

# Experience Does Matter: Managerial Capital and the Dynamics of Entrepreneurship\*

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January, 2014

## Abstract

A key question for entrepreneurship policy is how entrepreneurship-specific human capital is acquired and its effect on performance. This paper sheds light on this issue by providing evidence on the causal returns to experience in small business entrepreneurship. We exploit quasi-experimental variation in formal sector shocks in an emerging-market country where we can verify that the formal sector is plausibly independent from the informal sector, where most small-scale business activity occurs. This induces exogenous variation in the years of experience accumulated in entrepreneurship for individuals on the margin between wage work and self-employment. Since the country's formal sector is relatively small the analysis is not limited to subsistence-type enterprise activity, and the local average treatment effect is policy relevant since a policymaker might want to target entrepreneurial support to individuals on this margin. We find that an extra year of experience leads to an average increase in returns of 1.7-2.4 percent and as expected the effect is significantly larger amongst younger individuals. We also consider alternative explanations, and the extent to which the accumulation of years of experience can be interpreted as human capital accumulation. The paper provides some of the first evidence of a causal return to experience in entrepreneurship, complementing the (largely experimental) literature on the returns to human capital in entrepreneurship in developing countries.

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\*I thank seminar audiences at Monash University, the University of Pittsburgh/Carnegie Mellon University and the Otago Development and Growth Workshop for useful feedback. For feedback on earlier iterations of this project and inspiration for the current work I thank Thomas Åstebro, Chris Barrett, Jim Berry, AV Chari, David Easley, Corey Lang, Josh Lerner, Maximilian Mihm, Ted O'Donoghue, Albert Park, Matthew Rhodes-Kropf, Viktor Tsyrennikov, discussants Jenny Aker, Richard Holden, Claus Schnabel, and L.G. Thomas, and seminar audiences at Australian National University, Cornell University, Harvard Business School, the Graduate Institute-Geneva, the University of Sydney, the University of Waterloo, NEUDC (MIT-Sloan), Harvard Business School International Research Conference, the Third IZA Entrepreneurship Workshop, and the Workshop on Emerging Economies (University of New South Wales). I thank Andre Syafroni, Maria Wihardja and KPPOD for assistance with fieldwork. I acknowledge support from the Cornell University Institute for the Social Sciences, the Mario Einaudi Center for International Studies, the Cornell University Graduate School, and NSF Expeditions grant number 0832782. All errors are my own.

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# 1 Introduction

Does managerial capital matter? Bruhn *et al.* (2010) label the set of skills specific to managerial performance "managerial capital" and discuss how it has received relatively little attention in the economics literature until quite recently. Bloom and van Reenen (2007, 2010) report on a cross-country project that allows for the measurement of managerial practices. While they find that the adoption of standardized management practices is correlated with better firm performance, it is still difficult to know if this is a causal relationship, due to various potential sources of unobserved heterogeneity in the relationship between management practices and firm performance. Some recent studies have attempted to overcome this selection problem through conducting randomized experiments providing management consulting and technical support services to firms of various sizes in the developing world (e.g., Bruhn *et al.* (2012), Bloom *et al.* (2012)). However, it is still difficult to identify whether the reported positive treatment effects represent a long-lived increase in managerial capital, or merely a short-lived information or technical assistance shock. In this paper we attempt to contribute to this literature by approaching the question through studying a natural experiment that provides plausibly exogenous variation in years of experience in running a business. We interpret years of experience as a proxy for the accumulation of managerial capital through learning-by-doing.

While a substantial literature in labor economics that similarly proxies human capital accumulation through years of formal education, and year of wage work experience, generally points to a positive effect of human capital on entry and earnings,<sup>3</sup> rigorous empirical evidence focused on human capital specific to entrepreneurship is scarce. Key to identifying the stock of managerial capital is the ability to disentangle it from other (generally unobservable) factors generating selection into entrepreneurial occupations, such as a market opportunity, a "good idea" shock, or unobserved ability or information. To generate exogenous variation in incentives to enter entrepreneurship,<sup>4</sup> we exploit a uniquely-suitable natural experiment, shocks to the formal sector. The crisis provides a plausibly unanticipated shock that generates increased entry into self-employment, for reasons largely orthogonal to a number of potential confounding factors.

We focus on Indonesia, where there is uniquely rich panel data on entrepreneurial dynamics is available spanning about 20 years (1988-2008). This setting is particularly attractive because we can argue institutionally, and show statistically, that the formal sector is largely independent of the informal sector where much of the small business activity occurs. Since the formal sector is relatively

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<sup>3</sup>See Card (1999) for a review of studies taking years of education as a proxy for generalized human capital accumulation, and Angrist (1990) and Behrman & Rosenzweig (1999) for studies of human capital accumulation through work experience.

<sup>4</sup>Throughout the paper I use the terms "entrepreneurship", "self-employment", "running a business" and the like, largely interchangeably. I acknowledge that this is not totally satisfying, and a more refined definition might take these to be two distinct forms of enterprise activity.

small, there are individuals reasonably high in the talent distribution who participate in informal-sector enterprise activity. We introduce the empirical analysis by presenting some basic stylized facts on enterprise outcomes in Indonesia during the period of the 1997-98, probably the main economic shock during the study period. We find that new entrants during the crisis period are surprisingly persistent in entrepreneurship. Will this finding could have a number of explanations, we use it as motivation for a theory of entrepreneurial human capital accumulation.

After developing a model that captures the mechanisms we have in mind, we carry the empirical exercise to estimate the causal effect of experience on earnings. We use years of experience in running a business as a proxy for managerial capital acquisition through learning-by-doing. The key identification challenge is that years of experience is clearly endogenous in a regression of earnings on experience: entrepreneurs with higher earnings for any number of reasons will be more likely to accumulate more years of experience. In order to overcome this identification challenge and provide evidence on this issue, we estimate returns to experience in the larger population through an instrumental variables strategy. The large sample size allows us to exploit cross-regional and cross-time differences more effectively, so a full IV strategy becomes feasible. We use community-level churning measures as instruments, and we show that these results survive overidentification tests of exogeneity. We estimate a 1.7-2.4% average increase in net profit per year of experience in running a business. The effect is decreasing in age (i.e., as one might expect, younger entrepreneurs have higher marginal returns to experience, about double the full-population estimate).

The unique empirical setting that we study allows us to contribute to the literature on the returns to entrepreneurial experience. One of the main puzzles in this literature is that observed returns to entrepreneurship seem to be flat over the life-cycle of the enterprise (i.e., entrepreneurs do not see a significant increase in earnings over the life cycle of their business, especially relative to wage workers) (Astebro (2012); Tergiman (2011) is among the papers that document this). This seems to go against a theory that involves accumulation of entrepreneurial skill or human capital. However, the model of Kawaguchi (2003) suggests a possible rationale. In his model, in order to survive, new entrants need to meet a reasonable standard of business performance, so they generally only startup when they have sufficient human capital, while they face higher opportunity costs to human capital investment on the job. Hence when they do enter by free choice, they immediately achieve a relatively high income level, fairly close to their longer-run level. Kawaguchi (2003)'s theory implies that in order to detect learning-by-doing or experience effects, we would need entrepreneurs to be "forced" to enter this occupation before they would freely choose to. This is exactly the kind of natural experiment that is pursued herein, by showing returns to experience among entrepreneurs whose earnings aren't truncated by the endogenous entry decision. To our knowledge this is the first paper to provide evidence for such entrepreneurial experience effects.

