Community Networks and the Growth of Private Enterprise in China

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Introduction

- China has experienced the same degree of industrialization in three decades as Europe did in two centuries (Summers, 2007)
- This transformation began in the 1980's with the emergence of TVE's, and accelerated with the entry of private firms in the early 1990's
  - By 2014, there were 15 million registered private firms in China, accounting for over 90% of all registered firms and 60% of aggregate industrial production
- China is the world's largest exporter today and the world's largest or second-largest economy (Wu, 2016)

Introduction

- Chinese growth occurred without the preconditions that are believed to be necessary for economic development; i.e. without effective legal systems or well functioning financial institutions (Allen *et al.*, 2005)
- The government compensated for some of these limitations (Long and Zhang, 2011; Wu, 2016)
- Informal mechanisms based on reputation and trust must have been at work to allow millions of (rural-born) entrepreneurs to establish and grow their business (Allen *et al.*, 2005; Song *et al.*, 2011; Peng, 2004; Greif and Tabellini, 2017)

Introduction

- Case studies of production clusters; e.g. Fleisher *et al.* (2010) and Nee and Opper (2012) indicate that long-established relationships among relatives and neighbors (from the rural origin) substitute for formal contracts
- We utilize comprehensive data covering the universe of registered firms over many years to identify and quantify the role played by hometown networks in the growth of private enterprise in China

Community Networks and Private Enterprise

- Social networks or *guanxi* facilitated China's historically unprecedented rural-urban labor migration; e.g. Zhao (2003), Zhang and Li (2003), Hu (2008)
- These networks are organized around the birth county and most migrants end up living and working with *laoxiang* or "native-place fellows" (Honig, 1992; Goodman, 1995; Cai Fang, 1997; Ma and Xiang, 1998)
    - If the sending county is the domain around which migrant labor networks are organized, then it will also be the domain around which business networks supporting county-born entrepreneurs are organized

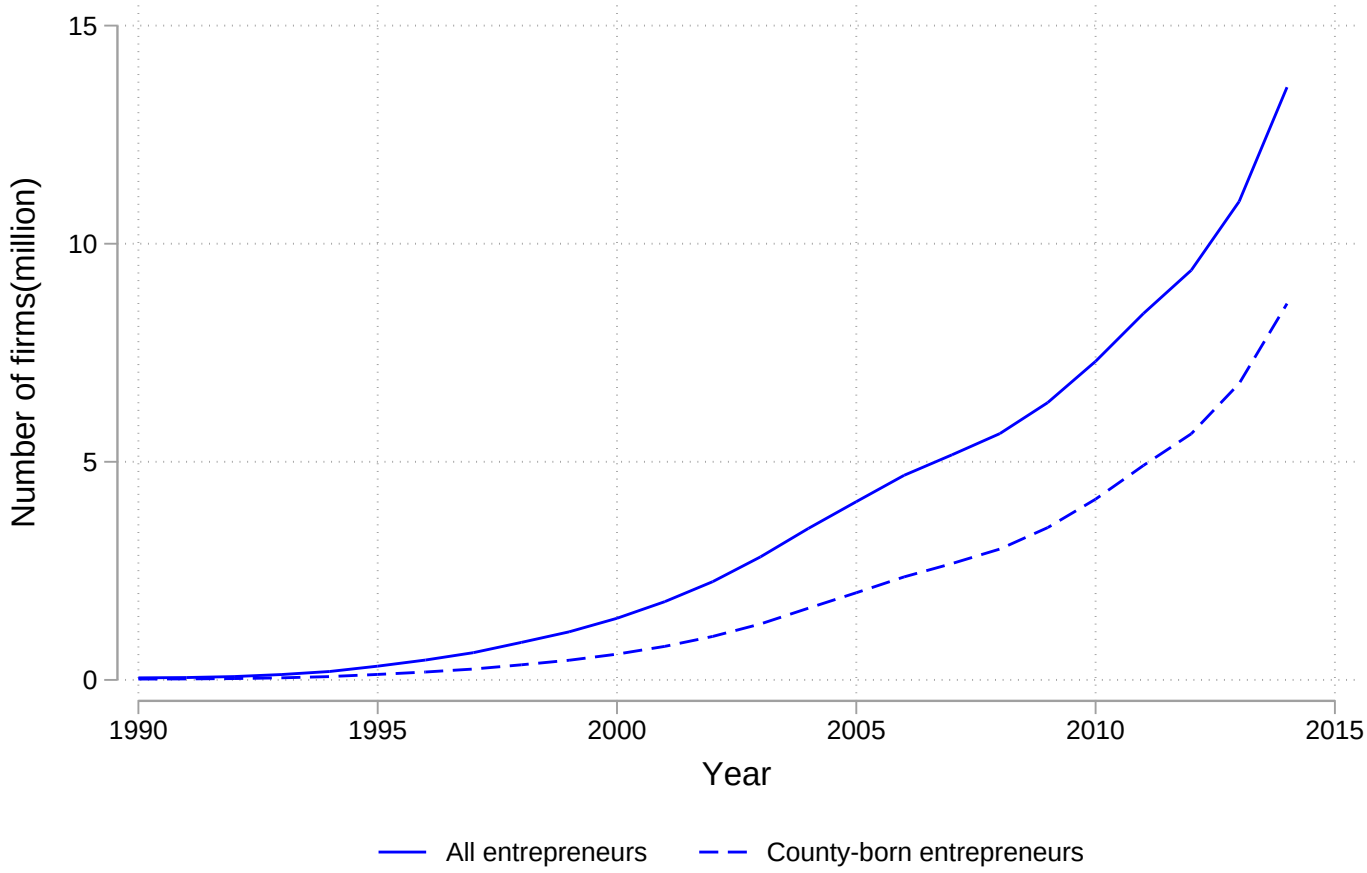
Analysis Plan

1. Establish that (historical) population density is a good proxy for social connectedness in a county
   - Business networks drawn from higher population density counties will sustain higher levels of mutual help - are of higher quality - regardless of where they are located
2. Develop a theoretical model that describes the relationship between network quality and the dynamics of entry, concentration and firm size
   - Rule out competing non-network explanations
3. Test the predictions of the model
   - Implement direct tests of the network mechanism
4. Estimate the structural parameters and quantify the impact of the networks on firm entry and capital stock
   - Additional counter-factual simulations shed light on misallocation and industrial policy in economics where networks are active

Social Connectedness and Economic Cooperation

- We proxy social connectedness by population density
  - The frequency of local social interactions is increasing in population density (spatial proximity)
  - Frequent social interactions support higher levels of economics cooperation by improving community enforcement
  - This argument is robust the definition of the community; i.e. clan vs. county, but may not hold in the city
- Empirically validate the preceding arguments with data from China Family Panel Survey
  - Thus focus on county-born entrepreneurs, using city-born entrepreneurs as a control group

Growth of Private Enterprise, by Birthplace of Entrepreneurs



Source: SAIC registration database.

