Comments by Rafael Repullo on

Intermediaries as Safety Providers

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Purpose of paper (i)

- New theory of financial intermediation

  → Based on demand for “safety”

  → Interpreted as subsistence level of consumption

- Consumers differ in access to safety

  → Heterogeneous (private) return to storage

- Consumers also have access to a public risky investment

Purpose of paper (ii)

- Intermediaries can invest in risky asset
  - → To satisfy demand for safety
  - → By consumers with low storage return
- How can you provide safety by investing in a risky asset?
  - → Exploit non-zero liquidation return
  - → Split cash flows by seniority
  - → Consumers with low storage return get senior debt
  - → Consumers with high storage return get junior debt/equity

Main results

- Portfolio choice in autarky

  → All agents use storage + invest in risky asset

- First-best improves upon autarky

  → Reduce storage by consumers with low return

  → Provide safety by liquidation returns

- First-best can be implemented by intermediaries

  → Pooling resources enables private provision of safety

  → No role for diversification (Diamond)

  → No role for liquidity insurance (Diamond and Dybvig)

Main comments

- Model assumes that intermediaries can only invest in risky asset

  → Strange assumption given role in providing safety

- Model assumes arrival of information at interim date

  → To justify the emergence of demand deposits

  → But this is not needed for the core of the argument

- Paper is short, but not easy to read

  → Some loose ends in the implementation section

What am I going to do?

- Consider a simple version of the model

  → With no arrival of information at interim date

- Briefly comment on some results of paper

  → Public provision of safety

- Briefly comment on some related work

  → Allen and Gale (1988)

Part 1

A simple version of the model

Model setup

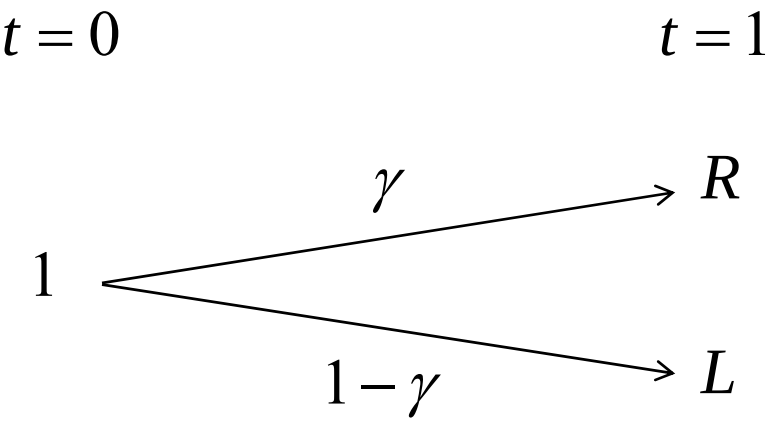
- Two dates ($t = 0, 1$)
- Consumer characterized by
  - → Unit endowment at $t = 0$
  - → Preferences for consumption c_1 at $t = 1$

$$u(c_1) = \begin{cases} c_1 & \text{if } c_1 \geq S \\ -\infty & \text{otherwise} \end{cases}$$

Investments

- Private safe investment (storage)

- Public risky asset



Assumptions

$$0 < L < S < s < \gamma R + (1 - \gamma)L$$

- Storage return s is lower than expected return of risky asset

  → Risky asset is better

  → But does not guarantee minimum consumption S

- Storage guarantees minimum consumption S

  → Some storage will be optimal

Optimal investment

- Let $x \in [0,1]$ denote investment in storage

  $\rightarrow 1 - x$ invested in risky asset

- Consumer's problem

$$\max_x \left[xs + (1-x)(\gamma R + (1-\gamma)L) \right]$$

$$\text{subject to } \; xs + (1-x)L \geq S$$

- Solution: minimum x that satisfies the constraint

$$\hat{x} = \frac{S - L}{s - L}$$

Two types of consumers

- Suppose that consumers may differ in storage return

  → Type H has high return s_H

  → Type L has low return $s_L < s_H$

- As before we assume

$$0 < L < S < s_L < s_H < \gamma R + (1-\gamma)L$$

First-best allocation

- Planner chooses $x_L \in [0,1]$ and $x_H \in [0,1]$ to maximize output subject to subsistence constraint

$$\max_{x_L, x_H} \left[x_L s_L + x_H s_H + (2 - x_L - x_H)(\gamma R + (1-\gamma)L) \right]$$

$$\text{subject to } x_L s_L + x_H s_H + (2 - x_L - x_H)L = 2S$$

Numerical illustration

- Suppose that

$$0 < L = 0.4 < S = 0.5 < s_L = 0.8 < s_H = 1.2$$

$$\gamma = 0.75 \text{ and } R = 2 \;\rightarrow\; \gamma R + (1-\gamma)L = 1.6$$

