State vs Market Revisited: China's Hybrid Economy

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State vs Market: The Long Debate

- One side: state controls and interventions are necessary for economic development
  - Central planning championed by the Soviet and other socialist countries before 1990s

- The other side: free markets are superior
  - Mises (1922): without markets, central planners would not know how to "calculate"
  - Hayek (1945): Central planners cannot command all the knowledge initially dispersed among many different individuals

- The debate waned after 1990s
  - The Soviet collapsed, many Eastern European countries adopted new systems, and China took successful market reforms

- Re-emerged in recent years
  - The slowing down of China's market reforms
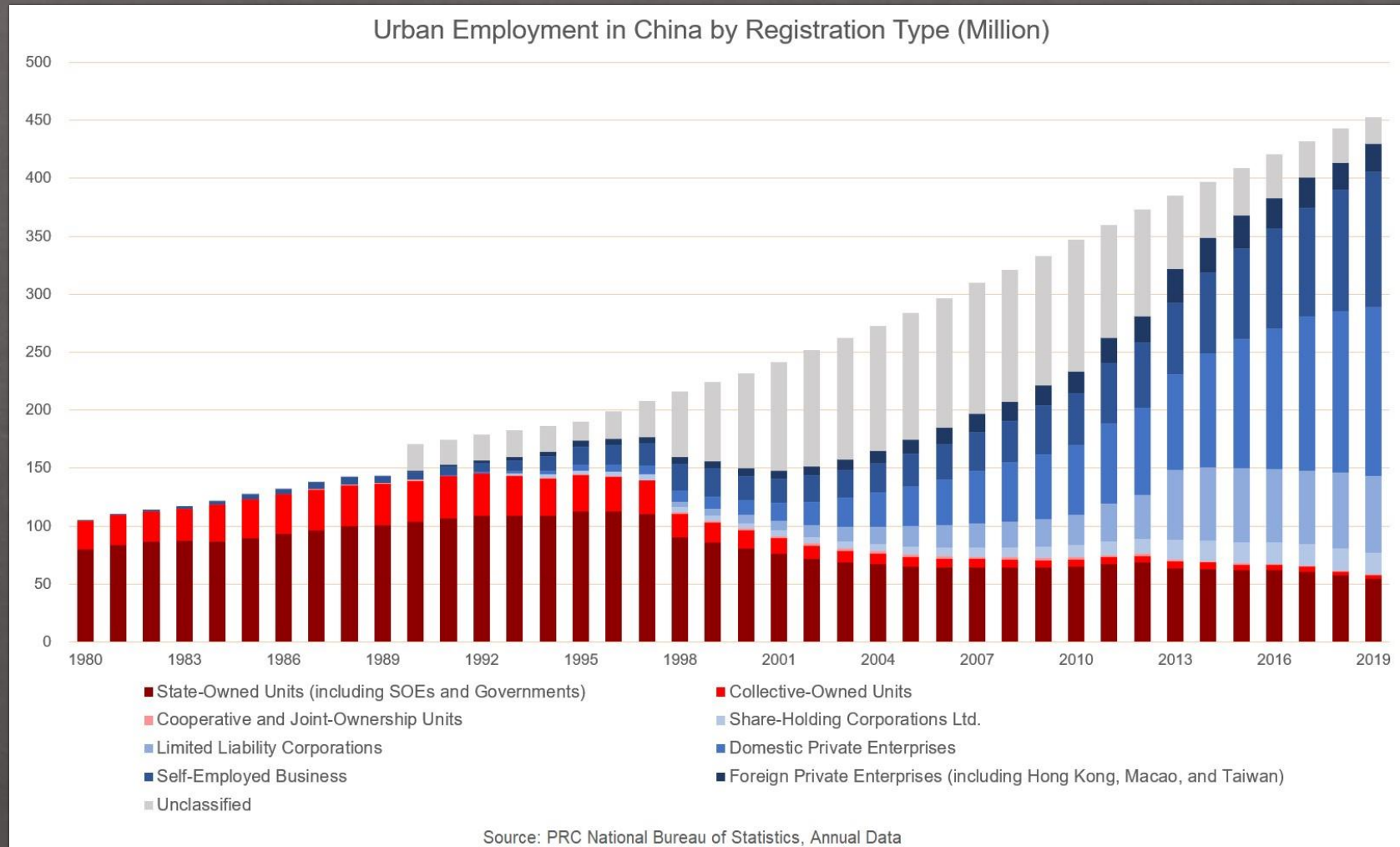 - Strong state interventions in India, Brazil, Indonesia …

Outline

◈ A brief overview of China's market reforms and hybrid economy

◈ A simple G-K framework to incorporate state and market

◈ Information discovery in the G-K framework
  ◈ Brunnermeier, Sockin & Xiong (2022, RES) "China's Model of Managing the Financial System"

◈ Incentives, investment and leverage in the mandarin system
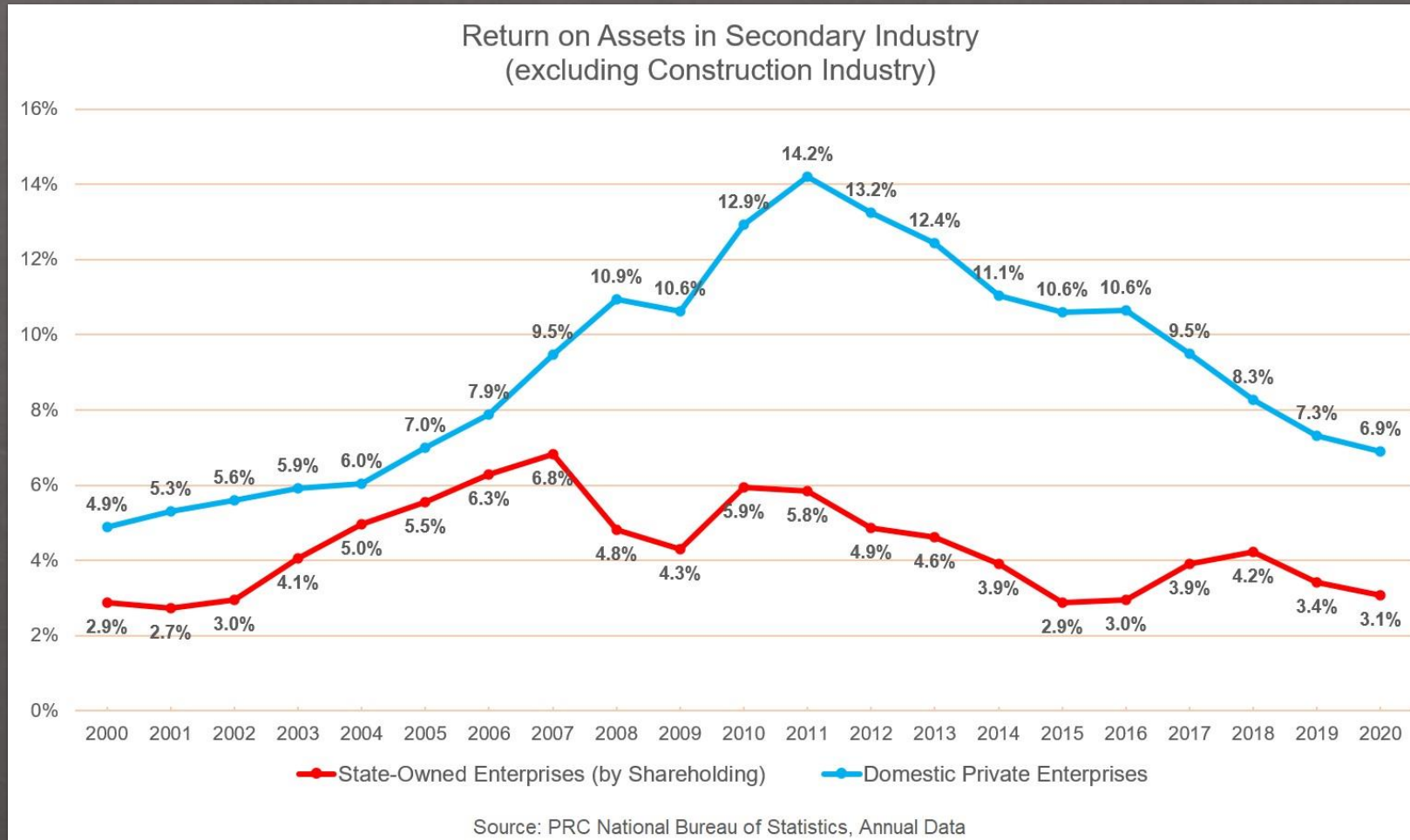 ◈ Song & Xiong "The Mandarin Model of Growth"