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Population and Technology

- There are many origin counties, each with an exogenous level of social connectedness, p
- An equal-sized cohort of new agents is born in each county in each period, $t = 1, 2, ...$, who live forever thereafter
- Each agent is born with ability ω; $log\omega \sim U[0, 1]$
- Every cohort t agent makes a once-and-for-all occupational choice at t
  - The choice is between a traditional non-entrepreneurial (T) sector and two business sectors, B_1 and B_2
  - Denote entry into sector B_i by past cohorts by $n_{i,t-1}$

Population and Technology

- Profit in the T sector is ω^{σ}, where $\sigma \in (0,1)$
- In sector B_i at date t, the production function is

$$y = A_{it}\omega^{1-\alpha}K^{\alpha}$$

  - where $\alpha \in (0,1)$ and $A_{it} = A_0 exp(\theta(p)n_{i,t-1})$ is Community TFP (CTFP)
  - This is the first source of network complementarity in the model
- There is a fixed product price (normalized to unity) and all agents incur the same cost of capital, r

Occupation Choice

- A fixed fraction k of agents in every cohort has the opportunity to become an entrepreneur
- Each such agent receives an opportunity to enter one of the two business sectors
  - The probability of getting an opportunity in B_i equals the share of incumbents in that sector, $s_{i,t-1}$
  - This is the second source of network complementarity
- Agents receiving a referral will enter sector B_i if

$$\log \omega > \log \underline{\omega} \equiv \frac{1}{1-\sigma}\left[\log \frac{1}{\psi} - \frac{1}{1-\alpha}\log A + \frac{\alpha}{1-\alpha}\log r\right]$$

- Entry into sector i in period t

$$e_{it} = k s_{i,t-1}[1 - \log \underline{\omega}_{i,t-1}]$$

Dynamics of Entry and Concentration

Proposition 1.

Entry and concentration are

(i) *increasing in t for any p*

(ii) *increasing in p at any t*

(iii) *increasing more steeply in p over time*

- *This result holds as long as the share of the larger sector is not too close to 1*

Firm Size Dynamics

- Higher CTFP has two effects on the marginal entrant's initial capital
  - The direct effect raises firm size by raising firm level TFP (for a given ω)
  - The negative selection on ability lowers firm TFP and size

$$\log K_{it}^{m} = U - \frac{\sigma}{(1-\sigma)(1-\alpha)} \log A_{it}$$

- Noting that the average entrant has (log) ability $\frac{1+\log \omega}{2}$

$$\log K_{it}^{a} = W + \frac{1-2\sigma}{2(1-\alpha)(1-\sigma)} \log A_{it}$$

  - Thus, average initial capital is decreasing in CTFP iff $\sigma > \frac{1}{2}$
- Firm growth is independent of ω and determined by changes in CTFP

Firm Size Dynamics

Proposition 2.

Averaging across sectors:

(a) *Initial capital and ability of marginal entrants (and of average entrants if* $\sigma > \frac{1}{2}$*) are*
   (i) *decreasing in* t *for any* p
   (ii) *decreasing in* p *at any* t
   (iii) *decreasing more steeply in* p *over successive cohorts*

(b) *The growth rate of capital of incumbent entrepreneurs of any past cohort* t *from* $t' - 1 (> t)$ *to* t' *is rising in* p *and in* t' *(more steeply with higher* p*)*

Alternative Explanations

- While population density may proxy for social connectedness, it could also be correlated with independent determinants of the model's outcomes
- Introduce new sources of heterogeneity at the origin, which are correlated with population density, and allow higher p origins to have better, and increasing, access to favorable destinations (locations)
- Non-network explanations can explain some of the results, but not all of them simultaneously
  - Once location-time period dummies are included in the estimating equation (to account for geography, local governments and agglomeration effects)

