
North-South Lending and Endogenous Capital Market Inefficiencies

Mark Gertler and Kenneth Rogoff, JME 1990
presented in T.Sargent's RG

Introduction

- Fact: Capital flows depend on cap mkt efficiency
- 2-period model with asymmetric information:
 1. Cost of investment finance depends on borrower's net worth
 2. Positive correlation between country wealth and investment
 3. Marginal products of capital can differ across countries
- Policy experiments:
 1. public debt
 2. government guarantee of private debt
 3. indexation of foreign debt

Economic Environment: Small Open Economy

- 2 periods
- Risk-neutral agents

$$u(c_1, c_2) = c_2$$

- Endowment stream is $W = (W_1, W_2)$
- Investment opportunities:
 1. invest abroad at gross risk-free rate r ;
 2. invest k in a risky project and get

$$y = \begin{cases} \theta, & \pi(k) \\ 0, & 1 - \pi(k) \end{cases}$$

- Lenders observe W but not k

Frictionless Equilibrium

- Optimal investment in risky project

$$k^* = \arg \max_k \left\{ \pi(k)\theta - rk \right\} \rightarrow \pi'(k^*)\theta = r$$

Equilibrium under Asymmetric Information

To finance investment issue security paying (Z^g, Z^b) .
Choose k to maximize expected utility:

$$k = \arg \max_k \left\{ \pi(k)(\theta - Z^g) - (1 - \pi(k))Z^b + r(W_1 + b - k) + W_2 \right\}$$

Optimal k solves

$$\pi'(k)(\theta - (Z^g - Z^b)) = r$$

Hence, $k < k^*$ unless $Z^g = Z^b$ (security is risk-free).
Socially optimal k^* is possible if

$$V := W_1 + W_2/r > k^*$$

Equilibrium under Asymmetric Information, $V < k^*$

To finance investment issue security paying (Z^g, Z^b) .

Choose k to maximize expected utility:

$$k = \arg \max_k \left\{ \pi(k)(\theta - Z^g) - (1 - \pi(k))Z^b + r(W_1 + b - k) + W_2 \right\}$$

