Microfranchising and Necessity Entrepreneurs

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Abstract

I study the effect that miniaturized franchising opportunities (microfranchise) can have on necessity entrepreneurs in less developed countries. The capacity of necessity entrepreneurs to self-supply entrepreneurial inputs may be smaller than for opportunity entrepreneurs, leading to poor outcomes in independent business. A microfranchise provides entrepreneurial inputs such as branding, marketing, supply chain logistics, product design, best practices, and reduced demand uncertainty. Franchisor supplied inputs may substitute for individual disadvantages, leading to greater business profit. Using a unique data set from Bangladesh, Ghana and Guatemala I test this hypothesis. Through control functions and random coefficient models, I find evidence that necessity entrepreneurs under perform their peers in independent business and that the average returns to microfranchising are larger for necessity entrepreneurs. Results suggest that franchisor's temporary provision of specific capital acts similar to a start-up capital loan, drawing important comparisons with microcredit.

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1 INTRODUCTION

Necessity drives an estimated 50 percent of entrepreneurial activity in less developed countries [LDCs] (Poschke, 2013a). Poor labor market conditions can make starting a business simpler than winning a job offer, even if the entrepreneur is under-skilled, undercapitalized, and risk-averse (Mandelman and Montes-Rojas, 2009; Banerjee and Duflo, 2007). Consequently, these "necessity businesses" are typically unproductive.

Microfranchising offers an alternative to creating a new business from scratch. Traditional franchising in developed economies offers entrepreneurial inputs that partially compensate for a franchisee's inability to self-supply such inputs (Rubin, 1978). Microfranchising adapts the traditional franchise contract for LDCs, promoting economic development through its emphasis on microfranchisee welfare over microfranchisor profit (Christensen et al., 2010). In the United States, franchisor inputs appear to result in more profitable businesses for some entrepreneurs (Williams, 1999).

Little attention has been paid to the general effect of microfranchising on LDC entrepreneurs. Furthermore, how those effects vary across different types of entrepreneurs is unknown. Knowledge of differential impacts, especially for disadvantaged groups such as necessity entrepreneurs, can improve microfranchise development.

The primary objective of this paper is to understand the returns to microfranchising and how returns differ between opportunity and necessity entrepreneurs. I satisfy this objective by first modeling the household's decision to enter either independent business or microfranchising as well as the decision's relationship to necessity. Second, using a sample of data drawn from interviews of business operators in Bangladesh, Ghana, and Guatemala, I explore the general impact of microfranchising across these countries and their microfranchises. In particular, I estimate the average returns to microfranchising, the difference in returns for necessity entrepreneurs, and the variation in returns with respect to unobserved factors affecting the decision to microfranchise.

Selection bias is accounted for through both instrumental variables and control function approaches to endogeneity. Identification is achieved through exogenous factors affecting access and exposure to microfranchising as well as non-pecuniary motivations for business selection such as individual need for flexibility and control. Control function methods not only permit the estimation of average returns, but also allow me to analyze the effect of unobservable factors on those returns.

Necessity entrepreneurs are expected to underperform opportunity entrepreneurs in independent business and I find evidence supporting this relationship. Most importantly, estimates provide significant evidence that necessity entrepreneurs do, in fact, experience greater returns to microfranchising than opportunity entrepreneurs. In addition, I also find strong evidence of negative selection into microfranchising as well as positive selection on returns.

Microfranchising Traditional franchising is a familiar concept (think McDonalds), but microfranchising is quite new and has important differences. I offer a short example to motivate the concept.

Vision Spring (VS) manufactures reading glasses for about $1 US and is able to ship that same pair to localized distributors for roughly another $1 US. Eyesight problems are common in LDCs, many of which can be corrected with prescriptive lenses. VS uses microfranchising to distribute and sell glasses. The average pair of VS glasses in Central America sells for $5-7 US (in 2007) and less in countries like India. Microfranchisees start out with a "business in a bag" consisting of a VS backpack containing a starter inventory, marketing materials, instructions, sales tracking and other supplemental materials. The entry level kit is roughly $100 US (consignment opportunities with little down also exist). VS also provides training for vision screenings, business practices, and an established supply chain. For information on the microfranchises above see the appendix and (Fairbourne et al., 2007).

Significant variety exists in microfranchise structure, size of start-up costs, and operations. However, all of them provide significant entrepreneurial inputs into the business process.

2 RELATED LITERATURE

The franchising literature cites the right to make use of a trademark, or brand, as a key benefit to franchisees (Caves and Murphy, 1976; Rubin, 1978; Mathewson and Winter, 1985). Although Caves and Murphy (1976) focuses on the franchisor's rent extraction problem, the fact that franchisors generally advertise and promote the brand on a regional or national level represents a savings to the franchisee who would otherwise have to advertise without the economies of scale achieved by the centralized franchisor.

Rubin (1978) also mentions the value of the brand name that differentiates the franchisees' product, but also mentions that franchisees benefit from reduced demand uncertainty. Furthermore, Rubin describes types of managerial assistance frequently provided to the franchisee such as site selection, training, standardization, operating manuals, design of business layout and general advice. In fact, Rubin goes so far as to make the argument that the distinction of the franchisee as a firm, separate from the franchisor, is more legal than it is economic. In other words, franchisees may be more like employees than entrepreneurs and, "simply lack the requisite human capital to open businesses without the substantial assistance of franchisors" (Rubin, 1978).

Empirical evidence from US based independent and franchise businesses suggest that franchisor inputs are valuable to franchisees (Williams, 1999). More specifically, Williams (1999) found that although franchisees as a group have average incomes lower than the independent business group, the franchisees had average incomes greater than they were predicted to have in the counter-factual scenario in which they entered independent business.

Microfranchisors often operate with a distinctive social aim to benefit their microfranchisees.

> "Microfranchising develops and promotes, by sale, small businesses that the poor can afford to enter and operate. Microfranchising fuels economic development by providing a turnkey business-in-a-box for rapid deployment and replication by people living in subsistence markets. Microfranchisees replicate businesses by following proven mentoring, marketing and operational concepts" (Christensen et al., 2010).

