

CAP Part II: Currency Crises & Multiple Equilibria

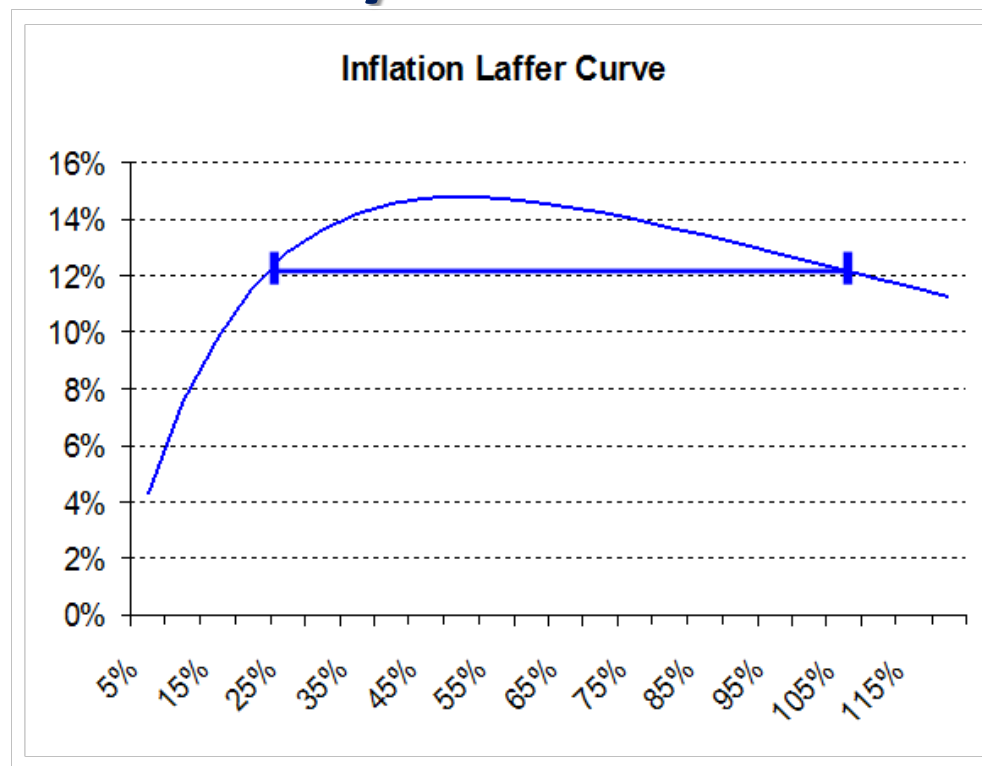
**ECON 5450 Crisis, Adjustment and Poverty
November 18th 2015 Darryl McLeod,
Economics, Fordham University**

Generations of Currency Crises

- 1. Generation One:** Krugman (1979) switch from fixed to floating.... Mainly fiscal, fundamentals....
- 2. Generation II:** self-fulfilling 1993 Euro Crisis not deficit, high stress, too expensive to maintain the peg 2011 Euro Crisis similar two equilibria....
- 3. Generation III** add banks, currency & financial crisis fuel one another currency mismatch, balance sheet effect, LOLR is Central bank printing currency

Multiple equilibria

1. **Generation One:** Fixed to floating rate, figure 1
2. **Generation II:** bubble good and bad equilibria
3. **Seigniorage Laffer curve, debt Laffer curve Rodrik model uncertainty and investment**



Generation I Crises: Krugman's speculative attack model

(see Allan Drazen, 2001 Political Economy in Macroeconomics)

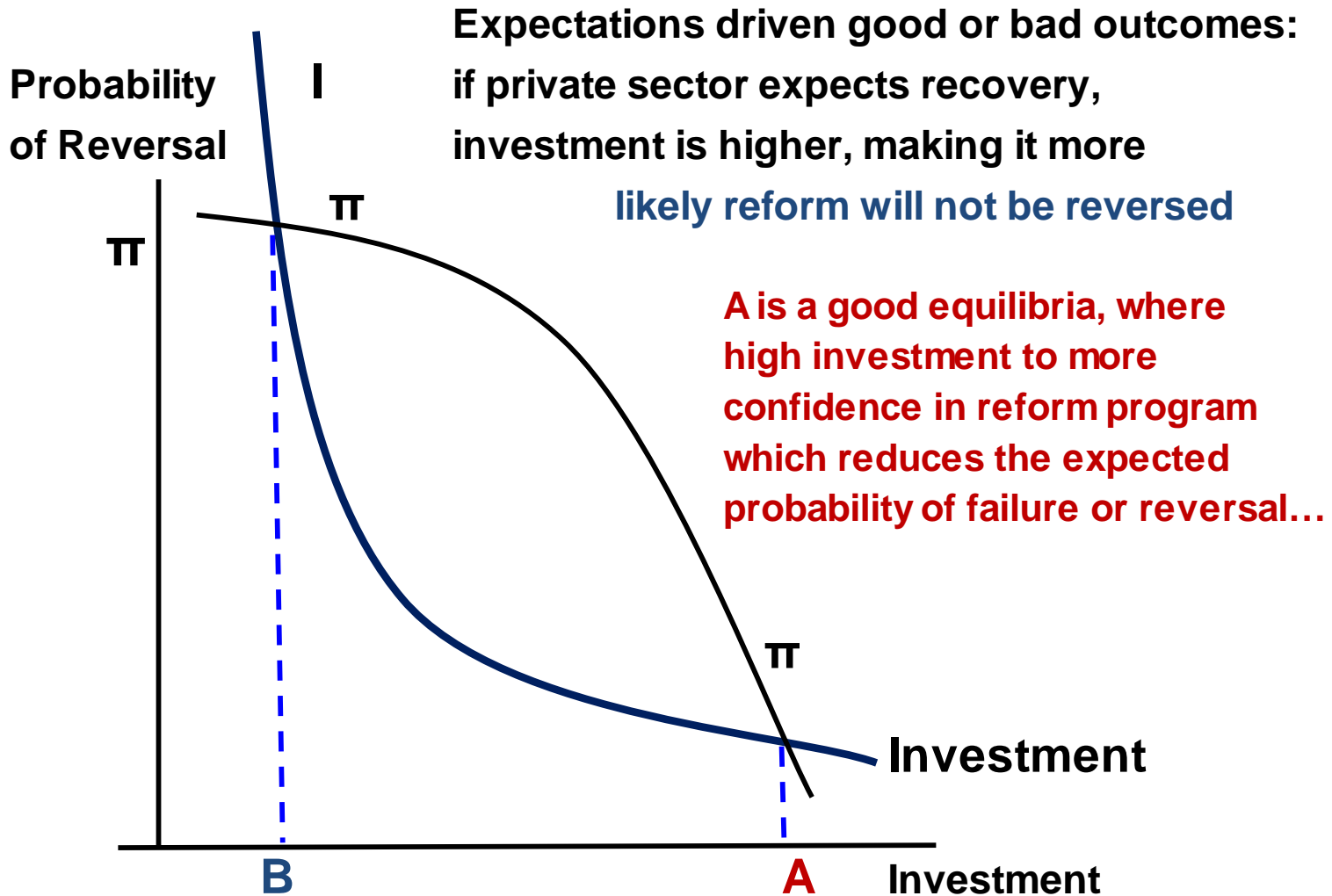
- Two regimes: one where fiscal deficits are financed with Seigniorage (flexible exchange rate) one where deficits are finance with reserves (fixed rate regime, no inflation).
- Switch in regime is a “currency crisis” private sector holders of local currency anticipates loss of reserves, at date T when reserves are still available, private sector converts all local currency to dollars, and
- ***Fundamental cause of crisis is fiscal deficit that leads to CA deficit.... See [Handout for details](#)***

Generation I Crises: complications

(why we missed the 1994 Mexico crisis)

- **Uncertainty:** creates a more realistic model where interest rates rise before crisis, see [figure 1](#)
- **Balance sheet issues:** Short term debt seems to augment reserves but it really does not help in crisis (but swap lines or an FCL might) see Figure 2.
- ***Fundamental cause of crisis remains private borrowing or a fiscal deficit that leads to CA deficit and depletes reserves.... See [Handout for details](#)***
- ***But long term borrowing and/or IMF help (or swap lines) can push crisis into the future (Greece?)***

Figure 12: Generation II crises models: expectations driven multiple equilibria or "self-fulfilling" crises... During crises expectations drive investment



B is the bad equilibria, low investment high probability of political unrest and reforms being reversed, leading to RER appreciation.

parameter. For purposes of illustration, let investors differ by their entry costs, $\varepsilon \in [0, \infty)$. Let ε be distributed according to the probability distribution function $f(\varepsilon)$. Further, in general equilibrium the differential in the marginal products of capital will be a decreasing function of the amount of capital that is reallocated. So we can write

$$r - r^* \equiv \Delta(I), \quad \Delta' < 0, \quad \Delta'' < 0,$$

where I stands for the aggregate investment response to the reform.

Now define ε^* as the cut-off point at which expression (6) holds as an equality:

$$\varepsilon^* = (\rho + \pi)^{-1} [\Delta(I) - t - \pi\theta]. \quad (7)$$

(I am here assuming the large-reversal case.) Since all investors with entry costs below ε^* will choose to invest, the aggregate investment function can be written as follows:

$$I = N \int_0^{\varepsilon^*} f(\varepsilon) d\varepsilon. \quad (8)$$

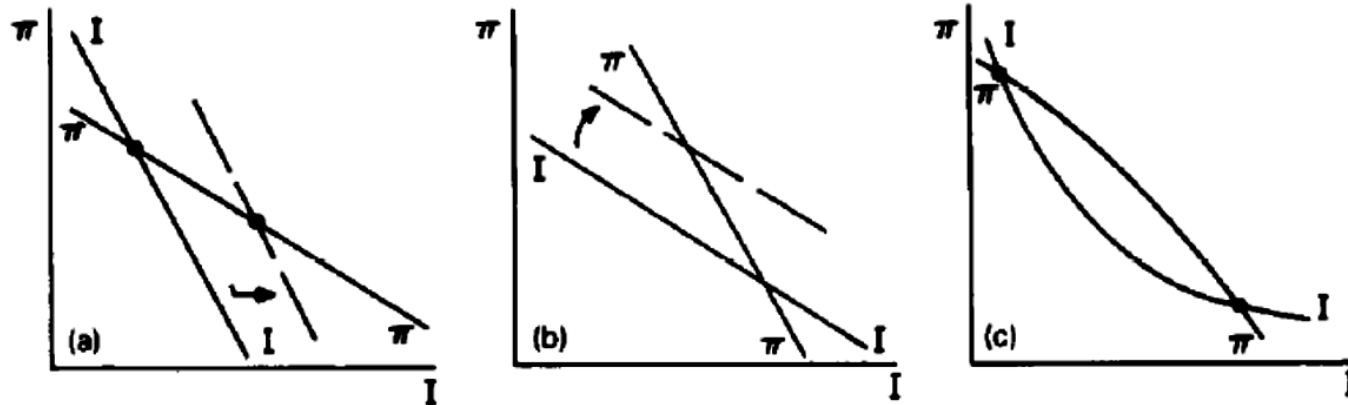


Fig. 1. (a) Reduction in t increases I , reduces π . (b) Reduction in t reduces I , increases π .
(c) Multiple equilibria.

