

International Finance: Lecture 8

Exchange Rate Crises and Reforms

Biwei Chen

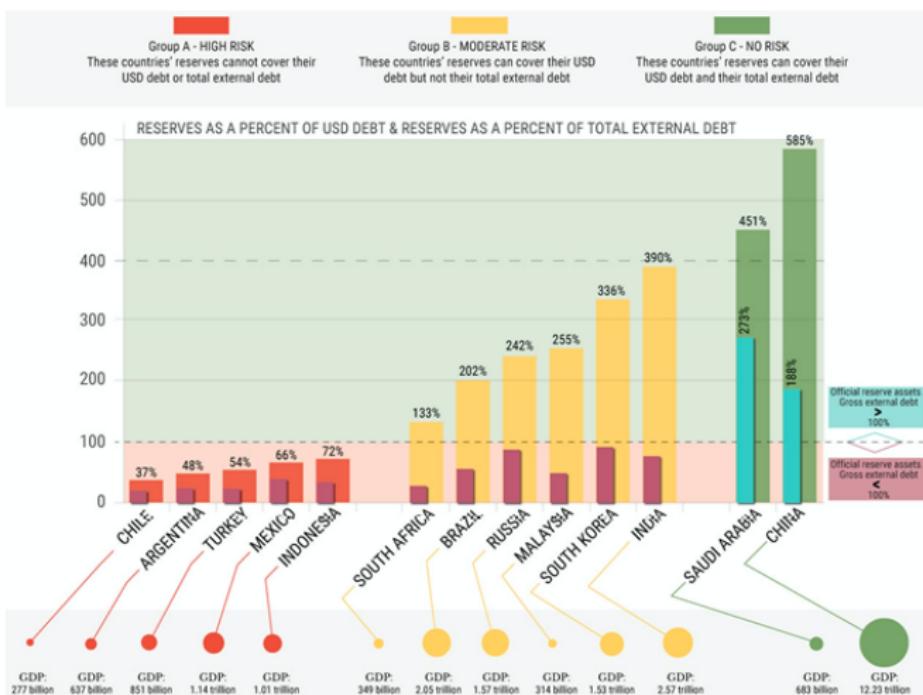
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Introduction

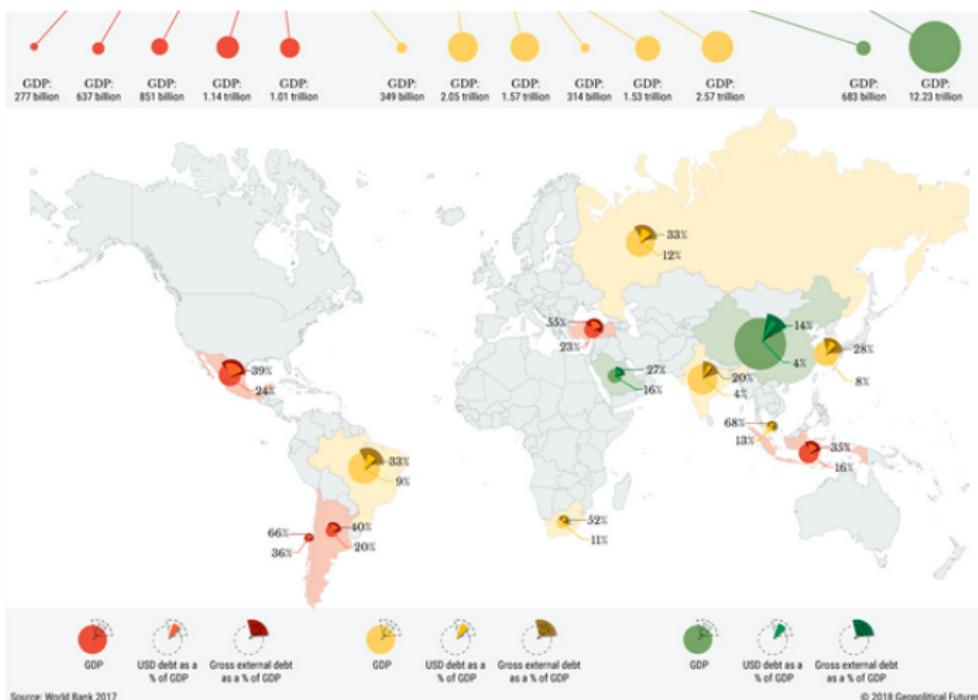
- An exchange rate crisis is a large and sudden depreciation that brings to an end a fixed exchange rate regime.
- Such crises are common. The typical fixed exchange rate lasts only a few years. History shows that crises can affect all types of countries—advanced, emerging, and developing.
- Crises have economic costs that tend to be very large in emerging markets and developing countries. Political costs are also large.
- To avoid a crisis, the central bank in a country with a fixed exchange rate regime must have the ability to peg the exchange rate. In practice, this means the central bank needs foreign currency reserves, which can be bought or sold in the forex market at the fixed rate.

Where Are the Next Currency Crises? (w)



<https://geopoliticalfutures.com/countries-risk-currency-crisis/>

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<https://geopoliticalfutures.com/countries-risk-currency-crisis/>



Outline

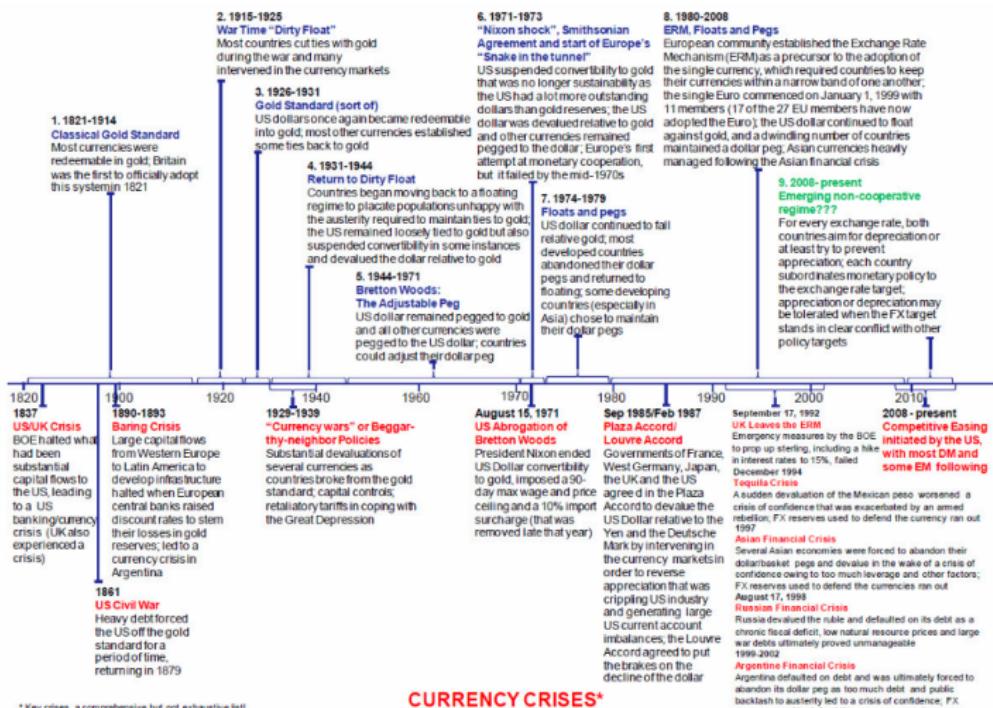
- 1 Overview
- 2 Crises and Costs
- 3 Theories and Models
- 4 Rescues and Reforms

Definition and Episodes

Glick and Hutchison, 2011, Currency Crisis. Encyclopedia of Financial Globalization: Evidence on Financial Globalization and Crises.

- An exchange rate crisis, or currency crisis, is a speculative attack on the foreign exchange value of a currency, resulting in a sharp depreciation or forcing the authorities to sell foreign exchange reserves and raise domestic interest rates to defend the currency.
- Dramatic episodes of currency crises include the breakdown of the Bretton Woods system in 1971-73, the crisis of the British pound in 1976, the near-breakdown of the European Exchange Rate Mechanism in 1992-93, the Latin American Tequila Crisis following Mexico's peso devaluation in 1994-95, and the Asia financial crisis in 1997-98.
- More recently, the global financial crisis in 2008-09 forced sharp depreciations in many advanced as well as developing economies.

Exchange Rates Regimes and Crises: 1820-2010 (w)



Source: GoldMoney; Bordo and Landon Lane, Rutgers University; Temin, MIT; Simmons, Harvard University; Goldman Sachs Global ECS Research.

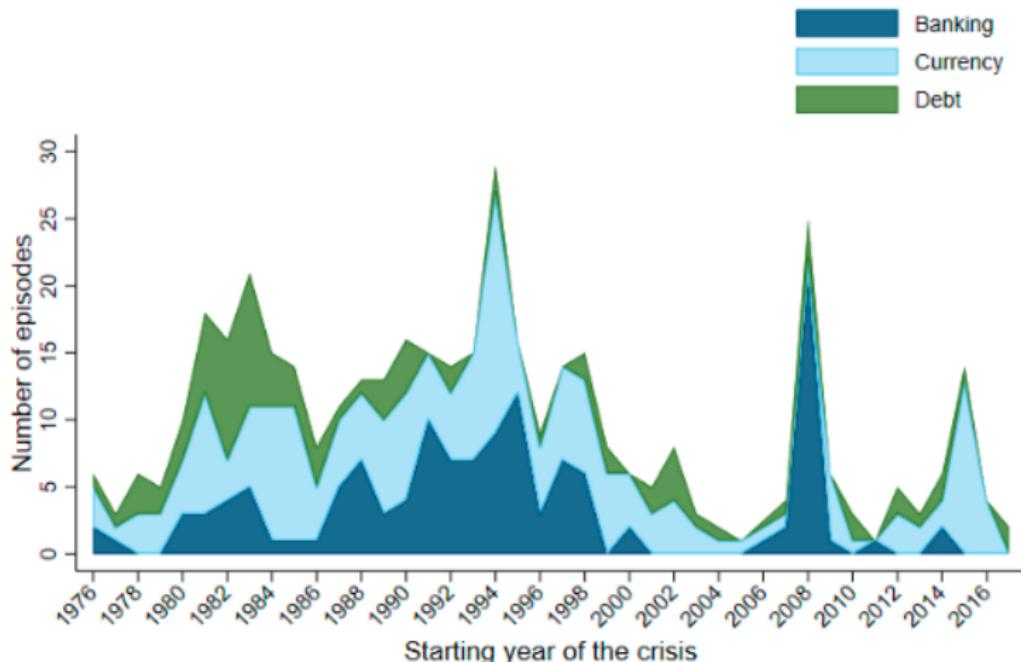


Currency Crises and Association

A financial crisis may involve

- ① **Currency crisis:** a large and rapid depreciation of a currency value.
- ② **Banking crisis:** bankruptcy and other problems for private sector banks due to high default rates on loans and self-fulfilling bank runs.
- ③ **Debt default crisis:** an inability to repay sovereign or private sector debt. A debt crisis in which governments default on their debt can be a self-fulfilling mechanism. It causes low income and high interest rates, which make government and private sector debts even harder to repay.
- ④ **Balance of payments crisis** occurs more often under a fixed exchange rate system. Official international reserves may quickly be depleted because governments and private institutions pay for their debts with foreign funds, forcing the central bank to abandon the fixed exchange rate.

Financial Crises 1976-2017

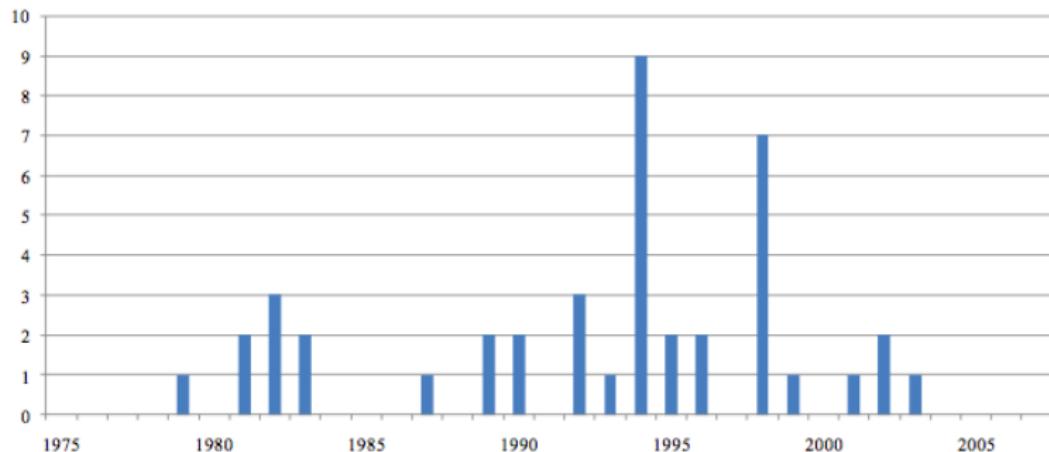


Source: Laeven and Valencia (2018).

Currency Crises and Banking Crises

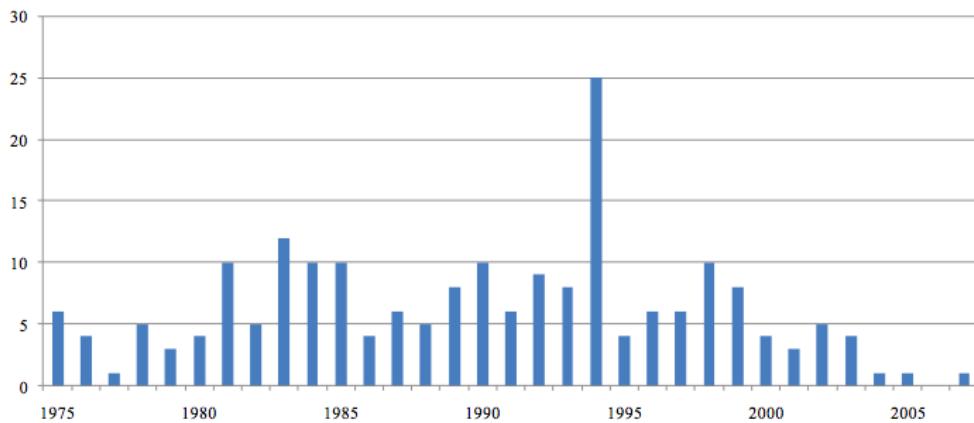
- Currency crises are often associated with other types of financial crises, such as banking crises. The occurrence of so-called twin crises may be attributable to a number of channels of causation.
- A bank run can cause a currency attack if the increased liquidity associated with a government bailout of the troubled banks erodes their ability to maintain the prevailing exchange rate commitment.
- A currency crisis shock can adversely alter the banking sector directly by causing a deterioration of bank balance sheets as currency depreciation raises the domestic currency burden of these liabilities.
- Banks and firms are exposed to liquidity shocks if they finance long-term lending and investment with short-term borrowing. Consequently, an international liquidity crunch may trigger twin crises.
- Currency crises may also be associated with **sudden stops of capital inflows, sharp rises in capital outflows, and sovereign debt defaults.**

Twin Crises 1975-2007



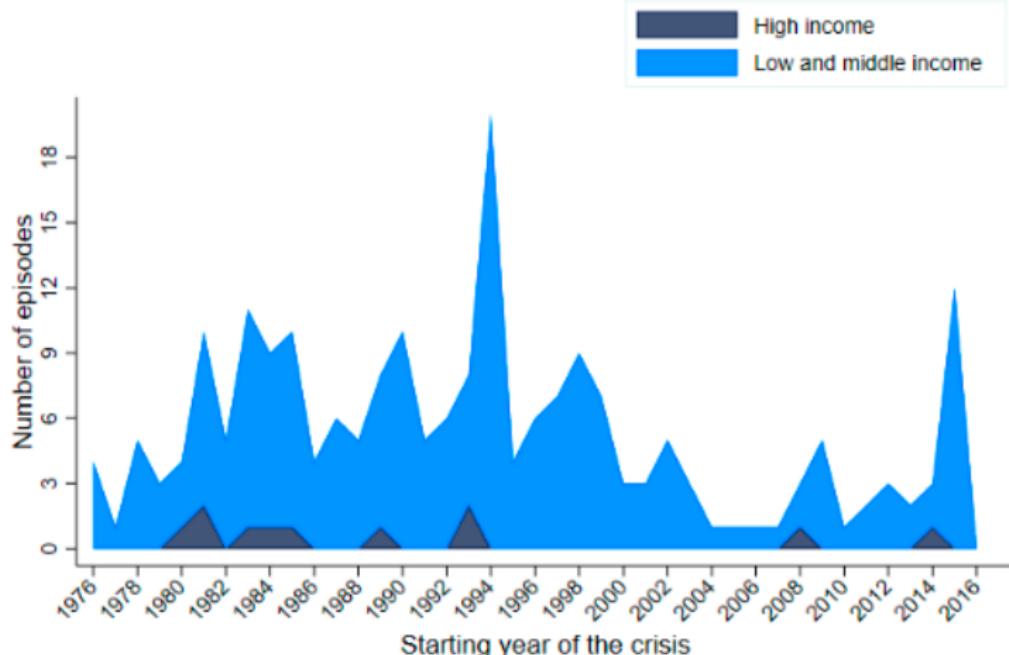
Source: Laeven and Valencia (2008). A twin crisis is defined as currency crisis that is accompanied by a banking crisis in the preceding, same, or following year.

