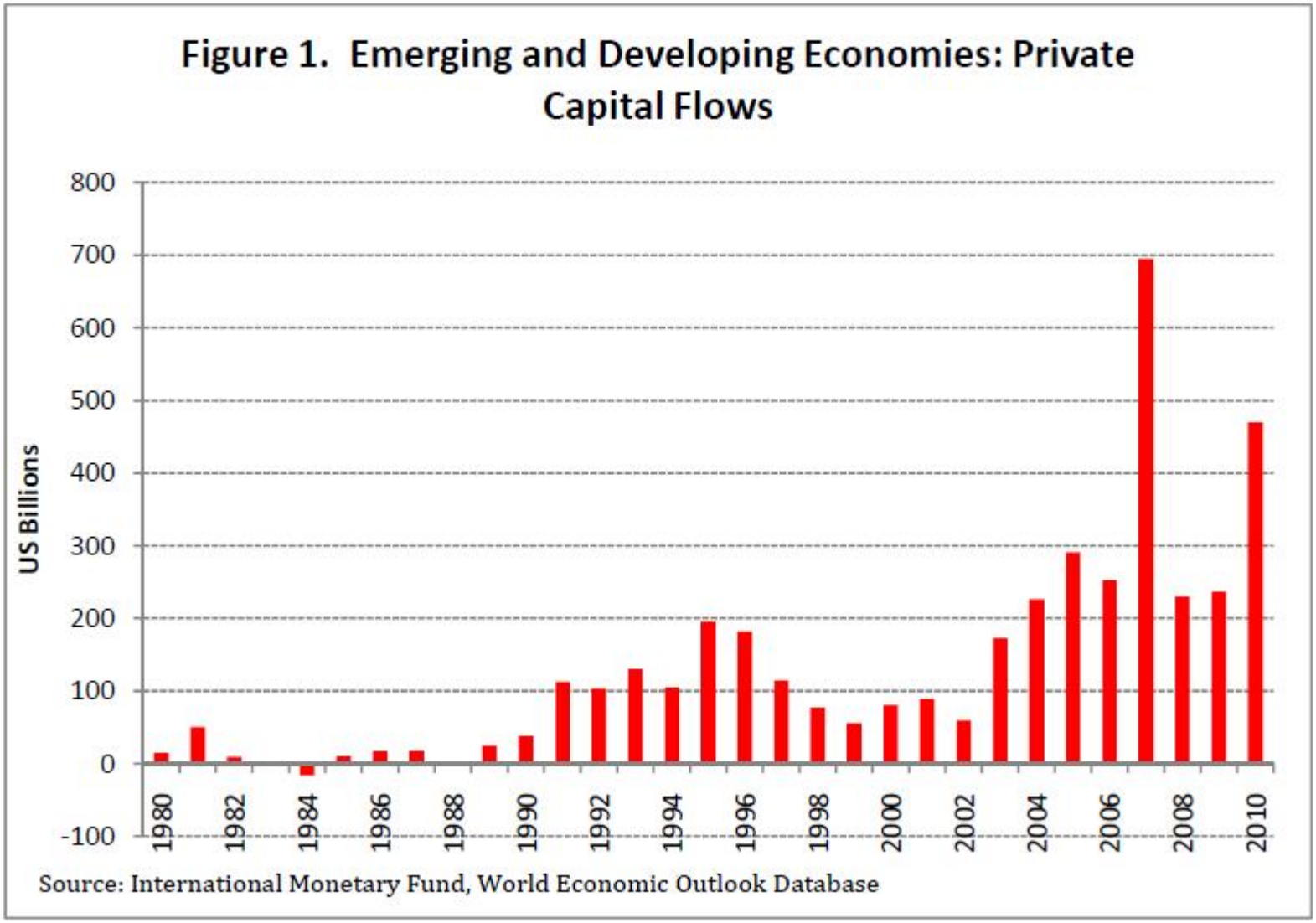
Chapter 5
Capital Inflows and Sudden Stops

Stylized facts

- The flow of private capital to emerging countries follows a cyclical pattern (see figure by CV, ch. 14).
- We can observe four cycles, with peaks in 1981, 1993, 1995, and 2007.
- The year following the peak is typically a year of financial crises: the 1982 debt crisis, the 1994 Tequila crisis, the East Asian crises in 1997-1998, and the American financial crisis in 2008 .