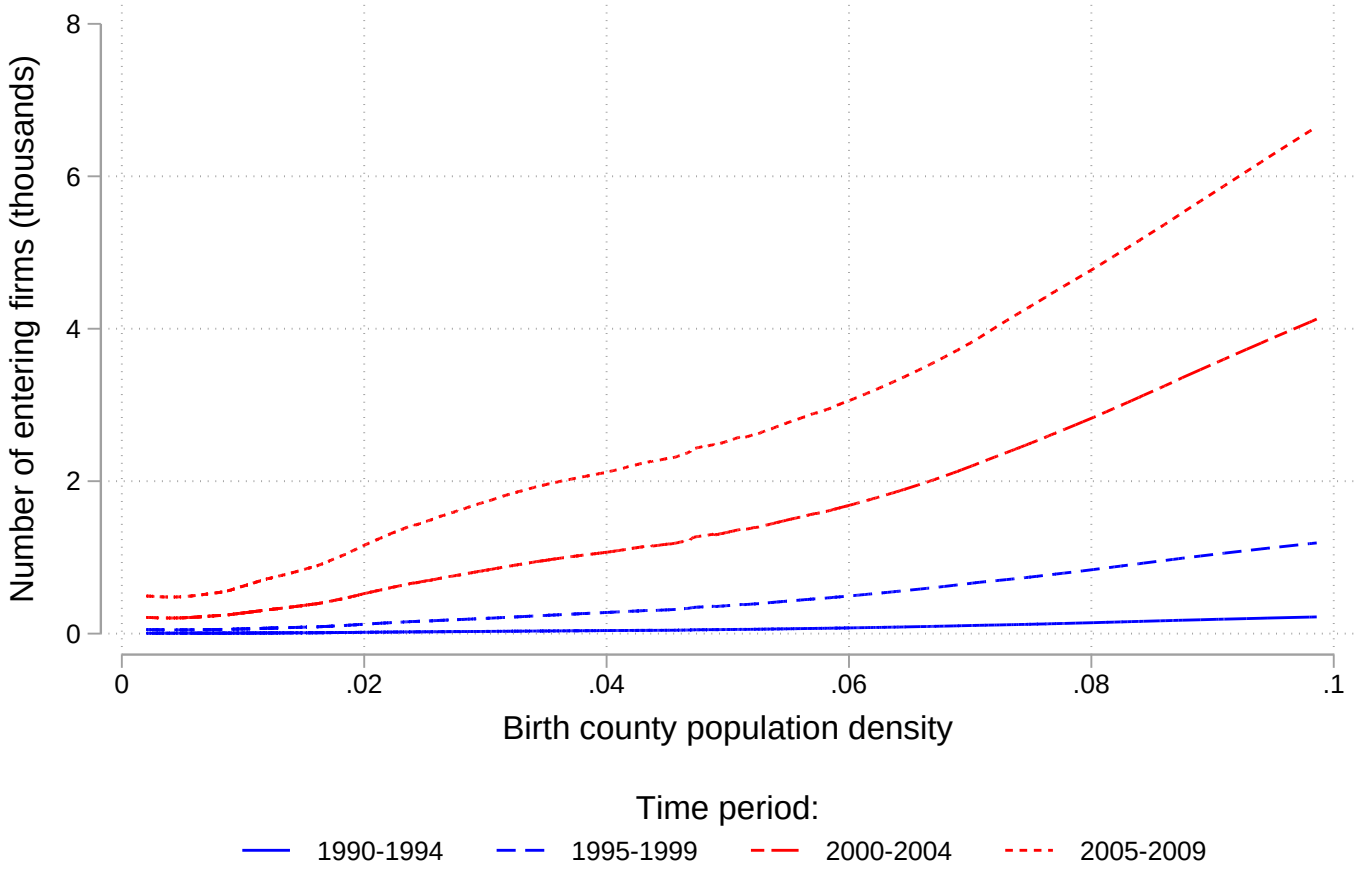
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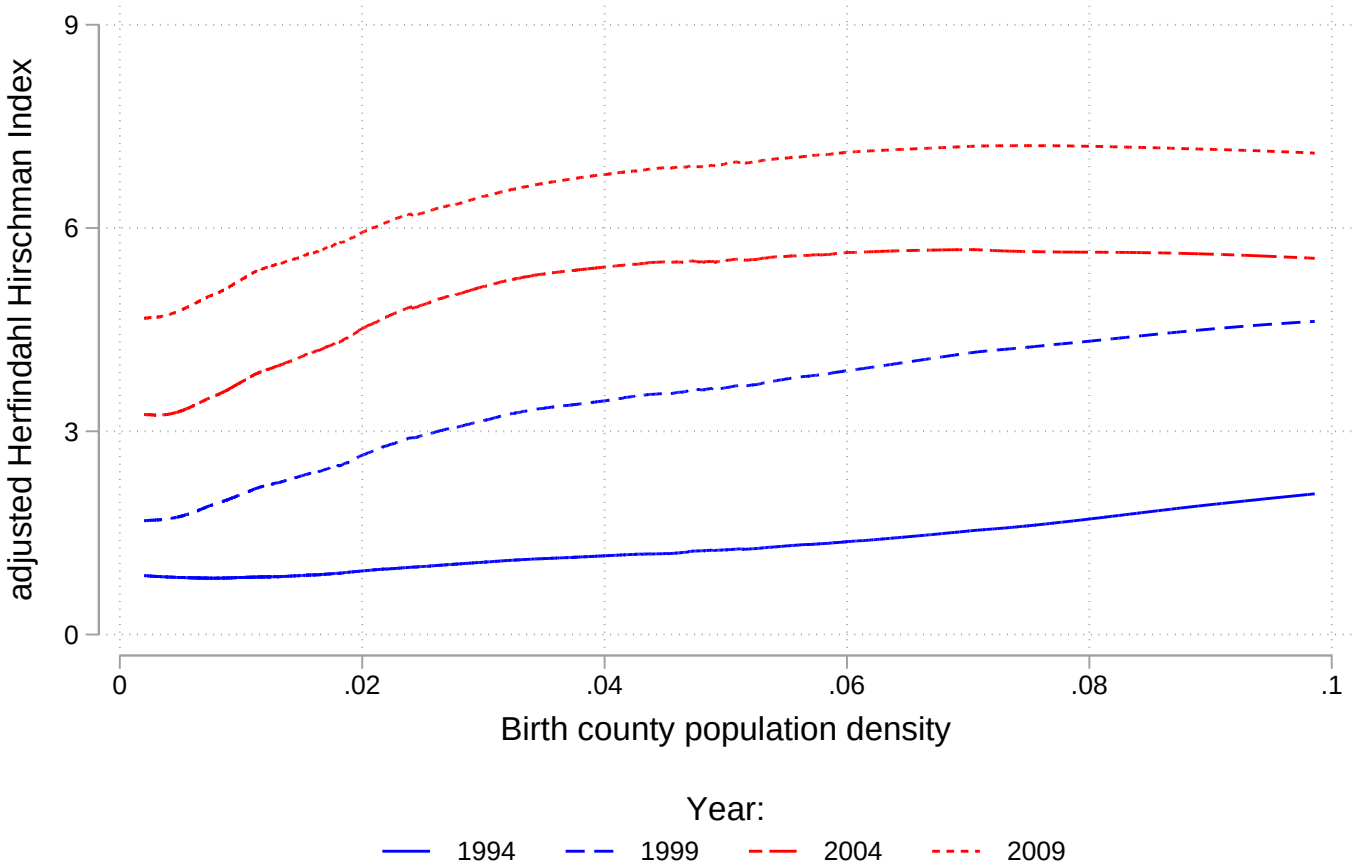
Evidence on Firm Entry



Source: SAIC registration database and 1982 population census.

