Financial Engineering and Economic Development

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  2. But eventually much of financial development is repackaging and this has ambiguous effects on output and TFP
- Our goal: formalize and evaluate the second part of this story

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- While spending on securities generally rises, much of this spending may go to security creation costs and producer/intermediary rents
- Impact on capital formation and output is ambiguous
- It is small at best, if not negative outright

Literature

- King and Levine (1993), Rajan and Zingales (1998) ...
- Amaral and Quintin (2010), Midrigan and Xu (2014), Moll (2014) ...
- Berkes, Panizza and Arcand (2012), Gennaioli, Shleifer and Vishny (2012)
- Allen and Gale (1989, 1991), Corbae and Quintin (2016)

▸ Other related papers

The environment

- Time is discrete and infinite
- Mass one of two-period lived households
- Supply one unit of labor when young, invest their earnings, consume when old
- Household type 1 is risk neutral
- Household type 2 is infinitely risk averse (only value the worst-case scenario)
- Large mass of one-period lived producers
- Stand-in intermediary

Safe technology

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- Rents consumed every period by producers
- Risk-averse household lose fraction $\delta \in (0,1)$ of their investment in transaction costs so that their net return is $(1-\delta)R$

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- Can activate a project by installing a unit of capital
- Once capital is installed, aggregate conditions are either good (G) or bad (B)
- Markov with transition T
- An active producer of talent $z \in \{z_B, z_G\}$ transforms labor n into the consumption good according to

$$z^{1-\alpha} n^{\alpha}$$

where $\alpha \in (0, 1)$

- Define:

$$\Pi(w; z) \equiv \max_{n>0} z^{1-\alpha} n^{\alpha} - nw$$

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- Investments in risky projects are intermediated
- Intermediary purchases a project for price $\kappa(z_B, z_G)$
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- Intermediary purchases a project for price $\kappa(z_B, z_G)$
- It sells claims to the project's output
- Selling securities to risk-neutral agents is free
- Selling securities to risk-averse agents carries a verification cost c

Risk-averse household problem

$$\max_{a^S, a^G, a^B} \min\left(c_B, c_G\right)$$

subject to:

$$\begin{aligned} w_t &= a^S + a^G + a^B \\ c_B &= a^S(1-\delta)R + a^B R\left(B|\eta_t\right) \\ c_G &= a^S(1-\delta)R + a^B R\left(G|\eta_t\right) \end{aligned}$$

where

$$\begin{aligned} R\left(B|\eta_t\right) &= \frac{R}{T\left(B|\eta_t\right)} \\ R\left(G|\eta_t\right) &= \frac{R}{T\left(G|\eta_t\right)} \end{aligned}$$

Risk-neutral household problem

$$\max_{a^S, a^G, a^B} T(B|\eta_t)\, c_B + T(G|\eta_t)\, c_G$$

subject to:

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Willingness-to-pay for securities

- Risk-neutral households are willing to pay

$$q^1(B) = \frac{T(B|\eta_{-1})}{R}$$

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- By assumption,

$$q^2 > q^1(B) + q^1(G)$$

Intermediary's problem

Intermediaries choose b to maximize:

$$\begin{aligned} q^2 b + q^1(G)\Big(\Pi(w(G); z_G) - b\Big) \quad &+ \quad q^1(B)\Big(\Pi(w(B); z_B) - b\Big) \\ -\kappa(z_B, z_G) \quad &- \quad c\mathbf{1}_{\{b>0\}}, \end{aligned}$$

subject to:

$$b \leq \Pi(w(B); z_B).$$

Equilibrium

An equilibrium consists of project prices, wage rates, security menus, pricing kernels, and policies for all agents such that, at all dates and histories:

1. Old agents consume the payoff of their portfolio while young agents save their earnings
2. Security menus solve the intermediary's problem
3. Profits are zero for the intermediary
4. $R_t = \omega k_t^{\omega-1}$
5. Producers of type z are active if and only if $\kappa_t(z_B, z_G) \geq 1$
6. The market for labor clears
7. The market for each security clears

Financial policies

Lemma

In any equilibrium, the consumption of risk-averse agents is risk-free and they only purchase risk-free securities.

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Proposition

If the intermediary activates projects of type $z \equiv (z_B, z_G)$, then it also activates all projects of type $z' \geq z$. Furthermore, among active projects and μ-almost surely:

1. *Either $b(z) = 0$ or $b(z) = \Pi(w(B); z_B)$*
2. *$b(z_B, z_G)$ is monotonic in z_B in the sense that given z_G, $b(z'_B, z_G) \geq b(z_B, z_G)$ whenever $z'_B > z_B$, strictly so when $b(z_B, z_G) > 0$.*

Aggregation

Let K be the aggregate quantity of capital used to operate active projects. Then:

$$K = \int_{Z_\Theta} d\mu.$$

Furthermore,

$$F(\eta, K, N) = \bar{z}(\eta)^{1-\alpha} K^{1-\alpha} N^{\alpha},$$

where $\bar{z}$ is the average productivity of active projects.

Existence and comparative statics

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An equilibrium exists. Furthermore, all equilibria feature strictly positive storage.