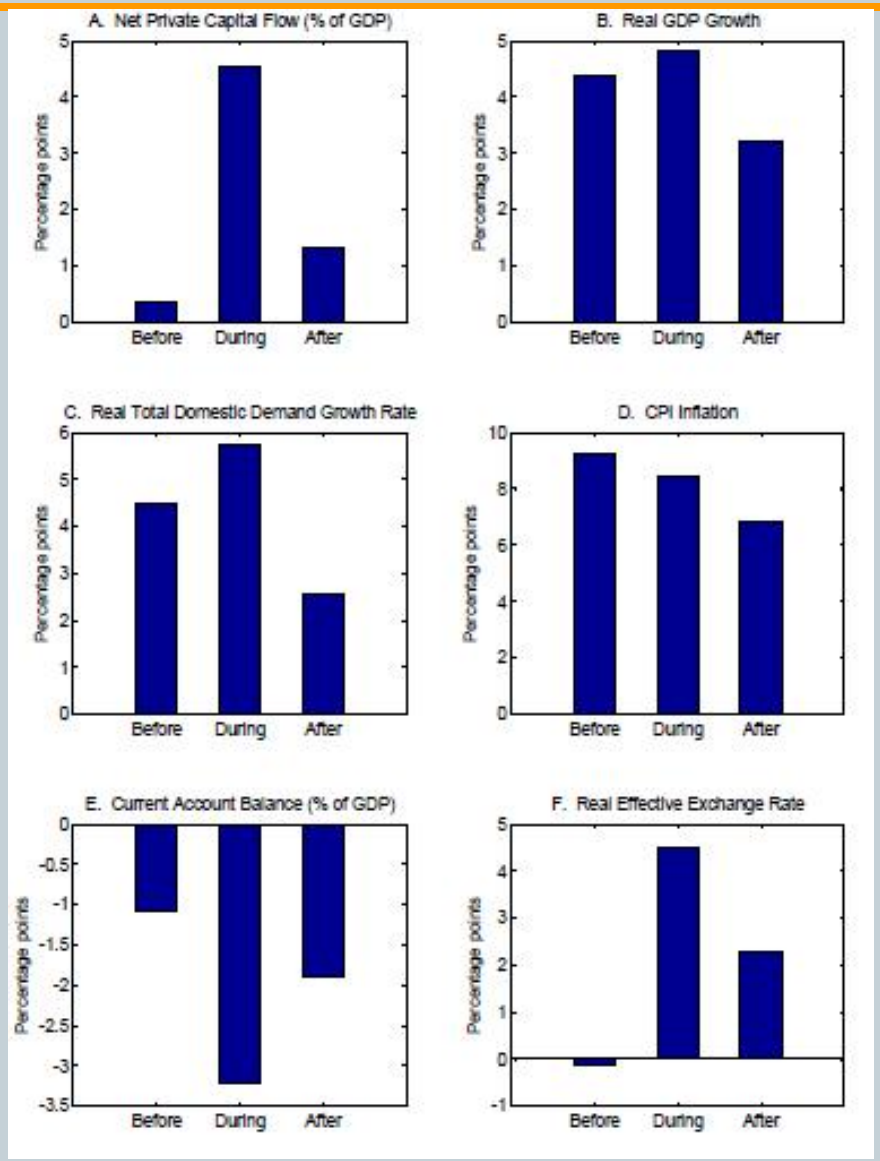
Stylized facts



Stylized facts

- The 2007 *World Economic Outlook* identifies 73 large capital inflows periods to developing countries for the period 1987-2006 (definition in CV, ch. 14).
- The figure shows the average impact of these inflows on the main economic variables two years *before* the episode, *during* the episode and two years *after* the final year of the episode. The scale represents the median of each variable across all episodes.

Stylized facts



Stylized facts

- Panel A shows that net capital flows peak at around 4.5 percent of GDP during the episodes. 34 episodes ended in a sudden stop and 13 with a currency crisis. In seven cases a sudden stop coincided with a currency crisis. A *sudden stop* is defined as a fall in capital inflows by more than 5 percentage points of GDP when the episode ends
  - Panels B and C show the effect on GDP growth and aggregate demand. Both peak during the capital inflow episode and fall sharply after.
  - Panel E shows that the current account deficit increases sharply during the capital inflow episode and falls afterward.
  - Panel F shows that capital inflows go hand in hand with a real appreciation of the domestic currency.

Stylized facts

- In a similar but more extensive study Reinhart and Reinhart (2008) identify a pattern, which has often been repeated in the modern era of global finance
  - As restriction on international capital flows have been relaxed worldwide, more and more often foreign investors turn with interest toward some developing country. Capital flows in volume into small and shallow local financial markets. The exchange rate tends to appreciate and local commodity prices to boom. These favorable price movements improve national fiscal indicators.
  - Policymakers and investors are often lulled into treating the bonanza (which lasts somewhere between two and four years) as a *permanent* phenomenon rather than a *temporary* shock.

Stylized facts

- This optimism explains why the growth in real government spending is notoriously procyclical during capital inflows bonanzas.
- It also encourages domestic credit expansion. These, in turn exacerbate structural weaknesses in the domestic banking sector even as these local institutions are courted by global financial institutions seeking entry into a hot market.
- At the same time, local authorities resort to large-scale foreign exchange sales of the local currency to cushion the effects on the exchange rate of the capital inflow bonanza.
- Other policy interventions, such as increases in reserve requirements and transaction taxes, usually follow to insulate the economy from the accumulation of reserves.

Stylized facts

- But tides also go out when the fancy of global investors shift. Flows abruptly reverse or *sudden stop* and asset prices give back their gains, often forcing a painful adjustment on the economy. The current account path around bonanzas is distinctly V-shaped. There is a cumulative appreciation of the real exchange rate up to the bonanza years and a sharp depreciation afterward.
- Capital inflow bonanza periods are associated with higher incidence of banking, currency and inflation crises. Capital flow bonanzas systematically precede sovereign default episodes. Middle- and low- income countries had a roughly 20% chances of suffering a banking crisis and a 30% chance of a currency crisis, external-debt default or inflation spike (to more than 20% a year) if they experienced a capital flow bonanza in the three years beforehand.

Stylized facts

- Equity and house prices rise when capital flows in and retreat when capital flows out. Share prices rose by more than 10% in real terms in the two years before a bonanza, then fell relentlessly for four years, ending below where they started. House price went up by 15% in real terms over four years during a bonanza before falling back.