China's Market Reforms

◈ China didn't adopt the shock therapy and instead took gradualist reforms to incorporate many free-market features in the past 40 years

    ◇ Deng Xiaoping: "crossing river by touching the stones"

◈ Reforms without a blueprint

    ◈ Lau, Qian & Roland (2000, JPE) "Economic Reforms without Losers": a dual-track approach to avoid massive unemployment and social unrest

    ◈ Song, Storesletten & Zilibotti (2011, AER) "Growing Like China": A transition economy with the state sector that will eventually vanish
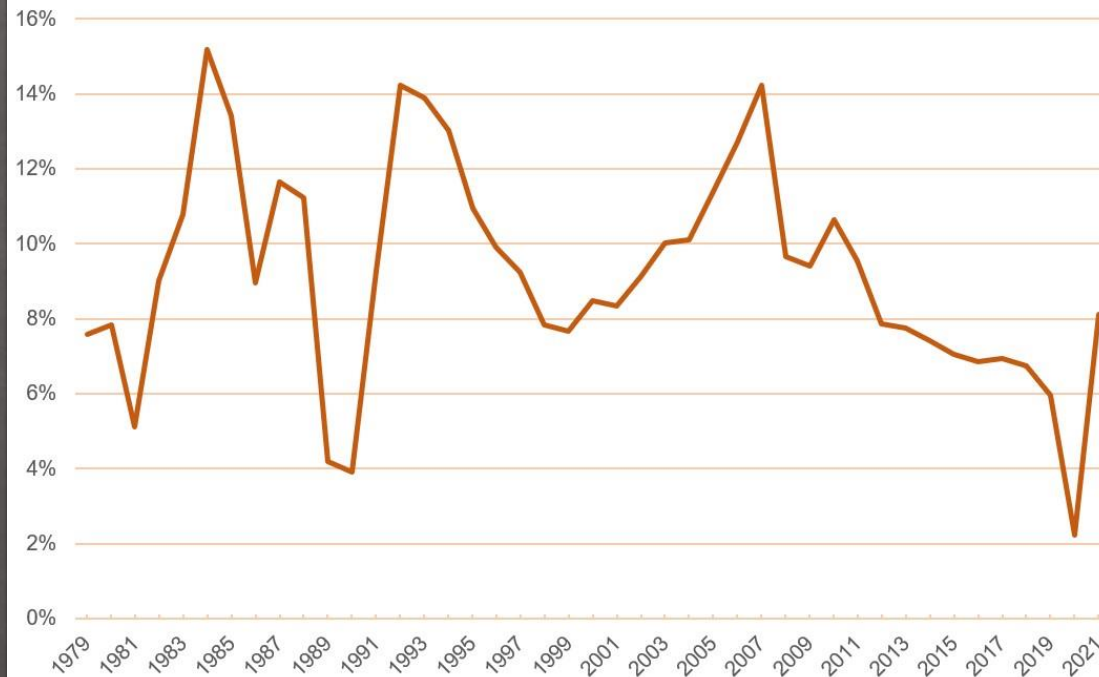
Urban Employment

Urban Employment in China by Registration Type (Million)
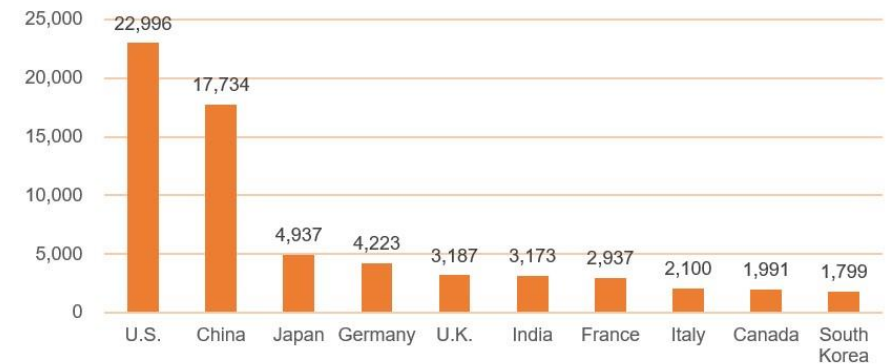
Legend:
- State-Owned Units (including SOEs and Governments)
- Collective-Owned Units
- Cooperative and Joint-Ownership Units
- Share-Holding Corporations Ltd.
- Limited Liability Corporations
- Domestic Private Enterprises
- Self-Employed Business
- Foreign Private Enterprises (including Hong Kong, Macao, and Taiwan)
- Unclassified

Source: PRC National Bureau of Statistics, Annual Data

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ROA of State and Non-State Firms

Return on Assets in Secondary Industry
(excluding Construction Industry)

State-Owned Enterprises (by Shareholding): 2.9%, 2.7%, 3.0%, 4.1%, 5.0%, 5.5%, 6.3%, 6.8%, 4.8%, 4.3%, 5.9%, 5.8%, 4.9%, 4.6%, 3.9%, 2.9%, 3.0%, 3.9%, 4.2%, 3.4%, 3.1%

Domestic Private Enterprises: 4.9%, 5.3%, 5.6%, 5.9%, 6.0%, 7.0%, 7.9%, 9.5%, 10.9%, 10.6%, 12.9%, 14.2%, 13.2%, 12.4%, 11.1%, 10.6%, 10.6%, 9.5%, 8.3%, 7.3%, 6.9%

Source: PRC National Bureau of Statistics, Annual Data

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Economic Growth

Real GDP Growth Rate of China (1979-2021)

GDP of Top 10 Countries in 2021
(2021 USD, Billion)

Country	GDP
U.S.	22,996
China	17,734
Japan	4,937
Germany	4,223
U.K.	3,187
India	3,173
France	2,937
Italy	2,100
Canada	1,991
South Korea	1,799

GDP per Capita in 2021
(2021 USD, K)

Country	GDP per Capita
U.S.	69
China	13
Japan	39
Germany	51
U.K.	47
India	2
France	44
Italy	36
Canada	52
South Korea	35
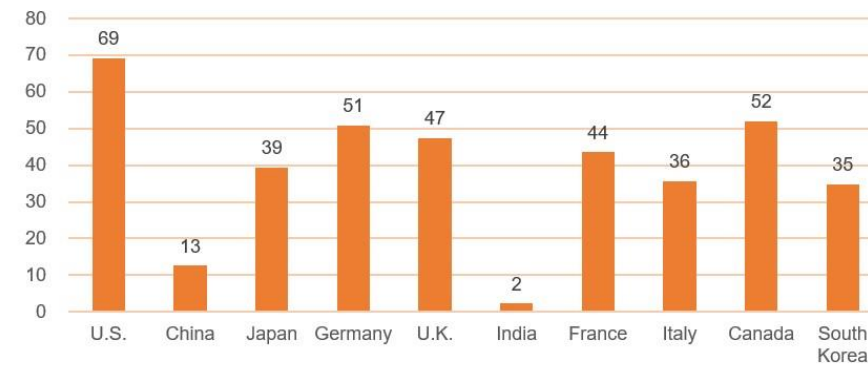
Source: World Bank Data, World Development Indicators