One might justifiably ask: if one wants to learn about managerial capital, why focus on this particular developing country? Such a natural experiment is relatively rare, and justifies the pursuit of this question in the context of Indonesia rather than a more prominent, developed country. In addition, while we see an upward tick in enterprise activity during crisis and recession periods in developed countries, this comes primarily from lower-ability workers, who are presumably entering self-employment as a safety net. Because the formal sector is relatively smaller in Indonesia than in the developed world, all individuals in the formal sector tend to be of relatively higher-ability, so that as the crisis generates separations, a relatively higher caliber of worker enters the informal sector to pursue self-employment. The Indonesian setting also faces less distortions than would be present in the developed world, such as social safety nets like unemployment benefits and severance pay, that would raise additional selection bias concerns.

The question of what drives enterprise dynamics has important implications for enterprise policy and our understanding of entrepreneurship. This issue has taken on new urgency in the developing world due to the pressures and opportunities of globalization and the stresses of economic crises, with an increased hope that vibrant private-sector enterprise activity can be a source of economic growth and poverty reduction. While a number of explanations have been suggested to explain enterprise dynamics on the intensive and extensive margin, including credit constraints, government regulations, market frictions, and the (fixed) distribution of entrepreneurial ability, we are only beginning to gain a clearer sense of what factors might be relatively important. This paper focuses on a factor that has received relatively little attention to date: the endogenous accumulation of managerial capital through learning-by-doing in running an enterprise.

The paper proceeds as follows. We begin with a discussion of salient stylized facts in Section 2. We then outline a simple, dynamic model of entrepreneurial selection in Section 3. We provide descriptive evidence on the dataset in Section 4. We then estimate the causal effect of experience on earnings in Section 5. This section also addresses other potential explanations for the initial findings. Section 6 concludes, while additional content appears in the Appendix.

## **2 Stylized Facts: Entrepreneurial Dynamics and the 1998 Financial Crisis in Indonesia**

In this section we lay out some salient stylized facts about entrepreneurial dynamics and the late 1990s financial crisis in Indonesia. This provides suggestive evidence and motivation for the core

empirical work in the paper, which exploits cross-population data across a 20-year time span.

### **2.0.1 The financial crisis caused a large and unanticipated shock to the labor market, primarily hitting the formal sector**

The study of the labor market and self-employment effects of the crisis is facilitated by the availability of two excellent micro-datasets, which is unusual for a developing country. SAKERNAS is a labor-force survey that is collected by the Indonesian government statistical service, BPS, and is a large-scale, cross-sectional labor force survey. The Indonesian Family Life Survey (IFLS), is a panel dataset that was collected over multiple years, including the years spanning the crisis. For the study of the effects of a large-scale economic crisis, the dataset is particularly exciting because it included rounds just before the crisis hit, in 1997, and then a one-year-later follow-up on a subset of provinces. The IFLS is the primary dataset that will be used in the subsequent analysis in this paper.

Smith *et al.* (2002) and Thomas *et al.* (2000) provide evidence on the labor market effects of the crisis. It is broadly recognized that Indonesia was the country worst-hit by the crisis, and that it was an unexpected event. The primary direct victim of the crisis was the banking and financial-services sector. The banking sector fell into disarray, and this led to a shortening of credit in the formal sector. While some of the early post-crisis research speculated that the crisis caused massive unemployment, in fact this claim does not hold up in the micro-data. What we see instead is significant churning in occupational allocations, with one important movement being from private sector waged employment to self-employment. The government sector seems to be relatively well-sheltered from the effects of the crisis.

Consumer prices began to spiral upward in 1998, at the rate of 80% in that year according to CPI. Hence a number of price subsidies were removed, such as on rice, oil and some fuels. All of this uncertainty and economic pain led to the fall of President Suharto in May 1998, with multi-party elections and the return to relative stability in 1999. The shock to relative prices that the crisis brought about did have some beneficiaries – exporters, export producers and the like. Those producing services and non-tradeables likely did less well, though on the other hand the informal sector was also better-sheltered from the crisis, by being more independent from formal sector financial institutions *ex ante*.

### **2.0.2 The shock caused significant labor market churning, in particular pushing relatively high-ability individuals into running a business**

The labor market and consumer effects were a derivative of the impacts on firms and the price rises. On average real wages collapsed by 40% between August 1997 and August 1998, and these

effects reached most sectors of the economy. However, informal sector effects were less pervasive, particularly amongst rural, self-employed males. Of greater interest to the current study is the resulting *relative* price changes, as reported in Thomas *et al.* (2000). In particular, there is strong evidence that the main relative price shock during the crisis was in expanding the relative margin between waged employment and self-employment. Self-employment broadly became relatively more attractive in comparison to private, waged employment, on the order of a 25-60% shift in relative returns depending on sector, gender and urban or rural location. In addition, this effect seems to be more strongly concentrated at the upper-end of the wage distribution (Smith *et al.* (2002); Thomas *et al.* (2000)), and we see the most significant occupational churning from private wage to self-employment at the upper end of the wage distribution.<sup>5</sup> This suggests that it might be relatively high-ability individuals who were induced to enter self-employment during the crisis.

Hence it appears that the crisis can be interpreted as a large, unexpected shock to the choice margin between private wage employment and self-employment, which hits the most able formal-sector workers the hardest. This was due both to a significant hit to private wage returns, along with the observation that informal-sector, self-employment activity was generally more sheltered from the crisis. This exogenous and unanticipated shift in the choice margin appears to have induced sectoral restructuring toward self-employment activity.

### **2.0.3 The individuals starting enterprises or early in their working life during the crisis period are unusually persistent in enterprise activity**

As already discussed in the Introduction, about 78% of individuals who enter self-employment during the crisis are running a business as their primary occupation 9 years after the crisis, whereas the usual 9-year persistence rate among other cohorts is around 46%. This evidence is quite surprising. All things equal we would expect these individuals to re-integrate into the labor force as the economy returns to its long-run steady state 3-4 years after the initial crisis, as occurs in most developing countries after crisis periods. Given the lack of information on worker histories it would be relatively difficult for employers to statistically discriminate against these workers. The persistence seems to be particularly driven by younger individuals who experience the early years of their working life during the crisis period.

Hence it seems that to explain this evidence, we need a model that provides a reason why individuals would remain in running a business. On the one hand it could be about selection – these individuals may be (observably or unobservably) unique in ways that cause them to persist. However, the results on the dynamics of returns to business activity are quite stark, which rules out this kind of

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<sup>5</sup>Poppele *et al.* (1999) argue that the main effect of the crisis was on the urban elites.

explanation. On the other hand, it may be that these individuals change in some way due to their experience in running a business. While this could be about habit formation or acquiring a taste for being one's own boss, again this seems to be ruled out by improvements in returns. Instead it seems that something must change about these individuals relative to others.

We posit a theory of entrepreneurship-specific human capital accumulation, which we term managerial capital. The theory is consistent with the evidence we have already seen. The goal of the subsequent sections is to further formalize and test this theory, and then see if it can be leveraged to estimate the return to experience in entrepreneurship.