It can be checked easily that aggregate investment is decreasing in π :

$$\begin{aligned} dI/d\pi &= N f(\varepsilon^*) d\varepsilon^*/d\pi \\ &= -N f(\varepsilon^*)(\varepsilon^* + \theta)/[(\rho + \pi) - N f(\varepsilon^*)\Delta'] \\ &< 0. \end{aligned}$$

A numerical example from (Rodrik, 1992)

Cost of moving from NT to Tradables is ϵ

Cost of moving back to Non-tradables is θ

Opportunity cost of Investors ρ

$R_T - R_{NT} = \sigma$ difference in rates of return to tradables > 0 to switch
(shifts TNT PPF to the right, tradables boom)

with no uncertainty, investors switch sectors when

$\sigma > \rho\epsilon$ or when expected profit exceeds adjustment

But if there is some probability RER will appreciate again soon,

$\sigma > \rho\epsilon + \pi(\epsilon + \theta)$ it takes a much higher expected return to
induce investors to switch to the traded goods sector

For example, if $\pi = .20$ and $(\epsilon + \theta) = .50$ then the
lack of credibility tax is 10%: instead of 10% profit
to switch sectors the private sector requires much
higher rates of returns to invest and recovery can be delayed.

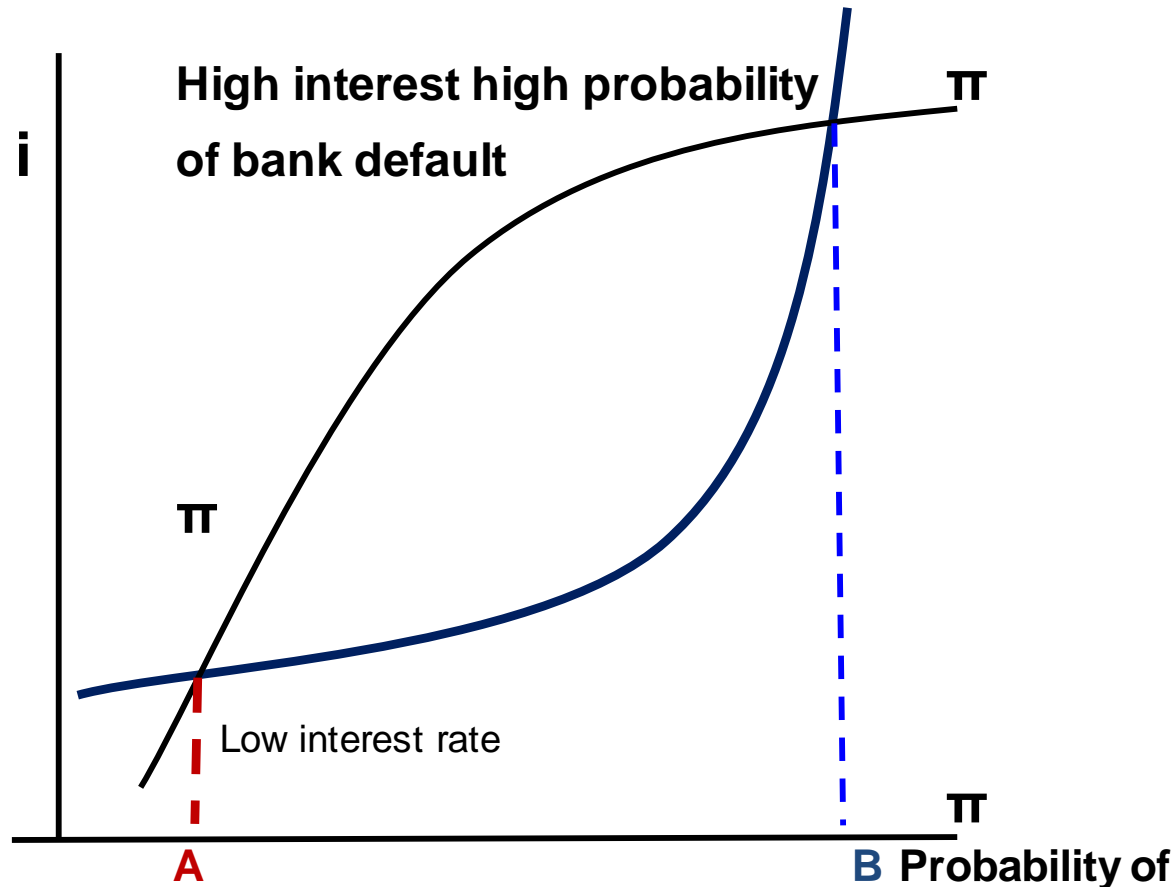
**Does a fixed exchange rate help or hurt? It depends on
expected inflation/deflation in the nontradables sector...**

The high interest rate trap: Stiglitz & Weiss (and Flood and Garber) tell a similar re interest rates and expected devaluation (or default on loan) high interest rates

- Can be sincere effort of CB to punish speculators or defend a currency or
- Signal investor expectations of the probability of devaluation or default (or both, gen III)
- Lead to adverse selection (but no moral hazard).
- Create a banking crisis where there was not one before... banks get squeezed
- Signal investors (bond holders) current regime cannot last...

The high interest rate trap: can also lead to multiple equilibria...

Interest rate



See Stiglitz and Weiss, or Flood and Garber

loan default

At high rates of inflation, money demand falls (velocity rises) reducing seigniorage revenues

See page 109 of Franko, 2007, monetarist

$$M * v(\pi) = P * Q$$

Where v is velocity of Money,
so money demand is,

$$M = (P * Q) / v(\pi)$$

so money demand & seigniorage rise with P , up to a point, then HH and business get rid of money faster so v rises with inflation, π

At high rates of inflation, money demand falls (velocity rises) reducing seigniorage revenues

Table 6.4

Seigniorage and inflation, Argentina, Brazil, Chile, and Mexico, 1978–1986
[percentage]

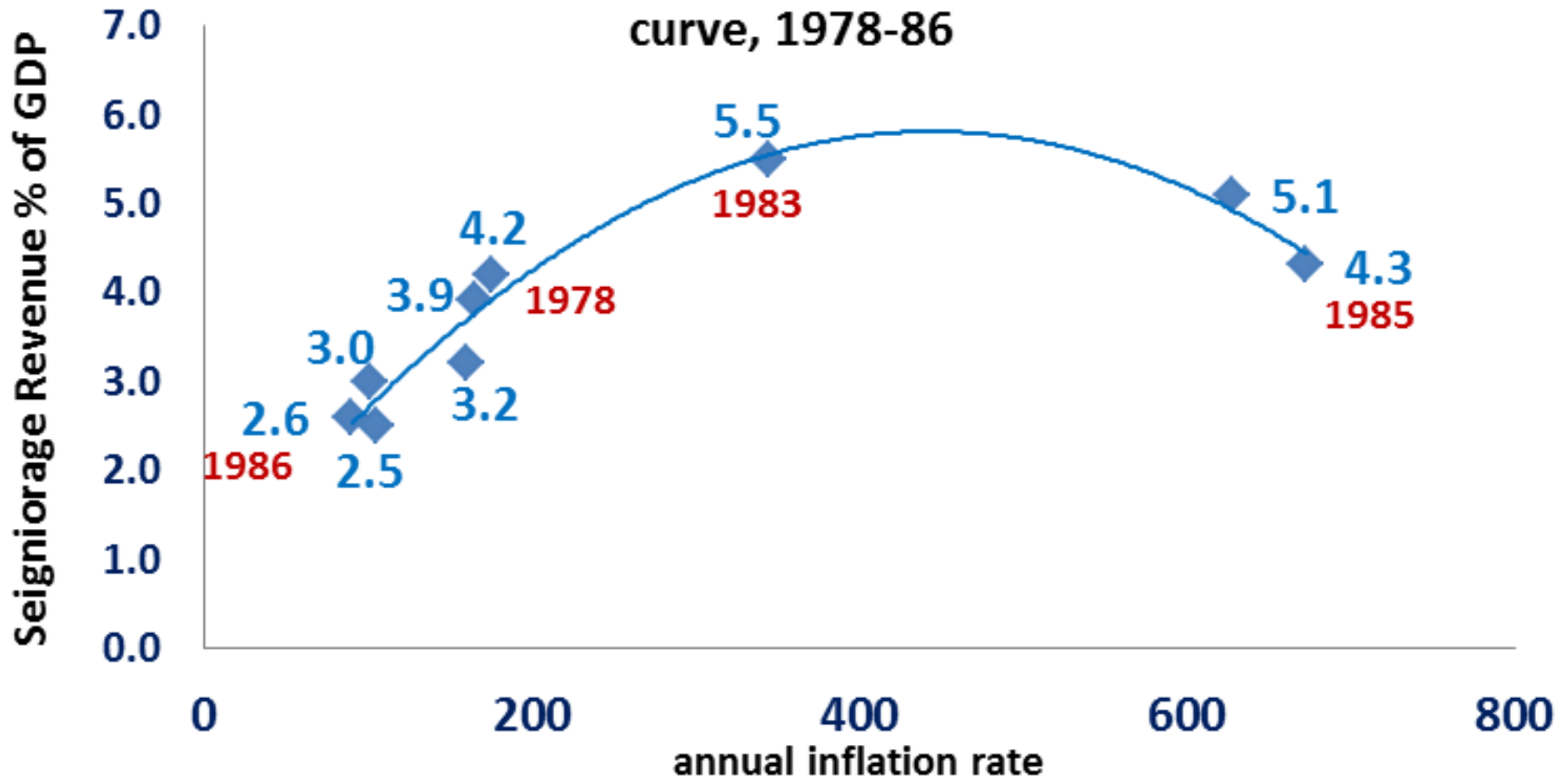
Year	Argentina		Brazil		Chile		Mexico	
	$\Delta H/\text{GDP}$	Inflation	$\Delta H/\text{GDP}$	Inflation	$\Delta H/\text{GDP}$	Inflation	$\Delta H/\text{GDP}$	Inflation
1978	4.2	175.5	2.0	38.7	3.4	40.1	3.6	17.5
1979	3.2	159.5	3.3	52.7	2.5	33.4	4.3	18.2
1980	3.0	100.8	2.0	82.8	2.4	35.1	4.9	26.4
1981	2.5	104.5	2.0	105.6	-0.7	19.7	5.5	27.9
1982	3.9	164.8	2.1	97.8	-1.7	9.9	10.9	58.9
1983	5.5	343.8	2.0	142.1	0.7	27.3	6.7	101.8
1984	5.1	626.7	2.7	197.0	0.8	19.9	5.8	65.5
1985	4.3	672.1	2.7	226.9	1.0	30.7	1.8	57.7
1986	2.6	90.1	3.6	145.2	n.a	19.5	1.8	86.2