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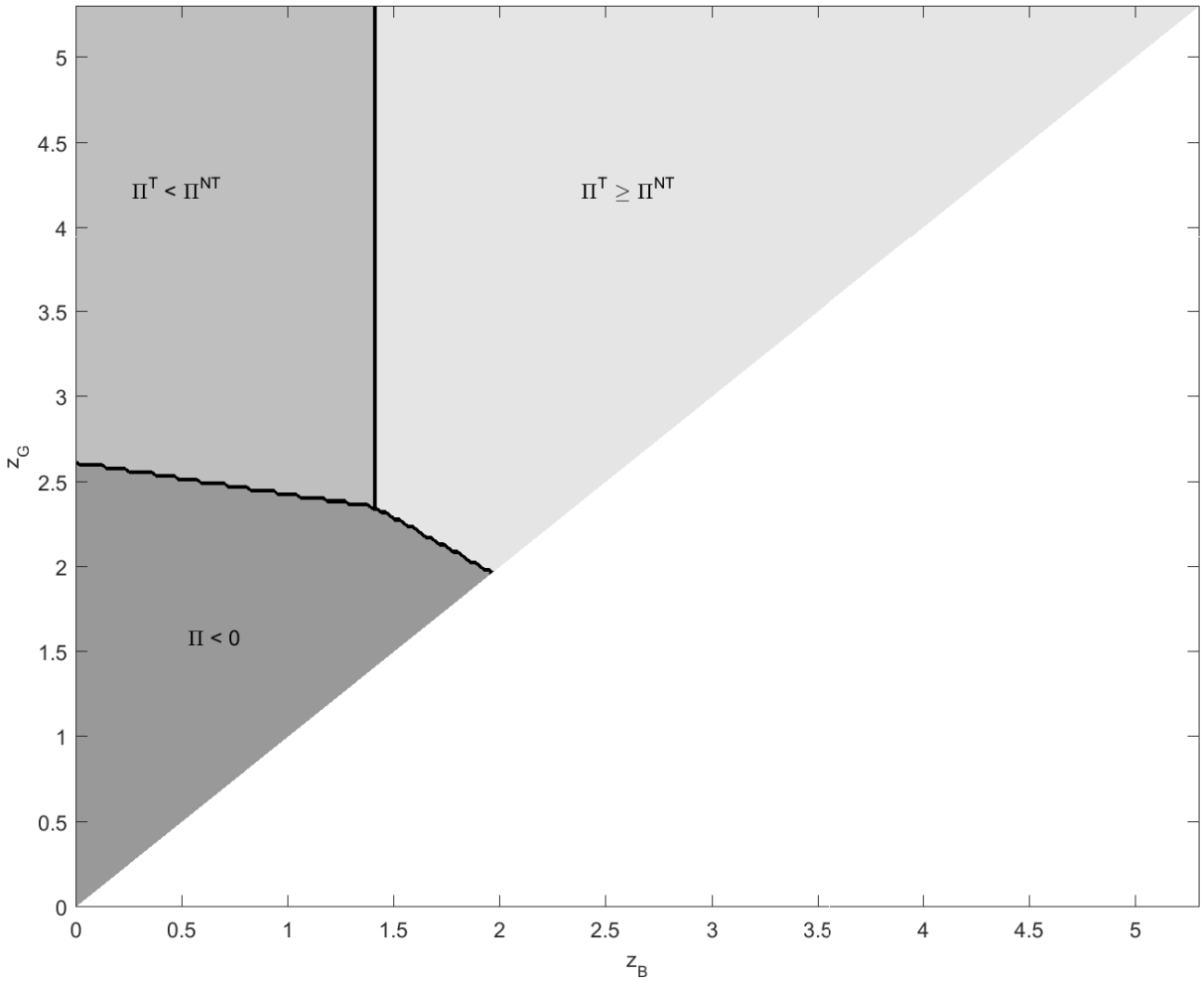
Assume that $\frac{z_G}{z_B}$ is μ-almost surely a constant. Assume that in a given economy and in a particular period, security creation costs suddenly fall. An equilibrium path exists in economy where gross investment (i.e. spending on securities) rises on impact.

Parametrization

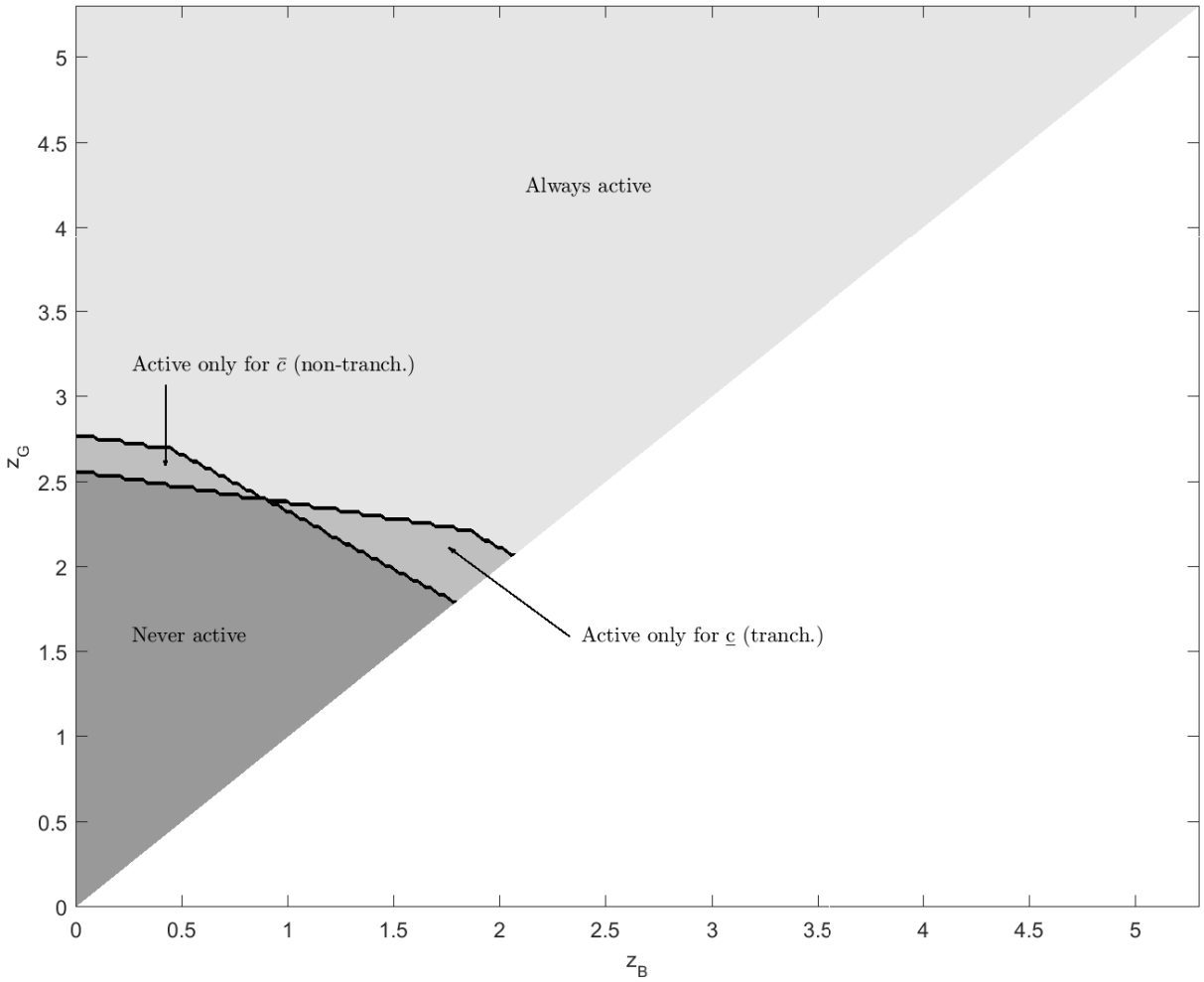
- One period= 25 years
- $\omega = .37$ which implies a yearly safe rate of return of 4%
- $\delta = 0.22$ which means that risk-averse agents are willing to pay 100 basis points premium on safe assets
- $T_{BB} = .2$, $T_{GG} = .8$
- μ is bivariate normal and is specified to imply:
  1. Average output difference of 1% a year between good and bad times
  2. A ratio of producer rents to value added of around 10%

