Crísis Financieras y Política Macroeconómica

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A Simple Macro Model of Currency Crisis

Road map

- Simple macro model to think about the experience of Mexico and East Asia
- Mexico: loss of confidence on ability of government to pay back debt
- East Asia: loss of confidence on ability of banks to honor their liabilities

Framework

- Fixed exchange rate regime: S
- M = monetary base, F_c^* = CB's foreign reserves, B_c = CB credit

Money supply

$$M^s = SF_c^* + B_c \tag{1}$$

Money demand

$$M^d = f(\underbrace{S}_{+}, \underbrace{R^* + \hat{S}}_{=\mathrm{R}}) \tag{2}$$

- Given R^* (exogenous) and $\hat{S}$ (policy), (2) determines $M^d = M^s = M$
- Given M and B_c (policy), (1) determines F_c^* through capital flows

Framework

Balance of payments

$$\dot{F}_c^* = B\left(\underbrace{S}_{+}, \underbrace{\theta}_{\text{taste shifter}}\right) + R^*\left(F_c + \underbrace{D}_{\text{Net External Debt (Private)}}\right) \tag{3}$$

$$+ \left(\underbrace{F}_{\text{Gross capital flows}} - \underbrace{\gamma}_{\text{fraction of maturing debt}} D\right)$$

Evolution of Debt

$$\dot{D} = F - \gamma D \tag{4}$$

Key element: F is determined by beliefs about sustainability of debt D

Normal times equilibrium

- For simplicity assume that policy variables are set to zero: $B_c = \hat{S} = 0$

$$
\begin{aligned}
M &= SF_c^* && (1)\\
M &= f(S, R^*) && (2)\\
\dot{F}_c^* &= B(S, \theta) + R^*(F_c^* - D) + (F - \gamma D) && (3)\\
\dot{D} &= F - \gamma D && (4)
\end{aligned}
$$

- Equation (2) implies that M is constant
- Given M, Equation (1) determines F_c^*
- For a given level of debt D, Equation (3) determines F such that $\dot{F} = 0$
- Note that if $F = \gamma D$, Equation (4) implies $\dot{D} = 0$ and $B(S, \theta) + R * F_c^* = -R^* D \rightarrow CA = 0$

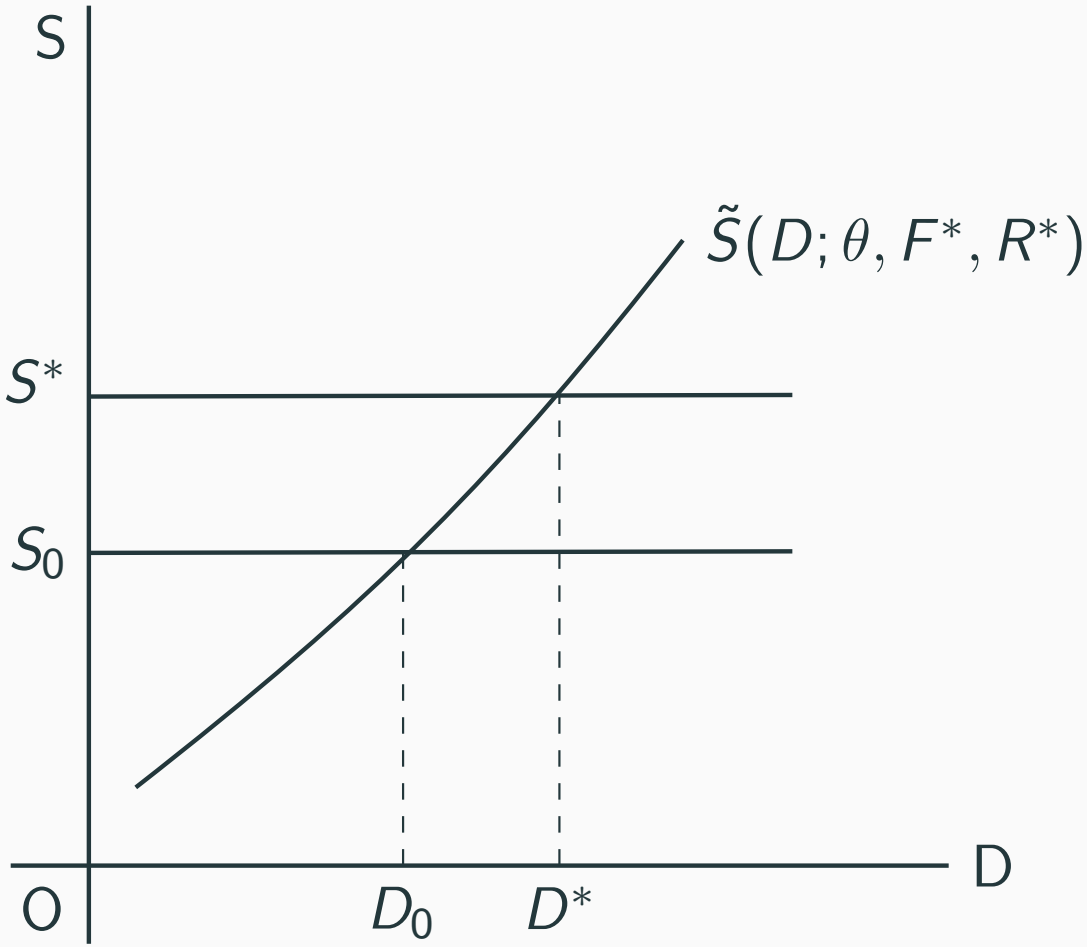
Attack equilibrium

- *Assumption 1:* In the case of an attack $F_c^* = 0$ and exchange rate will be allowed to float
- *Assumption 2:* Before the attack $F > 0$ but in the case of an attack $F = 0$, capital flows stop
- Equilibrium: $\dot{F}_c^* = F = 0$

$$0 = B\left(S^{shadow}, \theta\right) - \left(R^* + \gamma\right) D + R^* F_c^* \tag{5}$$