Note: Seigniorage, ΔH , is the increase in the money base, H , defined as line 14 in *International Financial Statistics*, except for Argentina, where it is line 14a. Inflation is the annual change in consumer prices, line 64.

Source: Ibid.

We can see this inflation laffer curve in the Argentine data (From C&H)

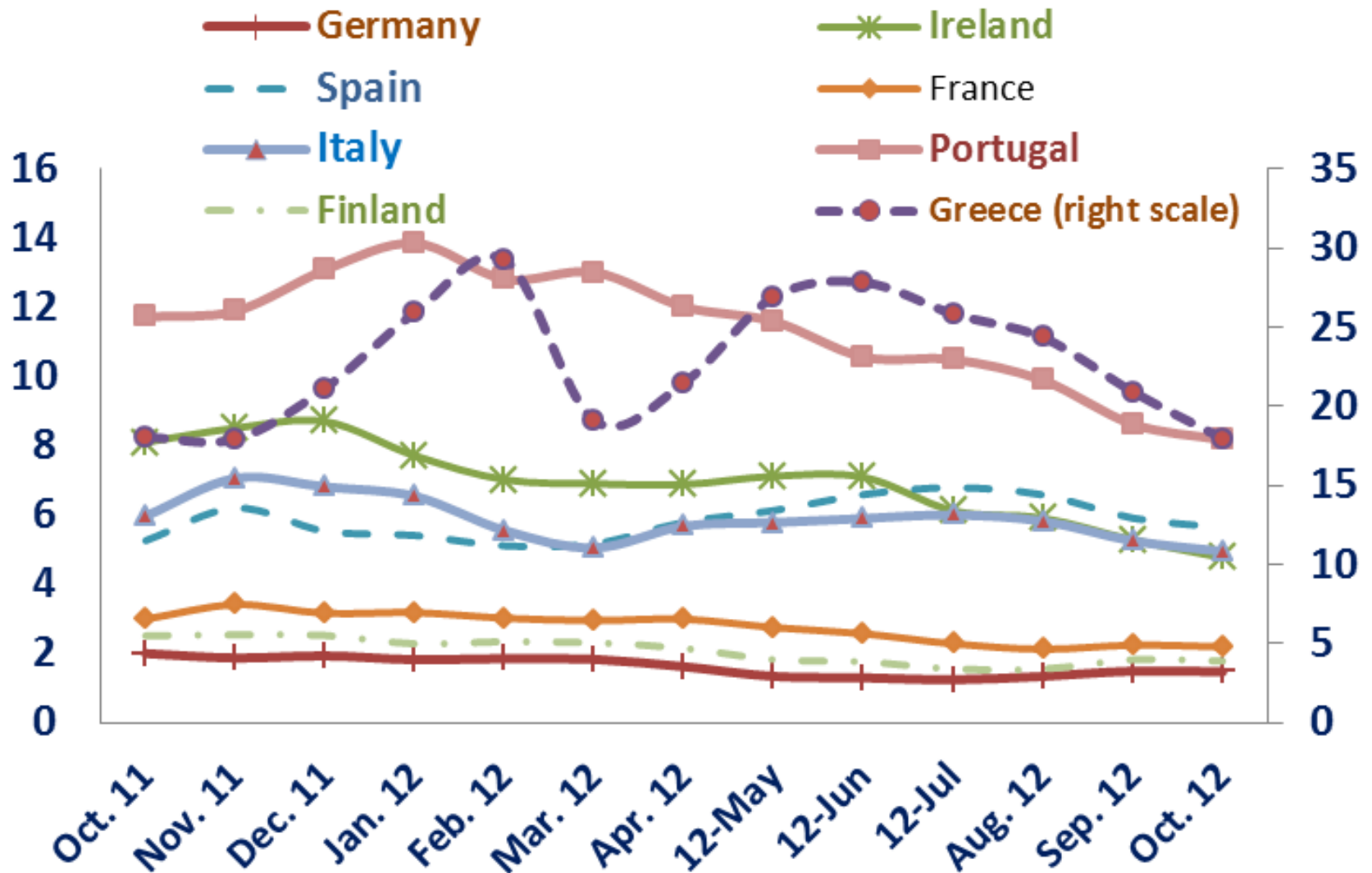
Figure 4-2- Argentina Seigniorage/Inflation tax Laffer curve, 1978-86



Source: Cardoso and Helwege, Chapt 6, Table 6.4, p. 153

Another “self-fulfilling” Euro crisis..

Figure i-2: EU Members long-term interest rates



Source: ECB stats, <http://www.ecb.int/stats/money/long/html/index.en.html>

Latam Stabilization Policy Lessons: many failures then success in all major countries

1. Inflation tax regressive & destabilizing, a tax that falls on the poor, informal sector,
2. Orthodox programs fail because deep recession
3. Heterodox/neo conservative programs fail because of balance of payments crisis, see handout.
4. Fiscal adjustment key to Heterodox success, but **Talvi effect** (higher VAT collections due to Consp boom) and **Olivera-Tanzi effect** (higher tax collections when inflation falls) and seigniorage boom create temporary revenue surge, but

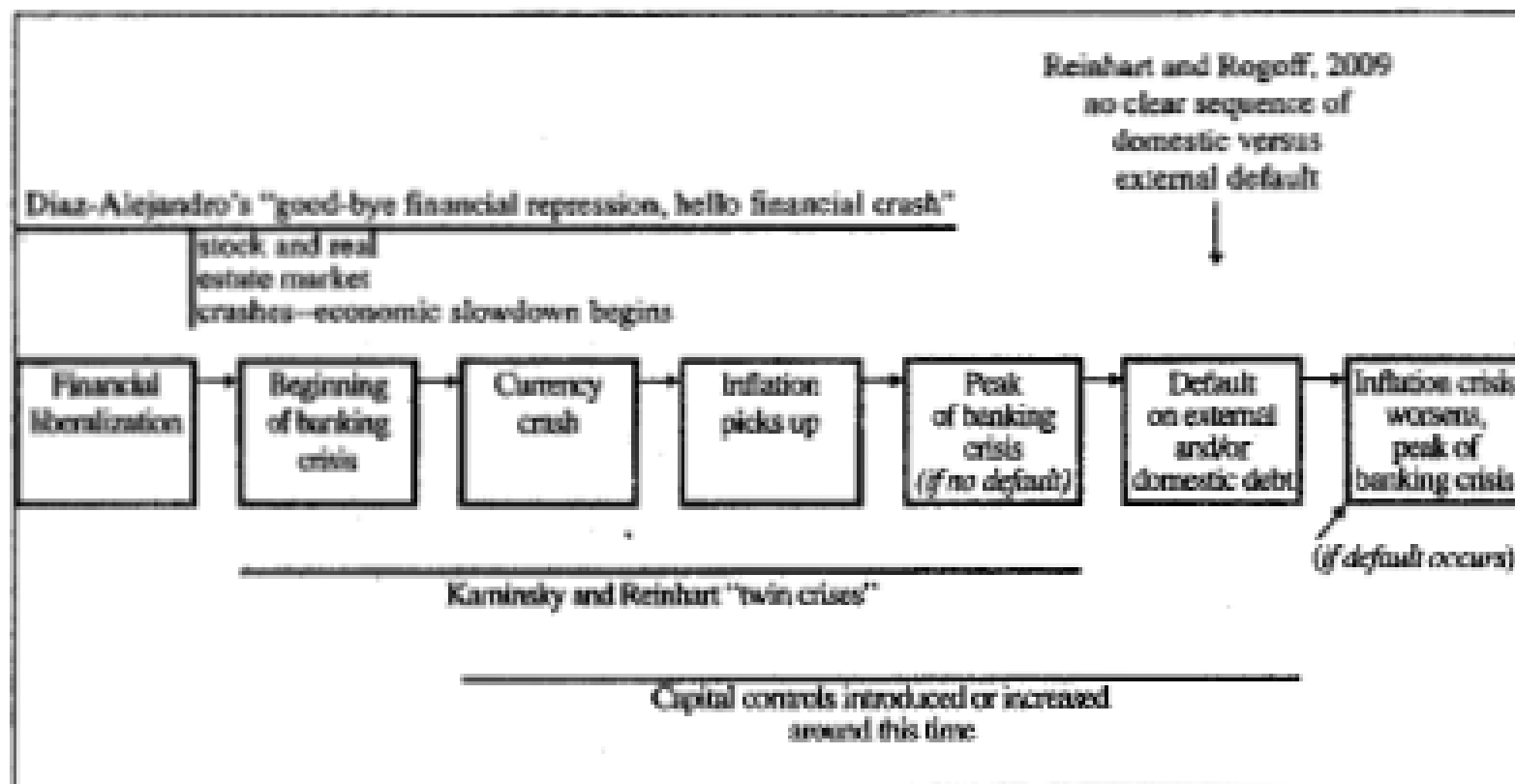
Typical Crises: all the same or always a little different?