Christensen et al. (2010) studies a small data set from Ghana including only a single microfranchise, Fanmilk, based in Accra Ghana.[1] The authors looked primarily at the relationship between microfranchising and job creation, the differences in financial and non-financial profiles of franchisees and how microfranchisees performed (in terms of monthly profits) relative to comparable non-franchise businesses in the area. Results suggest microfranchising is associated with a statistically significant and small positive increase in log monthly profits, roughly a 13 percent increase. Various control variables and attempts to interview independent businesses of comparability to Fanmilk were used in their analysis. Furthermore, their estimates

[1] Data used by Christensen et al. (2010) represents a precursor to a subset of the data I utilize in this paper.

were based soley on one specific microfranchise in Ghana, with a sample consisting of only males. The generalizability of the result becomes difficult without variation in microfranchises and additional countries in the sample. In comparison, I extend their results over multiple microfranchises in multiple countries – Ghana, Bangladesh and Guatemala. I additionally study the differential effect that participation in a microfranchise has on individuals engaged in self-employment out of necessity and opportunity.

The Global Entrepreneurship Monitor (GEM) collects data on individuals involved in entrepreneurial activities in countries all over the world. Individual's in their collected data are asked, '*Are you involved in this start-up/firm to take advantage of a business opportunity or because you have no better choices for work?* Those who indicate they had no better choices for work are labeled *necessity entrepreneurs*. A review of GEM's findings show almost 30 percent of entrepreneurs globally qualify as necessity entrepreneurs by the above definition and the fraction increases to 50 percent in non-OECD countries (Poschke, 2013a).

It is not clear where the necessity entrepreneur fits in the economic theory of entrepreneurship. Poschke (2013b,a) argues that in most economic theories involving heterogenous firms, the unproductive are weeded out such as in (Jovanovic, 1982) and (Hopenhayn, 1992) and thus leave no room for the continued participation of necessity entrepreneurs.

Several theoretical models of entrepreneurship dictate that knowledge of one's skill in business (entrepreneurial ability) affects the occupational decision of whether to enter the labor market as a wage employee or be self-employed (Lucas, 1978; Blau, 1985; Poschke, 2013b; Evans and Jovanovic, 1989). Or after gaining knowledge of one's skill through trial and error, the individual chooses whether to stay in entrepreneurship or exit to wage employment (Jovanovic, 1982). Kihlstrom and Laffont (1979) show the same occupational decision can be explained by a person's temperament towards risk. In all these models, individuals with less business skill and/or greater aversion to risk are thought to sort themselves into wage employment where they enjoy relatively greater income and lower uncertainty compared to operating their own business.

To explain the existence of necessity entrepreneurs in equilibrium (Poschke, 2013b) develops a model of entrepreneurship where individuals have a general ability level that improves their prospects in both business and wage employment. The highest ability individuals find entrepreneurship optimal while the middle ability individuals sort themselves into wage employment. Finally, the least able individuals face such poor prospects in the labor market that they find it optimal to continue starting and exiting unproductive businesses until they "draw" a particularly profitable one by chance.[2] In this way, necessity entrepreneurs are those with such poor labor market prospects that they resort to entrepreneurship.

However, Poschke's model assumes the existence of an ability specific wage offer that represents an ever available outside option.[3] What happens when queuing for formal sector jobs or other labor market imperfections constrain occupational choices such that no jobs are available? Individuals in the preceeding models who would find wage employment preferable but resort to entrepreneurship simply because wage employment is unavailable might also say they are starting a business because they '*have no better choices for work*.'

Christensen et al. (2010) use involuntary unemployment as their working definition of a necessity entrepreneur, "...some people do not have the skills or temperament to invent and develop a completely new business as they are necessity entrepreneurs – enterprising self-employed

[2] In previous models, these "inefficient" entrepreneurs would eventually be expunged from the self-employed population and shift into wage employment.

[3] The model also assumes that there are no fixed entry costs so that necessity entrepreneurs can always draw a new business if they desire.

who would prefer to work for an established entity." I will use this definition to satisfy my objective of understanding how the effects of microfranchising on profitability may differ between necessity entrepreneurs and their complement, opportunity entrepreneurs.

Models of entrepreneurial choice predominantly suggest necessity entrepreneurs are at a relative disadvantage in business compared to opportunity entrepreneurs. Thus, as a matter of hypothesis, I expect necessity entrepreneurs to have lower mean profits in business compared with opportunity entrepreneurs. Strong evidence of this outcome is found in each of the empirical models estimated in this paper.

The remainder of the paper proceeds as follows. Section 3 presents the models of occupational and franchising choices made by households of heterogenous productivity. Section 4 describes the data and empirical methods. Section 5 discusses estimation results, Section 6 discusses findings and Section 7 concludes.

3 THE MANAGERIAL ASSISTANCE HYPOTHESIS

A key difference between independent business and franchising is the contribution of critical business inputs from the franchisor. The franchising literature describes what Williams (1999) refers to as the "managerial assistance hypothesis," hereafter referred to as (MAH). The hypothesis states that those who choose to start a franchise, rather than an independent business, do so because they value the managerial assistance and entrepreneurial inputs contributed by the franchisor. Potential inputs include not only managerial best practices for operating a given branch, but also the large quantity of soft capital such as branding, product development, supply chain logistics, advertising materials, and more. The franchisor-supplied stock of soft capital is important for understanding the returns to microfranchising. When an individual decides to microfranchise they incur explicit costs in the form of franchising fees and royalties, if any[4], and opportunity costs in the form of possible forgone profits from relying on their own ability to combine business inputs. The relative net value of franchisor supplied inputs to an individual depend on the magnitude of the costs and can vary by individual. For simplicity, I separate inputs into two general types: (1) hard and soft capital such as available start-up funds, available labor supply, and (2) skill based inputs such as experience, education, training, and ability.

A household faces a potential outcomes framework in which they supply resources (X_i), skills (θ_i) and labor to either an independent business of their own creation or a microfranchise and then realize the profit outcome. If households derive utility from income, then business profits are the outcome of primary importance. I assume business profits from the household's choice are random variables that depend on contributed inputs and skills.

Profit Outcome	**Expected Profits**	**Variance**	
$Y_F(X_i, \lambda, \theta_i)$,	$\mathbb{E}[Y_F(X_i, \lambda, \theta_i)] = \mu_F(X_i, \lambda, \theta_i)$,	$Var(Y_F) = \sigma_F^2$	(1)
$Y_I(X_i, \theta_i)$,	$\mathbb{E}[Y_F(X_i, \theta_i)] = \mu_I(X_i, \theta_i)$,	$Var(Y_I) = \sigma_I^2$	(2)

4 Many microfranchises in the sample don't require any significant upfront franchising fee, resulting in microfranchisees with zero start up costs. Additionally, unlike the revenue-sharing mechanisms of traditional franchising, microfranchising often uses alternative methods of profit capture for the franchisor. For example, the franchisor often designs their supply chain so that the franchisor royalty is built into a small markup on inventory. This avoids a host of agency and monitoring problems which can arise when enforcing these "taxes" on unobserved revenues or profits.