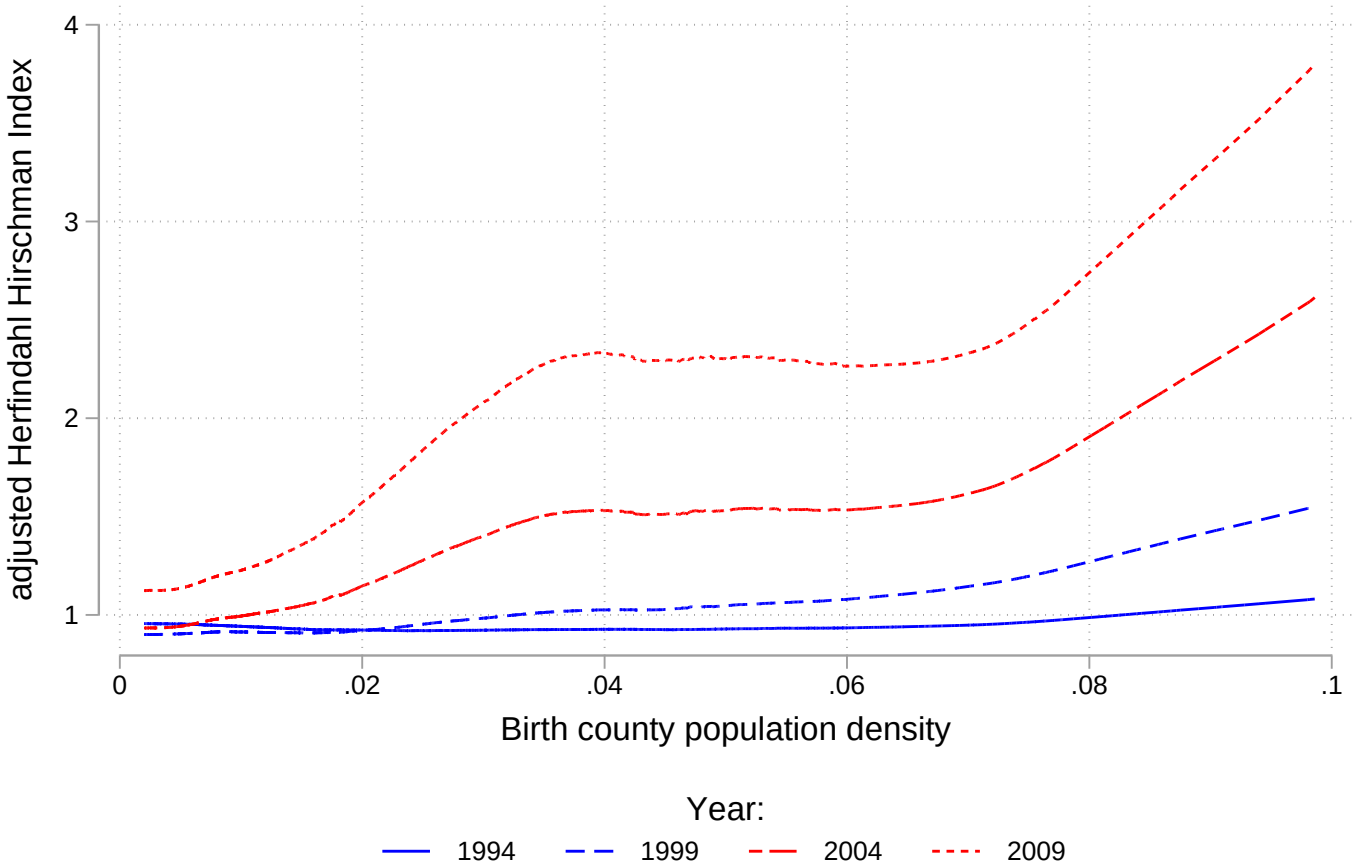
▶ Stock of Firms

Evidence on Sectoral Concentration



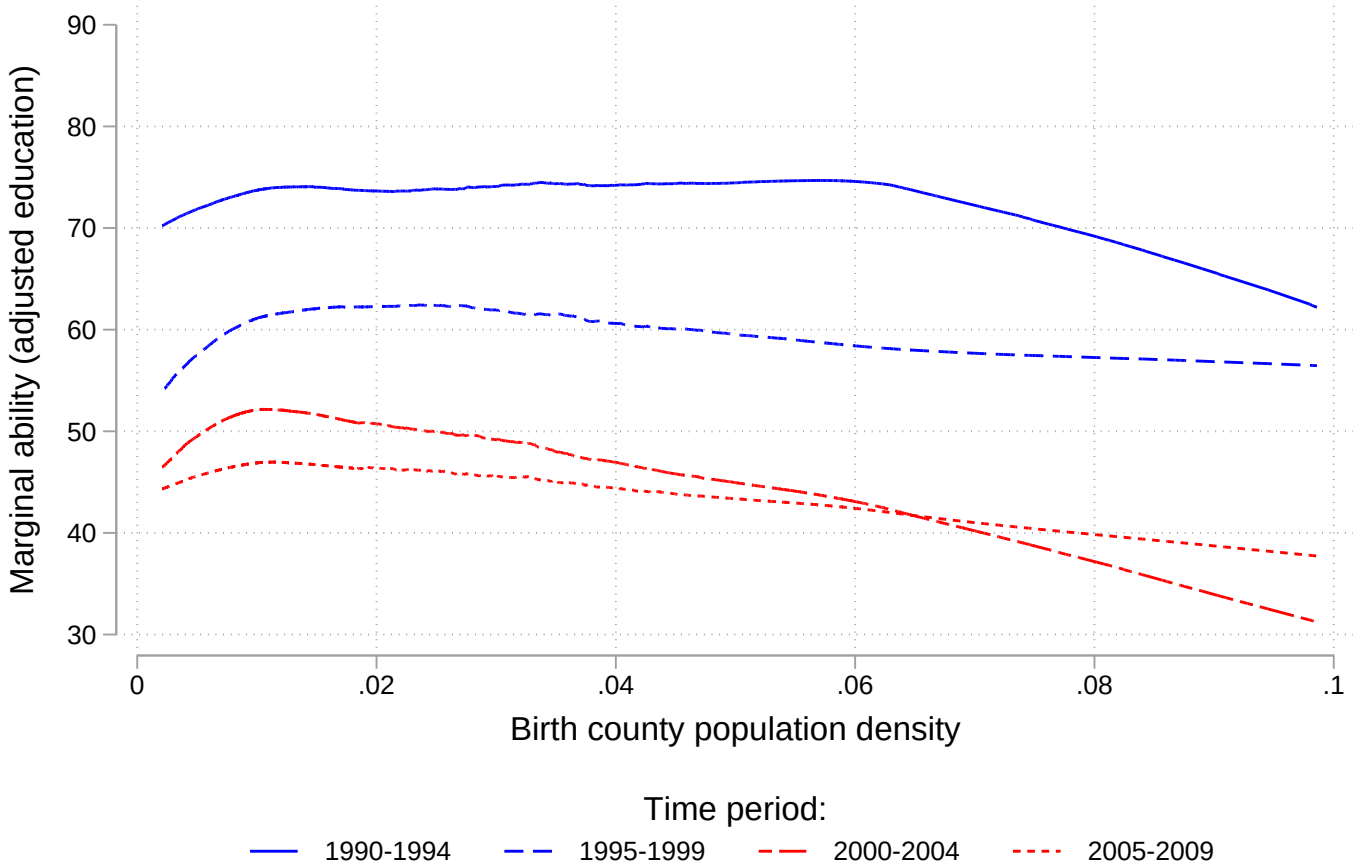
Source: SAIC registration database and the 1982 population census

