Growing Like China

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Introduction

This is a story about China 's economic growth after economic reforms, transiting towards market economy.

Research Question

- High Economic Growth
- High Returns On Capital
- Growing Foreign Surplus

Model Setup

- State owned enterprise - Financially Integrated (F) -Better assess to financial market - Lower productivity
- Domestic private enterprise - Entrepreneurial firms (E) - Credit constrained- Higher productivity
- The reallocation of resources (capital and labor) between the two firms

1. Empirical Evidence
2. Benchmark Model
3. Quantitative Analysis
4. Two Sector Model
5. Key Take Away Message

Productivity

- E is more productive than F
- The gap is about 9 percent per year

Measure of Profitability

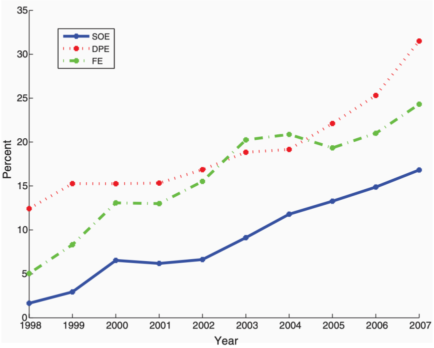

FIGURE 3. TOTAL PROFITS OVER NET VALUE OF FIXED ASSETS

Note: The figure plots the average ratio between total profits and the book value of fixed assets across firms of different ownership, in percent.

Source: CSY, various issues.

Credit Frictions

- E have limited assess to credit market than F
- F finance more than 30 percent of their investments through bank loans compared to less than 10 percent for E

Share of Investment Financed by Bank Loans and Government Budgets

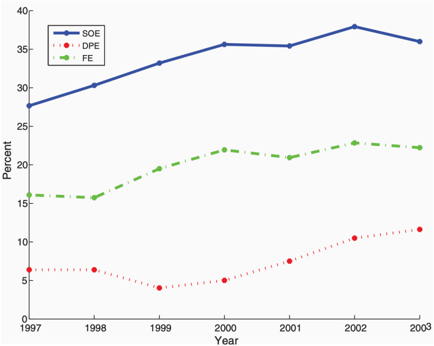

FIGURE 4. SHARE OF INVESTMENT FINANCED BY BANK LOANS AND GOVERNMENT BUDGETS

Note: The figure plots the average share of investment financed by bank loans and government subsidies across firms of different ownership, in percent.

Sources: CSY 1998 to 2001 and 2003, *China Economy and Trade Statistical Yearbook* 2002 and 2004.

Reallocation in Manufacturing

- The proportion of domestic private enterprises in the market is increasing from 19 percent to 54 percent in 2007

Private Employment Share

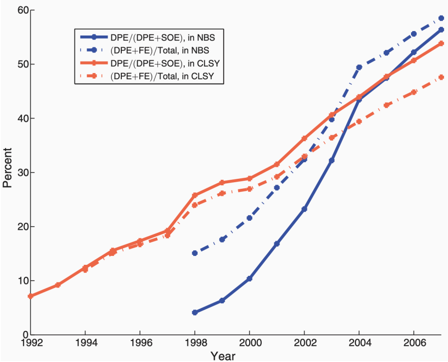

FIGURE 2. PRIVATE EMPLOYMENT SHARE

Notes: The figure shows, first, the DPE share of employment as a share of SOE + DPE employment in manufacturing (NBS 1998–2007) and in the urban sector (CLSY 1992–2007). Second, it plots DPE + FE employment as a share of total employment in manufacturing (NBS 1998–2007) and in the urban sector (CLSY 1992–2007).

Source: CSY and CLSY, various issues.

Income Inequality

- Gini Coefficient of income in China grew from 0.36 in 1992 to 0.47 in 2004
- Provinces with more private firms have a substantially higher income dispersion.

Income Inequality and Private Employment Share across Provinces

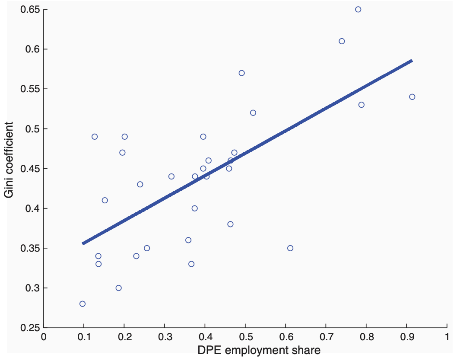

FIGURE 6. INCOME INEQUALITY AND PRIVATE EMPLOYMENT SHARE ACROSS PROVINCES

Notes: The figure plots the Gini coefficient of income against the DPE employment share across 31 Chinese provinces in 2006. The DPE share is computed as DPE/(DPE + SOE).

Source: CIESY 2007. Provincial Gini is from Report to the Seventeenth National Congress of the Communist Party of China.