From my previous discussion of the related literature, there are a number of assumptions about the relationships defining the MAH that relate directly to the potential outcomes above.

Assumption 1: $\sigma_F^2 < \sigma_I^2$ Franchises have lower risk or uncertainty in outcomes. Standardization of franchisee units and their operations tends to decrease outcome variation. Additionally, because the business model and product are observable in the market, demand and quality uncertainty are lower from the perspective of a household considering microfranchising as an option. This difference in outcome variance has direct effects on the expected utility of risk averse households. Households which are especially sensitive to income uncertainty, find increased incentives to franchise.

Assumption 2 Individual entrepreneurial skill has less impact on performance in a franchise than in independent business. Franchisor skill and assistance acts as a substitute or replacement for a franchisee's own skill deficiencies. Franchise contracts also constrain franchisee decisions and participation, leading to reduced value of own skills through underutilization. More formally, this assumption defines relative magnitudes of the mean functions μ_j such that

$$\frac{\partial \mu_I(X_i, \theta_i)}{\partial \theta_i} > \frac{\partial \mu_F(X_i, \lambda, \theta_i)}{\partial \theta_i} \text{ for all } \theta_i \quad \text{and } \frac{\partial \mu_F(X_i, \lambda, \theta_i)}{\partial \theta_i} \geq 0$$

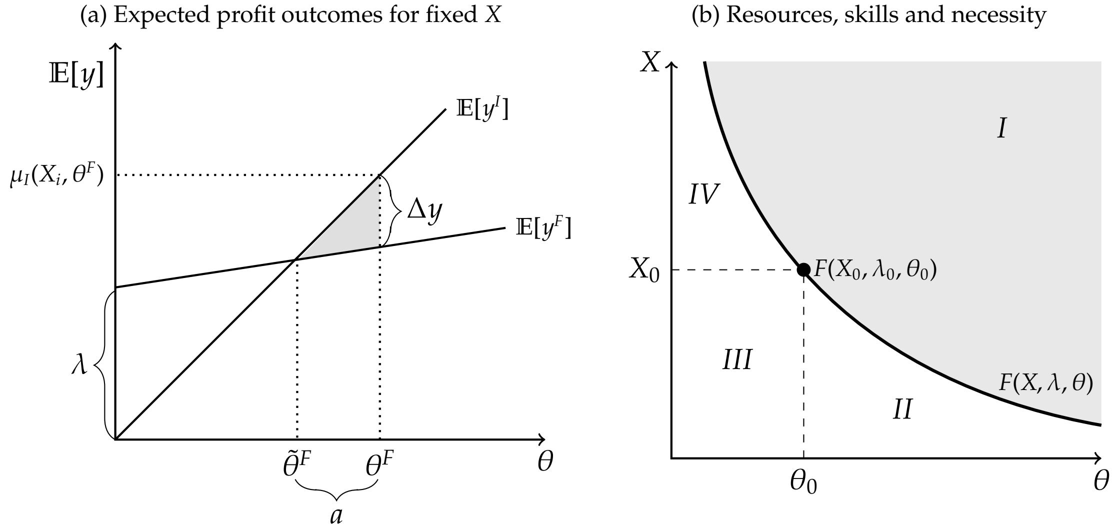
In other words, performance in any type of business is weakly improved by additional skill, but generally has a greater effect in independent business than it does in a franchise.

Assumption 3 Franchisor supplied inputs, λ, have positive value even when a franchisee has virtually no skills, θ, or resources, X, of their own (except labor) to contribute. Formally we have $\mu_F(0, \lambda, 0) > \mu_I(0, 0)$ where λ are the franchisor supplied inputs. Essentially, while independent businesses that have either no capital, no skilled entrepreneur, or both, may have no profits, a franchise will still have some positive outcome. This assumption is unique to the case of microfranchising and is important for understanding the measures of franchisor input value. Previous studies testing the MAH, such as (Williams, 1999), demonstrate that for developed economies such as the United States, franchising is an expensive option. The initial startup costs determined by the franchise fee are quite large, in fact, larger than the startup costs of most comparatively sized businesses. In contrast, microfranchises are intentionally designed to be accessible to those with little capital. Many microfranchises have no upfront capital required at all and permit individuals with virtually zero startup capital to start a business. As a consequence, the value of franchisor inputs, λ, can be substantial when compared to the potential outcome of a skill challenged household trying to start an independent and undercapitalized business.

Assumption 4 Finally, I assume that households decide whether to franchise or not based on which option maximizes their expected utility of income with a concave utility function. This assumption ensures that households have some measure of risk aversion and therefore value, to some degree, the decreased risk associated with franchising.

The four assumptions above characterize the MAH for microfranchising in less developed countries (LDC) and can be used to construct a simple graph depicting some implications of the assumptions. Figure 1 portrays some important implications of the MAH when considering returns to microfranchising and also the nature of necessity entrepreneurship.

Figure 1: Implications of the MAH on potential outcomes and necessity entrepreneurship.



Assumptions 1 - 4 guarantee that for a fixed value of X_i, there exists a skill level, $\tilde{\theta}^F$, at which a household would have identical expected profit in either a microfranchise or an independent business. Additionally, there is a skill level θ^F at which a household is indifferent (under expected utility, not profit) between independent business and microfranchising. Assumptions 1 and 4 generally ensure that, as depicted in Figure 1a, we have $\tilde{\theta}^F < \theta^F$. The gap in these critical skill levels reflects the assumption that microfranchising has lower risk than independent business. This decrease in risk is something that risk averse households are willing to pay for by foregoing additional expected profit they could otherwise acquire by using their skills in independent business. Foregone profits for individuals indifferent between microfranchising and independent business is shown by Δy in Figure 1a. Assumption 2 pertains directly to the independent business expected profit line, $\mathbb{E}[y^I]$ in Figure 1a, having a larger positive slope than the microfranchise expected profit line, $\mathbb{E}[y^F]$ of the same figure. The value represented by λ in the Figure 1a represents the value of microfranchisor supplied inputs to individuals with no entrepreneurial skill of their own and corresponds directly to assumption 3. A similar "intercept" value can be constructed for those with zero inputs of their own, such as start-up capital, to contribute to business creation. It is this value that will become of a focus of the estimated returns to microfranchising.