Currency Crises 1975-2007



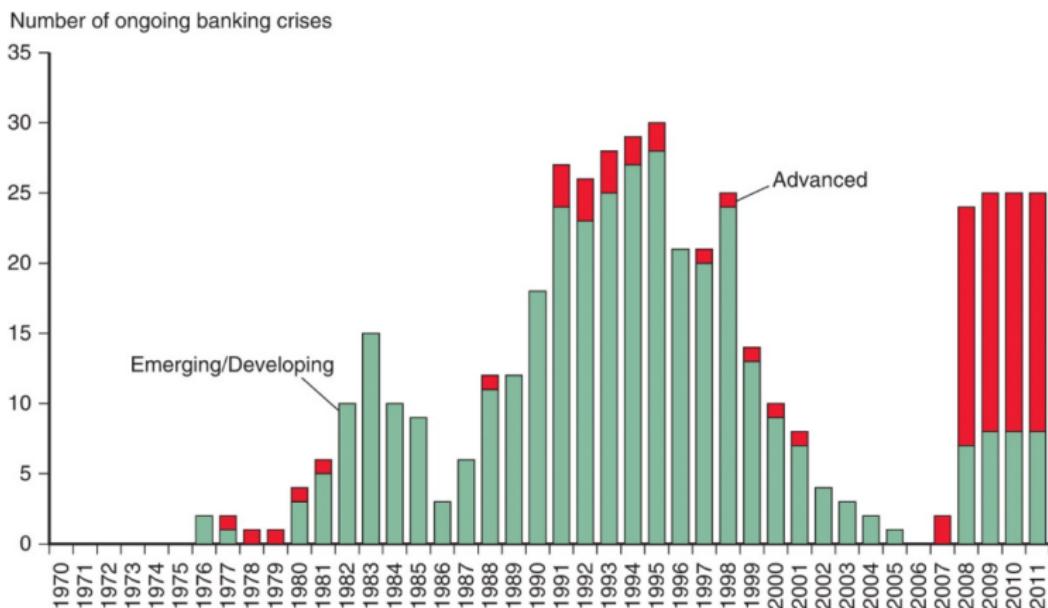
Source: Laeven and Valencia (2008). Currency crisis is defined as a nominal depreciation of the currency of at least 30 percent that is also at least a 10 percent increase in the rate of depreciation compared to the year before. Five-year exclusion windows employed. The figure for 1994 is inflated by the devaluation of the 14 African members of the CFA zone against the French franc and the dollar.

Currency Crises by Income 1976-2017



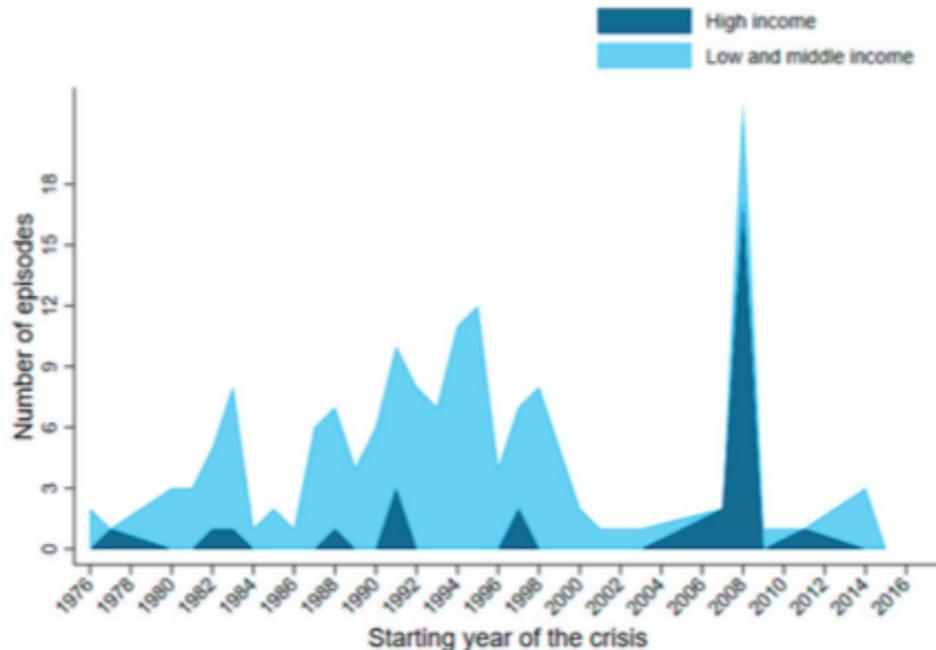
Source: Laeven and Valencia (2018).

Banking Crises 1970-2011



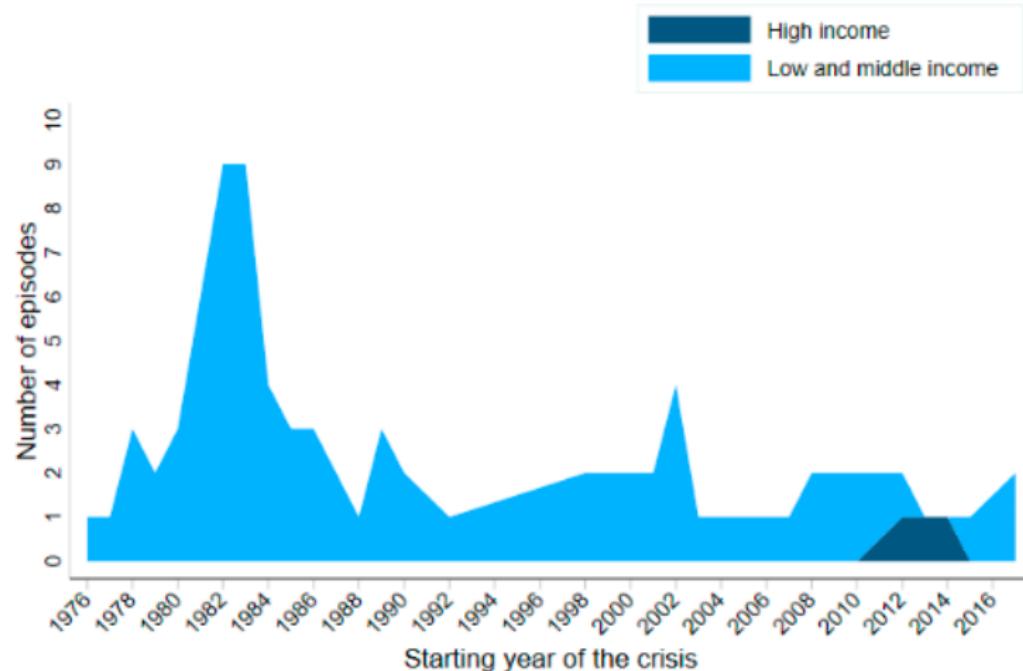
Source: KOM (2018). Generalized banking crises have been plentiful worldwide since the mid-1970s, but in recent years they have been concentrated in advanced nations.

Banking Crises by Income 1976-2017



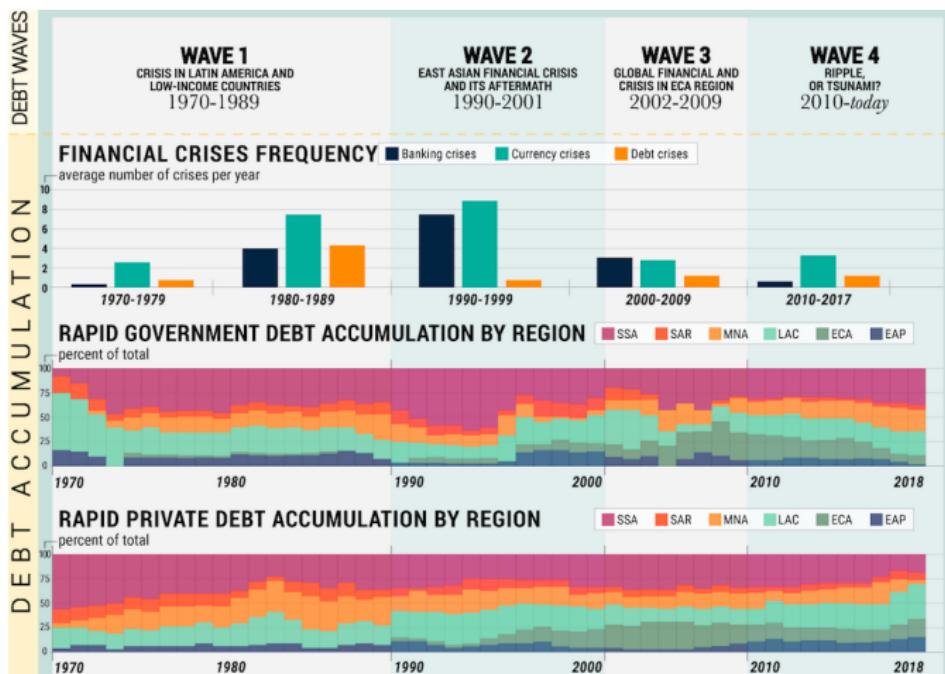
Source: Laeven and Valencia (2018).

Sovereign Debt Crises by Income 1976-2017



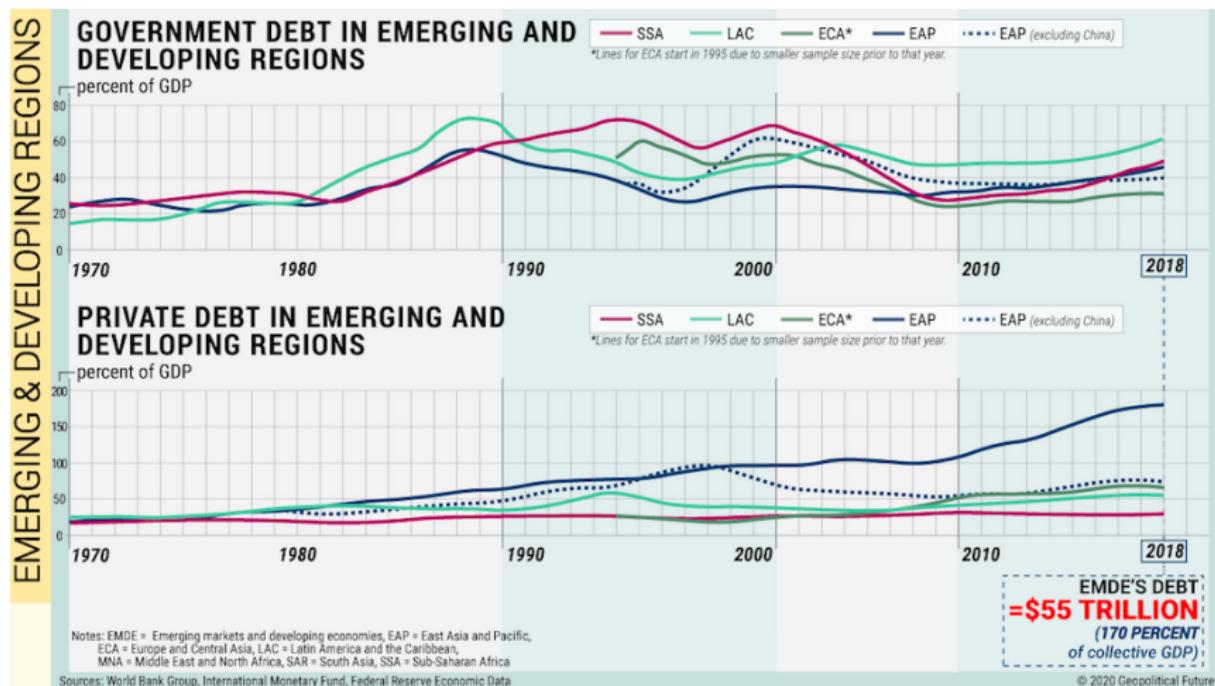
Source: Laeven and Valencia (2018).

Global Debt and Financial Crises (w)



<https://geopoliticalfutures.com/rising-global-debt/>

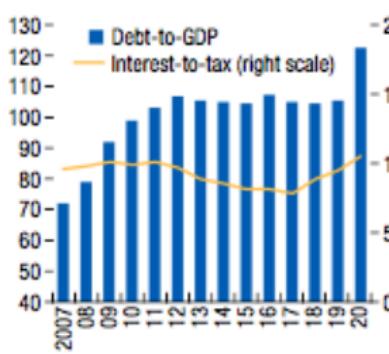
Rising EMDE's Debt: Public and Private (w)



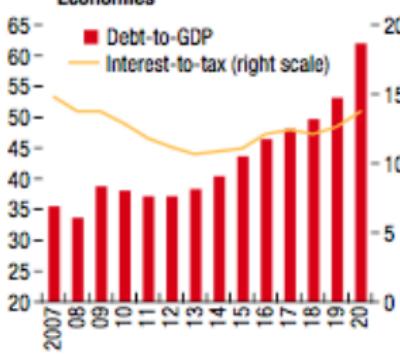
Mounting Public Debts 2007-2020

Public debt vulnerabilities persist.

