

HETEROGENEOUS GLOBAL CYCLES

Maryam Farboodi
MIT Sloan, NBER and CEPR

Péter Kondor
London School of Economics and CEPR

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HETEROGENEOUS EXPOSURE TO CREDIT CYCLES

- Before 2008: boom-bust cycles in emerging economies (LATAM, 1982, Mexico, 1994, East Asia, 1997, Russia 1998, Brazil 1999, Argentina, 2001) → structural weaknesses
- Since 2008, Eurozone Crisis 2010-2012: certain advanced economies are also exposed, while others experience inflows in bad times
 - ▶ why are countries differentially exposed to credit cycles? (core vs periphery? advanced vs emerging economies?) When does the exposure change?
 - ▶ instead of structural weaknesses in individual countries, we focus on **frictions in supply of global capital**

OVERVIEW. MECHANISM

- global institutions allocate credit across firms in several countries
 - ▶ Some lenders have more expertise to identify firms with good collateral: advantage in *opaque* countries

OVERVIEW. MECHANISM

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⇒ global recession when lenders turn from **bold** to **cautious**

- ▶ alter the way they learn
- ▶ a **bold** lender aims not to miss out on any firm with good collateral
- ▶ a **cautious** lender makes sure never to invest in a firm with bad collateral

⇒ firms' optimal response to this shock differ across countries

- ▶ in most opaque countries firms choose risky strategies → higher exposure to boom-bust cycles

⇒ (continuum of) countries partition to a low and a high exposure group

- ▶ match stylized facts on capital flows, output, portfolio rebalancing, etc.
- ▶ excess global saving → more countries are exposed to larger boom-bust cycles

SET UP.

BASICS

- one good, three periods $t = 0, 1, 2$
- firms with unobserved type $j = (\tau, \omega)$ borrow, invest, and produce
 - ▶ $\tau \in \{g, b\}$: good/bad
 - ★ bad firms' collateral cannot be seized (i.e. bad do not pay back)
 - ▶ $\omega \in [0, 1]$: opaque to transparent
- international expert investors lend, type s
 - ▶ $s \in [0, 1]$: skill
 - ▶ unit wealth
 - ▶ type distribution $w(s)$, $w'(s) < 0$
- everyone risk-neutral

SET UP.

INFORMATION FRICTION & AGGREGATE PRUDENCE SHOCK

- experts search for evidence about firm type τ
- evidence is always correct, but expert s can find it iff sufficiently skilled compared to firm's opaqueness

$$s \geq \hat{s} = 1 - \omega$$

- the nature of evidence they search for depends on aggregate state:
 - ① experts are **bold** w.p. π
they search for evidence that a firm is bad
 - ★ i.e. for low-skilled experts, **opaque bad firms are pooled with all good firms**
 - ② experts are **cautious** w.p. $1 - \pi$
they search for evidence that a firm is good
 - ★ i.e. for low-skilled experts, **opaque good firms are pooled with all bad firms**
- (See Farboodi-Kondor (2020) for bold/cautious as an endogenous choice of improving/deteriorating fundamentals)

SET UP.

FIRMS

production technology

- $t = 0$, *initial investment*
 - ▶ firm with a unit endowment, invest $I(\tau, \omega)$
 - ▶ save the rest (frictionless, state-contingent saving technology)
- $t = 1$, *shocks and external financing*
 - ▶ aggregate state (*the prudence shock*)
 - ▶ ϕ fraction of firms hit by idiosyncratic liquidity shock
 - ★ to maintain (rebuild) $i \leq I$, have to inject ξi
 - ★ can use i as collateral to borrow from experts
- $t = 2$, *production*
 - ▶ output is proportional to intact or rebuilt investment i

SET UP.

FIRMS

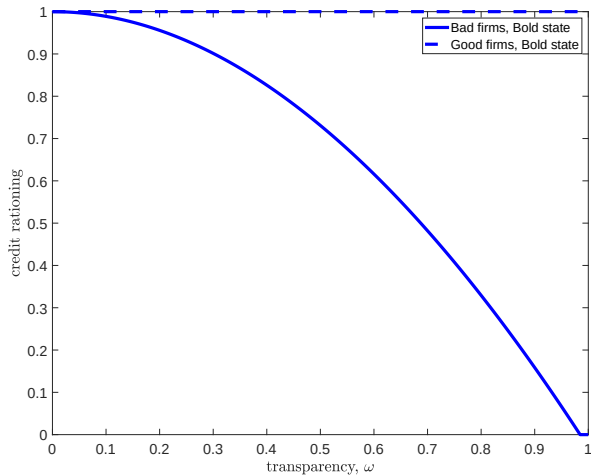
production technology

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$$I(\tau, \omega) + \mathbb{E} \left[\underbrace{\hspace{10em}}_{\text{increasing in interest rate and obtained credit}} \right] = 1$$