▸ Algorithm

Producer/intermediary policies



Changes in security creation costs



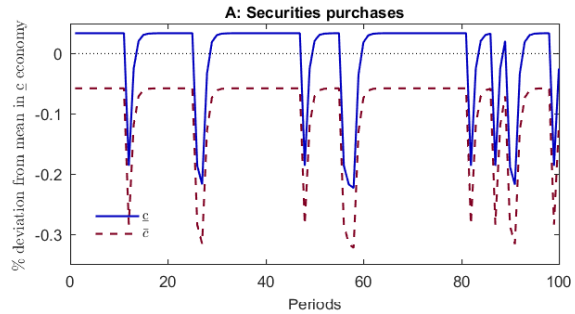
Comparative statics for capital formation

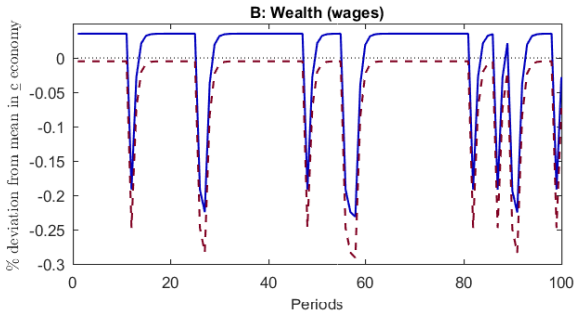
$$\Delta \text{ capital formation} \quad = \quad \Delta \text{ spending on securities}$$

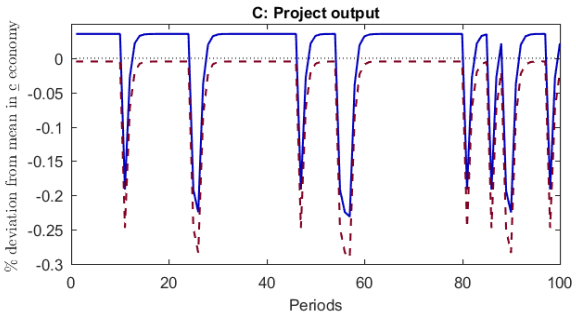
Comparative statics for capital formation

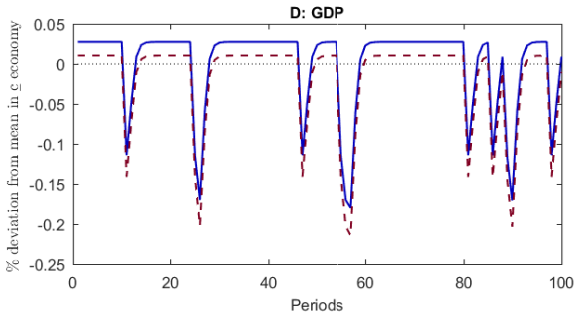
$$\begin{aligned} \Delta \text{ capital formation} &= \Delta \text{ spending on securities} \\ &- \Delta \text{ security creation expenditures} \\ &- \Delta \text{ risky producer rents.} \end{aligned}$$

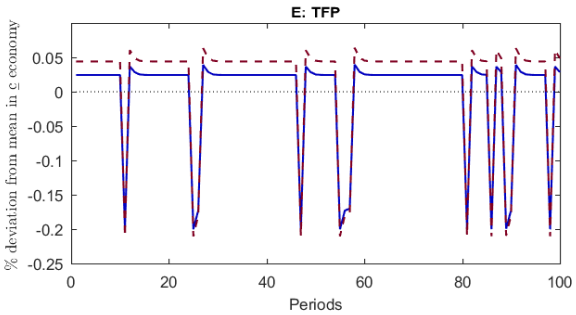
Stochastic steady state

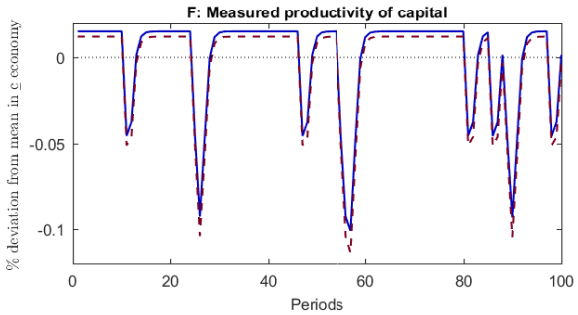












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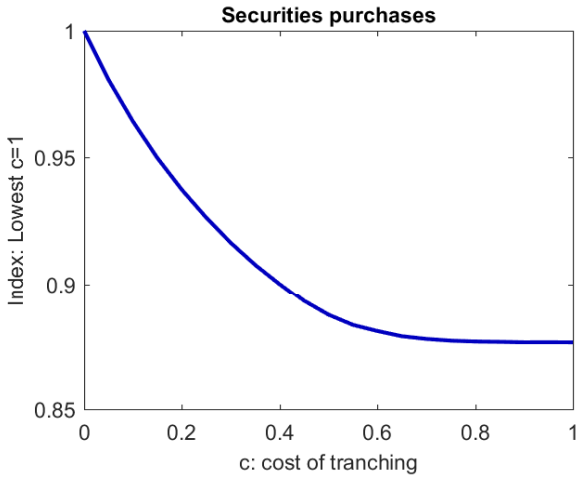

