Red Tape and Delayed Entry

[Accompanying Paper: Entry Regulation and Inter-sectoral Reallocation]

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Does red tape slow down entry?

— Theoretical model of red tape (administrative entry delays; product market regulation), entry (introduction of new varieties), and industry growth

— Empirical analysis of effects of country-level entry regulation on industry-level entry (industry growth in companion paper)
Related (Empirical) Literature

— Cross-country cross-industry approach to determinants of growth:
  Started by Rajan-Zingales (AER 1998); recently extended to other fields in development-growth economics

— Product Market Regulation (Red Tape) and entry/growth:
  Fisman and Sarria-Allende (NBER 2004); Klapper, Laeven and Rajan (JFE forthcoming); Perotti and Volpin (CEPR 2004)
Presentation Overview

1. Model
2. Data
3. Results
   1. Using US-based proxies only
   2. Accounting for measurement error [bias when employing US (or any other country) data to construct worldwide industry characteristics]
4. Summary
Entry Regulation, Entry, and Growth in a World Equilibrium Model

ANTICIPATED and unanticipated INDUSTRY-LEVEL SHIFTS in PRODUCTIVITY and PREFERENCES

PROMPT-ENTRY EQUILIBRIUM: Entry eliminates expected profits

INDUSTRY VALUE ADDED GROWTH

Equilibrium with Prompt Entry/Frictionless Equilibrium
Entry Regulation, Entry, and Growth in a World Equilibrium Model

ANTICIPATED and unanticipated INDUSTRY-LEVEL SHIFTS in PRODUCTIVITY and PREFERENCES

PROMPT-ENTRY EQUILIBRIUM: Entry eliminates expected profits

INDUSTRY VALUE ADDED GROWTH

Entry Regulation Potentially slows down ENTRY

Theoretical Model – Data – Results – Conclusion
Set-Up: Multi-Industry World Equilibrium Model

Love-for-variety Preferences

\[ U_t = \int_0^1 \left( \int_0^N \frac{\sigma-1}{\sigma} B_{i,n} \, dn \right)^{\sigma/\sigma-1} di \]

\[ \sigma > 0 \]

Industries

Countries

Elasticity of substitution between existing national and international varieties

ENDOGENOUS Set of Varieties

\[ C_{i,n,t} = \left( \int_0^{V_{i,n}} c_{i,n,v,t} \, dv \right)^{\varepsilon/\varepsilon-1} \]

\[ \varepsilon > 1 \]

Elasticity of substitution between varieties in the same country-industry

Technology

\[ l_{i,n,v,t} = \frac{z_{i,n,v,t}}{A_{i,n,t}} + f_{i,n,t} \quad z_{i,n,v,t} \geq 0 \]
Profit Maximization of Monopolistically Competitive Firms

Firm-Profit Maximization [MR=MC]

\[ E_{t-1} \left( A_{i,n,t} p_{i,n,v,t} \right) \text{ price-markup} = w_{n,t} \]

Inverse Demand in Symmetric Equilibrium

\[ p_{i,n,t} = B_{i,n,t} \left( \frac{Y_t}{P_{i,t}^{1-\sigma}} \right)^{\frac{1}{\sigma}} V_{i,n,t}^{\frac{1-\sigma}{\sigma}} z_{i,n,t}^{\frac{1}{\sigma}} \]

Production of typical variety

Set of varieties

Price of typical variety
Inverse Demand Elasticities

... with respect to quantity of existing varieties:

\[ \frac{1}{\sigma} \]  
where \( \sigma \) is the elasticity of substitution among existing domestic and international varieties  
(between 3 and 7 according to empirical work)

... with respect to quantity of new varieties (\( \varepsilon > \sigma \)):

\[ \frac{1}{\sigma} \frac{\varepsilon - \sigma}{\varepsilon - 1} < \frac{1}{\sigma} \]  
if \( \sigma > 1 \)
Inverse Demand Elasticities and Returns with Entry

Marginal Revenue Industry 1

= p(1)/μ

Employment Industry 1

ε > σ
Inverse Demand Elasticities and Industry Returns with No Entry (Fixed Set of Varieties)

Marginal Revenue Industry 1

\[ = \frac{p(1)}{\mu} \]
**Benchmark: Equilibrium with Prompt Entry**

Equilibrium Measure of Varieties

\[
V_{i,n,t}^* = \theta E_{t-1} \left( \frac{A_{i,n,t}^\sigma B_{i,n,t}^{\sigma-1}}{P_{i,t}^{1-\sigma} W_{n,t}^\sigma} Y_t \right)^{\frac{\varepsilon-1}{\varepsilon-\sigma}}
\]

Equilibrium Employment Allocation

\[
L_{i,n,t}^* = l_{i,n,t}^* V_{i,n,t}^* = \theta L_{t-1} \left( \frac{A_{i,n,t}^\sigma B_{i,n,t}^{\sigma-1}}{P_{i,t}^{1-\sigma} W_{n,t}^\sigma} Y_t \right)^{\frac{\varepsilon-1}{\varepsilon-\sigma}}
\]

**Theoretical Model — Data — Results — Conclusion**

• ANTICIPATED technology and demand shifts;
  &
  • World income
  • International competition
  • Domestic factor price

All adjustment at extensive margin
Demand Shifts and Prompt Entry Equilibrium Growth (Without Sectoral Technology Differences)

Marginal Revenue Industry 1
\[ = \frac{p(1)}{\mu} \]

Marginal Revenue Industry 2
\[ = \frac{p(2)}{\mu} \]

Prompt-Entry growth (“Potential growth”)
Product Market Regulation (PMR) and Slow Entry

