"Growing Like China"

Song, Storesletten, & Zilibotti (AER, 2011)

- Proposes possible explanation of the "Allocation Puzzle"
- Case study of China, 1992 - 2007
- Dismisses ex. rate manipulation
  - real vs. nominal ex. rates
  - argues govt. can't control real ex. rate in long-run
- Instead focuses on financial frictions & structural transformati

Recent trends in China

1.) Rapidly growing fx reserves & CA surpluses

2.) Factor reallocation from SOE to DPE

3.) Productivity of DPE > Productivity of SOE

4.) SOE have preferential access to credit

5.) DPE mainly financed by retained earnings

6.) High & Steady rates of return on capital
Little evidence of diminishing returns

7.) Growing inequality within urban areas.

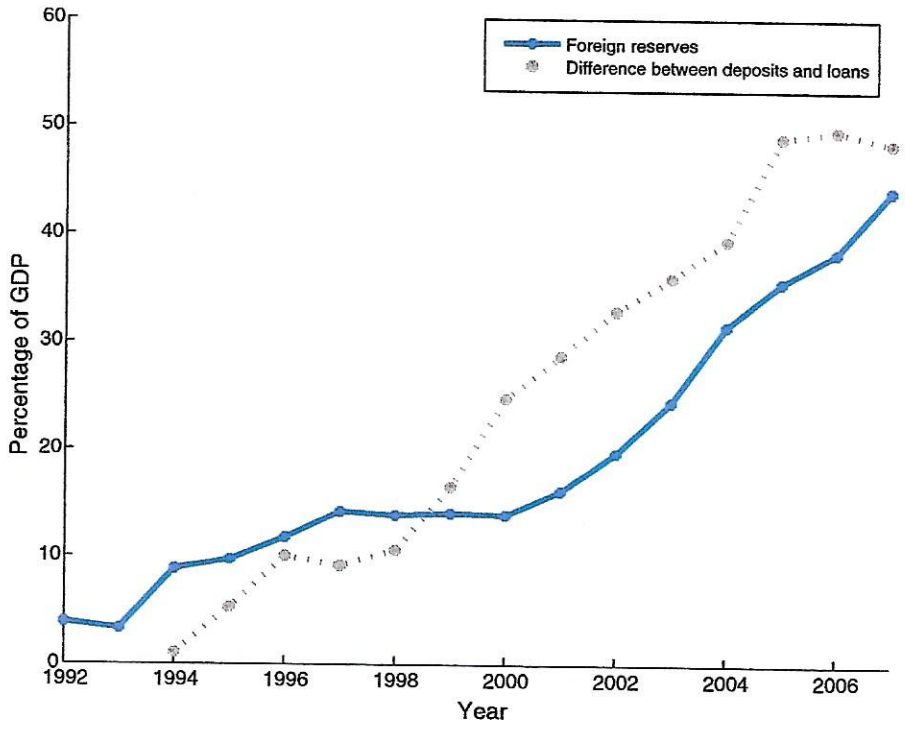

FIGURE 1. FOREIGN RESERVES AND THE DIFFERENCE BETWEEN DEPOSITS AND LOANS

Note: The figure plots China's foreign reserves (solid line) and the domestic bank deposits minus domestic loans (dotted line), both expressed as a percentage of GDP.

Source: CSY, various issues.

neoclassical growth model predicts that the high investment rate would lead to a fall in the return to capital. An open-economy model predicts a large net capital inflow rather than an outflow, owing to the high domestic return to capital. In this paper, we propose a theory of economic transition that solves this puzzle while being consistent with salient qualitative and quantitative features of the Chinese experience. The focal points of the theory are financial frictions and reallocation of resources across firms. In our theory, both the sustained return to capital and the foreign surplus arise from the reallocation of capital and labor from less productive externally financed firms to entrepreneurial firms that are more productive but have less access to external financing. As financially integrated firms shrink, a larger proportion of the domestic savings is invested in foreign assets. Thus, the combination of high growth and high investment is consistent with the accumulation of a foreign surplus.