subject to

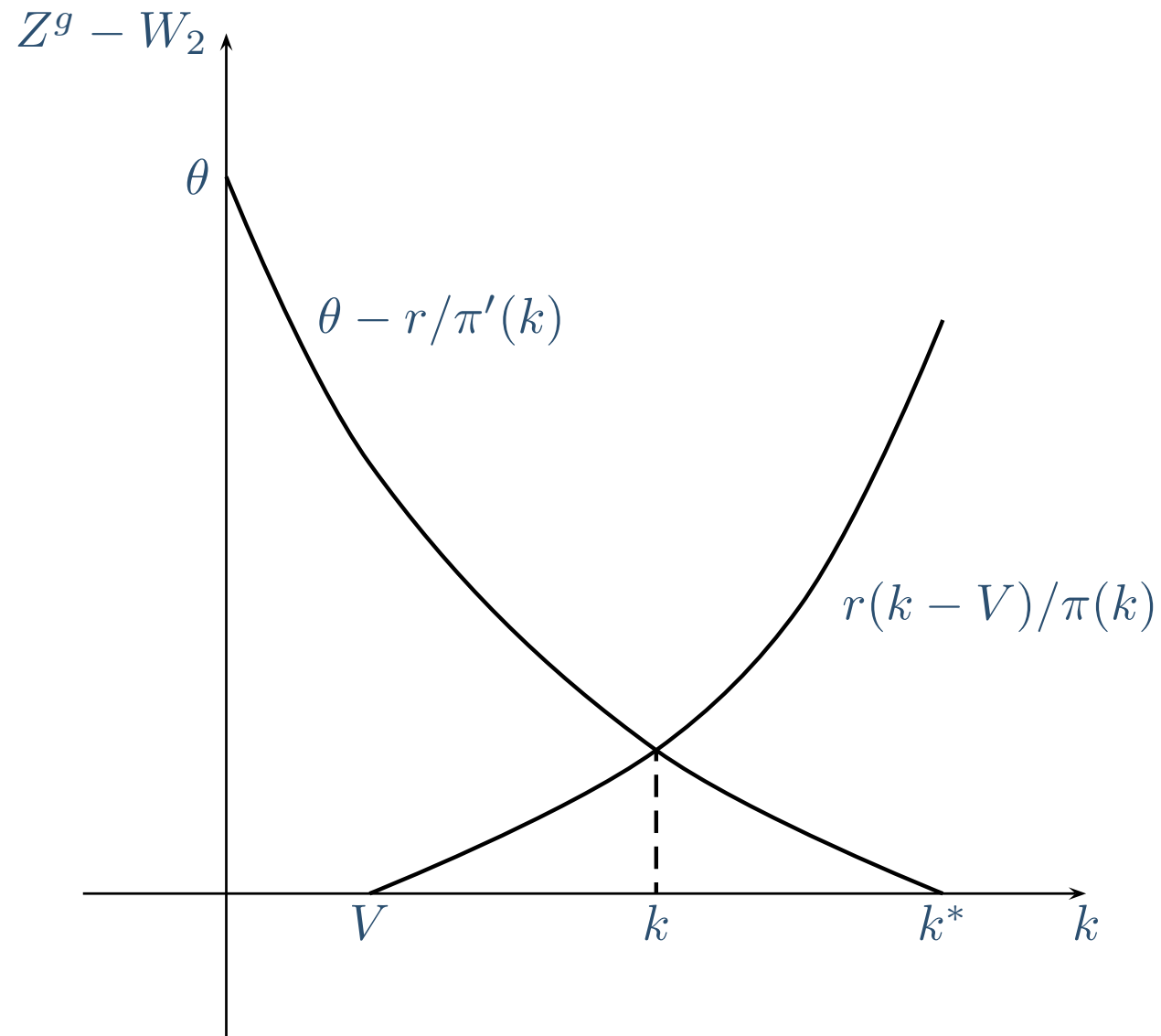
$$Z^b \leq W_2, Z^g \leq W_2 + \theta$$

In equilibrium $Z^b = W_2$ thus:

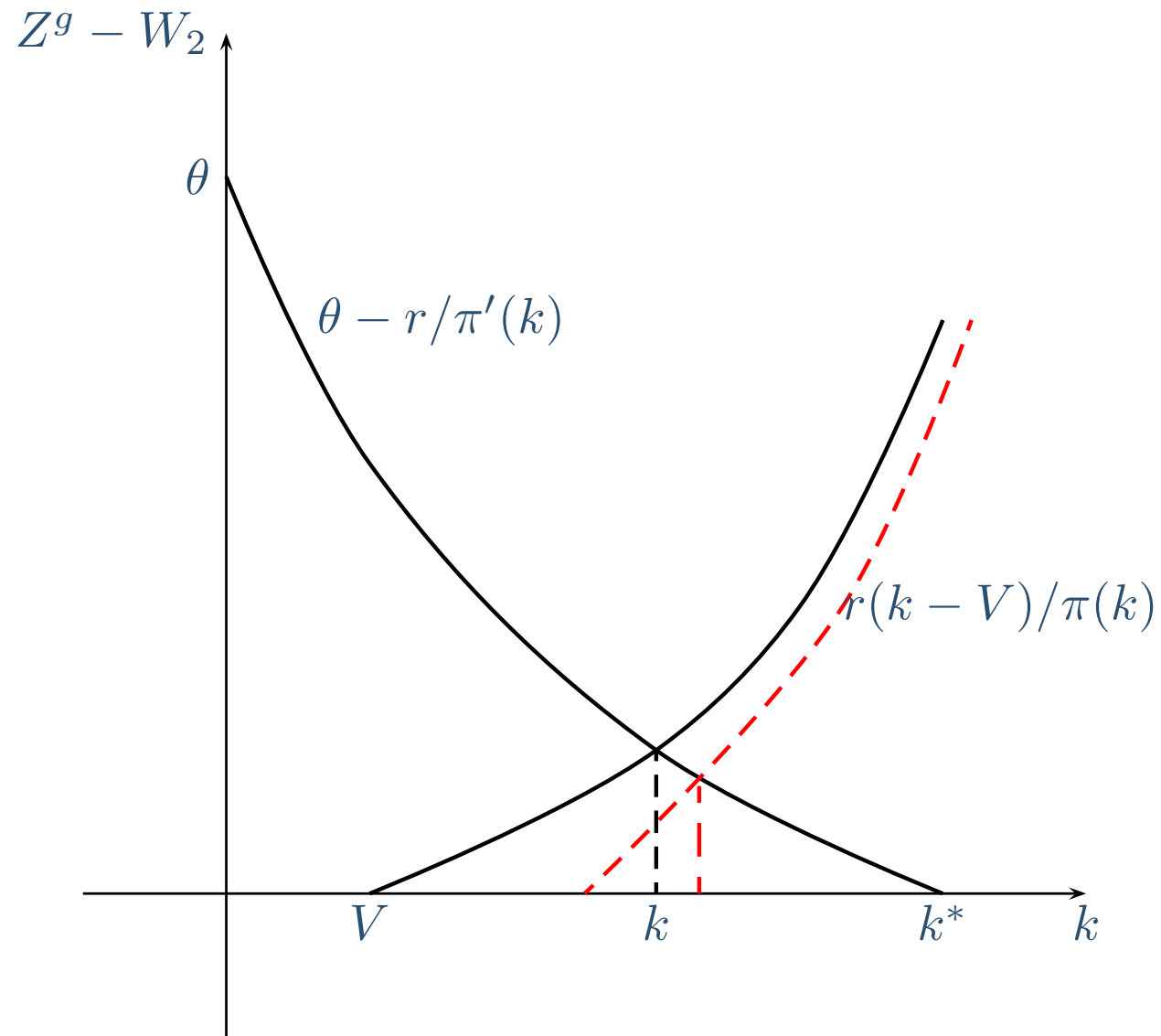
$$\text{f.o.c. for } k : Z^g - W_2 = \theta - r/\pi'(k)$$

