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A model of destructive entrepreneurship

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Working Paper No. 2010/34

A Model of Destructive Entrepreneurship

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April 2010

Abstract

The current research on entrepreneurship as an economic phenomenon often assumes its desirability as a driver of economic development and growth. However, entrepreneurial talent can be allocated among productive, unproductive, and destructive activities. This process is theorized as driven by institutions. Although the tradeoff between productive and unproductive entrepreneurship has been examined, destructive entrepreneurship has been largely ignored. We build from existing theory and define destructive entrepreneurship as wealth-destroying. We propose three assumptions to develop a model of destructive entrepreneurship that presents the mechanisms through which entrepreneurial talent behaves in this manner. We present four key propositions on the nature and behavior of destructive entrepreneurship. We conclude by identifying policy and research streams that emerge from our model.

Keywords: destructive entrepreneurship, entrepreneurship, allocation, rent-seeking, incentives, informal institutions

JEL classification: O1, L26, P00

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1 Introduction

Attempts to shed light on the dynamics of entrepreneurial talent have come overwhelmingly from empirical perspectives, while its theoretical foundations have remained largely unexplored. Empirical approaches tend to assume that entrepreneurship should be encouraged—i.e., that its positive effects on job creation, wealth creation, and innovation (Acs and Audretsch 1988) are universal across contexts. Such approaches focus on key relationships, i.e., between banking and new firm formation, with the underlying assumption motivation of understanding and identifying channels to strengthen entrepreneurship.

However, entrepreneurial activity is not universally "good" because entrepreneurs act in creative ways simply to increase their wealth, power, and prestige—and without active consideration of externalities or societal effects (Baumol 1990). Entrepreneurial talent is allocated to activities with the highest private returns, which may not generate the highest social returns (Murphy, Shleifer, and Vishny 1991). If activities are chosen based on perceived profit, it is not implicit that they will have positive effects and can include activities with questionable or undesirable societal outcomes. Therefore, entrepreneurial talent can be allocated among a range of selections with varying effects.

The determinants of this allocation process lie in the overarching institutional framework, for which two similar theories have been proposed. The theoretical framework proposed by Baumol (1990) is a seminal contribution to the growing literature on entrepreneurship and economic processes. In this theory, Baumol identifies productive entrepreneurship as wealth-creating activity and unproductive entrepreneurship as redistributive activity. Baumol (1990) assumes a generally substantial role for entrepreneurs across societies and argues that entrepreneurial behaviors respond to incentives set by institutions (i.e., "the rules of the game"), which are subject to change in any given institutional context. Murphy, Shleifer, and Vishny (1991) make a similar argument, distinguishing between entrepreneurship and rent-seeking. They find that rent-seeking rewards talent more than entrepreneurship in many countries. In their approach, the tradeoff is between entrepreneurship (starting firms that innovate and foster growth) and rent-seeking (redistributing wealth and reducing growth). Although Murphy, Shleifer, and Vishny (1991; 1993) treat entrepreneurship as distinct from rent-seeking, we argue this is the result of the tendency to consider entrepreneurship desirable in general. Their terms actually parallel those of Baumol: "entrepreneurship" with "productive entrepreneurship" and "rent-seeking" with "unproductive entrepreneurship." In addition, both Baumol (1990) and Murphy, Shleifer, and Vishny (1991) are consistent in their focus on incentive structures determining entrepreneurial choices among these two broad classes of activities. However, Murphy, Shleifer, and Vishny (1991) make an additional, critical distinction: that increasing returns to ability will force entrepreneurship and rent-seeking to compete for the same talent.

If this is indeed the case—that the same actor could be engaged in such different entrepreneurial activities—then the mechanisms through which entrepreneurial talent is allocated have critical implications for modern economic thought. The tradeoff between productive and unproductive activity has been discussed most often in the context of economic organization. For example, Bhagwati (1982) proposed directly unproductive, profit-seeking activities, which comprise rent-seeking as subset. However, these

approaches tend to treat rent-seeking (or unproductive entrepreneurship) as the worst case condition, which threatens productive entrepreneurship (see also Nunn 2007 and Grossman and Kim 1995 for related work). Murphy, Shleifer, and Vishny (1993) find a negative effect of rent-seeking on growth is stifling innovation through bureaucratic agents. These effects (stifling innovation and creating inefficiencies) prevent the proverbial "pie" from growing, thereby generating unproductive overall results. Baumol's passing mention of destructive entrepreneurship serves largely as acknowledgment of the existence of a truly negative type of entrepreneurial activity. However, neither perspective presents a convincing explanation for the s*hrinking of the pie* – i.e., what happens when entrepreneurial activity does not create or redistribute wealth, but *destroys* it. We extend Baumol's peripheral discussion of this concept in a simple and intuitive manner, to define destructive entrepreneurship as wealth-destroying (such as the destruction of inputs for production activities).

