A Model of China's State Capitalism

Xi Li, Xuewen Liu, Yong Wang

HKUST

June 2012

State capitalism as alternative growth model

US Congress blame SOE subsidies to POEs for China's CA surplus

U.S.-China Economic and Security Review Commission

October 26, 2011

An Analysis of State-owned Enterprises and State Capitalism in China

Puzzling Facts about Fast-Growing China Economy

- The State-Owned Enterprises (SOEs) have outperformed the private firms in the past decade while the opposite was true in the 1990s, although the GDP growth rates were stably high during the whole period.

Puzzling Facts about Fast-Growing China Economy

- The State-Owned Enterprises (SOEs) have outperformed the private firms in the past decade while the opposite was true in the 1990s, although the GDP growth rates were stably high during the whole period.

- The labor income share in total GDP is persistently declining in the past two decades

Total Profit to Sales Revenue of Chinese Industrial Enterprises

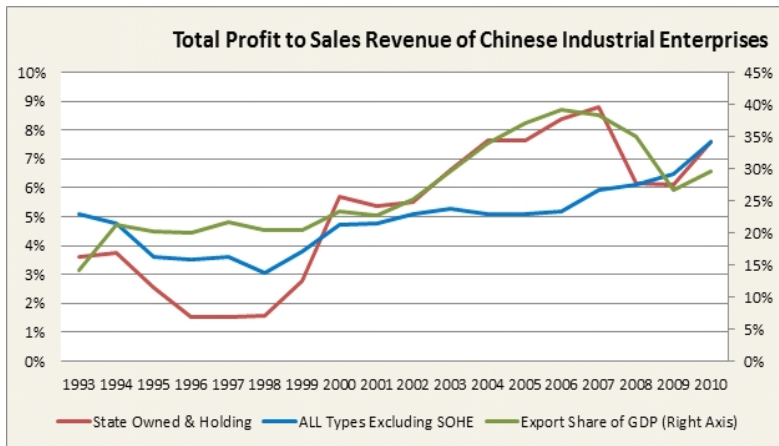Legend: State Owned & Holding — ALL Types Excluding SOHE — Export Share of GDP (Right Axis)

Figure 1: Total profit to sales revenues of Chinese enterprises in the industrial sector. We use CEIC (Table CN.BF: Industrial Financial Data: By Enterprise Type) to obtain Total profit to Sales Revenue. In this table, CEIC categorizes industrial enterprises into: state owned & holding,
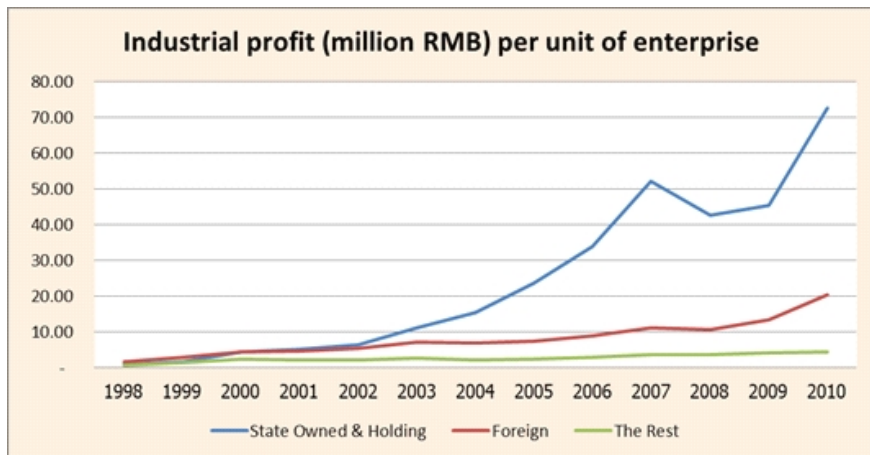
Puzzling Fact 1: SOEs Outperformed POEs

Figure 2a: Average Profit per Industrial Enterprise (by Different Ownership Structure): 1998-2010

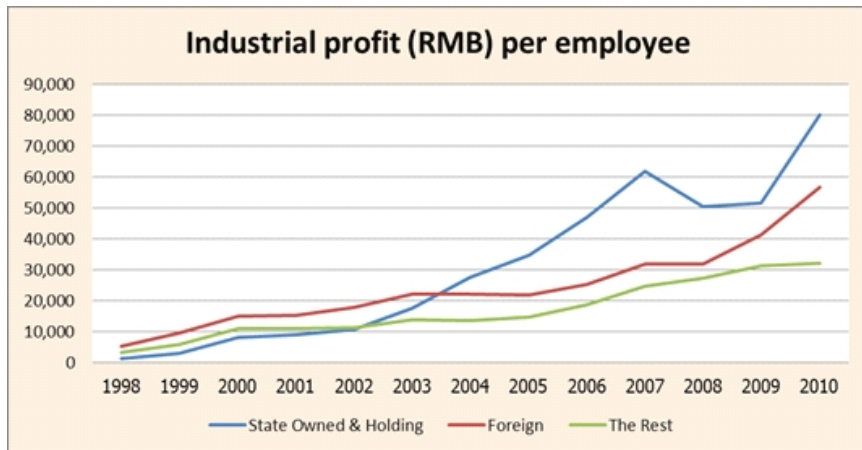**Industrial profit (RMB) per employee**

Legend: State Owned & Holding — Foreign — The Rest

Figure 2b: Average Profit per Employee for Industrial Enterprise (by Different Ownership Structure): 1998-2010

Figure 10: China's Labor Income Share (replicated from Bai and Qian, 2010)

- **Vertical Structure:** SOEs monopolize key upstream industries while the downstream industries are largely open for private competition

Key Characteristics of China's State Capitalism

- **Vertical Structure:** SOEs monopolize key upstream industries while the downstream industries are largely open for private competition
- **Dual Labor Market and Structural Change:** a huge labor supply in the process of industrialization

Key Characteristics of China's State Capitalism

- **Vertical Structure:** SOEs monopolize key upstream industries while the downstream industries are largely open for private competition
- **Dual Labor Market and Structural Change:** a huge labor supply in the process of industrialization
- **Trade Liberalization:** entering WTO in 2001, export-promoted strategies

Key Mechanisms

- **Key Story:** Upstream SOEs extract monopoly rents from expanding downstream private sectors, especially after China's entry to WTO in 2001.

