A Positive Theory of Entry Costs

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Work in Progress

Introduction

- Costs to start a business vary substantially across countries.
  - These costs involve both certification and registration requirements and represent both monetary and time costs.
- Time-consuming and costly procedures discourage creation of new businesses and hampers economic development.
- Why do entry costs exist and vary across countries then?
- **This Paper:** Develop a (stylized) model to answer above question.
  - Increasing entry costs can improve welfare in the presence of imperfect legal system (entry costs as endogenous response to institutional failure).
  - Socially optimal entry costs depend on inefficiency of legal system

Related Literature

- Grabbing hand theories.
  - Regulatory capture: Tullock (1967); Stigler (1971); Acemoglu (2008).
  - *Toolbooth* theories ("Creating difficulties in order to sell favors"): DeSoto (1990); Shleifer and Vishny (1993); Banerjee (1997).
- Helping hand theories.
  - Pigou (1938); Atkeson, Hellwig, and Ordoñez (2014).
- Regulation can arise as a consequence of imperfect legal institutions: Schwartzstein and Shleifer (2013).
  - In their setting, costly certification generates socially useful information.

Summary of Model and Results

- Agents either form bilateral relationships, which are subject to moral hazard and adverse selection problems, or collect outside option.
  - Moral hazard: partnerships require effort.
  - Adverse selection: agents heterogenous w.r.t. cost of effort (productive vs. unproductive).
- Legal system: enforcement of effort in relationships.
  - In absence of well-functioning legal system, it pays for unproductive agents to form short-term relationships and behave opportunistically.
- Entry cost affects unproductive agents disproportionately more, improving market selection.
  - Entry cost is (imperfect) substitute for legal system.

Environment: Agents and Activities

- Discrete time, infinite horizon.
- Mass one of infinitely-lived agents, discount factor $\delta \in (0, 1)$.
- Agents can either:
  - (i) form bilateral relationships; or
  - (ii) choose an outside option.
- Relationships costly to form and last until terminated or exogenous separation shock occurs.
  - Per-capita cost $\kappa > 0$ of setting up a relationship.
  - Separation shocks are i.i.d., with per-period probability $\lambda \in (0, 1)$.

Environment: Production

- (Flow) payoff from outside option is $A > 0$.
- Agents in a relationship either exert effort (h) or no effort (ℓ).
  - Effort is observable within the relationship.
- Per-capita output in a relationship is:
  (i) 0 if both agents exert no effort;
  (ii) $\gamma > 0$ if only one agent exerts effort;
  (iii) $\pi > \gamma$ if both agents exert effort.

Environment: Agent Types

- Agents differ with respect to their cost of exerting effort.
- Two types of agent: productive (p) and unproductive (u).
  - c_τ = cost of effort for an agent of type $\tau \in \{p, u\}$.
  - $c_u > c_p > 0$.
- Agents are privately informed about their type.
  - $\theta \in (0, 1)$ = share of productive agents in the population.

Environment: Assumptions

Assumptions

(A1) $\pi \geq 2\gamma$.

(A2) $\pi - c_p > A$ and $\max\{2\pi - c_u - c_p, 2\gamma - c_p\} < 2A$.

(A3) $\gamma > A$.

- (A1): Gains from cooperation are large.
- (A2): Only relationships involving productive agents who exert effort can be mutually beneficial.
- (A3): Unproductive agents can benefit from relationships only if they do not exert effort while their partners do (opportunistic behavior).

Environment: Timing

- Agents in a relationship (matched agents).
  1. Simultaneously choose their efforts and output is realized.
  2. Decide whether to maintain the relationship or not.
  3. Exogenous separation shock is realized.
- Agents not in a relationship (unmatched agents).
  1. Decide between outside option or forming relationships.
  2. Agents who choose the latter are randomly and anonymously matched in pairs, then timing is of matched agents (no delay between forming relationships and production; can be relaxed).