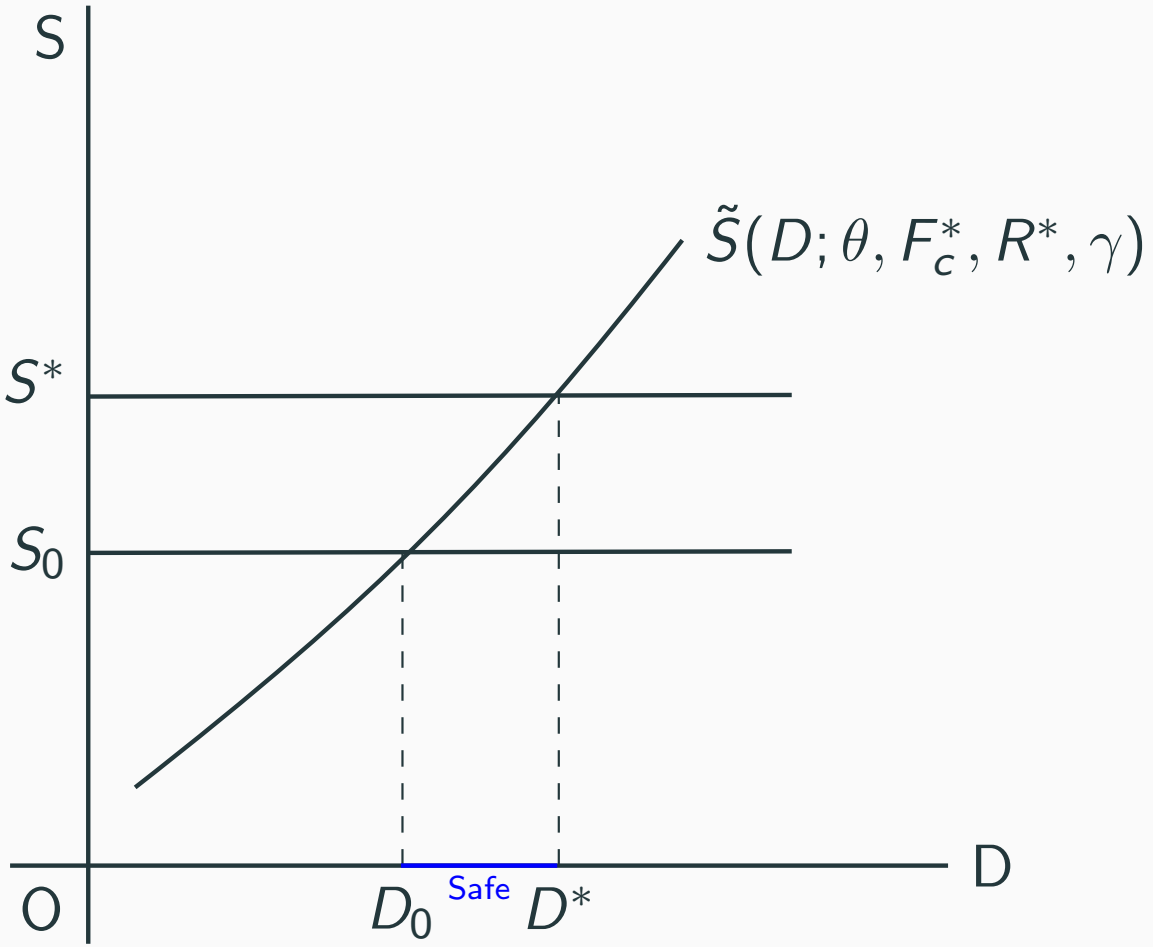
- We can show that $\frac{dS^{shadow}}{dD} > 0$