Foreign Surplus and Productivity Growth

TABLE 1

	(S-I)/GDP		Growth rate of GDP p.c.		Growth rate of VA p.w.	
Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)
D.($EMPL^{PRIV}$)	0.9964**	0.8920*	0.1893***	0.1903***	—	—
	(0.4889)	(0.4659)	(0.0603)	(0.0610)		
D.($EMPL^{NONSOE}$)	—	—	—	—	1.4257***	1.5973***
					(0.4785)	(0.3572)
L.(GDP p.c.)	—	6.6268***	—	−0.0646	—	—
		(2.3952)		(0.2136)		
L.(VA p.w.)	—	—	—	—	—	0.1283***
						(0.0152)
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes
Observations	124	124	124	124	112	112
R^2	0.0424	0.1984	0.2252	0.2258	0.2104	0.2577

Foreign Surplus and Productivity Growth

- Higher E firms' employment share -higher saving relative to GDP
- Higher E firms' employment share - higher GDP growth rate
- Higher E firms' employment share - higher growth rate of productivity

Little Summary

- Productivity difference and Credit frictions between two firms will be used as assumption for model
- Growing number of E firms, income inequality, foreign surplus and productivity growth can be predicted by model

Two-period Model Setting

Firms

- Financially Integrated (F) - centralized - better assess to financial market
- Entrepreneurial firms (E) - delegation - credit constrained

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Production Function

$$Y_{Et} = K_{Ft}^{\alpha}(A_t N_{Ft})^{1-\alpha}$$
$$Y_{Ft} = K_{Et}^{\alpha}(\chi A_t N_{Et})^{1-\alpha}$$

where $\chi > 1$ represents an extra efficiency gain by delegation.

Two-period Model Setting

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Agents

- Workers - without entrepreneurial skill -earn wages w_t -gain deposit interest earnings R^d
- Entrepreneurs -with entrepreneurial skill -earn managerial compensation m_t -either deposit or invest in family business

Utility Function

$$U_t = \left(\frac{c_{1t}^{1-\frac{1}{\theta}} - 1}{1 - \frac{1}{\theta}} \right) + \beta \left(\frac{c_{2t+1}^{1-\frac{1}{\theta}} - 1}{1 - \frac{1}{\theta}} \right)$$

Two-period Model Setting

Banks collect savings

- Invest in foreign bonds R
- Lend domestic firms at

$$R^l = \frac{R}{1-\xi}$$

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Competitive Equilibrium

$$R = R^d = R^l(1-\xi)$$

where ξ represents the operation cost.

F Firm's Maximization Problem

F Firms No Credit Constraint

$$\frac{dy_{Ft}}{dk_{Ft}} = \alpha k_{Ft}^{\alpha-1}(A_t N_{Ft})^{1-\alpha} = R_l$$

$$\frac{dy_{Ft}}{dN_{Ft}} = (1-\alpha) k_{Ft}^{\alpha}(A_t N_{Ft})^{-\alpha} \cdot A_t = w_t$$

Optimal Solution

$$w_t = (1-\alpha)\left(\frac{\alpha}{R_t}\right)^{\frac{\alpha}{1-\alpha}} A_t$$

E Firm's Maximization Problem

E Firms

$$\Gamma(k_{Et}) = \max\left\{(k_{Et})^{\alpha}(\chi A_t n_{Et})^{1-\alpha} - m_t - w_t n_{Et}\right\}$$

$$\text{s.t.}\, m_t \geq \psi\,(k_{Et})^{\alpha}\left(\chi A_t n_{Et}\right)^{1-\alpha}$$

Optimal Solution

$$m_t = \psi\,(k_{Et})^{\alpha}\left(\chi A_t n_{Et}\right)^{1-\alpha}$$

$$n_{Et} = \left((1-\psi)x\right)^{\frac{1}{\alpha}}\left(\frac{R}{\alpha}\right)^{\frac{1}{1-\alpha}}\frac{k_{Et}}{\chi A_t}$$

Profit Function and E Firm's Return of Capital

Rate of return to capital ρ_E

$$\Xi_t(k_{Et}) = (1-\psi)\alpha\chi^{\frac{1}{\alpha}} R^l k_{Et} = \rho_E k_{Et}$$

$\rho_E >$R^l

$$\chi > \left(\frac{1}{1-\psi}\right)^{\frac{1}{1-\alpha}} > 1$$

- Delegation is profitable and it is optimal for entrepreneurs to invest in family business
- Large productivity difference is necessary to trigger economic transition

Entrepreneur's Investment Problem

Composition of E Firm's Capital

$$k_{Et} = s_{t-1}^{E} + l_{t-1}^{E}$$

Credit constraint

$$R^{l} l^{E} \leq \eta \rho_{E} (S_{t} + l_{t})$$

Assume

$$\eta < \frac{R^{l}}{\rho_{E}} < 1$$

Share of Investment Financed by Bank Loans

E Firm

$$\frac{l_E}{l_E + s_E} = \frac{\eta \rho_E}{R^l}$$

F Firm

$$l_F = k_{Ft}$$

Little Summary

- Financial frictions obstruct the flow of capital towards high-productivity entrepreneurial firms
- If E firms have better assess to external funds, only more efficient E firm would be active in equilibrium