Spatial Concentration, within Sectors



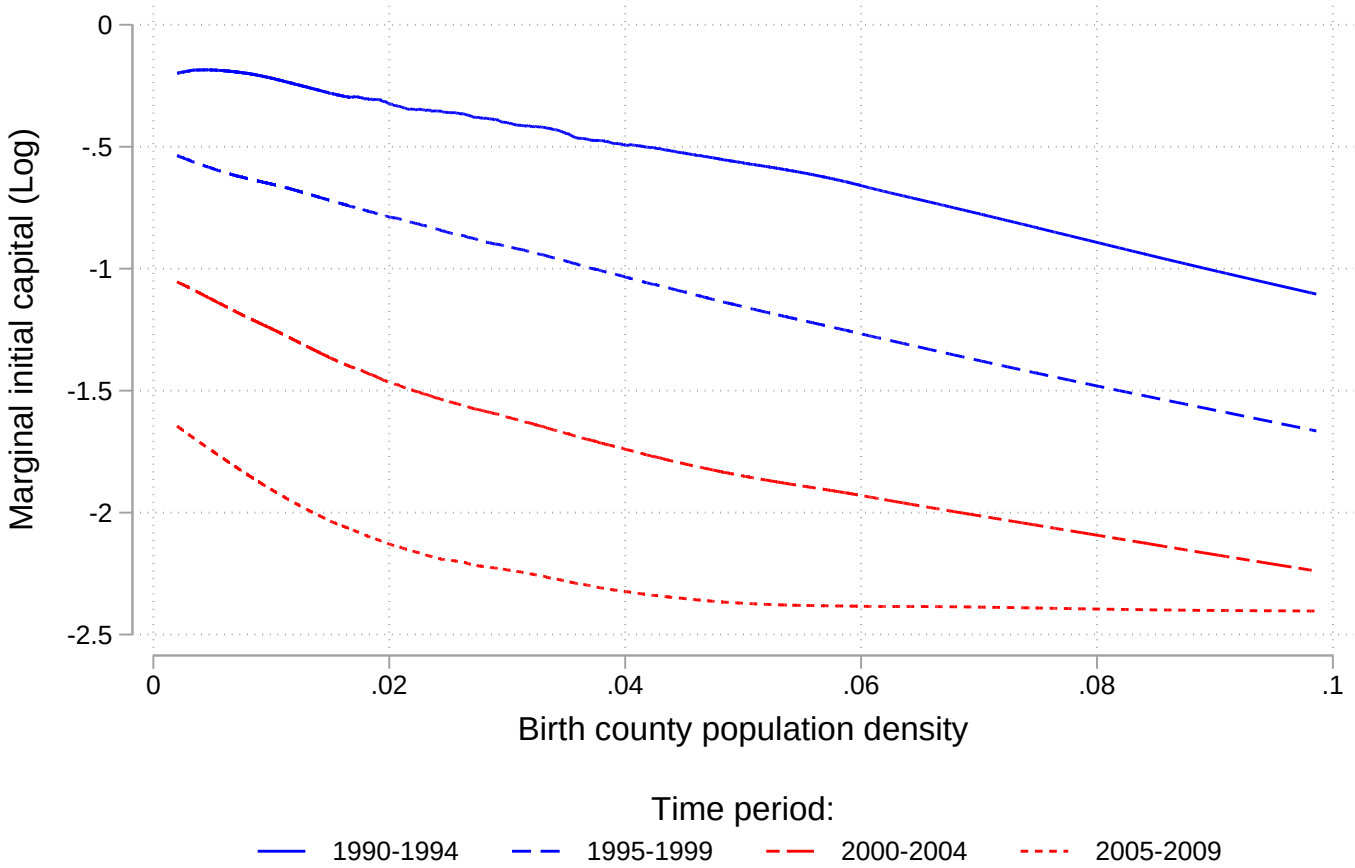
Source: SAIC registration database and 1982 population census.

Marginal Ability and Population Density



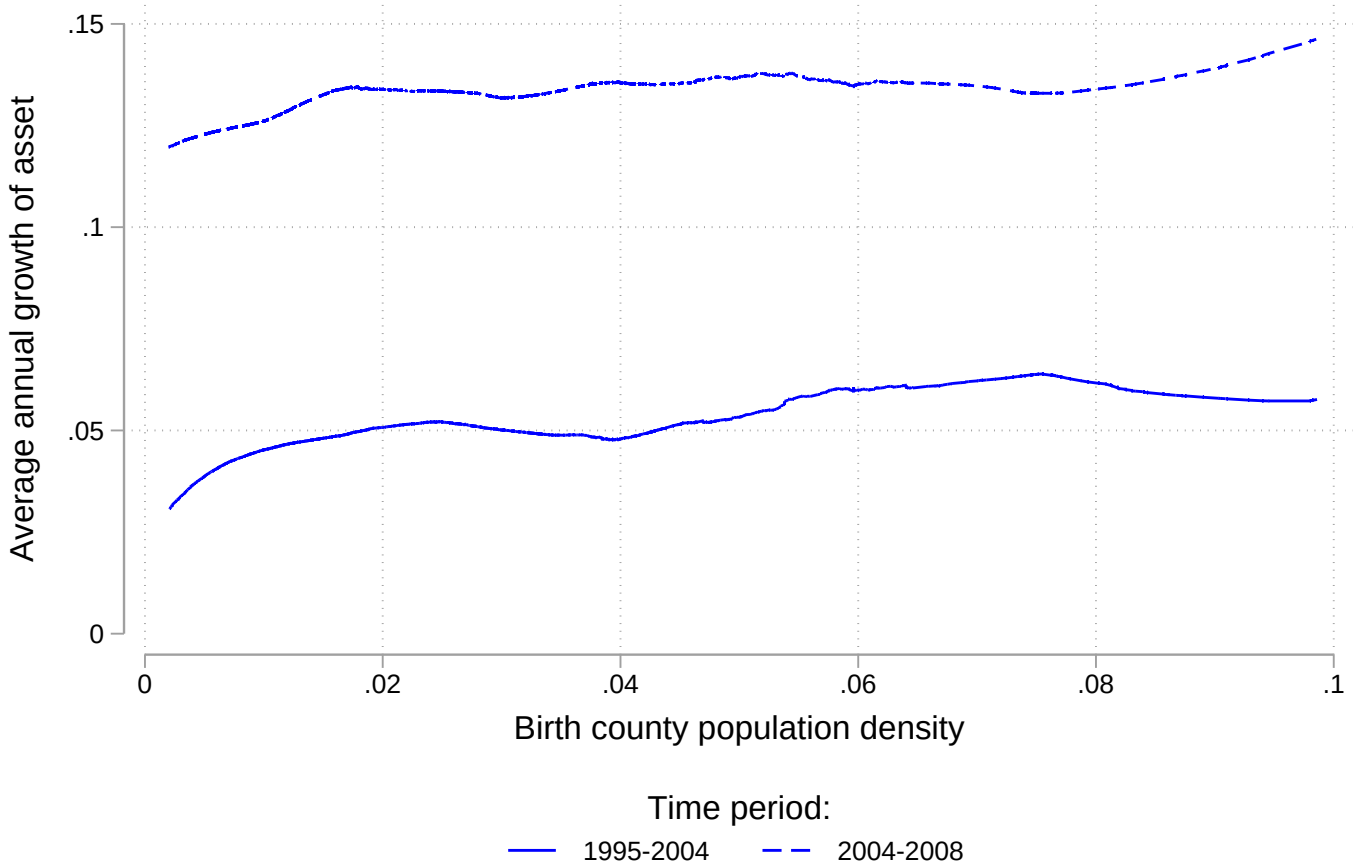
Source: SAIC registration database and 1982 population census.

Marginal Initial Capital and Population Density



Source: SAIC registration database and 1982 population census.