1. Krugman, 2008: problems is too much faith in financial sector and bailout plans (see Chapter 2)
2. Edwards, 2010: just avoid pegged exchange rates, all will be fine... (Euro countries and Argentina remind us of the hazards of fixing exchange rates)
3. Reinhart and Rogoff, 2012: we are condemned to re-live the same crises again and again... see Stanley Fischer quote in recent ARC conference panel... even those who know history are condemned to relive it... Bernanke describes 1907 crises... similar to today's (but also different).

Typical Crises: is this time different?

CARMEN M. REINHART AND KENNETH S. ROGOFF

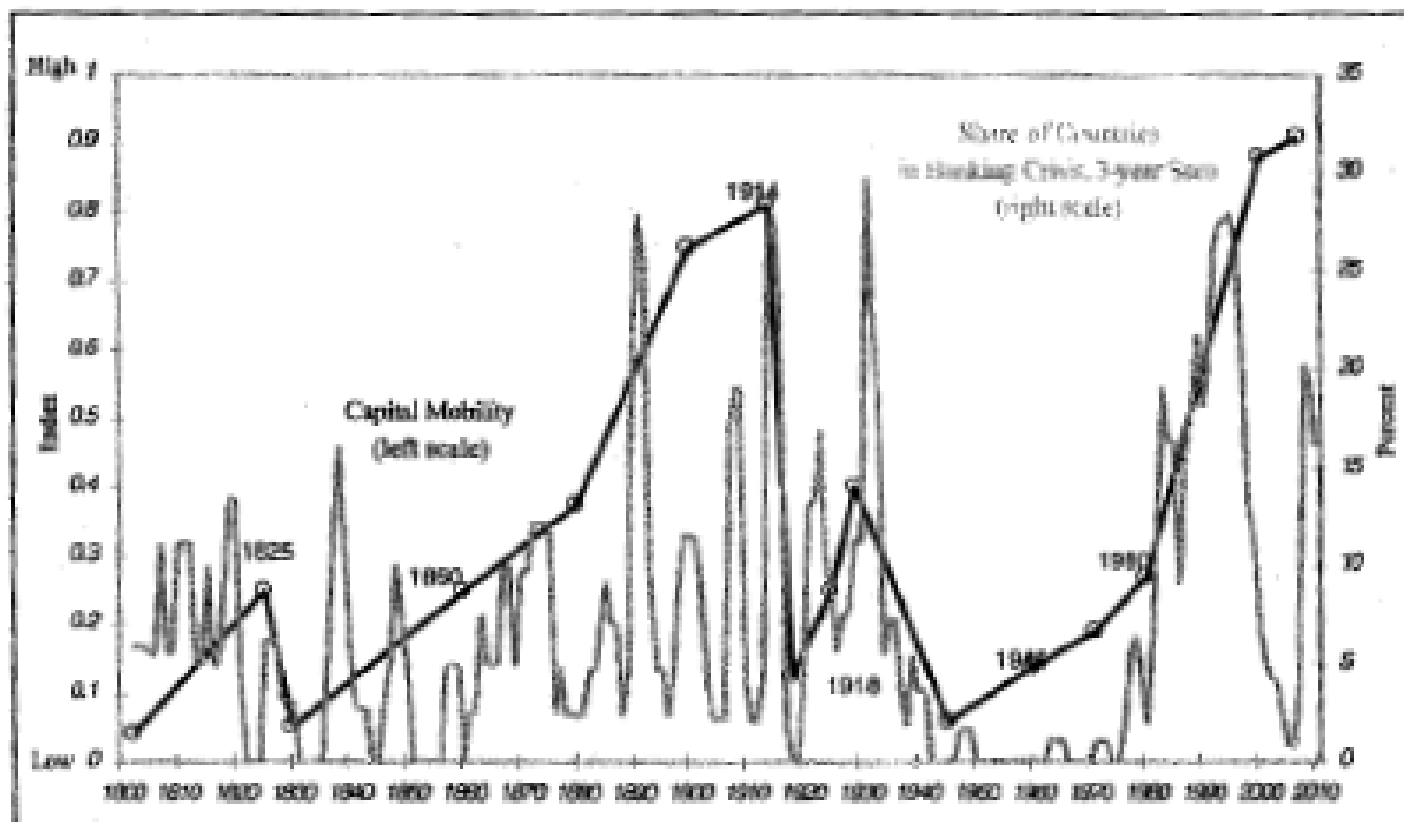
Figure 3. The Sequencing of Crises: A Prototype



Source: Reinhart and Rogoff (2009) and sources cited therein.

**Figure 1. Capital Mobility and the Incidence of Banking Crises:
All Countries, 1800–2010**

**Typical
Crises: is
this time
different?**



Sources: Updated from Reinhart and Rogoff (2009) and sources cited therein.

Notes: This sample includes all countries. On the left scale, we updated our favorite index of capital mobility, admittedly arbitrary, but a concise summary of complicated forces. The smooth dark line shows the judgmental index of the extent of capital mobility given by Obstfeld and Taylor (2004), backcast from 1800 to 1859.

R&R typical currency Crises: is this time different?

Table 1. Quantitative Antecedents of Financial Crises: The "Lead" of the Leading Indicators

Large capital inflows

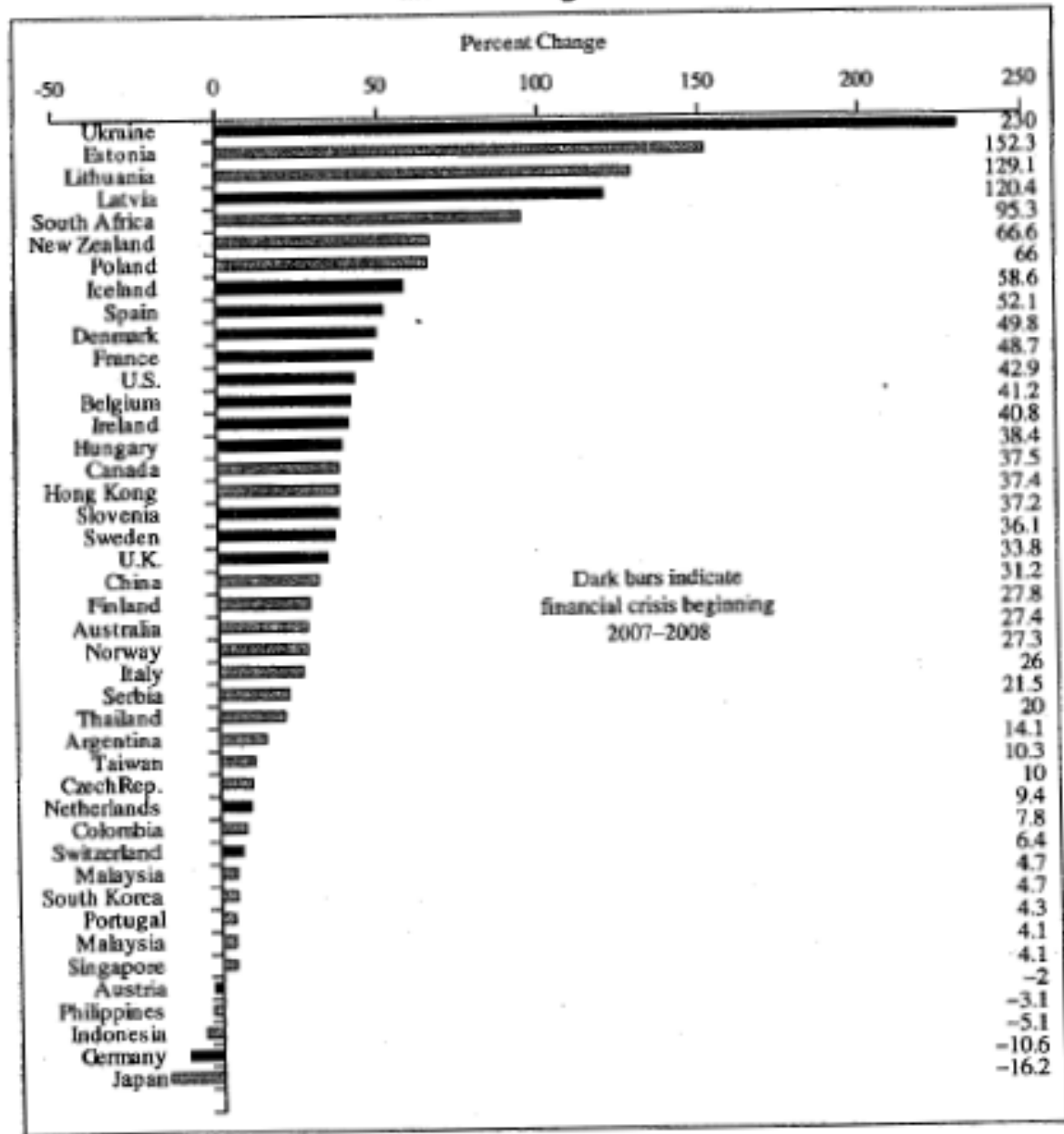
Sharp run-ups in equity prices

Sharp run-ups in housing prices

Inverted V-shaped growth trajectory

Marked rise in indebtedness

Figure 2. Percent Change in Real Housing Prices (2002–2006) and Banking Crisis



Source: Reinhart and Rogoff (2009).