### 3 A Simple Model of Managerial Capital Accumulation

In this section we outline a simple model of accumulation of human capital specific to business activity through learning-by-doing. Following the literature (Bruhn *et al.* (2010)), we call this stock of human capital managerial capital (MC). We begin by describing in a bit more detail what MC is, then move to setup the model. This modeling approach is relatively unique because much of the existing literature takes MC as fixed,<sup>6</sup> and then studies dynamics emanating from the physical capital accumulation (savings) choices of the entrepreneur,<sup>7</sup> or learning about the value of the unknown entrepreneurial ability endowment in a Bayesian learning framework.<sup>8</sup>

MC constitutes specialized, high-level entrepreneurship-specific skills and knowledge, such as in selling, negotiating, product development, risk judgment (Shane (2003)) and entrepreneurial social capital. Above and beyond heterogeneous *ex ante* endowments of innate MC, perhaps due to genetic inheritance or early upbringing (i.e., dynastic transitions), we hypothesize that MC is significantly accumulated through *direct* exposure to enterprise activity. Such entrepreneurial capabilities are distinct from other, generalized forms of human capital such as education, life experience, and experience in waged employment. A primary channel for acquiring MC is learning-by-doing (i.e., running

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<sup>6</sup>The seminal, early reference on job- and occupation-specific human capital is Becker (1964). Surprisingly little work has been done to formally extend such ideas to entrepreneurship, though less formal work exists in the economics literature in the work of Schultz (1980); see also Klein & Cook (2006). Two exceptions, though less general in scope, are Otani (1996) and Iyigun & Owen (1998).

<sup>7</sup>The literature focusing on occupational choice and the dynamic savings problem has primarily been motivated by an attempt to rationalize otherwise surprisingly strong inequalities in the aggregate wealth distribution. In such models individuals with (unobserved) high entrepreneurial skill have an incentive to save much more than others, which can generate significant wealth inequalities in a dynamic setup. See, e.g., Cagetti & Nardi (2006) and Buera (2009).

<sup>8</sup>The early, seminal paper in this line is Jovanovic (1982). Taveras (2010) carries out a calibration exercise on a similar model to show that a number of stylized facts that have been taken as evidence of credit constraints in prior literature can in fact be rationalized in a model of Bayesian learning about entrepreneurial skill if learning is sufficiently slow.

an enterprise, the focus of this paper).<sup>9</sup> MC cannot be transacted in the marketplace separately from the individual endowed with it and public institutions for the transmission of MC (such as the formal education system for wage work) are generally absent. Hence dynamic occupational selection incentives can play a crucial role in individuals' ability to accumulate MC.

Let us consider a model in which an agent makes occupational choices and accumulate earnings in each of three periods. The occupational choice is binary: the agent can either work for a wage and obtain the return  $w$ , or run a business and obtain the return  $R$ . We think of this like a dual-economy model – the wage earning activity is in the formal sector, while the business activity is in the informal, non-farm sector. Suppose that the agent is endowed with a stock of skill specific to each occupation:  $\theta_W$  represents the stock of skill specific to wage employment, while  $\theta_{MC}$  denotes the managerial capital stock of the agent, where a higher value of  $\theta_{MC}$  represents a larger stock of skill in running a business. In addition, returns are affected by the state of the formal sector, represented by the parameter  $\eta$ . A high value of  $\eta$  represents good times in the formal economy – demand is strong for domestic output so real wages and output prices are relatively high. A low value of  $\eta$  represents the opposite – a formal sector in a recession or depression, with low aggregate demand and hence fewer formal-sector wage jobs and lower real prices for domestic output.

Hence in each of the three periods the agent will select an occupation by solving the following simple comparison:

$$\max \{w(\theta_W, \eta), R(\theta_{MC})\}, \quad (1)$$

where each return function is increasing in both of its arguments, and we can think of  $R(\cdot)$  as the profit function (i.e., the value function of the firm's profit maximization problem). It is clear that this specification imposes a number of simplifications, most of which are innocuous and designed to allow us to focus on the key mechanisms. However, there are a couple of substantive restrictions in the model that are worth pointing out.

First,  $\eta$  does not appear in the function  $R(\cdot)$ . This captures the idea that real returns in informal sector enterprise activity are largely independent of conditions in the formal sector. Partial justification for this restriction comes from our empirical application: as will be discussed more later in the paper, there is significant empirical evidence that the informal sector was much less affected by the shock of the late 1990s financial crisis, especially in real terms, than the formal sector in Indonesia. While perhaps surprising at first, the finding makes sense when we consider that the channels through which a formal sector banking shock might impact the informal sector. First, since informal sector firms had little connection to formal finance in Indonesia, the financial shock would not directly hit many informal sector firms. Similarly, while import prices would skyrocket, this would

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<sup>9</sup>Other channels for MC transmission that one might consider include transmission of MC in the family (e.g., learning from one's parents, if they are entrepreneurs), or learning through work experience in another firm.

again have relatively little effect on informal sector firms with little connections to such markets. A second channel from the formal to the informal sector would be wages and product prices. A serious recession in the formal sector should depress local demand, hence wages and prices. The effects on informal sector firms, lower demand and prices, yet also lower labor and capital costs, are ambiguous, and hence could very well cancel out in practice. Since many of the informal sector firms form the backbone of local markets for staples like food and clothing, consumers would be relatively less likely to substitute away from their wares given subsistence constraints, and maybe even substitute toward them if the shock is sufficiently disruptive to formal sector firms.

Second, it is notable that  $\theta_W$  and  $\theta_{MC}$  each only appear in one returns function. While one could imagine that  $\theta_{MC}$  might have value in formal sector work in particular, such as in a managerial position, we can think of this as either ignoring that possibility, or that  $\theta_{MC}$  is a pure measure of skills needed in running a business and not directly transferable. Third, it is clear that  $R(\cdot)$  is a highly simplified version of the profit function, which would normally carry additional parameters such as market prices, and might even capture additional structure such as through financing constraints on capital purchases. Some of these extensions will be considered in due course as the analysis proceeds.

The first implication from this setup comes from simply solving the static optimization problem, that the individual will choose wage work so long as

$$w(\theta_W, \eta) > R(\theta_{MC}). \quad (2)$$

What is interesting about this in this inequality is that it shows that the best potential entrepreneurs might not select into entrepreneurship. Namely, if  $\theta_{MC}$  and  $\theta_W$  are positively correlated in the population, a high value of  $\theta_{MC}$  is more likely to be paired with a high value of  $\theta_W$ . Depending on the relative returns to each of these skills, it could be that the above inequality holds. The point that individuals might not sort into occupations purely based on absolute advantage dates back at least to Roy (1951). What it implies in our context is that many individuals with relatively high potential to succeed in running a business may never get the chance if left to their own devices, because they always find it optimal to select into wage work. It could be that most high-ability individuals tend to enter waged employment. On the other hand, low-skill individuals might receive relatively lower returns in wage employment, particularly if low-skill labor supply is abundant. This is consistent with the massive cohort of low-skill, self-employed individuals in developing countries, most of whose enterprises have low returns and grow little.<sup>10</sup>

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<sup>10</sup>This characterization is consistent with recent empirical evidence (e.g., Carter & Olinto (2003); de Mel *et al.* (2008); Banerjee *et al.* (2009); Karlan & Zinman (2010)). Demand for capital ends up being relatively stronger amongst wealthier or higher-ability individuals and hence individuals end up more responsive to positive financial shocks.