- **Key Story:** Upstream SOEs extract monopoly rents from expanding downstream private sectors, especially after China's entry to WTO in 2001.
- **Without Openness**, SOEs in the downstream industries could not exit so fast; Demand for downstream goods and services would be small, hence the profits of upstream SOEs would be small.

Key Mechanisms

- **Key Story:** Upstream SOEs extract monopoly rents from expanding downstream private sectors, especially after China's entry to WTO in 2001.

- **Without Openness**, SOEs in the downstream industries could not exit so fast; Demand for downstream goods and services would be small, hence the profits of upstream SOEs would be small.

- **Without Labor Abundance**, wage will increase fast as export increases, which limits the room for the monopoly pricing charged by the upstream SOEs.

Key Mechanisms

- **Key Story:** Upstream SOEs extract monopoly rents from expanding downstream private sectors, especially after China's entry to WTO in 2001.

- **Without Openness**, SOEs in the downstream industries could not exit so fast; Demand for downstream goods and services would be small, hence the profits of upstream SOEs would be small.

- **Without Labor Abundance**, wage will increase fast as export increases, which limits the room for the monopoly pricing charged by the upstream SOEs.

- **Without Strong Government and Political Centralization,** SOEs would not be able to maintain the monopoly position in the upstream industries for so long

Road Map

- Documenting the vertical structure
- A Model of State Capitalism: Autarky, Trade
- Sustainability of this State Capitalism
- Emergence of State Capitalism
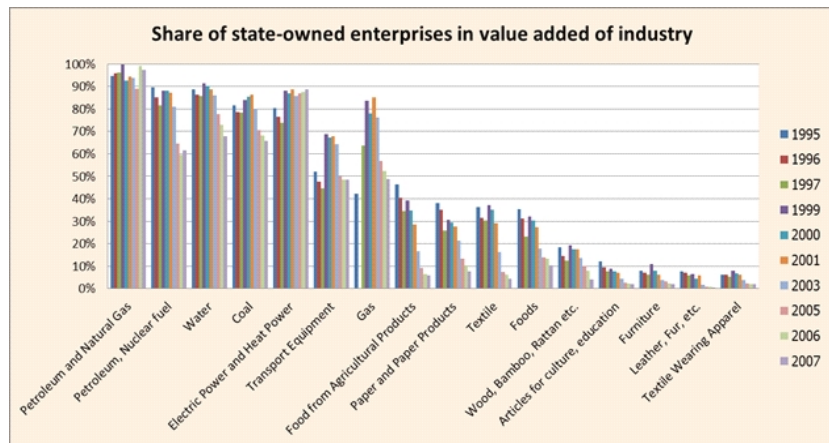- Dynamic Extensions and Implicaitons on China's high saving rate and global imbalance

Figure 5a: Share of state enterprises in industrial value-added.

Figure 5b: Share of state enterprises in value-added as a percentage of its 1995 value.

Figure 4: Investments in fixed assets in urban area by ownership for all sectors. The data are from the following tables of National Bureau of Statistics (NBS) of China: Investment in Urban Area by Sector, Source of Funds, Jurisdiction of Management and Registration Status. Note that NBS has changed the column title of state related ownership over time.

Facts about Vertical Structure [4]

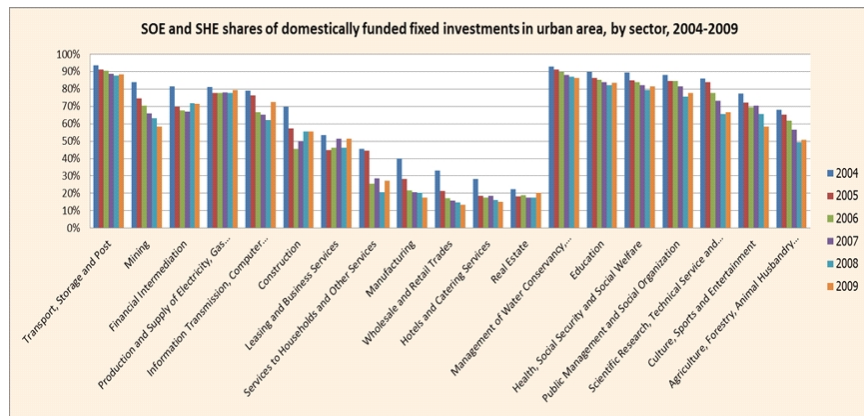Table 2. Chinese firms in 2011 Fortune Global 500

Company Name	Fortune Rank	Revenues ($millions)	Headquarter	Industry
Sinopec Group	5	273422	Beijing	Oil and Refinery
China National Petroleum	6	240192	Beijing	Oil and Refinery
State Grid	7	226294	Beijing	Electricity Power
Industrial & Commercial Bank of China	77	80501	Beijing	Banking
China Mobile Communications	87	76673	Beijing	Telecom
China Railway Group	95	69973	Beijing	Construction and Infrastructure
China Railway Construction	105	67414	Beijing	Construction and Infrastructure
China Construction Bank	108	67081	Beijing	Banking
China Life Insurance	113	64635	Beijing	Insurance
Agricultural Bank of China	127	60536	Beijing	Banking
Bank of China	132	59212	Beijing	Banking
Dongfeng Motor	145	55748	Wuhan	Automobile
China State Construction Engineering	147	54721	Beijing	Construction and Infrastructure
China Southern Power Grid	149	54449	Guangzhou	Electricity Power

Figure 3: Share of industrial output value from state enterprises in the industrial sector.