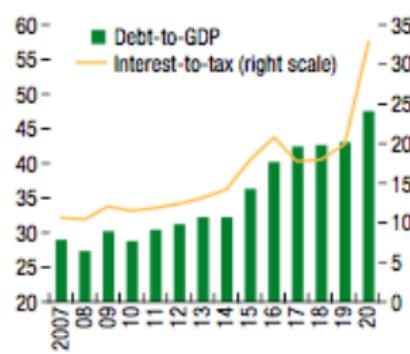
1. Advanced Economies



2. Emerging Market and Middle-Income Economies



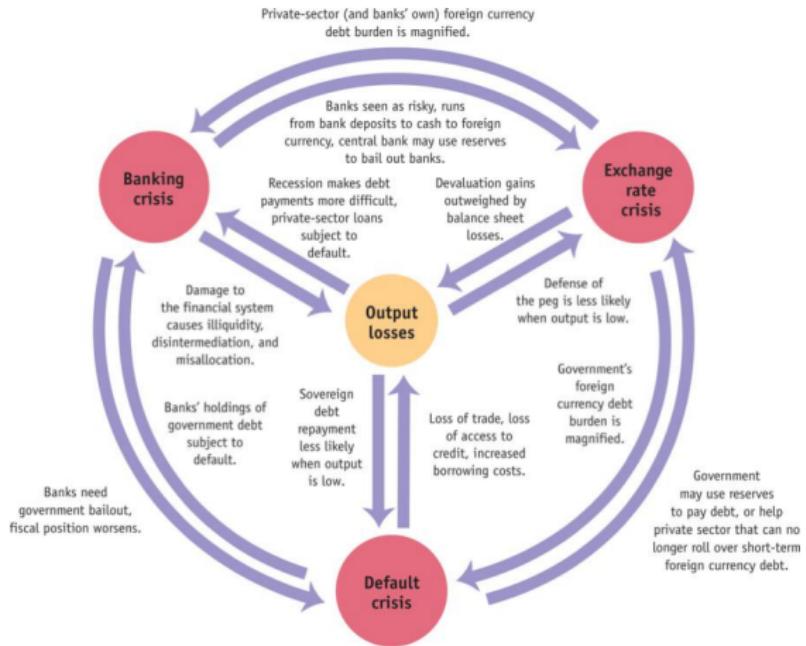
3. Low-Income Developing Countries



Source: IMF, World Economic Outlook database.

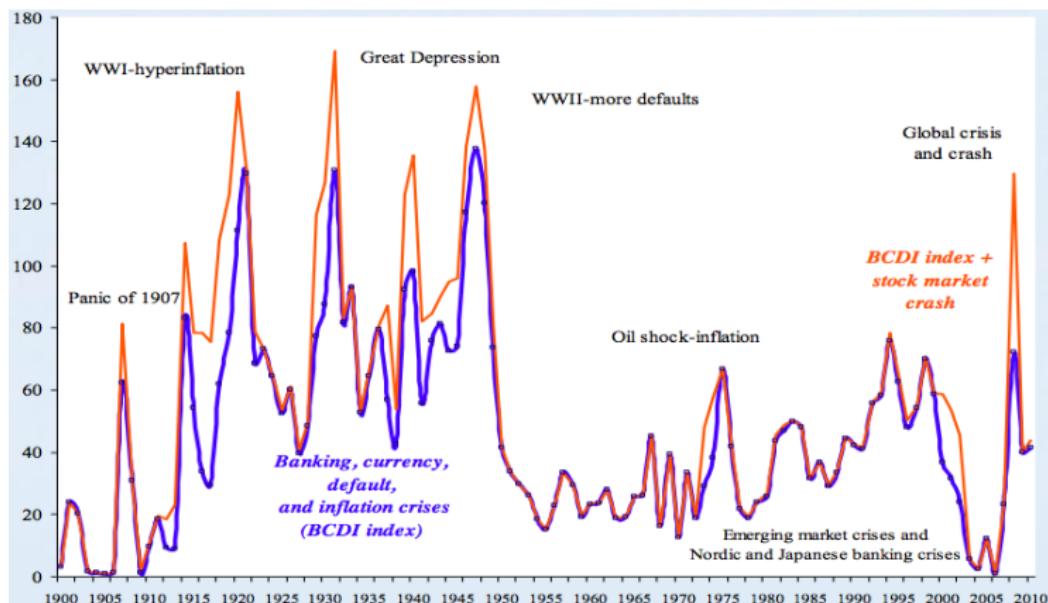
Note: Interest-to-tax ratios are weighted averages among countries in the income group. The rise in the average interest-to-tax ratio of low-income developing countries in 2020 is largely driven by a few countries, such as Nigeria and Zambia, that are expected to experience sizable increases in their ratios.

Vicious Circles in Twin and Triple Crises



Source: FT (2017). Complex feedback linkages between banking crises, default crises, and currency crises.

Global Financial Crises Index: 1900-2011



Source: Reinhart (2014). A composite index of banking, currency, sovereign default, inflation crises, and stock market crashes (weighted by their share of world income)

Currency Crisis and Exchange Rate Policy

- The ability of countries to maintain commitments to particular exchange rate targets became increasingly more difficult with increasing global financial integration and capital mobility over time.
- According to the principle of the impossible trinity, when capital mobility is high and a country pegs its exchange rates, its domestic interest rates will be linked to foreign interest rates, which severely limits its ability to pursue an independent domestic monetary policy.
- Historically, emerging markets as well as industrial countries often have not been able to make credible commitments to fixed exchange rates for an extended period.
- Although it is technically feasible for a country to maintain a pegged rate as long as its central bank has access to enough foreign reserves to respond to speculative attacks, its central bank also must be willing always to subordinate all the other goals of monetary policy.

Currency Crises and Fixed Rate Regimes

Glick and Hutchison, 2011, Currency Crisis. Encyclopedia of Financial Globalization: Evidence on Financial Globalization and Crises.

- For an economy with a fixed exchange rate regime, a currency crisis usually refers to a situation in which the economy is under pressure to give up the prevailing exchange rate peg or regime.
- Under pegged exchange rate regimes, however, many countries at some time or another consider forgoing an independent monetary policy to be a price too high to pay, particularly when high domestic rates adversely affect domestic unemployment or financial sector stability.
- Hence, countries with pegged or fixed exchange rate regimes are often not prepared to abandon completely the use of monetary policy for stabilization purposes. With their priorities in doubt, they are more likely to become lightning rods for speculative attack and currency crises.

Currency Crises and Floating Rate Regimes

- In principle, countries with floating exchange rates should be more resistant to currency crises, since one would expect continuous market adjustment to limit the buildup of pressures leading to extreme currency overvaluation and subsequent large discrete currency declines as may occur under fixed exchange rate regimes.
- In fact, pegged and intermediate exchange rate regimes—those that maintain relatively rigid exchange rates but do not formally peg to a single anchor currency—are associated with greater susceptibility to currency crises—as well as other financial crises, such as debt crises, sudden stops in capital inflows, and banking crises.
- This has been particularly true for developing and emerging market countries with more open capital accounts.
- Nonetheless, many countries purportedly with floating exchange rates have experienced currency crises.

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- 2 Crises and Costs
- 3 Theories and Models
- 4 Rescues and Reforms

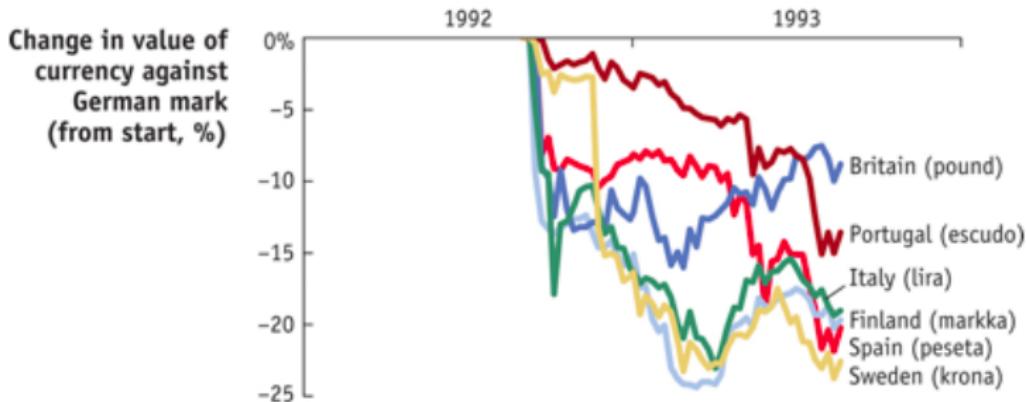


Financial Crises and Economic Costs

- Laeven and Valencia (2012) find that over the period 1970 to 2011 the world's economies were confronted with a total of 218 currency crises, 66 sovereign debt crises and 147 banking crises.
- Authors show that dealing with crises causes high economic costs. They find cumulative output losses of 32.9% of GDP in advanced economies originating from banking crises, an increase in public debt levels by another 21.4% of GDP and cumulated fiscal costs (i.e. fiscal outlays directed to the restructuring of the financial sector) in the order of 3.8% of GDP.
- Given these enormous costs related to banking crises, there seems to be a change of paradigm since the beginning of the current crisis in 2008, with a tendency to return to increase the degree of financial regulation and with a more active use of fiscal policies in order to counteract or avoid banking crises in advanced economies.

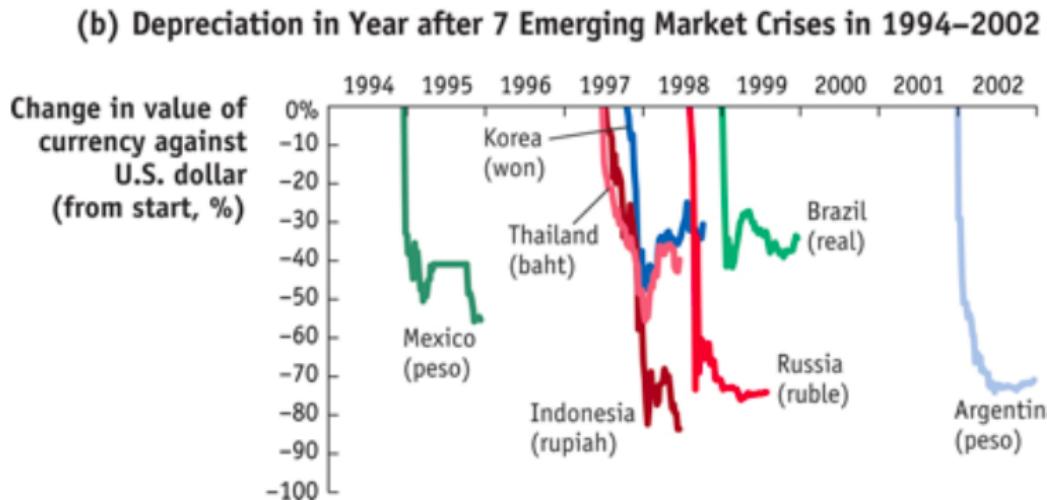
Currency Crises in European Countries 1992-93

(a) Depreciation in Year after 6 European Exchange Rate Crises in 1992



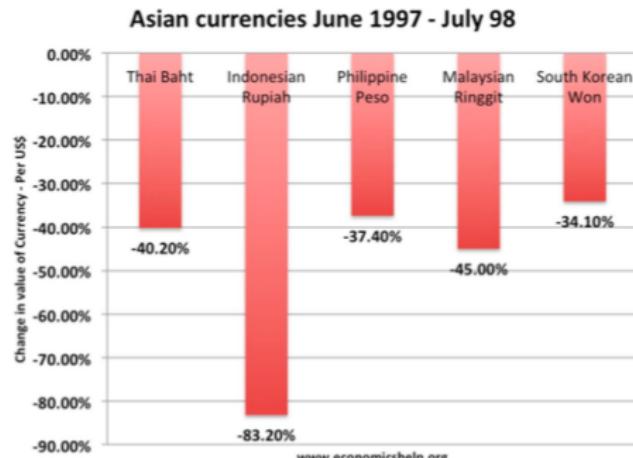
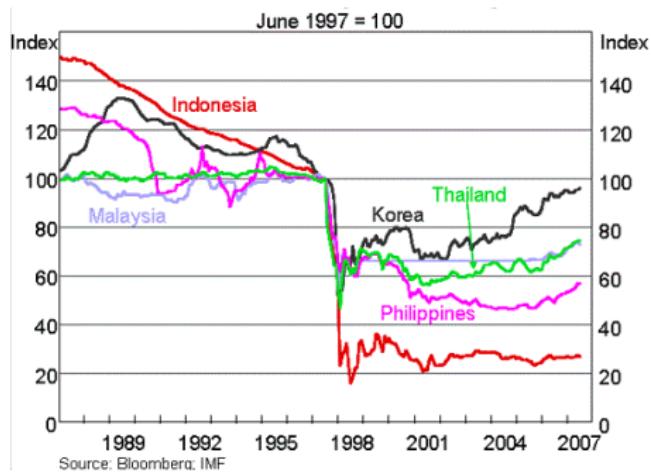
Source: FT (2017). The figure shows depreciations of six European currencies after crises triggered by the speculative attack on the European Monetary System (EMS). As Germany raised interest rates to fight inflation following reunification in the early 1990s, other European countries who had linked their currencies to the Deutschemark through the EMS found matching the higher German interest rates onerous.

Currency Crises in Emerging Economies 1994–2002



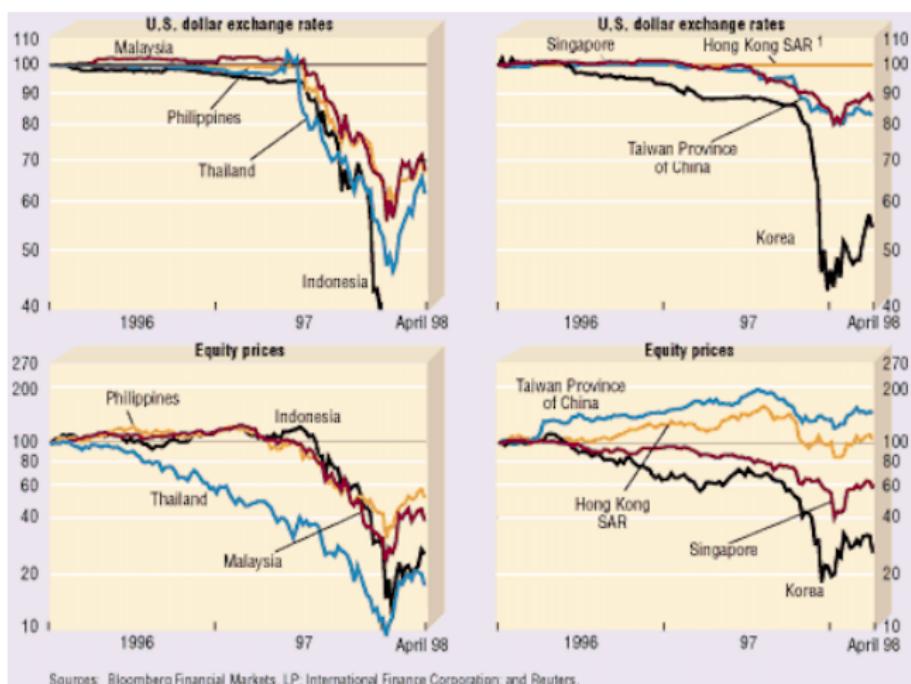
Source: FT (2017). The figure shows depreciations of seven emerging market currencies after crises between 1994 and 2002.

Asian Financial Crisis: Currency Depreciations



The origins of the Asia crisis of 1997-98 were in part related to the fact that many countries had effectively linked their currencies to the dollar at a time when the dollar appreciated relative to the Japanese yen and Chinese yuan.