Autarky allocation

- Storage under autarky

$$\hat{x}_L = \frac{S - L}{s_L - L} = \frac{0.5 - 0.4}{0.8 - 0.4} = 0.25$$

$$\hat{x}_H = \frac{S - L}{s_H - L} = \frac{0.5 - 0.4}{1.2 - 0.4} = 0.125$$

- Consumption under autarky

$$\hat{u}_L = \hat{x}_L s_L + (1 - \hat{x}_L)(\gamma R + (1 - \gamma)L) = 1.40$$

$$\hat{u}_H = \hat{x}_H s_H + (1 - \hat{x}_H)(\gamma R + (1 - \gamma)L) = 1.55$$

First-best allocation

$$\max_{x_L, x_H} \left[3.2 - 0.8x_L - 0.4x_H \right]$$

$$\text{subject to } \; 0.8 + 0.4x_L + 0.8x_H = 2S = 1$$

- Solving for x_H in the constraint gives

$$x_H = 0.25 - 0.5x_L$$

- Substituting it into objective function gives

$$\max_{x_L} \left[3.1 - 0.6x_L \right] \; \rightarrow \; x_L^* = 0 \; \text{ and } \; x_H^* = 0.25$$

First-best vs. autarky allocation

- Comparison of first-best with autarky allocation

  → Type *L* reduces storage to zero (relative to autarky)

  → Type *H* increases storage from 0.125 to 0.25

  → Total consumption increases from 2.95 to 3.1

Implementing first-best allocation

- Implementation by intermediary offering debt and equity
- Implementation constraints

  → Both types should be better off than in autarky

  → $x_L^* = 0$ implies that type L prefers debt to storage

  → $x_H^* s_H = 0.3 < S$ implies that type H is indifferent between debt and storage

  → Expected equity return must be sufficiently high

Comments on the implementation

- One can show that previous constraints can be satisfied

  → What happens in model with continuum of types?

- One important unresolved issue (also in paper)

  → How are the output gains distributed among types?

Part 2

Public provision of safety

Public provision of safety

- Paper addresses impact of changes in supply of safe assets

  → Interesting topic (given literature on scarcity of safe assets)

- This is done through change in low storage return s_L

  → Too much of a reduced form!

  → May be better to analyze effects of change in subsistence S

Effect of change in subsistence consumption

- Suppose that reduced public provision of safety increases S
- Effect on first-best allocation

$$\max_{x_L, x_H} \left[3.2 - 0.8x_L - 0.4x_H \right]$$

$$\text{subject to } \; 0.8 + 0.4x_L + 0.8x_H = 2(S + \Delta S) = 1.2$$

$\rightarrow$ Operating as before this reduces to

$$\max_{x_L} \left[3 - 0.4x_L \right] \; \rightarrow \; x_L^* = 0 \;\; \text{and} \;\; x_H^* = 0.5$$

Effect of change in subsistence consumption

- Effect of an increase in S

  → Type H increases storage from 0.25 to 0.5

  → Lower investment in risky asset

  → Lower private provision of safety (more storage)

  → Total consumption goes down from 3.1 to 3

- In contrast with results in the paper!

Part 3

Comment on some related work

Allen and Gale (1988)

"This article develops a model in which the instruments that are traded are chosen optimally and the economy's market structure is endogenous. It is shown that the **firm's income stream should be split** so that in every state all **payoffs are allocated to the security held by the group that values it most**."

- Is it not the same story, with "banks" instead of "firms"?

  → Deserves a serious discussion

Some results of Allen and Gale (1988)

- Equilibrium is constrained efficient

  → But first-best risk-sharing is not achieved

- When firm issues two securities each one targeted to clientele

  → Firm's output allocated to clientele that values it most

- Optimal securities need not be debt and equity

- No short-sales assumption is critical

Concluding remarks

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- Interesting idea to build theory of intermediation

  → New approach to model demand for safety

- Need to tide up some results

  → In particular on implementation of first-best allocation

- Need to relate to previous work by Allen and Gale

  → In what sense are we talking about “banks”?

- Model should be able to incorporate other theories

  → In particular those related to provision of liquidity

References

• Allen, F., and D. Gale (1988), “Optimal Security Design,” *Review of Financial Studies*.

• Allen, F., and D. Gale (1991), Arbitrage, Short Sales and Financial Innovation,” *Econometrica*.

• Allen, F., and D. Gale (1994), *Financial Innovation and Risk Sharing*.