Model

Autarky
Environment

- a continuum of households with measure unity: θ elite group, $1 - \theta$ grassroot.

- a continuum of households with measure unity: θ elite group, $1 - \theta$ grassroot.
- Preference

$$u(c) = c_n + \frac{\epsilon}{\epsilon - 1} \left[\left(\int_0^1 c(i)^{\frac{\eta-1}{\eta}} di \right)^{\frac{\eta}{\eta-1}} \right]^{\frac{\epsilon-1}{\epsilon}}, \ \epsilon > 1, \eta > 1,$$

Autarky
Environment

- a continuum of households with measure unity: θ elite group, $1 - \theta$ grassroot.

- Preference

$$u(c) = c_n + \frac{\epsilon}{\epsilon - 1} \left[\left(\int_0^1 c(i)^{\frac{\eta-1}{\eta}} di \right)^{\frac{\eta}{\eta-1}} \right]^{\frac{\epsilon-1}{\epsilon}} , \; \epsilon > 1, \eta > 1,$$

- Technology

- a continuum of households with measure unity: θ elite group, $1 - \theta$ grassroot.
- Preference

$$u(c) = c_n + \frac{\epsilon}{\epsilon - 1} \left[\left(\int\limits_0^1 c(i)^{\frac{\eta - 1}{\eta}} \, di \right)^{\frac{\eta}{\eta - 1}} \right]^{\frac{\epsilon - 1}{\epsilon}}, \ \epsilon > 1, \eta > 1,$$

- Technology
  1. one unit of labor produces one unit of numerare good n

- a continuum of households with measure unity: θ elite group, $1 - \theta$ grassroot.
- Preference

$$u(c) = c_n + \frac{\epsilon}{\epsilon - 1} \left[\left(\int_0^1 c(i)^{\frac{\eta-1}{\eta}} di \right)^{\frac{\eta}{\eta-1}} \right]^{\frac{\epsilon-1}{\epsilon}}, \ \epsilon > 1, \eta > 1,$$

- Technology
  1. one unit of labor produces one unit of numerare good n
  2. differentiated consumption good:
     $F_i(k, l, m) = A k^\alpha l^\beta m^{1-\alpha-\beta}, \forall i \in [0, 1]$

Autarky
Environment

- a continuum of households with measure unity: θ elite group, $1 - \theta$ grassroot.

- Preference

$$u(c) = c_n + \frac{\epsilon}{\epsilon - 1} \left[\left(\int\limits_0^1 c(i)^{\frac{\eta - 1}{\eta}} \, di \right)^{\frac{\eta}{\eta - 1}} \right]^{\frac{\epsilon - 1}{\epsilon}}, \ \epsilon > 1, \eta > 1,$$

- Technology
  1. one unit of labor produces one unit of numerare good n
  2. differentiated consumption good:
     $F_i(k, l, m) = A k^\alpha l^\beta m^{1 - \alpha - \beta}, \forall i \in [0, 1]$
  3. Intermediate good: $F_m(k, l) = A_m k^\gamma l^{1 - \gamma}$

- Endowment:

- Endowment:

  1. Each household, elite or grass root, is endowment with L units of time (labor) and K units of capital.

- Endowment:

    1. Each household, elite or grass root, is endowment with L units of time (labor) and K units of capital.
    2. The profits of all the state-owned enterprises are equally shared by the elite class.

- Endowment:
  1. Each household, elite or grass root, is endowment with L units of time (labor) and K units of capital.
  2. The profits of all the state-owned enterprises are equally shared by the elite class.
  3. All the private firms are owned by the grassroot.

- Endowment:
  1. Each household, elite or grass root, is endowment with L units of time (labor) and K units of capital.
  2. The profits of all the state-owned enterprises are equally shared by the elite class.
  3. All the private firms are owned by the grassroot.

- Market Structure:

Static Autarky
Environment

- Endowment:
  1. Each household, elite or grass root, is endowment with L units of time (labor) and K units of capital.
  2. The profits of all the state-owned enterprises are equally shared by the elite class.
  3. All the private firms are owned by the grassroot.

- Market Structure:
  1. Intermediate good market monopoly

- Endowment:
  1. Each household, elite or grass root, is endowment with L units of time (labor) and K units of capital.
  2. The profits of all the state-owned enterprises are equally shared by the elite class.
  3. All the private firms are owned by the grassroot.

- Market Structure:
  1. Intermediate good market monopoly
  2. all the other markets are perfectly competitive

Autarky Equilibrium Characterization

$$\text{Household Wealth} \quad : \quad I_e = WL + RK + \frac{\Pi_m}{\theta}; \ I_g = WL + RK$$

$$\text{BC} \quad : \quad Wc_n + \int\limits_0^1 p(i)c(i)di \leq I, \text{ where } I \in \{I_e, I_g\}$$

$$\text{Price} \quad : \quad p(i) = \frac{R^\alpha W^\beta {p_m}^{1-\alpha-\beta}}{A\alpha^\alpha\beta^\beta (1-\alpha-\beta)^{1-\alpha-\beta}};$$

$$\text{Upstream SOE} \quad : \quad \Pi_m = \max_{p_m} D_m(p_m) \cdot \left[p_m - \frac{R^\gamma W^{1-\gamma}}{A_m\gamma^\gamma (1-\gamma)^{1-\gamma}} \right]$$

$$p_m \quad = \quad \mu \frac{R^\gamma W^{1-\gamma}}{A_m\gamma^\gamma (1-\gamma)^{1-\gamma}}; \ \mu \equiv \frac{(1-\alpha-\beta)(\epsilon-1)+1}{(1-\alpha-\beta)(\epsilon-1)}.$$

