Personal Profile

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Lingnan College, Sun Yat-sen University

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Contents

Education Background

Education Background

- Bachelor of Economics in Lingnan College, Sun Yat-Sen University from Sep 2017 to Jun 2021,
- Master of Finance in Lingnan College, Sun Yat-Sen University from Sep 2021 to present,
- Exchange in **Warwick Business School, University of Warwick** from Sep 2019 to Dec 2019.

Research Interests

Research Fields of interest in Finance

1. **Financial Economics**
   - **Zeng, Yan, Xuefeng Wu, Junqing Kang, and Zhuoran Chen, 2023. Optimal Coupon Cooperation Policy of E-commerce Platforms and E-tailers and Its Benefit. Systems Engineering – Theory & Practice, 43(1): 110-134,**
   - Does Technological Progress aggravate consumption inequality between urban sector and rural sector?—Based on the price effect and the common prosperity effect.

2. **Financial Econometrics**
   - Zhou, Xianbo and Zhuoran Chen, 2023. The Impact of Uncertainty Shocks to Consumption under Different Confidence Regimes Based on a Stochastic Uncertainty-in-Mean TVAR Model. Sustainability, 15(4): 3032.

3. **Financial Network**
   - Financial Crisis and Financial Network Stability—Based on the perspective of risk contagion in the financial system.

Research Papers

Published

Optimal Coupon Cooperation policy of E-commerce Platforms and E-tailers and its benefit

Yan ZENG, Xuefeng WU, Junqing KANG, **Zhuoran CHEN**

(Lingnan College, Sun Yat-sen University; Imperial College Business School)

Motivation

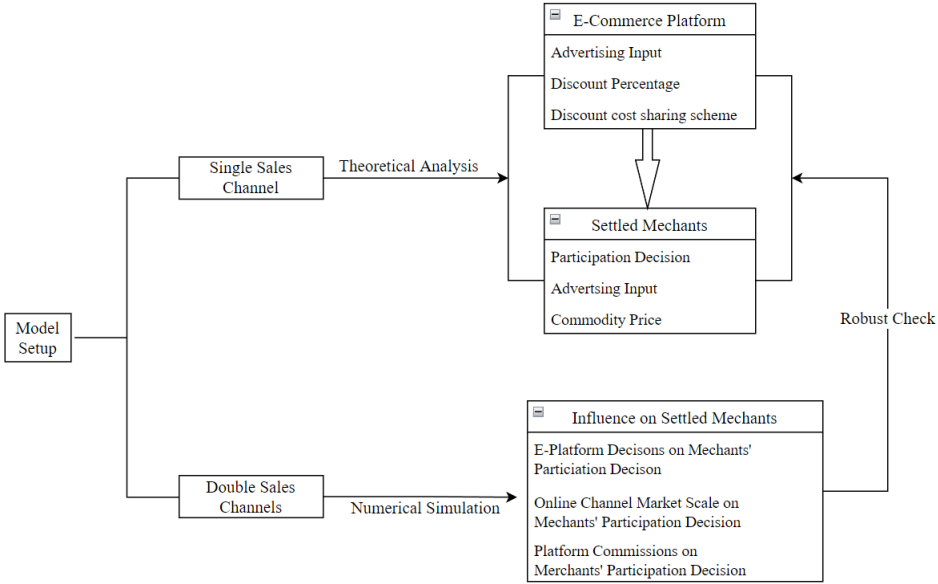
- Issuing consumption coupons cooperatively by e-commerce platforms and their merchants is recently an innovative and promising trend in platform economy.

- Several typical examples:
  - "Ten Billion Yuan subsidy program" by Pinduoduo since June, 2019;
  - "Juhuasuan subsidy program (USD 1.4 billion)" by Alibaba since Dec, 2019;
  - AliExpress claims to subsidize retailers $3/order since March 2020.
  - ...

Relevant Questions

- How to maximize the profits of both e-commerce platform and its merchants while protecting consumers' legal rights at the same time?
  - ✓ Are the merchants willing to participate in the program, and if not, how to beef up their enthusiasm?
  - ✓ What are the effects of cooperate coupon issuing on the advertising inputs of the merchants?
  - ✓ Will cooperative coupon issuing benefit consumers (the prices of the commodities)?

