Debt crises

Macroeconomic Analysis 2018

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Agenda

- Simple model to illustrate the multiple-equilibrium nature of debt dynamics.
  - The interest rate charged by creditors depends on the probability of default
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- Because of this circularity, a sovereign, may face interest rates that are too high, being punished by a crime that is not committing.
  - Self-fulfilling crisis

What is Default?

- When a sovereign government fails to meet its legal obligations on debt
- Default is different from **insolvency** (when the debtor has no means to honour its obligations) or from **bankruptcy** (legal process)
- Distinction between:
  - Debt default: when the debtor fails to service the debt on the due time
    - Ex: **Moratorium** : Unilateral act consisting on a sovereign declaring the suspension of its debt service
  - Technical default: when the debtor fails to meet any obligation in the contract
    - Ex: issuing a senior bond
  - Both are considered **credit events**
    - Protection mechanisms, defences, are automatically activated: collateral, CDS, write-offs

Defaults in history

- First default (4th century BC):
  - 13 Hellenic city states defaulted on loans from the Temple of Delos
- First international debt crisis (1340):
  - Edward III of England defaulted, causing a bank run in Florence, and the bankruptcy of Peruzzi Bank, in 1343, and the Bardi Bank, in 1346.
- Between 1300 and 1799, only six European nations have recorded external defaults:
  - France (1558, 1624, 1648, 1661, 1701, 1715, 1770, 1788)
  - Spain (1557, 1575, 1596, 1607, 1627, 1647),
  - England (1340, 1472, 1594)
  - Portugal (1560)
  - Prussia (1683)
  - Austria (1796)

Liquidity vs solvency

- **Insolvency** : when the debtor has no means to honour its obligations
- Liquidity concerns the ability to attract new borrowing
  - If the country is known to be solvent, there will be no liquidity problem
  - If risky but expected to be solvent, risk neutral lenders will always find an interest rate
- A liquidity problem arises when there are doubts about solvency

Peculiar Facts about Sovereign Debt

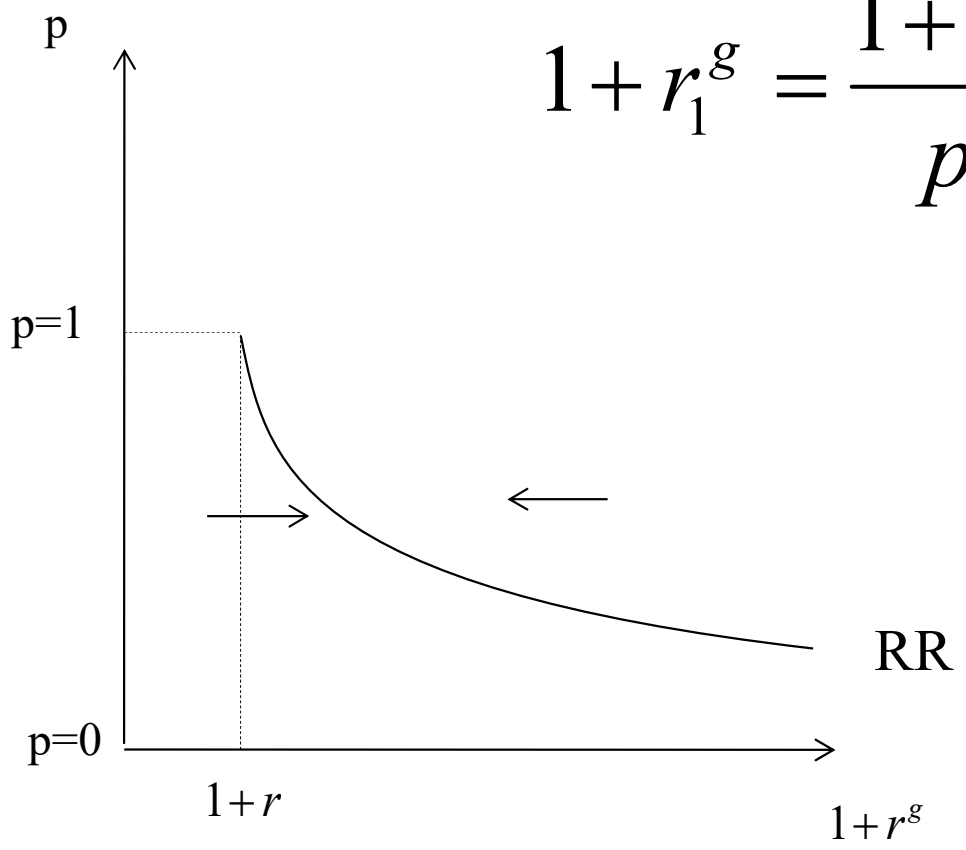
- Private debt contracts can be enforced in courts
- External debt contracts are more complicated
  - There is no supranational legal framework to enforce a claim against a sovereign nation ("sovereign immunity")
- On the positive side:
  - nations don't go out of business: scope for creditors to claim and claim again, until a settlement is reached
  - In 1918, the Russia's Bolshevik government repudiated the Tsarist debts. In 1987, Russia regained access to the international debt market, and to build credibility ended up negotiating a payment token for a debt that remained in default for 69 years.

Old-style punishment: In response to a default, the French invaded and occupied Mexico in 1862, suffering only one major defeat at the battle of Puebla (now commemorated by the Mexican holiday Cinco de Mayo).

Modern feature

- Game changers:
  - The US Foreign Sovereigns Immunity Act (1976)
  - The United Kingdom State Immunity Act (1978)
- Allowed private entities to sue a foreign government on activities related to commerce, including sovereign bonds
  - Created the conditions for private investors to enter in the sovereign debt market
  - These changes tilted the structure of developing countries liabilities away from official loans, towards bonds that are now dispersed among a large number of small lenders
  - …Problems of coordination.