Asset Growth and Population Density



Source: industrial census (1995, 2004, 2008) and 1982 population census.

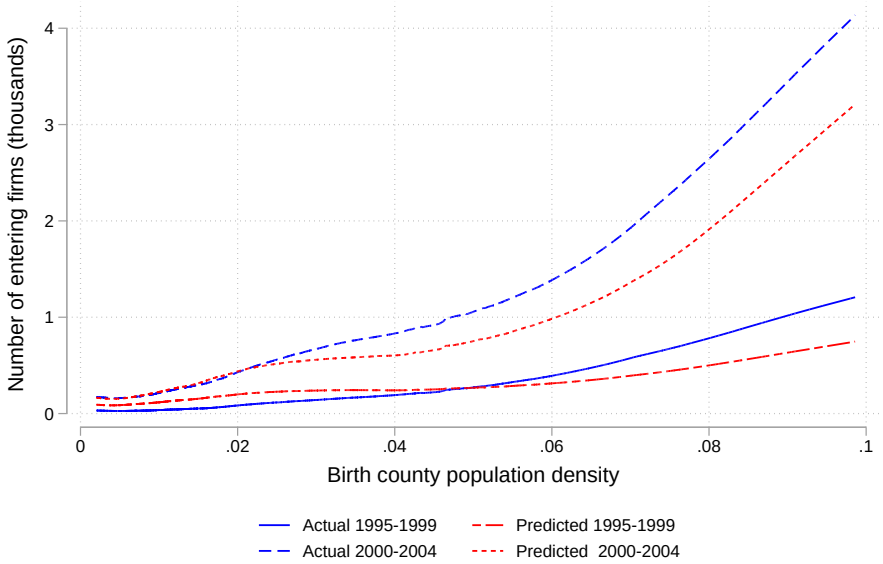
The Mechanism

- Estimate the relationship between initial entry and subsequent entry by firms from a given birth county in a particular sector-location
  - One additional entrant in the 1990-1994 period results in seven additional entrants in 2000-2004 and nine in 2005-2009
  - Initial entry effects are stronger in high-p counties
  - No effect of total initial entry from other origins (alternative explanation for large spatial dispersion in China)

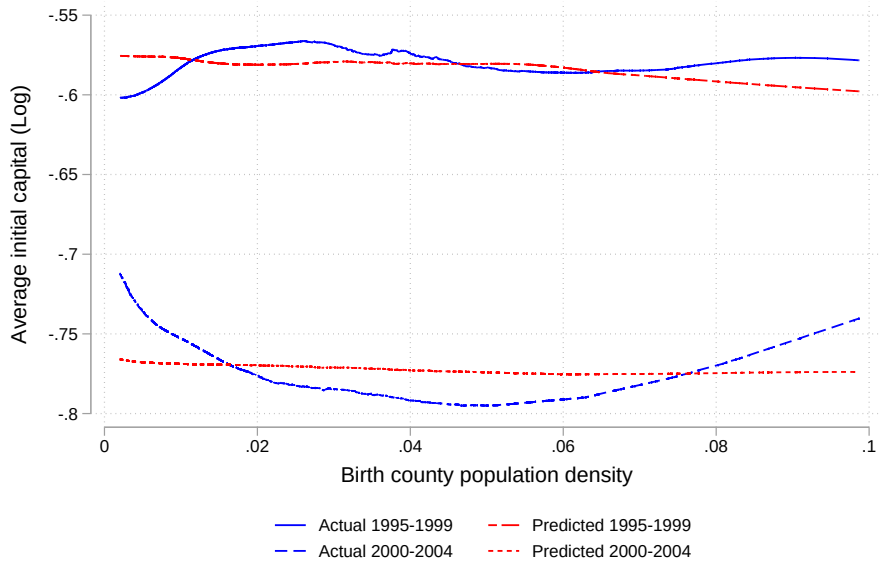
Structural Estimation and Quantification

- Structural estimation based on the entry equation and the (average) initial capital equation
  - Estimated at the birth county-sector-time period level (1995-2004)
- More flexible specifications allow for forward-looking behavior and sector-level spillovers