There is no conceptual framework for destructive entrepreneurship and the topic is noticeably absent from the literature. The current understanding of entrepreneurship is fundamentally incomplete, rendering applications of existing knowledge inadequate or worse, inaccurate. This is particularly the case for public policies and economic development. For example, most models of entrepreneurship assume occupational choice: individuals can choose between entrepreneurship and wage employment. Murphy, Shleifer, and Vishny note that "when they are free to do so, people choose occupations that offer them the highest returns on their abilities" (1991, 503). However, very real constraints exist on individual occupational choice (see Ghatak and Jiang 2002) and thus, entrepreneurial choices particularly in developing countries. In addition, existing models of entrepreneurship may be appropriate for high growth and high technology sectors, but simply do not fit many, if not most, activities in poor, underdeveloped, and conflict countries.

In this paper, we advance the literature by proposing a model of destructive entrepreneurship. We use three important assumptions to build our theory. First, we assume constant supply but varying allocation of entrepreneurial talent. Second, we assume that entrepreneurs can diminish inputs for production. Third, we assume heterogeneity of entrepreneurs. Our assumptions allow us to shift the focus from the productive/unproductive tradeoff and focus directly on destructive entrepreneurship.

In the next section, we present our assumptions and derive our model of destructive entrepreneurship. In the third section, we briefly discuss incentives and the problems of endogenous institutions in directing entrepreneurship. We present implications and conclude in the fourth section.

2 A Model of Destructive Entrepreneurship

2.1 Assumptions

We begin with three fundamental assumptions:

Assumption 1: *The supply of entrepreneurial talent is constant, but varies in its allocation.*

We accept Baumol's proposition that the supply of entrepreneurs remains relatively constant and assume that the same proportion of people will be entrepreneurs, but their chosen activities can change. As private sector agents, entrepreneurs operate to maximize utility. Although this seems obvious for the study of most economic behavior, it is necessary to restate because it underscores that entrepreneurship is not by nature positive.[1] We view rent-seeking within the spectrum of entrepreneurial activity (as does Baumol 1990). Therefore, we have assumed that entrepreneurs are driven by rents and this generally holds true across the range of allocation.

Assumption 2: *Entrepreneurs are able to diminish inputs for production.*

Classical principal-agent models on externally financed ventures assume that entrepreneurs are able to divert some of the venture's proceeds for private use (e.g., Tirole 2006). Hence, although the cash flows of a venture can be diverted, the productive assets remain untouched. We include the possibility that entrepreneurs can also misappropriate the productive inputs of a venture, effectively destroying the possibility to generate revenues at all. This can be done in two ways: first, destructive entrepreneurs can convince capitalists to invest into a venture and then find ways to steal or misappropriate the committed funds or the fixed assets purchased with them. Second, destructive entrepreneurs can simply raid any productive assets in an economy. Thus, instead of convincing the capitalist to fund a productive venture, destructive entrepreneurs devise ways to forcefully steal the assets from capitalists, irrespective of the latter's investment decision. In our model, we analyse both types of destructive entrepreneurs.

Assumption 3: *Entrepreneurs are heterogeneous.*

Even if all entrepreneurs are born with exactly the same entrepreneurial talent, it is likely that they differ in many other aspects. This heterogeneity can result from different initial endowments of other talents, varying degrees of training or skills, different levels of patience (discount factors), or from differences in access to markets or to facilitating networks. This heterogeneity may not influence the entrepreneurial talent per se, but affects the magnitude and choice of possible returns once the talent is employed (see Murphy, Shleifer, and Vishny 1991 for related discussion). In less developed economies, additional training, initial endowments, and the urgency for quick returns play a particularly important role in the success of entrepreneurial activities, as well as constitute dimensions with significant heterogeneity and polarization. To integrate this aspect, we assume that entrepreneurs expect different payoffs from their activities. For simplicity, we model this assumption by specifying different levels of patience (discount factors) for entrepreneurs, but other characteristics that motivate heterogeneous project returns are also possible.

Together, these three assumptions shift the lens from productive and unproductive entrepreneurship to destructive entrepreneurship.

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1 We are explicit because most studies separate rent-seeking from entrepreneurship. As noted earlier, for example, Murphy, Shleifer, and Vishny (1991, 520) state that talent will allocate to *either* activity, depending where larger wealth is available.

2.2 Framework

The basic framework for the model of destructive entrepreneurship builds upon the work of Tirole (2006), who employs a simplified version of the model by Holmstrom and Tirole (1997). The starting point of the model is that any entrepreneurial opportunity will require a fixed investment *I*, which the entrepreneur cannot fully finance internally. Let us assume the entrepreneur would like to exploit an opportunity. Initially, the entrepreneur has assets $A < I$. Since he must access external capital, he will approach a capitalist for the amount $I - A > 0$. If undertaken, the activity will yield a verifiable income $R > 0$.

Based on this framework, we assume that the entrepreneur has two types δ_i, which can be interpreted as levels of impatience. This reflects the notion of heterogeneity between entrepreneurs. The capitalist believes that the types δ_i are independent and only have two possible values: $\delta_i = \delta$ is an impatient entrepreneur with a low discount factor and $\delta + \Delta$ is a patient entrepreneur with a high discount factor, with $\Delta > 0$. The capitalist believes p is the probability that δ_i equals $\delta + \Delta$ and that $(1 - p)$ is the probability that δ_i equals δ. Thus, p corresponds to the proportion of patient entrepreneurs in the market. Only the entrepreneur knows his type δ_i, however.