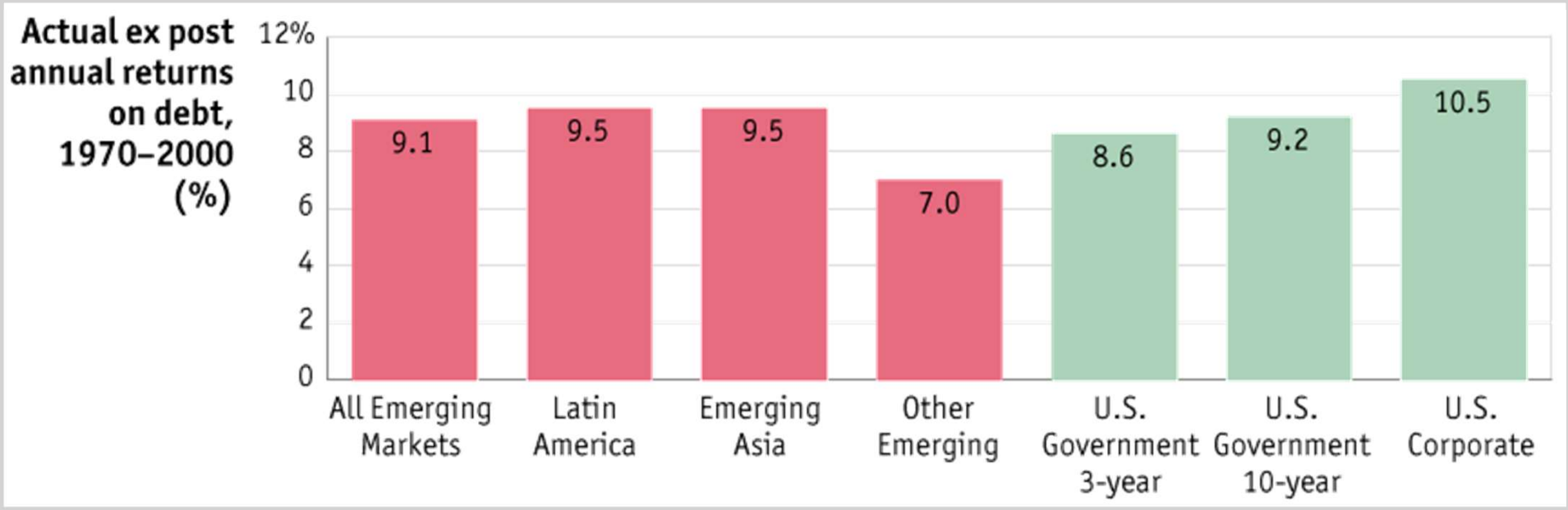
Lender's risk



$$1+r_1^g = \frac{1+r_1}{p}$$

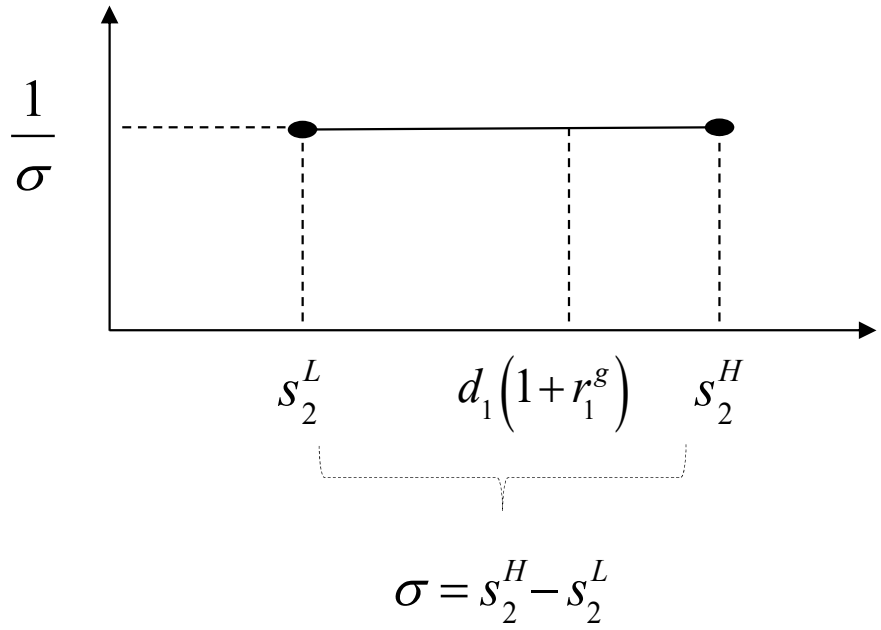
- The lower the probability of repayment, the higher the interest rate creditors will charge on the risky loan
- This equation determines the interest rate, given the probability of repayment
- If this condition holds the sovereign is expected to be solvent

Is There Profit in Lending to Developing Countries?



Returns on Emerging Market Debt, 1970s–2000s The ex post realized returns on emerging market debt have been 9.1% on average, as high as 9.5% in Latin America and Asia, but as low as 7% elsewhere (columns 1–4). Given their riskiness, these returns compare unfavorably with returns on safe U.S. government debt and U.S. corporate debt (columns 5–7). Whatever ex ante risk premiums were charged to emerging markets, defaults ate them all up and lenders only just broke even.

The probability of repayment



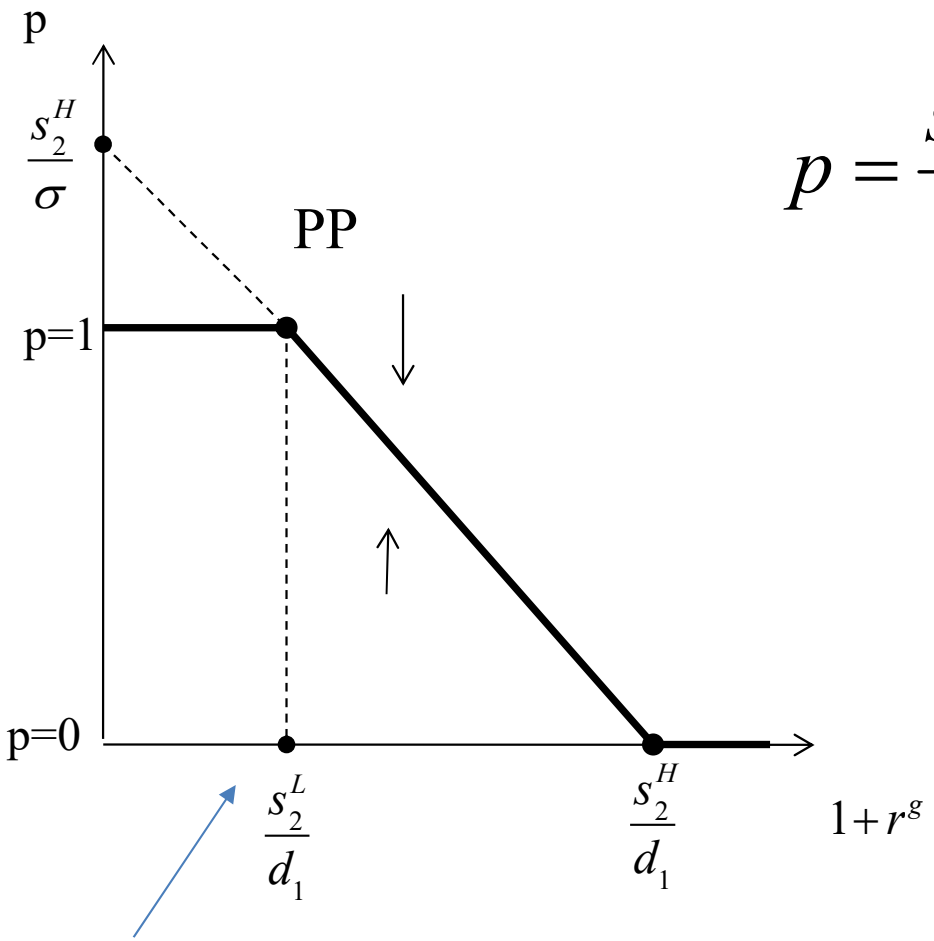
- S2 has a uniform distribution
- Each possible realization in the range has an equal probability