Framework

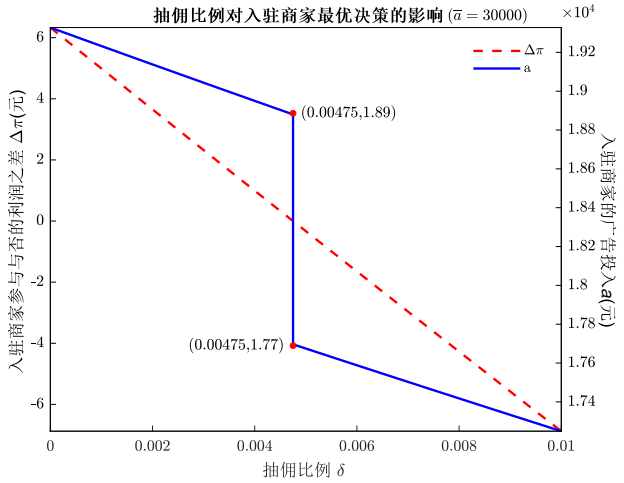

E-Commerce Platform
Advertising Input
Discount Percentage
Discount cost sharing scheme
Settled Mechants
Participation Decision
Advertsing Input
Commodity Price
Single Sales Channel
Theoretical Analysis
Model Setup
Double Sales Channels
Numerical Simulation
Influence on Settled Mechants
E-Platform Decisons on Mechants' Particiation Decison
Online Channel Market Scale on Mechants' Participation Decision
Platform Commissions on Merchants' Participation Decision
Robust Check

Results I

Q1 Are the merchants willing to participate in the program, and if not, how to beef up their enthusiasm?

A1 Merchants' willingness to engage will increase if

- the platform commissions decrease,

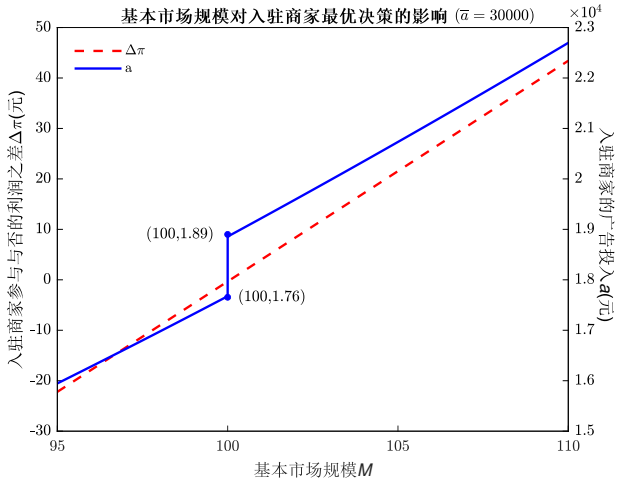


Results I

Q1 Are the merchants willing to participate in the program, and if not, how to beef up their enthusiasm?

A1 Merchants' willingness to engage will increase if

- the platform commissions decrease,
- the market scale of merchants' platform sales channel increases,

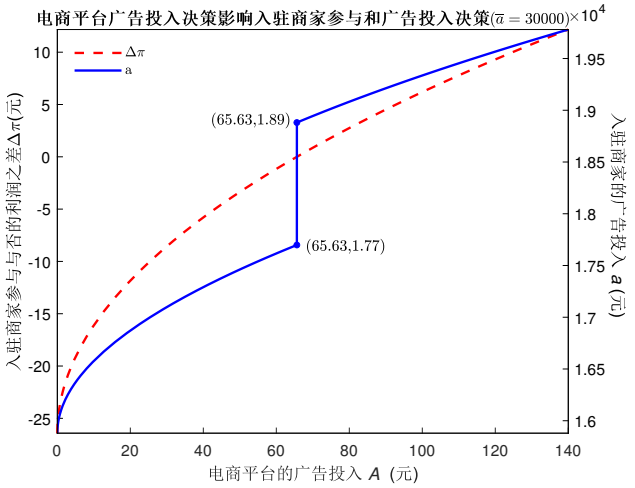


Results I

Q1 Are the merchants willing to participate in the program, and if not, how to beef up their enthusiasm?