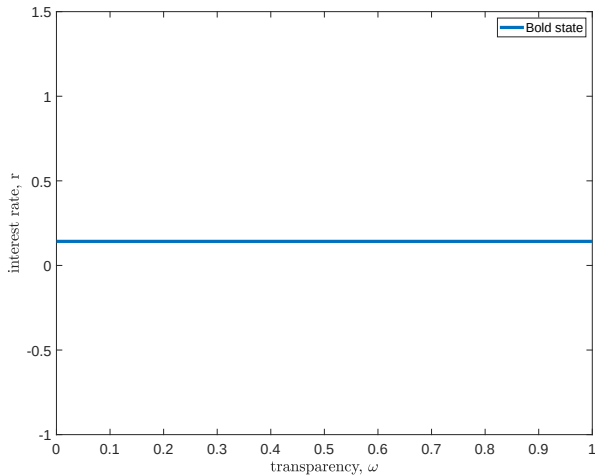
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EQUILIBRIUM: CREDIT MARKET, BOLD INVESTORS



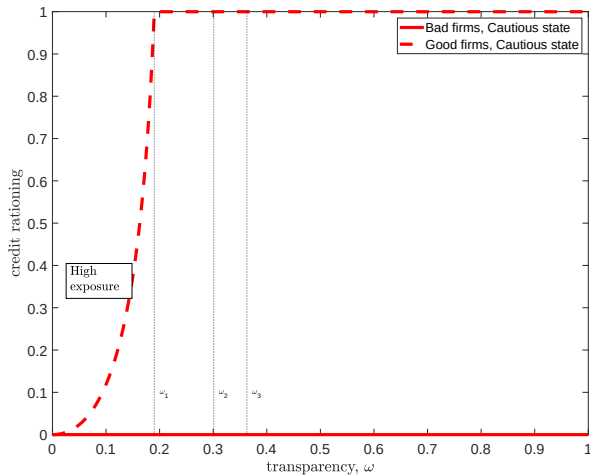
- all good firms are unconstrained
- opaque bad firms get some credit from low skilled not finding evidence against them

EQUILIBRIUM: CREDIT MARKET, BOLD INVESTORS



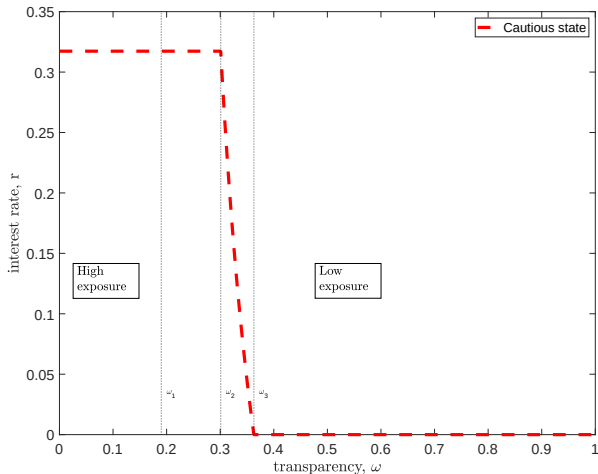
- identical interest rate
- skilled deriving rent from better quality loan-portfolio

EQUILIBRIUM: CREDIT MARKET, CAUTIOUS INVESTORS



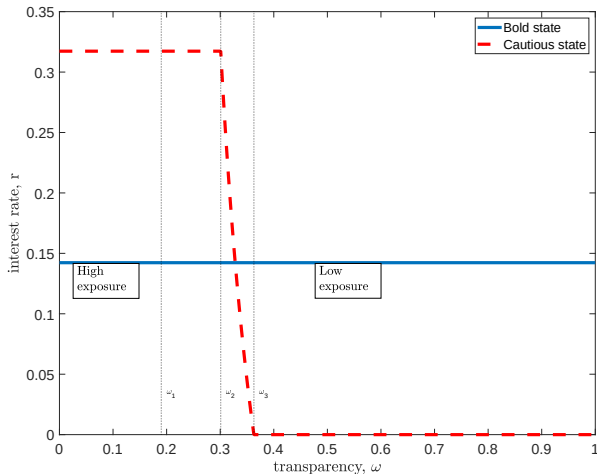
- no credit to bad firms
- opaque good firms get limited credit $\leftarrow$ short supply of skilled-capital
 - high exposure firms

EQUILIBRIUM: CREDIT MARKET, CAUTIOUS INVESTORS



- high exposure firms: high interest rates
- 0 interest rate for sufficiently transparent firms $\leftarrow$ low-skilled investors lining up
 - ▶ low exposure firms