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Chinese Firms in Fortune 500 in 2022
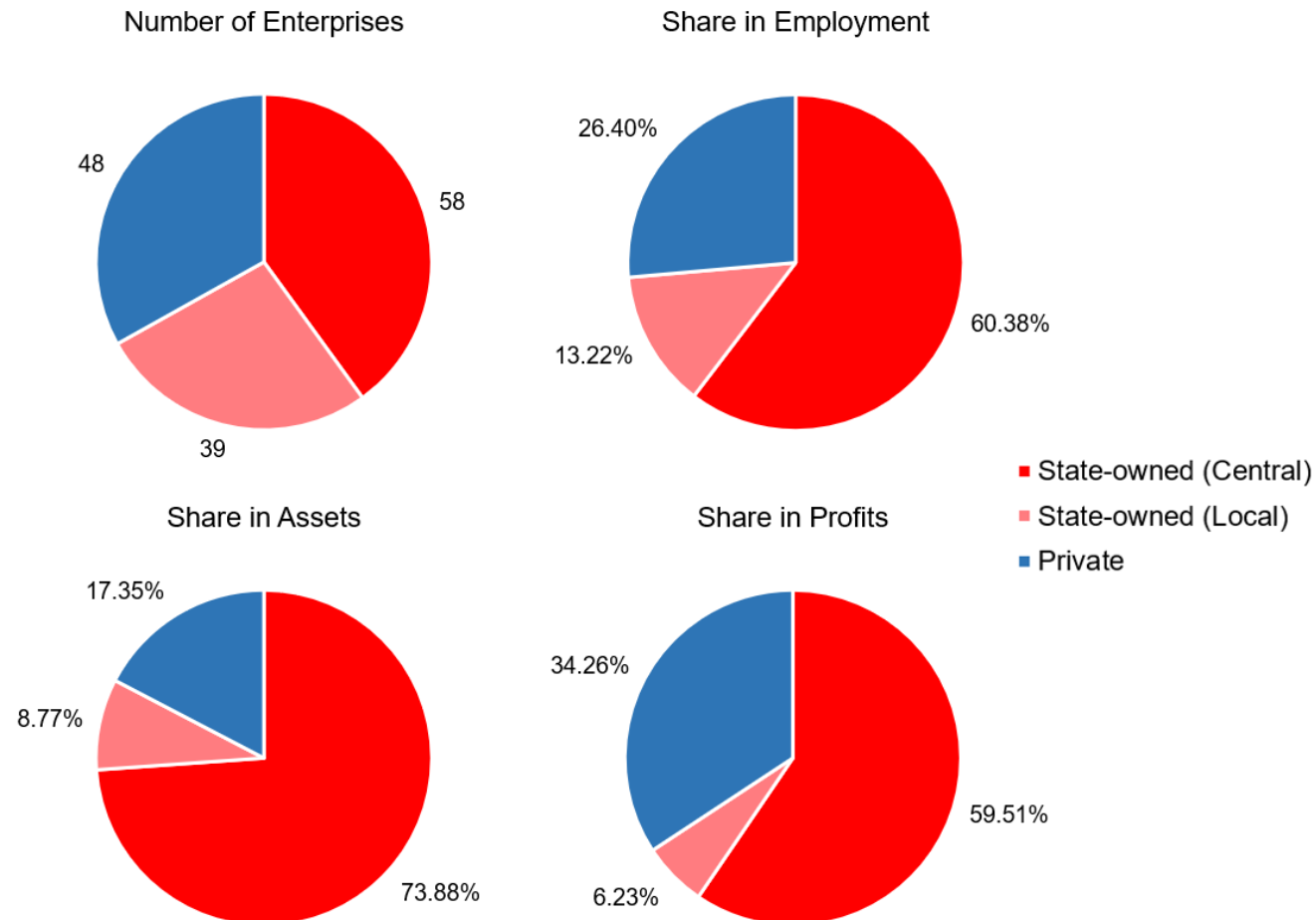
- Central SOEs
  - State Grid (3), Southern Power Grid (89)
  - Petro China (4), Sinopec (5), China National Offshore Oil (65)
  - ICBC (22), China Construction Bank (24), Agricultural Bank of China (28), Bank of China (42)
  - …

- Private firms
  - JD.com (46), Alibaba (55), Tencent (121)
  - Huawei (96)
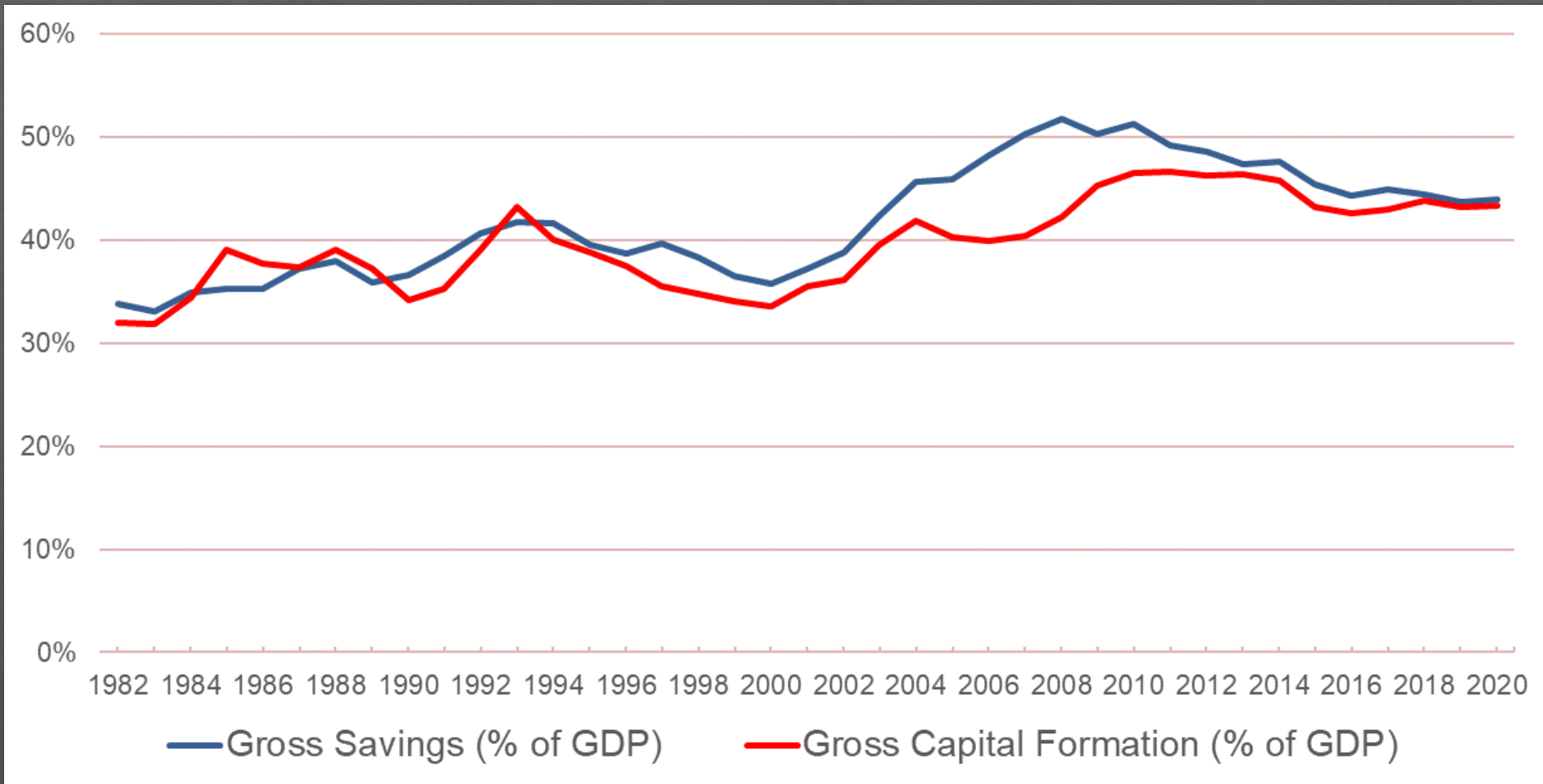 - Pingan Insurance (25)
  - …

China's Hybrid Economy

◈ Despite the highly successful market reforms, the state maintains its dominant position in the economy