The contract between the capitalist and the entrepreneur stipulates if the activity will be financed, and how the profit will be shared between the capitalist and the entrepreneur. For simplicity, we abstract from moral hazard problems and concentrate on the adverse selection problem only. It can be proven more rigorously that no positive transfer will be specified from the capitalist to the entrepreneur. We assume that the capitalist cannot specify a menu of contracts that leads to self-selection of the two types of entrepreneurs.

If the activity is successful, the two parties share the profit R, such that R_L goes to the capitalist and $R - R_L = R_E$ goes to the entrepreneur. The entrepreneur's limited liability implies that both sides will receive 0 in case of failure. The capitalist's claim can but need not to be interpreted as debt. In fact, the outside financing can take the form of either debt or equity.[2] For simplicity, however, we will present the model only in terms of debt-financing.

An entrepreneur of type i will earn $\delta_i R_E$. The patient entrepreneur will earn discounted profits $(\delta + \Delta)R_E > \delta R_E$, with $0 \leq \delta + \Delta \leq 1$, if $I - A$ has been invested into the *productive* venture. Alternatively, the entrepreneur can behave *destructively* and misappropriate the investment of the capitalist. In this case they keep their assets A and earn a destructive profit $\lambda(I - A)$ from the capitalist's investment. Here, λ represents a specific, exogenously given institutional environment, e.g., the level of rule of law in a country. If λ is high, weak institutions allow a destructive entrepreneur to appropriate a

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2 For instance, if the profit is 5, the capitalist's share of 1 can be interpreted either as a claim from 20 percent ownership, or as a claim from risky debt with a nominal value of 1. Analogously, a 10 percent return on investment for the capitalist can be interpreted either as an interest rate on debt, or as an internal rate of return of an equally risky equity investment.

high share of the capitalist's investment. A low λ represents a strong institutional environment where destructive entrepreneurship is less profitable.

The zero profit constraint of the capitalist (e.g., due to competition) can be written as:

$$R_L = I - A.$$

The rate of interest ι is implicitly given by:

$$R_L = (1+\iota)(I - A). \tag{1}$$

If the activity is not financed, the entrepreneur still holds his original assets A and the capitalist still holds his original assets $I - A$. To make things interesting (and for many countries also more realistic), we assume that the two types of entrepreneurs also have different incentives. Consistent with our theory, these incentives are determined by the institutional conditions represented by λ. We thus assume that the patient entrepreneur prefers to invest the external capital into the productive venture, with $(\delta + \Delta)R_E \geq A + \lambda(I - A)$, while the impatient entrepreneur prefers to behave destructively, because $\delta R_E < A + \lambda(I - A)$. Thus, the impatient entrepreneur will earn the destructive profit $\lambda(I - A)$.

This can be interpreted as economic inequality where one type needs the profits out of the project much earlier than the other, and in extreme, right away by stealing them once invested. As an alternative to different discount factors, we could also assume that the two types of entrepreneurs expect different profits (R_{hi} and R_{lo}). For instance, one entrepreneur may be less skilled or educated and therefore expects a much lower profit R from the venture than a more educated/skilled entrepreneur. Here, not the discount factor is different, but entrepreneurs are heterogeneous in their expected R (private knowledge to the entrepreneur), but the results would be qualitatively similar.

2.3 The Capitalist Analysis

In equilibrium, the capital will invest if:

$$pR_L \geq I - A,$$

$$p \geq \overline{p} \equiv \frac{I - A}{R_L}. \tag{2}$$

With respect to the interest rate of the capitalist, we can define critical levels of p and ι as:

$$p \geq \tilde{p} \equiv \frac{1}{1+\iota} \Leftrightarrow \iota > \tilde{\iota} \equiv \frac{1}{p} - 1. \tag{3}$$

As long as $p < 1$, there is some positive probability $(1 - p)$ that the capitalist will invest and face a destructive entrepreneur. The capitalist will ask for an interest based on the probability of meeting a patient versus an impatient entrepreneur. This situation perfectly demonstrates how the relationship between the capitalist and the entrepreneur

can become embedded. On the one hand: the higher the probability of meeting an impatient entrepreneur, the higher the interest rate charged by the capitalist. On the other hand: the higher the interest rate he is able to charge, the more accepting is the capitalist of impatient entrepreneurs in the market.

Note that as a necessary condition for financing the activity, the entrepreneur's assets are greater than $\overline{A}$:

$$I - pR_L \equiv \overline{A} \leq A. \tag{4}$$

This condition corresponds to established credit rationing models (see Holmstrom and Tirole 1997; Tirole 2006), which demonstrate that the entrepreneur needs to invest some level of necessary collateral $\overline{A}$ in order to receive any external investment. In (4) this critical level $\overline{A}$ is lower when the fraction p of patient entrepreneurs in the market increases, or when the contractually specified loan to the capitalist increases.

