The Institutional Foundation of China's Financial System

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Motivation for Understanding China's Financial System

Concerns about China's financial stability

- Rapidly rising leverage and a booming shadow banking sector
- Skyrocketing housing prices across China
- Unstable capital flow and exchange rate
- Volatile stock market and intensive speculation

Challenges

- China has a different economic system, and the financial system is designed in a particular way to support the economy
- Need a separate conceptual framework to systematically understand China's economy and financial system

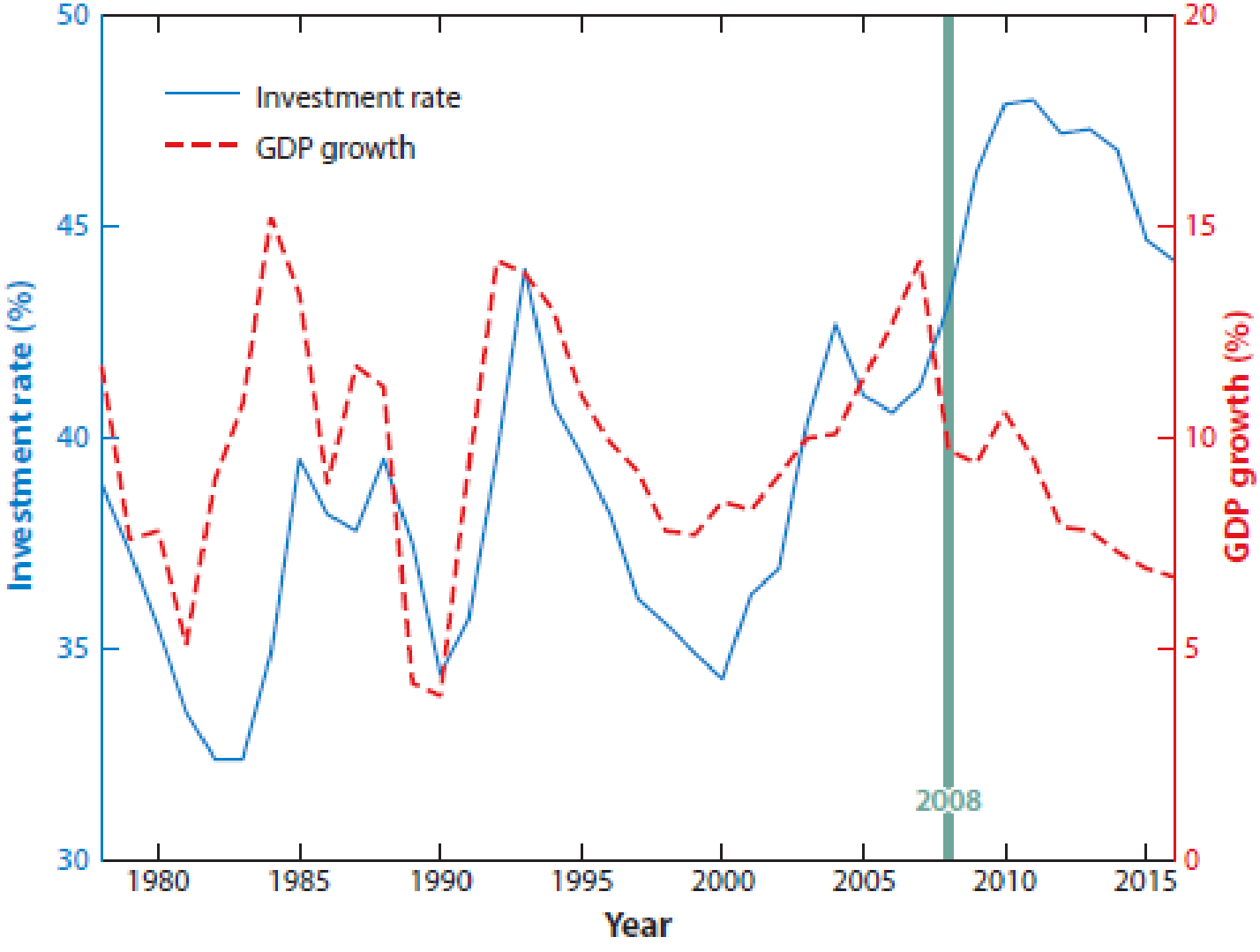
Outline

- An overview of China's economic system and financial stability
  - Song and Xiong (2018), "Risks in China's financial system"
- China's government system and the economy
  - Xiong (2018), "The Mandarin Model of Growth"
- Government policy and market speculation
  - Brunnermeier, Sockin and Xiong (2017), "China's Model of Managing the Financial System"

An Overview

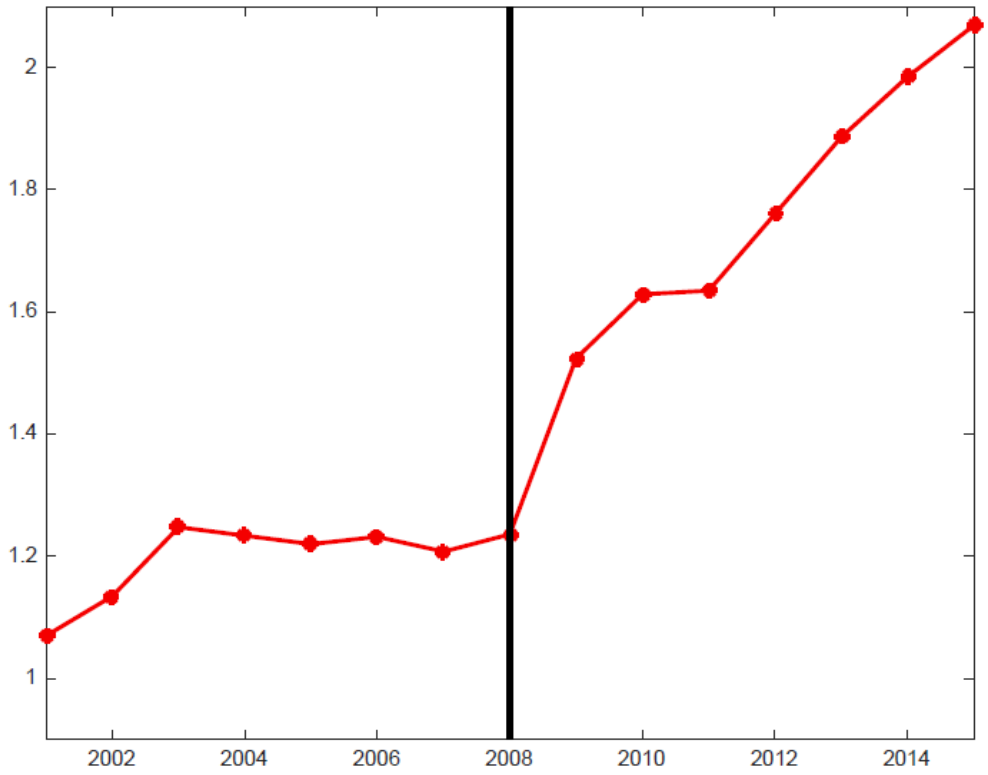
- Song & Xiong (2018): "Risks in China's Financial System"

Concerns: The Economic Slow Down



Concerns: Rising Leverage

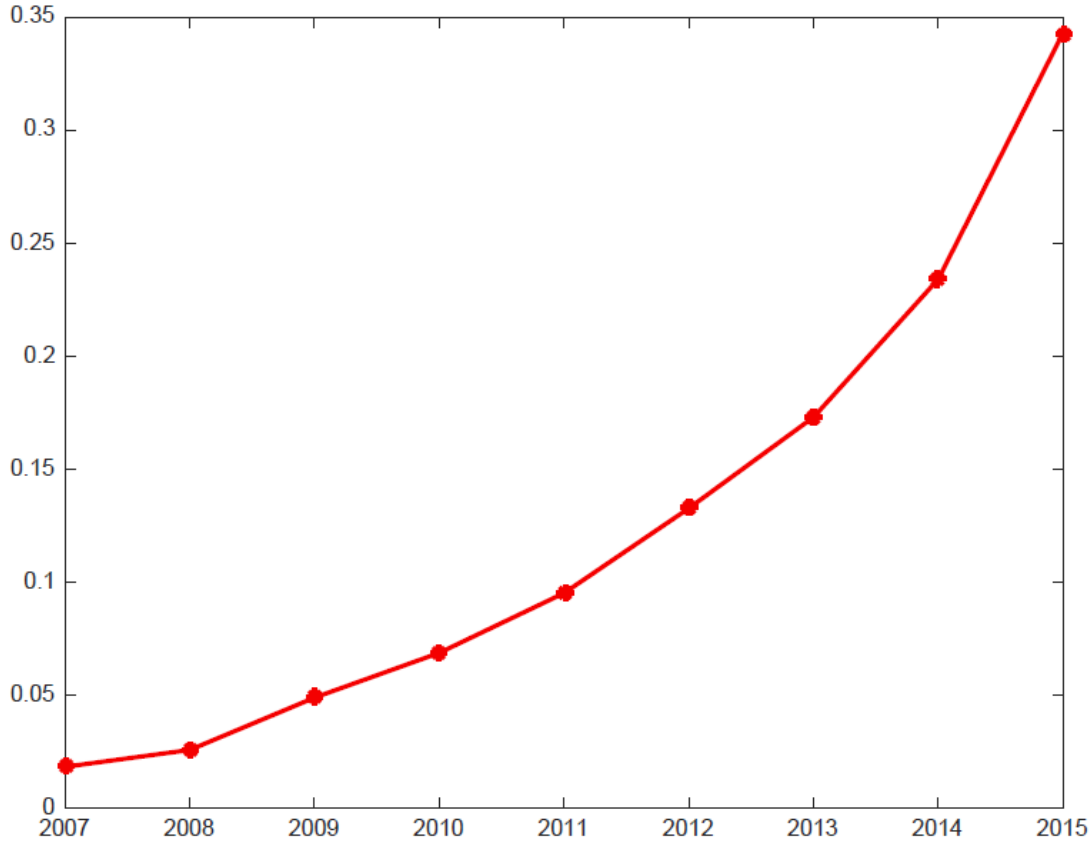
Debt to GDP ratio
(excluding central government debt)