Real estate boom reinforces credit boom

Capital flows lead to real estate boom and trade deficit

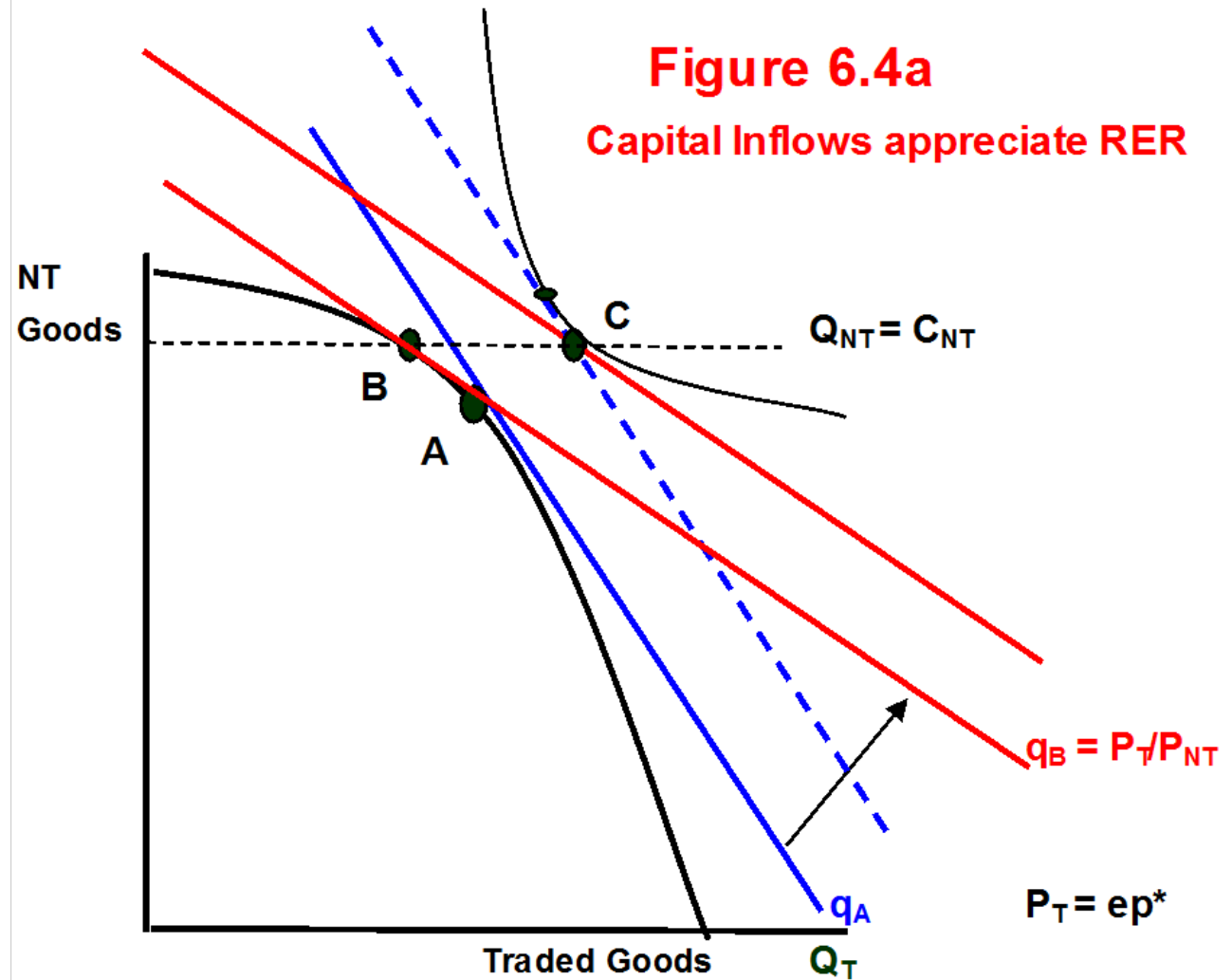


Figure 6.4: Capital Inflows always cause an appreciation of the real exchange rate, RER or $q = P_T/P_{NT}$ where $P_T = ep^*$.

Fixed Exchange Rate: P_T is fixed so P_N must increase.
(capital inflows are generally inflationary)

Flexible Exchange rate: $P_T = ep^*$ may fall, or P_N may increase.
(capital flows cause Inflation to rise or fall)

R&R: these amplify boom-bust cycle

Table 3. Amplifiers of Boom-Bust Cycles: The Usual Suspects

Procyclical macroeconomic policies

Hidden debts (implicit guarantees)

Overvalued currencies

Poor regulation

Even worse supervision

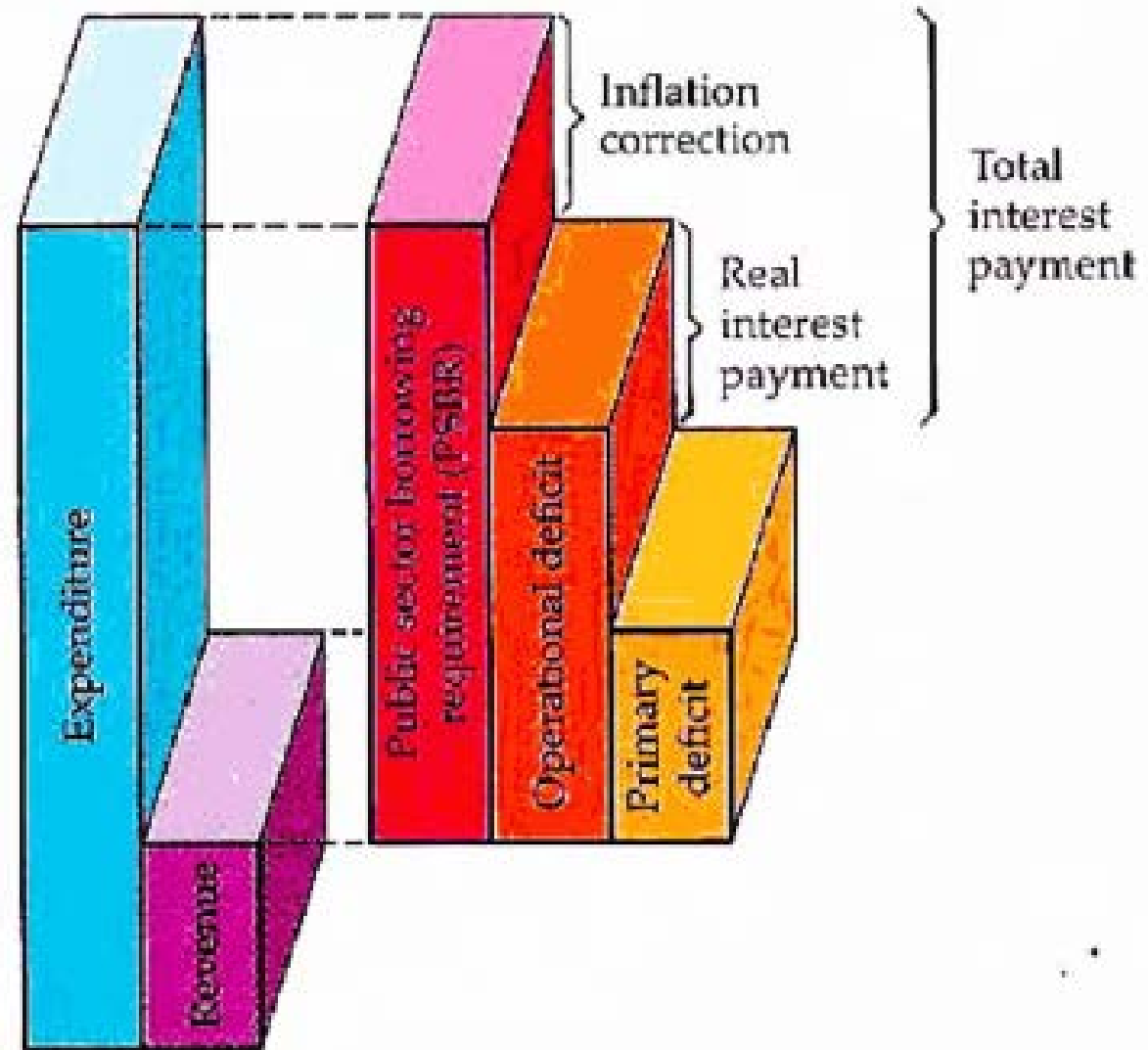
Outright fraud

Myopic credit rating agencies

Box figure 3.1 The relation between different deficit concepts

Primary deficit

excludes interest payments, a reduction in inflation reduces deficit, still need primary surplus to stabilize public debt to GDP ratio



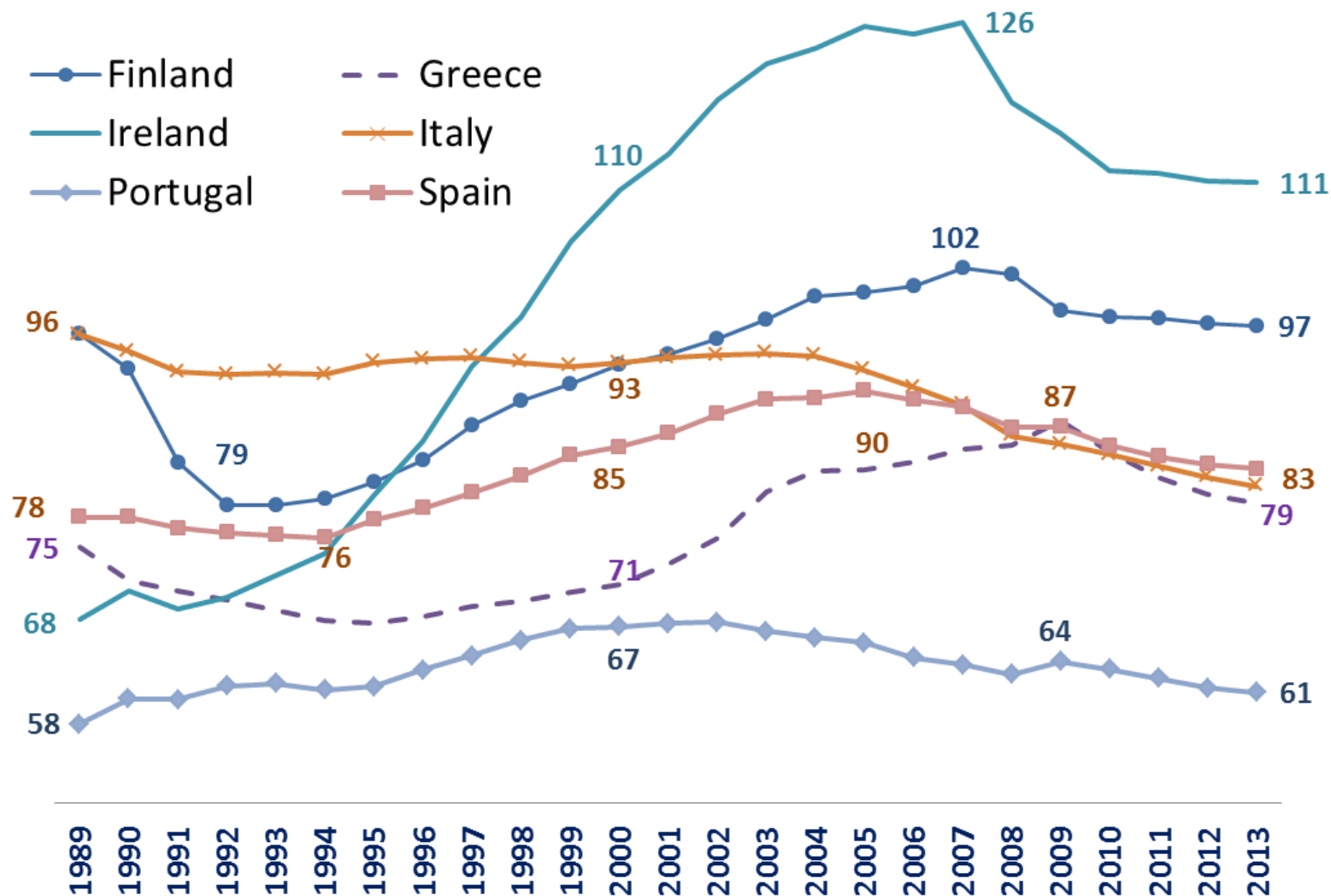
Generation II models: *Expectations management & multiple equilibria*