Definitions

- A sudden rise in capital inflows can have two causes:
  - External (*push factors*) such as low interest rates in industrial countries and the world business cycle;
  - Domestic (*pull factors*) such as a rise in domestic demand, capital account liberalization, a great oil discovery.
- Both kinds of capital inflows take the form of lower world interest rates and have similar macroeconomic effects. However, those induced by domestic factors are easier to foresee and control.

Definitions

- The financial crisis that started in the United States in 2008 led to very low interest rates. This has resulted in a strong incentive for speculative money to flow into emerging markets through the so-called « *carry trade* », which involves borrowing at very low interest rates in the United States and investing in emerging markets.
- A *sudden stop* (Calvo) is an exogenous stop in the flow of capital into a country.

A model of the economics of sudden stops

- The model is very similar to the second model of chapter 3, but with only three periods, $t = 0, 1, 2$.
- The consumer welfare at time zero is: $U_0 = \sum_{t=0}^{2} \beta^t log(C_t)$.
  - C is a consumption index, which aggregates the consumption of T and N goods : $C = (C_T/a)^a [C_N/(1-a)]^{1-a}$, with $0 < a < 1$.
  - The maximization of the consumption index under the budget constraint $C_T + pC_N = S$, determines the demand of nontraded good: $pC_N = (1-a)S$ and of traded good in function of total spending: $C_T = aS$. Then, $p^{1-a}C = S$.
  - p^{1-a} is the consumption price index and the RER.

A model of the economics of sudden stops

- The initial and final stocks of foreign assets are zero: $B_0 = B_3 = 0$. Moreover: $(1 + r)\beta = 1$
- The endowment path of tradable good is rising over time: $Y_{T,0} < Y_{T,1} < Y_{T,2}$. The path of the endowment of nontradable good is constant: $Y_{N,0} = Y_{N,1} = Y_{N,2} = Y_N$. These assumptions capture the idea of a growing economy where technical progress is higher in the tradable than in the nontradable sector. We will introduce labor input, which can freely move between sectors in an extension of the model.

A model of the economics of sudden stops

- The consumer's income and spending in period *t* are:

$$R_t = Y_{T,t} + p_t Y_N + rB_t$$

$$S_t = R_t - (B_{t+1} - B_t) = C_{T,t} + p_t C_{N,t} = {p_t}^{1-a} C_t$$

- The consumer welfare at the beginning of period zero is:

$$U_0 = \sum_{t=0}^{2} \beta^t log\{{p_t}^{-1+a}[Y_{T,t} + p_t Y_N + (1+r)B_t - B_{t+1}]\}$$

A model of the economics of sudden stops. Perfect capital market

- First, we assume that the country can freely lend and borrow on the international capital market at interest rate *r*.
- The consumer maximizes U_0 in B_1 and B_2. We get $S_0 = S_1 = S_2 = S$, constant.
- Remember that the consumption of traded and nontraded goods are: $C_{T,t} = aS$ and $p_t C_{N,t} = (1-a)S$ and that the consumption of nontraded good is equal to its output: $C_{N,0} = C_{N,1} = C_{N,2} = Y_N$. Hence, the price of nontraded good is constant over time: $p_0 = p_1 = p_2 = p = \frac{(1-a)S}{Y_N}$.

A model of the economics of sudden stops. Perfect capital market

- The consumption of traded good is perfectly smoothed that is constant over time: $C_{T,0} = C_{T,1} = C_{T,2} = C_T = aS.$
- The identity of the current account balance is:

$$CA_t = Y_{T,t} + rB_t - C_T = B_{t+1} - B_t, t = 0,1,2$$

- If we use the conditions: $B_0 = B_3 = 0$, we have

$$\sum_{t=0}^{2} (1+r)^{-t} Y_{T,t} = \sum_{t=0}^{2} (1+r)^{-t} C_T$$

or

$$aS = C_T = \frac{\sum_{t=0}^{2} (1+r)^{-t} Y_{T,t}}{\sum_{t=0}^{2} (1+r)^{-t}}$$

A model of the economics of sudden stops. Perfect capital market

- We deduce from this expression the price of the nontraded good and the consumption of traded good:

$$p_0 = p_1 = p_2 = p = \frac{(1-a)}{aY_N} \frac{\sum_{t=0}^{2}(1+r)^{-t}Y_{T,t}}{\sum_{t=0}^{2}(1+r)^{-t}}$$

$$C_{T,0} = C_{T,1} = C_{T,2} = C_T = \frac{\sum_{t=0}^{2}(1+r)^{-t}Y_{T,t}}{\sum_{t=0}^{2}(1+r)^{-t}}$$

- The current accounts surplus in each period is:

$$CA_0 = Y_{T,0} - C_T = B_1$$
$$CA_1 = Y_{T,1} + rB_1 - C_T = B_2 - B_1$$
$$CA_2 = Y_{T,2} + rB_2 - C_T = -B_2$$

A model of the economics of sudden stops. Perfect capital market

- As $Y_{T,0} < Y_{T,1} < Y_{T,2}$, and as C_T is a weighted average of $Y_{T,0}, Y_{T,1}$ and $Y_{T,2}$, the trade balance runs a deficit in period 0 and a surplus in period 2:

$$TA_0 = Y_{T,0} - C_T = B_1 < 0$$
$$TA_2 = Y_{T,2} - C_T = -(1+r)B_2 > 0$$

- That means that in period 0, the consumer anticipates his future higher incomes by consuming more traded good than he produces. He borrows on the world financial market to pay for the difference: $B_1 < 0$.