In order to consider the dynamic implications of the theory, we need to add one further element to the model: a function regulating the accumulation of MC. Denote by  $\Phi$  the function that maps MC today,  $\theta_{MC}$ , into MC tomorrow,  $\theta'_{MC}$ . Assume that  $\Phi$  has two arguments,  $\theta_{MC}$  and a second argument  $x$ , which takes the value 1 if the individual selects into running and enterprise today, and 0 otherwise. Namely,

$$\Phi(\theta_{MC}, x) = \theta'_{MC}. \quad (3)$$

We make the natural assumptions that  $\Phi$  is increasing and concave in its first argument, that  $\Phi(\theta_{MC}, x) \geq \theta_{MC}$  (that MC can only be accumulated and never lost), and that  $\Phi(\theta_{MC}, 0) = \theta_{MC}$  (MC accumulation only occurs when running a business). For simplicity we ignore the channel of learning-by-doing in wage employment; perhaps the easiest way to accept this restriction is to interpret  $\Phi$  as measuring relative human capital accumulation between running a business and wage work.

Now let us illustrate the usefulness of this model to understand the impacts of formal sector shocks like the Indonesian financial crisis. Consider a single worker endowed with skill levels  $\theta_W$  and  $\theta_{MC}$  in wage work and running a business, respectively. In the first period we assume that the individual is working for a wage  $w(\theta_W, \eta)$ . This means by revealed preference that  $w(\theta_W, \eta) > R(\theta_{MC})$ , and the worker attains income  $w(\theta_W, \eta)$ .

Now suppose that between periods 1 and 2 the economy experiences a serious and unanticipated shock, and  $\eta$  becomes much lower than in period 1, taking the value  $\eta' < \eta$ . This means that the agent enters period 2 facing the returns comparison  $w(\theta_W, \eta') \leq R(\theta_{MC})$ .  $\theta_{MC}$  remains unchanged because the individual has not gained experience running a business. It may well be that shock to the formal sector is serious enough that  $w(\theta_W, \eta') < R(\theta_{MC})$ , where it could even be that  $w(\theta_W, \eta') = 0$ , the case in which the individual has been laid off and cannot find permanent wage work. Hence it could be the case that the individual's earnings in period 2 are lower than in period 1, and even lower than the expected value of wage earnings in period 2, conditioning on observables, if the individual happens to have experienced an unlucky layoff shock. Indeed, we see drastic shifts in relative wages during the Indonesian crisis, with real private sector wages dropping up to 50% relative to the wages of government workers, and most importantly relative to the earnings of the self-employed, as documented by Thomas *et al.* (2000). This kind of shock to relative earnings seems to have led an unusually high number of individuals to be more likely to be employed in running a business.

If it is the case that  $w(\theta_W, \eta') < R(\theta_{MC})$ , so that the individual elects to run a business, we know that between periods 2 and 3 the individual will accumulate MC at the rate  $\Phi(\theta_{MC}, 1) = \theta'_{MC}$ . Assuming that period 3 also occurs late enough that the formal economy has fully recovered by the

onset of this period, so that  $\eta'$  has returned to the value  $\eta$ . Then agent will then face the comparison,

$$w(\theta_W, \eta) \leq R(\theta'_{MC}). \quad (4)$$

It may well be that even though  $\eta$  has returned to its longer-run value, the increase in the value of  $R$  is such that  $w(\theta_W, \eta) < R(\theta'_{MC})$ . This may be particularly true when the individual has no prior enterprise experience, so that accumulated learning could be quite large, i.e., if  $\Phi$  is concave individuals accumulating their first enterprise experience would initially be at a steeper part of  $\Phi$  so that  $(\theta'_{MC} - \theta_{MC})$  would be relatively larger for them. This implies that new entrants would be relatively more likely to persistent in enterprise activity, due to the accumulation of experience brought about by an exogenous shock.

Hence this simple model has managed to illustrate this interesting possibility in entrepreneurial dynamics – that enterprise activity may be persistent for individuals entering due to an unexpected market shock, and particularly persistent for individuals with relatively little prior enterprise experience.

## 4 Data and Preliminary Evidence

In this section we discuss the dataset that will be used throughout the paper, and present some initial descriptive evidence from the dataset.

### 4.1 Data

Our primary dataset is the Indonesia Family Life Survey (IFLS).<sup>11</sup> The data were collected as a household panel survey in Indonesia, with data collection rounds in 1993, 1997-98, 2000-01 and 2007-08. The 1997-98 round directly proceeded the crisis. For the intervening years when the survey is not fielded, significant retrospective data are collected in the subsequent round. The dataset was designed to be representative of 83% of the Indonesian population in 1993, covering 13 of the higher-population provinces generally in the western parts of the country, with over-sampling of urban locations and locations outside Java island, the main economic hub. Data were collected at the individual, household, and community level, and these three sources can be matched together. More details on relevant parts of the dataset, including for enterprise activity, will be discussed in more detail below.

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<sup>11</sup>Various organizations and researchers have been involved in designing, collecting and funding the IFLS. For more details, see Strauss *et al.* (2009), Strauss *et al.* (2004), Frankenberg & Thomas (2000), and Frankenberg & Karoly (1995).

The original 1993 round of the survey (IFLS1) surveyed 7224 households. Subsequent rounds have involved re-sampling the original households, and then sampling all split-offs from the original households. Attrition has been relatively minor, at less than 10% between rounds, and overall 87.6% of the original households appear in all four rounds. Table 1 presents the number of individuals,<sup>12</sup> households, household enterprises and communities appearing in each round of the survey. We see that the sample expands in each subsequent round, as splits from the original households are tracked and surveyed. In addition, the proportion of household members directly interviewed also increases across rounds.

There is significant geographic and size variation amongst the enterprises.<sup>13</sup> Though the largest firm representations are from Java, the economic and population center of the country, the bias is not overwhelming and a significant proportion of firms are observed from all of the main survey provinces. This is true even if we focus on firms with a relatively larger capital stock, above \$1000 US (converted from Indonesian rupiah at the going exchange rate in a given survey year). It is notable that the slightly larger proportion of firms seems to be in rural areas. This fits with Liedholm & Mead (1999) and may be due to the fact that smaller firms are more likely to service demand in more remote areas. Also, we see that the sample contains a significant number of firms exceeding the sizes observed in the vast majority of studies on micro and small enterprises from developing countries, while firm-level surveys looking at such firms generally have little information on the primary entrepreneur. Given that conversion to US purchasing power parity implies a multiple of about 12, there are hundreds of enterprises with more than \$25,000 US PPP equivalent in capital, and dozens with 10, 15 or more workers.

Table 3 presents a summary of a number of community-level measures of market churning that will be useful in the background of the later analysis, as these variables are used as exogenous sources of variation in the individual propensity to enter and remain in self-employment.

#### 4.1.1 Preliminary Evidence

In Figure ?? we non-parametrically plot experience-earnings (net profit) profiles across these three qualitative categories, using a Lowess tri-cube smoother. There we see that while all three groups enjoy an increase in earnings on average, the rate of increase is substantially higher for those running the enterprise we would expect to be most complex: firms with hired, wage workers. This bifurcation in returns is suggestive of the select group of individuals running more complex enterprises

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<sup>12</sup>Both adults and children (defined as those under age 15 at the time of the survey) are surveyed, though the childrens' module is less extensive.