Graphic Analysis



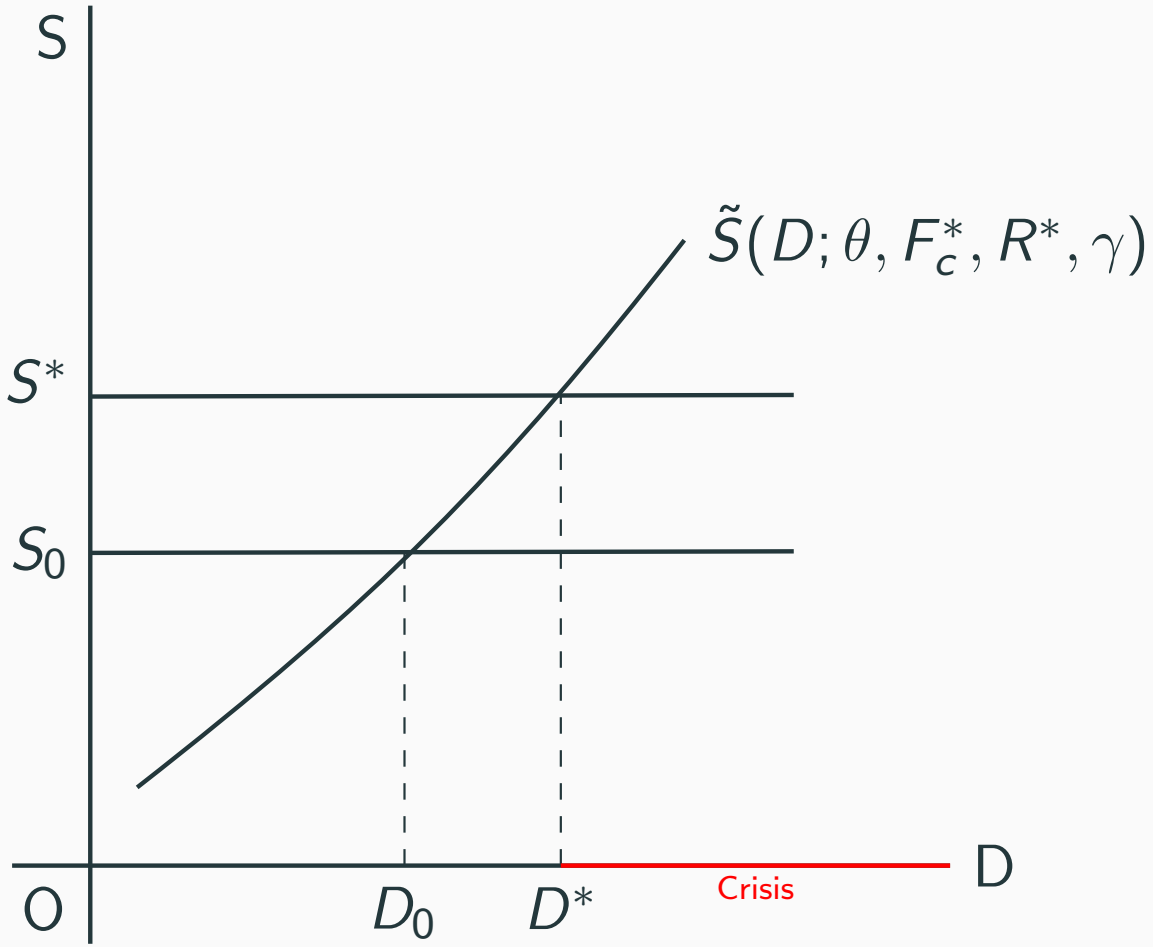
- $\tilde{S}()$ is the shadow exchange rate
- S^* exchange rate threshold above which domestic debtors default on debt

Graphic Analysis: Safe region



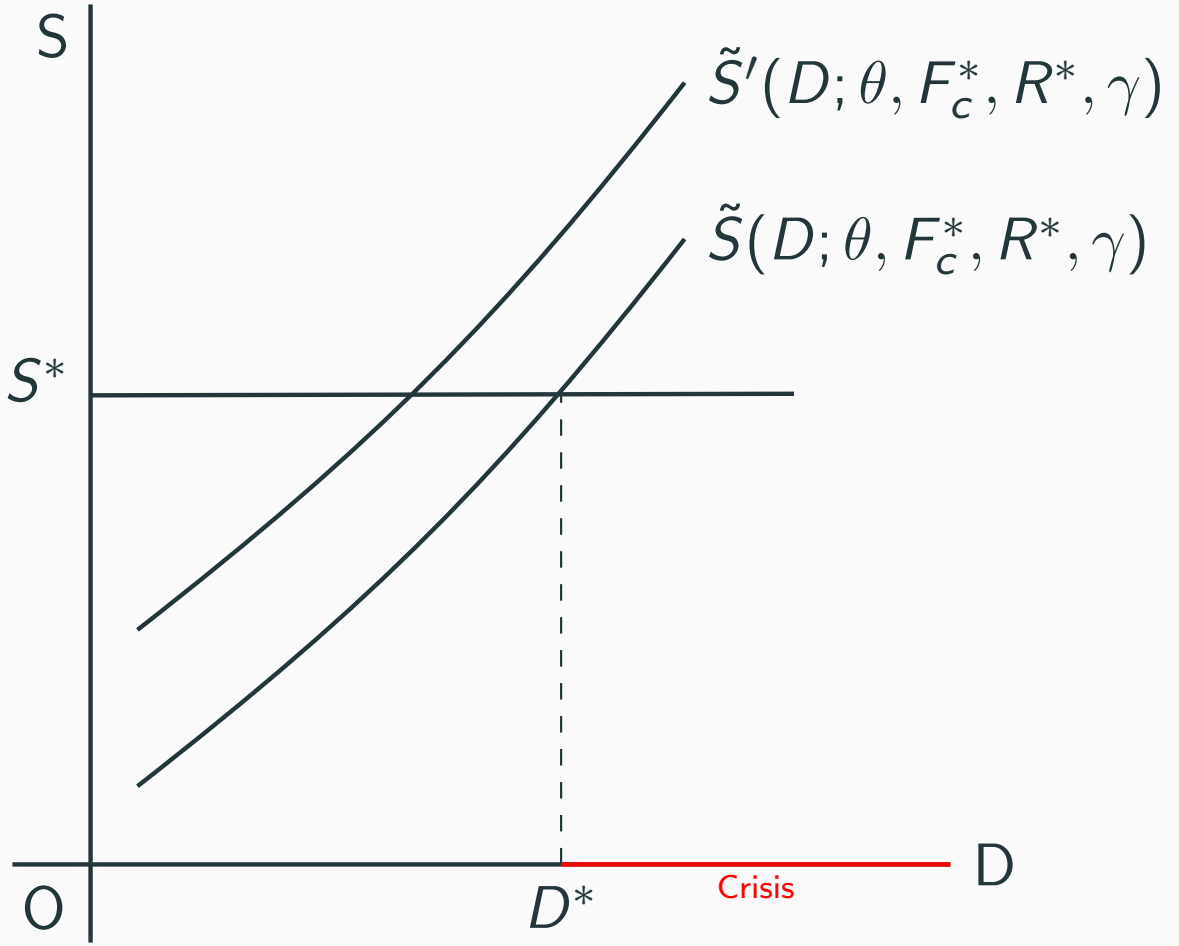
- When $D_0 < D < D^*$ a speculative attack would leave $S < S^*$
- $F > 0$ and exchange rate will survive the attack $S = S_0$

