The Institutional Foundation of China’s Financial System

Wei Xiong
Princeton University

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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

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 incentives
Stylized Fact: Infrastructure Investment

Diagram: Infrastructure Investment and Financing Sources (In percent of GDP)

Source: IMF staff estimates.
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 Holmstrom (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)

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 $\tau Y_{it}$ as tax revenue, separately from labor and capital, for infrastructure development and government consumption
A representative firm in each region first observes the current period productivity $A_{it}$ and then hires labor at a competitive wage $\Phi_{it}$ and rents capital at constant rate $R$:

$$\max \{K_{it}, L_{it}\} \quad A_{it} K_{it}^{\alpha_i} L_{it}^{1-\alpha_i} G_{it}^{1-\alpha_i} - \Phi_{it} L_{it} - RK_{it}$$

- 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: \( G_{it+1} = \beta \left[ Y_{it} + (1 - \delta) G_{it} \right]. \)
Regional productivity with three unobservable components:

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

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

The central government’s learning

\[ \hat{a}_{it} = E\left[ a_{it} \mid \{ Y_{it} \}_{i=1,...,M} \right] \]

with

\[ \ln(Y_{it}) = \frac{1}{1 - \alpha_i} (f_t + a_{it} + \varepsilon_{it}) + \frac{\alpha_i}{1 - \alpha_i} \ln\left( \frac{\alpha_i}{R} \right) + \ln(G_{it}) \]
The Career Concern

- The central government’s learning:

\[
\hat{a}_{it} - \bar{a}_i = \frac{\sigma_a^2 \left( \sigma_a^2 + \sigma_\varepsilon^2 + (M - 1) \sigma_f^2 \right)}{(\sigma_a^2 + \sigma_\varepsilon^2) \left( \sigma_a^2 + \sigma_\varepsilon^2 + M \sigma_f^2 \right)} \left[ (f_t - \bar{f}) + (a_{it} - \bar{a}_i) + \varepsilon_{it} + (1 - \alpha_i) \left( \ln G_{it} - \ln G_{it}^* \right) \right]
\]

\[
- \frac{\sigma_a^2 \sigma_f^2}{(\sigma_a^2 + \sigma_\varepsilon^2) \left( \sigma_a^2 + \sigma_\varepsilon^2 + M \sigma_f^2 \right)} \sum_{j \neq i} \left[ (f_t - \bar{f}) + (a_{jt} - \bar{a}_j) + \varepsilon_{jt} + (1 - \alpha_j) \left( \ln G_{jt} - \ln G_{jt}^* \right) \right]
\]

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

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

- Rational expectations of the central government imply

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

with \[ \kappa_i = \frac{\sigma_a^2 (\sigma_a^2 + \sigma^2 + (M-1)\sigma_f^2)}{(\sigma_a^2 + \sigma^2_f)(\sigma_a^2 + \sigma^2_f + M\sigma_f^2)} (1 - \alpha_i) \chi_i \]

- The tournament helps to mitigate under-investment:

\[ G_{it+1} = \left[ \frac{\kappa_i}{\gamma + \kappa_i} (1 - \beta) + \beta \right] (\tau Y_{it} + (1 - \delta_G) G_{it}) \]
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: \( \frac{\text{sum of provincial GDPs} - \text{national GDP}}{\text{national GDP}} \)
- % 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 $e^{\phi_{it}}$:
  \[ Y'_{it} = Y_{it} e^{\phi_{it}} \]

- The cost is a higher tax transfer to the central government:
  \[ \tau_c Y'_{it} = \tau_c e^{Y_{it} + \phi_{it}} \]

- Career concern $\hat{a}_{it+1} = E \left[ a_{it+1} \left| \{ Y'_{it+1} \}_{i=1,\ldots,M} \right. \right]$ leads to over-reporting, i.e., positive $\phi_{it+1}$ 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

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.