Our paper is part of a recent literature arguing that low aggregate total factor productivity (TFP)—especially in developing countries—is the result of micro-level resource misallocation (see Stephen L. Parente, Richard Rogerson, and Randall Wright 2000; Francesco Caselli and Wilbur J. Coleman II 2001; Abhijit Banerjee and Esther Duflo 2005; Diego Restuccia and Rogerson 2008; Gino Gancia and Fabrizio Zilibotti 2009; and Chang-Tai Hsieh and Peter J. Klenow 2009). While pockets of efficient firms using state-of-the-art technologies may exist, these firms fail to attract the large share of productive resources that efficiency would dictate, due to financial frictions and other imperfections. Most of the existing literature

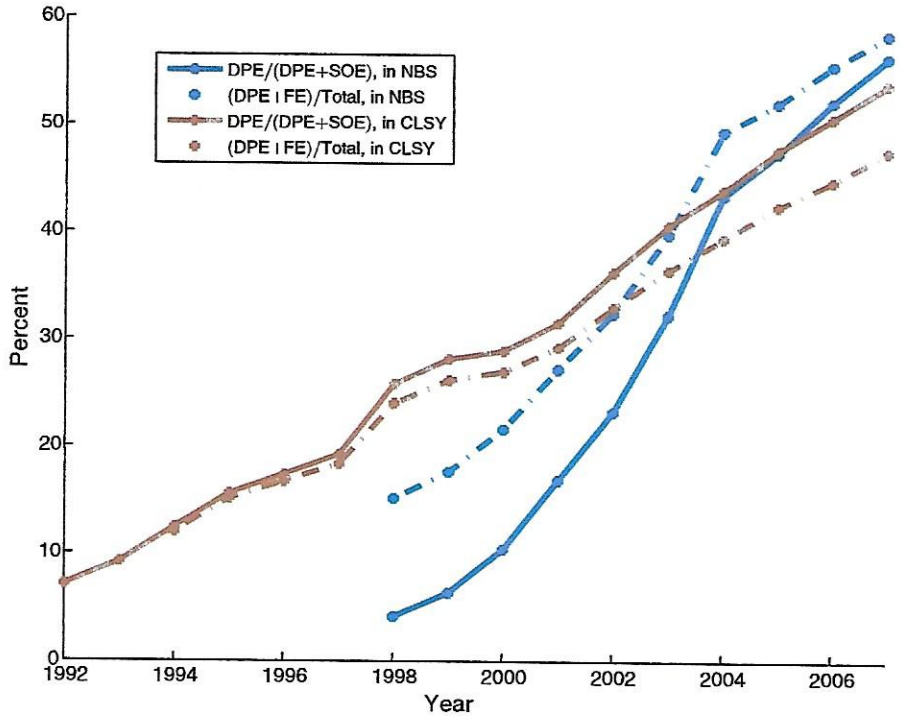

FIGURE 2. PRIVATE EMPLOYMENT SHARE

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.

59 percent in 1998 to 47 percent in 2007 (Bai and Zhenjie Qian 2009, Table 4).[3] The falling labor share has contributed to rising inequality even across urban households (Dwayne Benjamin, Brandt, John Giles, and Sangui Wang 2008).

B. *Reallocation in Manufacturing*

The reallocation of capital and labor within the manufacturing sector is a focal point of our paper. Figure 2 plots alternative measures of the evolution of the employment share of private enterprises. Our preferred measure is based on annual firm-level surveys conducted by China's National Bureau of Statistics (NBS), which include the universe of Chinese industrial firms (manufacturing, mining, and construction) with sales over 5 million RMB. The solid line plots the proportion of domestic private

4.6 percent if one excludes state-owned and collectively owned enterprises. In the same period, the average growth rate of real GDP per capita was about 9 percent. Using data from the NBS Urban Household Surveys 1992–2006, Suqin Ge and Dennis T. Yang (2009) report an annual growth rate of 4.1 percent for the basic wage (the lowest skill category) and of 6.2 percent for workers with "middle-school education and below." These are useful benchmarks since they separate the wage growth due to technological progress from that due to human capital accumulation—which reflects the increasing quantity and quality of education. Two additional remarks are in order. First, wages are deflated using the provincial consumer price index (CPI). The annual CPI growth rate was on average 0.9 percentage points lower than that of the GDP deflator in these years. Second, the compliance rate for pension contributions paid by employers declined dramatically in this period. Both considerations suggest that the growth of labor costs per worker for firms was lower than the figures above.

[3] Bai and Qian (2009) report data until 2004. The estimates for 2004–07 were kindly provided by Bai and Qian.

The Model

Basic Story

1.) Reallocation from SOE to DPE ⇒ ST↑ [DPE saves more]

2.) Shrinking SOE ⇒ Demand for bank borrowing ↓
⇒ Domestic Savings flow abroad
⇒ CA surplus

3.) Rapid TFP growth due to a selection effect
(resources moving into higher prod. sector)

Basic Ingredients

1.) 2 types of agents
- workers
- entrepreneurs (entrep. ability genetically transmitted ?!)