Probability of repayment

$$p = \Pr\left[s_2 \geq d_1\left(1+r_1^g\right)\right]$$

$$p = \frac{s_2^H - d_1\left(1+r_1^g\right)}{\sigma}$$

PP-Schedule

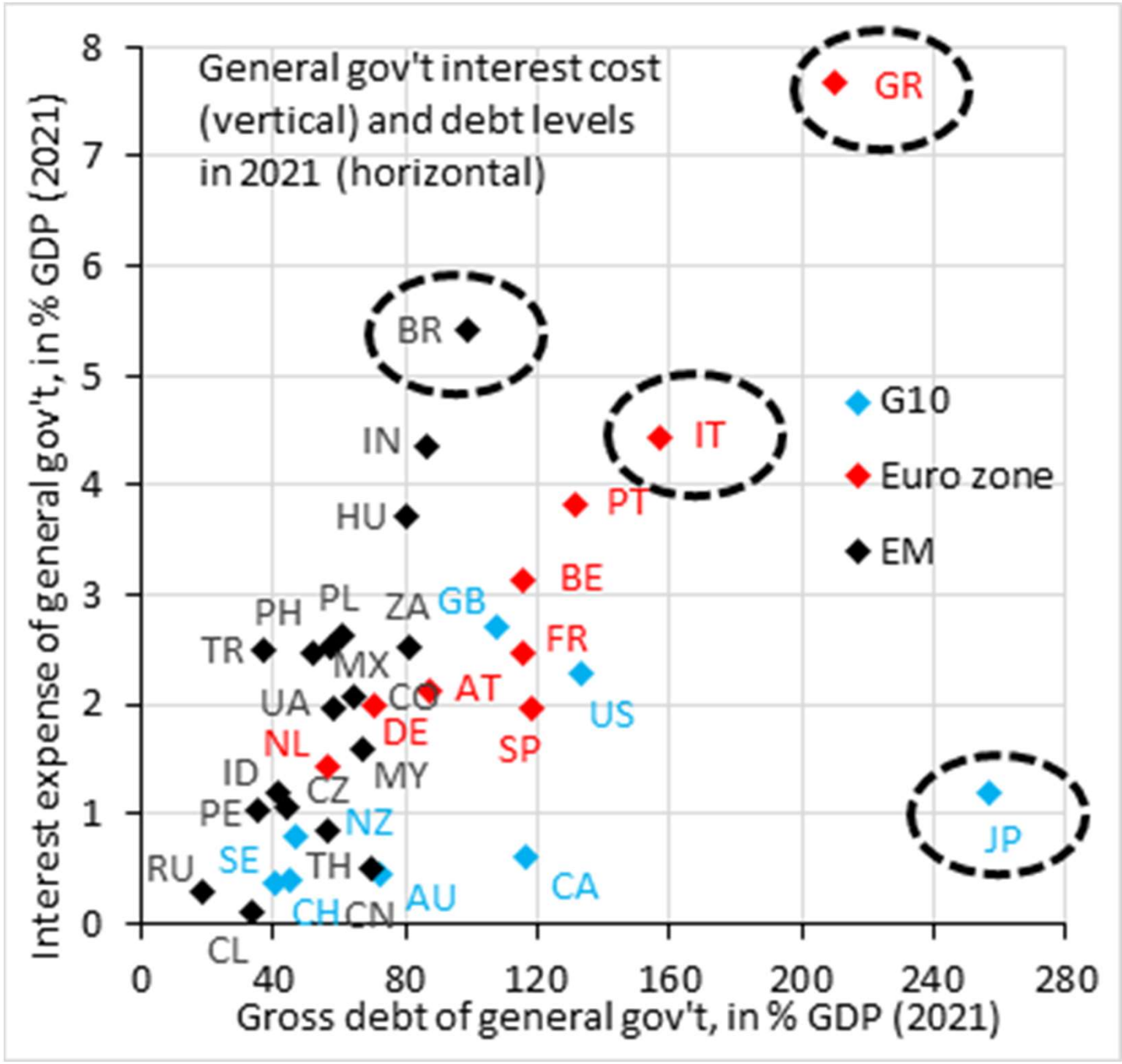


$$p = \frac{s_2^H - d_1\left(1 + r_1^g\right)}{\sigma}$$

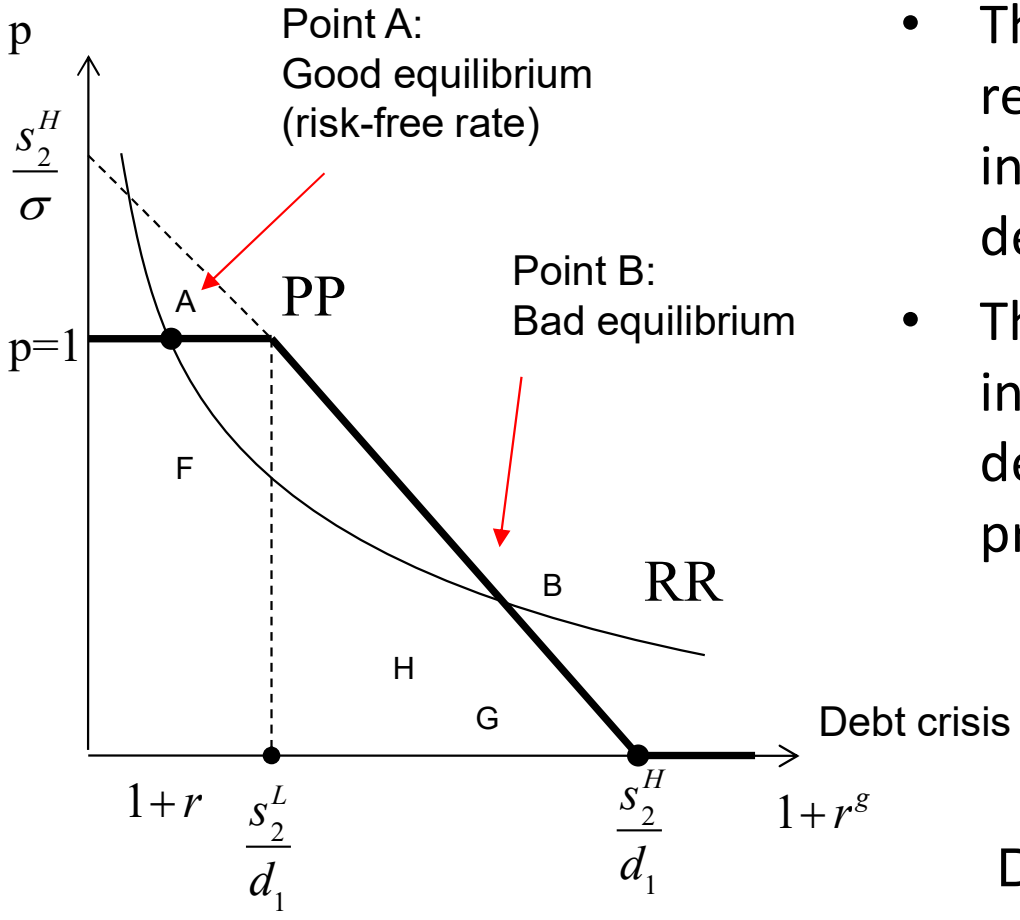
- This equation determines the probability, given the interest rate