Note: The outstanding debt is backed out from "social financing statistics" provided by NBS, which measures lending from the financial sector to the non-financial sector

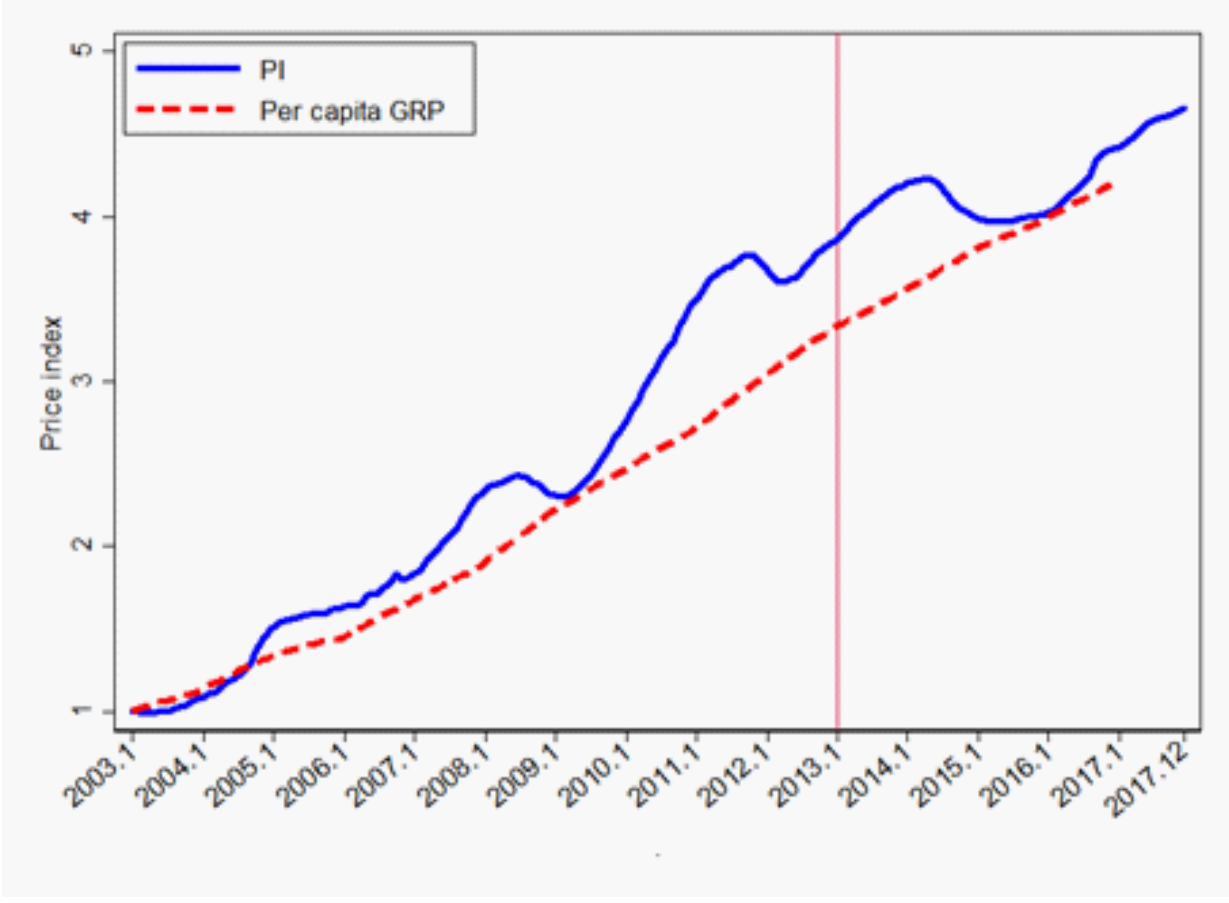
Concerns: The Booming Shadow Banking Sector

Figure 4: The Size of Wealth Management Products



Note: The figure plots total WMP balances as percent of GDP. Data source: China's Banking Wealth Management Market Annual Report (various issues)

Concerns: The Housing Boom



Source: Fang, Gu, Xiong & ZHou (2016) and NBS

China's Unique Institutional Environment

Institutional origins of financial risks in China

- The two-track reform makes the state sector and the non-state sector co-exist, compete, and flourish together
  - Lau, Qian and Roland (2000)
- Soft-budget constraints to SOEs, state banks, and local governments
  - Qian (2017), Xu (2011)

Two points:

- The rising leverage is mostly from state banks to state firms and local governments
  - A western style debt crisis is unlikely, even though the efficiency of capital allocation is a key concern
- The housing boom is heavily related to local governments
  - A housing crash is less likely, although high housing prices may distort resource allocation in the economy

China's Government System & the Economy

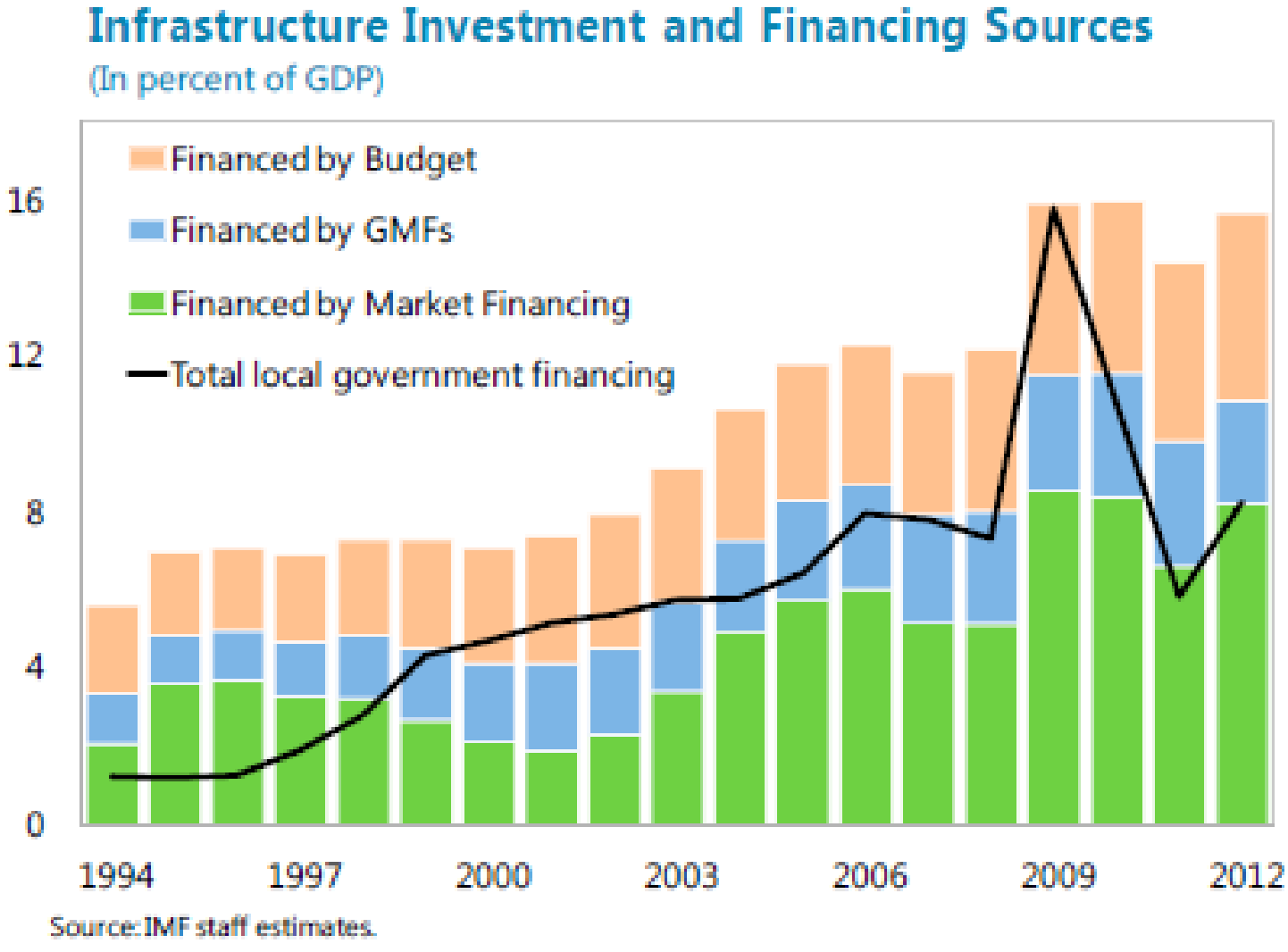
- Xiong (2018): "The Mandarin Model of Growth"