A model of the economics of sudden stops. Perfect capital market

- In period 2 he consumes less tradable than his production of this good and uses the difference to pay back the principal and the interest of his foreign debt, which is equal to $-B_2 > 0$.
- The current account balance is in deficit in period 0 and in surplus in period 1.

The sudden stop

- We assume that, the consumer cannot borrow nor roll over a part of his debt in period 1. The closure of the international financial market is sudden and was not expected at the beginning of period 0. Hence the consumer starts period 1 with the same foreign debt B_1 as before. But the debt at the end of the period is constrained to be zero instead of $-B_2 > 0$.
- We deduce from the current account identity

$$C_{T,1} = Y_{T,1} + (1 + r)B_1 = C_T + B_2 < C_T$$

The sudden stop

- The country has no more foreign debt in period 2. Then, the consumption of traded good is equal to the output of this good:

$$C_{T,2} = Y_{T,2} > C_T$$

- Remember that the optimal composition of consumption in period t is given by $\frac{p_t C_{N,t}}{C_{T,t}} = \frac{1-a}{a}$ and that the nontraded good market is balanced: $C_{N,t} = Y_N$. The price of the nontraded good is given by:

$$\frac{p_t Y_N}{C_{T,t}} = \frac{1-a}{a} \text{ or } p_t = \frac{1-a}{a}\frac{C_{T,t}}{Y_N}$$

The sudden stop

- As: $C_{T,1} < C_{T,0} = C_T < C_{T,2}$, we have:

$$p_1 < p_0 < p_2$$

- The sudden stop induces a sudden and unanticipated decrease in the consumption of traded good, in the price of nontraded good and in the RER ${p_1}^{1-a}$. The current account balance improves.

Supply

- As in chapter 3, the production functions of each sector are:

$$Y_T = A_T {L_T}^{\alpha}, \text{ with } 0 < \alpha < 1$$

$$Y_N = A_N L_N$$

  - We also have full employment of labor:

$$L = L_T + L_N$$

  - Firms set their demand of labor to satisfy the marginal conditions:

$$w = pA_N$$

$$L_T = \left(\frac{\alpha A_T}{pA_N}\right)^{1/(1-\alpha)} \quad \text{and} \quad L_N = L - L_T$$

Supply

- The sudden stop induces a decrease in the price of the nontraded good, p_1. Hence, employment in the tradable sector, and the output of this sector $Y_{T,1}$ increase. Employment in the nontradable sector and its output $Y_{N,1}$ decrease.
- This change in the composition of output dampens the decrease in the price of the nontraded good, and so the depreciation of the RER.

Sticky price and wage

- Introduce some Keynesian flavor in the model by assuming that the price of the nontraded good, and the wage rate, are sticky and cannot decrease during the sudden stop.
- Then, employment in the traded good sector $L_{T,1}$ and the output of this good $Y_{T,1}$ do not increase.
- The output of nontraded good adjusts to the demand for this good:

$$(1-a)\left[Y_{T,1}+p_1 Y_{N,1}+(1+r)B_1\right]=p_1 Y_{N,1}$$

$$\text{Hence: } p_1 Y_{N,1}=\frac{1-a}{a}\left[Y_{T,1}+(1+r)B_1\right]$$

Sticky price and wage

- We had the same relation when the nontradable price p_1 was flexible. Then, the lower $Y_{T,1} + (1+r)B_1$ (relative to the perfect capital market case) induced a decrease in p_1.
- Now, p_1 is stuck to its value in the previous period. Hence, the output of nontraded good $Y_{N,1}$ must decrease: $Y_{N,1} < Y_N$. Employment in the nontraded good sector and total employment also decrease.

Sticky price and wage

- Consumers must pay back the principal of their debt, $-B_1$, from their income $Y_{T,1} + p_1 Y_{N,1} + rB_1$. Assume that, in the case of perfect capital market, all the consumers have the same debt and income. The consequences of a sudden stop will be much more severe for consumers whose income is strongly related to the activity of the nontraded good sector than for consumers whose income is related to the activity of the traded good sector, because the price of nontraded good decreases.
- Actually, the former consumers may be unable to pay their debt, which will create a mess for the country. In the real world we will have bankruptcies in the nontraded good sector and the risk of a bank crisis.

Sticky price and wage

- Without this risk of bankruptcies, it would be better for the nontraded good price to be flexible than sticky: in the former case the sudden stop induces no unemployment in the country.
- Good prices and wages are usually sticky, but the nominal exchange rate is extremely flexible under a pure floating exchange system. The RER is the product of a ratio of good prices by a nominal exchange rate. Hence, it is very flexible under a floating exchange rate system and sticky under fixed exchange rate.
- Then, the former system is better than the latter because it makes the RER flexible and prevents unemployment under bad circumstances such as a sudden stop…. BUT….

Sticky price and wage

- If many consumers (firms, banks) whose income depends on the nontradable sector activity cannot pay their debt when the price of this good decreases, especially if the exchange rate is too volatile and overshoot its new equilibrium value, a fixed exchange rate system is not so bad. During the 1997-1998 Asian crisis, the depreciation of the nominal exchange rates of some Asian currencies was enormous.
- Fixing the exchange rate will induce unemployment by keeping the RER overvalued, but it can prevent a debt default with all its terrible consequences for the economy.