In this example

$$s_2^L > 0$$


General gov't interest cost (vertical) and debt levels in 2021 (horizontal)
Interest expense of general gov't, in % GDP (2021)
Gross debt of general gov't, in % GDP (2021)
0
1
2
3
4
5
6
7
8
0
40
80
120
160
200
240
280
GR
BR
IT
IN
PT
HU
BE
PH
PL
ZA
GB
FR
TR
MX
AT
UA
CO
US
DE
SP
NL
ID
MY
CZ
PE
NZ
SE
TH
RU
AU
CA
CH
CN
CL
JP
G10
Euro zone
EM

Multiple Equilibrium



- The lower the probability of repayment the higher the interest rate investors demand to hold the debt
- The higher interest rate investors demand to hold the debt, the lower the probability of repayment

In this example

$$s_2^L > \left(1 + r_1^g\right) d_1$$

Debt crisis

- P goes to zero
- r goes to infinity

Coordination failure

- If all debt was held by a small group of creditors, a coordinated move from a bad equilibrium to the good equilibrium should always be possible.
- In the real world, however, government bonds are owned by thousands of uncoordinated investors.
- Thus, if the interest rate starts out high, the sovereign will be perceived to be risky by any one investor, and no individual creditor will have an incentive to accept a lower interest rate in that bond, even if it perceived that a coordinated downward decrease in the interest rate by all creditors at the same time would make it possible a superior equilibrium.
- Because each individual investor is small in the market for this debt, it will not internalize the externality that imposes on the others by requesting a high interest rate.

Market price of bonds

- Value of bonds:

$$V_1 = p\left[\frac{d_1\left(1+r_1^g\right)}{1+r_1}\right]$$

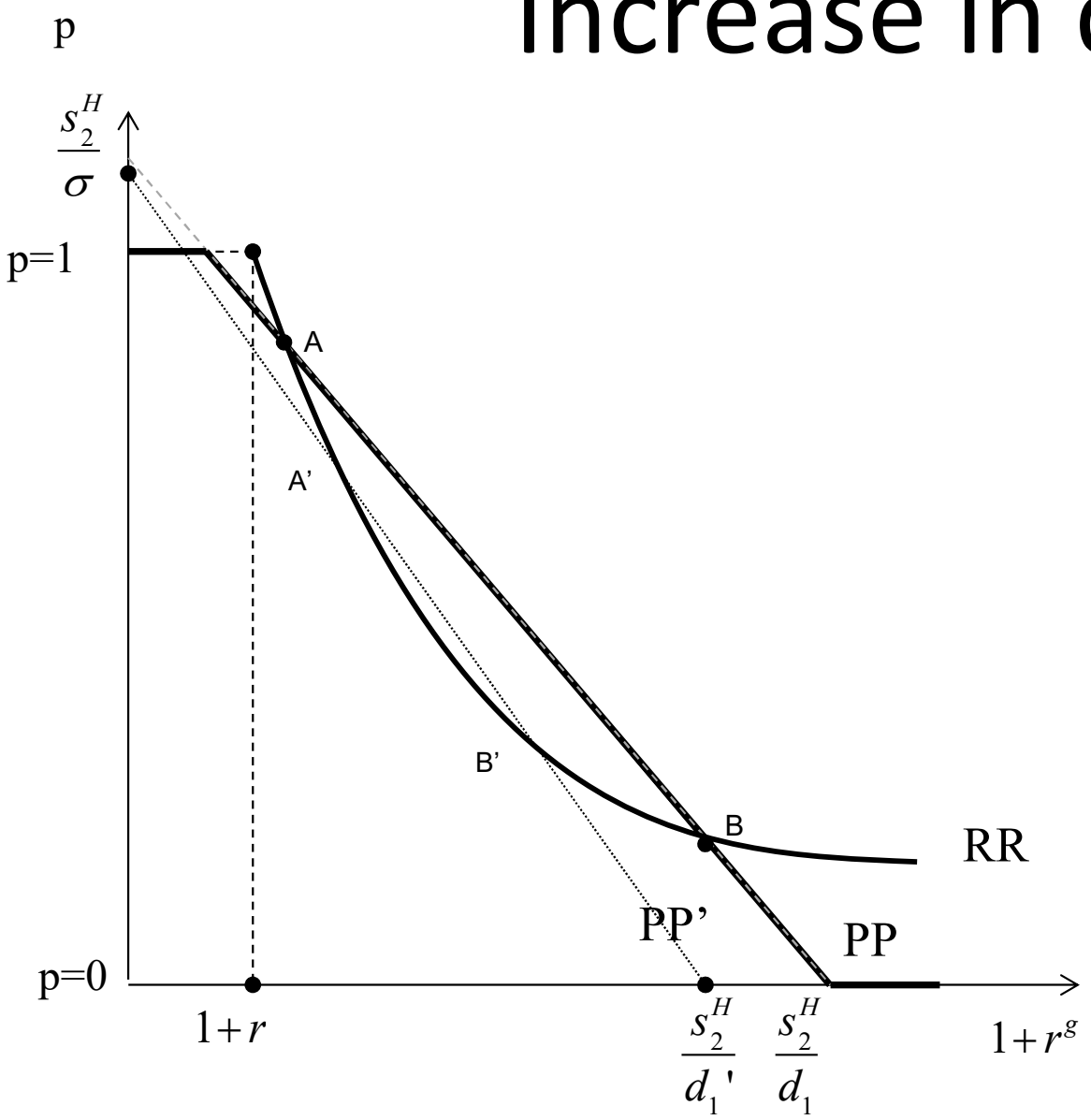
$$1+r_1^g = \frac{1+r_1}{p}$$

$$V_1 = d_1$$

$$q = \frac{V_1}{d_1} = 1$$

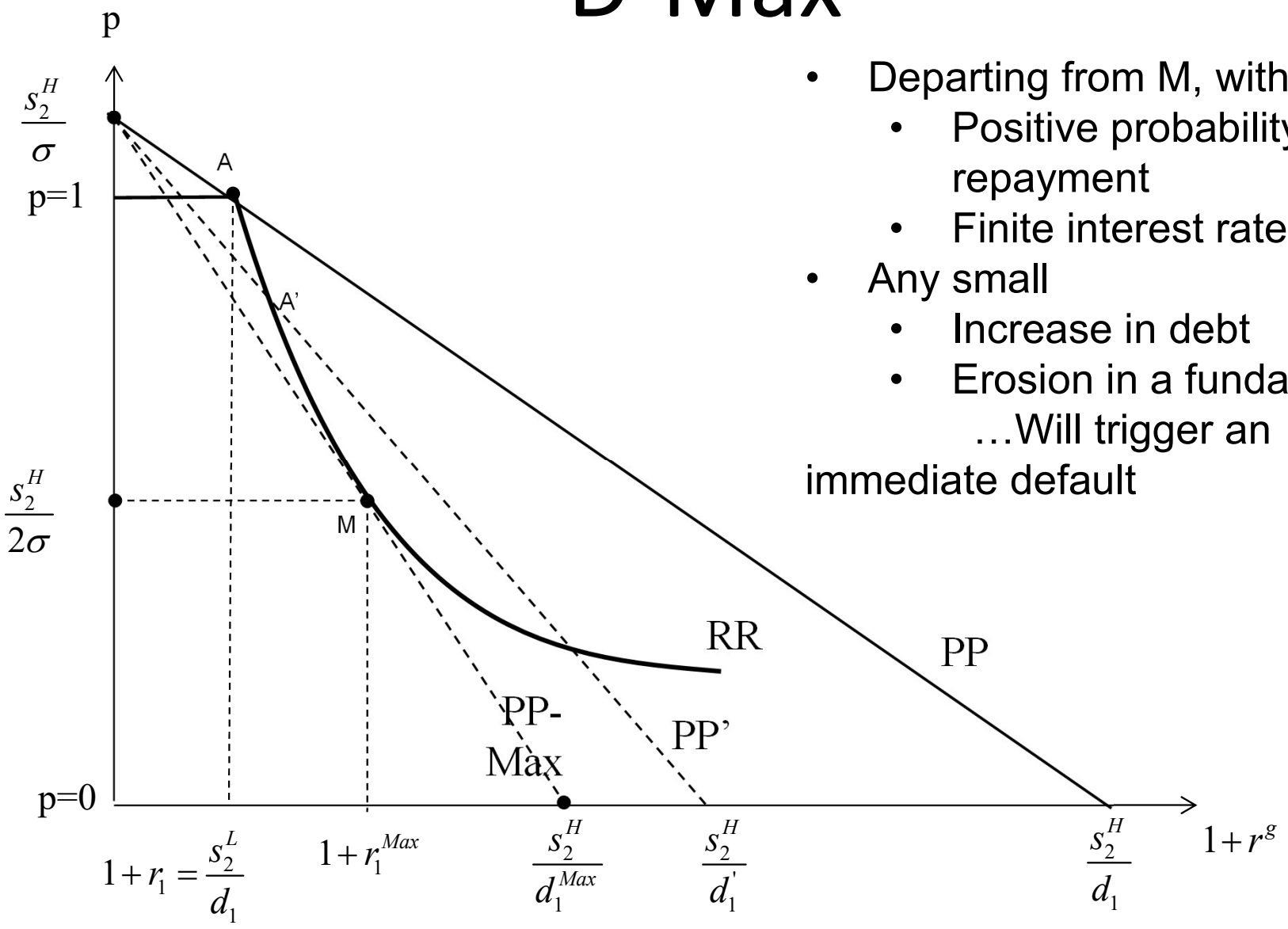
- As long as the arbitrage condition holds, the bond will be quoted at the par value

Increase in d



- In this case, the PP curve rotates downwards.
- If the economy starts out in the good equilibrium A, the new stable equilibrium A' is likely to be reached.
- If the economy started out in the unstable equilibrium B, a debt-crises would have been triggered.

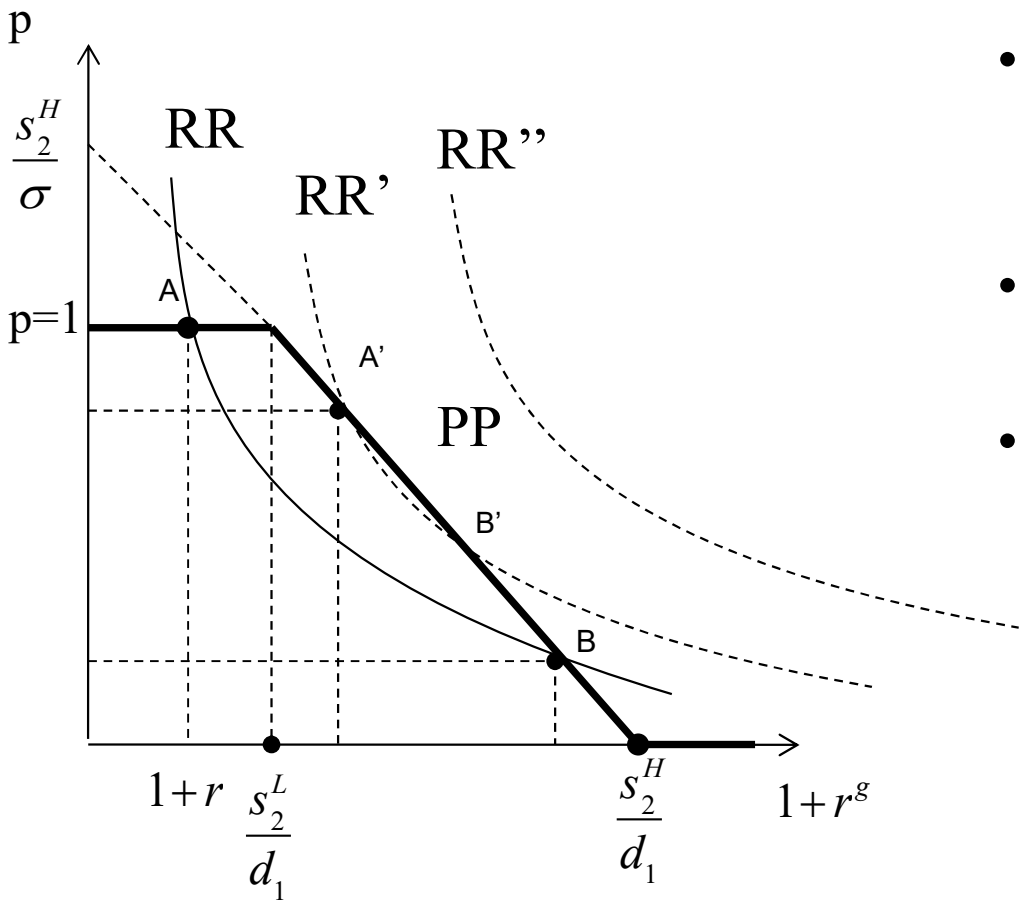
D-Max



- Departing from M, with
  - Positive probability of repayment
  - Finite interest rate
- Any small
  - Increase in debt
  - Erosion in a fundamental