The MAH and Figure 1a tell an important story about the returns to microfranchising. First, as the difference in the expected profit lines demonstrate, the returns to microfranchising decrease in entrepreneurial skill. In addition, risk aversion and the associated acceptable loss in expected profit, Δy, suggest that returns to franchising are not necessarily positive. Individuals with skill levels in the interval $(\tilde{\theta}^F, \theta^F]$ prefer microfranchising to independent business, yet experience negative returns. This possibility creates ambiguity in the expected sign of average returns for individuals with significant skill.

Disutility from risk can affect the decision to microfranchise, independent of skill. Empirically, entrepreneurial skill is only partially observable. Since the decision to microfranchise and the subsequent profit outcomes both depend on skill, identification of returns will require separating the decision to microfranchise from the unobserved factors affecting profitability.

The role of the disutility of risk in the decision to franchise can be clearly viewed in using second order Taylor approximations of the utility function. Let $Y_i(X_i, \theta_i)$ be the random variable representing the household's business profit having mean $\mu(X_i, \theta_i)$ and variance σ^2. Then the expected value of the linear approximation of utility about the mean outcome, μ, can be expressed as,

$$\mathbb{E}U_i(Y_i) = U[\mu(X_i, \theta_i)] + \frac{1}{2}U''[\mu(X_i, \theta_i)]\sigma^2$$

Under an increasing concave utility function, the above expression yields interpretations in terms of risk aversion coefficients. In particular, since households will choose to franchise if and only if doing so maximizes expected utility, the probability of selecting into franchising increases with the disutility of risk, holding skills and resources constant as is shown in the following lemma.

Lemma 3.1. *The probability that household j with resources X_i and entrepreneurial skill θ_i prefers microfranchising with franchisor inputs λ to independent business is*

$$Pr(F_i = 1) = Pr\left(\rho_j \geq \frac{U[\mu_I(X_j, \theta_j)] - U[\mu_F(X_i, \lambda, \theta_i)]}{\sigma_I^2 - \sigma_F^2}\right)$$

where ρ_j represents the disutility of risk.

Lemma 3.1 provides a basis for modeling the selection of households into microfranchising using risk aversion, or disutility of risk more generally, as exclusion restrictions. Factors increasing a person's disutility of risk can explain a person's decision to select away from risk (i.e., toward a lower risk franchise opportunity) while not having its own direct effect upon business profits. In other words, the factors belong in a selection equation, but not the outcome equation, making them candidates for exclusion restrictions. Unfortunately, consistent and strong measures of a person's risk aversion coefficient may not be available. However, the same argument for using risk aversion as an exclusion restriction may also be applied to other non-pecuniary preferences, such as a desire for flexibility in work schedules.

Necessity Entrepreneurship Recent literature identifies a useful dichotomy for the motives of individuals entering self-employment, a "push" or a "pull" into entrepreneurship. Opportunity entrepreneurs are classified as individuals who are pulled into self-employment by the existence of profitable opportunities and their possession of the skills and resources required to exploit those opportunities. Necessity entrepreneurs are thought to be pushed into self-employment as they lack better opportunities. In particular, it may be that they prefer wage employment, but without available jobs, subsistence self-employment is required for survival. Importantly, necessity entrepreneurship is closely related to relative quantities of resources, X, and the skill to use those resources, θ.

Consider a business environment in which microfranchisors supply inputs of size $\lambda_0 > 0$. Then there exist combinations of resources X and skill θ that determine whether self-employment in independent business or microfranchising is preferred to wage-employment. Figure 1b depicts a situation in which the shaded area (I) represents combinations of resources and skills that make self-employment preferable. The unshaded regions (II, III, IV) represent combinations for which individuals may prefer wage-employment. The curve, $F(X, \lambda_0, \theta)$ represents the combinations of resources and skill that are indifferent between the available self-employment opportunities and wage-employment. The regions identified in the figure as II, III and IV represent different ways in which a person may be identified as a necessity entrepreneur.

Region II in Figure 1b represents individuals with a significant level of entrepreneurial skill who would be well suited to self-employment, except for the fact that they don't possess enough resources X to realize that success. As a consequence, individuals in region II prefer wage-employment, perhaps as a means of acquiring sufficient resources to successfully enter self-employment later. Region II individuals only derive positive returns to microfranchising through the microfranchisor's supply of capital, not the managerial assistance. Skilled individuals lacking access to capital are a primary focus of micro-credit programs. However, such programs may be of limited use to individuals pushed into self-employment from regions III and IV.

Region IV in Figure 1b, depicts a reversal of the region II individuals. In particular, they have sufficient resources, X, to start successful self-employment ventures, but are deficient in the required skill to use those resources profitably. Region IV individuals may benefit a great deal from managerial assistance, but less so from the sharing of microfranchisor capital.

Region III necessity entrepreneurs are especially disadvantaged as they suffer from deficiencies in both start-up resources and entrepreneurial skill. This type of necessity entrepreneur should have the largest returns to microfranchising, as their counter-factual outcomes in self-employment are expected to be especially poor.

This paper will compare the returns to microfranchising between individuals in region I (opportunity entrepreneurs) and regions II, III, and IV (necessity entrepreneurs). Necessity entrepreneurs are identified in the data based on their response to a question indicating their preference for wage-employment, despite their current status as a business operator. The above discussion about the different types of necessity entrepreneurs pertains to a number of key reasons individuals may have for their stated preference. Because the expected outcomes in independent business are particularly poor for necessity entrepreneurs, the returns to microfranchising should be correspondingly high.

4 EMPIRICAL METHODS AND DATA

4.1 Model

Williams (1999) estimates returns to traditional franchising for entrepreneurs in the United States using an endogenous switching model as a special case of the generalized Roy model. This approach is consistent with the model defined in the previous section and the MAH. Low start-up capital requirements are an important difference between microfranchising and traditional franchising. The sample used in (Williams, 1999) confirmed previous findings that in the United States, the average starting capital (franchise fee) associated with franchising is greater than starting capital in independent businesses. Several microfranchises have zero initial franchise fees, meaning entrepreneurs can start businesses without any significant capital of their own and still be profitable, something not possible in independent business. Consequently, the intercept in the linear model will play a more important role.

