

The Impact of Regulation on Entrepreneurship and Innovation

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Abstract

While entrepreneurs are hailed as the key to innovation and growth, in industries where these benefits are most desired, government regulations may handicap entrepreneurs and dampen these benefits. Given the importance of both entrepreneurship and regulation to improving social outcomes, it is imperative for entrepreneurship scholars and policy makers to better understand these apparently countervailing forces of free entry and regulation. This work investigates the impact of regulations on competition, entry, and innovation (productivity) using the quasi-experimental properties of the U.S. bail bond industry. The results suggest it is possible to design regulations without inhibiting the benefits of entrepreneurship.

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Executive Summary

Overview

While entrepreneurs are hailed as the key to innovation and growth, often in industries where these benefits are most desired, regulations put in place to respond to first-order policy concerns, such as correcting market failures, may have the unintended consequence of handicapping entrepreneurs and dampening the associated benefits of entrepreneurship. Given the importance of both entrepreneurship and regulation to improving social outcomes, it is imperative for entrepreneurship scholars and policy makers to better understand these apparently countervailing forces of free entry and regulation. Increased understanding of the associated tradeoffs will allow for more targeted policy reforms that balance the first-order policy concerns of regulation with the goals associated with entrepreneurship of increased innovation and productivity. This work investigates the impact of firm regulations on price competition, firm entry, and innovation (productivity growth) to contribute to our understanding of these apparent tradeoffs.

Regulations are designed, among other reasons, to correct market failures, protect regional interests, and contribute to the moral aspirations of a society (e.g. reduce discrimination, enforce language laws, etc.). However, the literature offers little indication as to the relative performance of different types of regulations with respect to their impact on entrepreneurship and innovation. This is because prior empirical work has either looked at the impact of one particular regulation or, more commonly, has employed measures of regulatory extent rather than the nature of the specific regulations themselves.

Since industry regulation is rarely monolithic, there may be opportunity to choose from a menu of regulations in an effort to preserve these first-order goals while minimizing the costs of regulation. Indeed, most regulated settings already comprise

multiple regulations including entry restrictions and/or operating restrictions. Entry restrictions and operating restrictions differ in their impact on entrant and incumbent firm behavior. Operating regulations restrict the actions of all firms within the market. These regulations typically mandate specific firm behavior, such as requiring firms to follow specific 'best' practices or setting a minimum for allowed product quality. For example, regulations in the child-care industry include a minimum staff-child ratio. Accordingly, one concern with operating regulations is that they may limit firms' ability to differentiate. An additional concern is that regulatory mandates may be driven by current processes and/or technologies and, as a result, may limit firms' ability to innovate or respond to future changes within the industry.

In contrast, entry regulations set no mandate for firm behavior. Rather they achieve their goals by screening potential entrants based on human and/or physical capital requirements. For instance, state banking commissions typically require potential entrants to have extensive industry experience as well as invested capital in excess of a million dollars in order to enter. Among incumbent firms, entry regulations such as these may allow for maximum flexibility in strategic decision-making when compared to operating regulations. However, by increasing the size and capital requirements for entrepreneurs there is concern these regulations may indiscriminately screen out small, young firms (Klapper Laeven Rajan 2006). Furthermore, by restricting the pool of potential entrants, such regulation may deter competition and affect incumbent incentives to innovate (Posner 1975, Peltzman 1978, Stigler 1971).

Chapter 1 addresses the concern that entry regulations, by restricting entry, may deter competition. This analysis finds the counter-intuitive result that a regulatory environment with entry regulations requires fewer firms than an environment with unrestricted entry to achieve a competitive environment (lower price-cost margins). In contrast, operating regulations were found to have no impact on price competition compared to an unregulated environment.

Chapter 2 investigates the larger implied negative relationship between regulation and firm entry and innovation (productivity growth). Results from this analysis indicate that both entry and operating regulations reduce the equilibrium number of firms, yet increase innovation (productivity growth) relative to a setting with no regulation. More

specifically, the analysis reveals that specific regulations that operate through firm selection mechanisms (either financial or human capital) increase innovation (productivity growth) whereas regulations that seek to alter firm behavior directly have no impact on firm entry or innovation (productivity growth).

These results suggest that it is possible to design regulations without imposing a cost on price competition, innovation, and productivity growth. They also provide preliminary evidence as to which types of regulations best accomplish this goal.