Autarky Equilibrium

Factor Markets Clear

$$L = \underbrace{D_m \frac{\partial \frac{R^\gamma W^{1-\gamma}}{A_m \gamma^\gamma (1-\gamma)^{1-\gamma}}}{\partial W}}_{\text{by producer of intermediate good } m} + \underbrace{\int_0^1 D(i) \frac{\partial p(i)}{\partial W} di}_{\text{by producers of differentiated goods}}$$

$$+ \underbrace{D_n}_{\text{by producers of good } n}$$

$$K = \underbrace{D_m \frac{\partial \frac{R^\gamma W^{1-\gamma}}{A_m \gamma^\gamma (1-\gamma)^{1-\gamma}}}{\partial R}}_{\text{by producer of intermediate good } m} + \underbrace{\int_0^1 D(i) \frac{\partial p(i)}{\partial R} di}_{\text{by producers of differentiated goods}}$$

Lemma

Suppose L is sufficiently large. The autarky model has a unique equilibrium, in which all the prices $(R, p_m, p(i), W)$ are explicitly solved.

- $\frac{\partial R}{\partial K} < 0$, $\frac{\partial R}{\partial A_m} > 0$, $\frac{\partial R}{\partial A} > 0$, $\frac{\partial R}{\partial L} = 0$.

Autarky Equilibrium

Lemma

Suppose L is sufficiently large. The autarky model has a unique equilibrium, in which all the prices $(R, p_m, p(i), W)$ are explicitly solved.

- $\frac{\partial R}{\partial K} < 0$, $\frac{\partial R}{\partial A_m} > 0$, $\frac{\partial R}{\partial A} > 0$, $\frac{\partial R}{\partial L} = 0$.
- $\frac{\partial p_m}{\partial K} < 0$, $\frac{\partial p_m}{\partial A_m} < 0$, $\frac{\partial p_m}{\partial A} > 0$, $\frac{\partial p_m}{\partial L} = 0$.

Lemma

Suppose L is sufficiently large. The autarky model has a unique equilibrium, in which all the prices $(R, p_m, p(i), W)$ are explicitly solved.

- $\frac{\partial R}{\partial K} < 0$, $\frac{\partial R}{\partial A_m} > 0$, $\frac{\partial R}{\partial A} > 0$, $\frac{\partial R}{\partial L} = 0$.
- $\frac{\partial p_m}{\partial K} < 0$, $\frac{\partial p_m}{\partial A_m} < 0$, $\frac{\partial p_m}{\partial A} > 0$, $\frac{\partial p_m}{\partial L} = 0$.
- $\frac{\partial p(i)}{\partial K} < 0$, $\frac{\partial p(i)}{\partial A_m} < 0$, $\frac{\partial p(i)}{\partial A} < 0$, $\frac{\partial p(i)}{\partial L} = 0$.

Autarky Equilibrium

Lemma

Suppose $L > \frac{\mu - \gamma(1-\alpha-\beta) - \alpha\mu}{(1-\gamma)(1-\alpha-\beta) + \beta\mu}\overline{L}(A, A_m, K)$. In the autarky equilibrium,

$$\Pi_m = \frac{(1-\alpha-\beta)(\mu-1)}{(1-\gamma)(1-\alpha-\beta) + \beta\mu}\overline{L}(A, A_m, K),$$

$$Y = \left[L + \frac{\alpha\mu + (1-\alpha-\beta)(\gamma+\mu-1)}{(1-\gamma)(1-\alpha-\beta) + \beta\mu}\overline{L}(A, A_m, K) \right],$$

$$\theta_L = \frac{L}{L + \frac{\alpha\mu + (1-\alpha-\beta)(\gamma+\mu-1)}{(1-\gamma)(1-\alpha-\beta) + \beta\mu}\overline{L}(A, A_m, K)},$$

$$\overline{L}(A, A_m, K) \equiv \varkappa^{\frac{1}{1+\alpha(\epsilon-1)+\gamma(1-\alpha-\beta)(\epsilon-1)}} \frac{(1-\gamma)(1-\alpha-\beta) + \beta\mu}{\gamma(1-\alpha-\beta) + \alpha\mu}$$

$$\cdot \left[A_m^{(1-\alpha-\beta)} A \right]^{\frac{\epsilon-1}{1+\alpha(\epsilon-1)+\gamma(1-\alpha-\beta)(\epsilon-1)}} K^{\frac{\alpha(\epsilon-1)+\gamma(1-\alpha-\beta)(\epsilon-1)}{1+\alpha(\epsilon-1)+\gamma(1-\alpha-\beta)(\epsilon-1)}}$$

Autarky Equilibrium

Proposition

Suppose $L > \frac{\mu - \gamma(1-\alpha-\beta) - \alpha\mu}{(1-\gamma)(1-\alpha-\beta) + \beta\mu} \overline{L}(A, A_m, K)$. In the autarky equilibrium,
$\frac{\partial \Pi_m}{\partial A} > 0$, $\frac{\partial \Pi_m}{\partial A_m} > 0$, $\frac{\partial \Pi_m}{\partial K} > 0$; $\frac{\partial \theta_L}{\partial A} < 0$, $\frac{\partial \theta_L}{\partial A_m} < 0$, $\frac{\partial \theta_L}{\partial K} < 0$.

Socially Efficient Allocation

Proposition

In the social optimal equilibrium (liberalization of the upstream SOE), the wage is still equal to the numeraire good price, the rental price of capital becomes larger, both the intermediate good and the differentiated goods become cheaper, the total non-numeraire employment and the GDP both become larger, and the labor income share becomes smaller.

Open Economy

- Country H is same as the static autarky.