<sup>13</sup>The distribution of enterprises is less even if we stratify by industry—the largest proportions of enterprises by far are in the sectors of restaurant/food, and sales:non-food, at around 30% each. The next two largest sectors are food processing, and services:transport.

"pulling away" from the much larger group of individuals running enterprises in the other two categories. We would expect that significantly greater returns would enable significantly greater capital accumulation.

In Table 2 we present summary statistics on the smaller population of individuals who enter self-employment during the financial crisis, a smaller sample. There are 684 such individuals who are eligible for the study due to entry during 1998, and 1355 eligible due to entry in 1999. We want to clearly emphasize that we put greater stock in the 1999 cohort. This is the cohort that was most clearly affected by the crisis, since the brunt of the crisis hit Indonesia during 1998, so resulting occupational changes would be seen as of 1999. We see that both cohorts are highly likely to be married, and more likely to be male. The main cohort of interest, the 1999 entrants, are relatively young,<sup>14</sup> and significantly more educated, which is consistent with a relatively high-ability cohort being involuntarily pushed into self-employment due to the crisis.

## 5 The Return to Experience

While it is tempting to measure the returns to experience by simply correlating returns with years of experience in the presence of some control variables, this approach suffers from the classic endogeneity problem in the human capital literature. Namely, it could be that individuals have certain unobservable characteristics (e.g., ability) that make them more likely both to accumulate more human capital and experience higher returns, independent of the direct impact of human capital on returns. The classic example is the measurement of the returns to education: high-ability individuals may be both more likely to accumulate more years of schooling and earn higher subsequent wages, with the latter potentially only a partial causal effect of the former. The typical empirical strategy employed to overcome this issue is to search for sources of exogenous variation in years of schooling, from cost shifters such as distance to school to policy restrictions such as student quotas.

The version of this endogeneity issue that we consider herein is a twist on the classic problem. In the case of schooling, individuals usually first accumulate human capital, and then subsequently redeem its value in the labor market. Incentives to continue to accumulate years of schooling may be linked in sensible ways to expectations about later earnings, but these connections are somewhat loose because the earnings only occur in the future. By contrast, entrepreneurs get immediate feedback on their performance all along the way, through earnings, which we would expect to be at least partially determined by unobserved ability. We naturally expect that this will lead to direct behavioral response, with the particular concern being on the extensive margin – individuals may

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<sup>14</sup>This could be a reflection of the role of seniority, rather than ability, in worker separations during the crisis.

completely exit running a business in response to returns. Hence we expect the observed sample of entrepreneurs at any given time to be a direct product of such selection forces in the market.

In order to empirically identify MC, the ideal experiment would randomly assign MC to individuals, orthogonal to all other characteristics, and then observe the resulting enterprise performance trajectories. Clearly such an experiment would be infeasible for a number of reasons, including endogenous enterprise survival, and difficulties in "assigning" MC. Since the ideal experiment is not feasible in practice, we first exploit a source of exogenous and unanticipated assignment into self-employment (experience). In particular, the interest is in individuals who were 'pushed' into self-employment, who would not have otherwise entered, which provides a source of a counterfactual to consider the effects of the quasi-random assignment of MC.

## 5.1 Estimates of the Return to Experience: Setup

In order to have exogenous variation in years of experience we exploit cross-regional variation in entry incentives in running an enterprise, using measures of formal-sector market churning as instruments. These are the measures summarized in Table 3. Formally, the IV strategy is as follows. In the first stage we instrument for total years of experience in running a business for person  $i$  in community  $j$  in time period  $t$ , as follows,

$$\text{exp}_{ijt} = \alpha_0 + Instr_{jt}\beta + X_{ijt}\gamma + \sum_{years} \delta_{year}I(year) + \sum_{provinces} \delta_{prov}I(province) + \varepsilon_{ijt},$$

where  $Instr_{jt}$  is the set of instruments generated at the community level,  $X_{ijt}$  are other controls, and  $\delta$  are dummy coefficients on year and province fixed effects. The second stage is then,

$$y_{ijt} = \alpha'_0 + \beta'\widehat{\text{exp}}_{ijt} + X'_{ijt}\gamma' + \sum \delta'_{year}I(year) + \sum \delta'_{prov}I(province) + \eta_{ijt},$$

where  $y_{ijt}$  is the outcome of interest (reported net profits),  $\widehat{\text{exp}}_{ijt}$  is the projected experience value coming from the first-stage, and the parameters have primes ( $'$ ) to signify that they are different estimands.

We normalize the value of returns relative to an index expressed in dollar values, so we cancel out the role of currency fluctuations such as inflation. Also, by normalizing against market returns, the results are effectively a form of "differences in differences," indexing to the dynamic path of wage earnings in the formal sector, which is arguably a more appealing reference for comparison.

The instrument set in the first stage is constructed as a set of lags of measures of market shocks. We construct the lagged values in two ways. First, we vary the lag structure, so that the lags are

relative to the year in question. This specification assumes that the effects of shocks are primarily determined by the number of years of lag from a particular year. Second, we fix the lag structure, so that it is the particular shock year that matters, regardless of the year of the observation. We remain agnostic on which is the preferred specification, reporting results for both.

In addition, we consider the effect of truncating the dataset on age. This is interesting for two reasons. The first is simply technical: the most reliable data we have on occupational choices spans 1988-2008, so we are eliminating individuals who would have entered the workforce prior to that date. Hence the results should be more reliable as they are based on full year-on-year elicitation of occupational choices. Second, it is interesting to hone in on a sample of younger individuals. If we think that there is a concave learning function, then we might expect marginal returns to be higher for younger individuals.

## 5.2 Results

The main results appear in Tables 4-6. In the first-stage estimation (not reported here) we see that the instrument set strongly explains variation in the endogenous variable, years of experience. This is confirmed by a number of tests of weak identification, all of which confirming the strength and robustness of the estimated model at all conventional testing levels. All of the demographic controls are highly significant. Age has the expected concave functional form. The OLS results appear in Table 4. As noted above this specification suffers from potential endogeneity due to various sources of unobserved heterogeneity and selection bias. The estimates vary from a return to experience of less than 1% per year based on total enterprise experience, to 2.4% for current experience.

The main IV results appear in Tables 5-6. In Table 5 we present results from experience measured only for the current business that an individual is running. We see that on the full sample the experience effect is 2.4% using the varying lag instruments, and 2.2% for the fixed lag instruments. This is consistent with the OLS estimate. As expected, when we truncate the data on age, the coefficient estimates increase, from 4.7-6.9%, doubling or more the average effect for the full population.

In Table 6 we present results from experience measured for all the years of business experience that the individual has. We see that on the full sample the experience effect is 1.8% using the varying lag instruments, and 1.7% for the fixed lag instruments. This is much larger than the OLS estimate. This might be suggesting that selection bias is more relevant on the extensive margin: switching *between* businesses may be a much more important source of endogeneity than the years of experience accumulated within a particular business. The estimates are also notably smaller than the estimates for current experience. This is less surprising: we might expect that experience in current business is more relevant for returns than all prior experience. For example, there might be

business-specific human capital. Finally, when we truncate on age the estimates increase significantly, from 5.3-5.9%.