Asian Financial Crisis: Currency and Equity Indexes

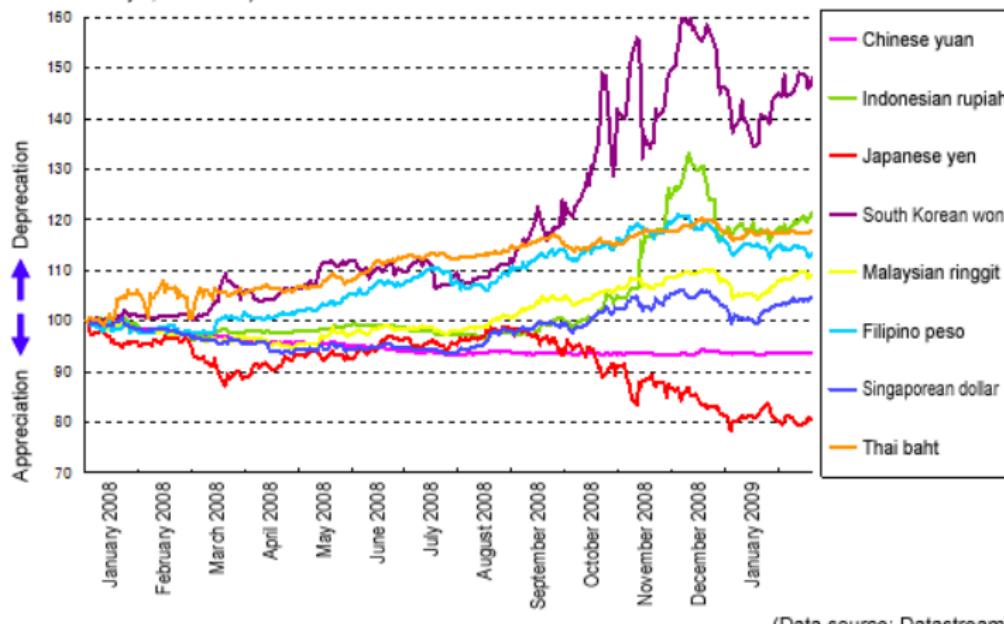


Sources: Bloomberg Financial Markets, LP; International Finance Corporation; and Reuters.

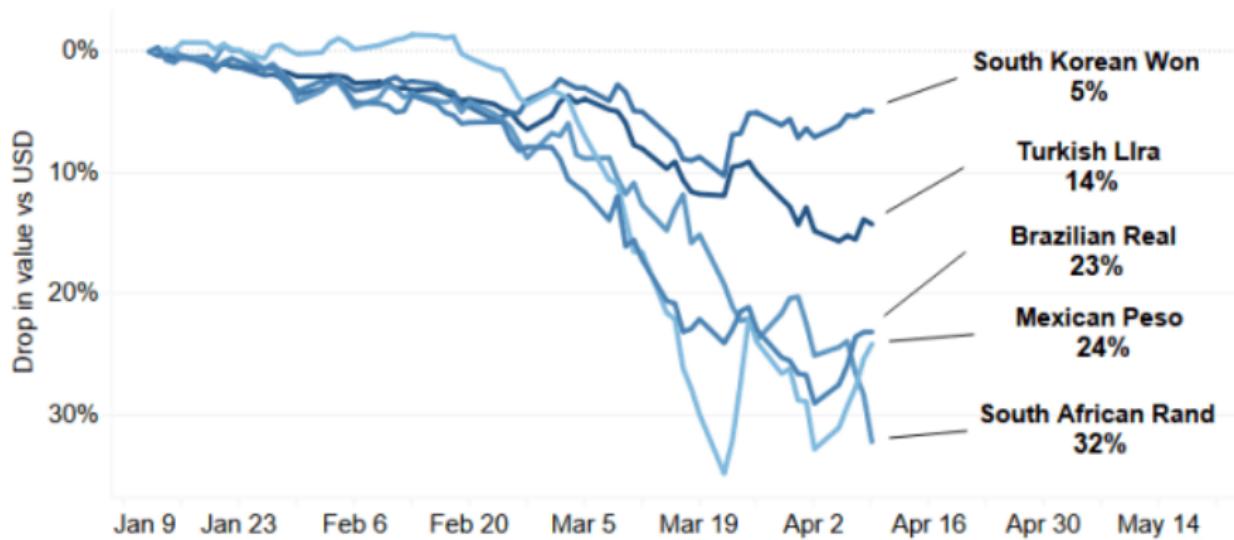
<https://www.imf.org/external/pubs/ft/fandd/1998/06/imfstaff.htm>

Asian Exchange Rates 2008

Exchange rates against the U.S. dollar
(Values on January 3, 2008 =100)



Emerging Market Currencies 2020 (w)

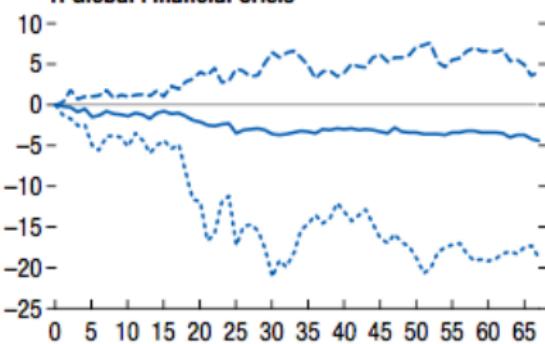


SOURCE: Reuters

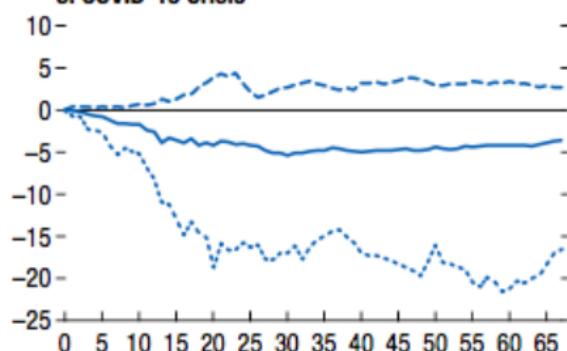


EMDE's Currency Movements during the Crisis

1. Global Financial Crisis



3. COVID-19 Crisis



Sources: IMF ESR (2020). Note: Global financial crisis indicates evolution starting September 10, 2008. Taper tantrum indicates episode starting May 22, 2013. COVID-19 crisis indicates episode starting February 19, 2020. Solid line is the NEER average. Dashed line is the 95th percentile. Dotted line is the 5th percentile.

Turkey in Financial Crisis 2018 (w)



<https://worldview.stratfor.com/article/making-sense-turkeys-economic-crisis>

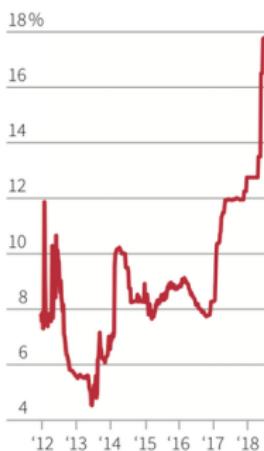
Turkey in Financial Crisis 2018 (w)

Looking for relief

Turkey's central bank pushed up the cost of borrowing and announced all funding would be done from its late liquidity window, the highest of its multiple interest rates, to support the lira.

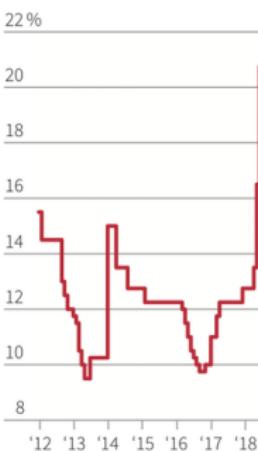
FUNDING RATE

Weighted average cost of funding



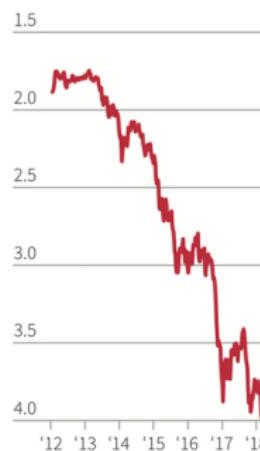
LENDING RATE

Late liquidity window lending rate



DOLLAR VS LIRA

Inverted to show the weak lira



Source: Thomson Reuters Datastream

L. Desrayaud, 12/07/2018



Turkey's Vulnerable Economy 2000-2007 (w)

Turkish ups and downs

GDP
% change on previous year



Current-account balance
As % of GDP



Turkish lira against the dollar
Lira per \$, inverted scale



Sources: Economist Intelligence Unit; IMF; Thomson Datastream

*Forecast

Venezuela Economic Crisis 2013-2019 (w)

The economic cost of Maduro...

Venezuela

Bolívar per \$, black-market exchange rate, inverted log scale



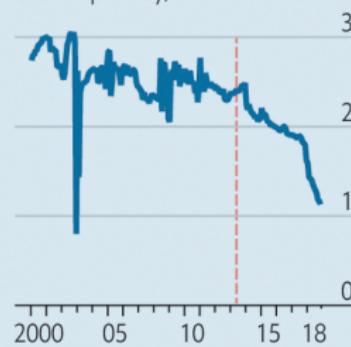
Sources: DolarToday; IMF; Energy Intelligence Group

GDP per person at PPP[†]
\$'000



*Replaced by sovereign bolívar

Crude-oil production
Barrels per day, m



[†]Purchasing-power parity, current prices

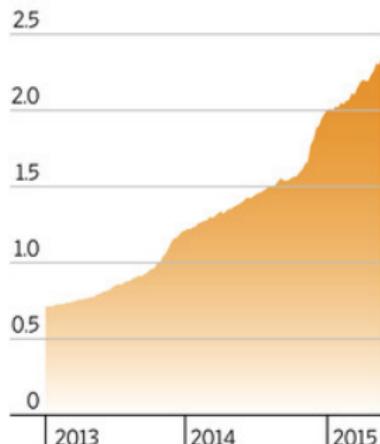
The Economist

Venezuela Economic Crisis 2013-2015 (w)

Vicious Cycle

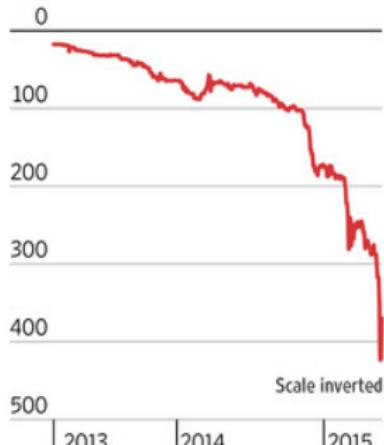
As Venezuela floods the market with newly printed money...

Money supply, in trillions of bolívares



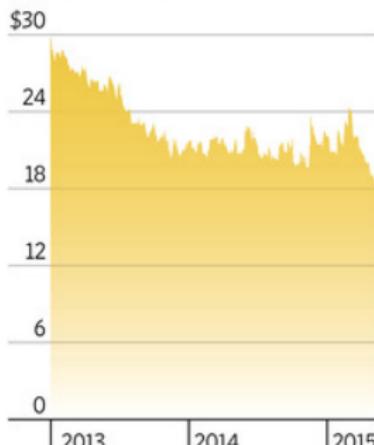
...the bolívar has lost value against the dollar...

Black-market rate^a



...a difficult trend to reverse, given dwindling reserves

Foreign currency reserves, in billions

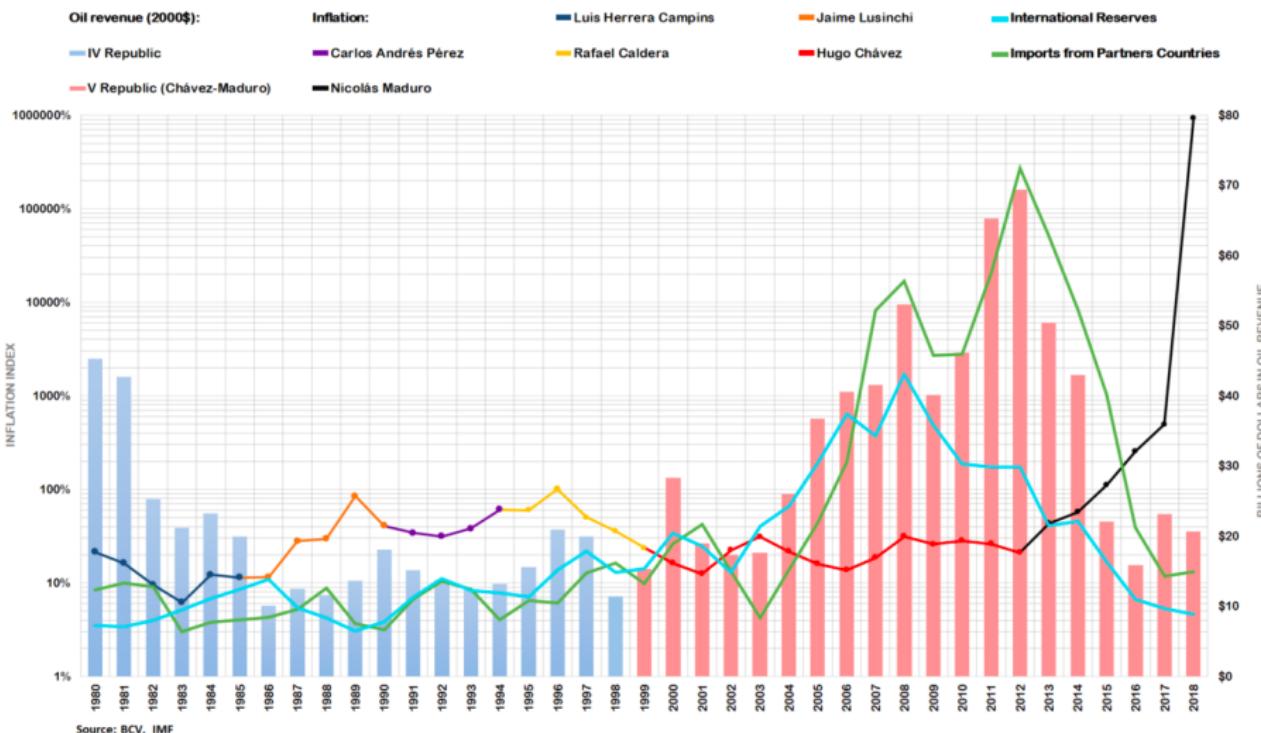


^aIn Cúcuta, Colombia

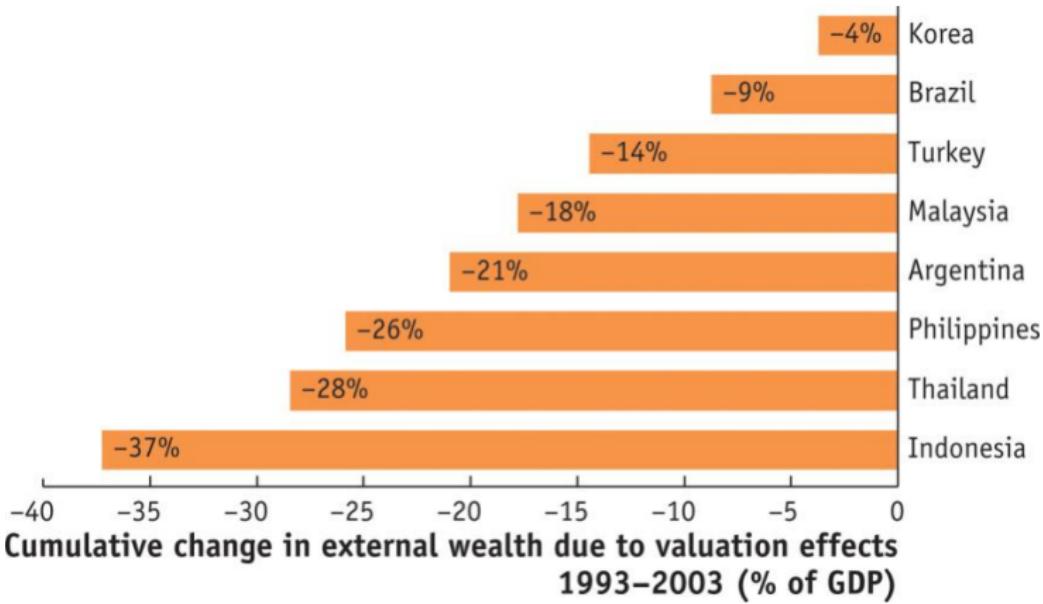
Sources: Venezuela's central bank; DollarToday.com

THE WALL STREET JOURNAL.