    ◈ The state sets the development agenda through Intensive industrial policies

    ◈ Local governments are key in driving local development

    ◈ SOEs control the commanding heights

    ◈ Private enterprises are at the peripheral

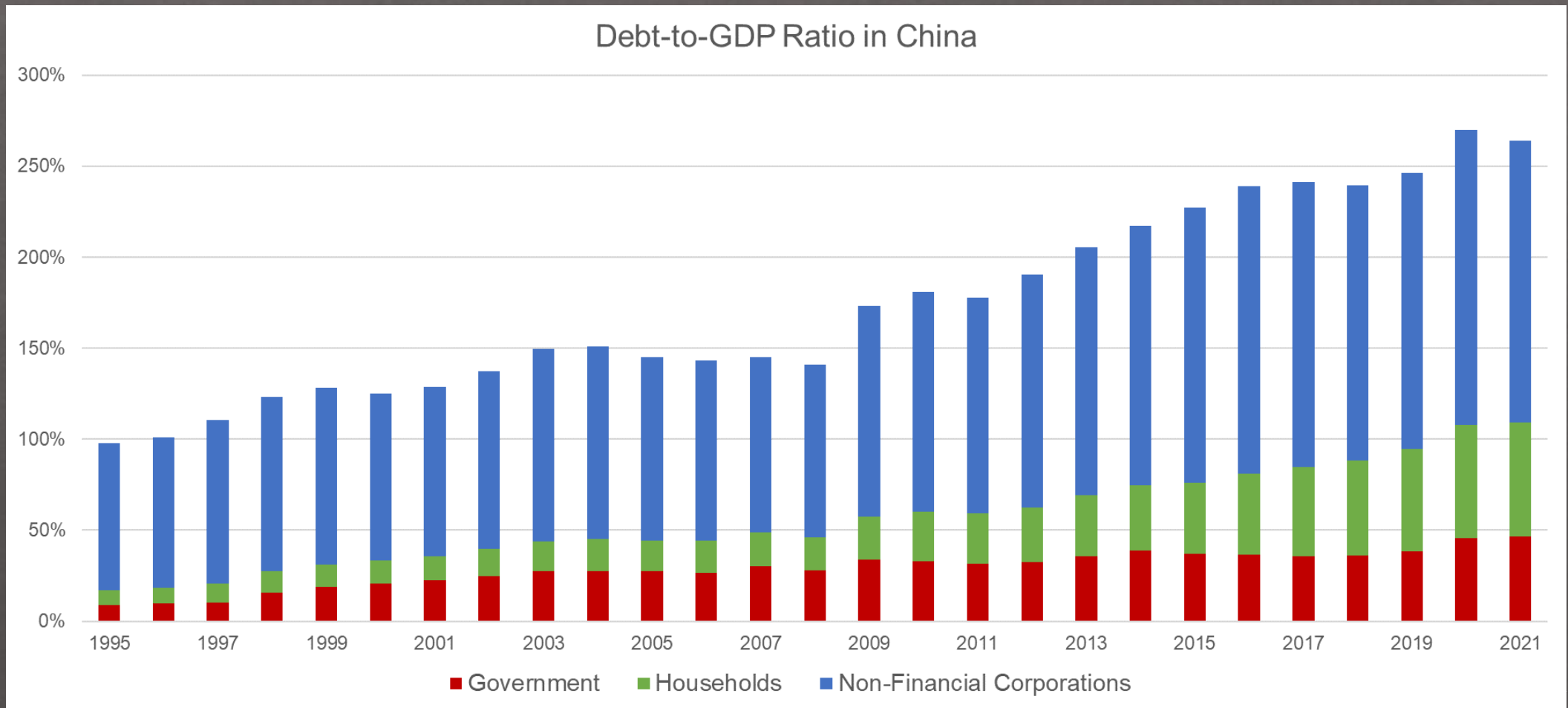Private Enterprises

The State, Local Governments & SOEs
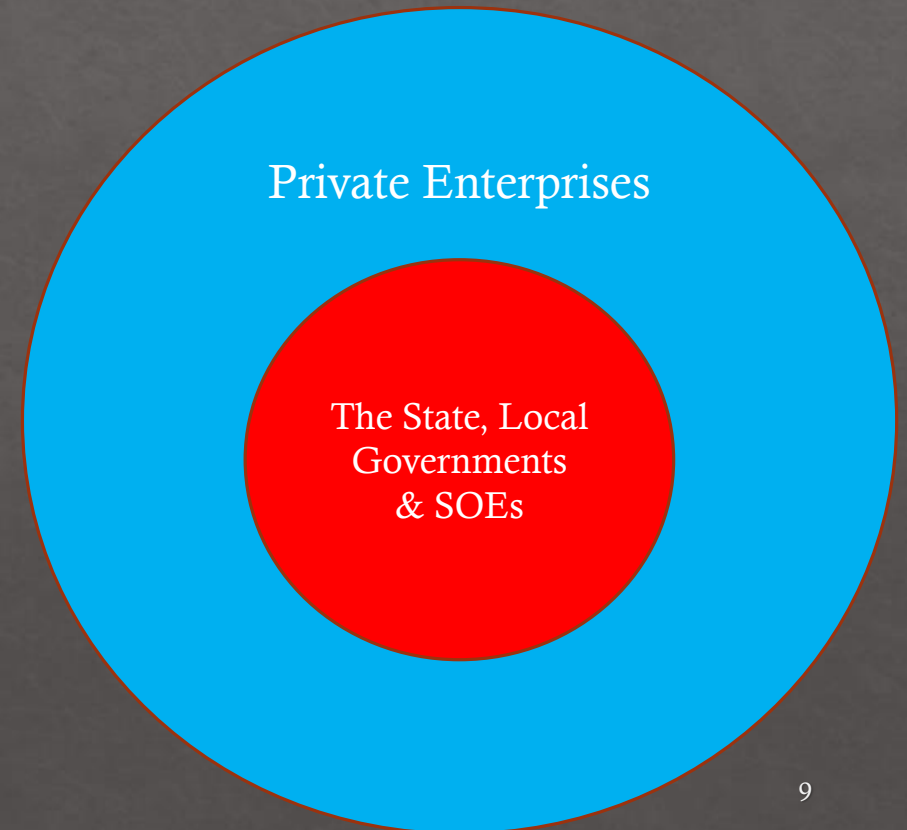
Open Issues

◈ How to characterize the relationship between state and market in China?

    ◈ Balancing the government's visible hand and the market's invisible hand is a recurring theme in China's economic reforms

    ◈ Xi's characterization: "enabling government and efficient markets" (有为政府、有效市场)

        ◈ 2022 CCP Constitution: "发挥市场在资源配置中的 基础性 决定性作用，更好发挥政府作用，建立完善的宏观调控体系。"

◈ Can the hybrid economy address the information and incentive challenges?

    ◈ An imbalanced economy

    ◈ The rising leverage

    ◈ The bubbly real estate
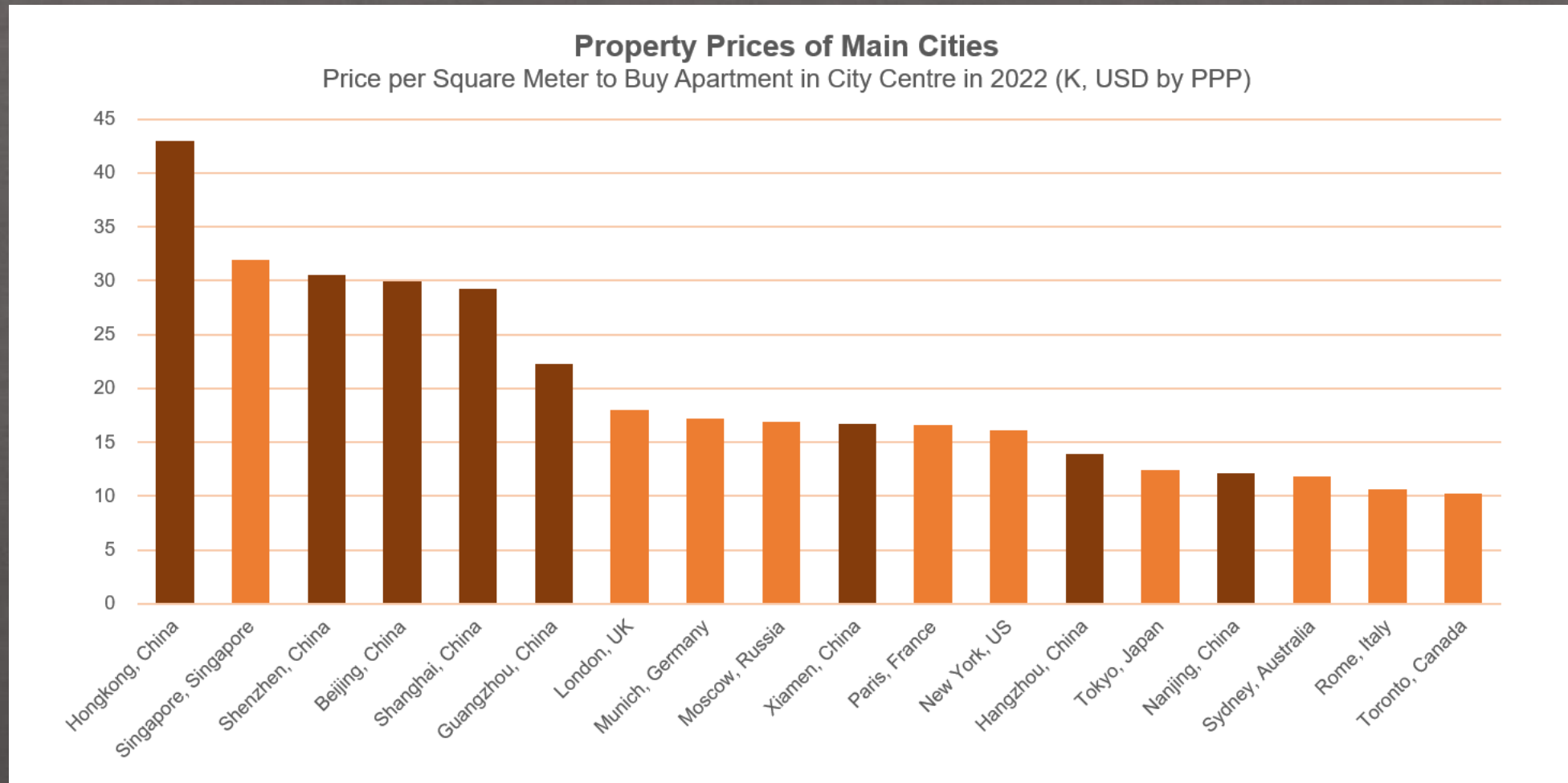
Investment-Driven Economy