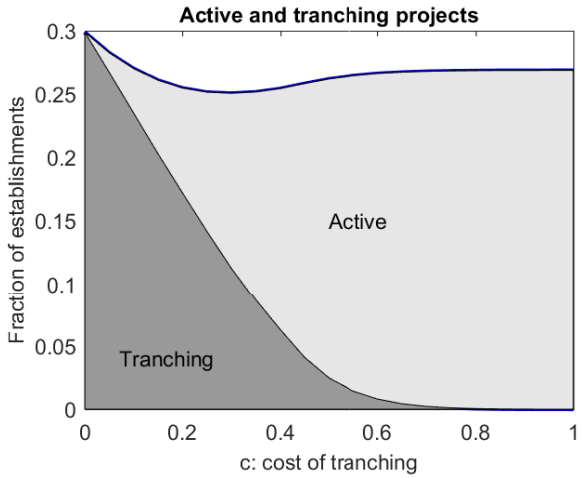

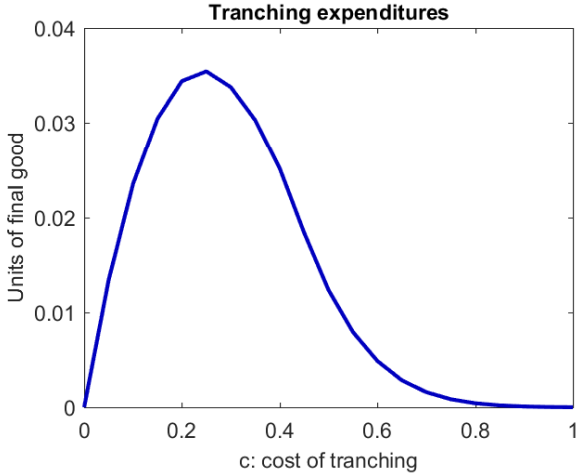

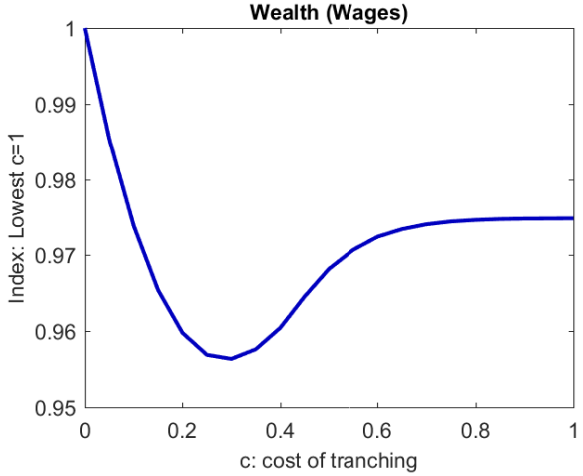