In all cases the estimates are highly significant, and the other variables have the expected sign and behaviour. Finally, we report on two overidentification tests for exogeneity, given that there are more instruments than endogenous variables, the Sargan and Basman tests. Both tests indicate that the instruments are not significantly correlated with the residuals from the second-stage equation, consistent with the argument that these instruments satisfy the exclusion restriction.

### 5.3 Placebo Test

While the exogeneity tests provide supportive evidence, we might be concerned about weakness in those tests. Another check on the identification strategy is a placebo test for the critical identification assumption that the formal sector shocks only affect selection between the formal and informal sectors, and not returns in the informal. While this might initially seem dubious, as we have already argued above there are institutional reasons to believe this might be true. In table 7 we also test this assumption statistically, running the current value of our instruments on current values of returns in business. Recall that in the main IV specification we only use *lags* of shocks as instruments, so this exercise is unique. What we would expect to see if the key identifying assumption holds is no correlation between the contemporaneous formal sector shocks and informal sector returns, and that is indeed what we see.

### 5.4 Whose Return to Experience? Decomposing the LATE

It is well-known in the literature employing instrumental variables techniques that we should attempt to understand which observations are actually affected by the instruments. The average change in outcomes for the set of observations whose behavior is actually altered by the instruments are considered to generate the local average treatment effect (LATE). It is useful to understand which subset of the population has their behavior altered by the instruments, to understand for whom the estimates are representative. In this section we attempt to identify which subset of the population is most at-risk to have its behavior altered by the instruments (newly choosing enterprise activity) and hence hope to narrow down the population of interest for the LATE.

## 5.5 What is Being Accumulated?

While much of the preceding analysis seems to paint a convincing picture that learning-by-doing through direct experience matters for entrepreneurs, it is still not quite clear what this human capital might be, or if it is entangled with other valuable forms of capital that one might accumulate over time, such as reputation and business network connections.

As an initial, simple way to try to get at this issue, we study the industry distribution of individuals who enter during the crisis and start their first business during that period. We would expect that if they are primarily high-skill individuals pursuing relatively human-capital intensive enterprise activities, then they would sort into industries with this kind of character. The IFLS provides a fairly crude, 10-industry classification, including Agriculture, forestry, fishing and hunting, Manufacturing, Construction, Wholesale, retail, restaurants and hotels, Transportation, storage and communications, and Social services. We propose that Wholesale, retail, restaurants and hotels, and Transportation (presuming it is basic transport like a bicycle carrier) are relatively low-skill occupations that can be quickly learned with relatively less need for specialized human capital. In looking at the evolution of industry shares over time, comparing the new entrants to the larger population of entrepreneurs, we see that the new entrants are less likely to enter the posited low-skill segments like Wholesale, retail, restaurants and hotels, and Transportation, and more likely to enter apparent higher-skill sectors like Social services. While there is still potentially significant variation within these industry categories, this at least provides some support for the idea that the entrants are truly of relatively higher-ability, and that they accumulate significant human capital.

As an additional test, we look at the propensity of individuals to run what is plausibly the most skill-intensive enterprise category: those which hire outside workers. These enterprises are generally more developed on a range of measures – from formality to number of employees to capital stock. If the story that relatively high-ability individuals who would not otherwise go into enterprise activity do so during the crisis period holds, then we would expect the crisis-period entrants to be more likely to be running relatively more complex enterprises a few years later. And indeed, this is what we see: the crisis-period entrants are roughly twice as likely to be running enterprises with outside workers 9 years after the crisis, compared to those from other entry cohorts.

## 6 Concluding Discussion and Implications

In this paper we develop and test a microeconomic theory of managerial capital (MC) accumulation. The key channel for acquiring MC is posited to be through learning-by-doing. The theory is tested through exploiting a natural experiment that induces exogenous variation in the years of experience

accumulated by small business owners in Indonesia. This provides a source of exogenous selection into enterprise activity, focusing on effects for relatively high-ability individuals, as the shock is focused on the formal sector. We estimate an average return to experience of 1.7-2.4% per year, which is approximately doubled for younger individuals. These results suggest the importance of modeling entrepreneurial dynamics in a way that incorporates the role of endogenous human capital accumulation.

Throughout the paper the results on the returns to experience have been interpreted as a kind of "managerial capital", which is an interpretation that fits with other literature. Yet at the same time, it is not clear exactly what kind of human capital this is, or even if it is human capital at all. For example, the main return to experience running a business could be in building up a reputation with customers and suppliers, or in operational improvements that come about from a more experienced workforce. While we argue that the apparent learning dynamics are relatively less consistent with latter this explanation, it cannot be ruled out entirely. It quickly becomes apparent that disentangling the entrepreneurial and managerial skill of the firm's management team from other dynamic, intangible, assets of the firm is not trivial. However, to be fair, this is a problem that plagues parallel literatures on the returns to experience, such as the literatures on the returns to education and wage work experience.

More broadly, this work raises a number of questions about what kind of human capital is accumulated and how. This is a potentially exciting topic for future research, looking in more detail at what and how entrepreneurs learn. Learning more about this would require even richer data on entrepreneurial behavior, which isolates in more detail the kinds of interactions and experiences the entrepreneur has, and the ways in which ownership and managerial behaviors are altered in response to these experiences. Further questions might include: What are the most important high-level entrepreneurial skills? Are they complementary to each other, or are certain skills critical at certain stages? How can such skills be effectively transmitted?

Given the caution that must be attached to the interpretation of the results, it is very difficult to make concrete policy prescriptions. Hence we will briefly discuss some tentative ideas for further investigation. First, the existing approaches to the identification of high-potential entrepreneurs in the literature are largely static in nature, based on the analysis of a fixed set of characteristics. The implicit assumption from this approach is that the optimal financing of the entrepreneur is fixed from the time they enter the market. Of course asymmetric information about underlying characteristics will prevent this determination from occurring, yet even if this screening problem could be overcome a static approach would still be sub-optimal. Instead of trying to customize services to an entrepreneurial "type" that is assumed to be unchanging, policymakers, banks, etc., should consider the process of entrepreneurial development of the individual entrepreneur, and how

financing and other services should evolve over time as the entrepreneur's own abilities evolve.

Secondly, if further research building on this work were able to show more robustly that learning-by-doing is indeed a crucial channel in entrepreneurial development, then it might raise the need for more high-ability individuals to get the opportunity to gain experience running an enterprise. In most countries the primary institution for the formation of skills for the wage sector is formal education, which can last twelve or more years. While some writers, notably Schultz, have suggested that education might be an important venue for the formation of entrepreneurial skill, such a hypothesis is not well supported by the evidence in this paper. Instead, the results suggest that entrepreneurial skills are more specific and require more focused and sustained exposure to enterprise activity itself.<sup>15</sup> Hence this suggests the potential for specialized institutions for the transfer of MC. In most developing countries, the existing institution seems to be the family unit, at least those households in which the parents have a significant stock of MC that can be transferred to their children. More formal arrangements, such as internships and fixed-term job placements in entrepreneurial firms, might be a way to give potential entrepreneurs much more exposure to enterprise activity.