A1 Merchants' willingness to engage will increase if

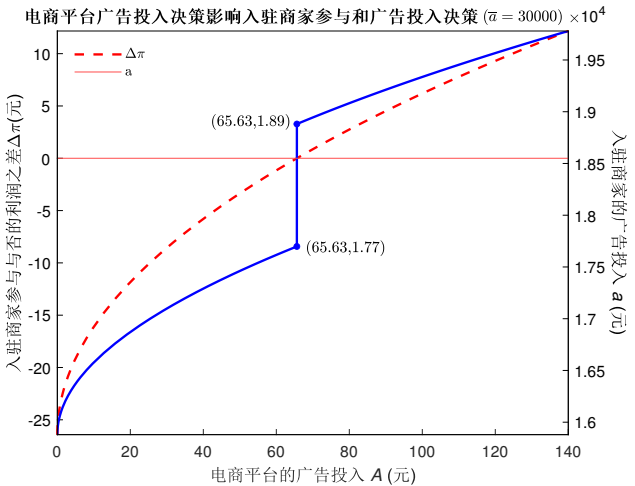
- the platform commissions decrease,
- the market scale of merchants' platform sales channel increases,
- the advertisements input of e-commerce platform increases.



Results II

Q2 What are the effects of cooperate coupon issuing affect the advertising input of the merchants?

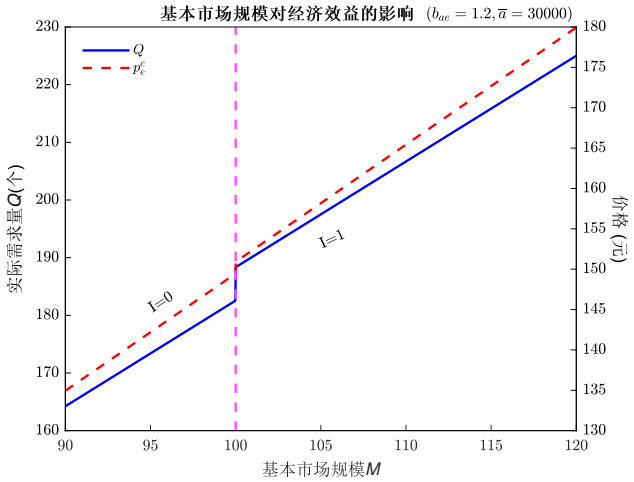
A1 There is a positive correlation between participation decision and advertisements input.



Results III

Q3 Will cooperative coupon issuing benefit consumers (the prices of the commodities)?

A3 The actual price facing consumers goes up due to cooperative coupon issuing if merchants can rely more on commercials to increase the demands.



Published

The Impact of Uncertainty Shocks to Consumption under Different Confidence Regimes

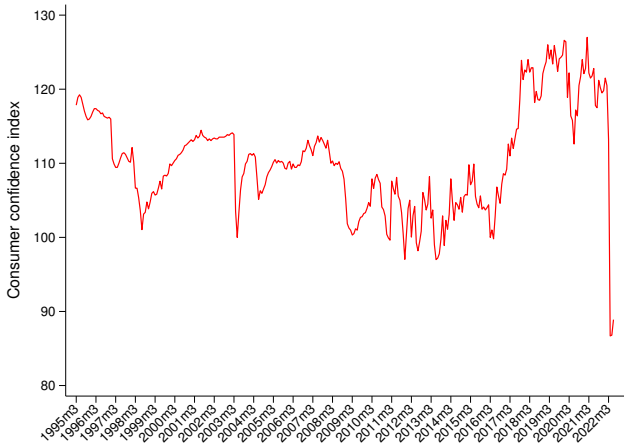
—Based on a Stochastic Uncertainty-in-Mean TVAR Model.

Xianbo ZHOU, **Zhuoran CHEN**

(Lingnan College, Sun Yat-sen University)