Venezuela Economy 1980-2018 (w)

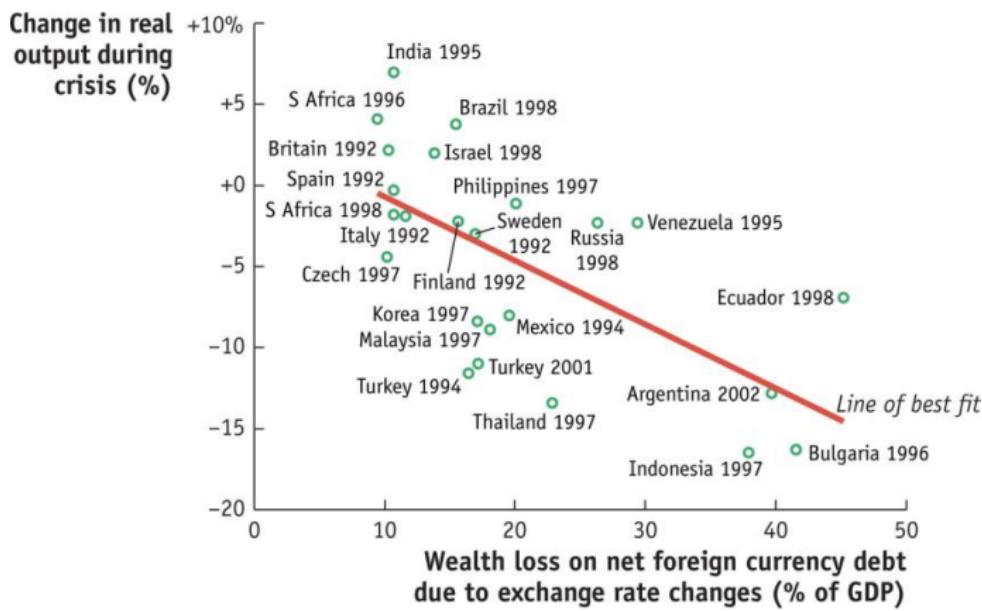


Currency and Wealth Depreciations



Source: FT (2017). The countries experienced crises and depreciations of between 50% and 75% against the U.S. dollar and other major currencies from 1993 to 2003.

Foreign Debt, Wealth Loss and Costs of Crises



Source: FT (2017). The correlation between a measure of the negative wealth impact of a real depreciation and the real output costs after a currency crisis.

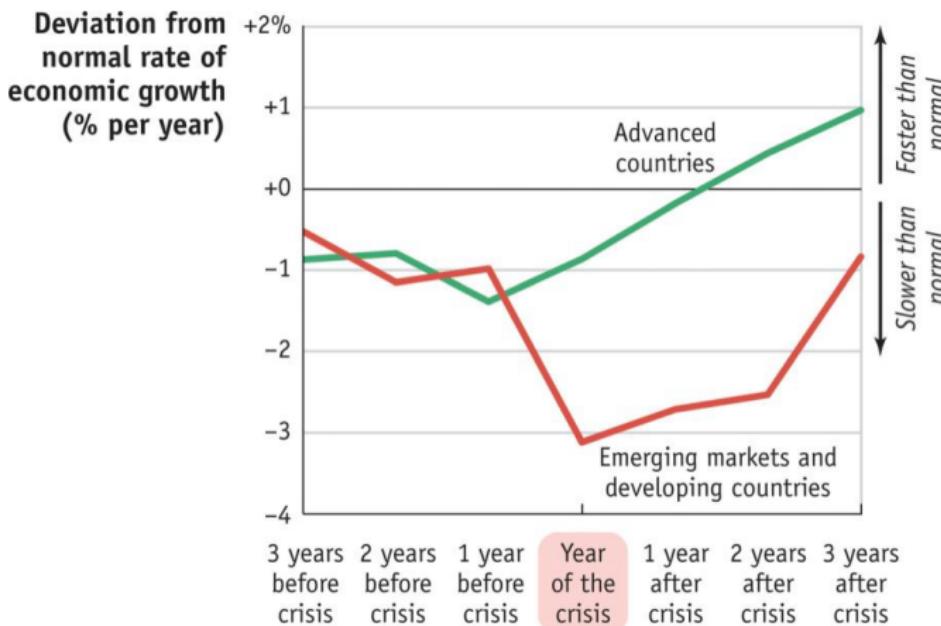


Currency Mismatched Debt and Original Sin

	External Liabilities Denominated in Foreign Currency (average, %)
Financial centers (United States, United Kingdom, Switzerland, Japan)	8%
Eurozone countries	9
Other developed countries	72
Eastern European countries	84
Middle East and African countries	90
Developing countries	93
Asia/Pacific countries	94
Latin American and Caribbean countries	100

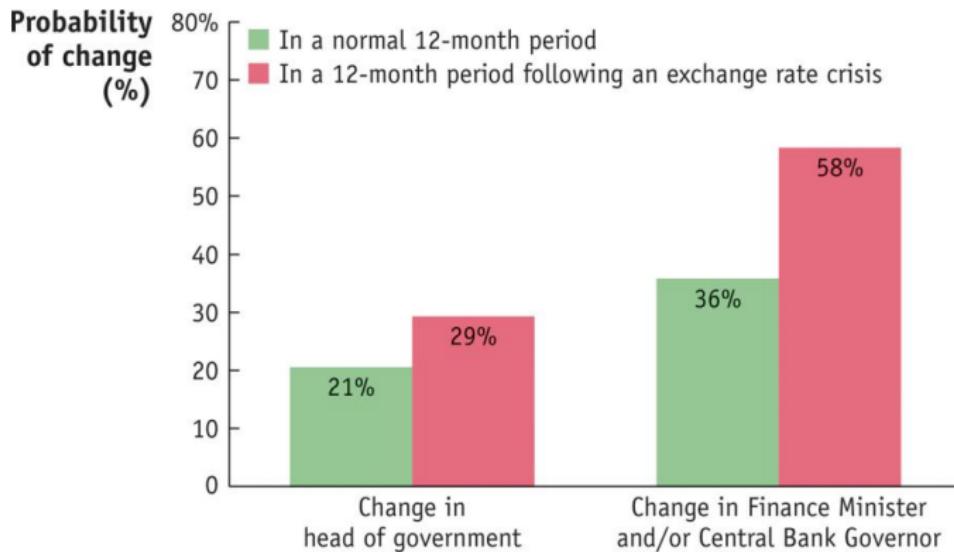
Source: FT (2017). Measures of “Original Sin”: Only a few developed countries can issue external liabilities denominated in their own currency. In the financial centers and the Eurozone, the fraction of external liabilities denominated in foreign currency is less than 10%. In the remaining developed countries, it averages about 70%. In developing countries, external liabilities denominated in foreign currency are close to 100% on average.

Exchange Rate Crises and Economic Growth



Source: FT (2017). Exchange rate crises can impose large economic costs on a country.

Exchange Rate Crises and Economic Growth



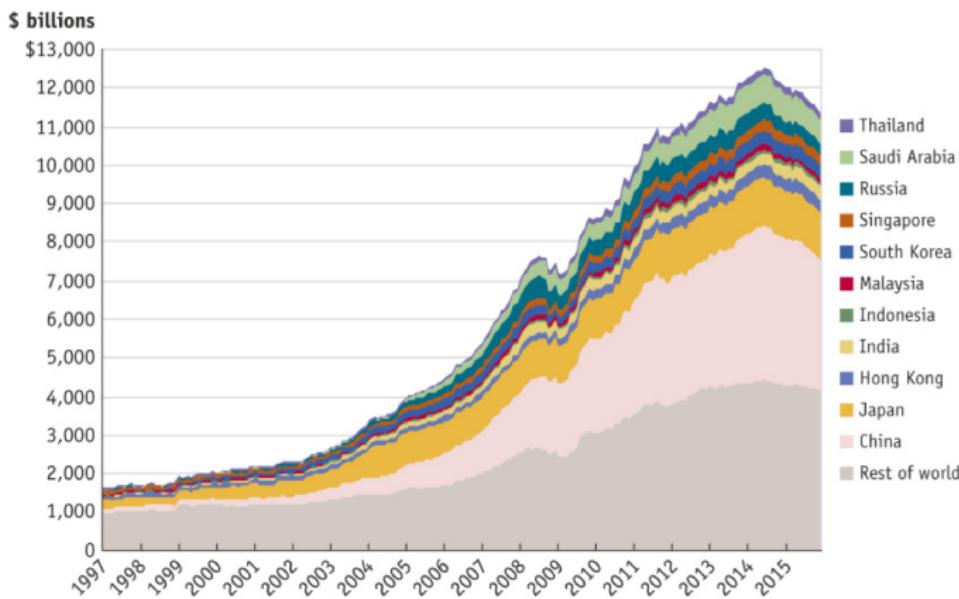
Source: FT (2017). Exchange rate crises can impose large political costs on those in power.

Costs of Banking Crises since 1991

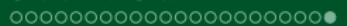
Country	Starting Year of the Crisis	Output Loss (% of GDP)*	Direct Fiscal Costs (% of GDP)**	Increase in Public Debt (% of GDP)***
Argentina	2001	71.0%	9.6%	81.9%
Brazil	1994	0.0	13.2	-33.8
China	1998	19.4	18.0	11.2
Denmark	2008	36.0	3.1	24.9
Finland	1991	69.6	12.8	43.6
France	2008	23.0	1.0	17.3
Germany	2008	11.0	1.8	17.8
Greece	2008	43.0	27.3	44.5
Iceland	2008	43.0	44.2	72.2
Indonesia	1997	69.0	56.8	67.6
Ireland	2008	106.0	40.7	72.8
Italy	2008	32.0	0.3	8.6
Japan	1997	45.0	14.0	41.7
Korea	1997	57.6	31.2	9.9
Luxembourg	2008	36.0	7.7	14.6
Malaysia	1997	31.4	16.4	0.2
Mexico	1994	13.7	19.3	16.4
Netherlands	2008	23.0	12.7	26.8
Norway	1991	5.1	2.7	19.2
Portugal	2008	37.0	0.0	33.6
Russia	1998	—	0.1	-7.1
Russia	2008	0.0	2.3	6.4
Sweden	1991	32.9	3.6	36.2
Sweden	2008	25.0	0.7	11.1
Switzerland	2008	0.0	1.1	-0.2
Thailand	1997	109.3	43.8	42.1
Turkey	2000	37.0	32.0	15.3
United Kingdom	2007	25.0	8.8	24.4
United States	2007	31.0	4.5	23.6
Average		36.9	14.8	25.6

The table shows the estimated costs of major banking crises since 1991 in both advanced and emerging economies. Exchange rate crises usually go hand in hand with other types of harmful financial crises, especially in emerging markets. If banks and other financial institutions face adverse shocks, they may become insolvent, causing them to close or declare bankruptcy; this is known as a banking crisis. Source: FT (2017).

Foreign Reserve Accumulation 1997-2015



Source: FT (2017). By 2015, reserve holdings worldwide exceeded \$10,000 billion, more than five times the level in 1997. Most of the growth occurred in Asia.



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Fixed Exchange Rate and Currency Crisis

- To sustain a fixed exchange rate, the central bank must have enough foreign assets to sell in order to satisfy the demand of them at the fixed exchange rate.
- When a central bank does not have enough official international reserve to maintain a fixed exchange rate, a balance of payments crisis results.
- The central bank must devalue the domestic currency if it runs out of foreign reserve assets.
- Investors may expect that the domestic currency will be devalued, causing them to want foreign assets instead of domestic assets, whose value is expected to fall soon. This expectation or fear only makes the balance of payments crisis worse.
- Investors rush to change their domestic assets into foreign assets, depleting the stock of official international reserve assets more quickly.

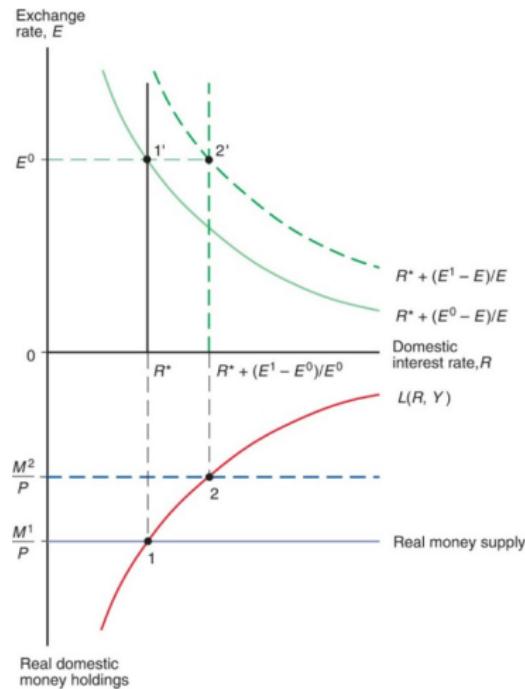
Financial Crises and Capital Flight

- Balance of payments crisis triggers devaluation expectation under a fixed exchange rate regime.
- As a result, financial capital is quickly moved from domestic assets to foreign assets: capital flight.
- To avoid this outcome, domestic assets must offer high interest rates to entice investors to hold them.
- The central bank can push interest rates higher by reducing the money supply (by selling foreign and domestic assets).
- As a result, the domestic economy may face high interest rates, a reduced money supply, low aggregate demand, low output, and low employment.

Capital Flight Crisis and Monetary Policy

The figure shows a capital flight crisis and monetary policy effects:

- ① Insufficient balance of payments
- ② Devaluation expectation: $E_0 \uparrow\rightarrow E_1$
- ③ Defend a fixed rate: $E = E_0$
- ④ Tightening money and credit
- ⑤ Depleting foreign reserves
- ⑥ Rising home interest rate
- ⑦ Falling output expectation



Source: KOM (2018)

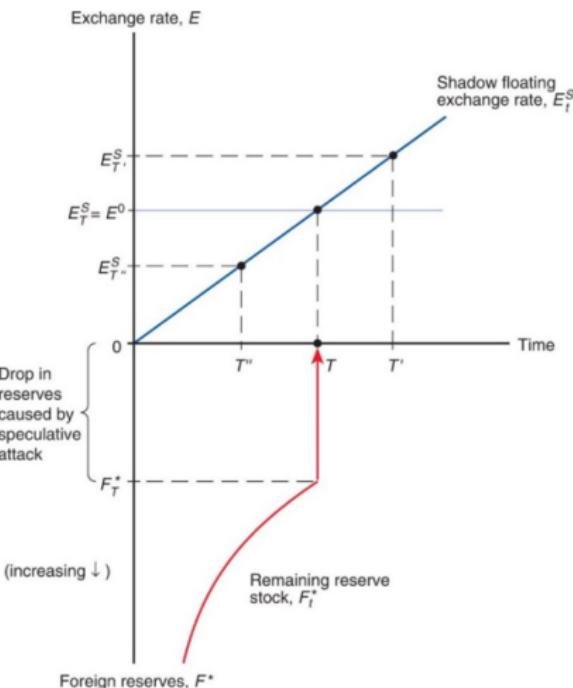
Financial Crises Expectations and Policy Trilemma

- Expectations of a balance of payments crisis only worsen the crisis and hasten devaluation. In fact, expectations of devaluation can cause an actual devaluation: a self-fulfilling crisis.
- Expectations about the central bank's ability and willingness to maintain the fixed exchange rate.
- Expectations about the economy: shrinking demand of domestic products relative to foreign products means that the domestic currency should become less valuable.
- In a balance of payments crisis, the central bank may buy domestic bonds and sell domestic currency (to increase the money supply) to prevent high interest rates, but this only depreciates the domestic currency more; the central bank generally cannot satisfy the goals of low domestic interest rates (relative to the foreign) and fixed exchange rates simultaneously.