Setting: The United States Bail Bond Industry

The challenge in investigating the comparative effect of specific regulations on firm behavior is finding a setting with considerable regulatory heterogeneity, and yet, without substantial variation in other institutional or regional conditions that may also contribute to deviations in firm behavior. In order to control for such variations, a within-country, within-industry study is often the best approach. However, finding regulatory heterogeneity within a specific country and industry can still be quite difficult, as even when there is considerable regulation at the state-level within a country, many states follow similar approaches in regulation; in fact, it is not uncommon for specific statutes to be identical across states.

Due to historical factors associated with its development, the United States bail bond industry, which is regulated at the state-level, has considerable variation in regulations across regions and with time. It, further, has natural quasi-experimental properties that make it ideal for studying the impact of firm regulation on price competition, firm entry, and innovation (productivity growth). It is comprised of roughly 14,000 owner-managed firms in over 3,000 discrete markets (county courthouses) that differ in demand (demographics and crime rates), entry costs and restrictions (through entry regulations), as well as profitability per defendant (through operating regulations). Furthermore, there are measures of market productivity and innovation that are readily comparable across markets and with time, which is not this case in many industries. Finally, there is substantial industry churn: new firms enter each year at a mean rate of 20% of the incumbent population (versus 10% within the economy generally). Thus the setting

presents an unusually sensitive test of entrepreneurial response to differences/changes in market conditions (including regulations).

Bail is a financial system for providing defendants freedom prior to trial while simultaneously attempting to ensure their appearance at trial. The court holds the bail amount in exchange for the release of the defendant pending trial. If the defendant appears at trial, the full bail amount is returned to the defendant regardless of trial outcome. If the defendant fails to appear at trial, the court retains the full bail amount and issues an arrest warrant for the defendant. Surety bonds (the bail bond industry) are a market mechanism for meeting bail in which a bail agent posts a surety bond with the court on behalf of a defendant.

Regulation in the bail bond industry is performed at the state-level, typically by the state Department of Insurance. The regulations are designed to prevent consumer and human right abuses that might arise due to the informational asymmetry between bail agents and prospective clients, the rare frequency of the business transaction for most clients, and the sensitive nature of the client situation. In order to fully appreciate the regulatory objectives in the bail bond industry, one should consider how these issues of uncertain quality and the government's role therein contribute to a particularly complex market environment.

Although the motivation for regulation may be similar across states, the specific regulations adopted in the bail bond industry vary across states and over time. This variation in type of regulation used by states does not appear to correlate with demographics, population, or crime levels. In most states, bail bond regulation comprises a combination of background restrictions and bail skill requirements at the individual level and setup costs, required business practices, and commission fee limits at the firm level. These restrictions affect firms' entry and operating costs.

Entrepreneurs entering a given bail bond market are typically drawn from the local population of bail agents. Bail bond firms can be operated from a home office with less than \$15,000 of invested capital: a fidelity bond filed with the state, a yellow page ad, and collateral held with the underwriter (Verocchi 2006). In this sense, the bail bond industry closely matches other professional service industries.

Chapter 1: Competitive Cost of Regulation

Market entry is one of the boldest strategic decisions a firm can make. From a firm perspective, entry is valued for its prospective profits. From a policy perspective, entry is valued because it triggers competition. This generates lower price-cost margins in the short run and greater efficiency in the long run (Barnett and Hansen 1996, Aghion et al 2001). These improved outcomes are obtained as firms either adapt through increased innovation to lower costs or increase willingness to pay (Jovanovic and MacDonald 1994, Klepper 1996) or are selected out of the market (Jovanovic 1982, Hannan and Freeman 1977, 1984). It is for this reason that free entry, unconstrained by real or artificial barriers, is valued by society. Empirically, the effects of lower price-cost margins and improved innovation have been demonstrated across a variety of industries (Bresnahan and Reiss 1991, Syverson 2004).

There is concern in the literature that by increasing the size and capital requirement necessary for entrepreneurs and by restricting entry, regulation deters competition and inhibits the disciplinary effects of competition on incumbents (Posner 1975, Peltzman 1978, Stigler 1971, Klapper Laeven Rajan 2006). This is especially of concern as the use of regulations has become increasingly pervasive; both as associated with the correction of market failures and other first-order policy concerns, and also due political maneuvering and incumbent lobbying. The goal of this chapter is to understand the extent of this regulatory cost on price competition.