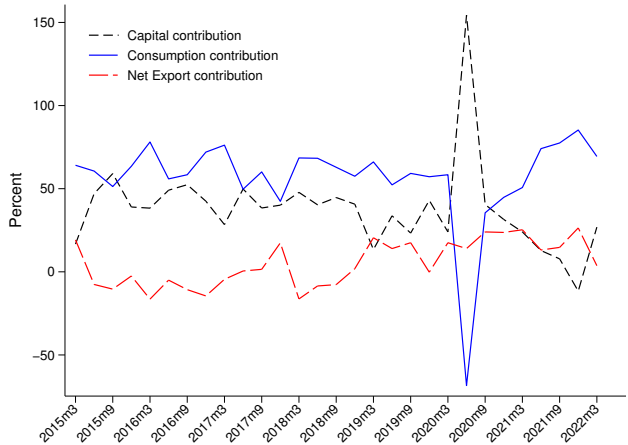
Motivation

- Volatile Chinese consumer confidence (CCI), $\Rightarrow$



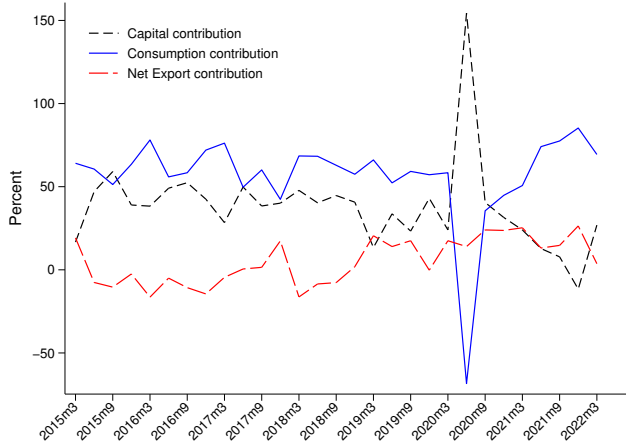
Motivation

- Volatile Chinese consumer confidence (CCI), ⇒
- Consumption contributes the most to Chinese economy among “three carriages”, ⇒



Motivation

- Volatile Chinese consumer confidence (CCI), ⇒
- Consumption contributes the most to Chinese economy among “three carriages”, ⇒
- Will the exogenous shock cause different effects on the Chinese economy, especially consumption, under different CCI regimes?



Contributions I

- Allows the stochastic uncertainty to affect simultaneously:
  - ✓ the endogenous variables directly in the mean equation [First order moment],
  - ✓ the covariance matrix of the disturbance term in the mean equation [Second order moment].

$$
\begin{aligned}
Z_t = & \left(c_1 + \sum_{j=1}^{M} \beta_{1j} Z_{t-j} + \sum_{j=0}^{J} \gamma_{1j} \ln \lambda_{t-j} + \Omega_{1t}^{1/2} e_t \right) \tilde{S}_t \\
& + \left(c_2 + \sum_{j=1}^{M} \beta_{2j} Z_{t-j} + \sum_{j=0}^{J} \gamma_{2j} \ln \lambda_{t-j} + \Omega_{2t}^{1/2} e_t \right) (1 - \tilde{S}_t)
\end{aligned}
\tag{1}
$$

where

$$
\begin{aligned}
\Omega_{1t} &= A_1^{-1} H_t A_1^{-1'} \\
\Omega_{2t} &= A_2^{-1} H_t A_2^{-1'} \\
H_t &= \lambda_t S \\
\ln \lambda_t &= \alpha + F \ln \lambda_{t-1} + \eta_t
\end{aligned}
\tag{2}
$$

Contributions II

- Considers the threshold effect of endogenous consumer confidence to capture the impact of uncertainty shocks on macroeconomic variables under different consumer confidence regimes.

$$
\begin{aligned}
Z_t = & \left(c_1 + \sum_{j=1}^{M} \beta_{1j} Z_{t-j} + \sum_{j=0}^{J} \gamma_{1j} \ln \lambda_{t-j} + \Omega_{1t}^{1/2} e_t \right) \tilde{S}_t \\
& + \left(c_2 + \sum_{j=1}^{M} \beta_{2j} Z_{t-j} + \sum_{j=0}^{J} \gamma_{2j} \ln \lambda_{t-j} + \Omega_{2t}^{1/2} e_t \right) (1 - \tilde{S}_t)
\end{aligned} \tag{3}
$$

where

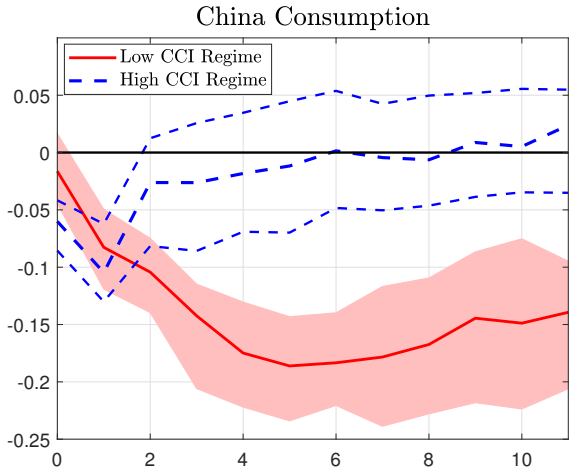
$$
\tilde{S}_t = 1 \{ CCI_{t-d} \leq Z^* \}
$$