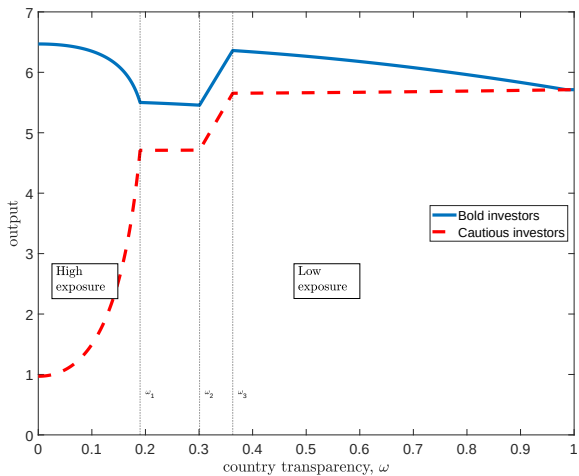
EQUILIBRIUM: CREDIT MARKET



- **Bold** investors $\rightarrow$ 'overheated credit market', low interest rates, all good and bad opaque firms get credit
- **Cautious** investors $\rightarrow$ 'fragmented credit market', for some good firms credit is abundant and cheap, for others expensive and scarce, low-skilled rebalance from opaque investment towards transparent

- firms are allocated across countries
 - ▶ countries homogeneous in the composition of bad and good firms
 - ★ λ fraction of bad firms in each country
 - ▶ heterogeneous in transparency (ω)
 - ★ for simplicity:
consider country $\omega \in [0, 1]$ with only firms with ω transparency
 - ★ (investors do not know the transparency of the country)

TOTAL OUTPUT BY COUNTRY

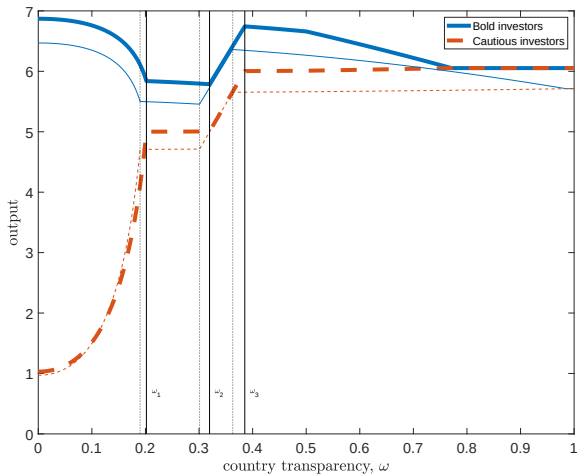


SAVINGS GLUT & SAFE ASSET DETERMINATION.

CABALLERO-FARHI-GOURINCHAS, FARHI-MAGGIORI, HE ET AL.

- global savings glut $\equiv w(s)|_{s < \bar{s}} \uparrow$
- safe assets $\equiv$ counter-cyclical interest rate (He et al, 2019): low exposure
 - ▶ $w(s)|_{s < \bar{s}} \uparrow$
 - larger demand for safe assets → lower real interest rate for all assets → higher I
 - safe asset supply $\uparrow$ but not as much as demand
 - ▶ → smaller low exposure group, larger group of high exposure countries, more pronounced boom-bust in high exposure countries

TOTAL OUTPUT BY COUNTRY



PREDICTIONS I.

CREDIT MARKET

- 1 integrated in boom, fragmented in bust
- 2 yields equal in boom, spike (fall) in bust for high (low) exposure countries
- 3 **concentration of credit provision**
 - ▶ **within country: more concentrated in busts than in booms**
 - ▶ **for debt issued in bust: more concentrated in high than in low exposure countries**
 - ↔ **good expert capital scarce**

PREDICTIONS I.

CREDIT MARKET

4 heterogeneous portfolio re-balancing by investors in bust

- ▶ unskilled investors re-balance out of high exposure countries (Ghallagher et al. 2018)
- ▶ skilled investors re-balance toward high exposure countries, and higher yields

5 smart experts' higher than average return

- ▶ booms: good portfolio composition, at low rate
- ▶ busts: high rates

6 realized return on the representative portfolio of bonds

- ▶ for debt issued in boom: higher in low than high exposure countries
- ▶ for debt issued in bust: higher in high than low exposure countries

PREDICTION II. REAL ECONOMY

- 1 *total output, total debt and total investment* by country (over initial GDP)
 - ▶ more cyclical in high exposure countries
 - ▶ in booms: higher in high compared to low exposure countries
- 2 **total value of non-performing debt (over initial gdp)**
 - ▶ within country: higher for debt issued in booms than debt issued in bust
 - ▶ for debt issued in booms: higher in high than low exposure countries

