

# Barriers to Entry and Regional Economic Growth in China

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# Motivation

- Since the onset of economic reform in the late 1970s, China has gone from one of the poorest to a middle-income economy
- Expansion of non-state sector was main source of growth (Zhu, 2012)
- But growth was highly uneven across localities ( $\approx$  350 prefectures)
- We show that
  - : By mid-1990s, there were **sizable local differences** in productivity, wages, & size of non-state manufacturing sector
    - dispersion reflected divergence before 1995
  - : Reversal of fortune from mid-1990s: differences across localities in non-state manufacturing performance started disappearing
    - **strong convergence across prefectures** in non-state value added per worker, TFP, wages, and capital per worker

# Overview

- Aim of paper: understand forces behind initial dispersion and 1995-2008 convergence
- Brandt et al. (2012) argue: creation and selection of new firms is most important source of non-state sector productivity and output growth
- We find: this process is very different across prefectures:
  - ... in prefectures with a large presence of state firms,
    - : **less entry** of non-state firms
    - : non-state entrants pay **lower wages**, have **lower TFP**, **lower value added per worker**, **lower capital per worker**

# Overview

- Build closed economy version of Hopenhayn (1992) model with 3 distortions to account for empirical patterns
  - : capital and output wedges,
  - : an entry wedge
- Interpretation of entry wedge: restriction on number of licences allowing potential entrants to operate.
- Solve model analytically
- Estimate model using firm-level data from the 1995, 2004, and 2008 Chinese Industrial Census
- Develop a political economy model to rationalize local government behavior

# Findings: Entry Wedge Is Quantitatively Most Important

- Entry wedge:
  - : main driver of initial 1995 dispersion
  - : main driver of 1995-2008 convergence
- World Bank survey “Cost of Doing Business in China, 2008”
  - : indices match well with our 2008 entry wedge estimates
- Study the empirical factors behind measured entry wedges:
  - : 1995 level systematically linked to size of SOE sector
  - : convergence after 1995 tied to downsizing of state sector

# Static Hopenhayn Model

$$y_i = z_i^{1-\eta} k_i^{(1-\alpha_j)\eta} n_i^{\alpha_j\eta}$$

- firms in each industry have common production function
- $j = J(i)$  denotes industry for firm  $i$
- $0 < \eta < 1$ : decreasing returns to scale
- common rental rate of capital ( $r + \delta$ )
- closed labor market: prefecture-specific wage rate  $w$
- distortions: output tax  $\tau^y$  and capital tax  $\tau^k$
- Benchmark: focus on prefecture-specific wedges.
  - : Extension: allow within-prefecture firm heterogeneity

# Entrepreneur's Problem, Entry Wedges

- Large (but finite) number  $M$  of potential entrepreneurs in each prefecture
- Potential entrepreneurs observe individual TFP  $z$
- $z$  is Pareto distributed  $f(z) = \underline{z}^\xi z^{-\xi-1}$  (with  $z^\xi \geq \underline{z}$ )
- Entrepreneur incurs fixed cost  $v$  if firm is operated
- Entry wedge: only a share  $(1 - \psi)$  of potential entrants allowed to enter
  - random selection/lottery

# Entry Decision and Clearing of Labor Market

- Only entrepreneurs with  $z \geq z^*$  will operate, where

$$z^*(\tau^y, \tau^k; w) = \frac{v}{(1 - \tau^y)(1 - \eta) \cdot \bar{y}}$$

- Equilibrium wage  $w$  clears the (local) labor market

# Equilibrium Mechanism

- Suppose  $(1 - \psi)$  is small
- Low  $(1 - \psi)$  implies that few firms enter
- Low entry implies low wages required to clear the labor market (since little competition for workers)
- Low wages implies low  $z^*$  (since labor is cheap)
- Low  $z^*$  implies negative selection  
... hence low TFP and low  $Y/N$

## Effects of Wedges on Allocations

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	$(1 - \tau_y)$	$(1 + \tau_k)$	$(1 - \psi)$	$N/M$
wage rate $w$	+	-	+	-
Solow residual $Z$	-	+	+	-
Entry $\Gamma$	+	-	+	+
$\frac{Y}{N}$	+	-	+	-