Actual and Predicted, Entry and Initial Capital



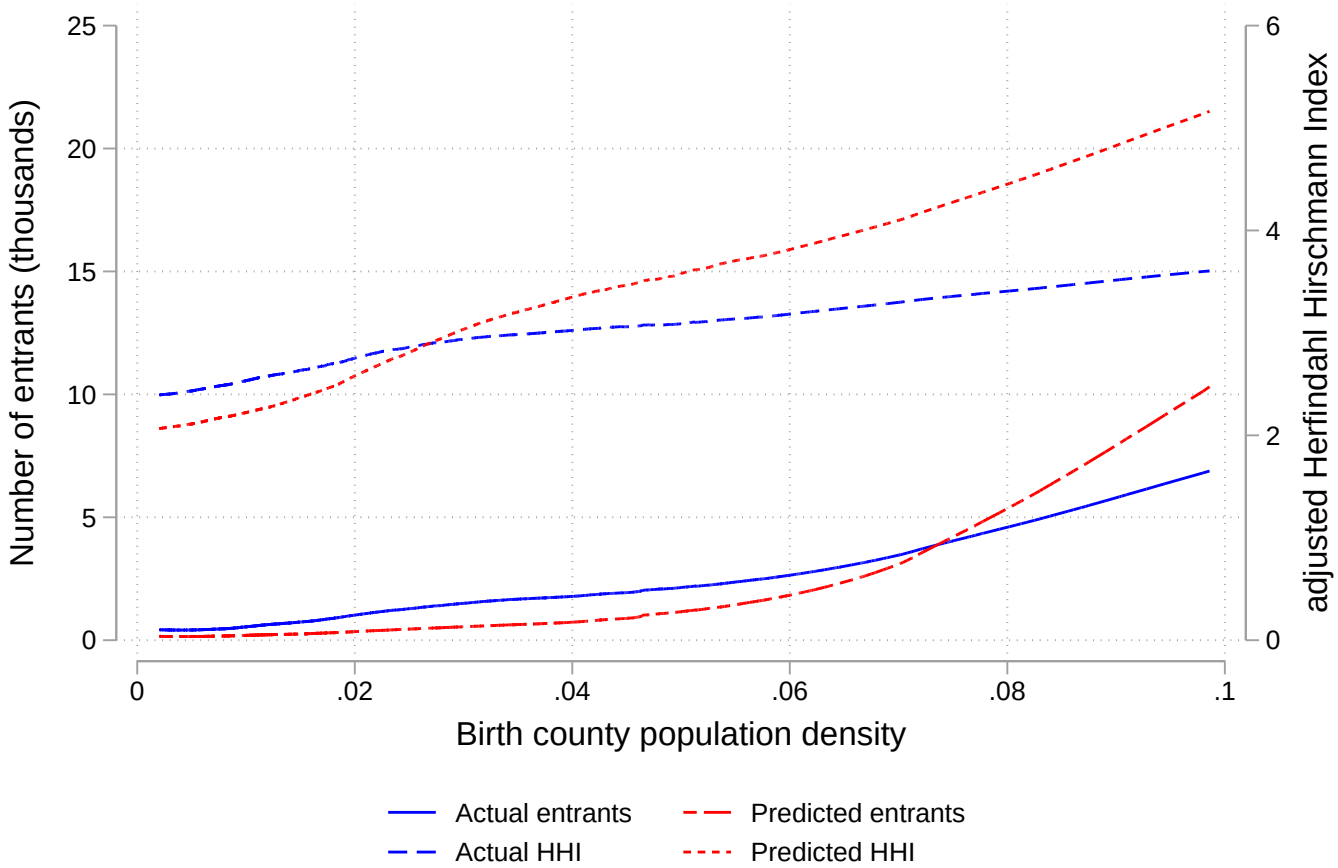
(a) Entry



(b) Initial Capital

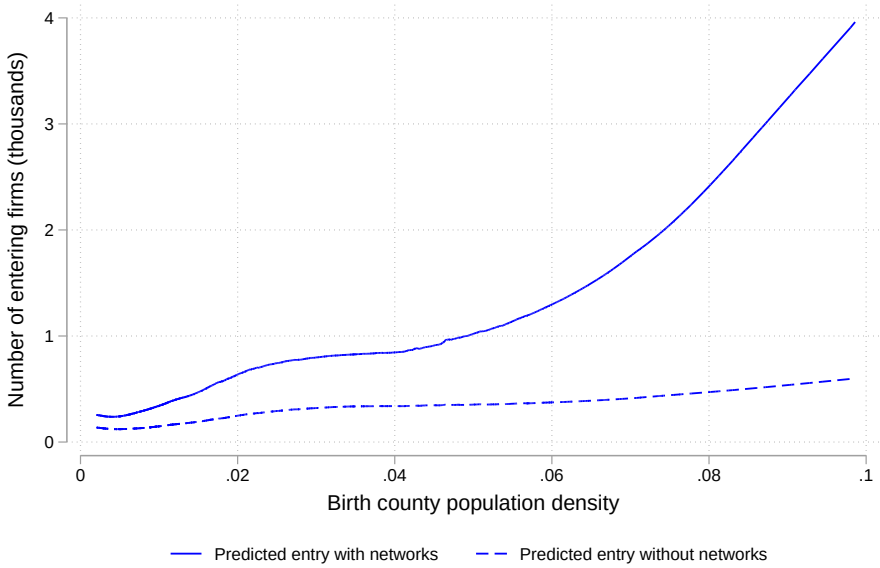
Source: SAIC registration database, model generated data, and 1982 population census.

Out of Sample Tests – Entry and Sectoral Concentration, 2005-2009

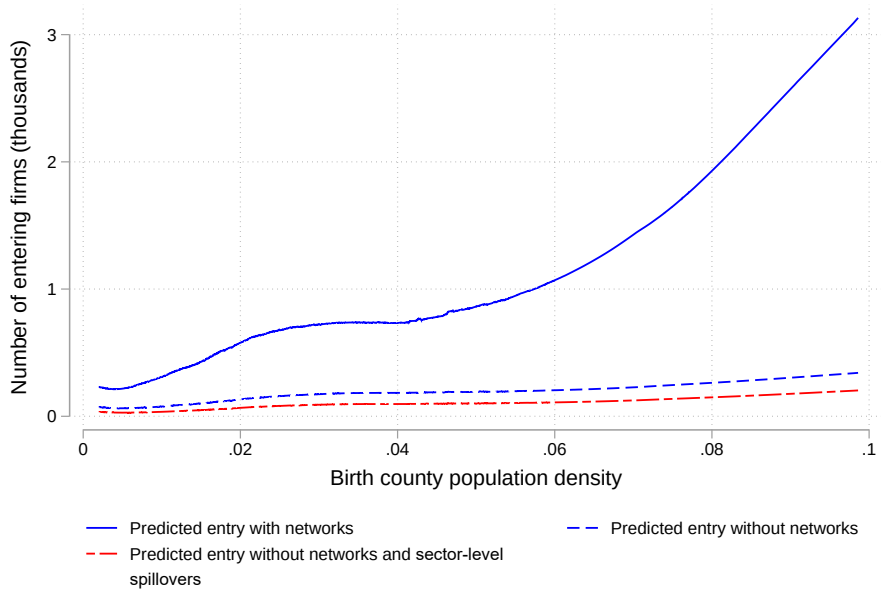


Source: SAIC registration database, model generated data, and 1982 population census.