$$\text{borrower's IR : } Z^g - W_2 = r(k - V)/\pi(k)$$

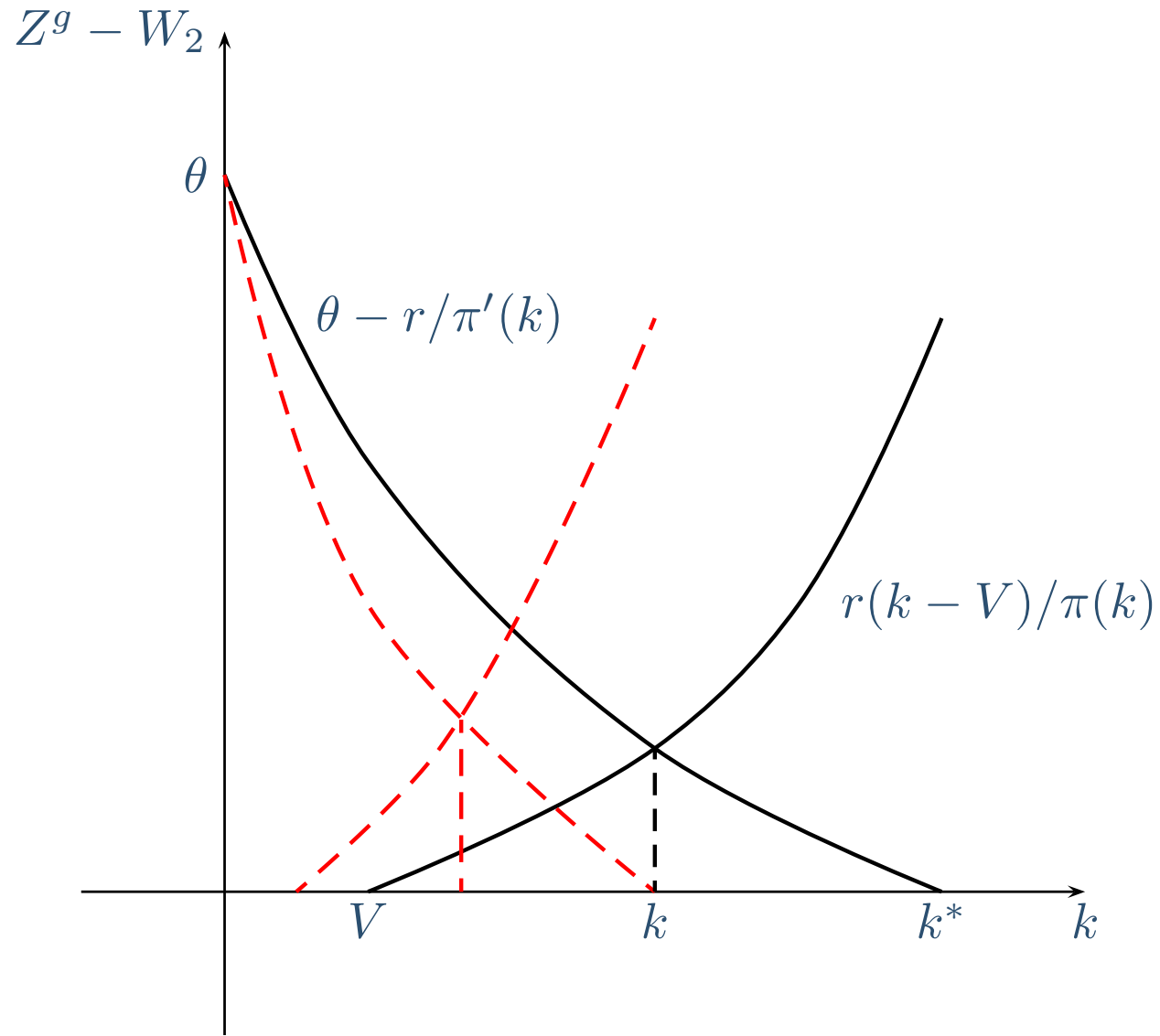
Graphical Representation



Rise in V



Rise in r



Some Insights

1. "PIH" flavor

Only present value of wealth V matters

2. Loan (risky debt) rate

$$r_L = \frac{Z^g - W_2}{k - V} = \frac{r}{\pi(k)}$$

is decreasing in k and thus in V

→ Richer countries have lower loan rates.

Application: Increase in Public Debt

- Government has debt to foreigners of D per capita
- Government levies lump-sum tax τ on successful entrepreneurs

$$\pi(k)\tau = D$$

In equilibrium $Z^b = W_2$ and Z^g, k solve

$$Z^g + \tau - W_2 = \theta - r/\pi'(k)$$

$$Z^g + \tau - W_2 = r(k - V - D/r)/\pi(k)$$

Increase of public debt \sim reduction of net worth.