High Leverage

Debt-to-GDP Ratio in China

Bubbly Real Estate

Property Prices of Main Cities
Price per Square Meter to Buy Apartment in City Centre in 2022 (K, USD by PPP)

Source: Numbeo; OECD Data

A Simple Framework

$$Y = A\, G^{\alpha_G}\, K^{\alpha_K}$$

- G is infrastructure developed by the government
  - Particularly relevant for developing economies, which tend to lack infrastructure
  - Difficult for private firms to provide due to its public good nature
  - The government can recover the cost through taxation
  - Can also be broadly interpreted as both physical and soft infrastructure

- K is capital investment by private firms

- G and K are complementary
  - Free markets are more efficient in information discovery and incentive provision, but subject to externalities
  - The state system can internalize externalities but is subject to information and incentive issues

Figure 1: Share of Infrastructure Capital

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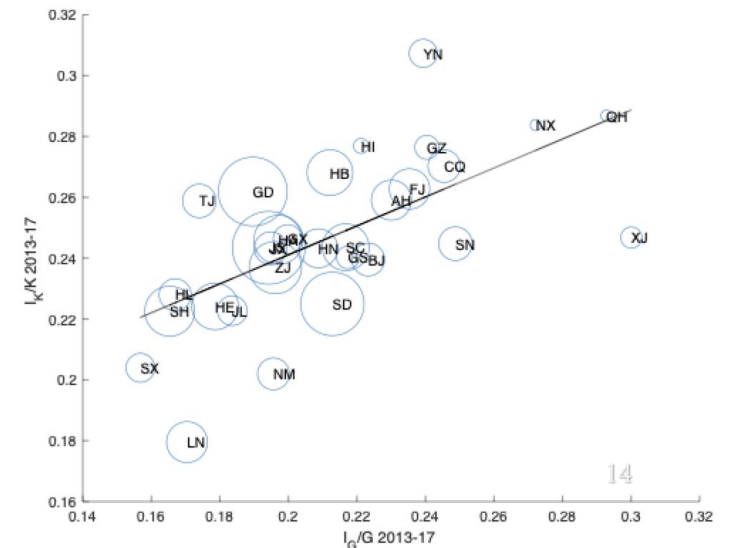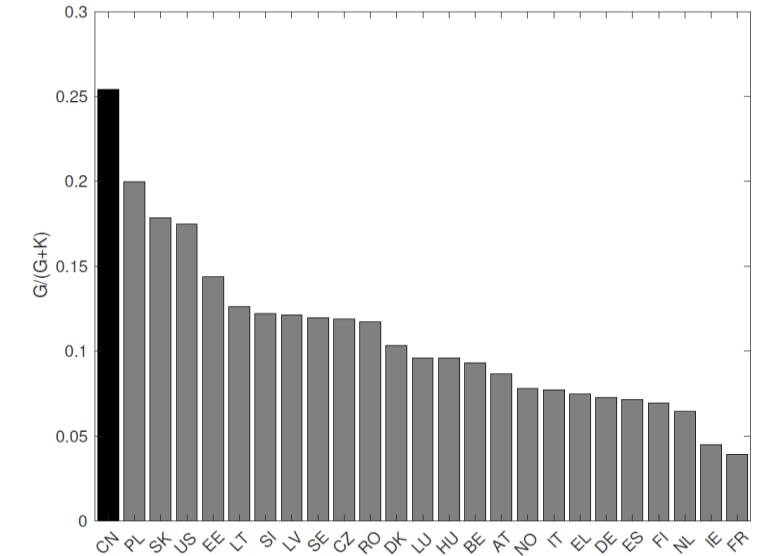
Information Discovery

- Can a hybrid economy overcome the information challenge faced by central planning, as highlighted by Mises (1922) and Hayek (1945)?

- Information among dispersed private firms can be aggregated through their investment decisions in the private sector

  - Feedback to other private firms
  - Feedback to policy makers and state firms

Information Discovery through G-K

◈ A continuum of firms with each firm's output:

$$Y_i = A \, G^{\alpha_G} \, K_i^{\alpha_K}$$

   ◇ A is unobservable to anyone

◈ Dispersed information

   ◇ The government observes a noisy signal: $s_G = \log A + \epsilon_G$

   ◇ Each firm also observes a noisy signal: $s_A^i = \log A + \epsilon_i$

◈ Each firms makes K_i based on I_i:

$$\max_{K_i} E\left[AG^{\alpha_G} \, K_i^{\alpha_K} \middle| I_i\right] - e^{\varphi_i} K_i$$

   ◇ $\varphi_i = \varphi + \epsilon_i^{\varphi}$

◈ The government chooses G based on I_G:

$$\max_{G} E\left[\int_i \tau Y_i \, di \middle| I_G\right] - R_G G$$

Information Discovery through G-K

◈ $K = \sum_i K_i$ *and* G serve to aggregate information

  ◈ $I_i = \{s_i, \varphi_i, K, G\}$

  ◈ $I_G = \{s_G, K\}$

◈ Investments in the equilibrium:

$$\log K_i = a_0 + a_k \log K + a_g \log G + a_s s_i + a_\varphi \varphi_i$$

$$\log G = b_0 + b_k \log K + b_s s_G$$

  ◈ Both $\log K$ and $\log G$ carry an information effect

  ◈ There are two equilibria

◈ Information transmission from K is a clear advantage to central planning

  ◈ Information distortions in China's Great Leap Forward and the subsequent famine

Government-Centric Equilibrium

◈ Brunnermeier, Sockin & Xiong (2022, REStud) "China's Model of Managing the Financial System"

◈ Suppose that each firm needs to choose a noisy signal

$$s_A^i = \log A + \epsilon^i$$

or

$$s_G^i = s_G + \epsilon^i$$

◈ A government-centric equilibrium may emerge with all firms acquiring information about s_G, but not $\log A$

　　◇ The market does not provide any fundamental information discovery

　　◇ This occurs when G is sufficiently dominant

Incentives in the Mandarin System

- A politically centralized but fiscally decentralized system, e.g., Xu (2011), Qian (2017), Zhou (2018)

  - Local governors have autonomy in managing local fiscal budget and development

  - The central government evaluates local officials based on unified performance measures

  - A key channel for the state to exert controls of local officials and thus implement central government agenda

- The performance measure varies

  - Ideology and political loyalty before 1978

  - Economic development after 1978

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Song & Xiong "The Mandarin Model of Growth"

◈ Consider an economy with M regions and $t = 0, 1, 2, \ldots$

◈ In each region, the representative firm's output is

$$Y_{it} = A_{it} G_{it}^{\alpha_G} K_{it}^{\alpha_K}$$

◈ The firm maximizes

$$\max_{K_{it}} (1 - \tau) Y_{it} - (r_t + \delta_K) K_{it}$$

◈ The representative household maximizes

$$J(W_{it}^H) = \max_{C_{it}^H, S_{it}^H} \log C_{it}^H + \log C_{it}^P + \beta E_t [J(W_{it+1}^H)]$$

with

$$W_{it}^H = (1 - \tau) Y_{it-1} - (r_t + \delta_K) K_{it-1} + (1 + r_{it-1}) S_{it-1}^H$$