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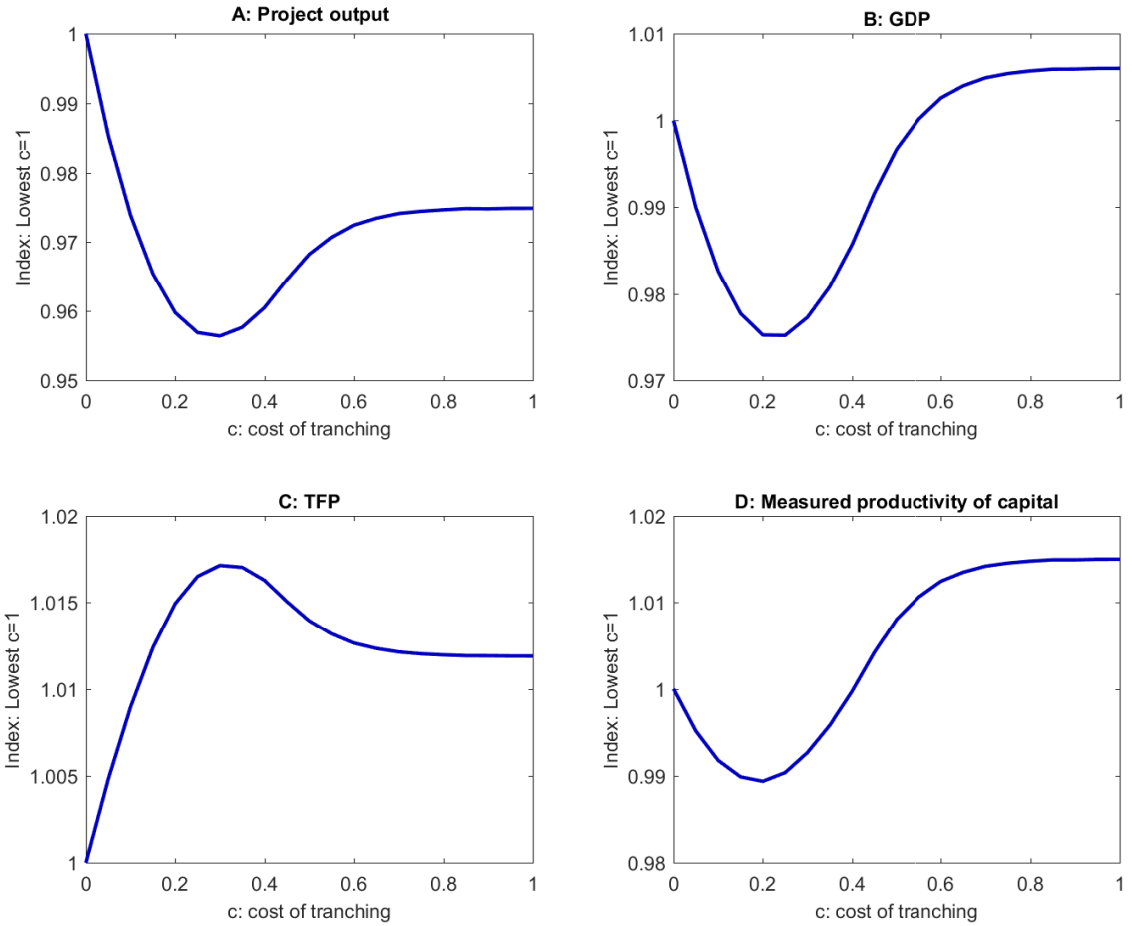
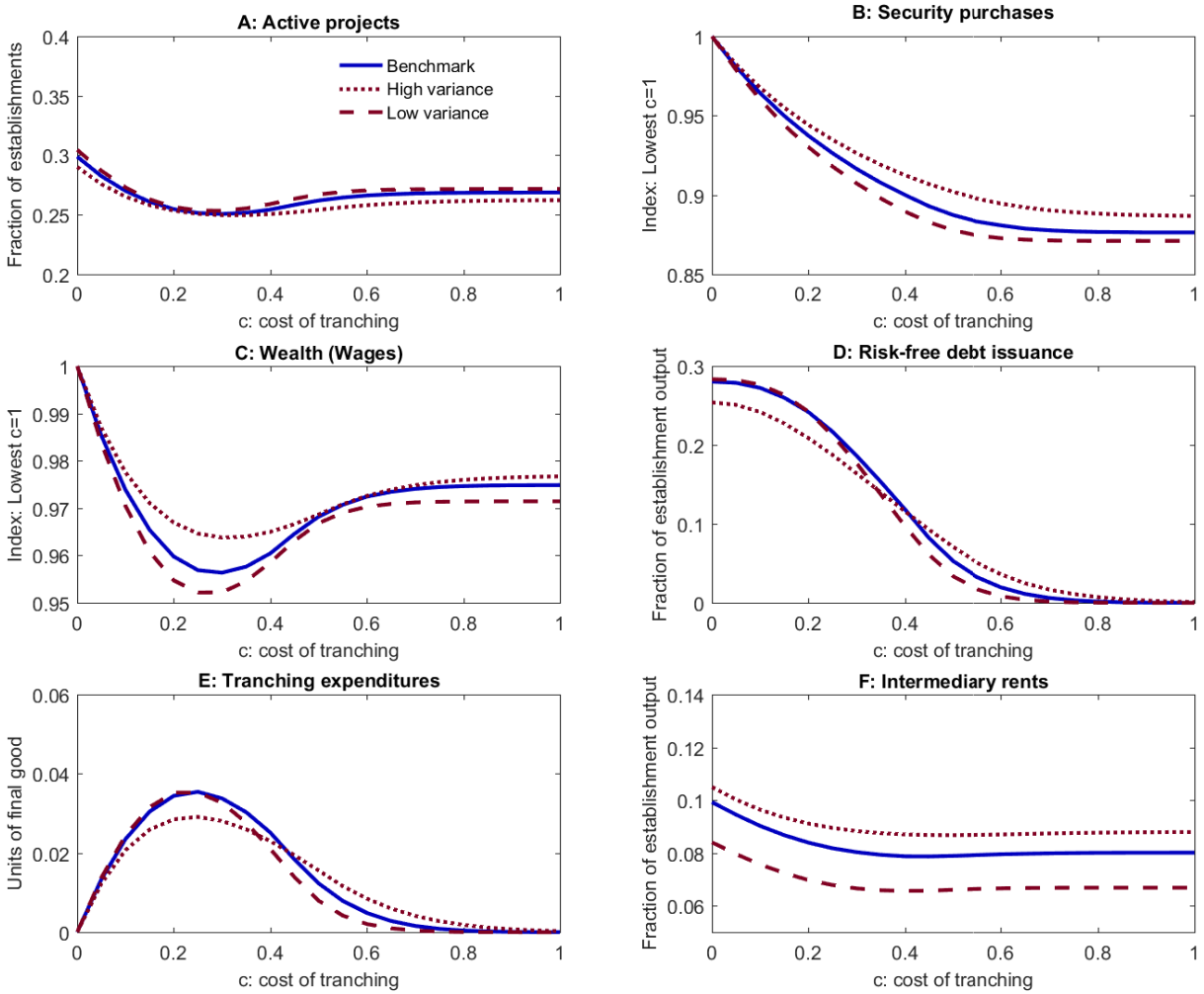
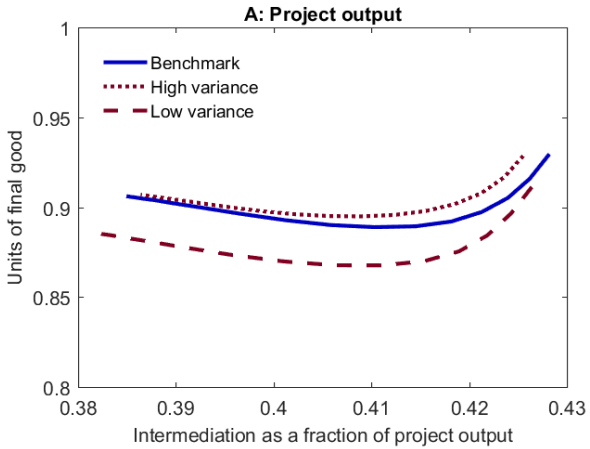