- Inflation/interest rate targets replace money aggregates
- Central Banks manage expectations Example: Krugman (2008) Key to escape from liquidity trap is expected future inflation (escape clauses in currency arrangements)
- IT and Fixed exchange rates/currency areas are ways to manage expectations
- If there is private sector gets “noisy signals” policy transparency

policy can prevent speculative attacks (see for example S. Morris and H. Song Shin (2001) “Rethinking [Multiple Equilibria in Macroeconomics](#)” NBER *Macroeconomics Annual*, p. 139-182 especially comments by Helene Rey)

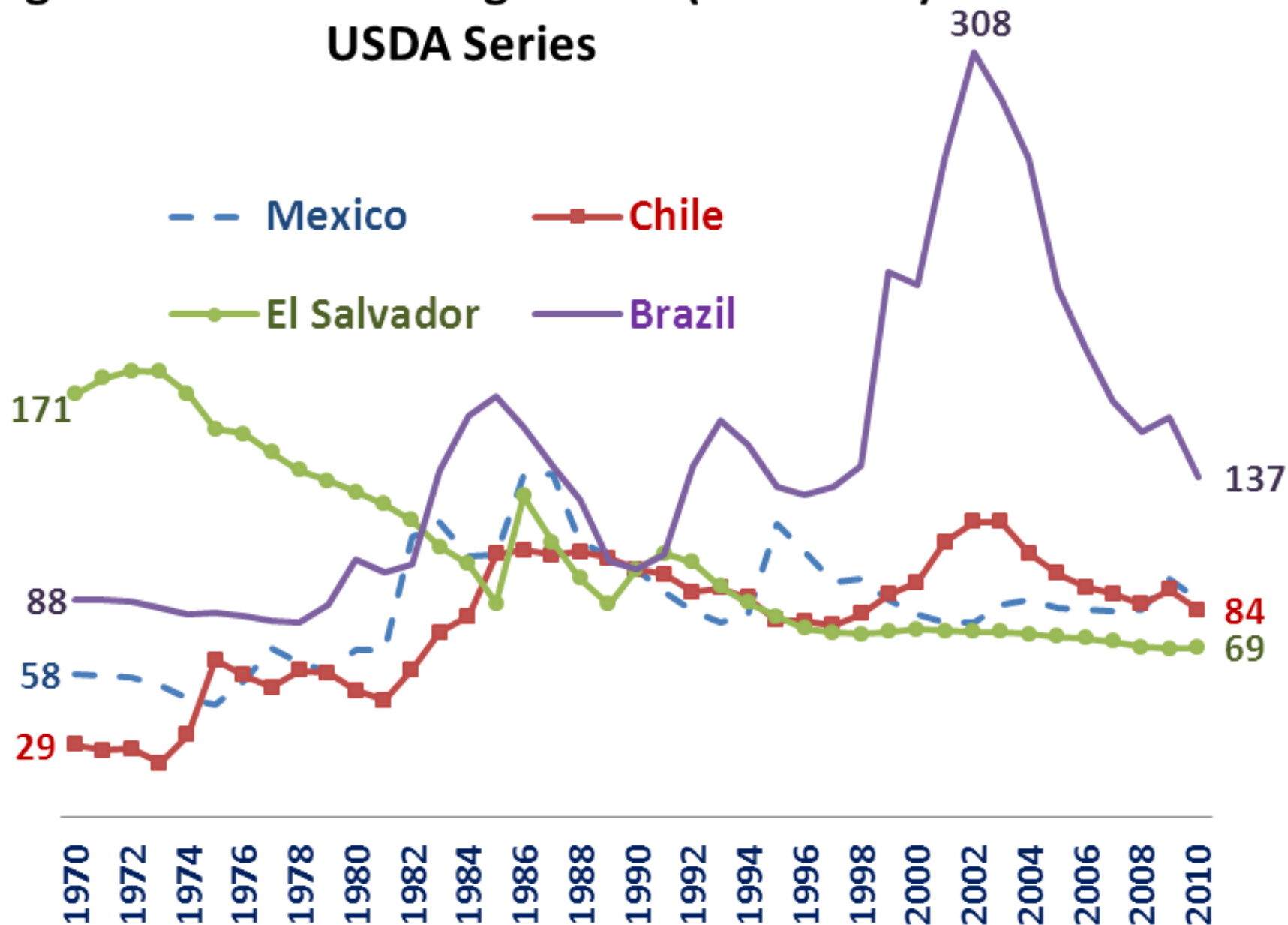
- ***Multiple Equilibria seem to create instability, but are provide an opportunity for good policy outcomes via managing expectations.***

Figure 3: Has the Euro area worked? Income per person relative to Germany (German per capita income = 100 \$PPP)



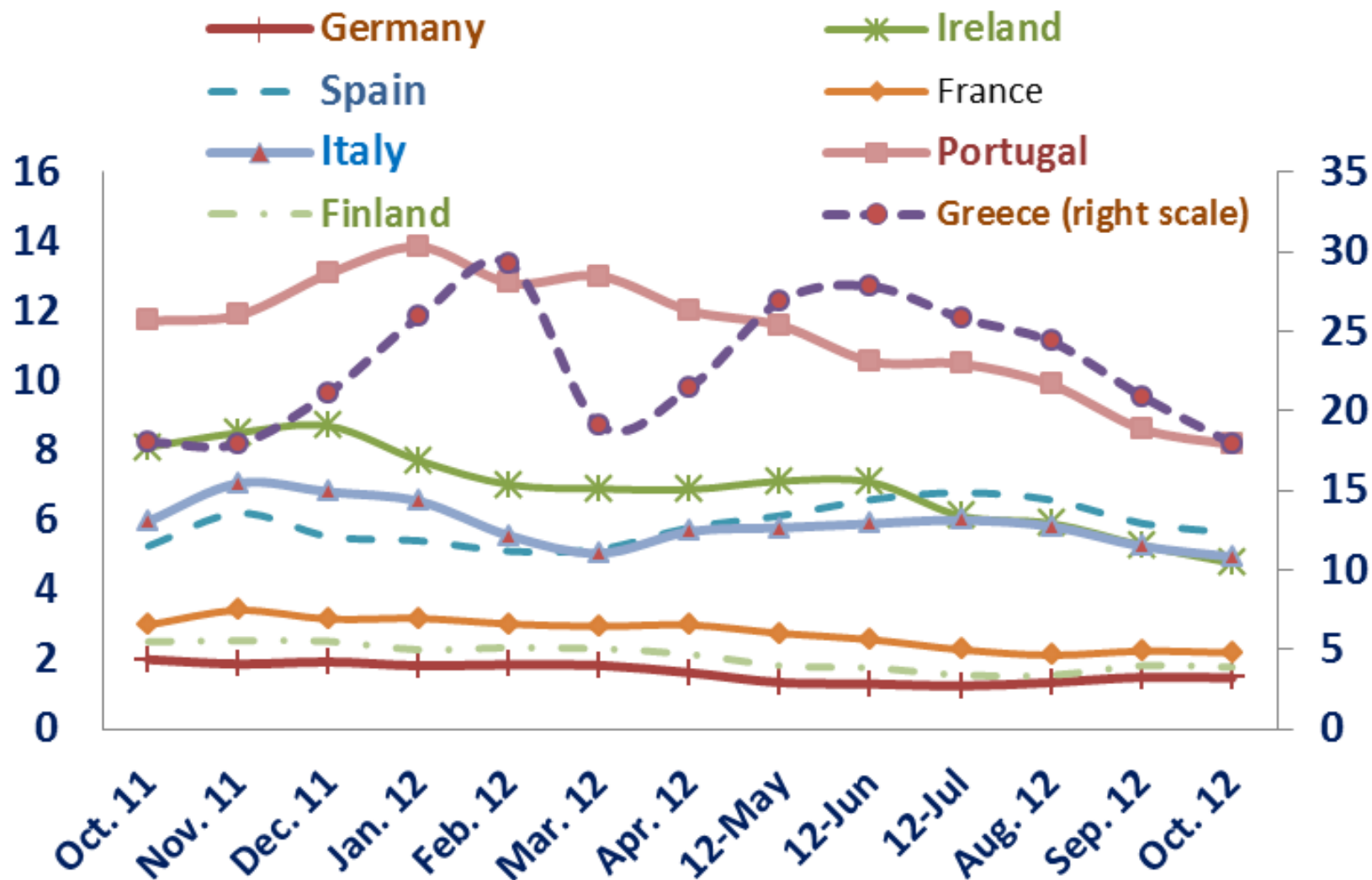
Source: IMF World Economic Outlook Database September 2011, post 2010 forecasts by IMF

Figure 10: Real Exchange Rates (1990=100)
USDA Series



The high interest rate trap: can also lead to multiple equilibria...