Results I

- In China, compared to high CCI, low CCI will

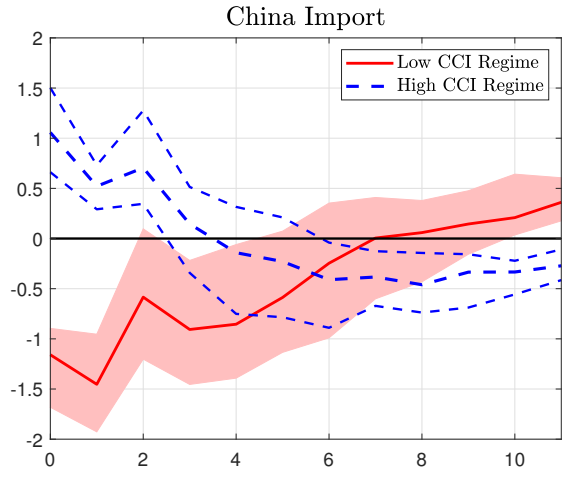
Results I

- In China, compared to high CCI, low CCI will
  - exacerbate domestic consumption,



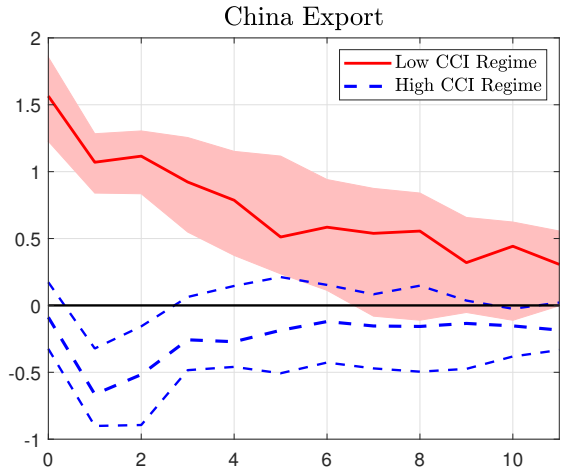
Results I

- In China, compared to high CCI, low CCI will
  - exacerbate domestic consumption,
  - deteriorate import,



Results I

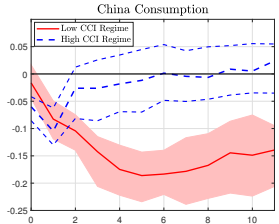
- In China, compared to high CCI, low CCI will
  - exacerbate domestic consumption,
  - deteriorate import,
  - benefit export.

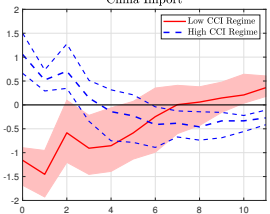


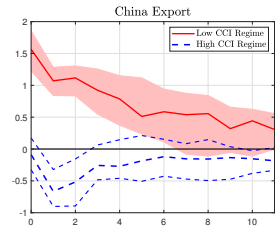
Results I

- In China, compared to high CCI, low CCI will
  - exacerbate domestic consumption,
  - deteriorate import,
  - benefit export.

- Low CCI regime means domestic consumers are more pessimistic than foreign consumers,
  - they would purchase less from both *home* (domestic consumption) and *abroad* (import),
  - *foreign* consumers will buy more (export).

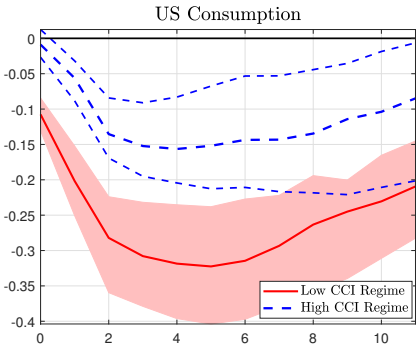


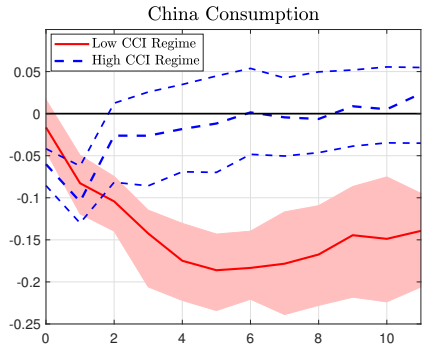




Results II

- Consumer confidence is much more influential in US than China.