In (4) this critical level $\overline{A}$ is also lower when the total investment necessary for the activity decreases. By substituting $R_L = R - R_E$ into (4) we can rearrange the condition to relate it to return on the return on investment for the project:[3]

$$1 - p(\frac{R}{I} - \frac{R_E}{I}) = \frac{\overline{A}}{I} \leq \frac{A}{I}. \tag{5}$$

For the given investment I a decrease in return on investment R will increase the entrepreneur's necessary collateral $\overline{A}$. Therefore, in less profitable markets, capitalists will require entrepreneurs to provide higher collateral and tighten credit rationing. If entrepeneurs are less able to access external financing, they can shift towards higher levels of impatience. In turn, this can discourage capitalists from investing.

2.4 The Entrepreneur Analysis

In the following section, we will derive the comparative static properties of the equilibrium conditions from the perspective of the entrepreneur. In order to observe productive and destructive entrepreneurship simultaneously, the following two conditions need to be satisfied in equilibrium: $(\delta + \Delta)R_E \geq A + \lambda(I - A)$ and $A + \lambda(I - A) > \delta R_E$. From these conditions we can conclude the following proposition:

Proposition 1: *For all* $\overline{R}_E \geq R_E \geq \underline{R}_E$, *productive and destructive entrepreneurship coexist in equilibrium, with:*

$$\frac{A + \lambda(I - A)}{\delta} \equiv \overline{R}_E > \underline{R}_E \equiv \frac{A + \lambda(I - A)}{(\delta + \Delta)} \forall \Delta > 0. \tag{6}$$

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3 Or, the capital intensity if I is interpreted as capital requirements for the activity.

It follows that for all $R_E \geq \overline{R}_E$ there will be only productive entrepreneurship, since both types of entrepreneurs will prefer the profit from the productive activity. For $\underline{R}_E \geq R_E$, both types will prefer the profit from destructive entrepreneurship.

Thus, if returns from productive activities are very low, destructive entrepreneurship will dominate, and will even be pursued by more patient entrepreneurs. Above a certain level of project returns, however, it will be more profitable for patient entrepreneurs to behave productively, although impatient entrepreneurs will still be destructive unless an even higher level of productive returns is reached.

Next, we analyse how this interval is affected by changes in Δ. It is straightforward to see that while $\overline{R}_E$ is independent of Δ, $\underline{R}_E$ is a decreasing function of Δ:

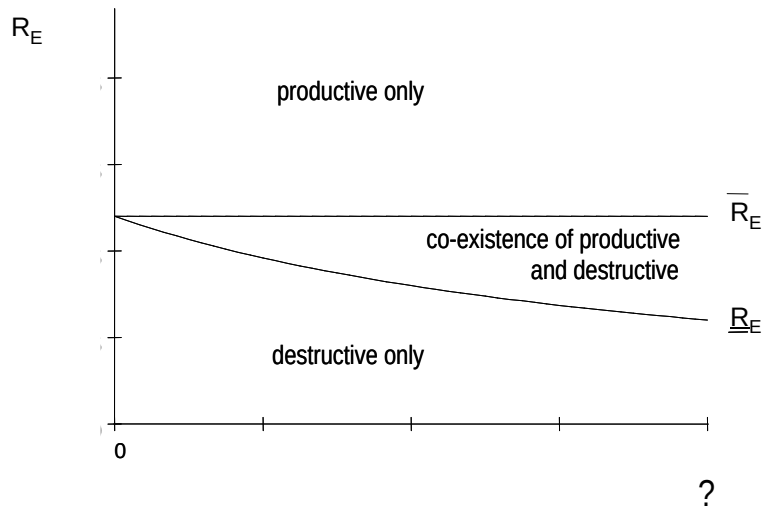
$$\frac{\partial \underline{R}_E}{\partial \Delta} = \frac{\partial\left(\dfrac{A+\lambda(I-A)}{(\delta+\Delta)}\right)}{\partial \Delta} = -\frac{\left(A - A\lambda + I\lambda\right)}{\left(\Delta+\delta\right)^2} < 0. \qquad (7)$$

This allows us to formulate the following proposition on the heterogeneity of entrepreneurs' with regard to their patience:

Proposition 2: *The larger the difference Δ of the entrepreneur's degree of patience the larger the interval in which both forms of entrepreneurship coexist.*

For arbitrary fixed vales of A, I, λ and δ, the following figure represents $\overline{R}_E$ and $\underline{R}_E$ as functions of the difference Δ of the entrepreneur's patience:

Figure 1: $\overline{R}_E$ and $\underline{R}_E$ as functions of the difference Δ of the entrepreneur's patience



The interval for R_E, where productive and destructive entrepreneurship coexist, increases in the difference in patience between the two entrepreneurs. Concurrently, the interval for which only destructive entrepreneurship exists is decreasing. Intuitively, the patient entrepreneur's incentive to behave destructively is reduced, because his revenue

from the activity increases with Δ. As the impatient entrepreneur's incentives remain unchanged, the overall incentive to behave destructively decreases in Δ.