2.) 2 types of firms
- "Financially integrated" (F)
- Entrepreneurial (E)

2 key frictions

1.) **Commitment**. Entrepreneurs can only promise to pay a share $\gamma < 1$ of 2nd period profits
$\Rightarrow$ Limits their ability to borrow

2.) **Monitoring**. Young Entrepreneurs can steal $\psi < 1$ of their firm's output. This gives them an incentive to work for their parents DPE.

Preferences

$$U_t = \frac{c_{1t}^{1-\theta^{-1}}}{1-\theta^{-1}} + \beta \frac{c_{2t}^{1-\theta^{-1}}}{1-\theta^{-1}} \qquad \theta = IES \quad (\theta \geq 1)$$

Technology

$$y_{Ft} = k_{Ft}^{\alpha} (A_t n_{Ft})^{1-\alpha} \qquad y_{Et} = k_{Et}^{\alpha} (\chi A_t n_{Et})^{1-\alpha}$$

$\chi > 1$

$A_{t+1} = (1+z) A_t$ (exog. TFP growth)

Worker Savings

$$s_t^w = \phi^w w_t \qquad \phi^w = \frac{1}{1+\beta^{1/\sigma} R^{1-1/\sigma}}$$

$$w_t = (1-\alpha)\left[\frac{\alpha}{R'}\right]^{\frac{\alpha}{1-\alpha}} A_t$$

$$R' = \frac{R}{1-\xi}$$

R = world int. rate

ξ = fin. mkt. development

Old Entrepreneurs

$$\pi(k_{E,t}) = \max_{m_t, n_{E,t}} \left\{ (k_{E,t})^{\alpha} (\chi A_t n_{E,t})^{1-\alpha} - m_t - w_t n_{E,t} \right\}$$

$$k_{E,t} = s_{t-1}^E + \ell_{t-1}^E$$

$$m_t = \psi k_{E,t}^{\alpha} (\chi A_t n_{E,t})^{1-\alpha}$$ > Bidding IC constraint

$$\Rightarrow \pi^* = (1-\psi)^{\frac{1}{\alpha}} \chi^{\frac{1-\alpha}{\alpha}} R' k_{E,t} \equiv p_E k_{E,t}$$

Young Entrepreneurs

$$\max_{s_E,\, l_E} U_t \quad \text{s.t.} \quad c_1 = m - s_E$$

$$c_2 = p_E(l_E + s_E) - R^l l_E$$

$$R^l l_E \leq \eta p_E (s^E + l_E)$$

$$\Rightarrow s_E = \phi^E m \qquad \phi^E = \frac{1}{1 + \beta^{-\theta}\left[\frac{(1-\eta) p_E R^l}{R^l - \eta p_E}\right]^{1-\theta}}$$

Aggregate Growth

$$\frac{Y_t}{N_t} = \frac{Y_{F_t} + Y_{E_t}}{N_t} = k_F^{\alpha}\left(1 + \frac{\psi}{1-\psi}\frac{N_{E_t}}{N_t}\right) A_t$$

Current Account

Banks Balance Sheet

$$K_{F_t} + \frac{\eta p_E}{R^l} K_{E_t} + B_t = \phi^w w_{t-1} N_{t-1}$$

$$B_t = \left[\phi^w \frac{(1-\alpha) k_F^{\alpha-1}}{(1+n)(1+v)} - 1 + (1-\eta)\frac{N_{E_t}}{N_t}\right] k_F A_t N_t$$

Calibration

$T = 50$ (30 years of work)

$R = 1.0175$

$\alpha = 0.5$

$\theta = 2$

$\beta = .997$! (calibrated to match observed avg. saving rate)

$\eta = 0.86$ (E firms externally finance $\frac{1}{2}$ invest)

$\chi = 4.79$ } 1.) $(K/Y)_{SOE} = 2.65\,(K/Y)_{DPE}$

$\psi = 0.45$ } 2.) $MPK_{DPE} - MPK_{SOE} = .09$

$v = .03$ ↑ urban pop. growth

$z = .038$

- Initial E wealth set so that initial E employment share (1992) = .03
- Initial worker + retiree assets set to match 1992 foreign surplus