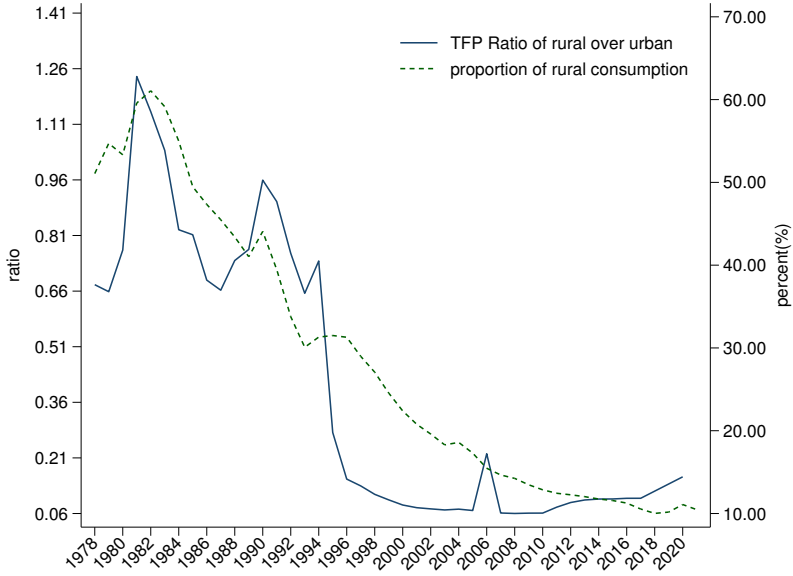




Does the rapid urban technological progress aggravate the demand for rural products in China?

— Based on the price effect and the common prosperity effect

Motivation


TFP Ratio of rural over urban
proportion of rural consumption
ratio
percent(%)
1.41
1.26
1.11
0.96
0.81
0.66
0.51
0.36
0.21
0.06
70.00
60.00
50.00
40.00
30.00
20.00
10.00
1978
1980
1982
1984
1986
1988
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2002
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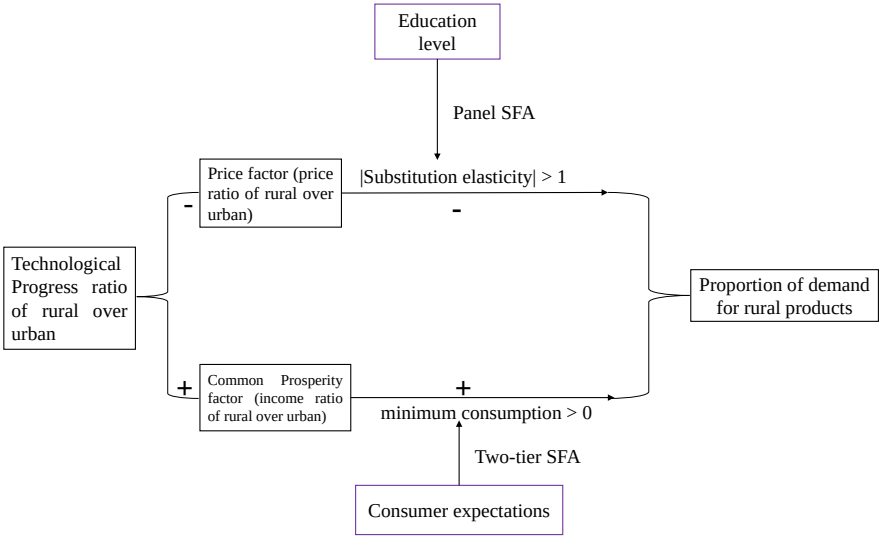
2016
2018
2020

Framework


Education level
Panel SFA
Price factor (price ratio of rural over urban)
|Substitution elasticity| > 1
-
-
Technological Progress ratio of rural over urban
Proportion of demand for rural products
+
Common Prosperity factor (income ratio of rural over urban)
+
minimum consumption > 0
Two-tier SFA
Consumer expectations

Price Effect

-

$$\frac{P_1 c_1}{P_2 c_2} = \frac{\omega_1}{\omega_2} \left(\frac{P_1}{P_2} \right)^{1-\epsilon} \tag{4}$$

  - With low substitution elasticity ($\epsilon < 1$), the increase of price ratio (rural over urban) will increase the proportion of rural consumption,
  - With high substitution elasticity ($\epsilon > 1$), the increase of price ratio (rural over urban) will decrease the proportion of rural consumption.