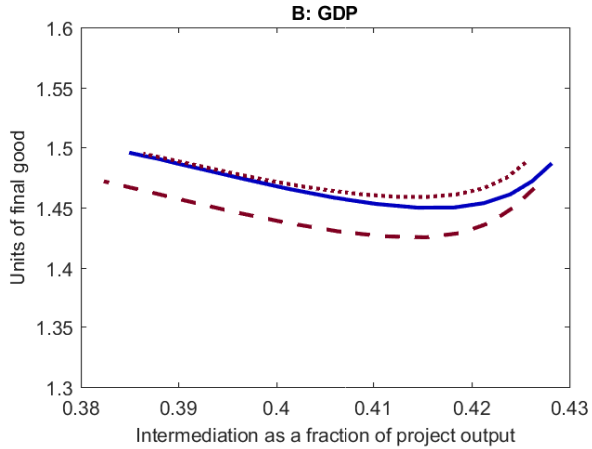
▸ Welfare

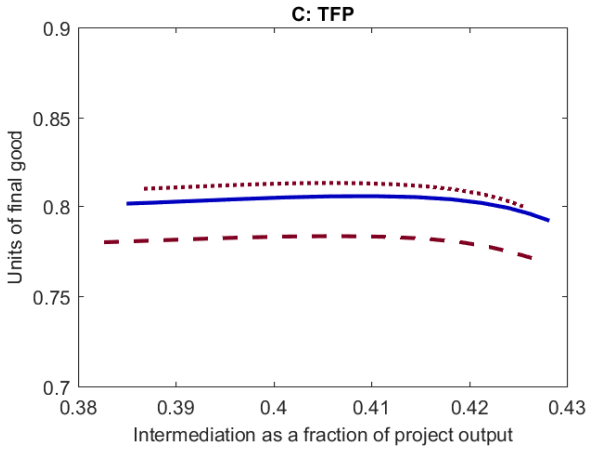
Sensitivity to talent dispersion

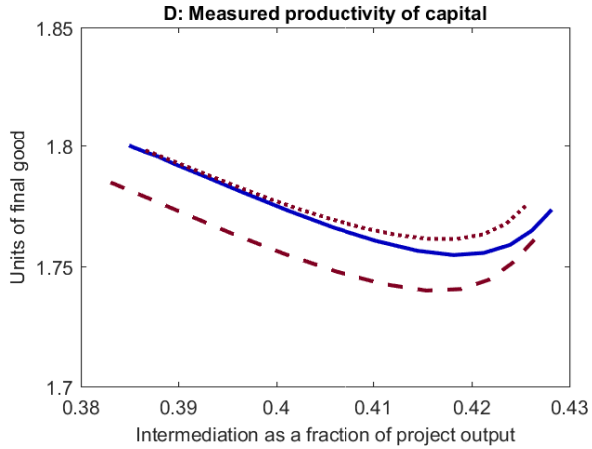


Financial engineering and economic development

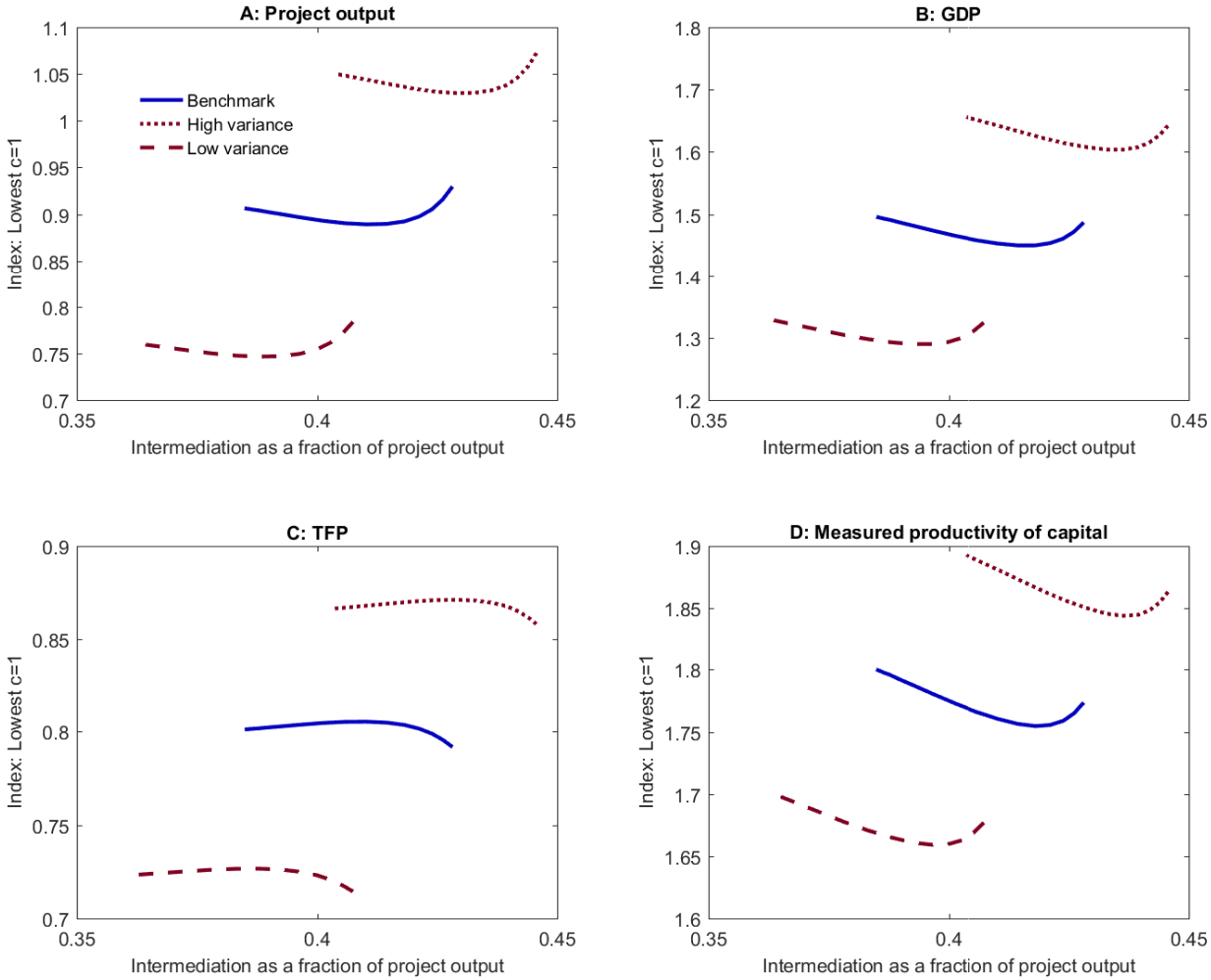








Enterprise leads, finance follows



Data I

We look at two proxies for financial complexity:

- Securitization activity
- Private bond market capitalization

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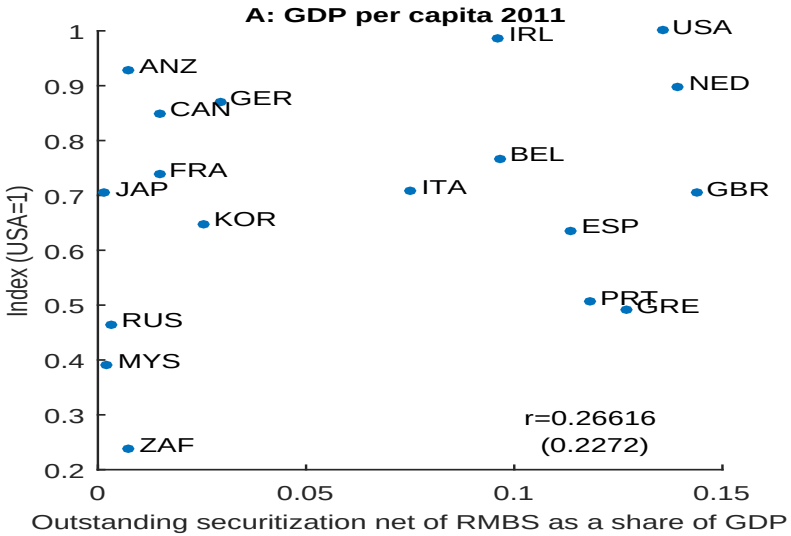
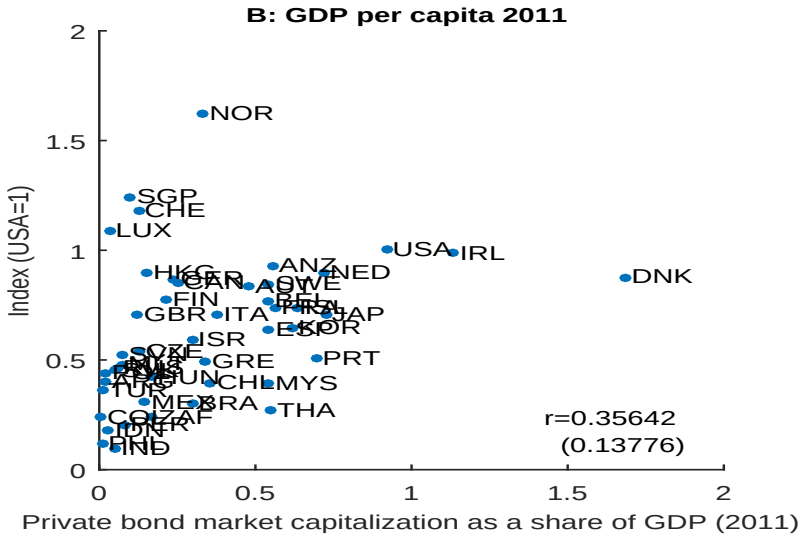
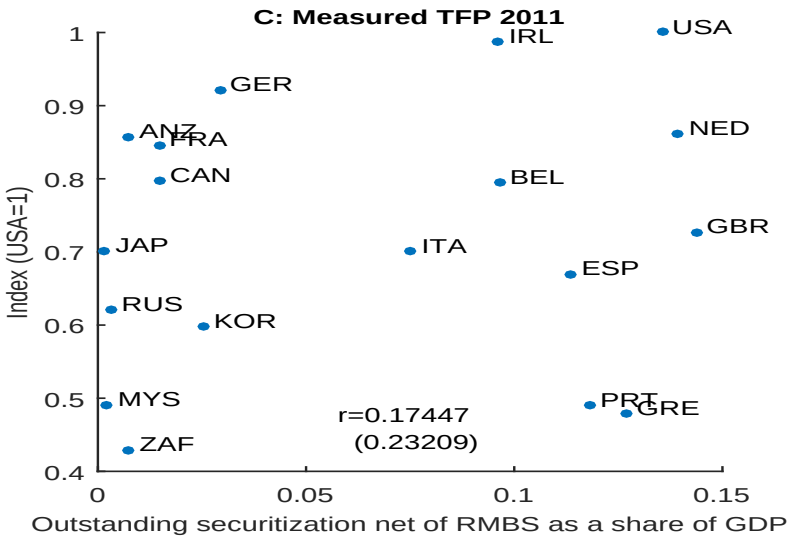
Unconditionally, financial complexity and economic development are positively correlated

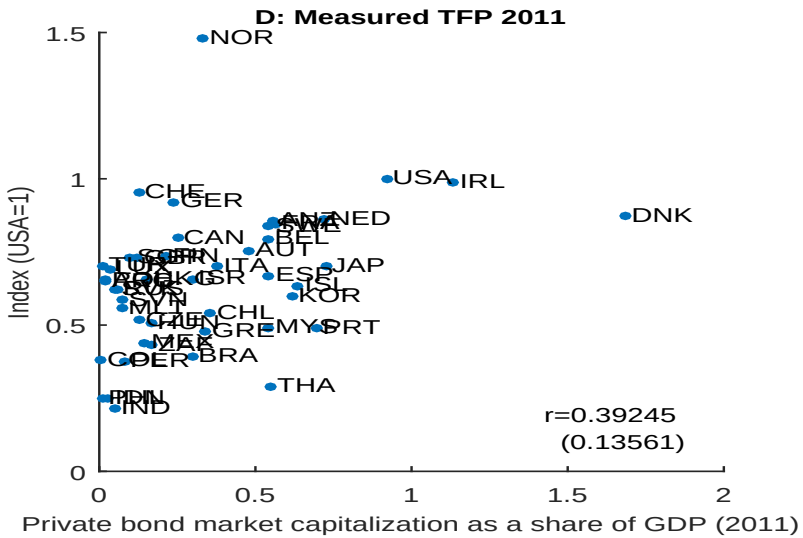
Conditionally on income they are not

Data II


A: GDP per capita 2011
Index (USA=1)
Outstanding securitization net of RMBS as a share of GDP
r=0.26616
(0.2272)
USA
IRL
ANZ
NED
GER
CAN
BEL
FRA
JAP
ITA
GBR
KOR
ESP
PRT
GRE
RUS
MYS
ZAF