…Will trigger an immediate default

Increase in r_f



- If the economy starts out in A, the new good equilibrium (A') is reached.
- If the economy starts out in B, a debt crisis will follow.
- If the global interest rate increases too much, a default will follow for sure

Debt Overhang

When debt gets so large that creditors do not expect to be fully repaid

Issues:

1. Incentive for creditors to lend to protect their claims
2. Conflict between individual and collective interest
3. Free riding

Debt crisis

- When a debt crisis occurs, a coordinated move among investors must be achieved, to drive the sovereign out of the trap.
  - In case the debt crisis is motivated by a self-fulfilling prophecy, the sovereign is not necessarily insolvent.
  - A coordinated move is needed to drive the debt dynamics to the good equilibrium.
  - No loss for creditors.
- A more difficult case arises when a sovereign debt becomes higher than the maximum it can serve.
  - The way out must involve a debt restructuring.
  - The threat of repudiation provides an incentive for lenders to accept a deal

Market price of bonds

- Value of bonds:

$$V_1 = p\left[\frac{d_1\left(1+r_1^g\right)}{1+r_1}\right]$$

$$p = \frac{s_2^H - d_1\left(1+r_1^g\right)}{\sigma}$$

$$V_1 = \frac{s_2^H d_1\left(1+r_1^g\right) - \left[d_1\left(1+r_1^g\right)\right]^2}{\sigma\left(1+r_1\right)}$$

$$q = \frac{s_2^H\left(1+r_1^g\right) - d_1\left[\left(1+r_1^g\right)\right]^2}{\sigma\left(1+r_1\right)}$$

- When $d_1 > d_1^{Max}$ the arbitrage condition $1+r_1^g = \frac{1+r_1}{p}$ does not hold, and the bond is quoted at discount q<1

Knocked Down

Secondary-market debt prices, September, 1991, % of face value

Country	Bid	Offer	Country	Bid	Offer
Argentina (Bonex 89)	79.20	79.30	Morocco	52.62	53.00
Brazil(investment bonds)	54.00	54.50	Nicaragua	8.00	N.A.
Chile	88.25	89.25	Nigeria	41.50	42.00
Colombia	77.00	79.00	Panama	17.50	18.50
Costa Rica	51.50	52.50	Peru	14.00	15.00
Cote d’ lvoire	5.00	7.00	Philippines	71.25	72.00
Cuba	5.00	N.A.	Poland	23.00	23.50
Dominican Republic	28.00	N.A.	Venezuela(par Bonds)	67.38	67.62
Ecuador	23.50	25.00	Yugoslavia	32.50	34.50
Mexico (Par Bonds)	59.38	59.62	Zaire	16.50	18.00

Defensive lending

When the sovereign is expected to be insolvent, further lending comes at a cost of an expected loss.

In this case, no creditor will voluntarily engage in new lending, unless it has a stake in existing claims

Current creditors, however, have an incentive to roll over the sovereign debt, engaging in a strategy that is coined *defensive lending*.

- If no lending takes place, the sovereign will find impossible to meet its obligations with the current resources and will default immediately.
- Avoiding a disordered default, the creditor still has a chance of recovering its claims, in case the good scenario materializes.
- By providing refinancing during the restructuring process, debt holders are in fact raising the value of the claims they already have.

Debt-restructuring

- Process through which the a distressed debtor reduces its debt obligations or renegotiates with the creditors the obligations in the contract.
  - Concerted lending (London Club, Paris Club): debt forgiveness, concessional rates, voluntary rescheduling
  - Market based arrangements: Voluntary market transactions: Debt buy-backs, debt swaps, debt-equity swaps.

Debt forgiveness

- Choose d1 such as to max:

$$V_1 = \frac{s_2^H d_1 \left(1 + r_1^g\right) - \left[d_1 \left(1 + r_1^g\right)\right]^2}{\sigma \left(1 + r_1\right)}$$