Environment: Legal System

- Agent in a relationship who engages in opportunistic behavior makes a transfer ρf to partner.
  - $f = \pi - \gamma$ (payoff loss to agent who exerts effort) is the *de jure* compensation.
  - ρf is the *de facto* compensation.
  - $\rho \in [0, 1]$ captures the efficiency of the legal system.
- Payoff to type-τ agent in a relationship as function of effort profile:

	h	ℓ
h	$\pi - c_\tau$	$\gamma - c_\tau + \rho f$
ℓ	$\gamma - \rho f$	0

- $\gamma > A \Rightarrow \gamma - \rho f > A$ if ρ is sufficiently close to zero.

Environment: Equilibria

- Consider perfect Bayesian equilibria (PBE).
- Given a strategy profile, let
  - $\varphi_t =$ fraction of productive agents in the set of unmatched agents who form relationships in period t.
- Restrict attention to *stationary* PBE in which $\varphi_t \equiv \varphi$.

First Best

- Only relationships between productive agents who exert effort can be socially optimal.
- Costly relationship formation + exogenous breakdowns imply that:
  - (i) either productive agents also collect the outside option; or
  - (ii) form relationships, exert effort, and wait for exogenous separation.

Proposition (First Best)

It is socially optimal for productive agents to form relationships, exert effort, and wait for exogenous separation if, and only if,

$$\lambda\kappa \leq \pi - c_p - A$$

- **Maintained Assumption:** $\lambda\kappa < \pi - c_p - A$.

Implementing First Best

Lemma

There exists $\overline{\delta} \in [0,1)$ such that no relationships are formed in equilibrium if $\delta < \overline{\delta}$. In particular, the first best cannot be implemented if $\delta < \overline{\delta}$.

- Let $\underline{\rho} = \underline{\rho}(\kappa) \in (0,1)$ be the value of ρ such that

$$\gamma - \rho f - \kappa = A$$

if $\kappa < \gamma - A$ and $\underline{\rho} = 0$ otherwise ($\pi \geq 2\gamma \Rightarrow \gamma - f \leq 0$, so $\underline{\rho} < 1$).

- Note that $\underline{\rho}$ is strictly decreasing with κ as long as $\underline{\rho} > 0$.

Proposition

Suppose $\delta \geq \overline{\delta}$. An equilibrium implementing the first best exists iff $\rho \geq \underline{\rho}$.

Implementing First Best

- Proof (sketch)
  - Following deviation from first best is profitable for unproductive agents if $\rho < \underline{\rho}$: form one-period relationships and behave opportunistically (flow payoff is $\gamma - \rho f - \kappa > A$).
  - Following assessment is a PBE if $\rho \geq \underline{\rho}$:
    (i) unproductive agents always collect the outside option;
    (ii) unmatched productive agents always form relationships;
    (iii) matched productive agents exert effort and keep a relationship iff no opportunistic behavior ever took place in the relationship; and
    (iv) matched agent assigns probability one to partner being productive.

Imperfect Legal System

- **Maintained Assumption:** $\delta > \overline{\delta}$ and $0 \leq \rho < \underline{\rho}$.
  - $\kappa < \gamma - A$ *a fortiori*.
- Focus on partial-sorting equilibria (full sorting not possible as $\rho < \underline{\rho}$):
  (i) unmatched productive agents always form relationships;
  (ii) matched productive agents exert effort and keep a relationship iff no opportunistic behavior ever took place in the relationship; and
  (iii) in every period, unproductive agents form relationships with probability $p \in (0, 1]$, in which case they engage in opportunistic behavior.

Imperfect Legal System

Lemma

In partial-sorting equilibria, the fraction $\varphi = \varphi(p)$ *of productive agents in the set of unmatched agents who form relationships is the only solution to*

$$\varphi = \frac{\lambda\theta}{\lambda\theta + p(1-\theta)[\lambda + \varphi(1-\lambda)]}.$$

- Properties of φ:

  (i) strictly decreasing with p and such that $\varphi = 1$ if $p = 0$.