In order to do so, counterfactual policy experiments across a range of regulatory environments (no regulation, only entry regulation, only operating regulation, and both entry and operating regulation) were conducted. These counterfactual policy experiments allow us to simulate how the industry would look under each of these regulatory environments. By then comparing the outcome measures across regulatory environments, we can better understand the effect of the specific regulations on the outcome measures (in this case, price competition). The counterfactual policy experiments in this chapter rely on an adapted version of Bresnahan and Reiss' (1991) methodology. These counterfactual policy experiments indicate that entry regulations achieve competitive margins (e.g. lower price-cost margins) with fewer firms in the market than in an unregulated environment. Operating regulations, however, show a

similar pattern as an environment with no regulation and are assumed to have no effect on price competition (potentially due to the challenges surrounding enforcement of operating regulations).

My results indicate that far from deterring the disciplinary effects of competition, entry regulations may in fact bring about a competitive environment with the entry of a fewer number of firms. This may be due to a reduction in the number (and churn) of low quality and part-time firms in the market. These low performing firms may not know their true costs and, as such, price in manners that, despite their eventual market exit, make it difficult for other firms in the market to compete around given the product homogeneity from the consumer perspective. Restricting the entry of these firms through entry regulations improves price competition and results in lower price-cost margins.

For policy makers, this means that there may not be a cost to competitiveness from correcting market failures using entry regulations. For firms, this indicates that the specific nature of the policies used by regulators can have dramatically different effects on the competitive environment within their industry. This means that in addition to focusing on whether industry regulations will come to pass, firms need to also focus on the specific nature of the statutes themselves. For managers, this strongly suggests that non-market strategies should incorporate not just the legislators, but also the regulators themselves.

Chapter 2: Schumpeterian Cost of Regulation

Entrepreneurship is valued in part because it stimulates Schumpeter's gale of creative destruction. In addition to bringing forth "the new commodity, the new technology, the new source of supply, the new type of organization" (Schumpeter 1947: 84), entrepreneurial entry "strikes...existing firms...at their foundations and their very lives" and thereby triggers two forms of incumbent response: an immediate response of lowering prices as addressed in the first chapter, and often a lagged response of strategic investment to reduce cost and escape competition (Aghion et al 2001). It is these strategic investments by firms to escape competition by reducing cost and/or improving quality, in addition to the direct actions of entrepreneurs, wherein innovation occurs.

One factor shown to affect the level of entrepreneurship is the administrative cost of entry imposed by governments. In a 2002 study, Djankov et al characterized the administrative entry costs to start a business across 85 countries (including both direct payments and time spent complying with procedures). The study revealed dramatic differences between entry costs (expressed as percentages of per capita income) in the US (0.017) versus Europe (0.35 to 0.40) as well as other countries. In addition, the study indicated that countries with lower entry costs had higher entry rates as well as higher productivity, as the Schumpeterian gale anticipates. The Djankov entry cost data were subsequently employed in a number of studies to further examine the basic findings. These studies revealed that entry costs had a significant detrimental impact on entry rates (Fisman and Sarria-Alende 2004, Klapper, Laevan and Rajan 2006, Ciccone and Papaioanno 2007, Dreher and Gassebner 2007) as well as total factor productivity (TFP) (Nicoletti and Scarpetta 2003, Fisman and Sarria-Alende 2004, Loayza Oviedo Serven 2005, Barseghyan 2008).

Not surprisingly, these findings stimulated widespread policy reforms to simplify business startup: 193 reforms across 116 countries (World Bank 2008). The reforms in turn fueled a second wave of empirical analyses employing new natural experiments with varied entry costs and administrative procedures. The second wave of empirics largely corroborated the results from the initial wave of entry costs studies. Studies of SARE (Expedite Business Startup System-- a federal government program allowing startups to open operations within one business day of application) in Mexico indicated that the startup rate (new entry as a percentage of the number of incumbent firms) increased four to five percentage points (Kaplan Piedra and Siera 2007 and Bruhn 2008) after the introduction of a more simplified, expedited new business registration system. In addition, the SARE studies found that the increased entry rate was associated with increased job creation (Kaplan Piedra and Siera 2007) as well as decreased prices (Bruhn 2008). Similar results were found for reforms in Brazil (Monteiro and Assuncao 2006), Russia (Yakovlev and Zhuravskaya 2007) and India (Chari 2007). Moreover, these results were consistent with prior studies of US deregulation, such as Olley and Pakes (1996) who found that telecommunications deregulation stimulated significant entry, which in turn generated the downsizing and shutdown of unproductive plants resulting in

substantial increases in productivity growth. These studies have been used to reinforce the popular view that regulation is counter to entry and innovation (productivity growth), expressed in political rhetoric, as well as in many policies proposed in response to the economic downturn.