- Since

$$\frac{P_1}{P_2} = \frac{w_1 A_2}{w_2 A_1} \tag{5}$$

- Urban sector with faster tech progress will bring the decrease of its relative price, thus increasing its consumption proportion given high substitution elasticity in China.

Common Prosperity Effect

- Since

$$\frac{P_1\left(c_1+\overline{c_1}\right)}{P_2\left(c_2\right)}=\frac{\omega_1}{\omega_2}\left(\frac{P_1}{P_2}\right)^{1-\epsilon}\Rightarrow\frac{A_1L_1+\overline{c_1}}{A_2L_2}=\frac{\omega_1}{\omega_2}\left(\frac{w_2A_1}{w_1A_2}\right)^{\epsilon}$$

- Proportion of rural consumption x_1^c

$$x_1^c=\frac{\frac{\omega_1\delta^{1-\epsilon}}{\omega_2}LA_1-\overline{c_1}\xi}{(1-\xi)\overline{c_1}+\left(1+\frac{\omega_1\delta^{1-\epsilon}}{\omega_2}\right)LA_1} \tag{6}$$

- Since we normalize $A_1=1$ in order to find out the impact of relative urban tech progress A_2/A_1, equation 6 turns out to be

$$x_1^c=\frac{\frac{\omega_1\delta^{1-\epsilon}}{\omega_2}L-\overline{c_1}\xi}{(1-\xi)\overline{c_1}+\left(1+\frac{\omega_1\delta^{1-\epsilon}}{\omega_2}\right)L}\Rightarrow\frac{\partial x_1^c}{\partial\xi}=\frac{-\overline{c_1}\left(L+\overline{c_1}\right)}{\left((1-\xi)\overline{c_1}+\left(1+\frac{\omega_1\delta^{1-\epsilon}}{\omega_2}\right)L\right)^2}$$

- Enlarging of income gap between urban and rural sectors may shrink the proportion of demand for rural products.

Financial Crisis and Financial Network Stability[1]

—Based on the perspective of risk contagion in the financial system

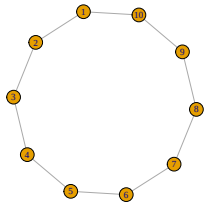
[1] Acemoglu, Daron, Asuman Ozdaglar, and Alireza Tahbaz-Salehi. 2015. "Systemic Risk and Stability in Financial Networks." *American Economic Review*, 105 (2): 564-608.

Motivation

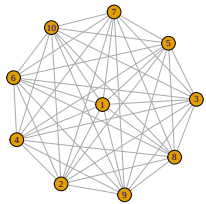
- Increasingly intricate interdependencies among financial institutions in different countries may increase the possibilities of financial tsunamis,
- Different structures of a financial network may affect the contagion of risks among its nodes (i.e. different financial institutes).

Systemic Risk and Networks

- A common hypothesis: more interbank connections enhance the resilience of the financial system to idiosyncratic shocks,whereas “sparser” network structures are more fragile.
  - Kiyotaki and Moore (2002),
  - Allen and Gale (2000),
  - Freixas et al. (2000).



- But also the opposite perspective: more densely connected financial networks are more prone to systemic risk: reminiscent of epidemics.
  - Blume et al. (2011).



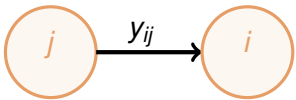
- In the context of input-output economies with linear interactions, sparsity is *not relevant*. Rather it is the symmetry that matters.
  - Acemoglu et al. (2012).

This paper

- A model of interbank lending and counterparty risk in financial networks.
- The form of interactions and magnitude of shocks are crucial for understanding systemic risk and fragility.
  - For **small shocks**, sparsity implies fragility and interconnectivity implies stability,
  - Phase Transition: with **large shocks**, the more complete networks become most fragile, whereas “weakly connected” networks become stable.