Assuming log-separability and log-linearity of the random variables Y_j for $j = F, I$ with respect to observable inputs $\mathbf{x}_i$ and unobservables $u = (\theta_i, \epsilon)$ the generalized Roy model becomes,

$$\begin{aligned} \ln Y_0 &= \alpha_0 + \mathbf{x}_i\beta_0 + \gamma_0\theta_i + \epsilon \\ \ln Y_1 &= \lambda + \mathbf{x}_i\beta_1 + \gamma_1\theta_i + \epsilon \\ F &= 1[U_F(\mathbf{z}_i\phi) - V_i > 0] \end{aligned}$$

where $\mathbf{x}_i$ is a vector of observable inputs to the business, θ_i the unobserved entrepreneurial skill, ϵ is other unobservables affecting log-daily profits. The binary variable F equals 1 when the person selects microfranchising and zero otherwise. The value of F depends upon a latent variable specification of net utility, where U_F is the net utility from franchising given the vector $\mathbf{z}_i$ which includes $\mathbf{x}_i$ as a strict subvector and V_i is the residual of the latent variable. The selection residual, V_i, is interpreted as the "resistance to treatment," or the opportunity cost to the individual of choosing to microfranchise rather than start their own independent business. In this case, the most interesting opportunity cost may be the value differential of entrepreneurial skill, $(\gamma_0 - \gamma_1)\theta_i$ when $\gamma_0 > \gamma_1$, meaning that the decision to microfranchise involves foregoing the larger returns to skill in independent business for those with substantial skill.

Because both potential outcomes are never simultaneously observed, the actual observable values of $\ln Y$ take the switching regression form,

$$\begin{aligned}
\ln Y_i &= \ln Y_1 F + \ln Y_0(1-F) \\
&= \alpha_0 + \mathbf{x}_i\boldsymbol{\beta}_0 + (\lambda - \alpha_0)F_i + (\boldsymbol{\beta}_1 - \boldsymbol{\beta}_0)\mathbf{x}_i F_i + (\gamma_1 - \gamma_0)\theta_i F_i + \gamma_0\theta_i + \epsilon \\
\tau(\mathbf{x}_i, \theta_i) &= (\lambda - \alpha_0) + (\boldsymbol{\beta}_1 - \boldsymbol{\beta}_0)\mathbf{x}_i + (\gamma_1 - \gamma_0)\theta_i
\end{aligned}$$

where $u_i = (\gamma_1 - \gamma_0)\theta_i F + \gamma_0\theta_i + \varepsilon$ is the full unobservable component and $\tau(\mathbf{x}_i, \theta_i)$ is the return (treatment effect) to microfranchising for a person with inputs $\mathbf{x}_i$ and skill θ_i.

Christensen et al. (2010) represents the only published empirical research on microfranchising. The authors look at a special OLS case of the above model in which they estimate a constant average return for the entire population, $\tau = (\lambda - \alpha_0)$. Their model places strong restrictions on how microfranchising differs from independent business. In particular, the authors implicitly assume the partial effects of both observables and unobservables on log-profits are identical between the two organizational forms, i.e., $\gamma_1 = \gamma_0$ and $\boldsymbol{\beta}_1 = \boldsymbol{\beta}_0$. Though attempts are made to partially "match" microfranchisees with comparable independent businesses through their sampling, selection is essentially assumed to be independent of unobservables affecting profits. The approach in (Christensen et al., 2010) may lead to biased estimates of the average return to franchising, $(\lambda - \alpha_0)$, when selection is not independent of unobservables such as skill, θ_i. If the returns to skill are not identical, then the (Christensen et al., 2010) model is,

$$\ln Y_i = \alpha_0 + (\lambda - \alpha_0)F_i + \mathbf{x}_i\boldsymbol{\beta}_0 + \underbrace{(\gamma_1 - \gamma_0)\theta_i F_i + \gamma_0\theta_i + \epsilon}_{\text{unobserved}}.$$

Under the assumptions in the MAH, we would expect $\gamma_0 > \gamma_1$ and we would expect less skilled entrepreneurs to select into microfranchising so that $Cov(F, \theta) < 0$. If we add the condition that $E[\theta|X] = 0$ so that $\theta = 0$ for a person with average skill and be positive (negative) for more (less) skilled individuals, then it can be shown through the omitted variables bias formula that OLS estimates of $(\lambda - \alpha_0)$ will be biased downward. In addition to bias, the (Christensen et al., 2010) specification ignores heterogeneity in returns to microfranchising for the most important subpopulation – necessity entrepreneurs.

In the remainder of this paper I do the following: (1) I test the generality of (Christensen et al., 2010) by estimating a constant population return to microfranchising over a pooled sample across several microfranchises in three countries, while controlling for endogeneity. (2) Under the same assumptions in (1) I explore heterogeneity by estimating constant average returns for two populations, necessity and opportunity entrepreneurs. (3) To more fully address return heterogeneity, I extend the previous model to a Correlated Random Coefficients (CRC) model and allow greater flexibility in the returns to microfranchising with respect to both observables and unobservables. In all procedures I use either IV or control function approaches to obtain consistent estimators. (4) Finally, I use the heterogenous returns of the CRC models to estimate average returns to franchising for both the "treated" and "untreated" groups of the populations of opportunity and necessity entrepreneurs.

4.2 Data and Sample

Over the years 2007-2009 the Ballard Center for Economic Self-reliance at Brigham Young University conducted surveys of microentrepreneurs in Ghana, Bangladesh and Guatemala. The goal was to interview 200 independent business owners and 100 microfranchisees in each country. Individuals were asked detailed questions about their business and household by the interviewer and their responses were recorded.

Many interviews represent convenience samples as interviewers waited in certain business districts and attempted to randomly select individuals to interview. One year later the team tried to follow up with each interviewee and survey them a second time. Due to some current issues with missing values and attrition in the follow up interview sample, this paper will focus on use of the cross section data generated from the first year of interviews in each country.

Ghana, Bangladesh and Guatemala have different currencies and price levels. Business information was coded in terms of local currencies making proper adjustments for cross-country comparisons necessary. Currency values for each country were converted to US dollars through purchasing power parity exchange rates in the appropriate year. Furthermore, each country's price level is assumed fixed during the time of the survey. Individual country controls are used to absorb remaining cross-country differences in price-level.

Business outcomes (i.e., business profit) are measured by average daily profits reported by respondents. Profit controls for business scale, such as capital, will be accounted for through the start-up costs invested during business creation. Labor inputs are controlled for by use of the hours per day the business is open and operating. The current stock of business capital is quite likely to be affected by the overall business profitability. However, the initial start-up cost, representing the initial capital stock before business operations began, are less likely to be directly effected (i.e., reverse endogeneity). Instead, start-up costs are more likely to be related to the expectations about business profitability (i.e., more profitable businesses justify larger initial outlays) and also reflect a number of unobservable and possibly random events that determine an individual's resource constraint. Additionally, the number of hours an individual operates a given business may also be related to the profitability of the opportunity. If the marginal value of an additional hour of operating a business is greater than the returns to other uses of that hour, we should see labor go up. Despite these potential endogeneity issues, franchising literature such as (Williams, 1999; Christensen et al., 2010) include such variables in the profit equation. As a consequence, I will maintain a number of assumptions pertaining to the exogeneity of these inputs.