Counter-Factual Simulation: Effect of Community Networks on Entry



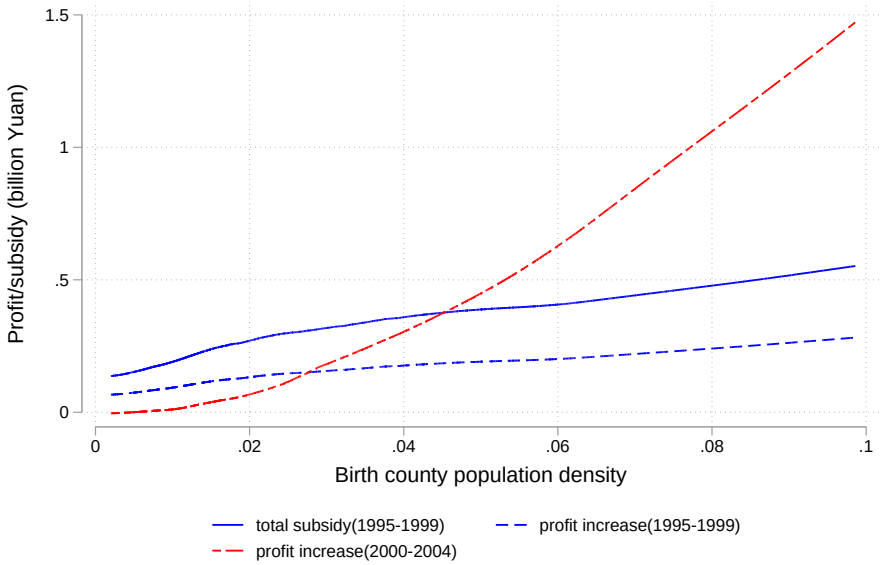
(a) Benchmark specification



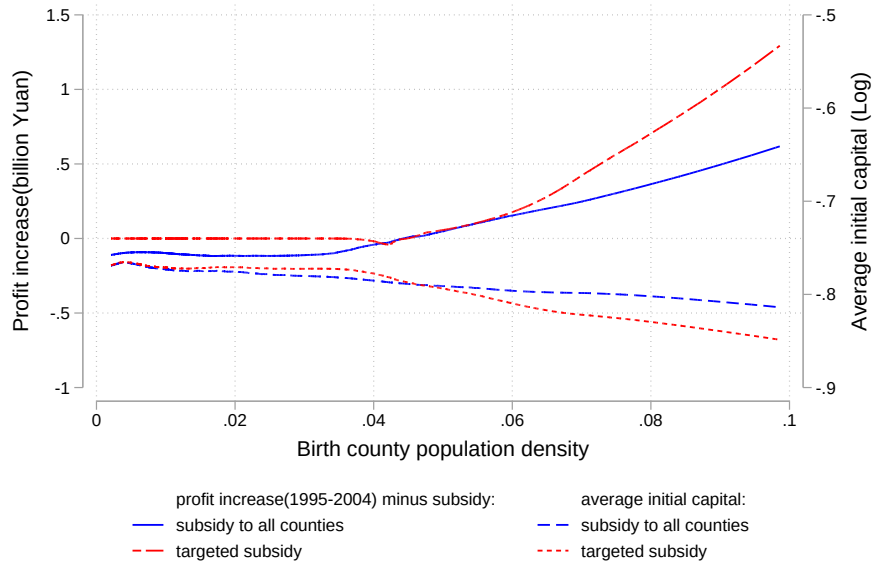
(b) Specification with sector-level spillovers

Source: SAIC registration database, model generated data, and 1982 population census

Counter-Factual Simulation: Effect of Interest Rate Subsidy on Profits



(a) Subsidy to all counties



(b) Targeted subsidy vs.subsidy to all counties

Source: SAIC registration database, model generated data, and 1982 population census

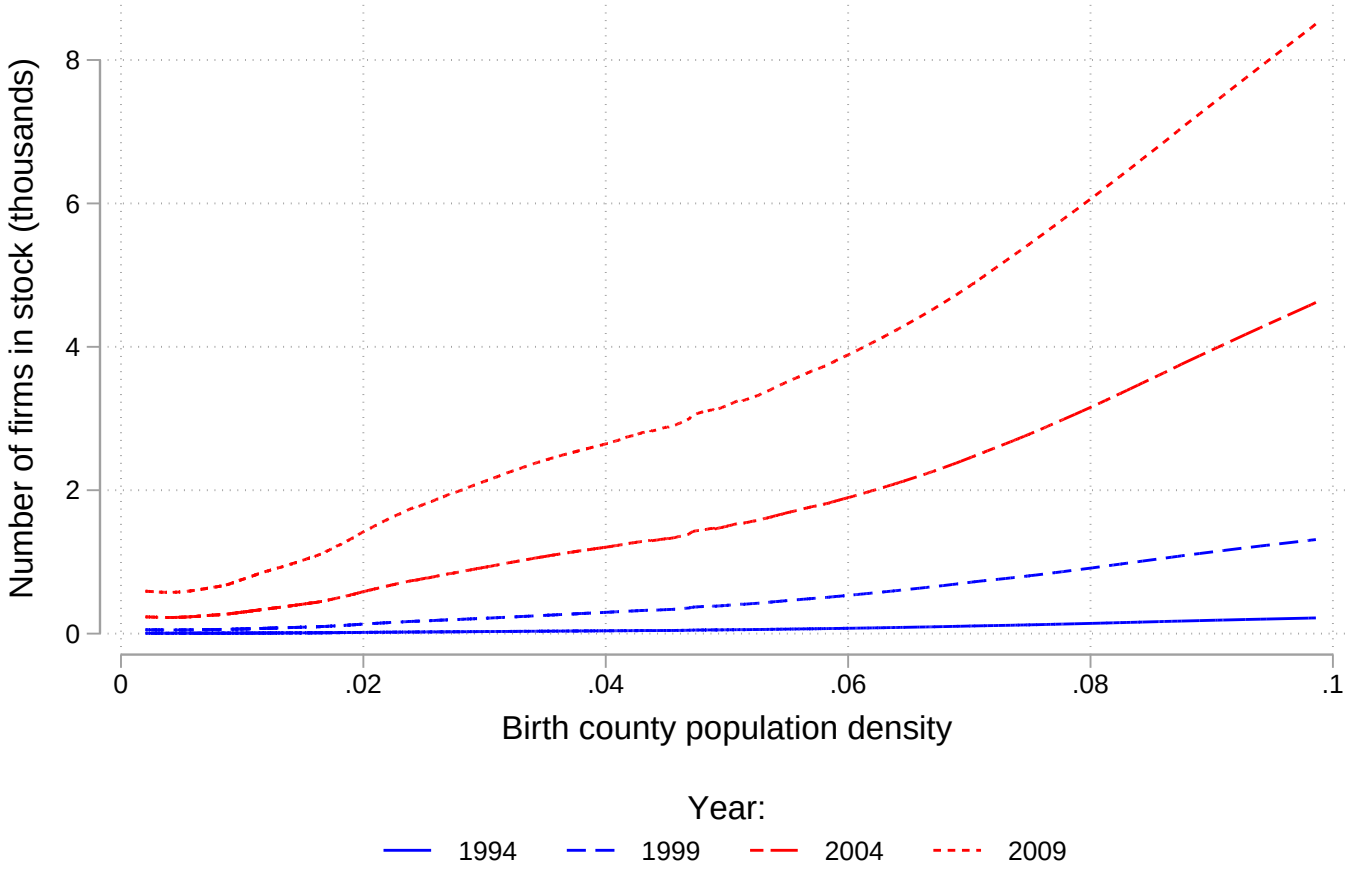
Conclusion

- There are no mark-ups in output prices or wedges in factor prices in our model, unlike the misallocation literature; e.g. Restuccia and Rogerson (2008); Hsieh and Klenow (2009)
  - Small firms and wide dispersion in firm size and productivity in our analysis are consequences of networks that substitute for missing markets, rather than inefficient taxes or regulations
  - Optimal second-best policies could entail subsidies targeting more connected communities, which would increase existing dispersion and induce even smaller firms to enter
  - More generally, we would not want to infer that one developing economy is less efficient than another because it has smaller firms or greater dispersion in firm size

Conclusion

- An additional implication of our network-based analysis is that subsidies should account for intra-community spillovers and individual ability
  - Existing efforts to stimulate entrepreneurship through business training programs or business plan competitions (McKenzie and Woodruff, 2014; McKenzie, 2017) do not incorporate these spillovers, potentially resulting in a substantial loss in efficiency
  - At the same time, policies that target more connected communities are likely to exacerbate existing inter-community inequality, while promoting intra-community equality, with complex distributional consequences

Stock of Firms and Population Density



Source: Registration database, and 1982 population census.

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