The Timing of a BOP Crisis

The figure shows how the timing of a balance of payments crisis is modeled. The market stages a speculative attack and buys the remaining foreign reserve stock F^* at time T , which is when the shadow floating exchange rate E^S , just equals the pre-collapse fixed exchange rate E_0 . The shadow floating exchange rate is the rate that would prevail if the CB held no foreign reserves, allowed the currency to float, but continued to allow domestic credit to change.

Source: KOM (2018)



Banking Crises and Central Bank Rescues

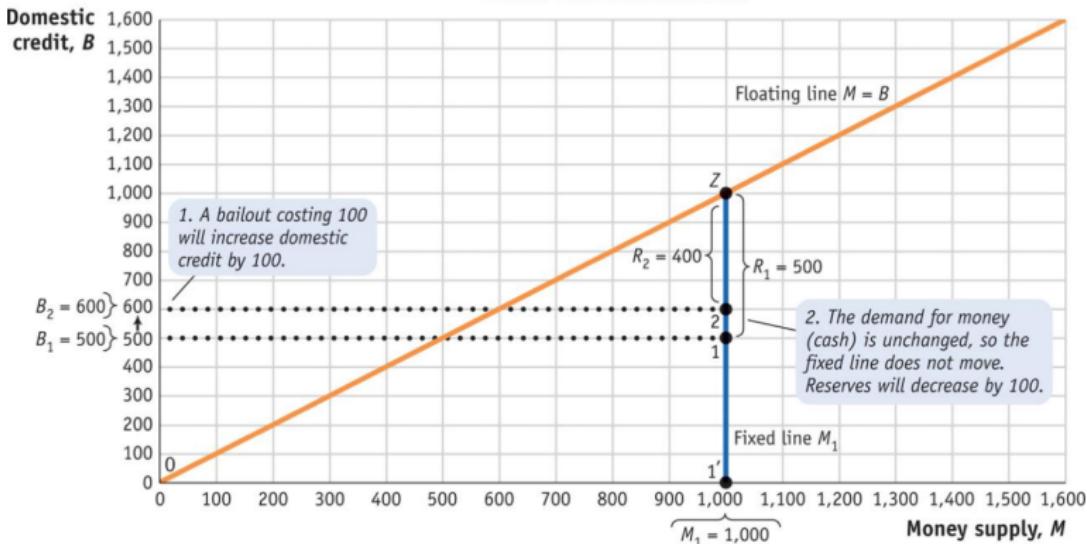
- When a central bank lends to private commercial banks in difficulty, it would be fulfilling one of its traditional responsibilities for defending the stability of the financial system. This action has real effects because a domestic banking crisis, if allowed to happen, can cause serious damage on the payments system and credit markets.
- Economists distinguish between banks that are illiquid and those that are insolvent. A private bank is insolvent if the value of its liabilities (e.g., customers' deposits) exceeds the value of its assets (e.g., loans, other securities, and cash on hand). The government may offer a bailout to insolvent banks in unusual circumstances.
- A private bank may be solvent, but it can still be illiquid: it holds some cash, but its loans cannot be sold (liquidated) quickly at a high price and depositors can withdraw at any time. A central bank can serve as the lender of last resort and provide liquidity to the banking system.

Banking Crises and Central Bank Rescues

- If depositors fear that banks are either insolvent or illiquid, a bank run may occur, and if the problem spreads to other banks, the panic may lead to a flight from domestic deposits to foreign bank deposits.
- As depositors demand foreign currency, they drain reserves and make it more likely that devaluation will happen. Devaluation leads to a higher-risk premium, worsening economic conditions, and a flight from the currency. A central bank can rescue in two ways.
- A cash bailout (printing money) from the central bank is equivalent to buying bonds from the government and then the government bailing out the distressed banks with the proceeds. In this case, central bank bailouts are very risky because they cause reserves to drain, endangering the peg.
- Central bank can provide emergency lending to solvent but illiquid banks. It is not risky because there is no reserve drain to threaten the peg.

Central Bank Bailout: Draining Reserves

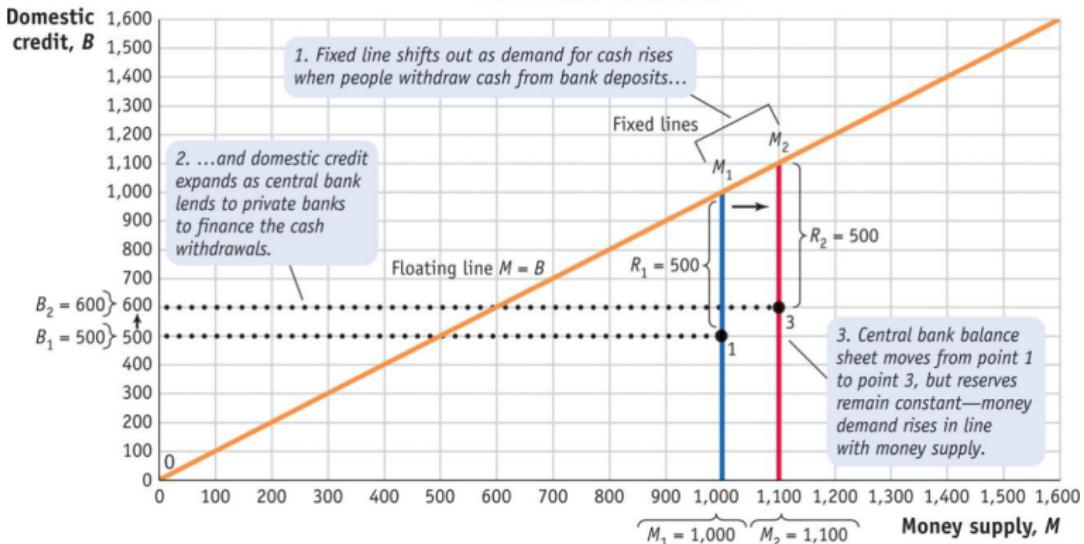
(a) Financial Sector Bailout Operation
Central Bank Balance Sheet



Source: FT (2017). A bailout occurs when the CB prints money and buys domestic assets—the bad assets of insolvent private banks. $M = \bar{M} = B + R, B \uparrow \& R \downarrow$.

Central Bank Liquidity Provision

(b) Lender of Last Resort Operation
Central Bank Balance Sheet



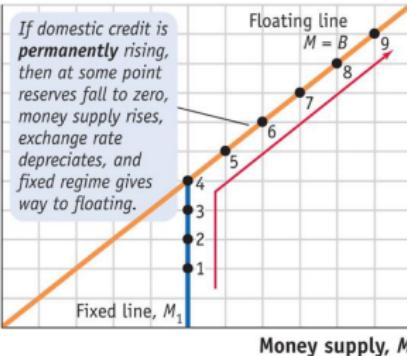
Source: FT (2017). The CB acts as a lender of last resort and temporarily lends the needed cash to illiquid private banks. $M = B + R, B \uparrow \rightarrow M \uparrow, R = \bar{R}$

Exchange Rate Crises and Central Bank Operations

(a) Permanently Rising Domestic Credit

Central bank balance sheet

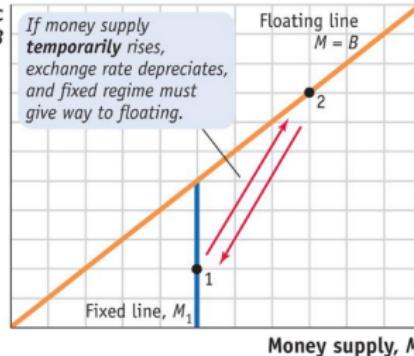
Domestic credit, B



(b) Temporary Expansion of Money Supply

Central bank balance sheet

Domestic credit, B



Source: FT (2017). Central bank actions breaking the peg. In panel (a), a permanent and ongoing expansion of domestic credit is incompatible with a fixed exchange rate regime because, sooner or later, reserves will be reduced to zero, and then the money supply starts to expand. In panel (b), a temporary expansion of domestic credit and the money supply will lower interest rates and depreciate the exchange rate, even if a reversal of this policy is expected in the future. Both policies take the country off the fixed line and onto the floating line.

First-Generation Crisis Model: Assumptions

How Pegs Break I: Inconsistent Fiscal Policies. The first-generation crisis model considers the role of inconsistent fiscal policies. Assumptions:

- ① Output is fixed, but the price level can change, according to purchasing power parity (PPP).
- ② The government runs a persistent deficit (DEF) and is unable to borrow from any creditor. It turns to the central bank for financing.
- ③ Domestic credit B increases by an amount $\Delta B = DEF$ every period and is growing at a constant positive rate, $\Delta B/B = \mu$.
- ④ Every change in the level of domestic credit leads to an equal and opposite change in the level of reserves. Reserves must eventually run out.

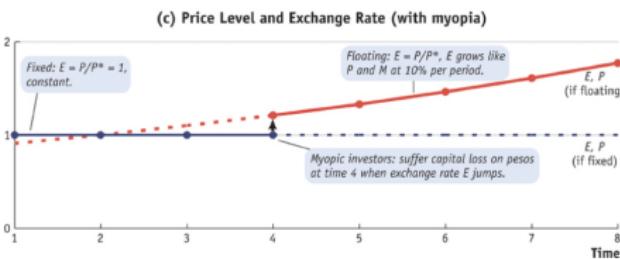
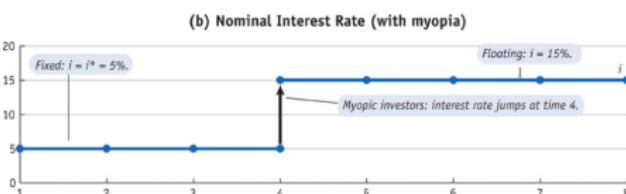
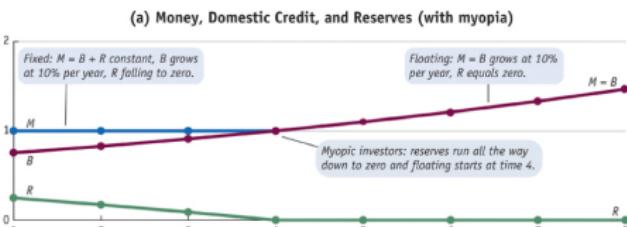
In this type of environment, economists speak of a situation of fiscal dominance in which the monetary authorities ultimately have no independence.

First-Generation Crisis Model: Logic

- At the point when reserves run out, the peg breaks and the central bank shifts from a fixed exchange rate regime to a floating regime, in which the money supply equals domestic credit, $M = B$.
- The crisis happens because authorities are willing to let it happen because of overriding fiscal priorities.
- An exchange rate crisis due to inconsistent fiscal policies can be discussed in two cases: a myopic case and a forward-looking case.
- When investors are forward-looking, they will move earlier than under myopia. With perfect foresight, forward-looking investors will sell all their holdings of a particular currency if they see that domestic credit is rising and reserves are falling.
- When such a speculative attack occurs, the economy must immediately switch to the floating regime once it has zero reserves.

Currency Crisis Due to Fiscal Dominance: Myopic Case

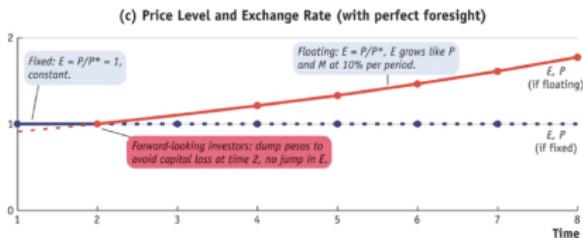
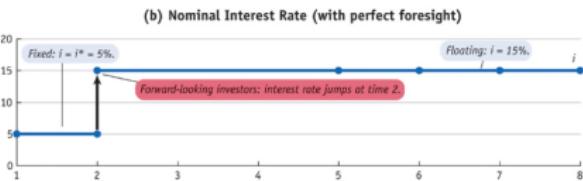
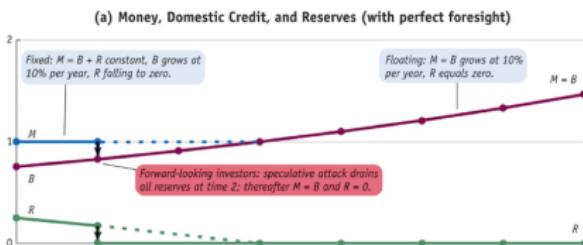
- 1 Under a fixed rate regime,
 $M_d = M_s = \bar{M} = B + R$
- 2 At $T = 1$, $\Delta B/B = 10\%$
- 3 $B \uparrow \Rightarrow R \downarrow$ until $R = 0$
- 4 At $T = 4$, switch to floating
 exchange rate $M = B > \bar{M}$
- 5 After $T = 4$, capital flight
 $\Delta M/M, \Delta P/P, \Delta E/E = 10\%$
- 6 After $T = 4$, $i = r + \pi^e = 15\%$
- 7 At $T = 4$, $(M_s = \bar{M} \text{ & } i \uparrow) \Rightarrow P \text{ jumps; PPP} \Rightarrow E \text{ jumps.}$



Source: FT (2017)

Currency Crisis Due to Fiscal Dominance: Forward-Looking

- 1 Under a fixed rate regime,
 $M_d = M_s = \bar{M} = B + R$
- 2 At $T = 1$, $\Delta B/B = 10\%$
- 3 At $T = 2$, speculative attack
 drains all reserves $R = 0$
- 4 At $T = 2$, switch to floating
 exchange rate $M = B \downarrow$
- 5 After $T = 2$, $\dot{M} = \dot{P} = \dot{E} = 10\%$
- 6 After $T = 2$, $i = r + \pi^e = 15\%$
- 7 At $T = 2$, no jump in P and E
 due to $M \downarrow M/P = L(i, Y)$



Source: FT (2017)

Case Study: Peruvian Crisis of 1986

An example of a crisis driven by inconsistent fiscal policies and excessive expansion of domestic credit is Peru under Garcia administration from 1985 to 1986.

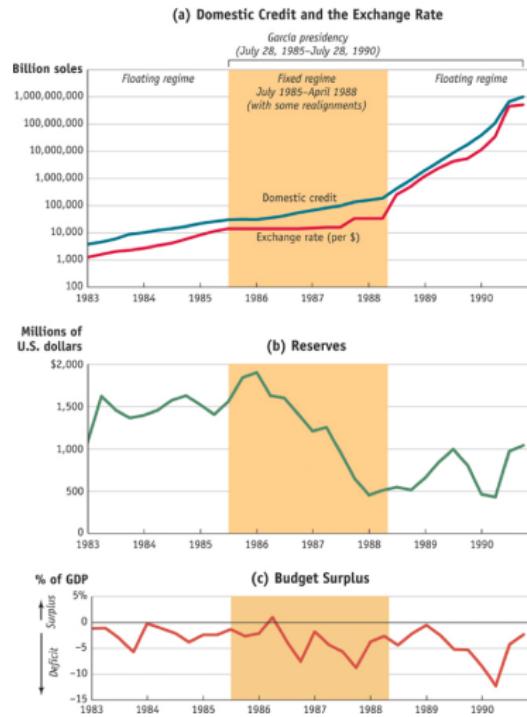
- In the early 1980s Peru's political and economic conditions were highly unfavorable. The government had an enormous external debt burden. Government deficits grew.
- At the same time, world interest rates sharply increased.
- President Alan García Pérez was elected to office in 1985. One important economic measure he instituted immediately was a fixed exchange rate.
- With domestic credit exploding, the central bank was continually selling reserves to defend the peg.

