Comments by Rafael Repullo on

Intermediaries as Safety Providers

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Conference on Modelling Credit Cycles

Imperial College London, 3 April 2017
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)

\[ t = 0 \quad t = 1 \]

\[ 1 \quad s \]

• Public risky asset

\[ t = 0 \quad t = 1 \]

\[ 1 \quad \gamma \quad R \]

\[ 1 - \gamma \quad L \]
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

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

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

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

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

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

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

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

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

→ Operating as before this reduces to

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

• Interesting idea to build theory of intermediation
  → New approach to model demand for safety

• Need to tidy 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