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# Chinese Industrial Census

- Chinese Industrial Census (CIC)
- CIC: (1992), 1995, 2004, 2008
- Large: covers most of the manufacturing sector
- Rich: firm-level observations on value added, employment, capital stock, wage bill, year of birth, ownership, sector
- Data work (issues)
  - make prefectures consistent across years
  - define the SOE sector (especially in 2004 and 2008)
  - construct measures of real capital

# Calibration

- Labor share for each industry  $\alpha\eta$ : Hsieh and Klenow (2009)
- Decreasing returns:  $\eta = 0.85$  (Restuccia and Rogerson 2008)
- $\xi = 1.05$ , Pareto parameter, use 30% of the most productive firms

$$\frac{E(z|z \geq z^*)}{z^*} = \frac{\xi}{\xi - 1}$$

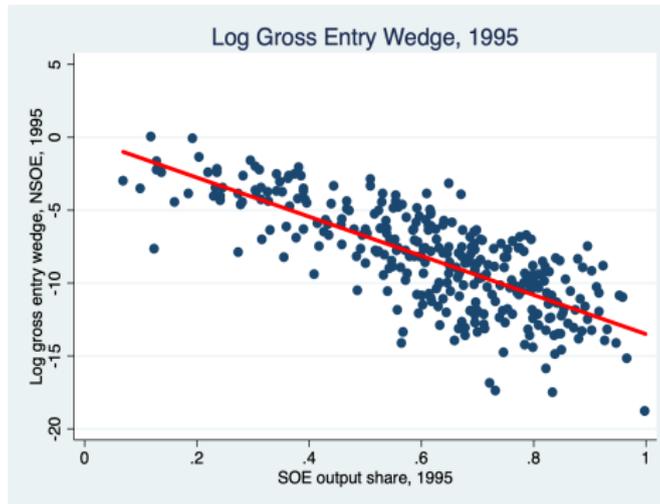
- Set  $v$  such that  $n^*(z^*) = 1$  in the lowest  $s$  prefectures
- Set  $\underline{z}$  such that  $\psi = 0$  in the lowest  $s$  prefectures
- From 1995, 204, 2008 Chinese Industrial Census
  - value added:  $y_i$
  - wage bill:  $w_i n_i$
  - estimated real capital:  $k_i$

## Entry Wedge ( $1 - \psi_p$ )

- Estimate  $\psi_p$  in prefecture  $p$  from the equilibrium condition

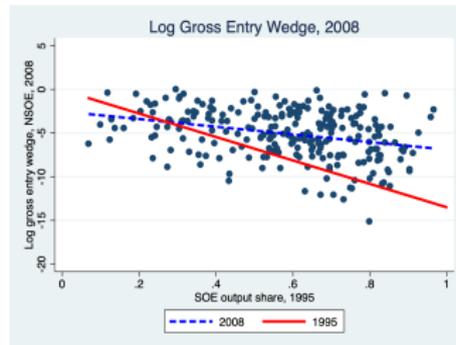
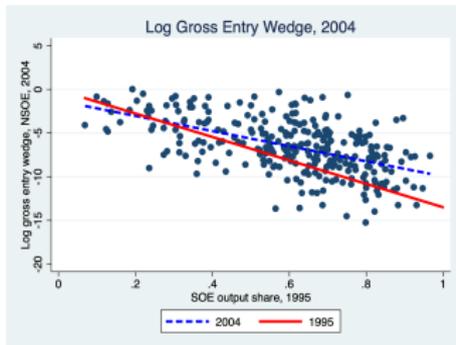
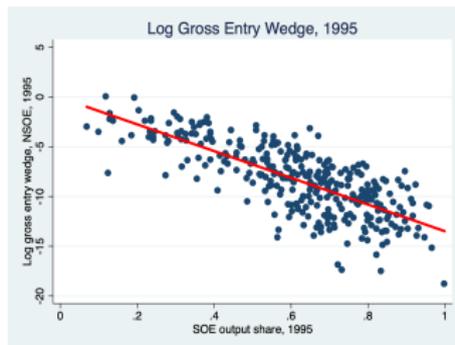
$$\begin{aligned}\ln(1 - \psi_p) &= \ln\left(\frac{N_p}{M_p}\right) + \frac{1 - \eta + \xi\alpha\eta}{1 - \eta} \ln w_p \\ &\quad - \frac{\xi}{1 - \eta} \ln \Delta_p^y \\ &\quad + \frac{\xi\eta(1 - \alpha)}{1 - \eta} \ln \Delta_p^k \\ &\quad + (\xi - 1) \ln v + \Omega(\alpha, \eta, \xi, \underline{z})\end{aligned}$$