However, as highlighted above, regulations are designed primarily for first-order policy concerns such as correcting market failures, protecting regional interests, and contributing to the moral aspirations of a society. The literature offers little guidance regarding the impact of these regulations on second order concerns such as entry and innovation. The goal of this chapter was to extend prior work both by examining regulation's impact on firm entry and productivity, and by looking at specific forms of regulation rather than regulatory extent.

As in the first chapter, counterfactual policy experiments were conducted. The goal here was to understand the extent to which differences in firm entry and innovation rates are driven by differences in regulation. These counterfactual policy simulations rely on structural models of the entrepreneur's entry decision and the incumbent's continuation (not to exit) decision. Results from this exercise indicate that both entry regulations and operating regulations (acting entirely through the continuation costs and not through mandated 'best' practices) reduce the amount of market churn (firm entry and exit), yet increase productivity relative to a setting with no regulation. These market-level productivity improvements were shown to be due primarily to regulations inducing firm selection either by restricting entry through entry costs and/or procedures (e.g. fees, licensing, or exams) or by restricting firm continuation in the market through costs to continue in operations (e.g. continuing education courses). Learning-by-doing and/or technology adoption also contributed to the productivity improvements seen, but the effect was minimal in comparison to the selection effect. Mandated 'best' practices, however, were found to have no effect on entry or productivity. Counter to most previous studies, lower entry and lower firm counts were inline with increased market productivity.

For policymakers, the results suggest that regulations designed to induce 'best' practices by mandating specific operating procedures are not effective at increasing innovation (productivity improvements) – either due to an ineffective direct mechanism

or to a lack of enforcement. A clear implication for policymakers is to consider enforcement when designing regulations. Both the ability to monitor the relevant business practices and the specifics of the industry should be considered in regulatory design. While it may be possible to regularly monitor the record books of a few firms, it is unlikely that a small regulatory agency could regularly monitor the books of dozens of firms. It is unclear even if effective in the short run, that designing regulations based on current 'best' practices would not impede the progress of the industry as technology changes. Poorly designed regulations focused on established 'best' practices might unduly penalize experimentation by entrants and incumbents and, as a result, industry productivity and innovation may lag over the long term despite regulations initially perceived as benefiting productivity.

A more effective mechanism to improve market productivity and innovation may be entry or operating (continuation) regulations. This type of regulation is far easier to enforce since it requires regulatory oversight at a defined and discrete time point. These regulations tend to be more objective in nature, decreasing the influence of individual regulators and incumbent firms (although firms may still influence legislators to increase entry regulation). Additionally, such regulations do not set mandates regarding how firms operate, allowing for industry experimentation and an unconstrained evolution. Interestingly, the analysis shows that entry regulation need not be financially binding to potential entrepreneurs to generate productivity benefits; both financial constraints, such as requiring the posting of an initial cash bond, and time and capability constraints, such as requiring the passing of an industry exam were similarly effective in restraining entry and increasing productivity. Operating (continuation) regulations have the additional advantage that, as the point of regulatory review is at set intervals after the founding of the firm, selection occurs based on the realized firm profit, not the expected firm profit. As such, regulations on the firm continuation decision may serve better than entry regulations when the expected profit function is positively skewed with negative or low average expected profit and/or when regulators want to encourage a high level of experimentation. In these scenarios, operating (continuation) regulations place no additional burden on experimentation, but encourage quick withdrawal from the industry should low performance be realized. In addition, such regulations are ideal when

regulators do not have an effective metric with which to screen potential entrants or are otherwise concerned about improperly screening entrants. However, there is a challenge with implementing incumbent-focused regulations since incumbents are more readily able to organize to resist such regulations compared to dispersed potential entrants. This will make it easier for such regulations to be perceived as unnecessary regulatory 'red-tape,' despite having potential market benefits above-and-beyond entry regulation.

Conclusion

These analyses highlight the need for careful consideration of specific regulations on entrepreneurship and innovation (productivity improvements) rather than measures of regulatory extent. This dissertation is an initial attempt at doing so. These analyses find that regulations inducing firm 'best' practices have no effect on price competition, firm entry, or innovation, whereas regulations affecting firm selection (either ex-ante through entry regulations or ex-post through continuation costs) appear to reduce firm counts while increasing price competition and innovation (productivity improvements). These benefits are above and beyond the intended first-order policy goals of the regulations (prohibiting transaction inequities and rights abuses in the bail bond setting). These results suggest that it is possible to design regulations without imposing the cost on innovation. They also provide preliminary results as to which regulations best accomplish this goal.

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