Of course, the result that the interval, in which productive and destructive activities coexist, increases in Δ, does not critically depend on the interpretation of Δ as the difference of entrepreneurs' patience. In principle, any other type-specific characteristics that affect R_E in a similar manner, and that motivate heterogeneous project returns across an entrepreneurial talent base, can produce similar results. These may be different levels of training, skills, market access, supportive networks, or any other factor that systematically produces heterogeneous project returns across the entrepreneurial talent base.

For an analysis of the effect of destructive entrepreneurship on social welfare we first define welfare as the sum of all profits (i.e., of the capitalist, the productive entrepreneur, and the destructive entrepreneur). If parameters are such that there is only productive entrepreneurship, welfare will be given as:

$$R_L + p(\delta + \Delta)R_E + (1-p)R_E . \tag{8}$$

Consider a situation in which the impatient entrepreneur is just indifferent between investing productively and disappropriating the capitalist's capital, thus $R_E = \overline{R}_E$. In this situation we know that for any $R'_E \leq \overline{R}_E$ the impatient entrepreneur will become destructive:

$$(1-p)\delta R'_E \leq (1-p)(A + \lambda(I-A)) , \tag{9}$$

and hence:

$$\begin{aligned} & R_L + p(\delta + \Delta)\overline{R}_E + (1-p)\overline{R}_E \\ & \geq R_L + p(\delta + \Delta)R'_E + (1-p)R'_E \\ & > p(R_L + (\delta + \Delta)R'_E + (1-p)(A + \lambda(I-A)) + (1-p)0. \end{aligned} \tag{10}$$

The last inequality stems from the fact that even the smallest reduction in R_E will, in equilibrium, lead to misappropriation of the capital with probability $(1-p)$. Thus, on the left hand side, we have the first best solution for a given R_E, while on the right hand side we have the equilibrium situation. Welfare reduction resulting from destructive entrepreneurship is thus captured by the difference in welfare in these two situations. Furthermore, we can add η as the shadow costs of enforcement, implying that the part of the investment not appropriated by the impatient entrepreneur is wasted to some degree *(1-η),* and is not entirely flowing back to society (neglecting conservatively any positive externalities from the project on society):

$$\begin{aligned} & R_L + p(\delta + \Delta)R'_E + (1-p)R'_E \\ & > p(R_L + (\delta + \Delta)R'_E + (1-p)((A + \lambda(I-A)) + (1-\lambda)(\eta(I-A)) \\ & \Rightarrow R_L + \delta R'_E > A + \lambda(I-A) + (1-\lambda)\eta(I-A). \end{aligned} \tag{11}$$

Using $R_L = I - A$ the last inequality can be rearranged to:

$$
\begin{aligned}
&I - A + \delta R'_E > A + \lambda(I - A) + (1-\lambda)\eta(I - A) \\
&\Rightarrow (1-\eta)(1-\lambda)(I - A) + \delta R'_E - A > 0.
\end{aligned} \tag{12}
$$

Interpreting this difference as the negative effect of the existence of destructive entrepreneurship on social welfare, we can conclude:

Proposition 3: *The effect of destructive entrepreneurship on social welfare is negative. The negative effect of destructive entrepreneurship is the weaker, the higher A, η, and λ. Larger δ and R_E increase (c.p.) the negative effects of destructive entrepreneurship.*

Thus, the more entrepreneurs (patient or impatient) are able to invest own capital into the joint project (i.e., the higher *A*), the smaller are the negative effects on welfare by destructive entrepreneurship. Intuitively, the wealthier entrepreneurs are, and the less they are dependent on capitalists' external investments, the less the potential to (partially) destroy these funds (*I*-*A*). Further, we find that the more patient both types of entrepreneurs, the larger the destructive impact on social welfare. This result is driven by the fact that investment returns increase in entrepreneurial patience, generating more profit and social welfare that can potentially be destroyed.

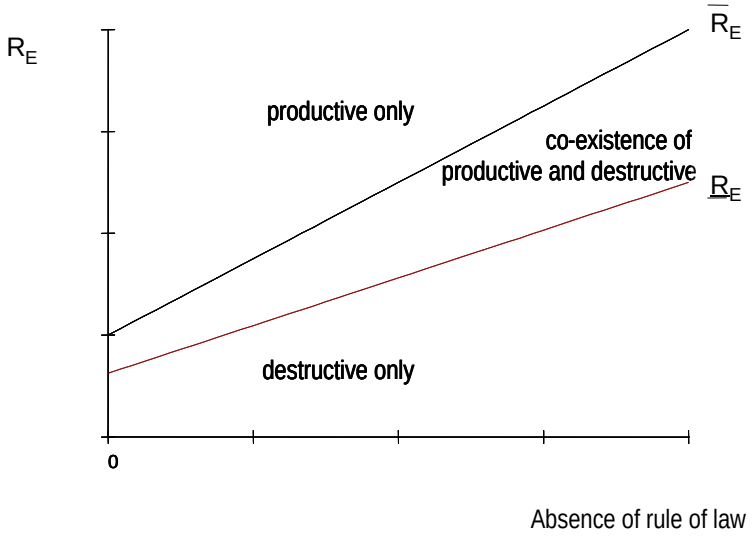
Proposition 3 also states that social welfare is decreasing in two institutional variables, λ (absence of rule of law), as well as η (proportion of assets that can be "saved" from total destruction). The greater the part of the misappropriated investment that can be "saved" from being entirely destroyed in the process, $\eta(1-\lambda)(I-A)$, the higher social welfare. Analogously, the weaker rule of law, the more is the destructive entrepreneur able to consume (i.e., "save") the misappropriated investment, $\lambda(I-A)$, which would otherwise be destroyed and wasted.