# Estimated NSOE Entry Wedge ( $1 - \psi_p$ ) in 1995



- Log gross entry wedge  $\ln(1 - \hat{\psi}_p)$
- SOE share accounts for 52% of the variation in the entry wedge

# Estimated NSOE Entry Wedge ( $1 - \psi_p$ )



# Convergence in TFP and Wages

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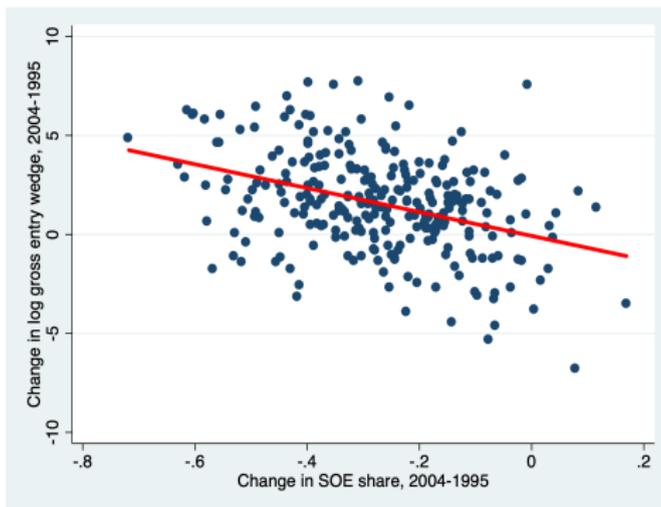
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Change in	TFP		Wages	
	1995-2004	2004-2008	1995-2004	2004-2008
all	<b>0.044</b>	<b>0.079</b>	<b>0.083</b>	<b>0.011</b>
$\alpha\eta$	-0.004	-0.005	<b>0.025</b>	0.018
$\frac{N}{M}$	-0.002	-0.001	0.003	-0.007
$(1 + \tau^k)$	-0.005	-0.001	0.015	0.031
$(1 - \tau^y)$	<b>0.011</b>	<b>0.028</b>	-0.011	<b>-0.078</b>
$(1 - \psi)$	<b>0.044</b>	<b>0.054</b>	<b>0.032</b>	<b>0.056</b>

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# Entry Wedge and SOE Share, 1995-2004



## Time-Series IV for Change in SOE Share, $\Delta e_p^{soe}$

- **Bartik** instrument for 1995-2004 SOE empl. change

: 1998 SOE reform “Grab the Large, Release the Small”

- Aggregate 1995-2004 SOE empl. change in industry  $j$

$$: \mu_j^{soe} = \frac{E_{j,2004}^{soe}}{E_{j,1995}^{soe}} - 1$$

- 1995 ratio SOE empl. share in ind.  $j$  / pref.  $p$  empl.

$$: e_{p,j}^{soe} = \frac{E_{p,j}^{soe}}{E_p}$$

- Predicted increase in SOE employment (**Bartik** instrument)

$$: IV_p^{ind} = \sum_j e_{p,j}^{soe} * \mu_j^{soe}$$

## Change in the Entry Wedge, 1995-2004

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$\Delta \ln(1 - \psi)$	<i>OLS</i>	<i>OLS</i>	<i>IV<sub>Bartik</sub></i>	<i>IV<sub>Bartik</sub></i>
$\Delta S$	-2.06* (1.16)	-1.82 (1.16)	-8.99** (2.63)	-10.28*** (2.91)
$\Delta \ln FREV$		1.24*** (0.40)		0.76* (0.46)
<i>First stage:</i>				
<i>IV coefficient</i>			0.62***	0.65***
<i>st. error</i>			(0.07)	(0.08)
$R^2$			0.22	0.25

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Note: \*\*\* – statistically significant at 1%; \*\* – at 5%; \* – at 10%.

# Conclusion

- Study growth patterns of non-state sector across localities in China
- Build Hopenhayn model of new firm entry with multiple distortions
- Identify novel entry wedge as key to explaining heterogeneity in new firm behavior across prefectures
  - Provide out-of-sample validation for these wedges
  - Link size and changes of entry costs to dynamics of state-sector
- Future directions
  - Allow wedges to differ by industry and location
  - Extend through Great Recession to capture possible reversal
  - Study role of wedges for impeding structural transformation

Thank You!