- Country H is same as the static autarky.
- Country F: L^* units of labor and same utility function

Open Economy

- Country H is same as the static autarky.
- Country F: L^* units of labor and same utility function
- All the firms are private in country F, and have exclusive technology: $F_i^*(l) = l$, for $\forall\ i \in [0, 1]$.

Open Economy

- Country H is same as the static autarky.
- Country F: L^* units of labor and same utility function
- All the firms are private in country F, and have exclusive technology: $F_i^*(l) = l$, for $\forall\ i \in [0, 1]$.
- One unit of foreign labor producing A^* units of numeraire good

Open Economy

- Country H is same as the static autarky.
- Country F: L^* units of labor and same utility function
- All the firms are private in country F, and have exclusive technology: $F_i^*(l) = l$, for $\forall\ i \in [0,1]$.
- One unit of foreign labor producing A^* units of numeraire good
- $p_n^* = \frac{W^*}{A^*}$, $p^*(i) = W^*, \forall i \in [0,1]$.

Open Economy

- Country H is same as the static autarky.
- Country F: L^* units of labor and same utility function
- All the firms are private in country F, and have exclusive technology: $F_i^*(l) = l$, for $\forall \ i \in [0, 1]$.
- One unit of foreign labor producing A^* units of numeraire good
- $p_n^* = \frac{W^*}{A^*}$, $p^*(i) = W^*, \forall i \in [0, 1]$.
- Assume $L^* < \frac{1}{A^*}$ so in the autarky equilibrium $c_n^* = 0$.

Trade Equilibrium

Assume

$$A^{*1-\epsilon} < \frac{\mu}{2\left[(1-\gamma)(1-\alpha-\beta)+\beta\mu\right]}\overline{\overline{L}}(A, A_m, K),$$

$$\frac{\mu}{2\left[(1-\gamma)(1-\alpha-\beta)+\beta\mu\right]}\overline{\overline{L}}(A, A_m, K) < L^*A^*,$$

and

$$L > \frac{\frac{\mu}{2}-\gamma(1-\alpha-\beta)-\alpha\mu}{(1-\gamma)(1-\alpha-\beta)+\beta\mu}\overline{\overline{L}}(A, A_m, K),$$

where $\overline{\overline{L}}(A, A_m, K)$ is total employment in the non-numeraire sectors in country H.

$$(\epsilon - 3)(1-\alpha-\beta) + 1 < 0$$

Lemma

In the free trade equilibrium,

$$\Pi_m = \frac{(1-\alpha-\beta)(\mu-1)}{(1-\gamma)(1-\alpha-\beta)+\beta\mu}\overline{\overline{L}}(A, A_m, K)p_n.$$

$$Y = \left[L + \frac{\alpha\mu+(1-\alpha-\beta)(\gamma+\mu-1)}{(1-\gamma)(1-\alpha-\beta)+\beta\mu}\overline{\overline{L}}(A, A_m, K)\right]p_n$$

$$\theta_L = \frac{L}{L + \frac{\alpha\mu+(1-\alpha-\beta)(\gamma+\mu-1)}{(1-\gamma)(1-\alpha-\beta)+\beta\mu}\overline{\overline{L}}(A, A_m, K)},$$

$$\overline{\overline{L}}(A, A_m, K) \equiv 2^{\frac{1}{1+\alpha(\epsilon-1)+\gamma(1-\alpha-\beta)(\epsilon-1)}}\overline{L}(A, A_m, K).$$

Trade Equilibrium Properties

Proposition

The monopoly profit of the upstream SOE and the GDP in country H are larger in the free trade equilibrium than in the autarky, but the labor income share in total GDP is smaller in the trade equilibrium.

- Export Promotion Policies

Trade Equilibrium Properties

Proposition

The monopoly profit of the upstream SOE and the GDP in country H are larger in the free trade equilibrium than in the autarky, but the labor income share in total GDP is smaller in the trade equilibrium.

- Export Promotion Policies
- Domestic Labor Market Integration ($\omega L < \bar{\bar{L}}(A, A_m, K)$)

Sustainability

- Rise of Wage (due to capital accumulation or productivity increase)

Sustainability Issues

- Rise of Wage (due to capital accumulation or productivity increase)
- Export Competition

- Rise of Wage (due to capital accumulation or productivity increase)
- Export Competition
- Change in External Demand

Rise of Wage

$$L < \overline{\overline{L}}(A, A_m, K),$$

<div>

Proposition

Suppose capital K in country H is moderately high. GDP in country H is

$$Y = B \cdot \left(A_m^{1-\alpha-\beta} A \right)^{\frac{\epsilon-1}{\epsilon}} K^{\frac{\alpha(\epsilon-1)+\gamma(1-\alpha-\beta)(\epsilon-1)}{\epsilon}} L^{\frac{(\epsilon-1)\{\gamma\beta+(1-\alpha)(1-\gamma)\}}{\epsilon}} p_n, \qquad (1)$$

where B is a constant. Moreover,

$$
\begin{aligned}
\frac{WL}{Y} &= \frac{(1-\gamma)(1-\alpha-\beta)+\beta\mu}{\mu}, \\
\frac{RK}{Y} &= \frac{\gamma(1-\alpha-\beta)+\alpha\mu}{\mu}, \\
\frac{\Pi_m}{Y} &= \frac{(\mu-1)(1-\alpha-\beta)}{\mu}.
\end{aligned}
\qquad (2)
$$

</div>

- $\frac{\partial W}{\partial L} < 0; \frac{\partial W}{\partial A} > 0; \frac{\partial W}{\partial A_m} > 0; \frac{\partial W}{\partial K} > 0.$