Graphic Analysis: Crisis region



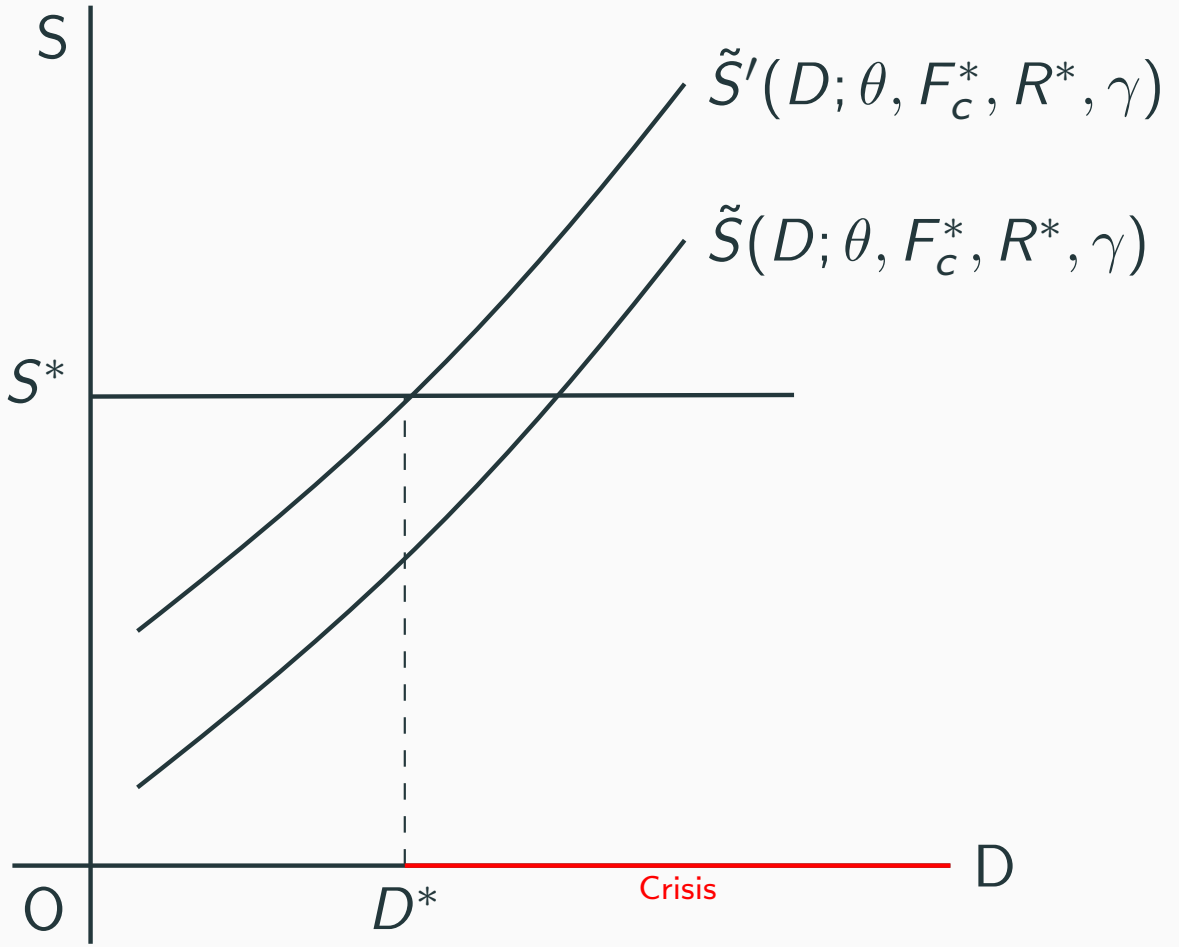
- When $D > D^*$, vulnerability to confidence $S > S^*$
  - If no change in confidence: D will be repaid.
  - If crisis ($F = 0$) and speculative attack: $S > S^*$ and $F_c^* = 0$

Graphic Analysis: Comparative statics



- Consider factors that shift $\tilde{S}$, e.g. (R^*, γ)

Graphic Analysis: Comparative statics



- Region of vulnerability to self-fullfiling crisis expands
- What happens when $\theta \downarrow$?