Entry and Industry Value Added Growth

\[ Y_{i,n,t} = \theta_Y \left( V_{i,n,t}^{\sigma-1} \left( V_{i,n,t}^{*} \right)^{\varepsilon-\sigma} \left( A_{i,n,t}^{Unanticipated} \right)^{\sigma-1} B_{i,n,t}^{Unanticipated} \right) \]

Adjustment Equation

\[ \Delta \ln V_{i,n} = (1 - \theta_{PMR_n}) \Delta \ln V_{i,n}^{*} \]

- ANTICIPATED technology and demand shifts;
- World income
- International competition
- Domestic factor price

Unanticipated technology and demand shifts
Demand Shifts and Prompt Entry Equilibrium Growth

Marginal Revenue Industry 1

= \frac{p(1)}{\mu}

Marginal Revenue Industry 2

= \frac{p(2)}{\mu}

Employment Industry 1

Employment Industry 2

Prompt-Entry growth ("Potential growth")
Demand Shifts and No Entry Equilibrium Growth

Marginal Revenue Industry 1 = p(1)/μ

Marginal Revenue Industry 2 = p(2)/μ

Actual growth

Prompt-Entry growth ("Potential growth")

Theoretical Model – Data – Results – Conclusion
Worldwide Industry Allocation Shifts

\[ \Delta \ln A_{i,n}^{\text{Anticipated}} = a + a_n + a_i + \zeta_{i,n}^a \quad ; \quad \Delta \ln B_{i,n}^{\text{Anticipated}} = b + b_n + b_i + \zeta_{i,n}^b \]

\[ \Delta \ln L_{i,n}^* = \Delta \ln L^* + \Delta \ln L_n^* + \Delta \ln L_i^* + u_{i,n} \]

Worldwide sector-specific employment (input) reallocation
Worldwide Industry Allocation Shifts

\[ \Delta \ln A_{i,n}^{Anticipated} = a + a_n + a_i + \zeta_{i,n}^a ; \quad \Delta \ln B_{i,n}^{Anticipated} = b + b_n + b_i + \zeta_{i,n}^b \]

\[ \Delta \ln L_{i,n}^* = \Delta \ln L^* + \Delta \ln L_n^* + \Delta \ln L_i^* + u_{i,n} \]

Estimating Equation (Entry)

\[ \Delta \ln V_{i,n} = \delta_n + \delta_i - \theta(PMR_n \Delta \ln L_i^*) + \zeta_{i,n} \]

Growth rate of establishment

Worldwide sector-specific employment (input) reallocation

Employment (input) growth proxy, using US data
Data

1. Country-Industry Level (from UNIDO)
   • Log change in number of establishments (in the 1980s)
   • 45 countries; 27-28 manufacturing industries (more than 1000 observations)

2. Country-Level
   • Entry regulation indicators from Djankov et al. (QJE 2002); focus on TIME & PROCEDURES to start a business

3. Industry-Level (from NBER Manufacturing database)
   • Employment growth (factor reallocation)
   • Other industry characteristics (sales growth)
## Least Squares Estimates (A)

<table>
<thead>
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<td>TimePcd X Employment Realloc</td>
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<td>([Y \times EMPGR])</td>
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## Least Squares Estimates (B)

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<td>Legal Inefficiency X External Finance Dependence</td>
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<td>Perotti and Volpin (2004)</td>
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<td>TimePcd X Sales Growth</td>
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<td>Fisman and Sarria-Allende (2004)</td>
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<td>Country and Industry Fixed-Effects</td>
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Measurement Error when Using US Employment Reallocation → Biased Estimates?

\[ \Delta \ln L_{i,US} = \Delta \ln L_{i,US}^{\text{Worldwide Shocks Only}} + \Delta \ln L_{i,US}^{\text{Idiosyncratic}} + \Delta \ln L_{i,US}^{\text{PMR}} \]

“Pure” US idiosyncrasies:
— Classical ME → Attenuation Bias

Demand and supply shocks specific to economies with US PMR
— Overestimate the role of PMR

NET BIAS can be upward or downward
IV Approach to Measurement Error

Estimate $\Delta \ln L_{i,US}^{\text{Worldwide}}$ and use as instrument for $\Delta \ln L_{i,US}$

(1) regress $\Delta \ln L_{i,n}$ on constant ($\Theta_i$) and $PMR_n$ (slope $\Lambda_i$)

(2) $\Delta \ln L_{i,US}^{\text{Worldwide,EST}} = \Theta_i^{\text{EST}} + \Lambda_i^{\text{EST}} PMR_{US}$

- GIVEN industry
- ACROSS countries without US
Predicted and Actual US Industry Employment Growth

Theoretical Model – Data – Results – Conclusion

slope = 0.9  
t-stat = 6.07
New Approach: Instrumental Variable Estimates

\[
\begin{align*}
\text{TimePcd} & \times \text{Factor Reallocation} & -0.2399 \\
\text{[TIME} \times \text{EMPGR]} & & (3.58)
\end{align*}
\]

-0.17 in LS

Observations 1162
Countries 45
Industry Fixed-Effects Yes
Country Fixed-Effects Yes
Double Instrumental Variable Estimates

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<td><strong>[TIME X EMPGR]</strong></td>
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<td><strong>[PROCED X EMPGR]</strong></td>
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<td>(2.54)</td>
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<td><strong>[STEPS X EMPGR]</strong></td>
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<td><strong>[COST X EMPGR]</strong></td>
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Conclusion

1. We present a multi-industry world equilibrium model of entry regulation, entry, and growth
   — Entry regulation (red tape) affects growth when industry demand is more price elastic when varieties adjust

2. Empirically, entry is slower in expanding industries in countries with greater bureaucratic-administrative delays to start up a new business
   — Account for measurement error when proxying (latent) industry characteristics with data from a benchmark country
   — Results do not seem to reflect labor market institutions, legal norms, or the overall level of development