Start-up costs may be reasonably exogenous under the assumption that the observed start-up cost is essentially the same as capital available at start-up and that the actual level of capital available at start-up is unrelated to unobserved factors, such as skill, that also affect outcomes. The former assumption may not be too strong, but the latter is indeed harder to justify. These issues will be revisited in a following subsection on the earnings equation.

Respondents also classified their business by type, selling location and general sector; providing some measure of control for the market conditions operated in by a given business.

4.2.1 Identifying Necessity and Opportunity Entrepreneurs

A primary purpose of this paper is to estimate the returns to microfranchising for necessity entrepreneurs and determine whether they are different from those for opportunity entrepreneurs. As previously discussed, identification of necessity entrepreneurs is not entirely straight forward. This paper also seeks to evaluate the use of identifying necessity entrepreneurs through their stated preference for wage employment over self-employment.

(Christensen et al., 2010) essentially label individuals with a preference for wage employment, despite their participation in self-employment, as necessity entrepreneurs. To aid in this identification, the interview included the following question:

> Would you prefer to:
>
> 1. operate your own business, or
> 2. work as an employee for an established company

Every individual in the sample is engaged in self-employment, otherwise they wouldn't have been interviewed. Hence, their statement of preference for wage-employment is at least suggestive of their involuntary engagement in self-employment. Individuals responding with 2, were coded as necessity entrepreneurs (i.e., $N_i = 1$) while those responding with 1 are considered opportunity entrepreneurs (i.e., $N_i = 0$). It is important to remember that there may be a number of feasible, not mutually exclusive reasons why an individual may, at the time of interview, prefer wage employment over self-employment.

First, an individual may prefer wage employment because they lack sufficient skill to be a successful entrepreneur, even with sufficient capital (region IV from Figure 1b). The decrease in risk in conjunction with the higher earnings make it more attractive than entrepreneurship. Second, many individuals who do possess substantial entrepreneurial skill may also respond that they prefer wage employment if they do not possess adequate capital (region II of Figure 1b). In this case, a skilled entrepreneur may temporarily prefer wage employment until they can save enough capital to start a more substantial business that complements their skill. Essentially, necessity entrepreneurs may prefer wage employment because they lack skill, lack start-up capital, or both (region III of Figure 1b). Hence, differences in returns to microfranchising for necessity entrepreneurs depend upon both observables and unobservables. In any of the cases discussed, the counterfactual outcome in independent business is expected to be poor, as success typically requires both capital and skill.

4.2.2 Instruments and Exclusion Restrictions

Identification of the returns to microfranchising in the presence of endogeneity requires exogenous sources of variation in the decision to franchise. As previously discussed, non-pecuniary sources of utility from franchising are one set of factors that increase the likelihood of franchising while being uncorrelated with unobserved factors affecting profits. One such instrument I utilize is a binary indicator for whether an individual is making occupational and organizational decisions based on their desire for flexibility and control.

In addition to being asked whether an individual prefers wage employment or business operation, people gave reasons for their preference and additionally answered questions about why they started the business that they did. A significant number of people responded that their preferences and their primary motivation for starting their particular business was a desire for lifestyle flexibility and control. I categorized their text-based responses to these questions and assigned a 1 to those expressing flexibility and control as a motivation and 0 otherwise. For example, women interviewees in particular may indicate that they started their business because they needed flexibility in the location and hours of work to take care of children and the household. In my sample, the desire for this flexibility and control is correlated with the decision to microfranchise. Under the assumption that the factors making flexibility attractive are uncorrelated with unobserved factors affecting business profitability, we may consider them as affecting selection into microfranchising, without affecting profits except through the choice of business.

In general, the desire for flexibility and control, even if independent of factors affecting profitability, does not clearly increase the likelihood of microfranchising. It is conceivable that a number of independent business opportunities could offer more flexibility. As a consequence, whether flexibility motivations increase or decrease the probability of selecting into microfranchising may depend on the sample.

A justification for expecting that flexibility may incline a person toward franchising is an indirect connection to the disutility of risk. For example, if a women needs a flexible business opportunity because of child care responsibilities, those responsibilities may also increase the disutility experienced from the uncertainty in business quality and outcomes. This indirect distaste for risk may lead the women to select into microfranchising to decrease her risk.

An additional exogenous factor affecting the decision to franchise is access and awareness, or exposure to microfranchising. One difficulty in this study is that I do not observe the full set of opportunities open to a person at the time they selected their business. Entrepreneurs with access to, and awareness of, microfranchising opportunities do not have to select microfranchising. Indeed the opportunities can be ignored if not deemed profitable. Access and awareness, however, weakly increase the probability of microfranchising.

If individuals learn their opportunity set as they enter the world of work, it seems reasonable that those exposed to microfranchising at earlier ages may also be more inclined to select into it as they will be forming their knowledge of opportunities in an environment containing microfranchise opportunities. A person's year of birth determines the year at which that person will later become of working age, say 18 years old, and is unrelated to a person's own innate skill. However, the year at which people in the sample turn 18 does affect their chances for exposure to microfranchising. Microfranchising is relatively new and both access and awareness of these opportunities may be greatest for those who turn 18 most recently.

Figure 2 shows the counts of independent and microfranchise businesses started in each year in each country. The red dots represent independent businesses, while blue indicates a microfranchise. A clear quadratic growth in both types of businesses is observable in the graphs. This pattern indicates that most businesses in the sample are relatively young. More importantly, it may also hint at a potential survivor bias. Most new businesses fail to survive and those that do may be substantially different from those that don't.

The growth in the count of microfranchise businesses in the sample requires some additional explanation. On one hand, it may be that entrepreneurs who choose to microfranchise don't persist in microfranchising, but move on to other opportunities. If so, then we should not be surprised by the increasing rate of newly started enterprises. However, this pattern may be unrelated to an individual's ability and instead is related more to their age. Perhaps younger entrepreneurs are more likely to use microfranchising as a stepping stone to independent business opportunities.

On the other hand, microfranchising opportunities are less abundant and relatively new. For example, while some microfranchises have been around for a longer period of time, like FanMilk in Ghana, others like VisionSpring (Guatemala) was started only as late as 2001.

Additionally, the microfranchise Banglalink, in Bangladesh, didn't get started until about 2005. Many other microfranchises follow a similar pattern of being recently founded. People who come of working age after the founding of these microfranchises have an increased probability of having both access and awareness of the opportunity and therefore an increased probability of selecting into it. Indeed, there are always never-compliers, those who would never franchise whether its available or not. But, there are also a great number of people who would choose to franchise if they knew about the opportunity and found it profitable. I will exploit an age related marker to exploit this exogenous source of a predictor for franchising.