How to avoid vulnerability?

- Mantain a large stock of foreign reserves or official credit lines
- Regulatory policies that increase the threshold value S^*: reduce currency mistmaches, correct balance sheet distortions
- Exchange rate or aggregate demand policies to reduce $B(S, \theta)$
- Capital account policies that length the maturity of debt $\gamma \downarrow$
- From Equation (4), if $F > \gamma D$ debt will accumulate over time $\rightarrow$ consider abandoning exchange rate peg before $S = S^*$

The Good Old Nineties

Case Study: Mexico

Overview

- Two currency crisis 1994 (second generation) and 1995 (self-fulfilling crisis on public-sector debt)
- Following a capital flow boom: exchange rate overvaluation and growing current account deficit
- Trigger factors: Political instability and increase in interest rates in the U.S.
- No real sign of public debt problems at the beginning of the episode
- Overall sound macro fundamentals in the early 1990s

Questions

- Why did Mexico lose a large amount of foreign reserves?
- What were the financial vulnerabilities?
- How was the policy response?
- What was the role of expectations?

Brewing the crisis

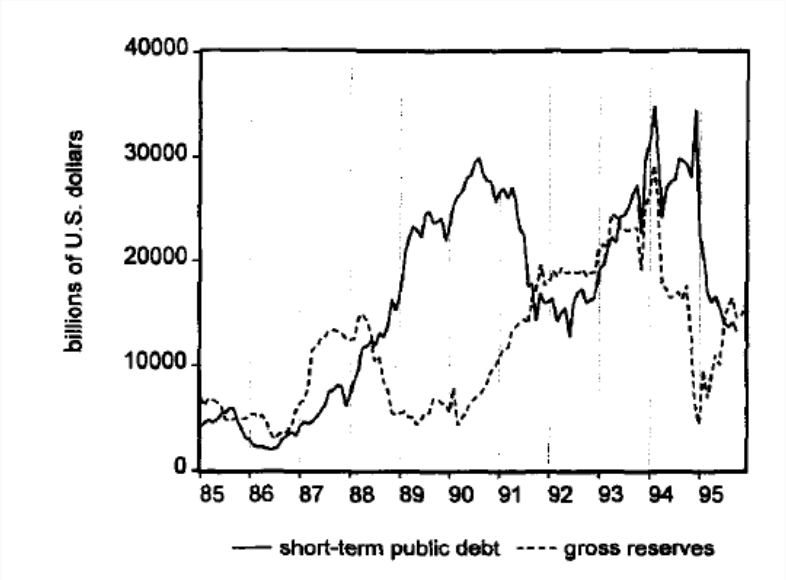
- Political turmoil + $R^* \uparrow$ put pressure on S
- $F_c^* \downarrow$ led to $S \uparrow$ to move to the ceiling of currency band
- CB exchanged domestic denominated liabilities *(TESOBONOS)* for foreign denominated *liabilities (CETES)*
- Premium on domestic liabilities $i - i^*$ moved from $1.3 \rightarrow 4.1 \rightarrow 9.5$
- Doubts of ability of government to $i \uparrow$ given that $Y \downarrow$ and poor state of financial system

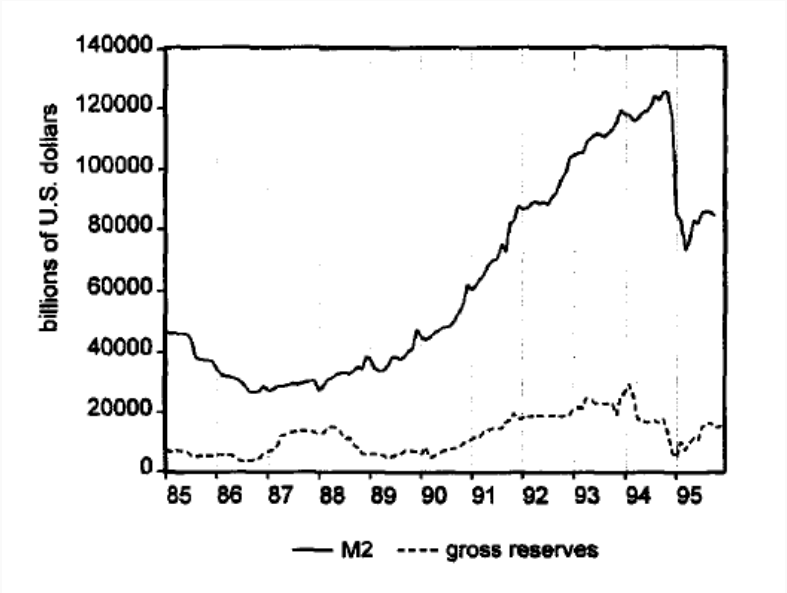
Role of financial liberalization

- Elimination of tight credit controls
- Poorly supervised banks
- Weak capital positions
- Banks operated under the assumption that all liabilities were implicitly insured by the government (**bailout expectations**)
- Unconstrained access to external funds