Figure i-2: EU Members long-term interest rates



Source: ECB stats, <http://www.ecb.int/stats/money/long/html/index.en.html>

Explaining 2008-11 crisis in U.S./EU

- Current account Imbalances– R&R, Geithner
- Monetary policy too loose (John Taylor)
- Lax regulation (leverage, Squam lake report)
- Black Swan theory (rare confluence of events)
- White Swan ([Krugman & Wells, Roubini](#))
 - Real estate bubble, typical, spread to many ctys.
- Greatest mistake - in crisis response not in predicting (see Krugman and [Blinder NYT](#))

Argentina's post 2001 recovery

- Income distribution worsened during crisis, poverty rose inflation devaluation led to run on banks (inflation tax & bank very regressive— see income dist and povert data below)
- Fast Phoenix recovery, devalued peso, high commodity prices helped a lot, banking system hardly recovered, still cannot borrow
- Fiscal revenues from exports rose (populist Kirchners took over)
- Some similarities to PIIGs, many important differences

Explaining earlier LDC crises

- Sudden stops: CA reversals (Calvo et. Al)
- Fixed exchange rates (policy mistake?)
- Excessive external debt low income ctys
- Fiscal deficits lead to currency crises (krugman speculative attack model)
- Currency mismatch creates banking crisis
- Mistakes by IMF/central banks in crisis response (Asia-contagion, Debt crisis 1980s)
- Mistakes by countries in crisis response

Argentina's 2001 crisis

- Parallels to Ireland, Greece and Spain... (GIPSI)
- Internal Devaluation, fixed exchange rate, slow growth **(IMF endorsed post Brazil 1998)** slow growth deflation
- Default on large external debt: Deflation/very high unemployment, near 20%
- Currency mismatch that should not have been
- Dollar accounts in banks “peso-ized” big losses for account holders sharp decline, crisis led to big jump in poverty rates, inequality rose (why?) freezing dollar/peso accounts hit middle class

Argentina's 2001 crisis?

- Unilateral default, no collective action clause, so pari passu this led to “Vulture fund” seizing ship seized
- Rapid “phoenix recovery”, “recovered with no credit systemic financial crises” Calvo et. al
- Managed exchange rate w/ blue market 2015.
- Argentina defaulted and devalued peso: fast recovery, triple digit inflation never returned (25%)
- Dramatic reduction in poverty, higher average growth (partly due to QE 1-3).

This time is different: a catalog of recent crises

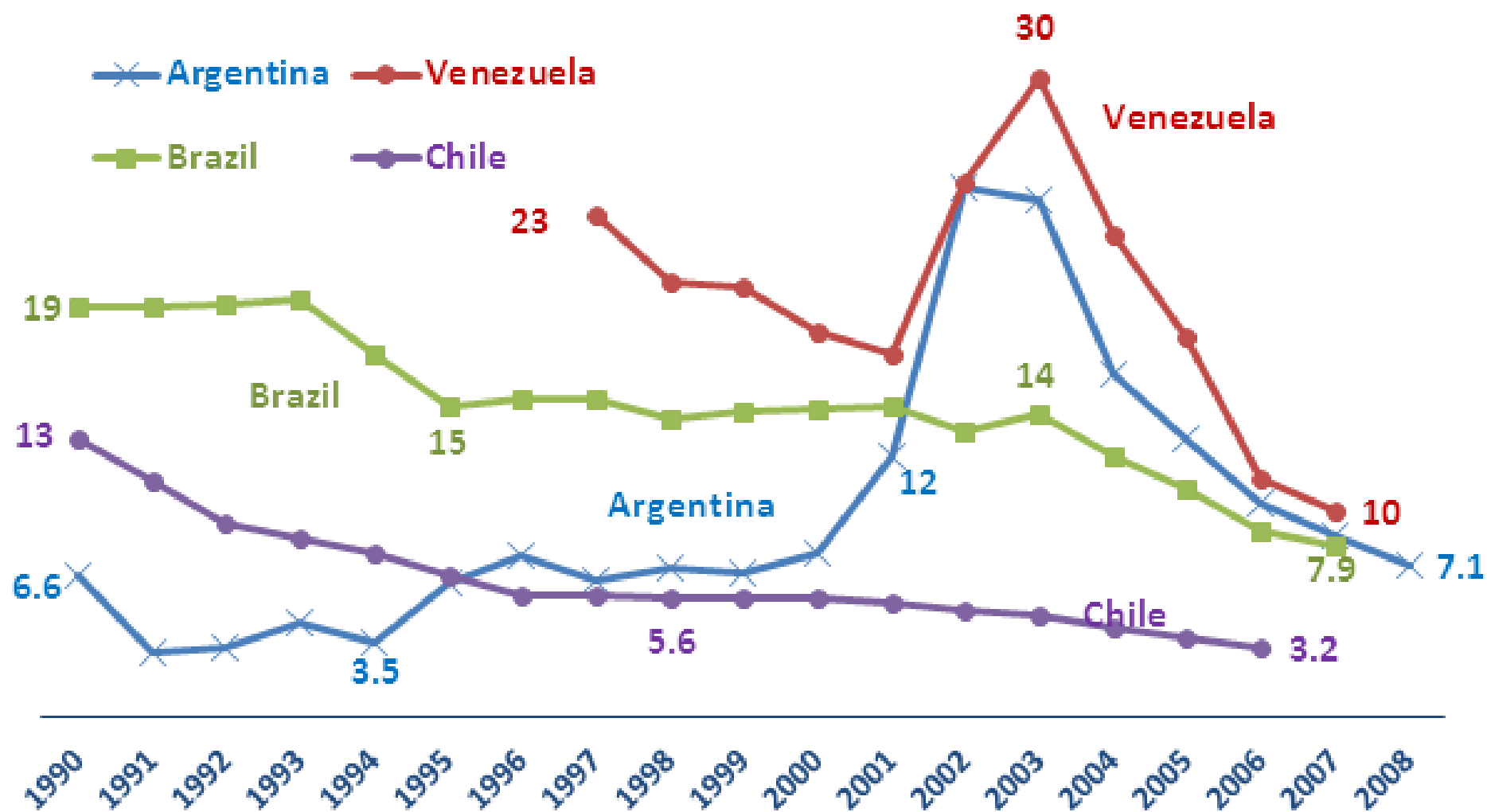
Rheinhart and Rogoff (2008) This time is different checklist	1980s LDC Debt	1992 ERM Crisis	1995 Mex Crisis	1997 Asia Crisis	1998 Brazil Russia	2001 Arg Default	2008-EU- U.S. Crisis
1. Excessive borrowing, leverage public or private? large fiscal deficits	yes pub ext yes	No none no	yes pub ext no	No private no	yes/no public ?	yes private no	yes private some**
2. Sovereign debt default	yes	No	No	No	Yes	Yes	almost**
3. Currency crisis Fixed rates played role?	yes yes	yes yes	yes yes	yes yes	yes yes	yes yes	not yet yes**
4. Mild to high inflation^{1/}	hyper	no	high	mild	moder	moder	not yet
5. Banking crisis run on banks/bank holiday	yes yes	some no	Yes no	Yes no	No no	Yes yes	Yes no*
6. Heavy damage slow recovery <i>Pheonix Recovery?</i>	yes No	no ?	No Yes	No Yes	No Yes	No Yes	Yes No
7. Policy mistakes in response	Yes	No	No	Some	no/yes	Yes	Yes

1/ Inflation: mild: less than 10% annually; moderate 10-25%; high inflation: over 25%; hyper: over 50% monthly or 10500% annually (Argentina, Brazil, Peru, NIC, Zimbabwe... who else?)

*Krugman (2008) calls collapse of Lehman/Bear Sterns a "bank run" stretching common usage.

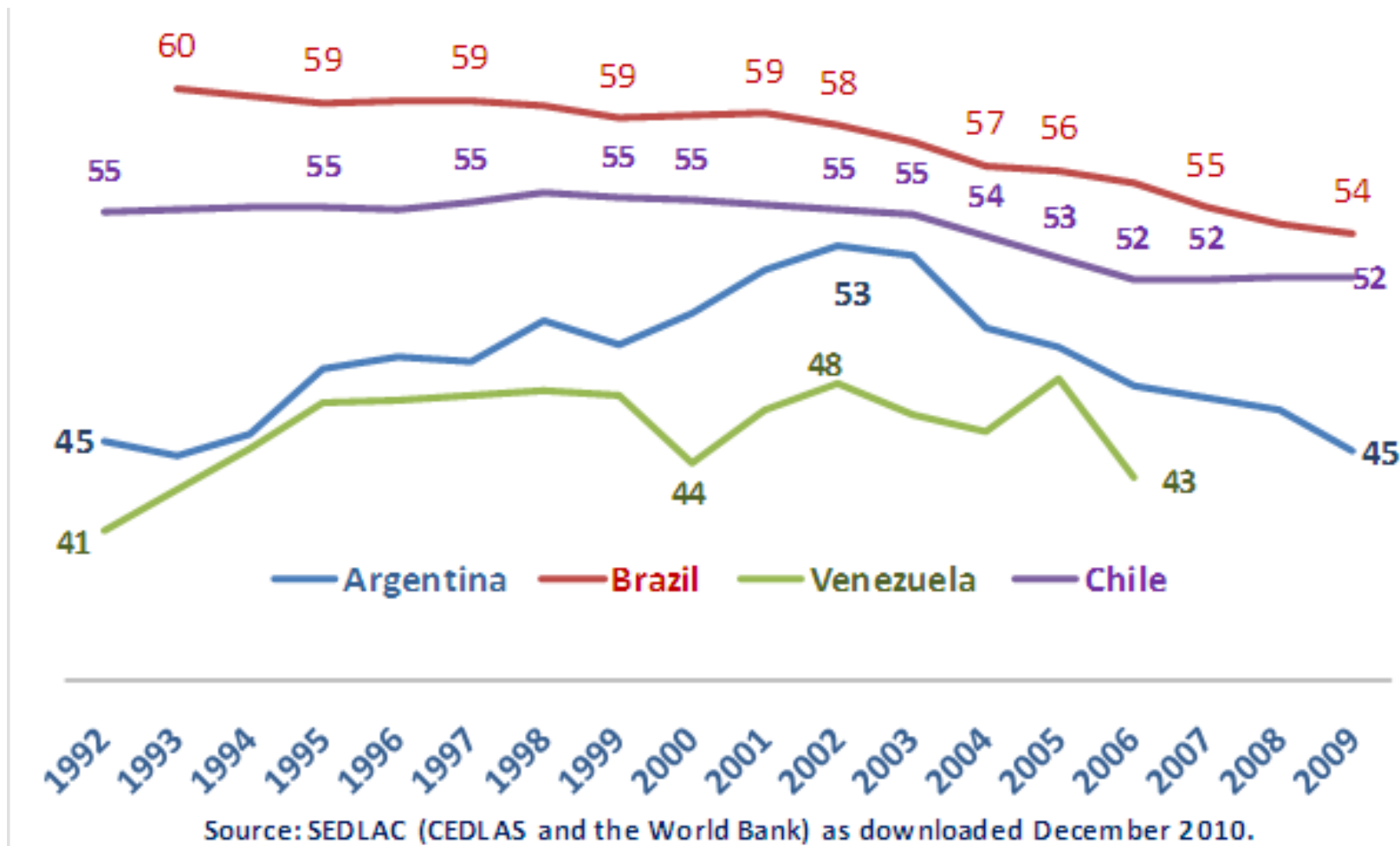
**Mainly Greece, U.S. had fiscal deficits, but of no consequence.