The identification operates as follows: An individual is randomly assigned a birth year. The year of birth determines the year at which the individual will turn 18. Those who are born earlier will have less access and be less likely to be aware of, and exposed to, microfranchising. Those born later will turn 18 in an environment with more plentiful opportunities to observe and engage in microfranchising. Individuals, who would prefer to microfranchise if only they had access and a knowledge of the benefits from observing others, will be "moved" by this instrument into compliance.

The instrument is calculated for individuals in each country. Using data on an individual's current age and knowing the year of data collection, I can calculate the year in which the person turned, or will turn, 18 years of age. The critical year in each country that indicates the founding of microfranchises or a sharp increase in the number of microfranchises is subtracted from the year at which each person turns 18. This new variable is positive for individuals in the sample who turn 18 after the critical year. For example, consider two people, one turned 18 in 1994 and the other in 2006. If the critical year for their country was 2003, then the first individual would have an instrument value of $1994 - 2003 = -9$ while the second person has an instrument value of $2006 - 2003 = 3$.

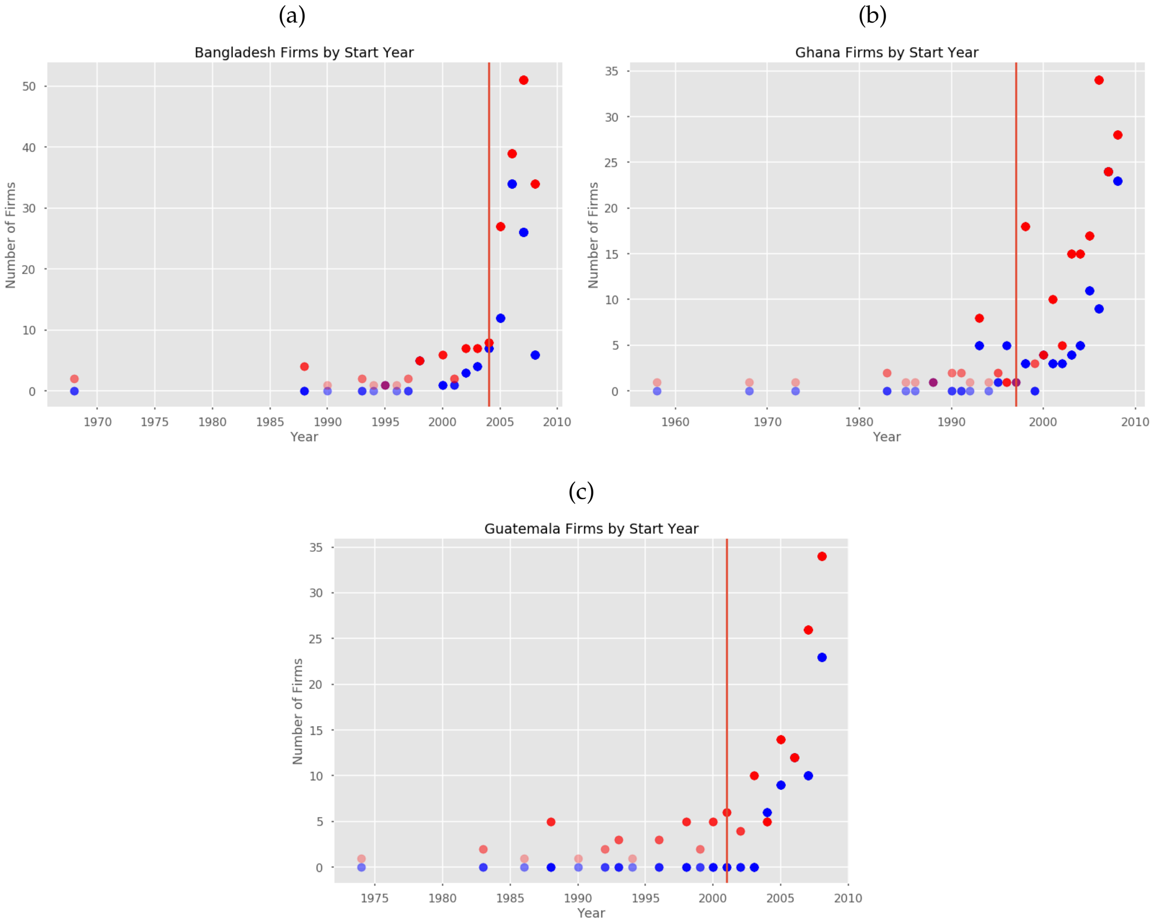
These individuals come of working age in an environment in which many more microfranchises may be operating, giving them greater exposure to the opportunity, and its benefits and costs, if they wish to comply. An alternative interpretation may be that individuals turning 18 after the critical year are young enough to find microfranchising opportunities attractive as a stepping stone to later business opportunities. In this case, the individual is more likely to franchise only because of their age independent of other unobservables affecting business outcomes and associated selection.

An age related instrument is not without complications. Age, by itself, does not make one more skilled at entrepreneurship. However, age is associated with relevant factors that accumulate over time, such as experience and education. Older individuals are more likely to have started previous businesses and have more experience. Older individuals have also had more time to acquire certain observable skills such as reading, writing and informal training as well as formal education. Including these human capital related variables in the outcome equation can control for the skills that correlate with age. Conditional on these skill accumulations, age should not directly affect business performance.[5] Essentially, identification through this birth-year derived instrument hinges on higher levels of access and awareness of microfranchising being as good as randomly assigned after conditioning on age-related accumulation of useful inputs such as start-up capital, education, and business experience.

The concept of randomly assigned access and awareness of microfranchising as a type of instrument is not too dissimilar from the form of treatment in randomized controlled trials of microcredit programs and information interventions. In the case of microcredit, different villages are often randomly selected to receive access to micro-loans. Uptake is typically low,

5 One particular issue may be that of labor. For example, much older individuals may not be as energetic, which may reduce their labor capacity in their business. However, I control for operating times which are proportional to labor which should account for this possibility.

Figure 2: Independent and microfranchise businesses started over time.



suggesting that even with access many do not prefer to borrow and/or may be unaware of the access they've been granted. The treatment received isn't an actual loan, its the opportunity for a loan if they want one. Other social programs, called information interventions, involve individuals being randomly selected to receive information, such as their access to a program and its benefits. In both of the above cases, treatment is weak in the sense that individuals are only randomly assigned opportunities and awareness, but not participation in the actual program whose impacts are being evaluated.