There have attempts at various forms of entrepreneurial training, including recent tests in the economics literature based on RCT designs, but based on the results in this paper it is not so surprising that the results from short-term training have been mixed at best. While many of the existing programs are focused on transferring low-level entrepreneurial skills (keeping records, basics of managing finances, etc.), it seems that high-level entrepreneurial skills (sales, marketing, risk judgment, product development, etc.) may be significantly more important, particularly for growth-oriented firms. It may be that a more intensive, sustained mix of direct experience and perhaps mentorship from more experienced and successful entrepreneurs is needed to enable the emergence of higher-potential entrepreneurs and the transfer of high-level entrepreneurial skills.

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<sup>15</sup>This is not to suggest that education is not useful in general, particularly for pushing up the overall level of human capital in the population. However, the evidence herein, based on within-population variation in education and entrepreneurial human capital, suggests that MC is a more important *relative* factor in enterprise outcomes.

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# A Appendix A: Figures and Tables

## A.1 Figures

Note: The Figure records net profits of enterprises that startup in the three employment categories ((i) no employees, (ii) only family/unpaid workers, (iii) having waged employees) against years of experience of the individual entrepreneur running the enterprise.

## A.2 Tables

Table 1: Summary Statistics on IFLS Rounds

Survey Round	Year	Individuals	Households	Enterprises	Communities
IFLS4	2007-08	44103 (50580)	13536	6186	313
IFLS3	2000	38433 (43649)	10435	5452	311
IFLS2	1997	22019 (33081)	7619	2625*	313
IFLS1	1993-94	22019 (33081)	7224	2439*	312
	Overall	66784	(unique)		

\*In IFLS1 and IFLS1 household's only report on one, "primary" enterprise.

Table 2: Summary statistics on individual entrants

1998 Entrants									
	N	Mean	SD	P25	Median	P75	P95	P99	
Age	684	33.81	12.78	25	30	40	60	73	
Marriage (married=1)	684	0.87	0.34	1	1	1	1	1	
Gender (male=1)	684	0.71	0.46	0	1	1	1	1	
Education (years)	684	5.58	6.04	0	0.5	12	15	19	
1999 Entrants									
	N	Mean	SD	P25	Median	P75	P95	P99	
Age	1355	27.67	10.72	20	25	33	49	59	
Marriage (married=1)	1355	0.87	0.33	1	1	1	1	1	
Gender (male=1)	1355	0.68	0.46	0	1	1	1	1	
Education (years)	1355	7.14	6.15	0	9	12	19	19	

Table 3: Summary statistics on community-level sources of variation  
Year 1998

Variable	N	Mean	SD	P25	Median	P75	P95	P99
Proportion workers switch to self-empl. (lag)	61796	0.01	0.02	0	0	0.02	0.06	0.09
Proportion workers switch to self-empl.	52853	0.01	0.04	0	0	0.02	0.05	0.11
Proportion switch any occupation (lag)	61796	0.02	0.14	0	0	0	0	1
Proportion switch any occupation	52853	0.06	0.23	0	0	0	1	1
Growth rate of employment (lag)	61797	0.01	0.14	-0.04	0	0.04	0.26	0.48
Growth rate of employment	61796	-0.24	0.6	-0.92	-0.13	0.23	0.64	0.97
Change in formal employment (lag)	48712	0.12	0.8	-0.2	0	0	1.5	4
Change in formal employment	48886	-0.29	1.05	-1	-0.75	0	2	3
Community uempl rate (lag)	61797	0.07	0.06	0.03	0.06	0.1	0.21	0.3
Community uempl rate	52938	0.04	0.07	0	0.02	0.05	0.12	0.33

Year 1999

Variable	N	Mean	SD	P25	Median	P75	P95	P99
Proportion workers switch to self-empl. (lag)	52853	0.01	0.04	0	0	0.02	0.05	0.11
Proportion workers switch to self-empl.	60671	0.08	0.1	0.01	0.05	0.09	0.29	0.36
Proportion switch any occupation (lag)	52853	0.06	0.23	0	0	0	1	1
Proportion switch any occupation	60671	0.08	0.28	0	0	0	1	1
Growth rate of employment (lag)	61796	-0.24	0.6	-0.92	-0.13	0.23	0.64	0.97
Growth rate of employment	52853	0.1	1.17	0.02	0.07	0.12	0.29	1
Change in formal employment (lag)	48886	-0.29	1.05	-1	-0.75	0	2	3
Change in formal employment	31873	0.02	0.19	0	0	0	0.33	1
Community uempl rate (lag)	52938	0.04	0.07	0	0.02	0.05	0.12	0.33
Community uempl rate	60750	0.03	0.06	0	0.01	0.04	0.11	0.25

Table 4: OLS estimates, effects of experience on returns

	Total Exp	Current Exp
Enterprise experience	0.007*** (0.002)	0.024*** (0.004)
Demographics	YES	YES
Year Effects	YES	YES
Province effects	YES	YES
Constant	-0.151* (0.223)	-0.048* (0.223)
Observations	28399	28399
R2	0.022	0.023
F	24.89	25.62

Note: Standard errors in parentheses, \* p<0.05, \*\* p<0.01, \*\*\* p<0.001

Note: Demographics include: age, age<sup>2</sup>, gender, years of education, urban location

Table 5: IV estimates, effects of experience on returns, current exp.

	Lag	Lag, Bth	Year	Year, Bth
Enterprise experience	0.024***	0.069***	0.022***	0.047***
Current	(0.004)	(0.018)	(0.004)	(0.014)
Demographics	YES	YES	YES	YES
Year Effects	YES	YES	YES	YES
Province effects	YES	YES	YES	YES
Constant	0.117*	-0.416*	0.110*	-0.319
	(0.047)	(0.196)	(0.047)	(0.182)
Observations	26428	7211	26428	7211
R2	0.114	0.050	0.116	0.091
Hansen J (endog)	16.091	11.036	25.677	18.568
Hansen J, p	0.244	0.608	0.019	0.137
Underident stat	1138.964	176.889	1546.207	205.480
Underident stat, p	0.000	0.000	0.000	0.000
Weak ID stat	88.683	13.725	142.305	15.264

Note: Standard errors in parentheses, \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Note: Demographics include: age, age<sup>2</sup>, gender, years of education, urban location

Table 6: IV estimates, effects of experience on returns, total exp.

	Lag	Lag, Bth	Year	Year, Bth
Enterprise experience	0.018***	0.059***	0.017***	0.053***
Total	(0.003)	(0.017)	(0.003)	(0.015)
Demographics	YES	YES	YES	YES
Year Effects	YES	YES	YES	YES
Province effects	YES	YES	YES	YES
Constant	0.246***	-0.202	0.226***	-0.193
	(0.061)	(0.183)	(0.057)	(0.180)
Observations	26428	7211	26428	7211
R2	0.096	0.010	0.101	0.031
Hansen J (endog)	15.686	11.372	21.162	14.670
Hansen J, p	0.267	0.580	0.070	0.328
Underident stat	1237.757	167.211	1506.645	125.475
Underident stat, p	0.000	0.000	0.000	0.000
Weak ID stat	86.613	11.882	129.747	8.933

Note: Standard errors in parentheses, \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Note: Demographics include: age, age<sup>2</sup>, gender, years of education, urban location