- This gives $d_1 \left(1 + r_1^g\right) = \frac{s_2^H}{2}$

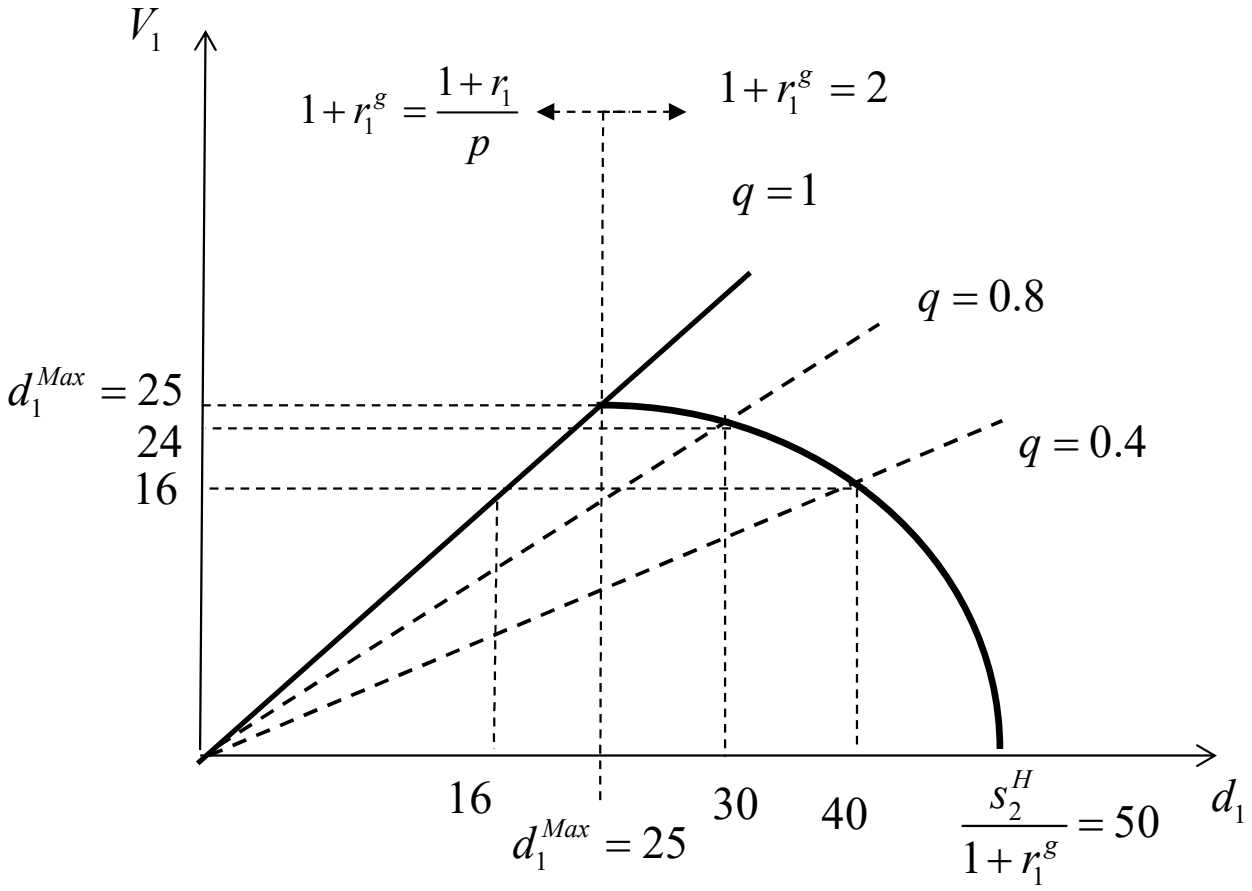
$$V_1 = d_1^{Max} = 25$$

- If d1 is set at d-Max: $1 + r_1^g = \frac{1 + r_1}{p} = 2$

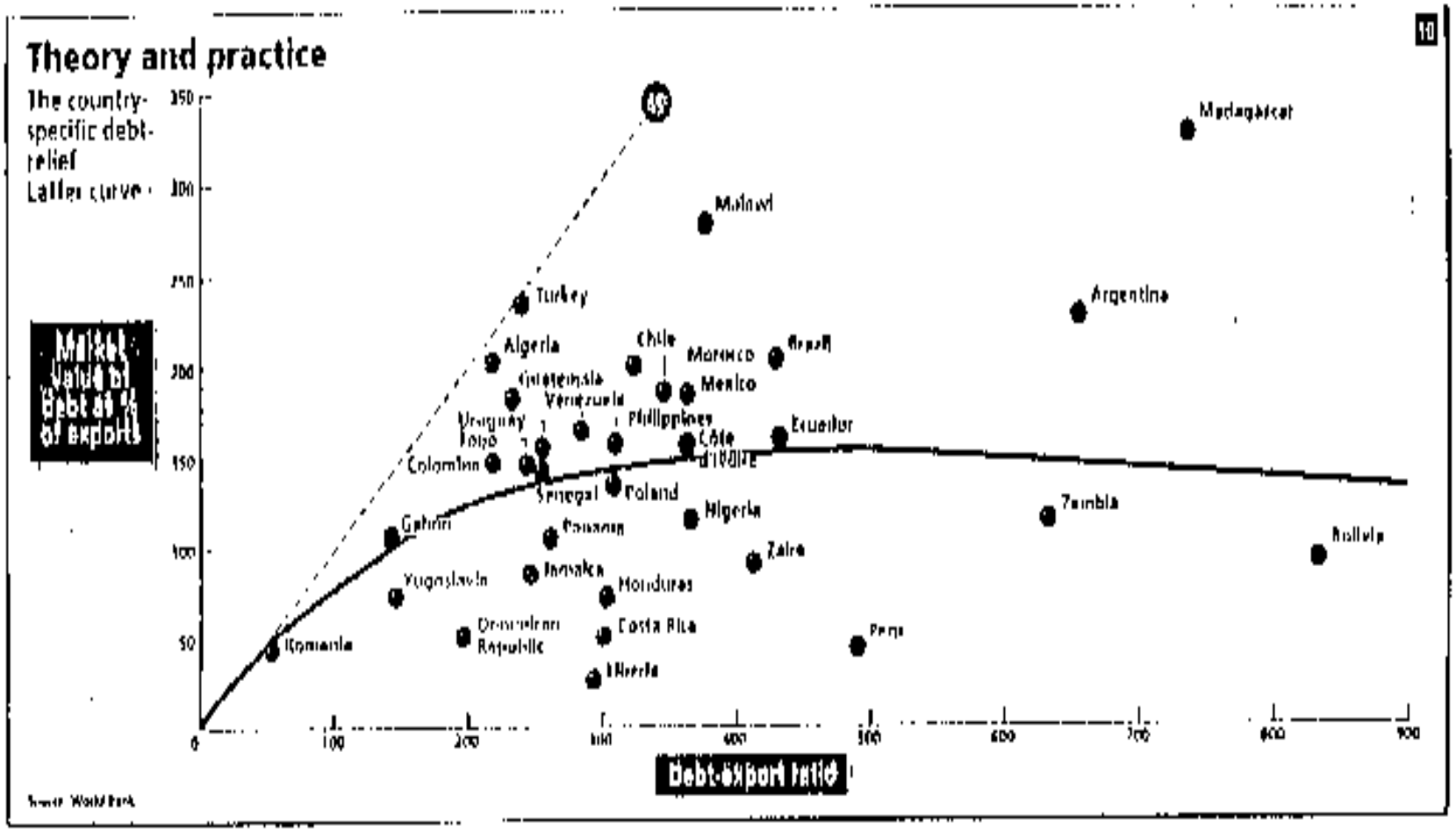
- Otherwise, the interest rate in the exchange bond shall be

$$\left(1 + r_1^g\right) = \frac{1 + r_1}{p} \left(\frac{d_1^{Max}}{d_1} \right)$$