Career Incentives in the Mandarin System

◈ The local governor's ability a_{it} is unobservable and affects the local productivity

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

◈ The central government uses the local output to evaluate performance:

$$\hat{a}_{it} = E[a_{it}|Y_{it}] \qquad \text{where} \qquad Y_{it} = A_{it} G_{it}^{\alpha_G} K_{it}^{\alpha_K}$$

The market provides the performance measure

and

$$\log Y_{it} = \frac{\alpha_G}{1 - \alpha_K} \log G_{it} + f_t + a_{it} + \epsilon_{it}$$

◈ The signal jamming mechanism of Holmstrolm (1982):

$$\hat{a}_{it} \propto \kappa[(f_t - \bar{f}) + (a_{it} - \bar{a}_{it}) + \epsilon_{it} + \alpha_K(\log G_{it} - \log G_{it}^*)]$$

◈ The governor chooses G_{it}:

$$J^G(W_{it}^G) = \max_{C_{it}^G, C_{it}^P, G_{it}} \log C_{it}^G + \rho \log C_{it}^P + \kappa \log G_{it} + \beta_G E_t[J^G(W_{it+1}^G)]$$

subject to

$$C_{it}^P + C_{it}^G + G_{it} = \tau Y_{it-1} + (1 - \delta_G)G_{it-1}$$

The Career-Driven Equilibrium

- If $\delta_K = \delta_G = 1$, the governor chooses

    - $G_{it} = \left[1 - (1 + \rho) \frac{1 - \beta_G \frac{\alpha_G}{1-\alpha_K}}{1+\rho+\kappa} \right] \tau Y_{it-1}$

- $C_{it}^P = \frac{1 - \beta_G \frac{\alpha_G}{1-\alpha_K}}{1+\rho+\kappa} \rho \tau Y_{it-1}$

- $C_{it}^G = \frac{1 - \beta_G \frac{\alpha_G}{1-\alpha_K}}{1+\rho+\kappa} \tau Y_{it-1}$

- In the absence of career incentives $\kappa = 0$, G_{it} is lower than the first best level if $\frac{\beta_G \tau}{1-\alpha_K} < \beta$.

- If the career incentives, i.e., κ, are sufficiently large, G_{it} is higher than the first best level.

    - Short-termist behavior

Debt Financing

Debt-to-GDP Ratio in China

◈ Local governments were not allowed to raise debt before 2008

◈ This changed in 2008-2010 during China's massive post-crisis stimulus, e.g., Bai, Hsieh & Song (2016) and Chen, He & Liu (2021)
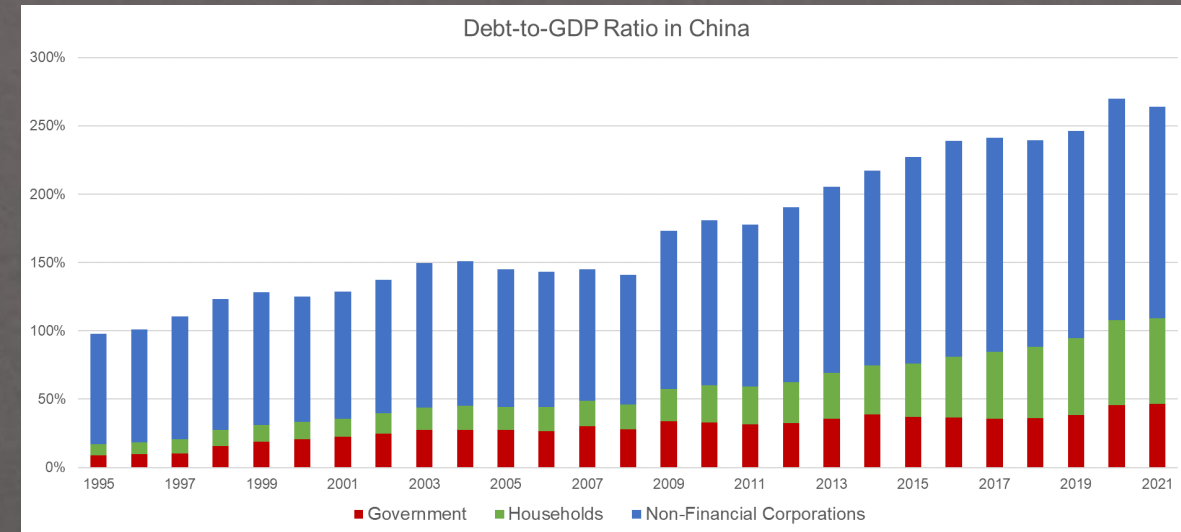
◈ Suppose that the local governor can use debt D_{it}:

$$C_{it}^P + C_{it}^G + G_{it} + (1 + r_{it-1})D_{it-1} + \frac{\psi}{2}\left(\frac{r_t D_{it}}{E_t(\tau_i Y_{it})}\right)D_{it} = \tau Y_{it-1} + (1 - \delta_G)G_{it-1} + (1 + r_{it})D_{it}$$

◈ In the steady state equilibrium, D_* increases with κ

◈ Without sufficient κ_{it}, debt is used to boost C_{it}^G

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Quantitative Analysis: Heterogeneous Local Economy

◈ Estimate city-level career incentives through observed G_{it} in 2013-2017

◈ Each region is represented by $(W_{it}^H, W_{it}^G, \kappa_{it}, a_{it}, S_i)$

   ◇ κ_{it} iid, $r_{it} = r_t + \phi_i$, no aggregate shock in f_t

   ◇ $S_i = \{\bar{a}_i, \phi_i, \tau_i, T_i\}$

◈ Idiosyncratic shocks to households, causing each household to lose its labor income

◈ Let Γ_t be the cross-region distribution of $(W_{it}^H, W_{it}^G, \kappa_{it}, a_{it}, S_i)$

◈ A recursive equilibrium $\Gamma_{t+1} = H(\Gamma_t)$

   ◇ Local governor optimization: $W_{it+1}^G = W^G(W_{it}^G, \kappa_{it}, a_{it}, S_i | \Gamma_t)$

   ◇ Household optimization: $W_{it+1}^H = W^H(W_{it}^H, W_{it}^G, \kappa_{it}, a_{it}, S_i | \Gamma_t)$

   ◇ r_t determined by capital market clearing: $S^H(\Gamma) = K(\Gamma) + D(\Gamma)$
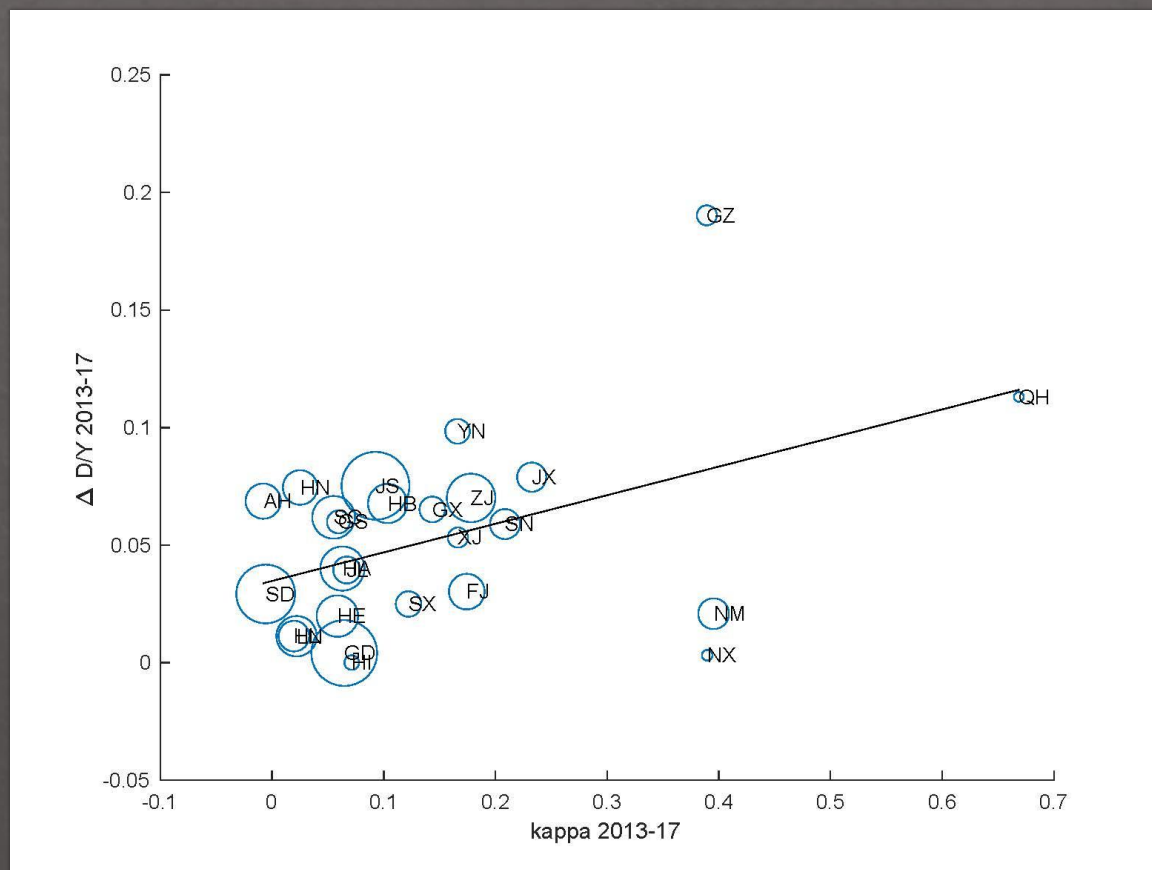
Quantitative Analysis