To provide more detail on the effects of the institutional environment and condition, we analyse how changes in the absence of rule of law λ affect the interval where both destructive and productive entrepreneurship coexist in equilibrium. We first assume complete absence of rule of law. Comparative static properties show that both critical values $\overline{R}_E$ and $\underline{R}_E$ are increasing functions of λ, but that $\overline{R}_E$ increases with a larger slope:

$$
\frac{\partial \overline{R}_E}{\partial \lambda} = \frac{(I-A)}{\delta} > \frac{\partial \underline{R}_E}{\partial \lambda} = \frac{(I-A)}{(\Delta+\delta)} > 0\,. \tag{13}
$$

For arbitrary fixed values of A, I, δ, and Δ, the following figure represents $\overline{R}_E$ and $\underline{R}_E$ as functions of the change in rule of law λ:

Figure 2: $\overline{R}_E$ and $\underline{R}_E$ as functions of the change in rule of law λ



We can summarize this in the following proposition:

Proposition 4: *The interval for R_E, where productive and destructive entrepreneurship coexist, is increasing under weakened rule of law. The interval for destructive entrepreneurship is also increasing.*

Intuitively, weaker rule of law increases the share of the external investment that can be consumed. Accordingly, there is a greater incentive for both types of entrepreneurs to behave destructively, and there is lower incentive for capitalists to invest.

2.5 Raiding

Up to now we assumed that only resources that are endogenously committed to the venture can be misappropriated. In this extension of the model we include the possibility that the entrepreneur can also decide to raid the resources although there are not endogenously invested by the capitalist. In the model so far, destructive entrepreneurship referred to a situation where, for example, a capitalist decided to invest into a venture, and the entrepreneur (partner in the venture) decided to either steal or misappropriate the committed funds and put them to suboptimal use (e.g., consume funds). The following extension also includes the case, where the capitalist simply has the funds, and an entrepreneur—instead of convincing the capitalist to fund a productive venture—simply raids these funds and consumes them.

Thus, there are two ways that raiding may occur. First, the entrepreneur can misappropriate the assets of the capitalist *independently* of the activity. The entrepreneur can engage in unproductive (redistributive) behavior and steal assets $I - A$ from the capitalist for a payout of $(1-\lambda_L)(I-A)$. Second, the entrepreneur can misappropriate the assets of the capitalist during or within the activity. Given this difference between forceful stealing *outside* and *within* the activity, we introduce $1-\lambda_L$ as a distinct notation for the effectiveness of rule of law with regard to raiding.

This extension of our model incorporates the assumption of a "predator-prey" situation, which is employed in related models of conflict resolution and in the property rights literature (see Bates, Greif, and Singh 2002; Skaperdas 1992). In this situation, the investment consideration of the capitalist will be:

$$pR_L \geq p(I-A)+(1-p)(1-\lambda_L)(I-A)\,,$$

$$p \geq \breve{p} \equiv \frac{(I-A)(1-\lambda_L)}{R_L-\lambda_L(I-A)}. \tag{14}$$

In terms of the interest rate of the capitalist, we can also define the critical levels of p and ι as:

$$p \geq \hat{p} = \frac{1-\lambda_L}{1+\iota-\lambda_L} \Leftrightarrow \iota \geq \hat{\iota} \equiv \frac{(1-\lambda_L)(1-p)}{p}\,. \tag{15}$$

A comparison to the threshold level $\tilde{\iota}$ of the capitalist's interest rate for $\lambda_L = 0$ as in (3) of the above analysis reveals that $\hat{\iota} < \tilde{\iota}$:

$$\hat{\iota} < \tilde{\iota} \text{ if } \frac{(1-\lambda_L)(1-p)}{p} < \frac{1}{p}-1 \Leftrightarrow (1-\lambda_L)(1-p) < 1-p\,. \tag{16}$$

The minimal interest rate that the capitalist demands will be lower if the entrepreneur can raid his assets. Intuitively, the threat of raiding idle assets reduced the expected value of *not* investing for the capitalist. If the capitalist understands this, then he still has an incentive to invest in otherwise unattractive activities, since the return still exceeds his expected costs of being raided.