Rapid expansion of credit during the 1990s

Loss of reserves





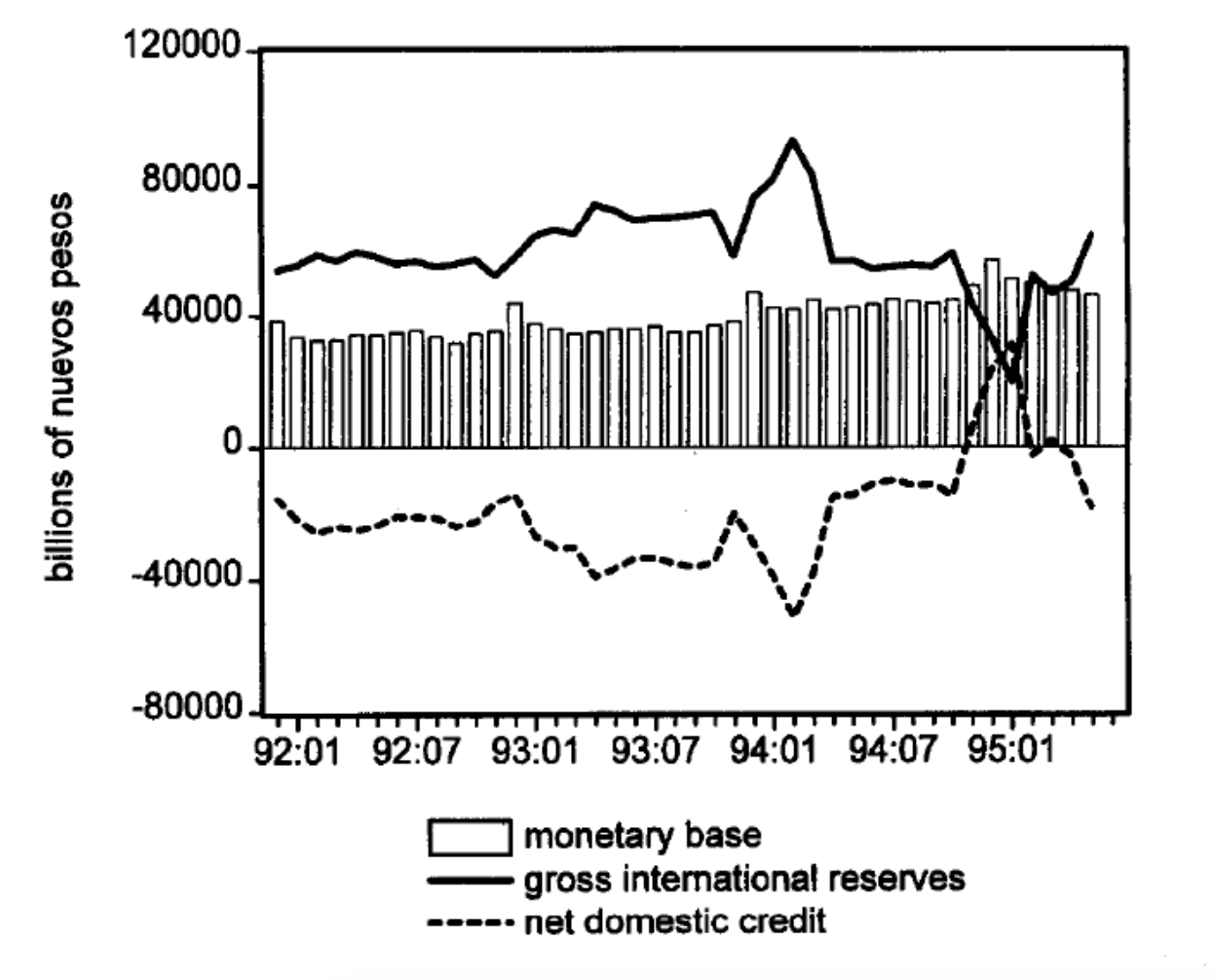
- M2 expansion due to credit boom and capital inflow in early 1990s
- Part of capital flows went to bank deposits
- Reversal of capital flows and decline in economic activity sparked concerns about appropriate level of exchange rate given M/F_c^*

Government Response

- Sterilized intervations $B_c \uparrow$ to offset F_c^*
- Shifted composition of public debt from *CETES* to **TESOBONOS**: $\gamma \uparrow$
- Net short term liabilities increased and liquid dollar assets decreased
- No external sources of funding in case of a run on private debt