A Minimalist Model of Financial Networks

- n risk-neutral financial institutions (banks),
- three dates: $t = 0, 1, 2$,
- each bank has an initial capital k.
- Banks lend to one another at $t = 0$ and write standard debt contracts in exchange.
  - to be repaid at $t = 1$,
  - face values: $\{y_{ij}\}$: how much bank j owes bank i?
  - defines a financial network:



- Take the interbank commitments as given.

A Minimalist Model of Financial Networks

- After borrowing, bank i invests in a project with returns at $t = 1, 2$.
  - random return of z_i at $t = 1$.
  - deterministic return of A at $t = 2$ (if held to maturity)

- Bank i's obligations:
  - Interbank commitments $\{y_{ji}\}$,
  - A more senior outside obligation of value $\nu > 0$.

- If the bank cannot meet its obligations, it defaults:
  - liquidates its project prematurely and gets ζA,
  - costly liquidation: $\zeta < 1$,
  - pays back its creditors on *pro rata* basis.

Summary: Timing and Description of Events

- $t = 0$:
  - interbank lending happens,
  - banks invest in projects.
- $t = 1$:
  - short term returns $\{z_i\}$ are realized,
  - banks have to meet the interbank and outside obligations,
  - any shortfall leads to default and forces costly liquidation.
- $t = 2$:
  - remaining assets have their long-run returns realized.

Small Shock Regime

Proposition

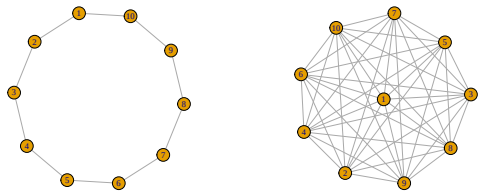
There exist ϵ^* and y^* such that for all $\epsilon < \epsilon^*$ and $y > y^*$,

(a) *the complete financial network is the most stable and most resilient,*

(b) *the ring financial network is the least stable and resilient,*

(c) *the γ-convex combination of the ring and complete financial networks becomes more stable and resilient as γ increases.*

$$y_{ij} = (1-\gamma)y_{ij}^{\text{ring}} + \gamma y_{ij}^{\text{comp}}$$



Insights under Small Shock Regime

- Sparsity $\Rightarrow$ Fragility,
  Interconnectivity $\Rightarrow$ Resilience.

- Intuition: the complete network reduces the impact of a given bank's failure on any other bank, whereas in the ring, all the losses are transferred to the next bank.

δ-connected financial networks

Definition

- Financial network is δ-connected if there exists a subset M such that
  (a) $y_{ij} \leq \delta$ for all $i \in M$ and $j \notin M$,
  (b) $y_{ij} \leq \delta$ for all $i \notin M$ and $j \in M$.

- Financial network disconnected if $\delta = 0$.

- "weakly connected" if δ is small

Large Shock Regime

Proposition

If $\epsilon > \epsilon^*$ and $y > y^*$, then

- complete and ring networks are the least resilient and stable networks,
- for δ small enough, δ-connected networks are more stable and resilient than both.

- Phase transition/Regime change:
  with large shocks, the complete is as fragile as the ring.

Insights under Larger Shock Regime

- Two absorption mechanisms:
  - i The excess liquidity of non-distressed banks $a - \nu > 0$,
  - ii The senior creditors of the distressed banks with claims ν.

- The complete network:
  - utilizes (i) very effectively, more than any other network,
  - utilizes (ii) less than any other network,
  - when shocks are small, (i) can absorb all the losses.

- Weakly connected networks:
  - do not utilize (i) that much,
  - utilize (ii) very effectively,
  - with *large shocks*, networks that utilize (ii) more effectively are more stable.

Summary

- A framework for studying the relationship between the structure of financial networks and the extent of contagion and cascading failures
- Small shocks: rings are most unstable and the complete network is the most stable
- For large shocks, there is a phase transition: complete network is the most unstable, and strictly less stable than weakly connected networks.

THANK YOU VERY MUCH !!!

References I

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Freixas, Xavier, Bruno M Parigi, and Jean-Charles Rochet, "Systemic risk, interbank relations, and liquidity provision by the central bank," *Journal of money, credit and banking*, 2000, pp. 611–638.

Kiyotaki, Nobuhiro and John Moore, "Balance-sheet contagion," *American Economic Review*, 2002, *92* (2), 46–50.