Similarly, a comparison to the threshold level $\overline{A}$ of assets for $\lambda_L = 0$ as in (4) reveals that $\hat{A} < \overline{A}$, and the critical level of assets (collateral) required from the entrepreneur is lower is the entrepreneur can raid the capitalist:

$$I - \frac{p}{(1-(1-p)\lambda_L)} R_L \equiv \hat{A} < A,$$

$$\hat{A} < \overline{A} \text{ if } \frac{p}{(1-(1-p)\lambda_L)} > p \Leftrightarrow 0 > -(1-p)\lambda_L. \tag{18}$$

3 Institutions and Incentives

It follows from our model that institutions are central drivers of entrepreneurial talent. Entrepreneurs are motivated to make selections based on perceived or expected rewards—i.e., their incentives come out of their institutional constraints.[4] The integral

[4] Baumol notes the implications of incentives favoring one type of entrepreneurship over another can be significant: "If the rules are such to impede the earning of much wealth via activity A, or are such as to impose social disgrace on those who engage in it, then, other things being equal, entrepreneurs'

role of reward structures in determining activity has been discussed at length (Baumol 1990; Murphy, Shleifer, and Vishny 1991; Acemoglu 1995; Grossman and Kim 1995) and typically focused on the tradeoff between productive and unproductive forms. Although there is analytical divergence on whether reward structures are initially shaped endogenously (Acemoglu 1995) or exogenously (Baumol 1990), they always have the potential to become endogenous due to path dependence (see Nunn 2007). This means reward structures are not only critical determinants of the current allocation of entrepreneurial activity, but also potential determinants of future reward structures and related allocations (Acemoglu 1995). Endogeneity in institutions can arise from the relationship between economic and political systems (Acemoglu and Johnson 2005). Entrepreneurs can also directly and indirectly affect institutions through gains of political power.[5] This is one of the many ways through which they may be able to destroy inputs. Endogenous institutions pose a problem when incentives do not favor productive entrepreneurship and particularly when they favor destructive entrepreneurship.

Entrepreneurs are heterogeneous for many reasons—among them is the range of political economy conditions under which they operate. This can lead to the persistence of destructive entrepreneurship both as a static outcome under weak rule of law, and an equilibrium outcome under persistently weak rule of law (see Proposition 4). Country context is the broadest level of differentiation, and research highlights the importance of local, state, and region-level differences in political economy conditions. For this reason, destructive entrepreneurship can become an equilibrium outcome (see also Desai 2008; Douhan and Henrekson 2008). First, individuals may respond to incentives with high time preference. Entrepreneur A may be willing to sacrifice future returns to his activity for lower returns today. If he makes a utility calculation of his expected gains and losses (for more on "participation decision" see Macculloch 2005, 94) and is not confident about transactions tomorrow, he will place a higher premium on what is possible today. The effects are marginal when only one entrepreneur engages in this kind of mental discounting. However, multiple entrepreneurs have a much greater effect. From a game-theoretic perspective, the incentives for destructive entrepreneurship are likely to be stronger in the presence of high time preference.[6] Thus, the long run equilibrium tendency under conditions of uncertain political economy will be towards destructive entrepreneurship.

4 Implications and Conclusion

We provide this model of destructive entrepreneurship in an attempt to explain this neglected concept and widen our understanding of the full spectrum of entrepreneurial activities. Four important research streams come out of this model:

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efforts will tend to be channeled to other activities, call them B. But if B contributes less to production or welfare than A, the consequences for society may be considerable" (Baumol 1990, 898).

5 For an excellent discussion of the effect of entrepreneurs on political power and subsequent effects on economic institutions, see Douhan and Henrekson (2008).

6 A basic hawk-and-dove set-up implies that if exchanging with each other, both entrepreneur A and B will hawk.

First, although the literature on entrepreneurial allocation and its underlying determinants is growing, the specific dynamics, causes, and effects of destructive entrepreneurship remain neglected. Incentives and institutions are increasingly studied with respect to transforming and strengthening economies, this can be greatly enhanced by first clarifying the "furthest point" of destructive entrepreneurship. For example, to what extent does an optimal balance of institutions exist (Acemoglu and Verdier 1998) to discourage entrepreneurial talent from selecting destructive activities? Institutions are paramount in understanding how destructive entrepreneurship occurs, requiring deeper insight into historic processes of institutional existence and change (Greif and Laitin 2004).

Second, significant conceptual work is necessary to understand how destructive entrepreneurship can be both a process and an outcome. This is closely related to occupational choice or the lack thereof, in countries under conditions of uncertain political economy and poor economic development. In many countries, the selection of destructive activities may not be a choice. It is useful to detangle *who* is the destructive entrepreneur and who the "others" are—for example, the actual acts of extractive mining of natural resources in the Congo are carried out by poor citizens, who are coerced to work and generally considered enslaved. However, the trade and rents are captured by middlemen, who are the real entrepreneurs.

This raises important empirical questions, such as measuring the share of destructive entrepreneurship as compared to other forms of entrepreneurship, as well as assessing effects on specific inputs or endowments. Trajectories of development vary depending on factors including human capital, and the allocation of entrepreneurship is likely to be closely related to such factors.