The Government System

- **A politically centralized but fiscally decentralized system**:
  - regional leaders are appointed by the central government
  - local governments contributed to over 70% of fiscal spending
  - local governments have de facto control of local SOEs
  - local governments are fully responsible for developing local infrastructure, markets, & institutions

- Agency problems and the economic tournament among local governments
  - strong incentives to develop local economies, e.g., Xu (2011) and Qian (2017)
  - rising leverage and housing prices are both associated with local government inventives

Stylized Fact: Infrastructure Investment



The Mandarin Model of Growth

- The baseline structure builds on Barro (1990)
  - Infrastructure developed by local government as a third production input that boosts local productivities
  - Each regional governor allocates local fiscal budget between infrastructure investment & government consumption
  - The local government's infrastructure investment directly drives firms' capital and labor choices

- Tournament among regional governors, through a joint performance evaluation based on local output
  - Implicit incentives by signal jamming, a la Holmstrolm (1982):
    - drive each governor to invest in infrastructure, mitigating an under-investment problem in infrastructure
  - Short-termist behaviors:
    - Overreporting of local output (a la Stein, 1989), excessive leverage, shadow banking boom
    - Spillover of short-termist behaviors across regions

Related Literature

Institutional reform of the Chinese economy

- Qian and Roland (1998)
- Lau, Qian and Roland (2000)
- Maskin, Qian, and Xu (2000)
- Li and Zhou (2005)

Macro models of the Chinese economy

- Song, Storesletten and Zilibotti (2011)
- Li, Liu and Wang (2015)

Government spending & the economy

- Barro (1990), Easterly and Rebelo (1993), and Glomm and Ravikumar (1994)

The Baseline Setting

A small open economy with M regions and government infrastructure investment

- The output of region i is given by

$$Y_{it} = A_{it} K_{it}^{\alpha_i} L_{it}^{1-\alpha_i} G_{it}^{1-\alpha_i}$$

  - A_{it} is the local productivity, random & iid
  - K_{it} is the capital
  - L_{it} is the local labor input
  - G_{it} is infrastructure created by the local government

- Each region has overlapping generations of households and a representative firm

- The regional government collects τY_{it} as tax revenue, separately from labor and capital, for infrastructure development and government consumption

Firm

- A representative firm in each region first observes the current period productivity A_{it} and then hires labor at a competitive wage Φ_{it} and rents capital at constant rate R:

$$\max_{\{K_{it}, L_{it}\}} A_{it} K_{it}^{\alpha_i} L_{it}^{1-\alpha_i} G_{it}^{1-\alpha_i} - \Phi_{it} L_{it} - R K_{it}$$

  - Fixed labor supply $L_{it} = 1$, which implies

$$\Phi_{it} = (1 - \alpha_i) A_{it} K_{it}^{\alpha_i} G_{it}^{1-\alpha_i}.$$

  - The optimal capital choice:

$$K_{it} = \left(\frac{\alpha_i A_{it}}{R} \right)^{1/(1-\alpha_i)} G_{it}.$$

- The regional output

$$Y_{it} = \left(\frac{\alpha_i}{R} \right)^{\alpha_i/(1-\alpha_i)} A_{it}^{1/(1-\alpha_i)} G_{it}$$

Local Government

- A new governor is assigned in each period with a budget of

$$W_{it} = \tau Y_{it} + (1 - \delta_G) G_{it}$$

on either G_{it} infrastructure or E_{it}^G government consumption

$$G_{it+1} + E_{it}^G = W_{it}$$

- Suppose each governor has an objective:

$$V(W_{it}) = \max_{G_{it+1}, E_{it}^G} E_t \left[\gamma \ln \left(E_{it}^G \right) + \beta V(W_{it+1}) \right]$$

- Without tournament, the optimal infrastructure investment is

$$G_{it+1} = \beta \left[\tau Y_{it} + (1 - \delta_G) G_{it} \right].$$

  - **Under-investment** relative to the first best for maximizing social welfare: $G_{it+1} = \beta \left[Y_{it} + (1 - \delta) G_{it} \right]$.

Tournament of Regional Governors

- Regional productivity with three **unobservable** components:

$$A_{it} = e^{f_t + a_{it} + \varepsilon_{it}}$$

  - $f_t \sim N\left(\bar{f}, \sigma_f^2\right)$ a countrywide common shock
  - $a_{it} \sim N\left(\bar{a}_i, \sigma_a^2\right)$ the governor's ability
  - $\varepsilon_{it} \sim N\left(0, \sigma_\varepsilon^2\right)$ iid noise

- The central government's learning

$$\widehat{a}_{it} = E\left[a_{it} \middle| \{Y_{it}\}_{i=1,\ldots,M}\right]$$

with

$$\ln\left(Y_{it}\right) = \frac{1}{1-\alpha_i}\left(f_t + a_{it} + \varepsilon_{it}\right) + \frac{\alpha_i}{1-\alpha_i}\ln\left(\frac{\alpha_i}{R}\right) + \ln\left(G_{it}\right)$$

The Career Concern

- The central government's learning:

$$\begin{aligned}
&\hat{a}_{it} - \bar{a}_i \\
= \quad & \frac{\sigma_a^2\left(\sigma_a^2+\sigma_\varepsilon^2+(M-1)\,\sigma_f^2\right)}{\left(\sigma_a^2+\sigma_\varepsilon^2\right)\left(\sigma_a^2+\sigma_\varepsilon^2+M\sigma_f^2\right)}\left[(f_t-\bar{f})+(a_{it}-\bar{a}_i)+\varepsilon_{it}+(1-\alpha_i)\left(\ln G_{it}-\ln G_{it}^*\right)\right] \\
-\frac{\sigma_a^2\sigma_f^2}{\left(\sigma_a^2+\sigma_\varepsilon^2\right)\left(\sigma_a^2+\sigma_\varepsilon^2+M\sigma_f^2\right)} & \sum_{j\neq i}\left[(f_t-\bar{f})+\left(a_{jt}-\bar{a}_j\right)+\varepsilon_{jt}+\left(1-\alpha_j\right)\left(\ln G_{jt}-\ln G_{jt}^*\right)\right]
\end{aligned}$$

  where G_{it}^* is the anticipated level

- **Signal jamming** as a_{it} and $\ln G_{it}$ are not observable

- Spillover
  - Case 1: if $G_{jt}^* = G_{jt}$ (rational expectations), G_{jt} doesn't interfere
  - Case 2: if $G_{jt}^* = G_{jt-1}$ (adaptive learning), there may be spillover and rat races across regions

Tournament-Driven Investment

$$V\left(W_{it}\right) = \max_{G_{it+1}} \; E_t \left[\gamma \ln \left(W_{it} - G_{it+1}\right) + \underbrace{\chi_i \left(\hat{a}_{it+1} - \bar{a}_i \right)}_{\text{career concern}} + \beta V\left(W_{it+1}\right) \right]$$

- Rational expectations of the central government imply

$$\chi_i \left(\hat{a}_{it+1} - \bar{a}_i\right) \propto \kappa_i \left[\ln\left(G_{it+1}\right) - \ln\left(G^*_{it+1}\right)\right],$$

with $\kappa_i = \frac{\sigma_a^2\left(\sigma_a^2+\sigma_\varepsilon^2+(M-1)\sigma_f^2\right)}{\left(\sigma_a^2+\sigma_\varepsilon^2\right)\left(\sigma_a^2+\sigma_\varepsilon^2+M\sigma_f^2\right)} \left(1-\alpha_i\right)\chi_i$

- The tournament helps to mitigate under-investment:

$$G_{it+1} = \left[\frac{\kappa_i}{\gamma+\kappa_i}\left(1-\beta\right)+\beta\right]\left(\tau Y_{it} + \left(1-\delta_G\right)G_{it}\right)$$