Case Study: Peruvian Crisis of 1986

The Inconsistent Policies of the García Administration

- 1 Government fiscal problems required hefty monetization of budget deficits.
- 2 Monetary and fiscal policies were inconsistent: A peg was in place, but domestic credit grew exponentially.
- 3 The central bank lost 75% of its reserves in two years, and the peg had to be abandoned.

Source: FT (2017)



Second-Generation Crisis Model: Background

- In countries with apparently sound economic policies, foreign currency speculators can also go for the attack and pegs broke.
- Economists therefore developed alternative models of crises, with the pioneering work on the second-generation crisis model being done by Maurice Obstfeld.
- These types of models can explain how, even when policy making is rational and purposeful—rather than incompetent and inconsistent—there may still be situations in which pegs break for no apparent reason.
- In these models policy makers are not committed to the peg under all circumstances. Defending the peg is a **contingent commitment**: If things get “bad enough,” the government will let the exchange rate float.
- The problem is that everyone—notably, investors in the forex market—knows it and will adjust their expectations accordingly.

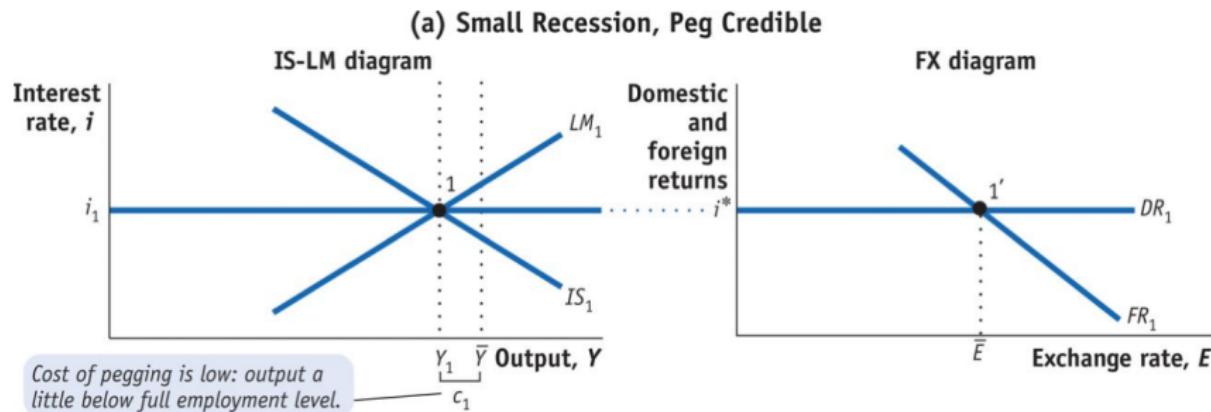
Second-Generation Crisis Model: Assumptions

How Pegs Break II: Contingent Monetary Policies. The second-generation crisis model considers the role of monetary policies.

- The cost of maintaining the peg is the deviation of output Y in the short run below its full employment level. Output will be variable, and prices will be sticky and treated as given.
- There are some benefits from pegging, say, the gains from increased trade. Let these benefits be $b > 0$ and constant.
- If costs exceed benefits, we assume that the government will elect to float next period and use monetary policy to restore full employment output.

In this model, self-fulfilling expectations drive. The model may not always find a single, unique equilibrium but rather multiple equilibria.

Contingent Commitments and the Pegging Cost

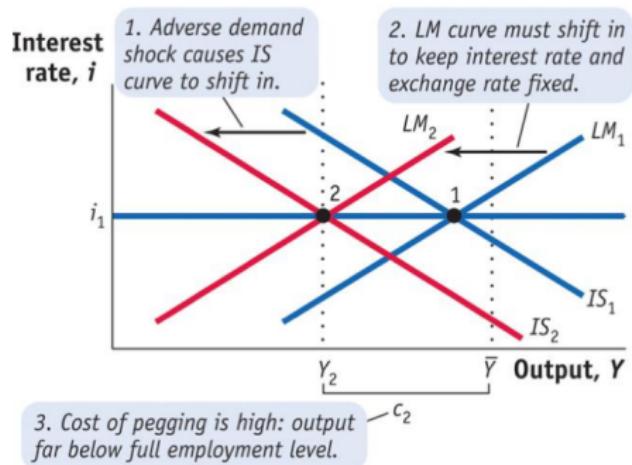


Source: FT (2017). This figure describes how the IS-LM-FX equilibrium changes as demand shocks occur and as the credibility of the peg weakens. The economy is pegging at a fixed exchange rate E . In panel (a), the economy IS-LM is reaching output-money equilibrium at point 1, with the FX market at point 1'. Output is a little below desired output, so the cost of pegging c_1 is small.

Contingent Commitments and the Pegging Cost

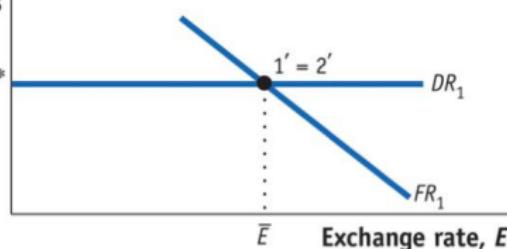
(b) Large Recession, Peg Credible

IS-LM diagram



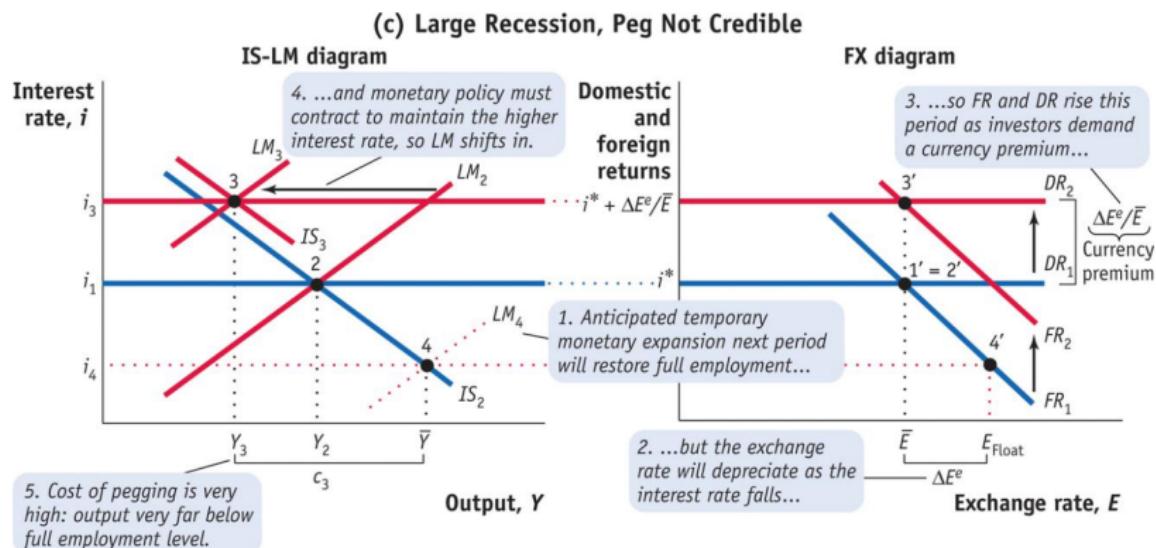
FX diagram

Domestic
and
foreign
returns



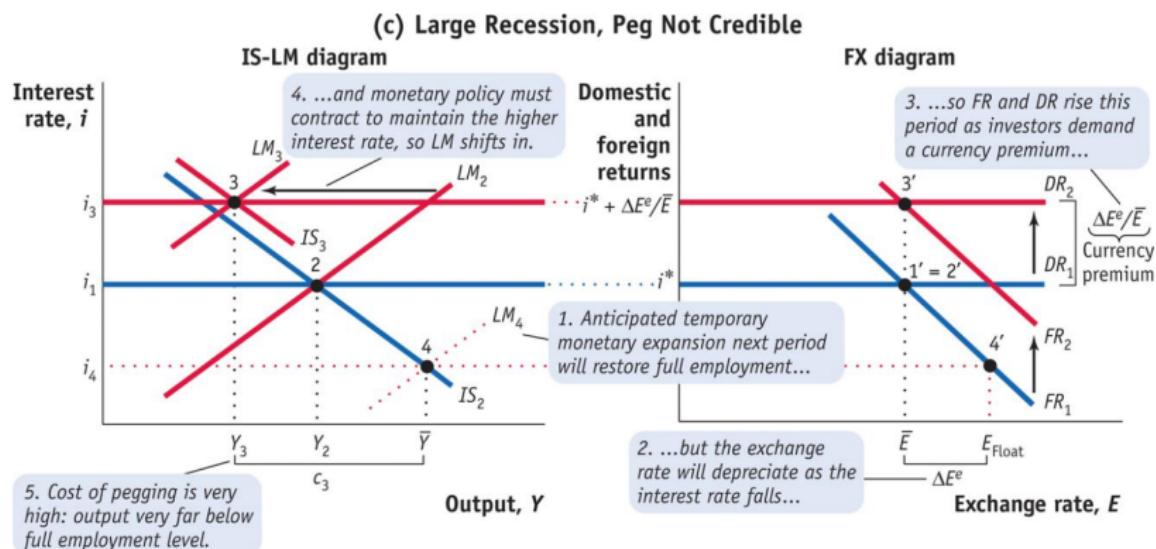
Source: FT (2017). In panel (b), an adverse shock to domestic demand causes the IS curve to shift in. LM shifts in, too, to maintain the peg. The new equilibrium occurs at point 2, with FX market equilibrium at point $2' = 1'$. The pegging cost $c_2 > c_1$.

Contingent Commitments and the Pegging Cost



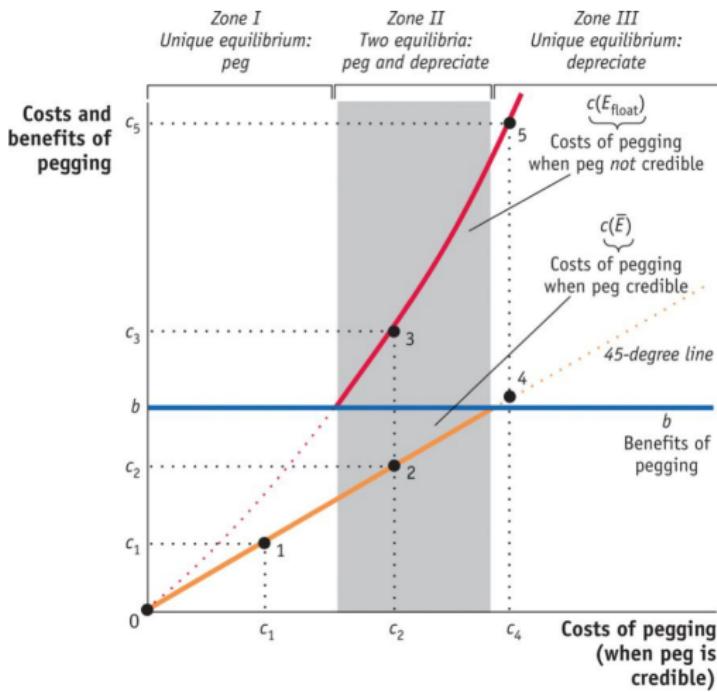
Source: FT (2017). Panel (c) shows that if the country wants to attain full employment output next period, it must move to point 4, shifting the LM curve out and allowing the exchange rate to depreciate to E_{float} . The peg would still be in operation but it would no longer be credible if such a policy change were anticipated.

Contingent Commitments and the Pegging Cost



Source: FT (2017). Because of the lack of credibility, investors would demand for a positive currency premium, and domestic interest rate would rise to i_3 , squeezing aggregate demand even more and moving the equilibrium to points 3 and 3'. Now the cost of pegging $c_3 > c_2$: A noncredible peg is more costly than a credible peg.

Contingent Policies and Multiple Equilibria



The costs of pegging when the peg is not credible will be even higher (the red line, dotted or solid), because costs rise when investors do not believe in the peg. Assume the government believes the benefits of pegging (e.g., lower trade costs) are fixed and equal to b . Equilibria in this world correspond to points on the solid segments of the red and orange cost lines.

Source: FT (2017).

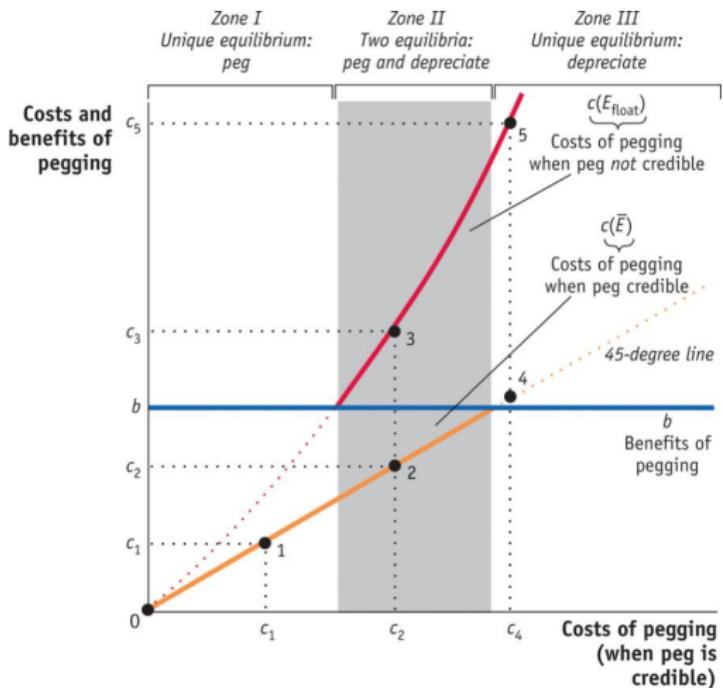
Contingent Policies and Multiple Equilibria

Assumptions:

- ① Benefit of pegging: Blue
- ② Cost of a credible peg: Yellow line
- ③ Cost of a noncredible peg: Red curve

Equilibrium or Equilibria

- ① Z I: $b > c(E_{\text{float}}) > c(\bar{E})$
- ② Z II: $c(E_{\text{float}}) > b > c(\bar{E})$
- ③ Z III: $c(E_{\text{float}}) > c(\bar{E}) > b$



Source: FT (2017)

External Stress and Crisis: Events and Predictors

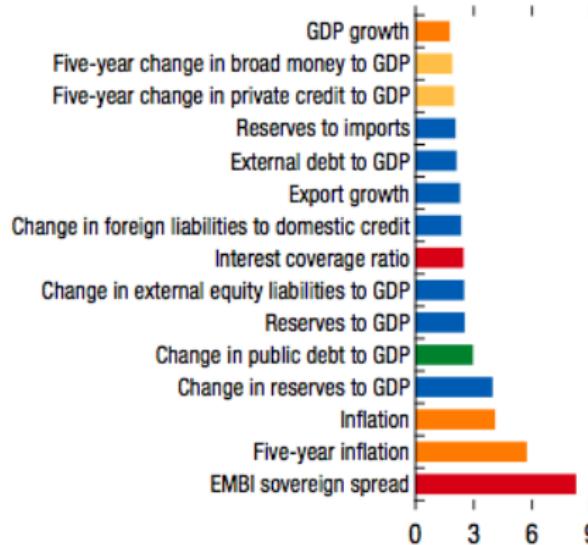
The following events complement the external stress episodes that feature capital outflows, exchange rate depreciation, and tighter financial constraints.