Debt-relief Laffer curve



Cross Section



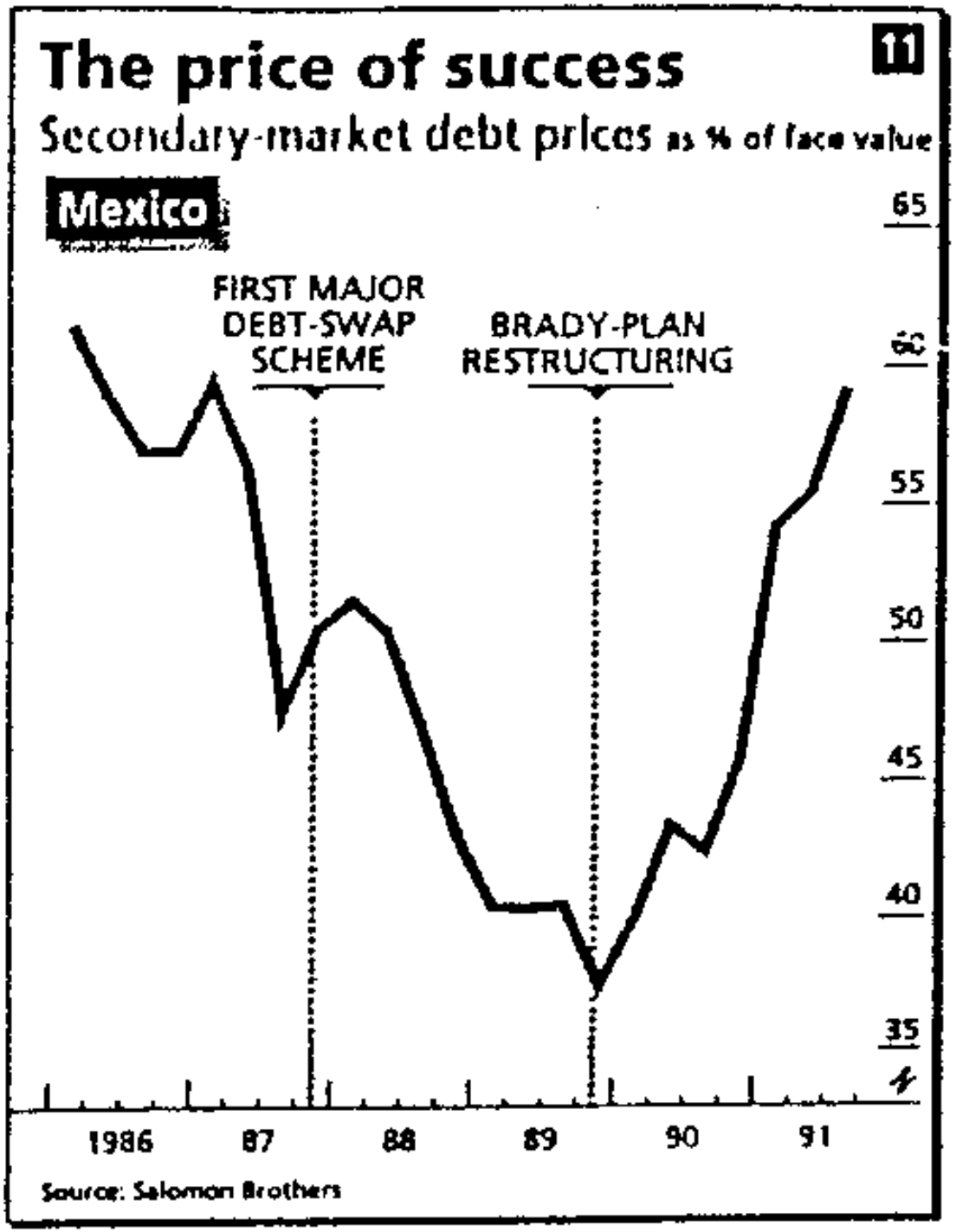
Brady bonds deal

- 1989’ Brady Plan
- Deals to restructure the debt of 18 emerging economies
  - 49% of restructured debt was converted into “par bonds” that provided the same face value as restructured bonds but at a concessional interest rate
  - 41% into “discounted bonds” with reduced principal but market interest rate.

The price of success

11

Secondary-market debt prices as % of face value



Source: Salomon Brothers

Holdout creditors

- There may come a point at which it is in everyone's best interests for a sovereign's debt to be restructured.
- However, there is a risk that individual creditors might decide not to participate in a restructuring in the hope that they will be able to recover the full value of their claims.
- If these so-called *holdout creditors* have a significant chance of recovering their claims in full, creditors who would otherwise have agreed to participate in the restructuring will become less willing to do so—even though it would be in the collective best interest of all creditors to agree to a restructuring as soon as possible.
- This is a collective action (coordination) problem. The uncertainty generated by collective action problems can create delays in the restructuring process—and may possibly push a country into default unnecessarily—to the detriment of the debtor, the creditors, and the system more generally.

Vulture funds

- Elliot and Peru
  - Along 1996, Elliot Associates purchased Peruvian bonds in the secondary market representing a face value of $20.7 million, at the discount price of $11.4 million, just before Peru initiated a debt restructuring process in the scope of the Brady plan.
  - Elliot did not participate in the restructuring process and appealed to the courts.
  - The final decision implied a payment of the total face value of the unrestructured debt owned by Elliot plus interest, which amounted to $58.45 million.
- Argentina
  - In 2005, Argentina made the largest bond exchange in history, restructuring a total of $62 billion in bonds. Still Argentina only managed to restructure 76% of its defaulted debt.
  - The low participation was related to the fact that previous holdouts revealed successful.
  - Under the terms of the exchange, creditors that agreed in the restructuring faced an average “hair-cut” of around 73%.
  - In 2012, the District Court of New York decided in favor of holdout creditors. With that decision, Argentina could not service the new debt without honoring the old un-restructured debt in full.

Pari passu

The recent Argentine litigation in the United States highlighted vulnerabilities in the existing legal framework:

- The pari passu provision (equal treatment) was interpreted by the New York and Belgium courts as requiring equal payment to *all* creditors.
- So Argentina was prevented from making any payments to those bondholders *who had agreed* to restructure their debt unless it also made payment in full to the *holdout* creditors.
- This case enhanced the expected benefits of holding out in future restructuring processes.
- Hence, it will be more difficult to achieve agreements in the future

IMF Agenda:

- Introducing a proviso clarifying that this clause would only prohibit actions that result in legal subordination of certain unsecured creditors over others.

Collective action clauses

The current legal framework on sovereign debt accounts for collective action clauses

- The *collective action clause* enables a qualified majority of creditors to take a decision regarding the terms of the restructuring that is then *binding on the minority*.
- These clauses are essentially designed to address the *holdout problem* by ensuring that all creditors are bound by the decision of the majority.

Problems:

- The existing clauses generally require a vote to take place on a *per-series basis*—that is, bond issuance by bond issuance.
- Holdout creditors may buy a sufficiently large share of the bonds in a particular issuance to block the restructuring of that issuance.
- This will reduce the willingness of other creditors to consent to the restructuring.

IMF Agenda:

- Single voting procedure, to allows decisions to be taken by a majority of creditors *across all bond issuances*, without the need for an issuance-by-issuance vote.

Greek deal, 2012

- D=350 bn of which 206 bn held by private sector

PSI scheme (officials out):

- Swap 1 € of old bonds for € 0.150 of a new EFSF guaranteed bond (q=1) and € 0.315 of a new Greek extended maturity bond.
- New bonds made senior relative to government consumption and investment expenditures
- Private sector was forced into agreement, because 177bn out of the 206bn had been issued under the Greek law.
- Only 9bn of old debt remains in hand of opportunistic **holdouts**