CONCLUSION

A model where

- countries identical in production fundamentals
- subject to information frictions in international markets
- follow differential investment and borrowing strategies
 - ▶ high-to-low exposure partition by competition for scarce expert capital
 - ▶ cross section:
large debt and investment, especially in high exposure countries by bad firms
 - ▶ time-series:
lower output everywhere, dramatic collapse in high exposure countries
- *funding mismatch*
in bust too little capital to high exposure countries, while some capital idle
- excess saving → larger high-exposure group, larger boom-bust cycles

EXTENSION I: ENDOGENOUS INFORMATION

- no external prudence shock
- instead, in $\theta = L$, adverse productivity shock by increasing fraction of bad firms: $\lambda_L > \lambda_H$.
- endogenous information acquisition:
 - ▶ expert s signal from risk-manager:
 - ★ chooses to search for b or g
 - ★ decides whether to report evidence or $\emptyset$.
 - ★ pay-off depends on realized type and report

Bold	$\emptyset$	b
g	a_g	$-c_g$
b	$-c_b$	a_b

Cautious	g	$\emptyset$
g	a_g	$-c_g$
b	$-c_b$	a_b

EXTENSION I: ENDOGENOUS INFORMATION

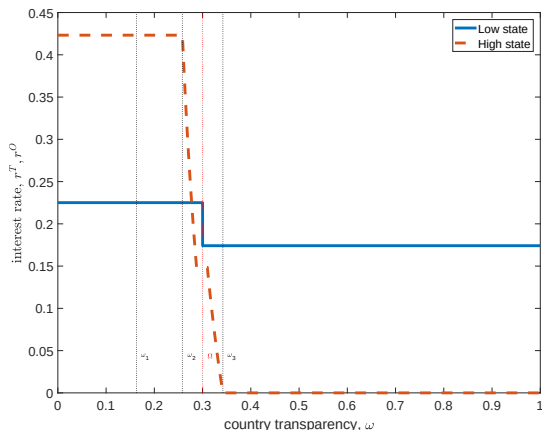
- we can show that all the results hold if

$$\lambda_L > \frac{1}{1 + \frac{a_b + c_b}{a_g + c_g}} > \lambda_H$$

- $\Rightarrow$ relatively small, adverse shock to productivity turns bold experts to cautious, leading to bust with heterogeneous effects across countries!

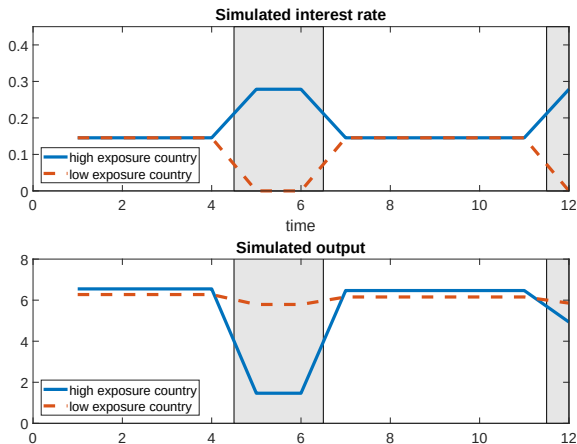
EXTENSION II: TRANSPARENCY GROUPS

- A public signal partitions country names to Transparent vs. Opaque group, T, O
- $\Rightarrow$ experts understand that
 - ▶ countries in T are populated by high transparency firms, $\omega > \Omega$
 - ▶ countries in O are populated by high transparency firms, $\omega < \Omega$



EXTENSION III: SIMPLE DYNAMICS. HETEROGENEOUS GLOBAL CYCLES

- consecutive generations of firms and investors
- each generation has a random life time
- consumes and repays at death, replaced by a new generation
- new prudence shock redrawn



TRANSITION FROM LOW TO HIGH EXPOSURE.

DEMAND CHANNEL: MORE GOOD FIRMS $1 - \lambda \uparrow$

- direct effect: increased aggregate demand by good firms in bad times
- indirect effect: increased aggregate demand in good times $\rightarrow r_H \uparrow$
 $\Rightarrow$ initial investment $I(.) \downarrow$
- direct effect tend to dominate and aggregate demand curve goes up
 - ▶ low exposure good firms in extreme-core borrow more in aggregate
 $\Rightarrow$ low exposure group shrinks ($\omega_3 \uparrow$)
 - ▶ low exposure good firms in $[0, \omega_2]$ borrow more in aggregate
 $\Rightarrow$ high exposure group expands ($\omega_1 \uparrow$)
- fiercer competition for scarce expert funding from comparable countries

DEMAND CHANNEL: MORE GOOD FIRMS $1 - \lambda \uparrow$