* Equilibrium-free calibration

  * $\alpha_K = 0.402$

  * $\alpha_G = 0.075$

  * $\delta_G = 1 - (1 - 0.10)^5 = 0.41$, $\delta_K = 1 - (1 - 0.14)^5 = 0.53$

  * τ_i varies across regions from 10.3% to 40.6%

* In a sample of 270 prefecture cities, we calibrate κ_i to G_i in 2013-2017
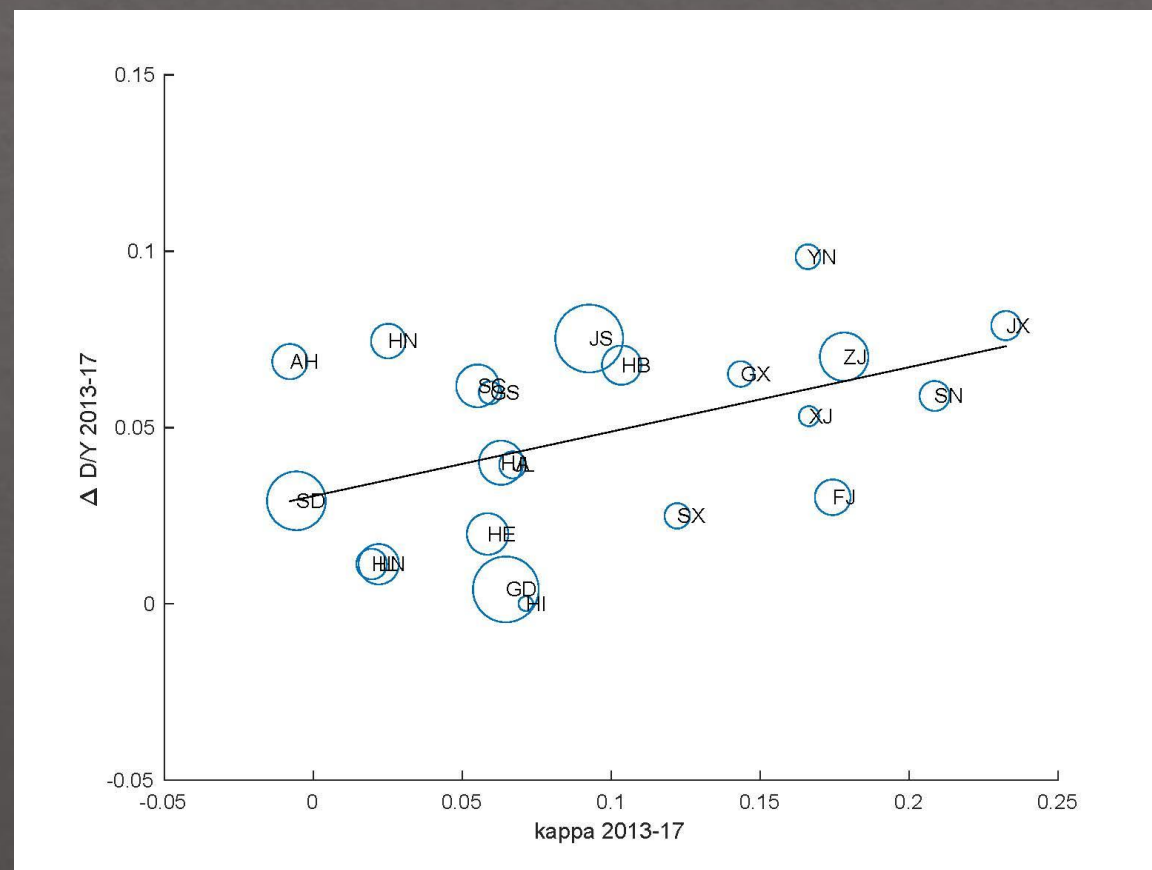
Estimates of Career Incentives
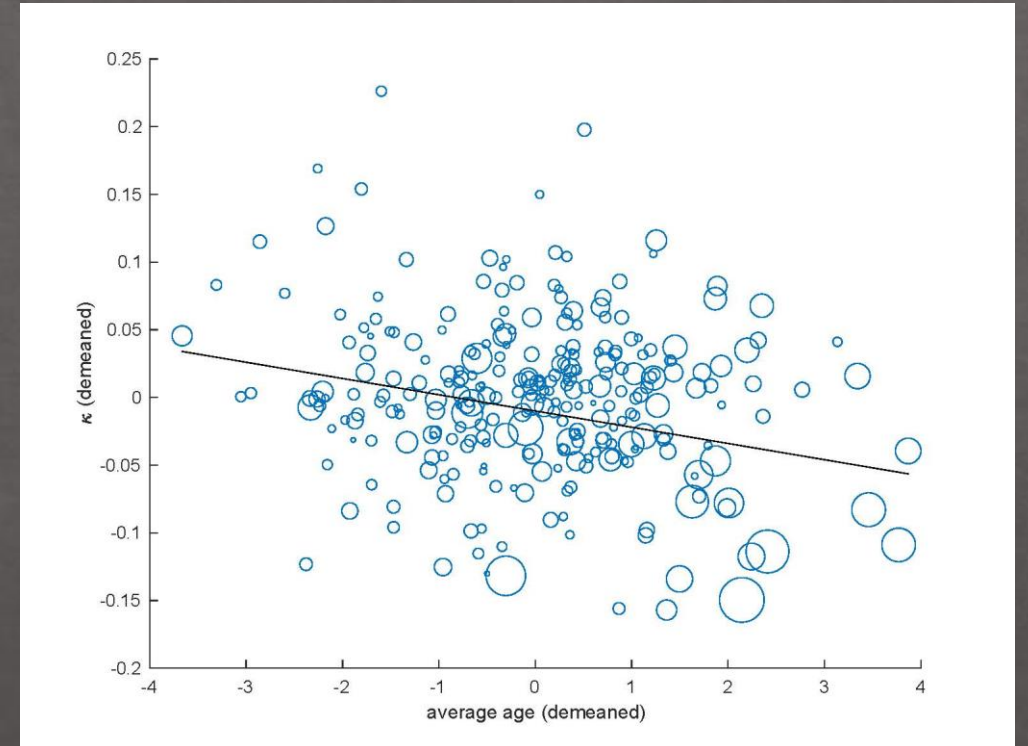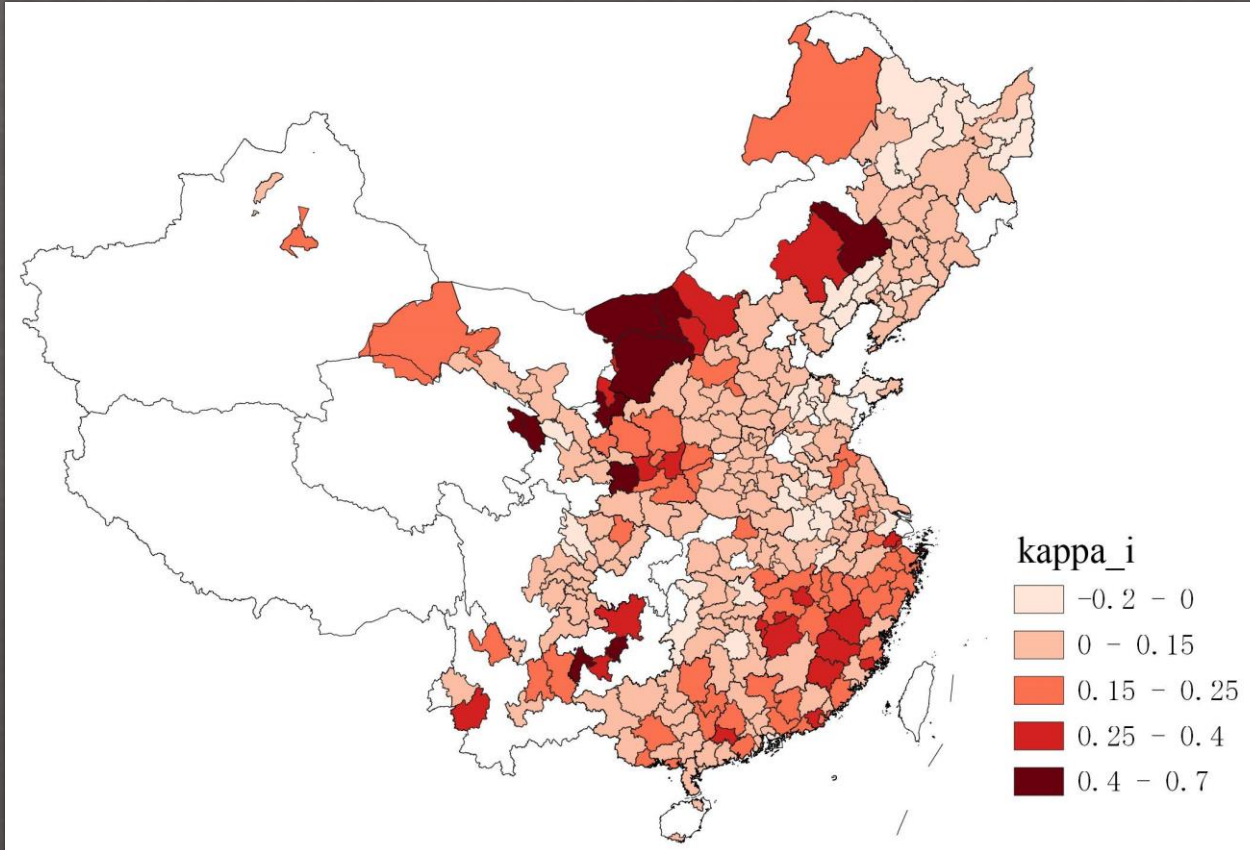
◈ Career incentives are inversely related to age