Figure 4a Extreme poverty in Argentina , Brazil, Chile and Venezuela



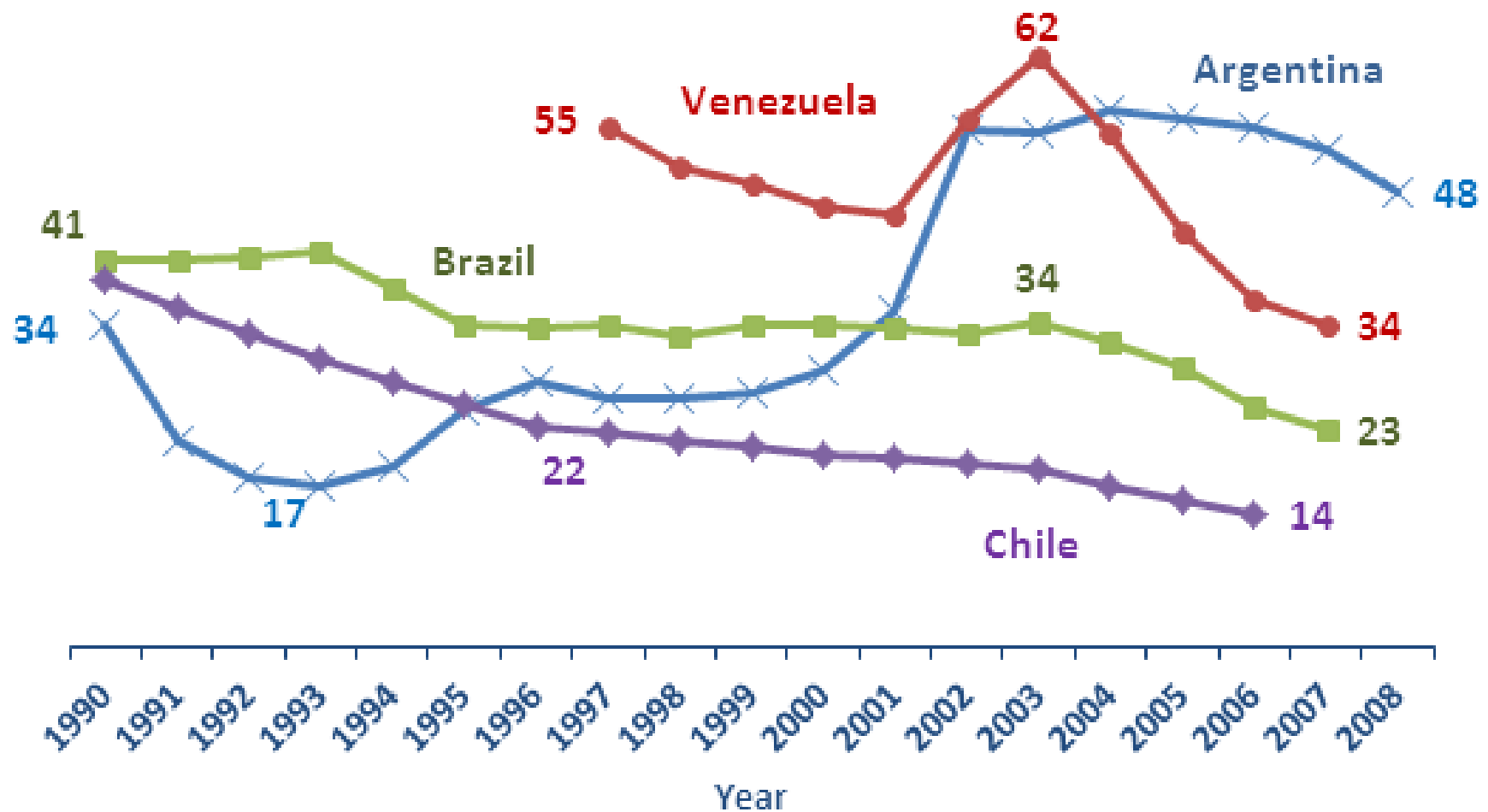
Source: SEDLAC/CEDLAS World Bank data downloaded July, 2009. Argentina is for urban areas only.

Inequality rose sharply in Argentina



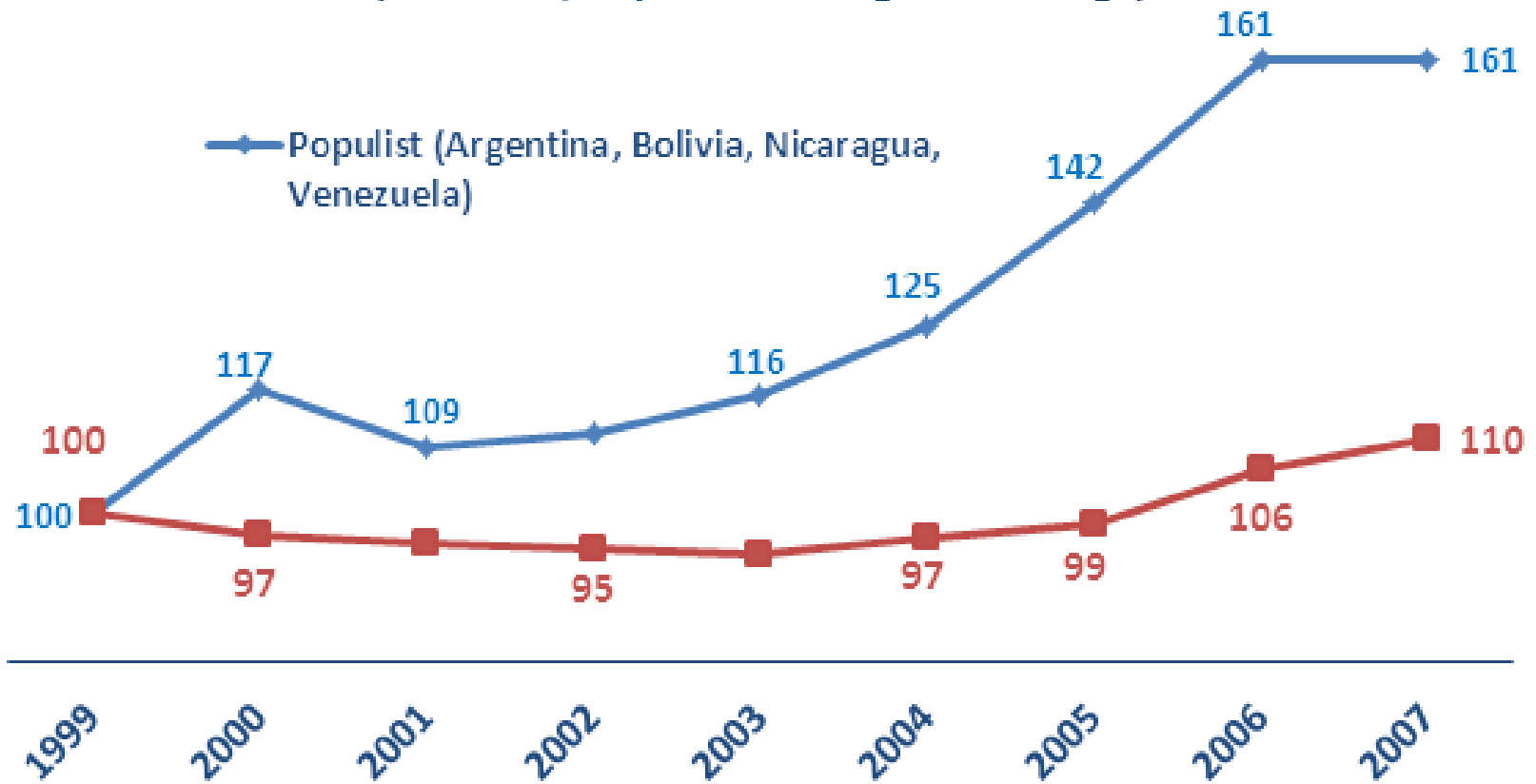
Moderate poverty rose as well

Figure 4b: Moderate Poverty rates in Argentina, Brazil, Chile & Venezuela (share population below national CEPAL poverty line)



Source: SEDLAC/CEDLAS World Bank downloaded July, 2009. Argentina urban areas only.

**Figure 5a: Net barter terms of trade
(1999=100, Population Weighted Average)**



Source: World Bank, WDI online, author's calculation using population weights.

Policy Options for Developing Countries

Emergency borrowing (TARP for LDCs)

IMF has not been generous LOLR, until recently (post G-20).
World Bank and regional banks financed safety nets

Adjust: (a number of unpleasant options)

- Stabilization (demand management-- contractionary)
- Devaluation (a weak currency makes dollars go farther)
- Structural Adjustment (supply side policies, expand exports)

Other long term options:

Regional Central banks -- Banco Alba
Currency boards or join the EU
Reform the BWIs and the UN (security council vs. GA)
Cultivate indigenous financing (remittance and microfinance)

Protecting the Poor

CCTs (conditional cash transfers)
Food for work
Cash for work public employment
Microfinance
Remittances
Devaluation and inequality? Thailand rice prices
Fiscal/monetary austerity and inequality/poverty