Table 7: Placebo test

	(1)	(2)	(3)	(4)	(5)
avg_switch	-0.465 (0.283)				-0.482 (0.286)
avg_switch_employed		0.036 (0.069)			0.110 (0.080)
growth_employment			-0.001 (0.012)		0.012 (0.021)
avg_change_formal				-0.020 (0.032)	-0.037 (0.047)
Year FE	YES	YES	YES	YES	YES
Location FE	YES	YES	YES	YES	YES
Demographic controls	YES	YES	YES	YES	YES
Constant	-0.035 (0.236)	-0.118 (0.205)	-0.090 (0.206)	-0.040 (0.208)	-0.030 (0.244)
Observations	27914	31865	31521	31345	27449
r2	0.021	0.021	0.021	0.022	0.022

Standard errors in parentheses

\* p&lt;0.05 \*\* p&lt;0.01 \*\*\* p&lt;0.001

Table 8: Summary statistics on firms, 2008, firms with no employees

	Enterprises with no employees						
	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>P25</b>	<b>P50</b>	<b>P75</b>	<b>P95</b>
Bus owned by household	2711	1.0	0.1	1	1	1	1
Pct owned by household	41	38.2	22.1	25.0	50.0	50.0	50.0
Bus. operated out. home	2711	0.8	0.4	1	1	1	1
Applied for permit	2711	0.0	0.2	0	0	0	0
Permit issued	100	1.0	0.0	1	1	1	1
Cost obtain permit	100	13014.2	35310.1	2.7	11.9	78.4	1081000.0
Unpaid labor startup	2711	0.2	0.5	0.0	0.0	0.0	1.0
Wage labor startup	2711	0.1	1.6	0.0	0.0	0.0	0.0
Total labor startup	2711	1.3	1.7	1.0	1.0	1.0	2.0
Startup capital	2251	409.9	2816.6	10.8	54.1	216.3	1406.0
Current unpaid labor	2711	0.0	0.0	0.0	0.0	0.0	0.0
Current wage labor	2711	0.0	0.0	0.0	0.0	0.0	0.0
Current total labor	2711	0.9	0.2	1.0	1.0	1.0	1.0
Current land assets	2711	324.2	3720.3	0.0	0.0	0.0	216.3
Current building assets	2711	182.6	1329.4	0.0	0.0	0.0	432.6
Current 4-wheel vehicle	2711	122.4	885.3	0.0	0.0	0.0	324.5
Current other vehicles	2711	101.2	301.4	0.0	0.0	0.0	757.1
Curr. other non-farm eq.	2711	84.3	414.0	0.0	8.7	43.3	324.5
Current total capital	2711	814.7	4467.1	5.4	37.9	346.1	2379.4
Unpaid labor shutdown	151	0.6	0.9	0.0	0.0	1.0	2.0
Wage labor shutdown	151	0.3	1.1	0.0	0.0	0.0	2.0
Total labor shutdown	151	2.0	1.3	1.0	2.0	2.0	4.0
Net profit	2637	679.2	1958.3	146.0	389.4	778.7	1946.8
Total revenue	48	448.5	515.5	108.2	324.5	648.9	1081.6
Total expense	43	251.4	266.8	108.2	108.2	324.5	648.9
Ent. products consumed	2660	92.9	254.9	0.0	13.0	75.2	389.4
Ent returns used by HH	2649	448.6	681.3	86.5	259.6	584.0	1349.8
Ent returns left over	2643	119.9	727.4	0.0	0.0	54.1	540.8
Total procure. of goods	643	188.0	556.0	5.4	21.6	86.5	1081.6
Total sales	88	410.1	711.2	13.5	64.9	405.6	2163.1
Total shared profit	54	304.8	394.2	2.7	64.9	584.0	1092.4
Unit returns to capital (%)	2259	983.6	45179.7	0.9	4.5	20.6	133.3
Unit returns to labor (USD)	2496	693.8	2005.1	155.7	389.4	778.7	1952.2
Net ch. labor since start	2711	-0.2	1.7	0.0	0.0	0.0	0.0
Net ch. capital since start	2251	450.1	5100.0	-21.6	0.0	135.2	1676.4

Note: Monetary values converted to 2008 US dollars. Dummy variables have decimal values removed.

Note: The three enterprise categories are mutually exclusive; in 2008 there are 6186 firms reported by IFLS households.

Table 9: Summary statistics on firms, 2008, firms with waged employees

	Enterprises with waged employees						
	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>P25</b>	<b>P50</b>	<b>P75</b>	<b>P95</b>
Bus owned by household	1149	0.9	0.2	1	1	1	1
Pct owned by household	72	44.6	17.8	33.0	50.0	50.0	75.0
Bus. operated out. home	1149	0.8	0.4	1	1	1	1
Applied for permit	1149	0.3	0.5	0	0	1	1
Permit issued	340	1.0	0.2	1	1	1	1
Cost obtain permit	340	8763.2	29239.7	10.8	54.1	216.3	1081000.0
Unpaid labor startup	1149	0.7	1.2	0.0	0.0	1.0	2.0
Wage labor startup	1149	2.2	6.3	0.0	1.0	2.0	6.0
Total labor startup	1149	3.8	6.4	2.0	3.0	4.0	9.0
Startup capital	1024	2021.4	7684.3	54.1	324.5	1622.3	6489.3
Current unpaid labor	1149	0.6	1.2	0.0	0.0	1.0	2.0
Current wage labor	1149	3.5	8.9	1.0	2.0	3.0	10.0
Current total labor	1149	5.1	8.9	3.0	3.0	5.0	12.0
Current land assets	1149	1519.9	8200.2	0.0	0.0	0.0	5407.7
Current building assets	1149	1534.9	7019.0	0.0	0.0	216.3	6489.3
Current 4-wheel vehicle	1149	1556.1	6032.4	0.0	0.0	0.0	8652.4
Current other vehicles	1149	277.3	768.7	0.0	0.0	32.5	1406.0
Curr. other non-farm eq.	1149	898.2	4066.3	10.8	108.2	540.8	3244.7
Current total capital	1149	5786.5	15666.2	119.0	1081.6	4326.2	26005.8
Unpaid labor shutdown							
Wage labor shutdown							
Total labor shutdown							
Net profit	1108	2749.0	6432.8	519.1	1297.9	2595.7	10123.3
Total revenue	30	1087.5	969.5	648.9	1081.6	1081.6	3893.6
Total expense	31	646.6	457.0	216.3	648.9	1081.6	1297.9
Ent. products consumed	1133	223.4	692.7	0.0	32.5	173.1	986.4
Ent returns used by HH	1129	1194.8	1838.5	259.6	648.9	1297.9	3893.6
Ent returns left over	1110	782.9	3263.5	0.0	64.9	540.8	2595.7
Total procure. of goods	457	1696.5	8365.4	27.0	108.2	540.8	6489.3
Total sales	72	4579.2	14121.5	39.2	200.1	2974.3	27038.7
Total shared profit	40	1442.8	4516.8	41.1	384.0	1081.6	3839.5
Unit returns to capital (%)	1037	13.2	100.7	0.3	1.0	4.5	60.0
Unit returns to labor (USD)	1108	614.3	1121.6	144.2	324.5	648.9	1946.8
Net ch. labor since start	1149	1.3	7.9	0.0	0.0	2.0	6.0
Net ch. capital since start	1024	3848.7	14910.6	-45.4	216.3	2109.0	22496.2

Note: Monetary values converted to 2008 US dollars. Dummy variables have decimal values removed.

Note: The three enterprise categories are mutually exclusive; in 2008 there are 6186 firms reported by IFLS households.