  (ii) $p > 0 \Rightarrow$ strictly increasing with λ and such that $\lim_{\lambda \downarrow 0} \varphi = 0$.

Imperfect Legal System

Lemma

In a partial-sorting equilibrium, the probability unproductive agents form relationships is the unique $p^* \in (0,1)$ solving

$$\varphi(p^*)(\gamma - \rho f) - \kappa = A$$

if $\varphi(1)(\gamma - \rho f) - \kappa < A$ and is $p^* = 1$ otherwise.

- Let $\overline{\kappa}(\rho) = \gamma - \rho f - A$. The next result follows from $\lim_{\lambda \downarrow 0} \varphi(1) = 0$, $\varphi(p^*) = 1$ iff $p^* = 0$, and $\underline{\rho} = 0$ if $\kappa = \overline{\kappa}(\rho)$.

Corollary

There exists $\underline{\lambda} > 0$ such that if $\lambda \in (0, \underline{\lambda})$, then p^* is strictly decreasing with κ and ρ as long as $\rho < \underline{\rho}$ and $\lim_{\kappa \uparrow \overline{\kappa}(\rho)} p^* = 0$.

Imperfect Legal System

Proposition

Suppose $0 \leq \rho < \underline{\rho}$. *There exist* $\overline{\delta} \leq \delta^* < 1$ *and* $0 < \lambda^* \leq \underline{\lambda}$ *such that if* $\delta > \delta^*$ *and* $\lambda < \lambda^*$, *then a unique partial sorting equilibrium exists. In this equilibrium,* p^* *is interior, strictly decreasing with* κ *and* ρ *as long as* ρ *is smaller than* $\underline{\rho}$, *and such that* $\lim_{\kappa \uparrow \overline{\kappa}(\rho)} p^* = 0$.

- Key incentive to be provided: productive agents must have an incentive to exert effort in the first period of a relationship.
- Since $\pi - c_p > A$, above incentive holds if agents are patient enough and relationships have a long expected duration if not terminated.

- Legal system and entry costs are substitutes when deterring unproductive agents from forming relationships.

Policy

- Suppose conditions of previous proposition hold.
- Policy affects the cost of forming relationships.
  - Now, this cost is $\widetilde{\kappa} = \kappa + \tau$, where τ is policy choice.
- Let:

  (i) U^p (V^p) = lifetime payoff to unmatched (matched) productive agent;

  (ii) ξ = fraction of unmatched productive agents in every period.

- Since unproductive agents indifferent between forming relationships and collecting outside option, flow welfare is:

$$W = (1-\theta)A + \theta(1-\delta)\left[\xi U^p + (1-\xi)V^p\right].$$

Policy

- Increase in τ has two effects on productive agents' payoffs.

  (i) $\tau \uparrow \Rightarrow \widetilde{\kappa} \uparrow$ (direct cost effect, negative).

  (ii) $\tau \uparrow \Rightarrow \varphi \uparrow \Rightarrow \xi = \dfrac{\lambda\theta}{\lambda + \varphi(1-\lambda)} \downarrow$ (indirect sorting effect, positive).

Proposition

W is strictly increasing with τ.

- $\pi \geq 2\gamma \Rightarrow$ indirect sorting effect dominates direct cost effect.

Corollary

Optimal choice of τ is such that $\widetilde{\kappa} = \overline{\kappa}(\rho)$ and there exists full sorting. So, welfare maximizing choice of entry cost is decreasing with ρ.

Final Remarks

- We develop a model of why do entry costs exist and vary across countries (entry costs as endogenous response to institutional failure).
  - In our setting, τ is a pure deadweight loss, i.e., "red tape" (same results when τ is monetary cost if there exists deadweight loss from taxation).
- Robustness (to do):
  - No "reputational" mechanism in our market (punishment for opportunistic behavior reduces scope for policy).
  - Agents' outside options are type-independent (market can collapse if productive agents' outside option is too high).
  - Agent's types are exogenous (endogenous types are additional source of inefficiency from policy).
- To do: Empirical Evidence.