Sticky price and wage

- Many emerging countries try to stabilize their nominal exchange rate and so their RER, to prevent too high fluctuations of the debt ratio of economic units exposed to changes in the nontraded good price.
- Calvo dialed the term *fear of floating*.

More stylized facts

- Brazil gives a good example of *carry trade*. The rise in commodity prices until mid-2011, induced inflationary pressures in Brazil. The central bank tried to fight them by raising the interest rate. At the same time the US Federal Bank had a policy of low interest rate and *quantitative easing*. Hence, speculators borrowed from the US market at low rate and invested in Brazil at high rate.
- The Brazilian authorities worried that this entry of floating capital would amplify the rise of its RER. To slow it down, it introduced in October 2009 a 2 percent tax on the purchase of stocks and bonds.

More stylized facts

- In 2010, the Brazilian authorities widened the asset of this tax and increased its rate to 6 percent. The Brazilian central bank explained that direct investments were welcome, but she had reservation on the entry of floating capital.
- The capital inflows period was followed by a period of capital outflows in summer 2013. One reason of the reversal was the expectation of a weakening of the quantitative easing policy in the US. This change induced a depreciation of the real and the tax was removed.
- The Brazilian capital control policy contributed to stabilize the flows of foreign capital and the Brazilian exchange rate.

More stylized facts

- Without it, the liquidity of Brazilian banks would have been excessive, they would have expanded credits and increased their risk exposure too much and they could have fed a real estate bubble.
- Since the 2008 subprime crisis, capital controls have become more frequent. The IMF, which had been traditionally very much against these controls (for instance during the 1998 Asian crisis) has softened its position, progressively over the February 2010 – November 2012 period.

More stylized facts

- These controls can be direct taxes on portfolio inflows and non-resident deposits on banks, unremunerated reserve requirements on short-term capital inflows (Chile, 1991-1998), restriction on foreign liability position of banks. They have been soft in Latin America after the 2001 Argentinean crisis.
- Empirical studies conclude that capital controls have been rather successful in shifting the composition of flows towards long-term flows and at preserving some monetary policy autonomy by severing the link between domestic and international interest rates.

More stylized facts

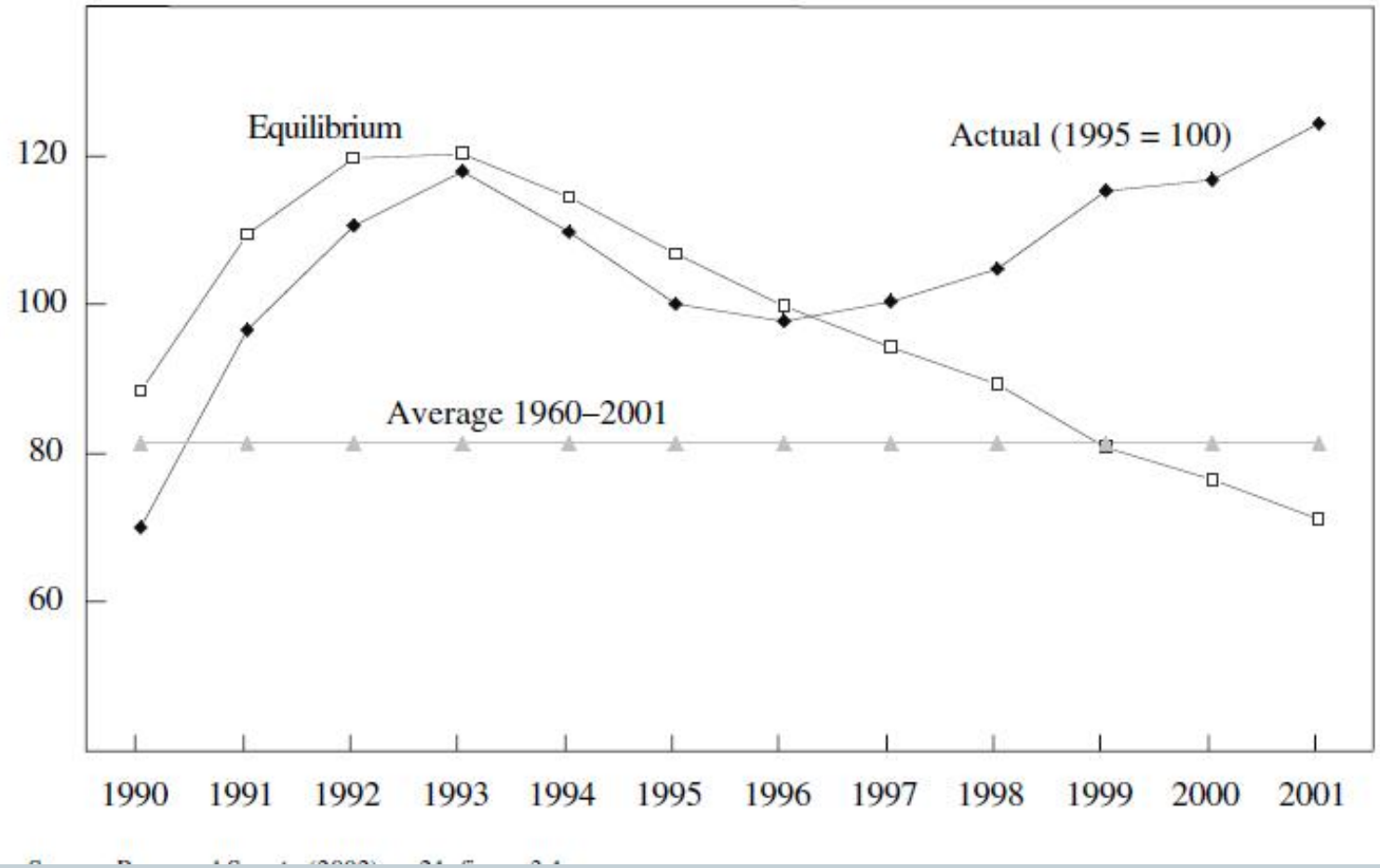
- Their results are more mixed on their ability to limit capital inflows and at alleviating real exchange rate pressures.