Rise of Wage

- $\frac{\partial W}{\partial L} < 0$; $\frac{\partial W}{\partial A} > 0$; $\frac{\partial W}{\partial A_m} > 0$; $\frac{\partial W}{\partial K} > 0$.
- $\frac{\partial \Pi_m}{\partial A} > \mathbf{0}$; $\frac{\partial \Pi_m}{\partial A_m} > \mathbf{0}$; $\frac{\partial \Pi_m}{\partial L} > \mathbf{0}$; $\frac{\partial \Pi_m}{\partial K} > \mathbf{0}$

Further Rise of Wage

Proposition

Suppose capital K is sufficiently high. H and F completely specializes. H consumes both while F only consumes the differentiated goods. GDP of H is given by

$$Y = \left[\frac{1}{(\widetilde{\mu} - \mu)(1 - \alpha - \beta)(\epsilon - 1)} + 1 \right] A^* L^* p_n, \tag{3}$$

and the factor income shares:

$$
\begin{aligned}
\frac{WL}{Y} &= \beta + (1 - \alpha - \beta) \frac{1 - \gamma}{\widetilde{\mu}}, \\
\frac{RK}{Y} &= \alpha + (1 - \alpha - \beta) \frac{\gamma}{\widetilde{\mu}}, \\
\frac{\Pi_m}{Y} &= (1 - \alpha - \beta) \frac{\widetilde{\mu} - 1}{\widetilde{\mu}},
\end{aligned}
$$

1. GDP of country H now depends explicitly on foreign variables (A^* and L^*).

Further Rise of Wage

1. GDP of country H now depends explicitly on foreign variables (A^* and L^*).

2. Markup $\widetilde{\mu}$ has the following properties:

$$\frac{\partial \widetilde{\mu}}{\partial A^*} > 0; \frac{\partial \widetilde{\mu}}{\partial L^*} > 0; \frac{\partial \widetilde{\mu}}{\partial K} < 0; \frac{\partial \widetilde{\mu}}{\partial L} < 0; \frac{\partial \widetilde{\mu}}{\partial A} < 0; \frac{\partial \widetilde{\mu}}{\partial A_m} < 0. \quad (4)$$

Further Rise of Wage

1. GDP of country H now depends explicitly on foreign variables (A^* and L^*).

2. Markup $\widetilde{\mu}$ has the following properties:

$$\frac{\partial\widetilde{\mu}}{\partial A^*} > 0; \frac{\partial\widetilde{\mu}}{\partial L^*} > 0; \frac{\partial\widetilde{\mu}}{\partial K} < 0; \frac{\partial\widetilde{\mu}}{\partial L} < 0; \frac{\partial\widetilde{\mu}}{\partial A} < 0; \frac{\partial\widetilde{\mu}}{\partial A_m} < 0. \quad (4)$$

3. The share of SOE profit in GDP in country H is larger than in the previous equilibrium, but it decreases when K, L, A or A_m increases.

Further Rise of Wage

1. GDP of country H now depends explicitly on foreign variables (A^* and L^*).

2. Markup $\widetilde{\mu}$ has the following properties:

$$\frac{\partial \widetilde{\mu}}{\partial A^*} > 0; \frac{\partial \widetilde{\mu}}{\partial L^*} > 0; \frac{\partial \widetilde{\mu}}{\partial K} < 0; \frac{\partial \widetilde{\mu}}{\partial L} < 0; \frac{\partial \widetilde{\mu}}{\partial A} < 0; \frac{\partial \widetilde{\mu}}{\partial A_m} < 0. \quad (4)$$

3. The share of SOE profit in GDP in country H is larger than in the previous equilibrium, but it decreases when K, L, A or A_m increases.

4. Labor income share in country H increases as domestic productivities or factor endowments increase.

Export Competition

$$p(i) = \Gamma(\mu) \cdot p_n, \forall i \in [0,1],$$

where function $\Gamma(\cdot)$ satisfies

$$\Gamma(\varpi) \propto \left[A_m^{(1-\alpha-\beta)} A \right]^{\frac{-1}{\epsilon}} K^{-\frac{[\alpha+\gamma(1-\alpha-\beta)]}{\epsilon}} L^{-\frac{(1-\gamma)(1-\alpha-\beta)+\beta}{\epsilon}}. \tag{5}$$

$$\Gamma(\widehat{\mu}) = T. \tag{6}$$

Proposition

When $T \cdot p_n$, the price of the differentiated goods charged by a potential competitor, is sufficiently high ($T > \Gamma(\mu)$), the upstream industry in country H charges monopoly price markup equal to μ; When $T \in [\Gamma(1), \Gamma(\mu))$, the SOE lowers the price makeup to $\widehat{\mu}$, determined by (6); When $T < \Gamma(1)$, the upstream SOE in country H has to improve its productivity A_m if it wants to maintain its international competitiveness of the differentiated goods.

A decline in A^* (or L^*) leads to

- a decrease in both the monopoly profit Π_m and GDP (i.e., $\frac{\partial \Pi_m}{\partial A^*} > 0$ and $\frac{\partial Y}{\partial A^*} > 0$; $\frac{\partial \Pi_m}{\partial L^*} > 0$ and $\frac{\partial Y}{\partial L^*} > 0$).
- an increase in labor income share, mainly due to the shrinkage of GDP, even though the wage also decreases.
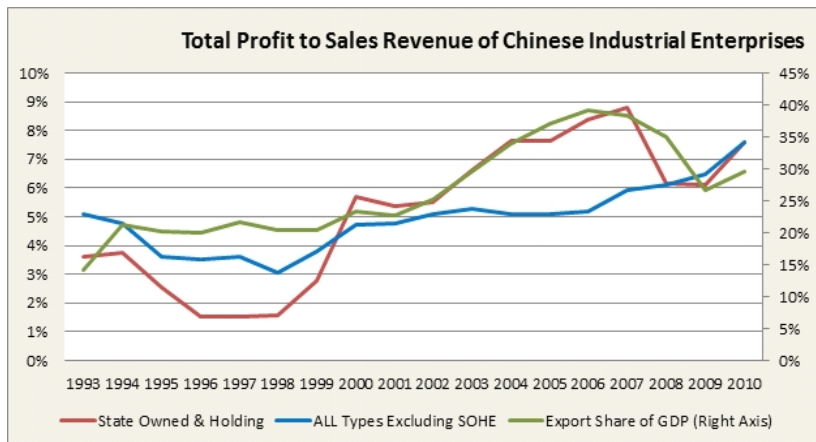
Figure 1: Total profit to sales revenues of Chinese enterprises in the industrial sector. We use CEIC (Table CN.BF: Industrial Financial Data: By Enterprise Type) to obtain Total profit to Sales Revenue. In this table, CEIC categorizes industrial enterprises into: state owned & holding,