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:

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

- 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

\[
\left( \frac{1 - \beta}{\beta} \frac{\kappa_i}{\gamma + \kappa_i} + 1 \right) \ln \left( \frac{1}{1 - d_{it}} \right)
\]

incentive to boost current performance

\[+ E_t \left[ \ln \left( \tau \left( \frac{\alpha_i}{R} \right)^{\alpha_i/(1 - \alpha_i)} A_{it+1}^{1/(1 - \alpha_i)} + (1 - \delta_G) - Rd_{it} \right) \right].\]

debt cost in the future period

- As \( \kappa_i \downarrow 0 \), 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:

\[
\hat{a}_{it} - \bar{a}_i = \frac{\sigma_a^2 (\sigma_a^2 + \sigma_\epsilon^2 + (M - 1) \sigma_f^2)}{(\sigma_a^2 + \sigma_\epsilon^2) (\sigma_a^2 + \sigma_\epsilon^2 + M \sigma_f^2)} \left[ (f_t - \bar{f}) + (a_{it} - \bar{a}_i) + \epsilon_{it} + \theta_i (\ln G_{it} - \ln G^*_i) \right] \\
- \frac{\sigma_a^2 \sigma_f^2}{(\sigma_a^2 + \sigma_\epsilon^2) (\sigma_a^2 + \sigma_\epsilon^2 + M \sigma_f^2)} \sum_{j \neq i} \left[ (f_t - \bar{f}) + (a_{jt} - \bar{a}_j) + \epsilon_{jt} + \theta_j \left( \ln G_{jt} - \ln G^*_j \right) \right]
\]

- 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 $i'$:

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

- Governor $i$ cares about out-performing $i'$:

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

  - $G_{it}$ 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: $t = 0, 1, 2\ldots$

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

$$D_t = \nu_t + \sigma_D \varepsilon^D_t, \quad \varepsilon^D_t \sim \mathcal{N}(0, 1)$$

- $\nu_t$ is an exogenous **asset fundamental**:

$$\nu_{t+1} = \rho_{\nu} \nu_t + \sigma_{\nu} \varepsilon^\nu_{t+1}, \quad \varepsilon^\nu_{t+1} \sim \mathcal{N}(0, 1)$$

- $\nu_{t+1}$ 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:

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

**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 \( W_{t+1}^i = R^f \tilde{W} + X_t^i R_{t+1} \) and \( R_{t+1} = D_{t+1} + P_{t+1} - R^f P_t \)

**Market Clearing** without government intervention:

\[ \int_0^1 X_t^i \, di = N_t \]
Conjecture a linear equilibrium: $P_t = \frac{1}{R^f - \rho_v} \nu_{t+1} + p_N N_t$

- 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: $\sigma_N \uparrow \Rightarrow$ 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

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

- 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

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

- Two objectives, often treated as equivalent in policy discussions:
  - Penalty $\gamma_\sigma$ for (conditional) price volatility,
  - Penalty $\gamma_v$ 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: $\mathcal{F}_t^M = \sigma \left( \{ D_s, P_s \}_{s \leq t} \right)$
  - $\hat{v}_{t+1} = E \left[ v_{t+1} \mid \mathcal{F}_t^M \right]$ 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)

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

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

1 / Price informativeness

Price volatility
Information Choice by Investors

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

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

- 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 $v_{t+1}$

$$P_t = p_{v} \hat{v}_{t+1}^{M} + p_{v} \left( v_{t+1} - \hat{v}_{t+1}^{M} \right) + p_{N} N_{t} + p_{g} G_{t}$$

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

A government-centric equilibrium

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

$$P_t = p_{v} \hat{v}_{t+1}^{M} + p_{G} \hat{G}_{t+1}^{M} + p_{G} \left( G_{t+1} - \hat{G}_{t+1}^{M} \right) + p_{N} N_{t} + p_{g} G_{t}$$

- 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

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)

Bond and Money Markets
Book Synopsis: The Making of an Economic Superpower: Unlocking China’s Secret of Rapid Industrialization
Yi Wen, Sep 27, 2017

This book argues that China’s rapid industrialization since 1978 can be attributed to its rediscovery of the secret recipe of the original Industrial Revolution. The secret recipe is not based on institutional changes per se but rather the sequential creation of mass markets to support mass production. Market creation requires a strong state and appropriate industrial policies because mass markets are a public good that is extremely costly to create and can only be created through stages and under enormous political stability and social trust.