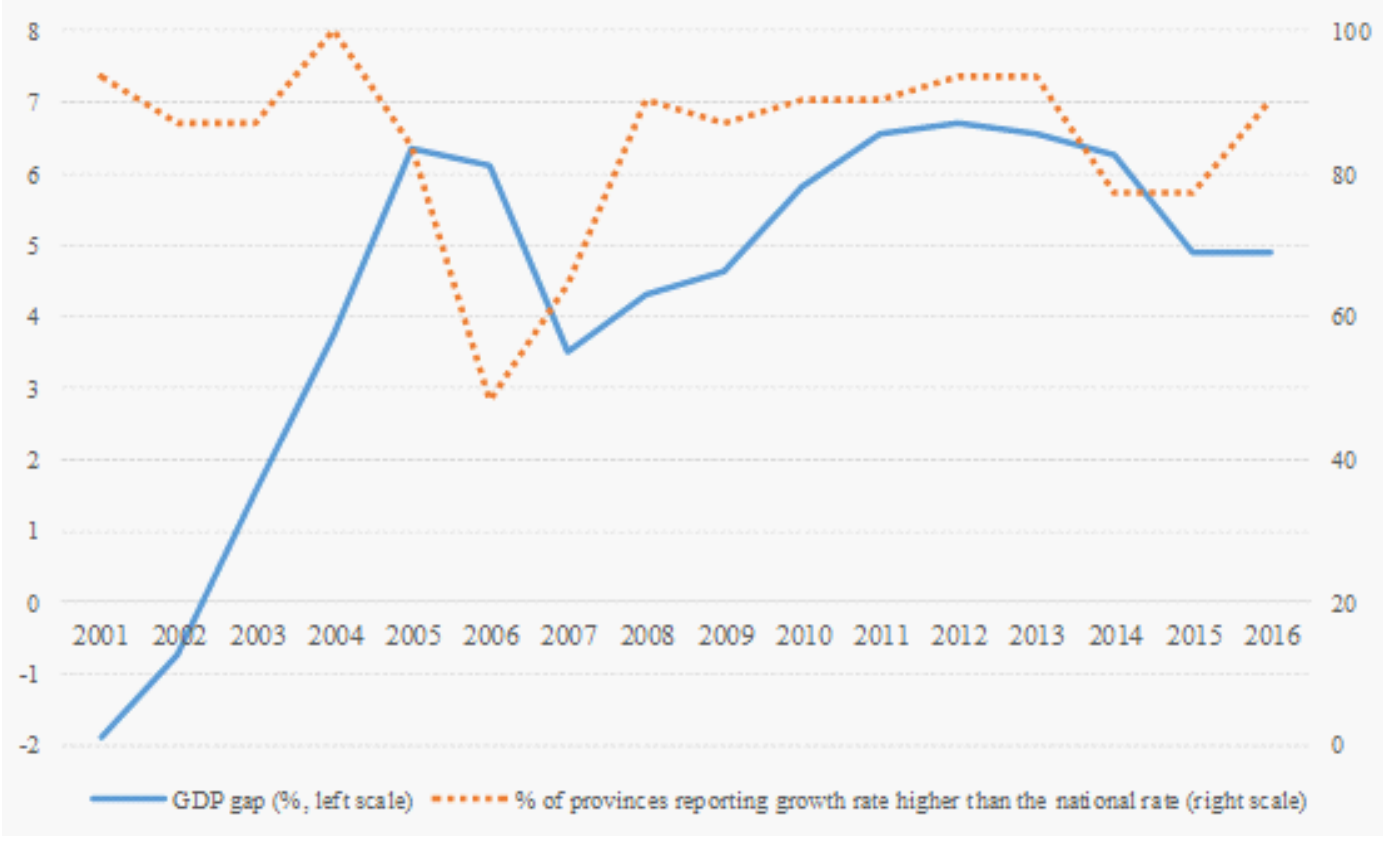
Short-termist Behaviors

Powerful incentives can lead to short-termist behaviors

- Over-reporting of local output
- Excessive leverage
- A rat race through shadow banking borrowing

Stylized Fact: Over-reporting of Regional Output

- GDP gap: (sum of provincial GDPs - national GDP)/national GDP
- % of provinces reporting growth rate higher than the national rate



Output Overreporting

Suppose that the central government relies on regional governors to report regional output

- A governor can choose to inflate the output by $e^{\varphi_{it}}$:

$$Y'_{it} = Y_{it} e^{\varphi_{it}}$$

  - The cost is a higher tax transfer to the central government:

$$\tau_c Y'_{it} = \tau_c e^{y_{it}+\varphi_{it}}$$

- Career concern $\hat{a}_{it+1} = E\left[a_{it+1} \middle| \left\{Y'_{it+1}\right\}_{i=1,\ldots,M}\right]$ leads to over-reporting, i.e., positive φ_{it+1} in equilibrium
  - Like earnings management by publicly listed firms, e.g., Stein (1989)
  - Unreliable statistics are a result of the bureaucracy!
- Overreporting may have severe consequences on central government decisions
  - The great famine in 1959-1961 (Fan, Xiong & Zhou, 2016)

Rising Leverage

- Local governments were not allowed to raise debt before 2008
- China's massive post-crisis stimulus in 2008-2010 opened the floodgate
  - To implement the stimulus, local governments were implicitly allowed to set up "Local Government Financing Vehicles (LGFVs)" to borrow from banks, e.g., Bai, Hsieh & Song (2016)
  - After the stimulus ended in 2010, the central government instructed banks to stop lending to LGFVs, leading to a shadow banking boom, e.g., Chen, He & Liu (2017)

Concerns: Rising Leverage through Shadow Banking

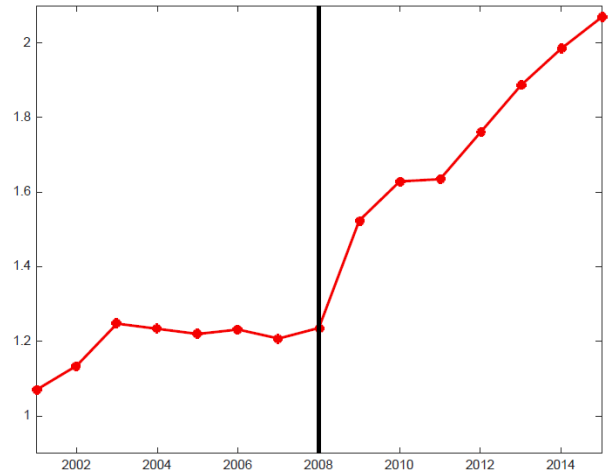


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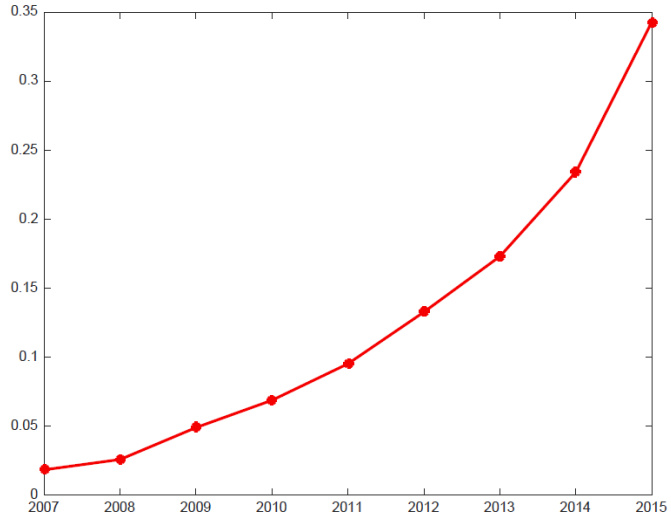
Figure 4: The Size of Wealth Management Products



Note: The figure plots total WMP balances as percent of GDP. Data source: China's Banking Wealth Management Market Annual Report (various issues)

Excessive Leverage

Suppose a local government borrows D_{it} at interest rate R_{it}

- Its budget at time t:

$$G_{it+1} + E_{it}^{G} = W_{it} + D_{it}$$

where

$$W_{it} = \tau Y_{it} + (1 - \delta_G) G_{it} - RD_{it-1}$$

- Debt choice:

$$V(W_{it}) = \max_{G_{it+1},\, D_{it}} E_t \left[\gamma \ln (W_{it} + D_{it} - G_{it+1}) + \chi_i (\hat{a}_{it+1} - \bar{a}_i) + \beta V (\tau Y_{it+1} + (1 - \delta_G) G_{it+1} - RD_{it})\right]$$

- Define leverage as $d_{it} = \frac{D_{it}}{G_{it+1}}$, then debt levers up investment:

$$g_{it+1} = \frac{G_{it+1}}{W_{it}} = \frac{\beta\gamma + \kappa_i}{\gamma + \kappa_i} \frac{1}{(1 - d_{it})}.$$