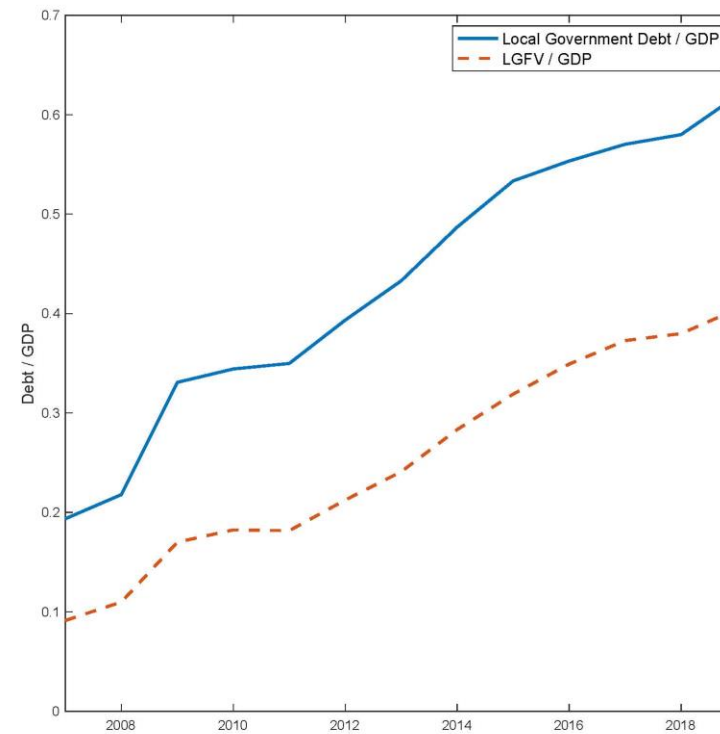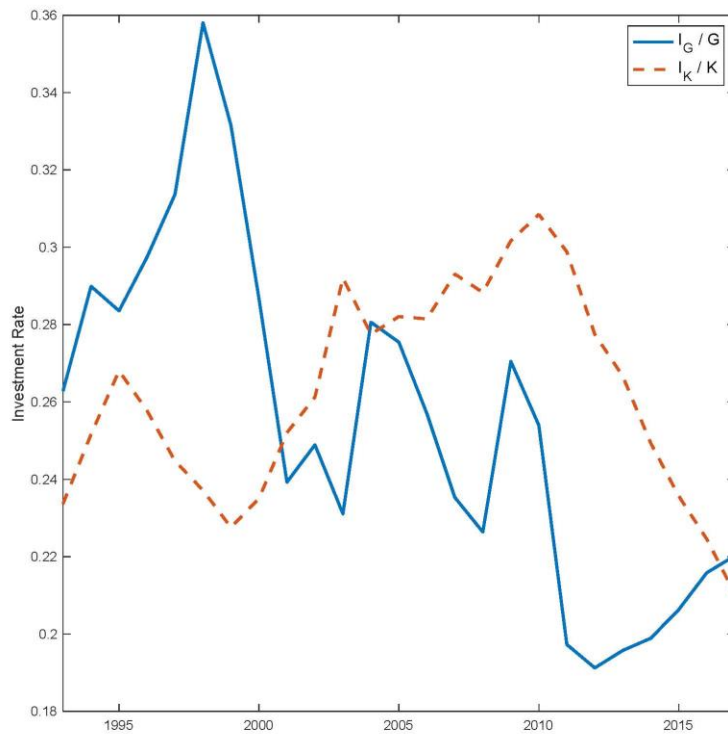# Career Incentives and Leverage

Slope 0.12, STD 0.065.

Slope 0.18, STD 0.088.

Counterfactuals

	$E(\kappa_i) = 0.09, \psi = 6.0$	$\kappa_i = 0$	$\psi = 4.5$	$\kappa_i = 0, \psi = 4.5$
$G(\Gamma)$	58.31	36.70	58.62	38.25
$D(\Gamma)$	120.33	112.20	160.93	142.75
$K(\Gamma)$	208.48	197.66	208.71	198.73
$Y(\Gamma)$	870.79	825.00	871.47	829.62
$\frac{D}{Y}$	0.69	0.68	0.92	0.86

Calibration of National Aggregate

Transitional Dynamics in Aggregate

Table 4: Transitional Dynamics

	Old Economy	1993-1997	1998-2002	2003-2007	2008-2012	2013-2017
Calibrated to match G_t and D_t						
κ_t	-0.0057	0.2851	0.3853	0.4064	0.1911	0.1331
ψ_t	∞	∞	∞	∞	13	5

Table 5: Counterfactual

	benchmark	no career incentive
$\kappa_{t \geq 5}$	0.13	0
$Y_6/Y_5 - 1$	4.3%	2.4%
Y_∞	1 (normalized)	0.94

Summary

- China's rapid growth is rooted to the complementarity between G and K

  - G provides public good to boost productivity of K

  - K provides information discovery and performance measure for G

- In light of the waning of China's market reforms, potential concerns going forward

  - Reduced incentives for G, further amplified by reduced K

  - The dominance of G may distort information discovery of K

- Many other issues to explore

  - The land-based fiscal policy for local governments

  - State capital in venture capital and private equity sector

  - …

Thank You!