The Labor Restructuring Policy, Human Capital Accumulation, and Career Choices in China

Presenter: MINGZE XIA

Graduate School of Economics, Kyoto University

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Motivation

- Reducing factor misallocation is one of the main drivers of economic growth in developing regions.
- When analyzing factor reallocation policies, most work does not account for micro-level responses.
- This project studies how labor restructuring policies affect individual decision-making and discusses aggregate implications.
- Policies affect not only factor misallocation but also **factor accumulation**.

Motivation

- We study labor restructuring policies in China during 1997–2005.
- During this period, Chinese state-owned enterprises (SOEs) dismissed about 28 million workers, causing what we call "the Massive Layoff".
  - Downsizing increased productivity in SOEs.
  - Spillover effects on non-SOE sectors are also observed.
  - Possibly through labor reallocation or human capital investment decisions.
  - An individual-level model is required to account for these effects.

Literature Review

- Labor Misallocation:
- Dynamic Discre Choice Model with Equilibirum: Lee 2005;Lee and Wolpin 2006; Lee and Wolpin 2010; Dix-Carneiro 2014; Llull 2018

Data

- Urban Household Survey (UHS)
  - Cross-sectional survey conducted by the National Bureau of Statistics of China from 1986 - 2012.
  - Demographics, employment status, wage.
- China Laborforce Dynamic Survey (CLDS) 2012
  - Working history $\leftarrow$ Transition history.
- China Statistical Yearbook 1986-2012
  - Macro-level statistics.

Environment

- At each age, from $a = 18 - 50$, an individual of type h who is alive at time t chooses among six mutually exclusive alternatives, each denoted by a dichotomous variable (d^j_{hat}) equal to 1 if alterantive j is chosen and 0 otherwise.
- There are six alterantives: (i) worker in the SOE-white-collar occupation, d^1_{at};(ii) work in the SOE-blue-collar occupation, d^2_{at}; (iii) work in the Non-SOE-white-collar occupation, d^3_{at}; (iv) work in the Non-SOE-blue-collar occupation, d^4_{at}; (v) pursue education, d^5_{at}; and (vi) stay at home, d^6_{at}.

Production

- A two-sector economy, the SOE sector (S) and the Non-SOE sector (N), each producing output (Y) using two skill categories of workers-white-, and blue-collar (W,B), and capital (K). Skill units (S) of each worker category employed in each sector are additive over workers in that occupation and sector. Specifically, production at time t, valued at the sector's period t real price p, is given by the nested CES function:

$$\begin{aligned} p_t^j Y_t^j &= p_j^t \eta_t^j F^j(S_t^{jW}, S_t^{jB}, K_t^j) \\ &= z_t^j \{\alpha_{1t}^j (S_t^{jW})^{\sigma^j} + \alpha_{2t}^j (S_t^{jB})^{\sigma^j} \\ &+ (1 - \alpha_{1t}^j - \alpha_{2t}^j)(K_t^j)^{\sigma^j}\}^{\frac{1}{\sigma^j}}, \quad j \in \{S, N\} \end{aligned} \tag{1}$$

Workers

- Each workers are assigned education, gender, and experience when entering the economy. Workers are split into H types, which affect choice-specific utility.
- for individual with age a and type h, the flow utility is (here I dismiss i):

$$
\begin{aligned}
u_{at}^{hc} = & \sum_{c=1}^{4} \beta_{c0} d_{at}^{c} + \sum_{c=1}^{4} w_{at}^{hc} d_{at}^{c} \\
& + (\beta_{50}^{h} - \beta_{51} I(Educ_a > 12) + \varepsilon_a^5) d_{at}^5 \\
& + (\beta_{60}^{h} + \beta_{61} I(g = female) + \beta_{71} I(Edu_a \geq 12) \\
& + \beta_{72} I(Edu_a \geq 12) I(t \geq 1999) + \varepsilon_a^6) d_{at}^6 \\
& - \sum_{c'=1}^{4} \sum_{c=1}^{6} mc^{c'c} d_{a-1t}^{c'} d_{at}^{c}
\end{aligned} \tag{2}
$$

Workers

- We specify a Ben-Porath style wage function

$$
\begin{aligned}
\log w_{at}^{hc} &= \log r_t^c + \log s_a^{hc} \\
&= \log r_t^c + \beta_{c1} Edu_a + \beta_{c2} I(Edu_a \geq 15) \\
&+ \sum_{j=1}^{4} \beta_{c4}^{j} X_a^j + \beta_{c5} a + \beta_{c6} a^2 + \theta^h + \varepsilon_a^c
\end{aligned} \tag{3}
$$

Optimality

- Workers choose alternative j by solving the dynamic problem based on state set Ω_{at}.

$$\begin{aligned} V_a(\Omega_{at}) &= \max_j V_a^j(\Omega_{at}) \\ V_a^j &= u_a^j(\Omega_{at}) + \beta Emax(\Omega_{a+1t+1} | d_{at}^j = 1, \Omega_{at}) \end{aligned} \tag{4}$$

Market Clearing

- Assume there are N_{at} number of workers. The total amount of skill supply by sector-occupation $j \in \{1-4\}$ and year t is given by:

$$S_t^j = \sum_{a=18}^{a=50} \sum_{n=1}^{N_{at}} \omega_{at} s_{nat}^j d_{nat}^j \tag{5}$$

- The labor market is clear by equating the marginal revenue product of aggregate skill for each sector-occupation to its current skill rental price. However, for $j = 1, 2$, we impose labor wedges to represent the labor misallocation level for the SOE sector.

$$\begin{aligned} \frac{\partial p_t^S Y_t^S(S_t^{SW}, S_t^{SB}, K_t^S)}{\partial S_t^{SO}} &= r_t^{SO}(1-\tau_t^O) \\ \frac{\partial p_t^N Y_t^N(S_t^{NW}, S_t^{NB}, K_t^N)}{\partial S_t^{NO}} &= r_t^{NO}, \quad O \in \{W, B\} \end{aligned} \tag{6}$$

Parameterization

- For "labor wedge " τ, we specify the following evlolution rule:

$$\tau_t^O = \begin{cases} \tau_0^O & \text{if} \quad t \leq 1996 \\ \tau_0^O - \tau_1^O(t-1996) & \text{if} \quad 1997 \leq t \leq 2005 \\ \tau_0^O - 9\tau_1^O & \text{if} \quad t \geq 2006 \end{cases} \tag{7}$$

- Workers have the following rational expectation:

$$\Delta \ln r_t^j = \phi_o^j + \sum_k \phi_1^k \Delta \ln r_{t-1}^k + \sum_n \phi_2^k \Delta \ln z_{t-1}^n \tag{8}$$

Parameterization

- Sectoral TFP follows the AR(1) process:

$$\Delta \ln z_t^j = \xi_0^j + \sum_n \Delta \ln z_{t-1}^n + \epsilon_t^j \tag{9}$$

- For technology used in sector j, we impose the following evlution rules:

$$\theta_{jt} = \alpha_{jt}^W + \alpha_{jt}^B$$
$$\theta_{jt} = \theta_{j0} + t\theta_1$$
$$\alpha_{jt}^W = \omega\theta_{jt}$$

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