Table 1. Chinese Exports by Enterprise Ownership

Exports are in billions of US dollars. The data are from China Custom. Some missing.

Year	Total Exports	Exports by Ownership		% of export from SOEs
		SOEs	non-SOEs	
1994	121.01	84.94	36.06	70.20
1995	148.78	99.25	49.53	66.71
1996	151.05	86.04	65.01	56.96
1997	182.79	102.74	80.05	56.21
1998	183.81	96.85	86.96	52.69
2000	249.20	116.45	132.76	46.73
2002	325.60	122.85	202.75	37.73
2004	593.33	153.58	439.75	25.88
2006	968.94	191.33	777.60	19.75
2008	1430.69	257.48	1173.21	18.00
2010	1577.75	234.30	1343.45	14.85

- ϕ : the fraction of downstream industries that are liberalized ($\phi = 0$ at the beginning)

Emergence of China's State Capitalism

- ϕ : the fraction of downstream industries that are liberalized ($\phi = 0$ at the beginning)
- SOEs and non-SOEs are engaged in perfect competition in each liberalized industry in the downstream.

Emergence of China's State Capitalism

- ϕ : the fraction of downstream industries that are liberalized ($\phi = 0$ at the beginning)
- SOEs and non-SOEs are engaged in perfect competition in each liberalized industry in the downstream.
- Each of the rest $1 - \phi$ fraction of the industries is monopolized by one state firm.

Emergence of China's State Capitalism

- ϕ : the fraction of downstream industries that are liberalized ($\phi = 0$ at the beginning)
- SOEs and non-SOEs are engaged in perfect competition in each liberalized industry in the downstream.
- Each of the rest $1 - \phi$ fraction of the industries is monopolized by one state firm.
- $A = A_p$ if private, and $A = A_s$ if state. $A_s < A_p$.

Emergence of China's State Capitalism

- ϕ : the fraction of downstream industries that are liberalized ($\phi = 0$ at the beginning)
- SOEs and non-SOEs are engaged in perfect competition in each liberalized industry in the downstream.
- Each of the rest $1 - \phi$ fraction of the industries is monopolized by one state firm.
- $A = A_p$ if private, and $A = A_s$ if state. $A_s < A_p$.
- **Key Result:** When $\frac{A_p}{A_s}$ is sufficiently large, the total profit of SOEs is maximized when $\phi = 1$.
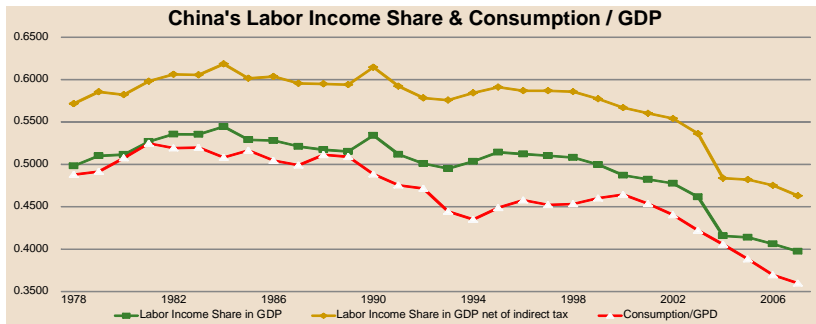
Emergence of China's State Capitalism

- ϕ : the fraction of downstream industries that are liberalized ($\phi = 0$ at the beginning)
- SOEs and non-SOEs are engaged in perfect competition in each liberalized industry in the downstream.
- Each of the rest $1 - \phi$ fraction of the industries is monopolized by one state firm.
- $A = A_p$ if private, and $A = A_s$ if state. $A_s < A_p$.
- **Key Result:** When $\frac{A_p}{A_s}$ is sufficiently large, the total profit of SOEs is maximized when $\phi = 1$.
- To compete with private firms in the liberalized industries, an downstream SOE needs a subsidy equal to $\frac{R^\alpha W^\beta P_m^{1-\alpha-\beta}}{\alpha^\alpha \beta^\beta (1-\alpha-\beta)^{1-\alpha-\beta}} \left(\frac{1}{A_s} - \frac{1}{A_p} \right)$ per unit of output.

Summary

- We provide a simple model of China's state capitalism that highlights a **vertical structure, internatioanl trade, and industrialization**.
- We explain why SOEs outperformed POEs in the last decade while the opposite was true in the 1990s.
- Our framework also explains the persistently low and declining labor income share in China's GDP in the past two decades
- Our theory points to the **incompleteness of the market-oriented reforms** as a plausible fundamental cause for the recent unusual prosperity of China's SOEs.
- We show how this development model of state capitalism emerges and why it may not be sustainable.