An example: the 2002 Argentinian crisis

- The first graph plots the RER of Argentina from 1990 to 2001. The RER appreciated from 1996 to 2001.
- The second graph plots the RER from 1994 to 2008. The RER (but also the exchange rate of the Argentinian peso) depreciated by a tremendous amount at the end of 2001.
- The third graph plots the current account deficit of Argentina on the same period of time.

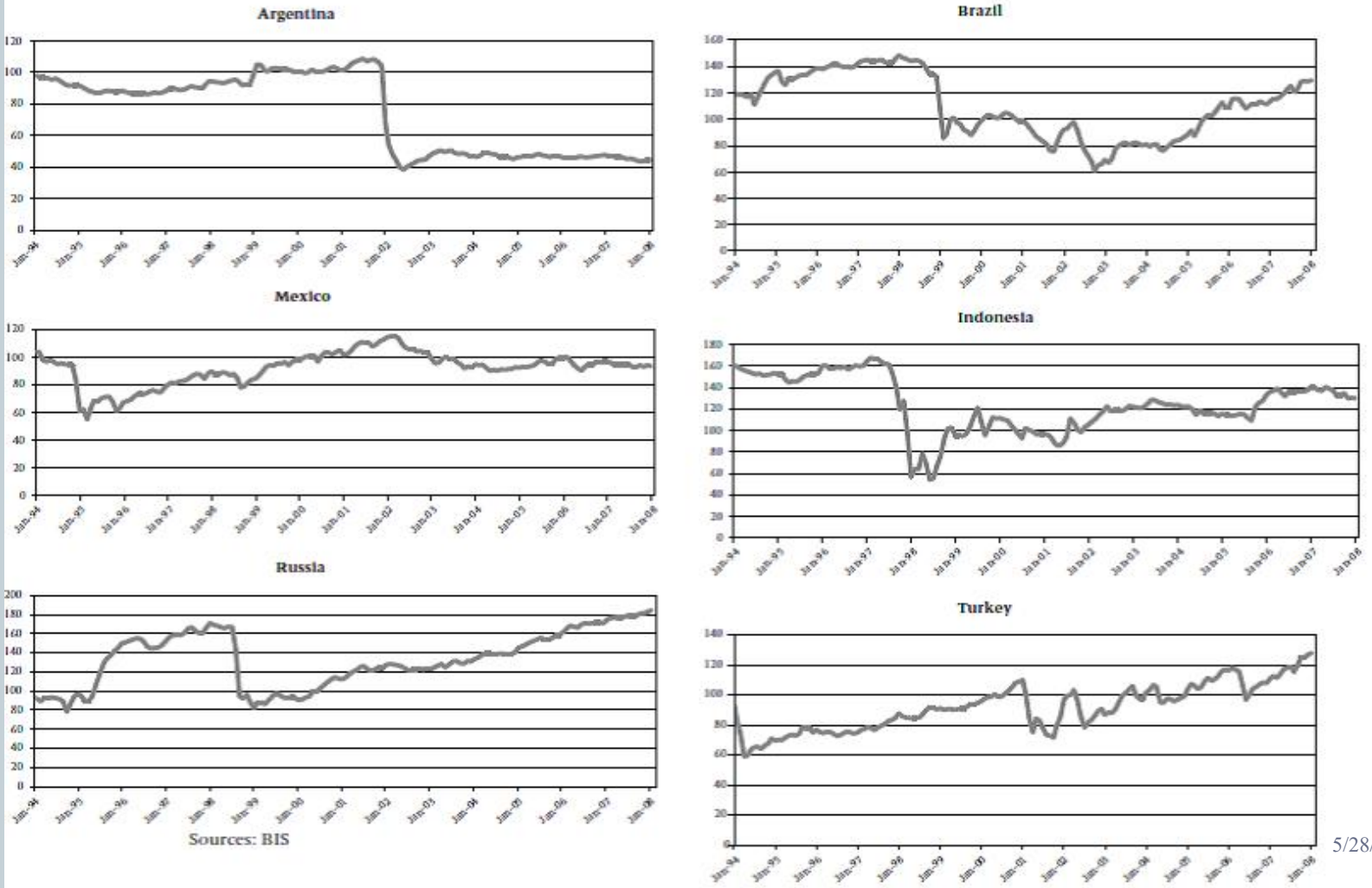
An example: the 2002 Argentinian crisis

Figure 5. Real Exchange Rate Misalignment, 1990–2001



An example: the 2002 Argentinian crisis

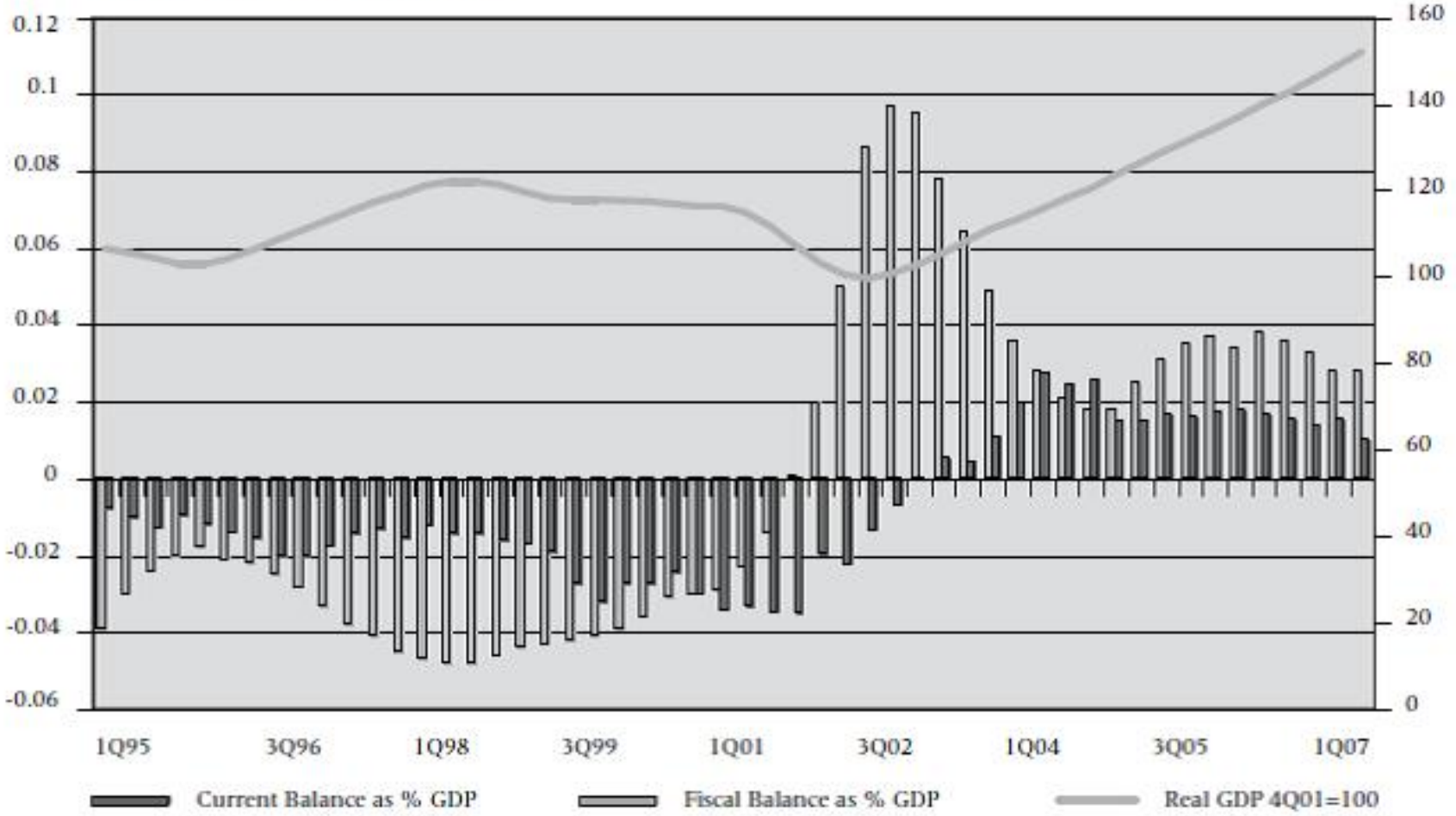
FIGURE 2
Real Effective Exchange Rates in Six Emerging Market Countries
(2000=100)



Sources: BIS

An example: the 2002 Argentinian crisis

FIGURE 4
Argentina: Macro Fundamentals



An example: the 2002 Argentinian crisis

- Before the crisis, Argentina had a *currency board*, which supported perfect convertibility between the peso and the dollar at the precise exchange rate of one peso = one dollar.
- The crisis was brutal and short-lived.
  - Argentina found more and more difficult to borrow from foreign countries after mid-2001.
  - To improve its budget the government decreased the salary and the pension of active and retired civil servants by 13 percent in July 2001.
  - At the end of 2001, Argentina could not borrow at all from foreigners, including the IMF.

An example: the 2002 Argentinian crisis

- At the end of November 2001, the Argentinians started withdrawing large sums of dollars from their bank accounts, turning pesos into dollars and sending them abroad, causing a bank run (capital outflows can also be made by nationals).
- On 2 December 2001, the government reacted by constraining bank withdrawals to less than 250 dollars a week – a system called *el corralito*. This unpopular measure led to insurrectional demonstrations and the President fled from la *Casa Roja* on 21 December 2001.
- The senators and MP elected as interim president Adolfo Rodriguez Saa, then shortly after Eduardo Duhalde.

An example: the 2002 Argentinian crisis

- Argentina defaulted on its public debt of 132 billion dollars in the last week of 2001.
- The fixed parity between the dollar and the peso, which had lasted for ten years, was abandoned in January 2002. A few months later the peso freely floated. It depreciated very fast and bottomed out at the rate of 4 pesos for one dollar in 2002. This depreciation induced a strong inflation.
- The *corralito* was kept for the time necessary to convert all the bank accounts in dollars into pesos, at the disadvantageous exchange rate of 1.4 pesos for one dollar.
- Many firms closed down, unemployment raised until reaching 25% in 2003. Imported goods reached unaffordable prices.