Excessive Leverage

- Optimal leverage determined by

$$\underbrace{\left(\frac{1-\beta}{\beta}\frac{\kappa_i}{\gamma+\kappa_i}+1\right)\ln\left(\frac{1}{1-d_{it}}\right)}_{\text{incentive to boost current performance}} + \underbrace{E_t\left[\ln\left[\tau\left(\frac{\alpha_i}{R}\right)^{\alpha_i/(1-\alpha_i)}A_{it+1}^{1/(1-\alpha_i)}+(1-\delta_G)-Rd_{it}\right]\right]}_{\text{debt cost in the future period}}.$$

- As $\kappa_i \searrow 0$, the leverage choice converges to the social planner's
  - The governor's debt choice is always higher than the planner's
- A mechanism for the tournament to lead to excessive leverage

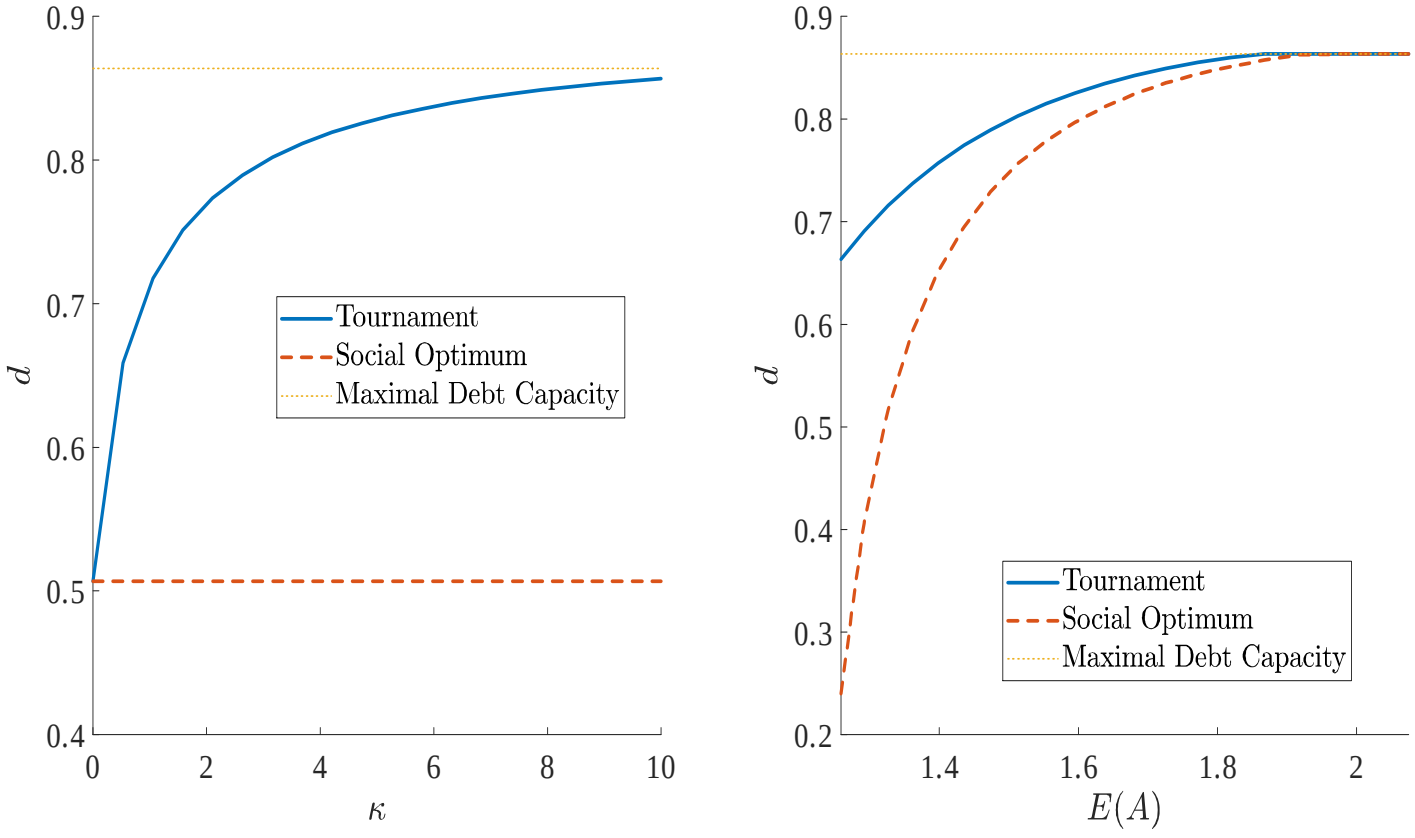


Figure: Leverage with Career Incentives and Expected Growth

Innovations and Leverage Spillover

- The central government's learning:

$$
\begin{aligned}
&\hat{a}_{it} - \bar{a}_i \\
= \quad & \frac{\sigma_a^2\left(\sigma_a^2+\sigma_\varepsilon^2+(M-1)\,\sigma_f^2\right)}{\left(\sigma_a^2+\sigma_\varepsilon^2\right)\left(\sigma_a^2+\sigma_\varepsilon^2+M\sigma_f^2\right)}\left[\left(f_t-\bar{f}\right)+\left(a_{it}-\bar{a}_i\right)+\varepsilon_{it}+\theta_i\left(\ln G_{it}-\ln G_{it}^*\right)\right] \\
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\end{aligned}
$$

- Policy and financial innovations make it difficult for the central government to form rational expectations of local leverage
- Assume $G_{jt}^* = G_{jt-1}$ (adaptive learning by the central government):
  - One governor's aggressive investment behavior may adversely affect other governors' performance
  - Potential spillover of short-termist behavior across regions

Leverage Spillover

Suppose that each governor i is paired with another governor i':

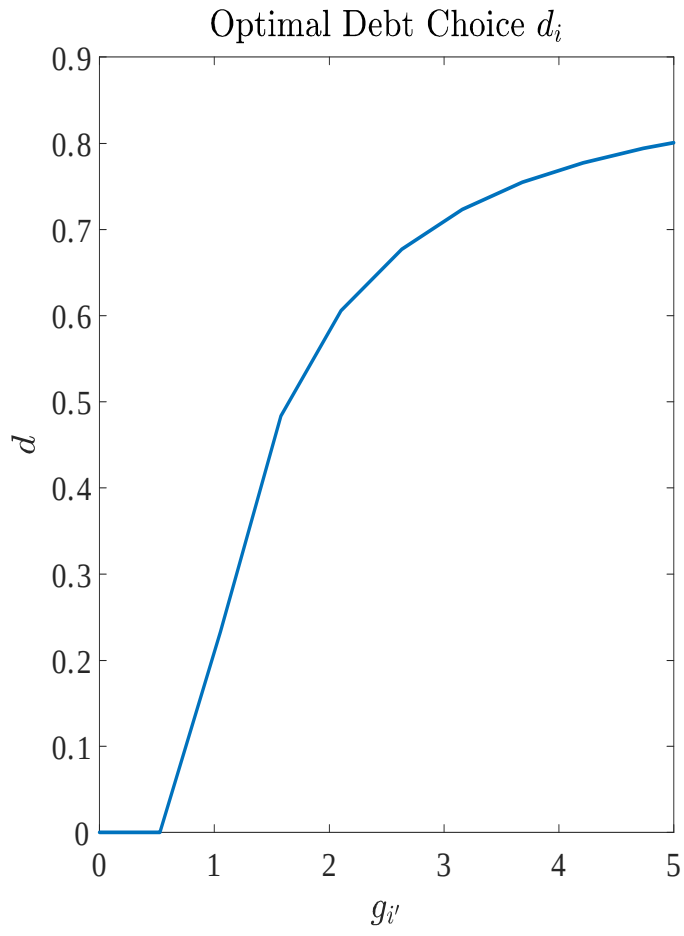
$$\hat{a}_{it+1} - \hat{a}_{i't+1} = (\lambda + \lambda') \left[a_{it+1} - a_{i't+1} + \varepsilon_{it+1} - \varepsilon_{i't+1} + (1-\alpha) \left(\ln G_{it+1} - \ln G_{i't+1} \right) \right].$$

- Governor i cares about out-performing i':

$$\max_{G_{it+1},\, d_{it}} E_t \left[\gamma \ln \left(E_{it}^{G} \right) + \underbrace{\kappa_i \left(\hat{a}_{it+1} - \hat{a}_{i't+1} \right) - \phi_i \left(\hat{a}_{it+1} - \hat{a}_{i't+1} \right)^2}_{\text{relative performance}} + \beta V \left(W_{it+1} \right) \right]$$

  - G_{it} increases with $G_{i't}$
  - Reciprocally, $G_{i't}$ increases with G_{it}

- An investment rat race financed by a shadow banking boom:
  - An increase in $\phi_{i'}$ leads governor i' to increase $G_{i't}$ and $D_{i't}$
  - this in turn leads governor i to increase G_{it} and D_{it}
  - consequently governor i' has to further increase $G_{i't}$ and $D_{i't}$
  - ...