Dynamic Extensions

- Dynamic Autarky: Investment demand increases demand for the downstream goods and hence increases upstream SOE profit
- Dynamic Balanced Trade:
- Dynamic Unbalanced Trade: International lending to foreign consumers$\Rightarrow$ more exporting$\Rightarrow$ upstream SOEs benefit most

China's state capitalism and the extreme & unsustainable imbalance

China's Labor Income Share & Consumption / GDP

Legend: Labor Income Share in GDP — Labor Income Share in GDP net of indirect tax — Consumption/GPD

Possible Explanation

- Income Inequality increases between the Elite group and the grassroot group

Possible Explanation

- Income Inequality increases between the Elite group and the grassroot group
- Poor people's purchase power is low while the rich people have a higher investment propensity, which contributes to a high saving and low private consumption

Possible Explanation

- Income Inequality increases between the Elite group and the grassroot group
- Poor people's purchase power is low while the rich people have a higher investment propensity, which contributes to a high saving and low private consumption
- Comparative disadvantages in the financial institutions plus weak domestic consumption demand lead to capital outflow, exacerbating external imbalance
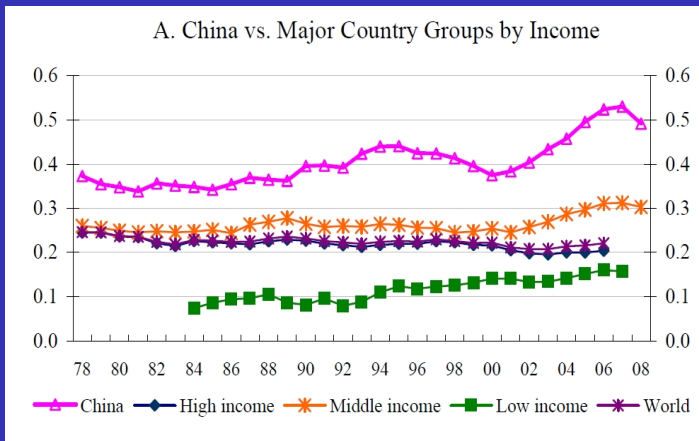
Possible Explanation

- Income Inequality increases between the Elite group and the grassroot group
- Poor people's purchase power is low while the rich people have a higher investment propensity, which contributes to a high saving and low private consumption
- Comparative disadvantages in the financial institutions plus weak domestic consumption demand lead to capital outflow, exacerbating external imbalance

- Weak domestic private consumption demand implies a high dependence on foreign demand and government investment, but exports will widen the income disparity even further.
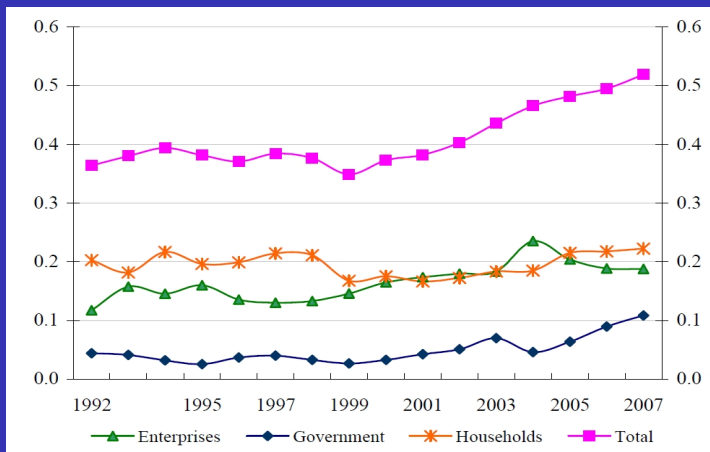
Possible Explanation

- Income Inequality increases between the Elite group and the grassroot group
- Poor people's purchase power is low while the rich people have a higher investment propensity, which contributes to a high saving and low private consumption
- Comparative disadvantages in the financial institutions plus weak domestic consumption demand lead to capital outflow, exacerbating external imbalance
- Weak domestic private consumption demand implies a high dependence on foreign demand and government investment, but exports will widen the income disparity even further.
- Vicious cycle: export$\Rightarrow$ *income* inequality $\Rightarrow$ weak domestic private consumption$\Rightarrow$ have to export and invest more

China's High Saving Rate

A. China vs. Major Country Groups by Income

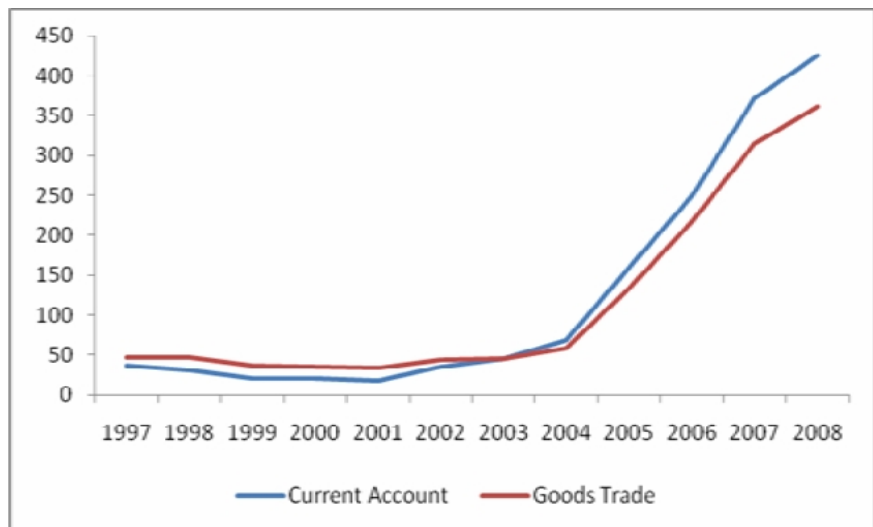Legend: China, High income, Middle income, Low income, World

Source: Yang, Zhang, Zhou (2011)

Composition of China's Saving

Source: Yang, Zhang, Zhou (2011)

Trade Surplus

Source: Huang et al (2010); Units: Billion USD