A third related question concerns the temporal dimension. This means, essentially, that perhaps destructive entrepreneurship and its share of total entrepreneurial activity varies not only according to country-specific factors, but to the level of economic development. Perhaps the "entrepreneurial allocation pyramid" changes along with the population pyramid? Perhaps destructive entrepreneurship is greatest in the immediate five years after the introduction of regulatory reforms, or perhaps it is lowest at this point. Understanding the potential relevance of time is likely to provide payoffs for economic development planning.

Fourth, direct delineation from this theory is in the conflict field, where there are many potential research agendas. As civil conflict and global terrorism are increasingly recognized to have roots in economic factors, the potential of entrepreneurship both to help and hinder is key. The destructive of inputs for production (in a context where scarcity already exists) highlights the importance and relevance of destructive entrepreneurship. Total income loss during a typical conflict is shown to decrease annual GDP by about 60 percent (Collier, Elliot, Hegre et al. 2003), and this is facilitated by the shift from productive and unproductive activities to destructive enterprise. As traditional components (market access, policy reform, aid) of economic development efforts in post-conflict countries have not proven effective (ibid. 2003), entrepreneurship offers a great deal of promise *if it is productive*. The role of informal institutions may be especially important in the context of conflict, since these are by nature marked by state and market failures. An interesting question in this regard is: *what specific institutions exert the greatest influence or offer the most opportunity for gains from change?*

In addition, our model highlights important implications for the practice of economic development across institutional context, ranging from inner cities in the United States to rapidly developing economies to post-conflict countries. Our model may provide insight into key failures of some economic development policies. In developing countries, policy has focused on how to increase the share of formal businesses in the economy—both through supporting new businesses and through formalization of existing businesses. However, our model calls into question the fundamental assumption that formal entrepreneurial activity is the solution to problems of development. Destructive entrepreneurship may be a much larger proportion of total entrepreneurial activity within a single economy than currently understood: our model proposes that it coexists with productive entrepreneurship, but the actual distribution of activities is an open question. This leads to a question more evasive than that of formalization: *what is the actual distribution of activities between unproductive and destructive entrepreneurship*? A second question: *how relevant is formalization to productive entrepreneurship?* Knowing that 50 percent of the economy is "formal" offers a limited amount of information as to the nature of these formal activities and *no* information as to the nature of the remaining activities. The ILO estimates 60 percent of the workforce in Asia operates in the informal sector (ILO 2007) but this reveals nothing more about the nature of their activities. This is a critical policy implication, because lobbying and human trafficking have vastly different effects on the economy. Unless the nature of activity is properly understood, attempts at transformation or reshaping have little chance of success. In other words, two developing countries with the same productive allocation (say, 50 percent) may have vastly different allocations of unproductive and destructive (say, 40 percent unproductive and 10 destructive in one, compared with 10 percent unproductive and 40 percent destructive in the other). For this reason, policies aimed at formalizing existing informal business will not be effective in mitigating destructive entrepreneurship, which in many countries is likely to comprise illegal activities. For example, people engaged in informal, illegal activity are unlikely to be reached through traditional economic development formalization strategies. However, people in informal self-employment that sources to the formal sector can be reached by strategies aimed at widening the tax base. Economic development policy can be made more effective by gaining the nuances of allocation, particularly if they have become oversimplified because we simply do not have enough information.

The policy applications are particularly important in the context of conflict. In these countries, the formal sector shrinks or often disappears during war. It may be taken over by the state or it may disintegrate due to institutional collapse. This does not mean that demand follows the same trend: in fact, this remains quite high during and after conflict but the channels of supply have changed. This supply is, essentially, the allocation of entrepreneurial talent. Post-conflict reconstruction is one of the major challenges to economic development (Wolfensohn 1999). It is further complicated by the endogenous nature of institutions—destructive entrepreneurship is easily institutionalized because entrepreneurs are heterogeneous across regimes, and can become a long run equilibrium.

Thus, a value-added of our model is that it serves as a platform to connect economic realities with economic development policies. Developed country trends cannot be assumed for developing countries, and this is well evidenced by different types of data

that track entrepreneurship.[7] Our model is relevant for uncertain political economies, which tend to be poor. In particular, our model can help explain the apparent mutually reinforcing relationship between poverty and instability (Collier and Hoeffler 1998) in low income countries, nearly half of which have hosted major conflict since 1980 (Wolfensohn 1999).

Our model can enhance understanding of economic activity in a range of societies. Although the implications are perhaps more clear for post-conflict economies, destructive entrepreneurship certainly occurs in countries across levels of development. In developed countries, the lines between unproductive and destructive entrepreneurship may be unclear (such as the sale and use of drugs) and may simply be an empirical question. In developing countries, and as overall development is lower, the tradeoff between unproductive and destructive entrepreneurship is perhaps increasingly unknown. In such cases, the payoffs from understanding and measuring destructive entrepreneurship are high. As we have seen from our model, the interaction between entrepreneurs and capitalists can easily become a relationship embedded with incentives to destructive entrepreneurship. The movement of entrepreneurial talent and destructive entrepreneurship selections is an urgent question in research and public policy—a question that can provide relevance on multiple fronts.

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7 See, for example, World Bank (2005) and GEM (2005).

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