Application: Gov Guaranteed Private Debt

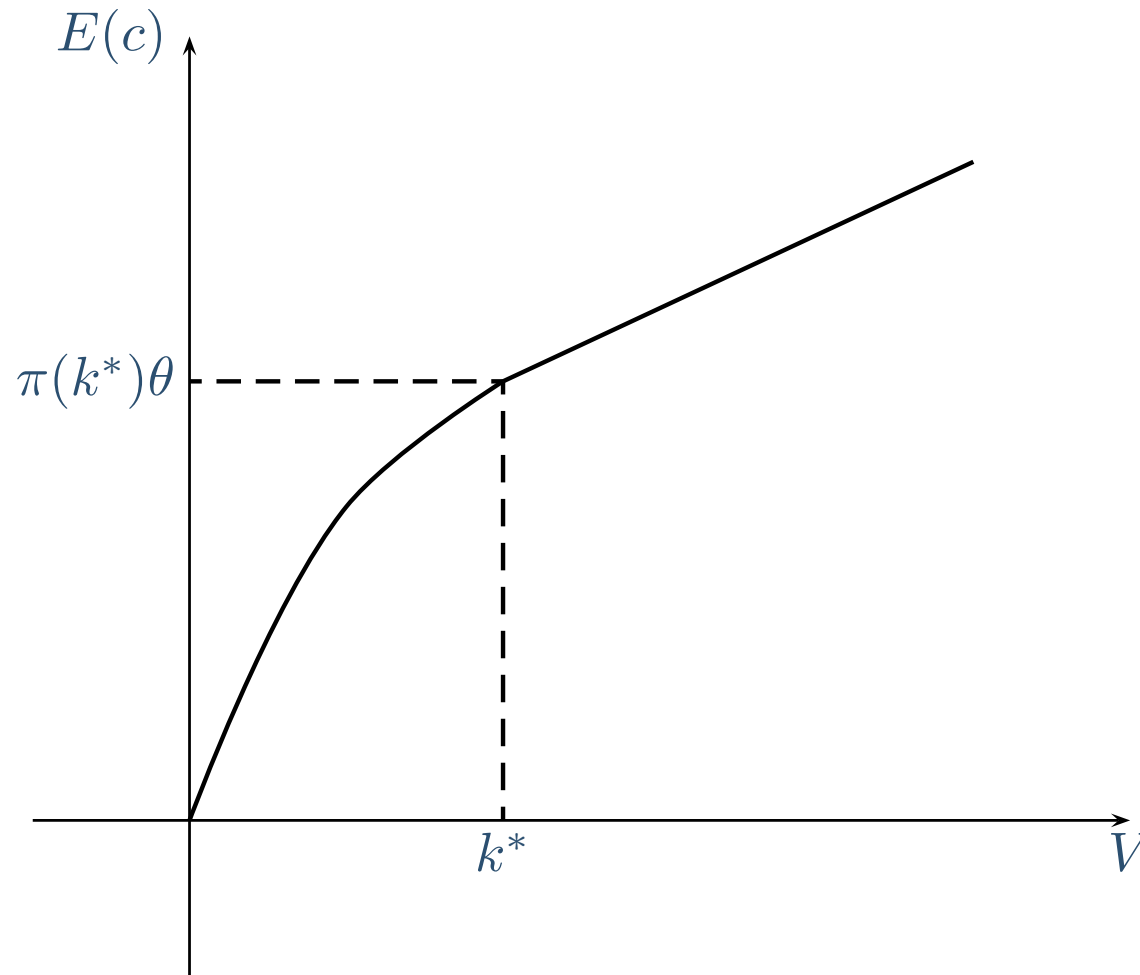
- Government pays foreigners σ if bad state realizes
- Government levies lump-sum tax τ on successful entrepreneurs

$$\pi(k)\tau = (1 - \pi(k))\sigma$$

Result: no effect on investment

- σ reduces Z^g
- τ increases Z^g
- the 2 effect are equal by gov BC
- Why? – b/c program is financed by beneficiaries
If partly financed by others \rightarrow investment \uparrow

Application: Wealth Shocks and Indexation



1. Variations in V_D reduce welfare \rightarrow index debt to W_2
2. Uneven wealth distribution \rightarrow lower per capita consumption

Application: Patterns of External Borrowing

- $W_1 \sim$ 'cash' assets, $db/dW_1 \approx 0$
- $W_2 \sim$ 'collateralizable' assets, $db/dW_2 > 0$
- $W_2 \gg W_1$ for LCD
→ $corr(\text{wealth, ext.borrowing}) > 0$.

Economic Environment: General Equilibrium

- 2 periods, 2 equal-pop countries
- Risk-neutral agents

$$u(c_1, c_2) = c_2$$

- Entrepreneurs = $\alpha \times$ population
- Endowment is $W^i = (W_1^i, W_2^i), i \in (\text{Poor}, \text{Rich})$
 $W^P < W^R$
- Poor country starts w debt D to Rich
- Investment opportunities:
 1. invest abroad at gross risk-free rate r ;
 2. invest k in a risky project and get θ with $\pi(k)$.
- Lenders observe W but not k

General Equilibrium: Results

Extra equilibrium relation

$$\alpha(k^P + k^R) = W_1^P + W_2^R$$

Relative to frictionless setup:

- Reduced flow of funds from Rich to Poor
- Under-investment in Poor and over-investment in Rich
- World r is lower
- For sufficiently large debt to Rich D
Poor lends funds to Rich
- “For Poor cost of debt is larger than its face value”
b/c of redistributive effect