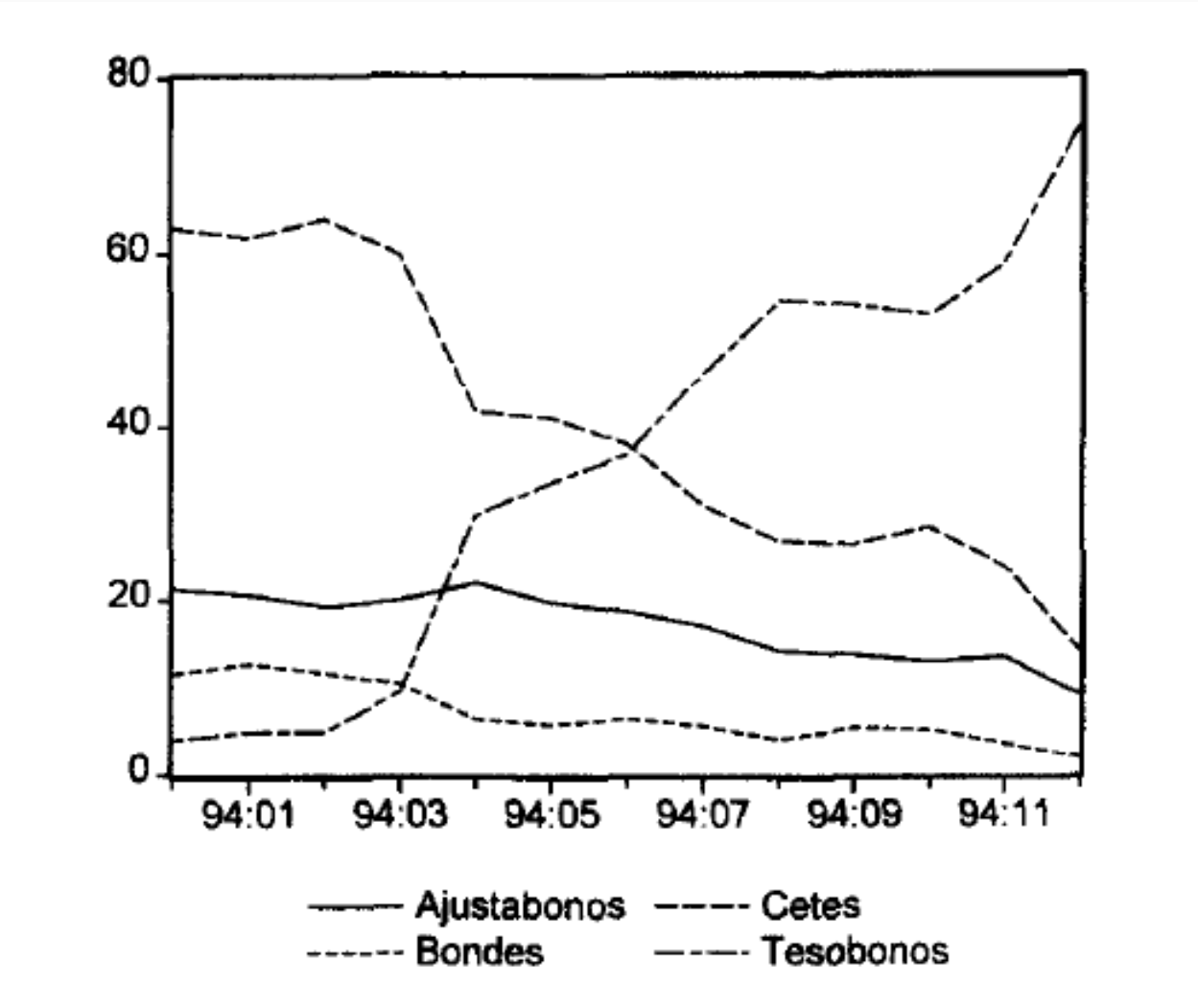
Most likely government response shifted the economy beyond D^*

Sterilized Interventions



- Large imbalance between debt and reserves due to $B_c \uparrow$
- Political uncertainty caused a run on CETES and a loss of 10 \$B of F_c^*

Composition of Public Debt



- Short-term dollar denominated debt rose from 5% to 75%
- A a run on TESOBONOS before 94 could have been absorbed by F_c^* and $\hat{S}$ would have reduced the \$ burden of CETES

The Attack: Part 1

- Mid-Nov 1994 expectations of $\hat{S}$ before change in administration
- Fall in reserves from 17$B to 12$B
- After Dec 1, 1994 leaks about plans of abandoning the peg raised uncertainty
- Dec 20 the government increases ceiling of exchange rate band by 15%
- Dec 21 authorities abandon the peg

Defending the peg became to costly $\rightarrow$ 2nd generation crisis model

The Attack: Part 2

- After devaluation premium on sovereign risk: $¡^{TESOBONOS} - R^*$ began to rise
- Recall that initial attack on the currency was not because of weak fiscal position, rather because of a loss of confidence on the peg (2nd generation)
- Also recall that change in debt composition to costlier and shorter maturity debt meant that $D > D^*$ after the devaluation
- Opened up the possibility of a *run* on public debt
- In the absence of F_c^* and lack of initial access to official foreign borrowing $\rightarrow$ increase in the risk of default

Eventually run on debt (3rd generation crisis) was stopped by liquidity package by the U.S. Treasury to restore market confidence

Case Study: Thailand

Similarities to Mexico

- Fiscal solvency was not a relevant issue
- Substantial CA deficit and real exchange rate overvaluation
  - Relatively small real appreciation prior to crisis
  - Devaluation of *equilibrium* exchange rate due to external factors
- Significant financial liberalization that lead to a domestic lending boom and weakened financial system
- Policy response increased vulnerabilities

Differences

- Strong growth prior to crisis
- Positive outlook favored by increase in domestic investment
- Debt mainly owned by the private sector

Brewing the crisis

- External factors that weighted on exchange rate overvaluation
  - Increased competition from China manufacturing exports $\rightarrow$ Terms of trade shocks
  - Japan's monetary policy $R^{JP} = 0$ pushed additional capital flows to the region
- Domestic lending boom fueled by external borrowing
- Large current account imbalances
- Exchange rate misalignment $\rightarrow$ doubts about the credibility of exchange rate regime