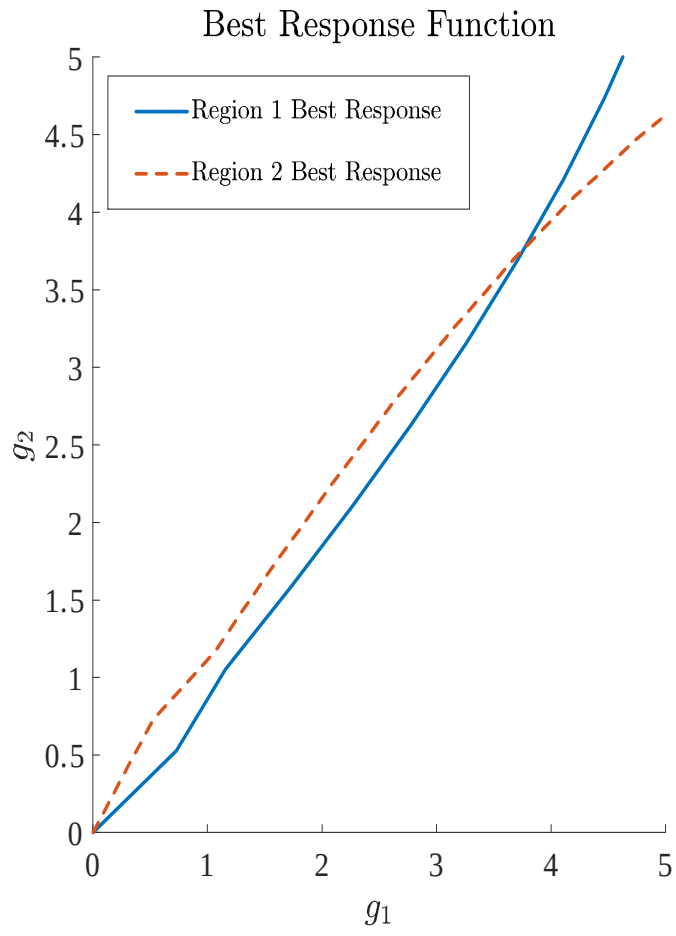


Figure: Equilibrium Debt and Investment Choices

Summary

A growth model with a regionally decentralized government system

- Local governments use Infrastructure investment to drive local economies
  - a key factor for China's rapid growth
  - the financial system serves as a key instrument to support this growth model

Tournament induced short-termist government behaviors provide a series of predictions for the post-stimulus period:

- Regions with lower investment returns tend to have
  - more pronounced over-investment
  - higher leverage
  - greater over-reporting of local output

Local Government Leverage and GDP Overreporting

GDP overreporting estimated by Bai et al. (2018)

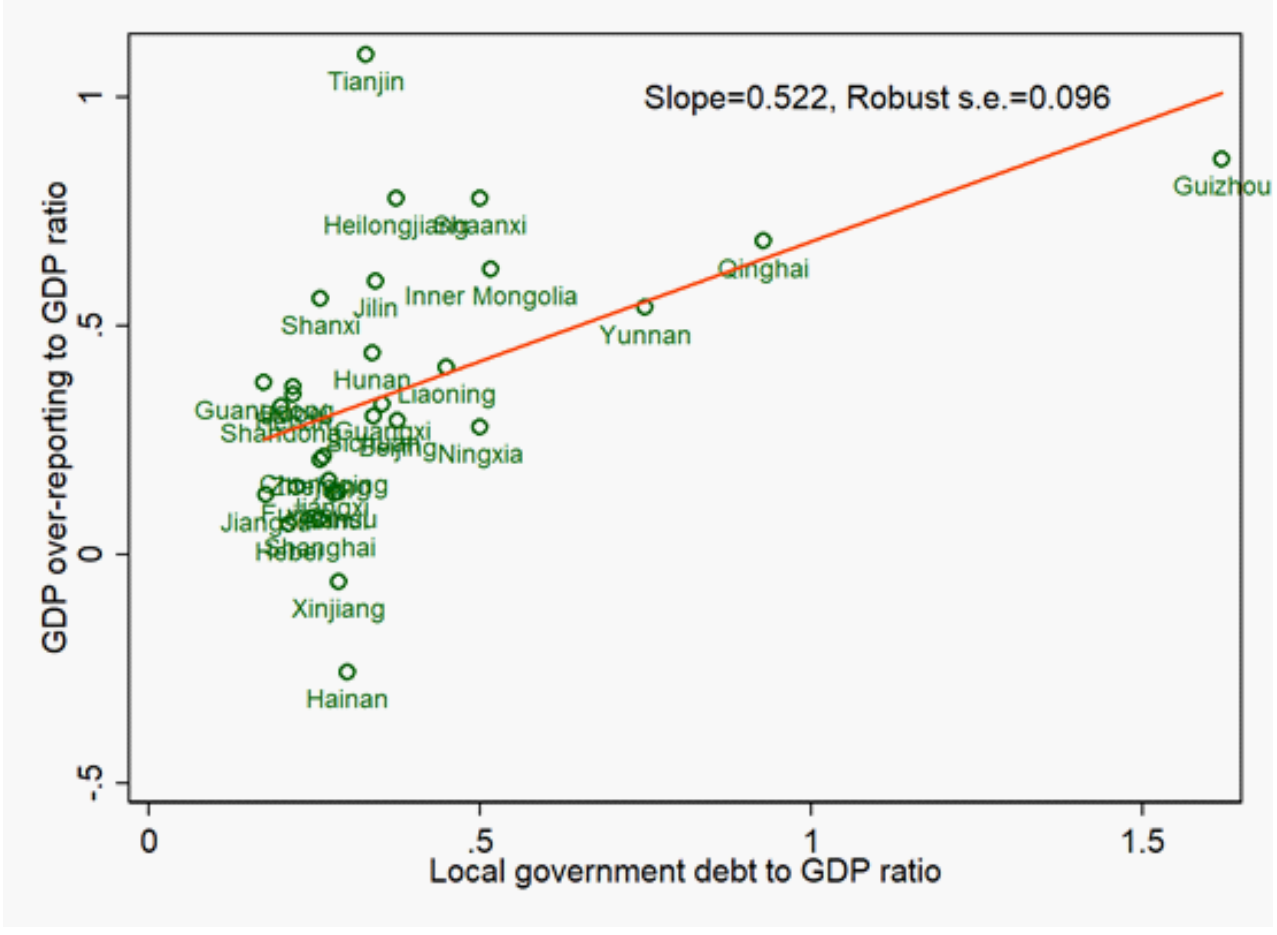


Figure: Provincial GDP overreporting versus local government leverage

Government Policy and Market Speculation

- Brunnermeier, Sockin & Xiong (2016): "China's Model of Modeling the Financial System"

Government Interventions in China's Financial System

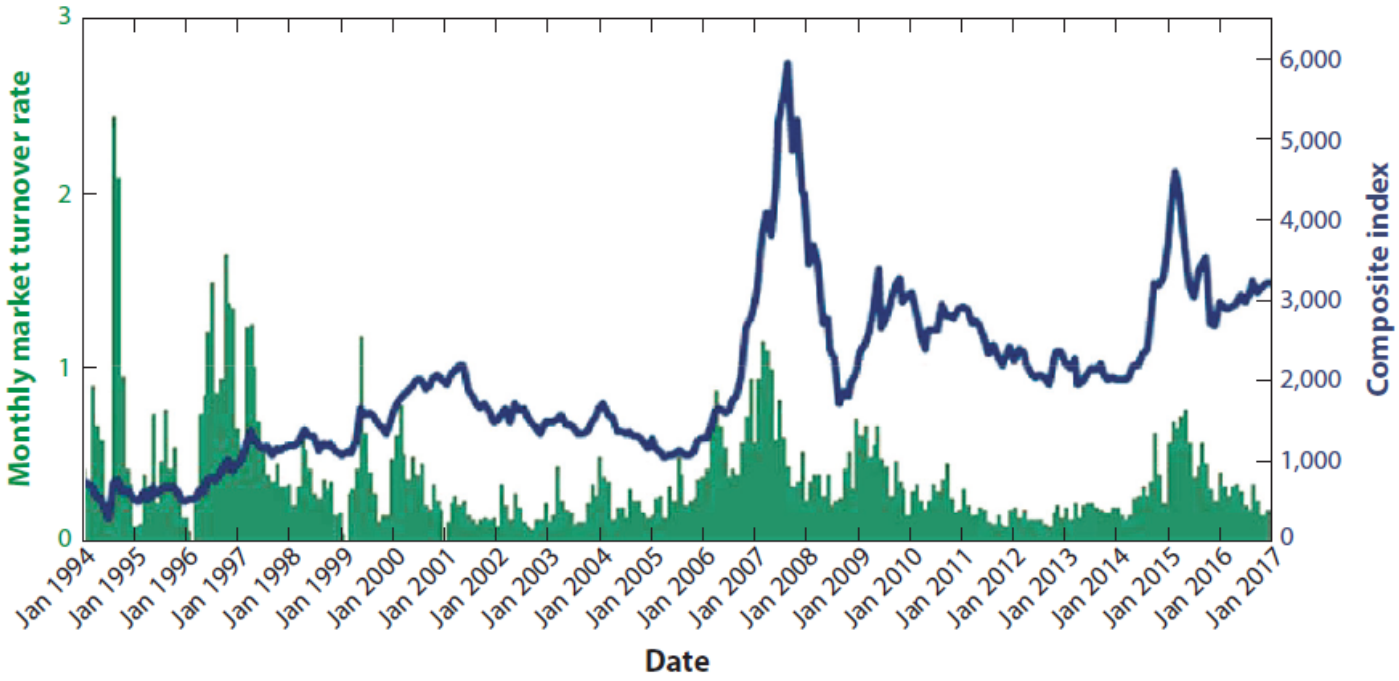
- History of **policies and regulations**
  - bank required reserve ratio (36 changes 2003-2011)
  - suspension of IPO issuance (9 times since 1992)
  - stamp tax on stock trading (7 changes since 1992)
  - countercyclical mortgage rate and first payment requirement
  - installation of circuit breakers (2016)