Equilibrium During Transition

Capital per effective labor

$$k_F = \frac{K_J}{A_J n_J}$$

F Firm - recall MPK = R^l – *constant*

$$k_F = \left(\frac{\alpha}{R}\right)^{\frac{1}{1-\alpha}}$$

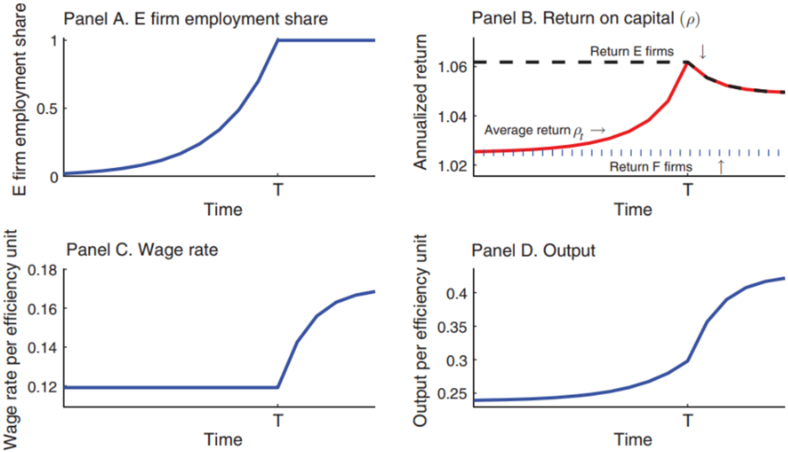
E Firm - recall optimal n_{Et} – *constant*

$$k_E = k_F\left((1-\psi)x\right)^{\frac{1}{\alpha}}$$

Equilibrium During Transition

- E firms have a lower capital- output ratio and a lower capital-labor ratio than F firms due to credit constraint
- Employment, capital and output of E firms grow at a constant rate during transition due to higher productivity
- Increasing share of the capital stock of E firms that yields the high return ρ_E

Equilibrium During Transition



Equilibrium During Transition

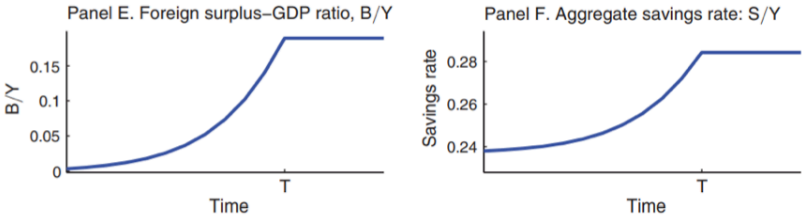
The growing earning inequality between workers and entrepreneurs is key for the transition to occur:

- the investment of E firms is financed by entrepreneurial savings and entrepreneurial savings is increasing during transition
- constant effective worker wages avoid a falling return to investment

High Economic Growth and High Returns of Capital

- Constant effective worker wages ensure high return of capital in E firms
- Entrepreneur could invest in family business by savings

High Returns of Capital and Growing Foreign Surplus



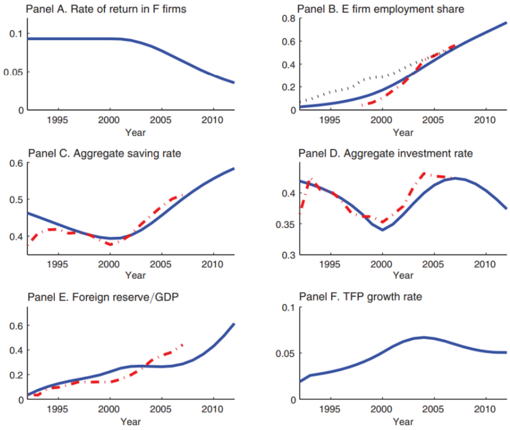
High Returns of Capital and Growing Foreign Surplus

- As employment is reallocated towards the more productive E firms, investment in the financially integrated F firms shrinks.
- Hence, the demand for domestic borrowing falls and banks must shift their portfolio towards foreign bonds.
- The demand of bank loans from E firms, this is small, due to the financial frictions

Overlapping Generation Model

- Match the theory with Chinas experience over the last 15 years from 1998 to 2005
- Agents (28-78) live T = 50 periods, born with zero wealth and cannot die with negative wealth
- Workers supply one unit of labor each period. They retire after J = 30 years of work
- Young entrepreneurs work as managers for T/2 periods and as entrepreneurs for the remaining T/2 periods

Calibration



Different Capital Intensities

- E firm will specialize in labor-intensive industries
- F firm retreat to capital-intensive industries
- Retreat further widen the gap of the capital and output ratio between E and F firms

Stages of Transition

- Both E and F invest in both industries.Due to specialization, E firm hire more worker and F firm
- All workers employed by E firms. Rate of return on labor intensive industry falls.
- E firms invest in both industry and F firms crowded out
- Post transition equilibrium - classic economic growth model

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2. Benchmark Model
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Key Take Away Message

- China's economic transition is driven by the reallocation of resources from low-productivity (F) to high-productivity (E) firms
- Facilitated by financial frictions and entrepreneurial savings
- Resulting in sustained high growth, increased productivity, and a significant foreign surplus.

Thank you for listening ! Open to any questions !