheet effects that arise from currency mismatch. 30
31

32 The choice of exchange rate regime is no more clear-cut for emerging market 32
33 countries than it is for advanced countries. On the one hand, small size, openness, 33
34 and less developed financial markets point relatively more to fixed exchange rates, 34
35

36 ²¹⁰ See Alesina and Wagner (2003) and Guidotti et al. (2003). The drawback is that the foreign liabilities of the financial 36 Au102, 103, 104
37 sector are not the same as foreign-currency liabilities of domestic residents. See Goldstein and Turner (2004). 37

38 ²¹¹ Computed by Arteta (2005a,b). 38

39 ²¹² Examples include Berg, Borensztein, Milesi-Ferretti, and Pattillo (1999); Frankel and Rose (1996); Goldstein, 39 Au105
40 Kaminsky, and Reinhart (2000); Mulder, Perrelli, and Rocha (2002); Rodrik and Velasco (1999, 2000); and Sachs 40
(1998).

1 terms of trade volatility and the experience with speculative attacks point toward more 1
2 flexible exchange rates. Some began to float after the crises of the 1990s. In place of the 2
3 exchange rate as favored nominal target for monetary policy, the conventional wisdom 3
4 has anointed inflation targeting with the CPI as the choice for price index. This chapter 4
5 has departed in one place from the mission of neutrally surveying the literature: 5
6 It argues that events associated with the global crisis of 2007–2009 have revealed 6
7 limitations to this role for the CPI. 7

8 Although the participation of emerging markets in global finance is a major reason 8
9 they have earned their own large body of research, they remain highly prone to pro- 9
10 blems of asymmetric information, illiquidity, default risk, moral hazard, and imperfect 10
11 institutions. Many of the models designed to fit developing countries were built around 11
12 such financial market imperfections, and few thought this inappropriate. Since the crisis 12
13 of 2007—2009 showed that the United States and other rich countries also have these 13
14 problems to a much greater extent than previously understood, perhaps some of the 14
15 models that had been applied to emerging markets could now be of service in thinking 15
16 how to rebuild mainstream monetary macroeconomics. 16

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