- **Direct trading** in stock markets
  - "national team" directed to bail out stock market in summer 2015, e.g., Huang, Miao, and Wang (2016)

Government's Paternalistic Philosophy

- Large population of **inexperienced retail investors**
  - banks prohibited from trading in stock exchanges
- Large price **volatility** in China's stock markets and heavy turnover
  - highest turnover rate among major stock markets (~40% per month)
- Asset prices often **deviate from fundamentals**
  - large price differentials between A-B and A-H stock pairs, e.g., Mei, Scheinkman and Xiong (2009)
  - dramatic warrant bubble in 2005-2008, e.g., Xiong and Yu (2011)
- **CSRC's mission**: protect retail investors and stabilize markets

Concerns: Speculative Stock Market



Conceptual Questions

Intensive and uncertain intervention can directly affect market speculation

- How does government intervention impact market dynamics?
- How do market participants react to this intervention?
  - do they trade along with or against the government?
- What is the right objective of government intervention?
  - reduce price volatility or improve informational efficiency?

Overview

- Perfect-Information Benchmark
  - justify need for government intervention
- Extended Setting with Informational Frictions
  - show that intense intervention makes **uncertainty about policy errors** a factor in asset prices
    - this factor gets **magnified by market speculation**
    - it distracts market participants from analyzing economic fundamentals by focusing their attention on future policies
- Potential tension between
  - **reducing price volatility**
  - **improving information efficiency**

A Model with Perfect Information

Discrete-time with infinitely many periods: $t = 0, 1, 2...$

- A risky asset, which pays a stream of **dividends** over time:

$$D_t = v_t + \sigma_D \varepsilon_t^D, \ \varepsilon_t^D \sim \mathcal{N}(0, 1)$$

- v_t is an exogenous **asset fundamental**:

$$v_{t+1} = \rho_v v_t + \sigma_v \varepsilon_{t+1}^v, \ \varepsilon_{t+1}^v \sim \mathcal{N}(0, 1)$$

  - v_{t+1} is **publicly observable** at time t in the baseline setting
  - unobservable later in the setting with informational frictions

A Model with Perfect Information

Noise traders submit random market orders:

$$N_t = \rho_N N_{t-1} + \sigma_N \varepsilon_t^N, \ \varepsilon_t^N \sim \mathcal{N}(0,1)$$

Rational short-term investors each maximize myopic trading profit:

$$U_t^i = \max_{X_t^i} E\left[-\exp\left(-\gamma W_{t+1}^i\right) \mid \mathcal{F}_t, N_t \right]$$

with $W_{t+1}^i = R^f \bar{W} + X_t^i R_{t+1}$ and $R_{t+1} = D_{t+1} + P_{t+1} - R^f P_t$

Market Clearing without government intervention:

$$\int_0^1 X_t^i di = N_t$$

Market Breakdown

Conjecture a linear equilibrium: $P_t = \frac{1}{R^f - \rho_v} v_{t+1} + p_N N_t$

- The **market breaks down** when

$$\sigma_N > \sigma_N^* = \frac{R^f - \rho_N}{2\gamma\sqrt{\sigma_D^2 + \left(\frac{R^f}{R^f - \rho_v}\right)^2 \sigma_v^2}}.$$

  - A feedback loop: $\sigma_N \nearrow \Rightarrow$ a high risk premium and a more negative $p_N \Rightarrow$ more volatile price $\Rightarrow$ even more negative p_N
  - Short-term investors ineffective in trading against noise trader risk, similar to DSSW (1990)

Government Intervention

- Introduce a government that trades the asset and takes a position

$$X_t^G = \underbrace{\psi_{N,t} N_t}_{\text{intended intervention}} + \underbrace{\sqrt{Var\left[\psi_{N,t} N_t \mid \mathcal{F}_{t-1}\right]}\, G_t}_{\text{unintended noise}},\ G_t \sim \mathcal{N}\left(0, \sigma_G^2\right)$$

  - the government chooses intervention intensity $\psi_{N,t}$
  - the amount of unintended noise increases with $\psi_{N,t}$
- Leaning against noise traders consistent with paternalistic philosophy of CSRC to protect retail investors and stabilize markets
- Can microfound G_t as noise in government private information

Government Objective

- choose $\psi_{N,t}$ to minimize

$$\min_{\psi_{N,t}} \quad \gamma_\sigma Var\left[\Delta P_t\left(\psi_{N,t}\right)|\mathcal{F}_t\right] + \gamma_v Var\left[P_t\left(\psi_{N,t}\right) - \frac{1}{R^f - \rho_v} v_{t+1} \;|\mathcal{F}_t\right]$$

- Two objectives, often treated as equivalent in policy discussions:
  - Penalty γ_σ for (conditional) price volatility,
  - Penalty γ_v for price deviation from fundamental

- With perfect information, there is always a linear equilibrium:

$$P_t = \frac{1}{R^f - \rho_v} v_{t+1} + p_N N_t + p_G G_t$$

Either objective would lead the government to take a sufficiently large $\psi_{N,t}$ to prevent market breakdown

Extended Model with Information Frictions & Gov.

- v_{t+1} is **unobservable**
- The public information set: $\mathcal{F}_t^M = \sigma\left(\{D_s, P_s\}_{s \leq t}\right)$
  - $\hat{v}_{t+1}^M = E\left[v_{t+1} \mid \mathcal{F}_t^M\right]$ serves as the anchor of asset valuation
  - $\hat{N}_t^M = E\left[N_t \mid \mathcal{F}_t^M\right]$ is the market perceived noise trading

- **Government** trade intervention
  - no private information
  - trades (with noise)

$$X_t^G = \psi_{\hat{N}} \hat{N}_t^M + \sqrt{Var\left[\psi_{\hat{N}} \hat{N}_t^M \mid \mathcal{F}_{t-1}^M\right]} G_t$$

$$\min_{\psi_N} \gamma_\sigma \underbrace{Var\left[\Delta P_t\left(\psi_{\hat{N}}\right) \mid \mathcal{F}_{t-1}^M\right]}_{\text{Price volatility}} + \gamma_v \underbrace{Var\left[P_t\left(\psi_{\hat{N}}\right) - \frac{1}{R^f - \rho_v} v_{t+1} \mid \mathcal{F}_{t-1}^M\right]}_{1 \text{ / Price informativeness}}$$

Information Choice by Investors

- Each investor i chooses $a_t^i \in \{0, 1\}$ to acquire private info about either v_{t+1} or future government noise G_{t+1}:

$$s_t^i = v_{t+1} + \left[a_t^i \tau\right]^{-1/2} \varepsilon_t^{s,i} \quad \text{or} \quad g_t^i = G_{t+1} + \left[\left(1 - a_t^i\right) \tau\right]^{-1/2} \varepsilon_t^{g,i}$$

- Three key forces drive which signal investors choose
  - **intra**generational substitutability: price today reflects what others choose to learn today
  - **inter**generational complementarity: price tomorrow reflects what others choose to learn tomorrow
  - **inter**generational complementarity between the government intervention and investor choice: the more that the government trades, price tomorrow reflects government noise more
- Government internalizes these forces in choosing its intervention intensity

Equilibria with Government Intervention

A **fundamental-centric** equilibrium

- all investors acquire signals about v_{t+1}

$$P_t = p_{\hat{v}}\,\hat{v}^M_{t+1} + p_v\left(v_{t+1} - \hat{v}^M_{t+1}\right) + p_N N_t + p_g G_t$$