Role of financial liberalization

- Opened capital account in early 1990s
- Active promotion of foreign investment
- Fast bank and nonbank credit growth
- Excessive exposure of to real state sector $\rightarrow$ balance sheet constraints vulnerable to asset price corrections

Government Response

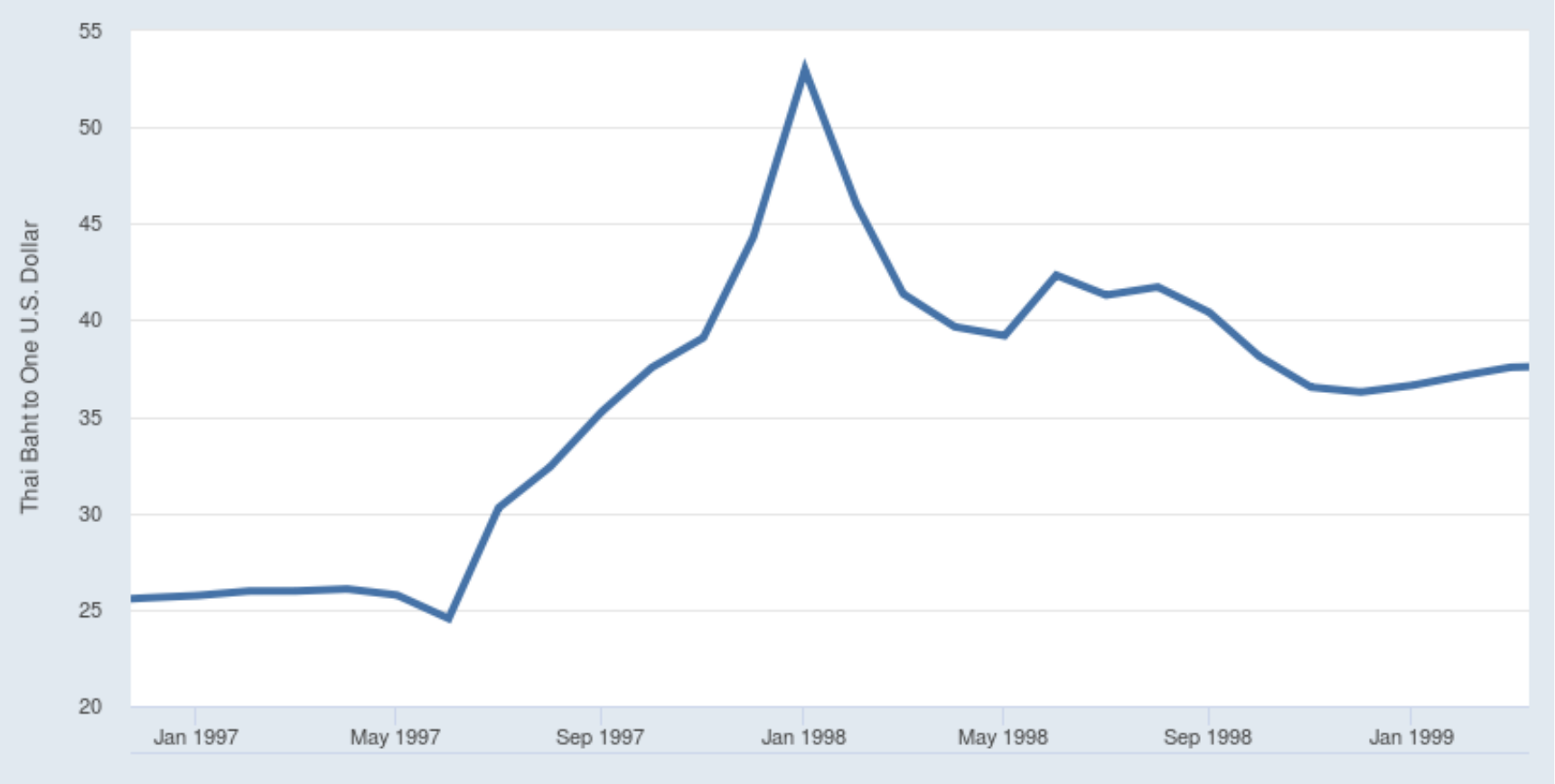
- Upsurge in short-term capital flows led to overheating of economy $\pi \uparrow \rightarrow$ tight monetary policy
- Sterilized interventions $B_c \uparrow$ to absorb capital inflow
- Pro-cyclical fiscal policy intensified effects of short-term inflows
- Asset price inflation due to rapid financial expansion was exacerbated by implicit guarantees

Again government response shifted the economy beyond D^*

The Attack

- Trigger was a decline in export performance in 1996:
  - Lowered aggregate demand and dampened expectations of future growth
  - Lower expected returns inflicted on asset values and coupled with high interest rates pushed asset prices down
- Increased perceived likelihood of an exchange rate adjustment and weakened further position of the financial system
- Cost of defending the currency and sustaining the financial system $\rightarrow$ confidence crisis
- Dec 20 the government increases ceiling of exchange rate band by 15%. Central bank loss about 1\$B in reserves in mid-1996
- Pressure mounted as asset prices continued to fall
- The exchange rate floated in July 1997 with a loss of 10\$B

Evolution of the Exchange Rate



- Initial devaluation caused by loss of confidence on exchange rate regime
- Currency continued to devalue due to fears of inability of