B: GDP per capita 2011
Index (USA=1)
Private bond market capitalization as a share of GDP (2011)
r=0.35642
(0.13776)
NOR
SGP
CHE
LUX
USA
IRL
DNK
HKG
ANZ
NED
GBR
ITA
JAP
ESP
KOR
ISR
PRT
GRE
CHL
MYS
THA
IND


C: Measured TFP 2011
Index (USA=1)
Outstanding securitization net of RMBS as a share of GDP
r=0.17447
(0.23209)
USA
IRL
GER
ANZ
NED
FRA
CAN
BEL
GBR
JAP
ITA
ESP
RUS
KOR
MYS
PRT
GRE
ZAF


D: Measured TFP 2011
Index (USA=1)
Private bond market capitalization as a share of GDP (2011)
r=0.39245
(0.13561)
NOR
USA
IRL
CHE
GER
DNK
ANZ
NED
CAN
BEL
AUT
ITA
JAP
ESP
KOR
CHL
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  1. Initiallly, institutional gains enable constrained producers to become active and/or operate more effectively.
  2. In economies with already well functioning markets, financial innovation tends to take the form of repackaging
- First phase delivers potentially high output and TFP gains
- Second phase probably not so much

More papers

- Goldsmith (1969), McKinnon (1973) and Shaw (1973)
- Greenwood and Jovanovic (1990), Bencivenga and Smith (1991), Banerjee and Newman (1993), Khan (2001), Amaral and Quintin (2006)
- Erosa (2001), Jeong and Townsend (2007), Erosa and Cabrillana (2008), Quintin (2008), Buera, Kaboski, and Shin (2011), Buera and Shin (2013), Caselli and Gennaioli (2013)

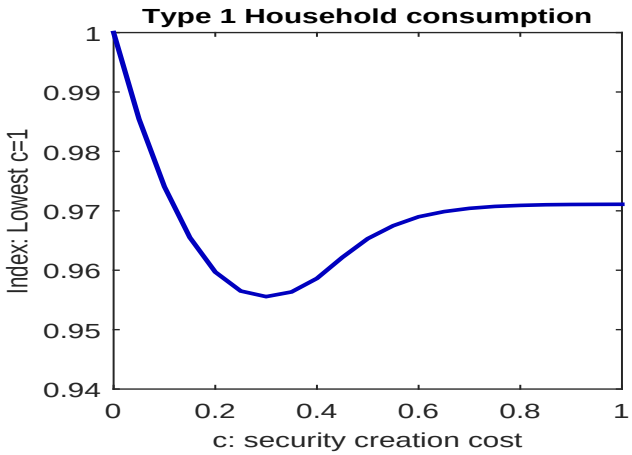
Go back

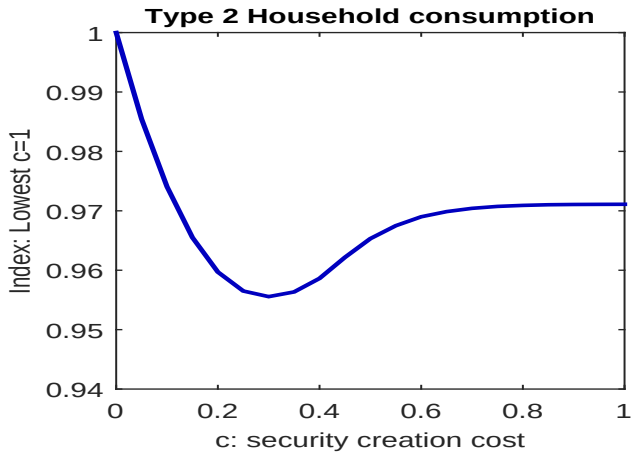
Algorithm

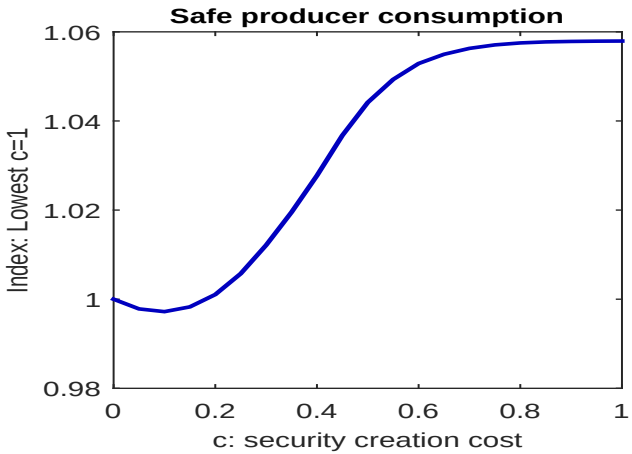
1. Given parameters, solve for household and intermediary policy functions for every possible aggregate state of the economy;
2. Draw a 1000-period sequence of aggregate shocks $\{\eta_t\}_{t=1}^{1000}$ using the Markov transition matrix T and record the value of all endogenous variables starting from an arbitrary value of aggregate wealth;
3. After dropping the first 100 periods, so that assumed initial conditions have at most a negligible effect on the value of endogenous variables, compute average values for all endogenous variables.

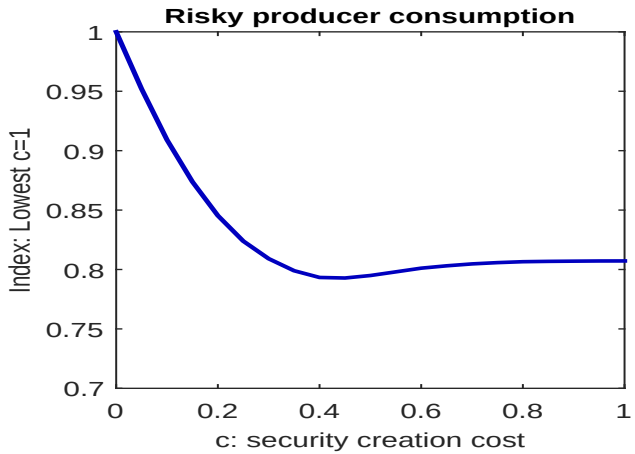
Go back

Welfare









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