  - investor trading makes price more informative about v_{t+1}

A **government-centric** equilibrium

- all investors acquire signals about G_{t+1}

$$P_t = p_{\hat{v}}\,\hat{v}^M_{t+1} + p_{\hat{G}}\,\hat{G}^M_{t+1} + p_G\left(G_{t+1} - \hat{G}^M_{t+1}\right) + p_N N_t + p_g G_t$$

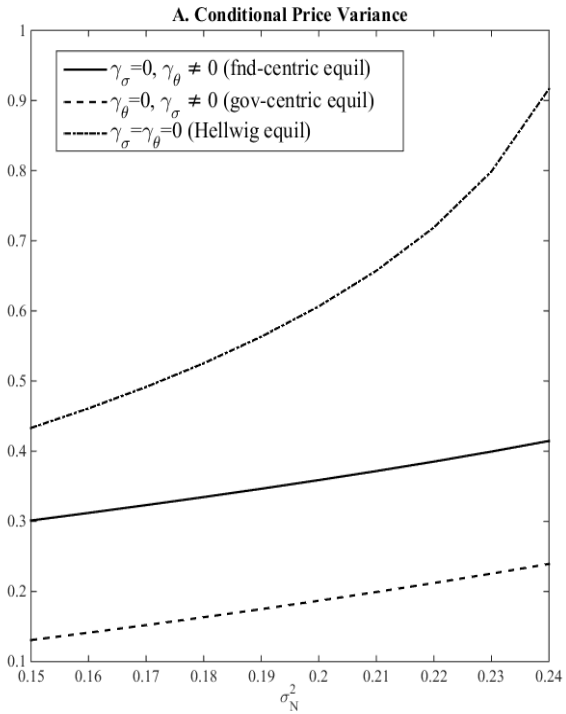
  - occurs when the government intervention is sufficiently intensive
  - price may be less informative about v_{t+1}

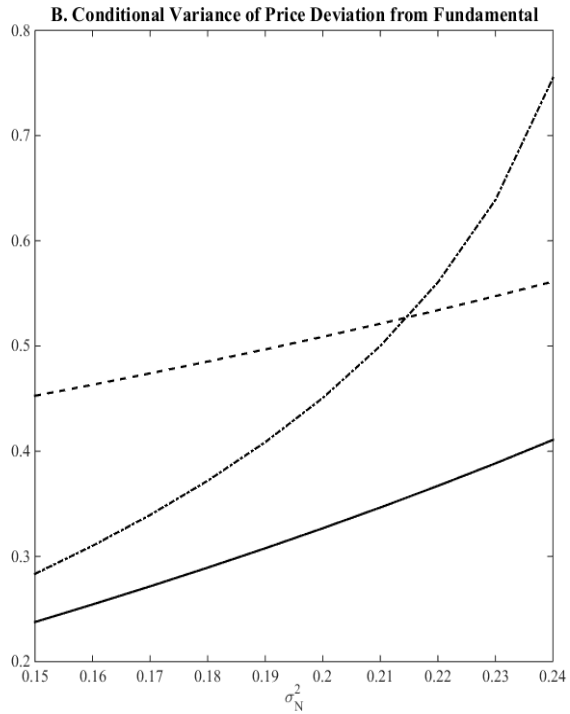
A mixed equilibrium

- some investors acquire signals about v_{t+1} some about G_{t+1}

Market Equilibrium with a Single Government Objective

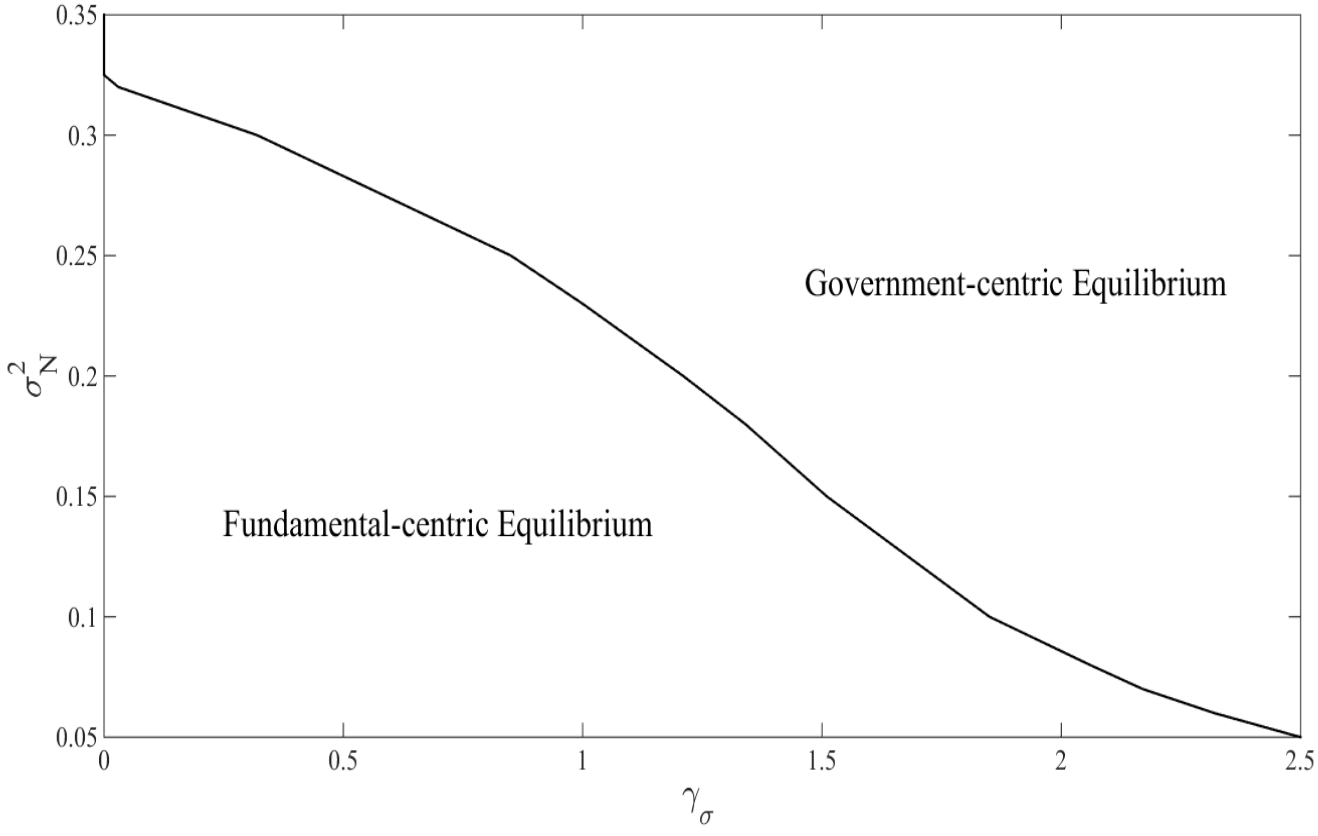
Three cases: (1) $\gamma_\sigma = 0, \gamma_v \neq 0$; (2) $\gamma_v = 0, \gamma_\sigma \neq 0$; (3) $\gamma_\sigma = \gamma_v = 0$





Boundary btw Government- & Fundamental-centric Equilibria

- Government-centric equilibrium more likely
  - the larger the noise trader variance
  - the larger the weight on reducing price volatility



Summary

- Government intervention helps to stabilize financial markets
  - unregulated markets can be highly volatile and might break down when noise trader risk is sufficiently large
- Adverse effects:
  - active government intervention renders noise in government policy **a pricing factor**
  - intervention can cause investors to **speculate on government noise** rather than fundamentals, which amplifies effects of policy errors
- Tension between objectives
  - reducing **price volatility**
  - improving **informational efficiency**
  - while price volatility is lower with intervention, informational efficiency can be worse

Final Remarks

The financial system carries designated duties in supporting China's unique economic structure:

- Two tracks: state vs private firms, with soft budget constraints to state firms and local governments
- A government system, politically centralized but fiscally decentralized

- Different roles played by the financial system in China:
  - vital interactions with objectives, incentives, and distortions of the government system
  - need a different framework for financial stability regulation and monitoring

The Handbook of China's Financial System

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Banking and Monetary Policy

1. **Banking System of China** [PDF][Slides]

   Guofeng Sun (People's Bank of China)

2. **Shadow Banking [PDF][Slides]**

   Xiaodong Zhu (University of Toronto)

3. **Monetary Policy Framework and Transmission Mechanisms** [PDF][Slides]

   Yiping Huang, Tingting Ge & Chu Wang (National School of Development, Peking University)

4. **Monetary Policy Instruments** [PDF] [Slides]

   Tao Wang (UBS Investment Bank)

5. **Interest Rate Liberalization** [PDF][Slides]

   Jun Ma (PBC School, Tsinghua University)

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