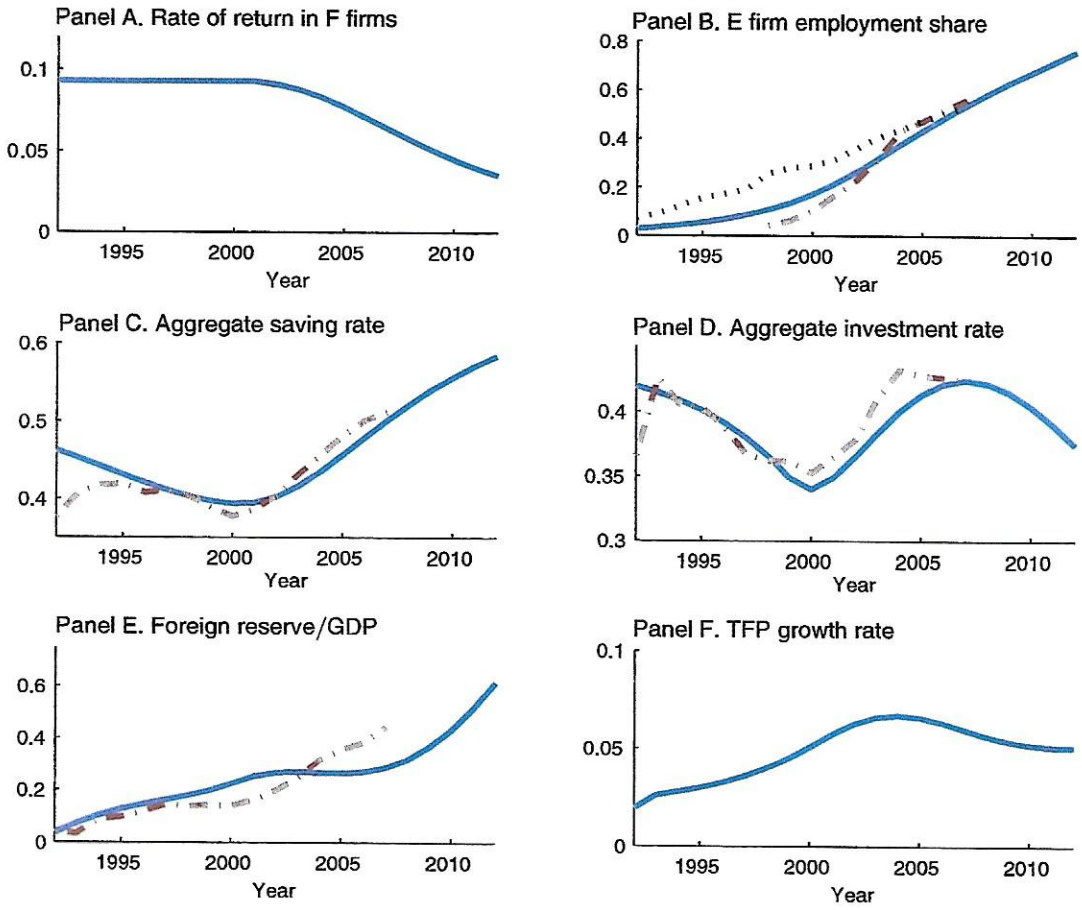

FIGURE 8. TRANSITION IN THE CALIBRATED ECONOMY

Notes: The figure shows the evolution of key variables during and after the transition in the calibrated economy. The solid and dashed lines refer to the simulated results from the model and the data, respectively. The dashed and dotted lines in panel B refer to private employment shares in NBS and CLSY data, respectively (see Figure 2).

set to 60 percent of the wealth in a steady state where there are only F firms. This ensures that the model matches China's net foreign surplus-to-GDP ratio in 1992.

C. *Results*

The dynamics of the calibrated multiperiod economy are illustrated in Figure 8. Panels B–F display various salient macroeconomic outcomes of the model versus the data.

First of all, the calibrated economy generates a speed of employment reallocation comparable to its empirical counterpart (panel B). Second, the aggregate saving rate (panel C) tracks remarkably well the U-shaped dynamics of the Chinese aggregate saving rate. Recall that the economy is calibrated to match the *average* saving rate, but not its time path. The decline during the 1990s is due to the assumption of low initial wealth of workers, implying that they save a lot initially. The rise after 2000 is driven by the fast reallocation towards E firms, the managers of which have high saving rates. This is the mechanism driving increased savings in the two-period model (Figure 7). Third, the calibrated model matches closely the trend of the net