- ① Sudden stops with growth impact (SSGIs): A large decline in net private capital inflows tightens financial constraints sufficiently to generate unusually large recessions or lead to recourse to IMF financial support (following the work of Dornbusch, Goldfajn, and Valdes 1995 and Mendoza 2002, among others).
- ② Exchange market pressure events (EMPEs): The currency sharply depreciates or reserves suddenly decline (as in Kaminsky and Reinhart 1999). Such events may imply different growth outcomes, depending on whether gains in export competitiveness are offset by the tightening of financial constraints due to foreign-currency-denominated debt.

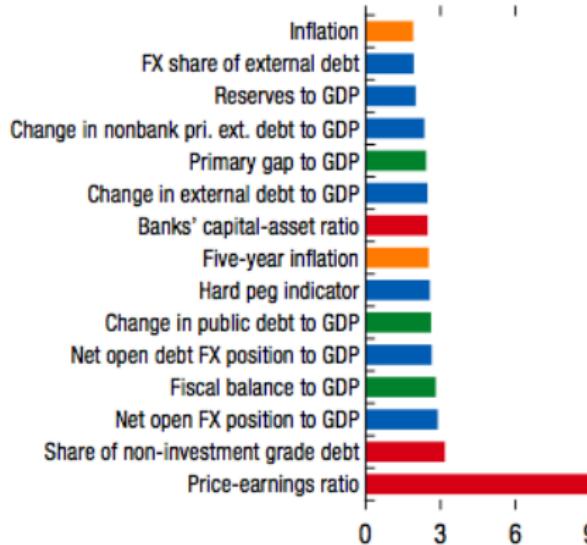
Top Predictive Variables for Various Crises

■ External ■ Financial ■ Financial-Real ■ Fiscal ■ Real ■ Global

1. EMPEs in EMs



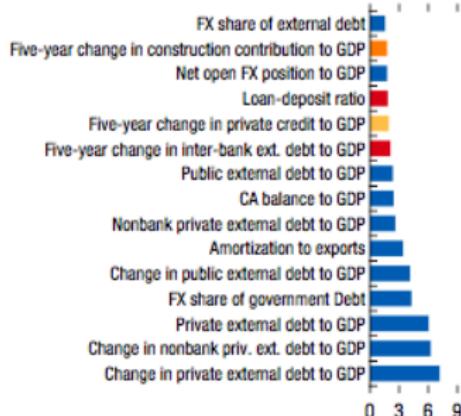
2. EMPEs in LICs



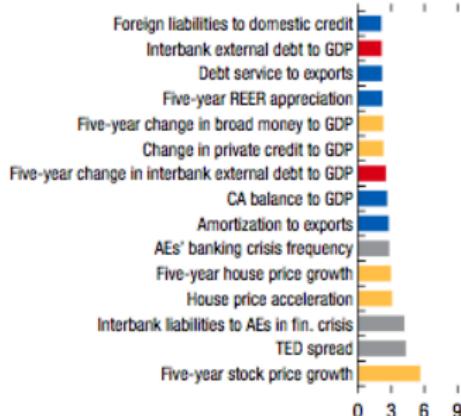
Source: IMF ESR (2020)

Top Predictive Variables for Various Crises

3. EMPEs in AEs



4. SSGIs in EMs



Source: IMF staff calculations.

Note: AEs = advanced economies; CA = current account; FX = foreign exchange; EMs = emerging market economies; EMPEs = exchange market pressure events; LICs = low-income countries; REER = real effective exchange rate; SSGIs = sudden stops with growth impact; TED Spread = the difference between the three-month US Treasury bill rate and the three-month Libor based in US dollars.

¹The horizontal axes plot the variable importance metric from authors' calculations. The metric in the signal extraction model is the weight of the variable. The metric in the machine-learning model is the percentage of in-sample variation in the sum of errors explained by removal of the variable from the model-generated trees.

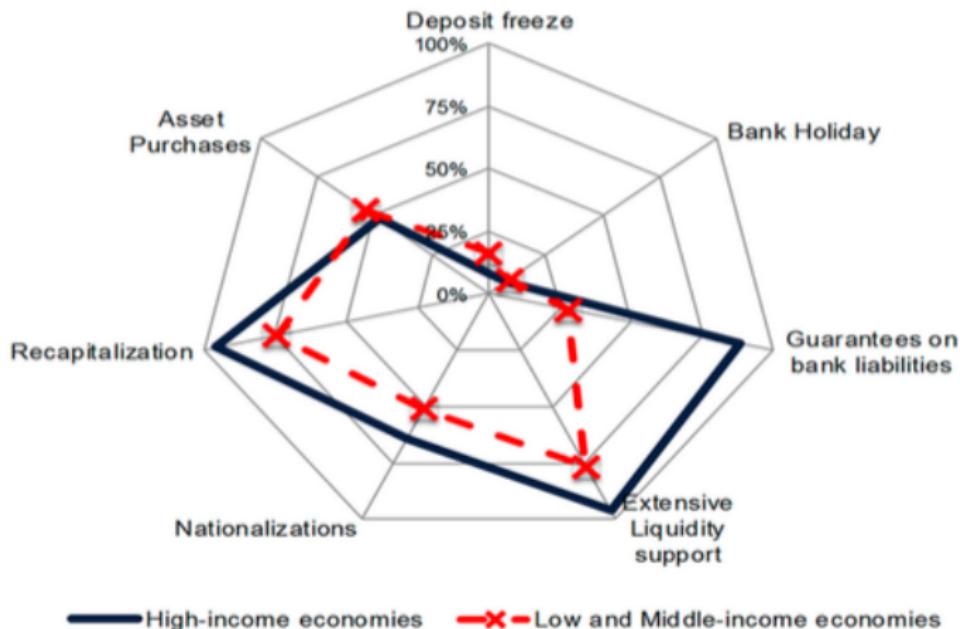
Outline

- 1 Overview
- 2 Crises and Costs
- 3 Theories and Models
- 4 Rescues and Reforms

Prevent Exchange Rate Crisis: Propositions

- ① Impose capital controls to stop the outflow (or restrict the inflow) of foreign capital to prevent speculative attack.
- ② Commit to either a floating or a fixed exchange rate, but do not attempt to maintain an intermediate regime.
- ③ Abandon the fixed exchange rate and switch to float. If a fixed exchange rate is preferred, then a hard peg (currency board) is most effective because the money supply is composed entirely of foreign reserves.
- ④ Establish a lender of last resort to loan foreign currency reserves during a crisis. Accumulate reserves as insurance against a crisis.
- ⑤ Improve the institutions of macroeconomic policy and financial markets to reduce the risks associated with exchange rate crises.

Policy Responses: Containment and Resolution



Source: Laeven and Valencia (2018).

Asian and Latin American Crises: Summary

Stanley Fisher, 2001, The International Financial System: Crises and Reform.

- The Mexican, Thai, Russian, and Brazilian crises all looked more or less like conventional old-fashioned crises, in which an unsustainable current account combined with a pegged exchange rate to lead to a crisis.
- However neither in Mexico nor in Thailand was there a serious fiscal problem. Financial sector weaknesses appeared especially important in Thailand, not least because its financial sector was much larger than that in the three non-Asian crisis countries.
- The crises in Indonesia and Korea looked different from the beginning, because both the current account and the fiscal deficits were small, and contagion seemed to play the dominant role.
- But the contagion hit economies with serious financial and corporate sector weaknesses, whose impact was magnified as market pressures increased.

Asian and Latin American Crises: IMF Rescues

Stanley Fisher, 2001, The International Financial System: Crises and Reform.

- Of the six crises, the IMF was called in to four of them—Mexico and the three Asian cases—after the pegged exchange rate had been abandoned.
- In the two other cases, the IMF was lending to help defend a pegged exchange rate, but neither defense ultimately succeeded.
- In each of the Brazilian and Russian cases, the exchange rate had originally been pegged as part of a successful disinflation program, but in neither case did the country succeed in moving out of the pegged regime in time.
- It should be noted though that during this period there was a successful defense of a (hard) pegged exchange rate regime: in April 1995, with Argentina in crisis as a result of contagion from Mexico, an IMF program that helped to maintain convertibility and restore growth was negotiated with that country.



IMF Programs: Criticism and Controversies

The crises—particularly the Asian crisis—generated an extraordinary storm of criticism about the IMF-supported programs put in place to deal with them.

- ① Fiscal tightening to reduce external deficit in a state of excess demand
- ② Monetary and exchange rate policies—particularly interest rate defenses of the currency
- ③ Structural policies—particularly those relating to the financial sector, as well as the question of whether the programs had excessive conditionality
- ④ The interrelated questions of private sector involvement and capital controls
- ⑤ The size of the financing packages, in relation to the nature of the crisis, with some arguing that the crises were liquidity crises that demanded larger financing
- ⑥ The overall question of why the programs did not rapidly restore confidence

International Financial System Reforms

Stanley Fisher, 2001, The International Financial System: Crises and Reform.

- ① Crisis prevention: improvements in policies and the strengthening of institutions, including the choice of exchange rate system, fiscal policy, reserve and debt management, capital account liberalization, and the adoption of international codes and standards.
- ② IMF reforms: improving surveillance and transparency; prequalification for loans.
- ③ Crisis response and private sector involvement: official financing is limited; that debtors and their creditors should take responsibility for their decisions to borrow and lend; and that contracts should be honored, except in extremis.
- ④ The operation of the international capital markets: too powerful and too volatile; less obvious what to do.

Crisis and Policy Response (w)

Eliana Cardoso and Andres Velasco: Monetary and Fiscal Responses to Currency Crises. World Bank.

Valuable lessons can be learned from the exchange rate, monetary, and fiscal responses to the recent currency crises in Asia and Latin America. Policy tradeoffs in response to speculative attacks are grim. No matter what governments do, the costs are high. The less costly response to a speculative attack depends on the nature of the shock, the economy's initial conditions, and the balance sheets of banks, firms, and the government.

- ① Defending the currency and allowing the exchange rate to float.
- ② A new monetary framework should be developed following adoption of a flexible exchange rate regime.
- ③ Fiscal policy should be tightened in response to speculative crises, but it should not be too contractionary if a tight monetary policy is adopted.

IMF Approach: Spotting Vulnerability to Financial Risks

Mulder, 2002, Assessing the Dangers, IMF Finance & Development, 39(4).

- ① Early warning systems (EWS). The IMF uses econometric models known as EWS models in its efforts to predict currency crises.
- ② Liquidity checks. Lack of a liquidity buffer is a key predictor of both the likelihood and the depth of a currency crisis. Official reserves, external financing needs, sources, and gaps.
- ③ Market pulse: sovereign ratings, bond market spreads, yield curves, the correlation of spreads across countries.

Using the analytic inputs—in addition to the country-specific analysis that is at the core of the IMF’s work, the monitoring of financial sector health and adherence to international standards, and other tools—the IMF is looking at vulnerabilities and policy prescriptions from a number of different angles and attempting to improve its ability to predict and head off crises.

IMF Approach: Balance Sheet Risks Assessment

Keller et. al., 2002, The Bottom Line, IMF Finance & Development, 39(4).

Balance sheet risks could impair an emerging country's ability to service its debt. Spotting such risks can contribute to our understanding of the dynamics of crises and thus inform measures to prevent other such crises.

- ① Maturity mismatches between short-term liabilities and longer-term liquid assets expose borrowers to rollover risk and interest rate risk.
- ② Currency mismatches arise when borrowers' liabilities are denominated in a foreign currency but their assets are in domestic currency. In the event of a devaluation, these borrowers will have trouble paying their creditors.
- ③ Capital structure mismatches may occur when a firm or a country relies on debt rather than equity to finance investment. Equity provides a buffer during hard times, because dividends drop along with earnings, whereas debt payments remain constant.
- ④ Solvency risk arises when an entity's liabilities exceed its assets.

IMF Approach: Rethinking Capital Controls

Kenneth Rogoff, 2002, Rethinking Capital Controls, IMF F & D, 39(4).

- Don't discourage FDI or equities. The real debate is about debt instruments. Debt does not have the desirable risk-sharing properties of FDI and equity, and it makes countries susceptible to reversals of sentiment and insolvency problems.
- Not all short-term flows are bad. Trade credits, the lifeblood of international trade, are a type of short-term capital flow. Speculative flows normally play an essential role in stabilizing forex and financial markets. Short-term instruments enable investors to hedge, creating, in turn, a welcoming environment for FDI. Excessive debt flows a worry.
- Capital controls must be on very focused, temporary measures aimed at stemming massive temporary inflows or outflows of debt. Hard work remains to be done on capital account liberalization and its sequencing with other policies to find the point at which the benefits to further capital market integration stop exceeding the costs.

IMF Approach: Dealing with Crises More Effectively

Lukonga, 2002, Riding Out the Storm, IMF Finance & Development, 39(4).

- ① Working with the private sector. In most cases, the IMF can help countries overcome balance of payments problems without their putting pressure on private creditors to act against their will. In extreme situations, private creditors might need to share the burden of restructuring by limiting their demands for repayment or even agreeing to reduce the real value of their claims.
- ② Collective action clauses. The CACs would limit the ability of dissident creditors to hold out against the majority and then litigate to seek full payment. The IMF is encouraging the use of CACs in debt contracts and is starting to monitor the use of these clauses in new bond issues.
- ③ The statutory approach. It aims to create a legal foundation for collective action among creditors. It would enable a sovereign debtor and a supermajority of its creditors to reach an agreement binding all creditors for all the debt of the sovereign while respecting the seniority of claims.

IMF Approach: Assessing Debt Sustainability

Daseking, 2002, Debt: How Much Is Too Much?, IMF F& D, 39(4).

If a country or government accumulates debt beyond what it is able to service, a debt crisis can erupt with potentially large economic and social costs.

Assessing debt sustainability requires three steps:

- ① Forming a view of how outstanding stocks of liabilities are likely to evolve over time relative to the economy's (or the government's) ability to pay; projecting the flows of revenues and expenditures?including those for servicing debt?as well as key macroeconomic variables.
- ② Examining how the outlook would change under plausible shocks; exploring the risks of rising financing costs and contingent claims.
- ③ Assessing whether the results may lead to an unsustainable situation; defining a threshold at which debt is deemed to become unsustainable.

IMF Approach: Financial Regulation Independence

Das et. al, 2002. Financial Regulators Needs Independence, IMF F& D, 39(4).

Political interference in financial sector regulation and supervision contributed to the depth and magnitude of nearly all of the financial crises of the past decade. More operational autonomy can bolster financial stability.

- ① Regulatory independence: agencies should have an appropriate degree of autonomy in setting prudential regulations within the legal framework.
- ② Supervisory independence is critical to enforcing rules, imposing sanctions, and managing crises.
- ③ Institutional independence is guaranteed by clear arrangements for appointing and dismissing senior personnel, the agency's governance structure, the roles and responsibilities of board members, and transparency in decision making.
- ④ Budgetary independence is needed so that the agency has the freedom to determine its staffing, training, and remuneration needs.

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