The 2002 Argentinian crisis: What happened before?

- There is no unique cause to the Argentinean crisis. We can instead identify an interaction between several causes, none of them dramatic. There is a similarity between the Argentinian economy at the end of the 1990s and the beginning of the 2000s and the Spanish economy nowadays. For instance the Argentinian peso was almost perfect substitute to the dollar, and the Spanish currency is the euro. This eased a lot foreign borrowing by these two countries until they were hit by a big crisis.

The 2002 Argentinian crisis: What happened before?

- Over the 1990-1997 period, inflation was low (because of the indexation of the peso to the dollar) and growth was strong (pulled by an increase in the volume and the price of the exports of primary commodities).
- The appreciation of the RER was limited, and it only slightly differed from its equilibrium value (graph, slide 38).
- The Argentinian terms-of-trade dropped in the second half 1997, a consequence of the Asia crisis.
- Strangely, the RER appreciated from 1996 onward, and it diverged more and more from its equilibrium value.

The 2002 Argentinian crisis: What happened before?

- This real appreciations was caused by capital inflows, but also by the strong depreciations of the Brazilian real and the euro in 1999 and 2000. Brazil, the main trade partner (and competitor) of Argentina, devaluated the real by a huge percentage in January 1999. The euro strongly depreciated during 2000. As consumption prices are sticky in the short-run, these nominal depreciations were also real depreciations.
- The world entered a recession in 2001 (bad for the price of primary commodities).
- This explains the current account deficit increase from the end 1994 to the crisis (third graph, slide 40).

The 2002 Argentinian crisis: What happened before?

- The government budget has always been in deficit (slide 40). The deficit peaked in the first quarter of 1998 and then steadily decreased until the crisis. After the deterioration of the terms-of-trade in the second half of 1997, the federal government used unpopular policies to control its deficit. But the provincial governments remained thriftless.
- At the end of 2001, foreign debts reached 51 percentage points of GDP. A big share of this debt was private, and the government should have tried to limit private borrowing since the mid-1990 (as the Spanish government should have limited the bank debt of its citizens, which financed a real estate bubble).

The 2002 Argentinian crisis: What happened before?

- In Argentina, as in Spain and most other countries, the government guarantees the debt of its national banks, because banks bankruptcies play havoc with the economy. Hence, private debt, implicitly is public debt.
- Private and public borrowing from international market has been easy and cheap for most of the 1990s. However, the trust of international lenders in emerging countries solvency was hit by the Russian crisis of August 1998. This was very bad for Argentina.
- This did not prevent the IMF publishing optimistic evaluations of the economic situation in Argentina, almost until the time of the crisis.

The 2002 Argentinian crisis: What happened before?

- The spread between the interest rate on government debt of Argentina and Mexico (a safe country) started to rise at the end of 1999. But we have to wait until March 2000 for this spread to quickly diverge.

The 2002 Argentinian crisis: What happened after?

- President Duhalde succeeded in stabilizing more or less the economy . The weak value of the peso improved the competitiveness of the traded goods sector and discouraged imports.
- On 25 May 2003 Nestor Kichner became president.
- The prices of soybean, the main Argentinian export, and of other primary commodities began to steadily rise. The peso slightly appreciated and then stabilized at the rate of 3 pesos for one dollar. The current account turned into surplus (slide 40).
- Exchange reserves increased.

The 2002 Argentinian crisis: What happened after?

- The government budget turned a surplus because a large share of government income comes from taxes on the exports of agricultural commodities, the price of which are set in dollars which has appreciated against the peso.
- The GDP growth rate had been negative since 1998 and reached a trough of -10.9% in 2002. It became strongly positive from 2003 to 2007 (at almost 9% per year). Unemployment decreased a lot (and reached the value of 10% in 2006). Inflation steadily rose, and was at rate of more than 20% per year in 2008 (probably more because inflation data were manipulated).

The 2002 Argentinian crisis: What happened after?

- A main weakness of the Argentinian economy is its dependence on the exports of a small number of agricultural commodities: they are the source of a large share of government tax income, and they are the trailing horse of the economy. The decrease in their prices has induced very serious difficulties for Argentina since mid-2011.
- Another big weakness is the difficulty for Argentina to borrow from the international market or to attract direct investment, which would be helpful to finance the economy during a temporary decrease in commodity prices, or to finance infrastructure or the investment necessary to exploit its huge reserves of gas and shale-oil.

The 2002 Argentinian crisis: What happened after?

- In spite of its huge reserves, Argentina spends more and more on imports of oil and gas.
- Foreign investors have little trust in the Argentinian government. They were mistreated in 2002-2003, but also afterward in many conflicts with the government (e.g. the brutal expropriation of the Spanish firm Repsol's controlling stake in the main Argentinian oil company YPF).
- Moreover, the official exchange rate of the peso, which is currently overvalued by about 60% (there is a huge black exchange market), makes bringing dollars unattractive for foreign investors.

The 2002 Argentinian crisis: What happened after?

- President Kichner reached an agreement with foreign creditors in 2005, which allowed him to exchange 76% of the government debt (about 81 billion dollars) against government bonds with higher maturity and a nominal value equal to 35% of the original debt. Another agreement was reached in 2010.
- No solution has been found for the last 7% of the original debt. It was sold to vulture funds, which are very good at spoiling the life of the Argentinian government by plenty of law suits, and at discouraging foreigners from investing in the country.
- The IMF debt was fully repaid in 2006.