When the instrument involves a weak inducement, such as access or awareness to a treatment, even if valid on the basis of exogeneity, the instrument may still be weak. The sample collected from all three countries suffers from the difficulty that no single, plausibly exogenous factor strongly predicts selection into franchising after conditioning on covariates in the profit equation. The strength of excluded instruments can be increased by including additional instruments.

Lewbel Instruments. In order to avoid problems which can arise from weak, but valid, instruments, I also use generated instruments as found in (Lewbel, 2012). These instruments are not entirely required, but increase the strength of the overall set of instruments used in this paper. The decision to microfranchise appears to depend strongly on unobservables, making it difficult to achieve significant explanatory power in first stage regressions. As a consequence, even with the valid instruments and exclusion restrictions previously discussed, the potential for weak instruments persists. Specifically, two additional instruments are generated. A reduced form OLS regression of the binary variable of microfranchise participation on the covariates in the profit equation, $\mathbf{x}_i$, yields a heteroskedastic residual. I then center two variables, start-up costs and business age and interact them with this reduced form, heteroskedastic, first stage residual. More formally, if $\hat{\varepsilon}$ is the predicted residual from the regression $F = \mathbf{x}\boldsymbol{\pi} + \varepsilon$, then we generate an instrument from exogenous variable x_j in $\mathbf{x}$ by computing $z_j = (x_j - \overline{x}_j) \cdot \hat{\varepsilon}$ where $\overline{x}_j$ is the sample mean for the jth covariate.

These generated instruments will be valid as long as unobserved skill, θ, is conditionally independent of start costs and business age and that variables are uncorrelated with the product of the idiosyncratic errors of the associated system of endogenous variables. That is, the residuals from the franchise selection equation and the profit equation.

The generated instruments proposed by (Lewbel, 2012) are similar to the Arrelano and Bond style instruments for handling endogeneity in panel data settings. However, they can be difficult to understand. Generated instruments tend to satisfy statistical measures of exogeneity while leaving little intuition for identification. For this reason, my use of these instruments is to increase the overall level of exogenous and excludable variation statistically explaining the decision to microfranchise; increasing overall instrument strength.

The initial intuition for the generated instruments stems from the idea that if a variable, x_j is exogenous in the sense that the $E(x_j\epsilon) = 0$ it may be that $E(x_j\epsilon^2) \neq 0$. When ϵ is a residual with zero conditional mean and non-constant conditional variance (i.e., heteroskedasticity); the variance is $V(\epsilon|x_j) = E[\epsilon^2|x_j]$. When this variance expression is nonzero then the instrument, z, will satisfy $Cov(z, \epsilon^2) \neq 0$. It is here that we require the heteroskedasticity of the error terms to ensure the relevancy of the generated instrument. The exogeneity requirement of the generated instrument stems from the assumed exogeneity of the covariates, x, in both the selection equation and the profit equation, combined with an additional assumption about the covariance of x_j with the product of the errors from the selection and profit equation. In other words, we require $Cov(x_j, \epsilon_1\epsilon_2) = 0$ for each x_j used and where ϵ_1 is the residual from the profit equation and ϵ_2 is the selection equation residual.

Most importantly for the model used in this paper, there is an unobserved common factor in both selection and outcome equations, the entrepreneurial skill. Let γ represent the reduced form coefficient on the unobserved skill in the profit equation and ξ be the coefficient on skill in the selection equation. Then let V_1 and V_2 be mean zero structural residuals such that,

$$\epsilon_1 = \xi\theta + V_1$$
$$\epsilon_2 = \gamma\theta + V_2$$

I follow (Lewbel, 2012) in deriving the condition,

$$\begin{aligned} Cov(x_j, \epsilon_1\epsilon_2) &= Cov(x_j, \gamma\xi\theta^2 + \gamma\theta V_2 + \xi\theta V_1 + V_1 V_2) \\ &= \gamma\xi Cov(x_j, \theta^2) + \gamma Cov(x_j, \theta V_2) + \xi Cov(x_j, \theta V_1) + Cov(x_j, V_1 V_2) \end{aligned}$$

A set of sufficient conditions for the covariance above to be zero is: (1) V_2 (and/or V_1) be heteroskedastic, i.e., $Cov(x_j, V_2^2) \neq 0$, (2) latent skill θ is conditionally independent of x_j, and (3) $Cov(x_j, V_1 V_2) = 0$. As argued in (Lewbel, 2012), these are relatively standard assumptions, but heteroskedasticity is now required instead of simply accommodated in the model. Intuitively, condition (2) refers to the latent nature of θ such that once we condition against observable characteristics of skill in the profit equation, such as business experience and education, start-up costs and business age are independent of latent skill. Additionally, condition 3 suggests that variables such as start costs and business age cannot covary with the interaction of the unobservables V_1 and V_2 from the profit and microfranchising equation.

4.3 The Profit Equation and Covariates

Both (Williams, 1999) and (Christensen et al., 2010) utilize a similar set of covariates in estimating the "earnings equation" relating to profits. Measures of business scale, such as log-sales or start costs, are utilized as explanatory control variables. Labor measures, education, experience, race, and more are also included. For purposes of comparability with the microfranchising literature, I specify my profit function in a nearly identical fashion as (Christensen et al., 2010). This is possible because the data I use is patterned after the data collected and used in (Christensen et al., 2010).

The covariates of the profit equation are shown in Table 1. To control for the scale of business, the firm's startup costs and its square are included in the regression. Start-up costs are an important variable, and will play a key role in understanding the estimated returns to franchising, particularly for necessity entrepreneurs. From Table 1, it's clear that unlike franchisees in developing countries studied by (Williams, 1999), microfranchisees tend to have significantly lower start-up costs. This result is less pronounced in Bangladesh, where many of the microfranchises are capital intensive and startup costs are similar to non-franchisees. However, in Ghana, and especially in Guatemala, a number of microfranchise opportunities exist which do not require any start-up costs at all. This possibility has a profound impact on the estimation of a counterfactual outcome in a corresponding independent business and highlights the potential value of franchisor supplied inputs. An independent business started with extremely small levels of capital will likely have nearly zero profit and will likely fail. However, franchisees starting a new franchise unit can generate significant profits from the hard and soft capital provided by the franchisor. As a consequence, the gap in potential outcomes grows quite large.

The correct use of start-up costs as a regressor requires some assumptions, as previously mentioned. First, since franchise opportunities differ in their start-up capital requirements, it is possible that start-up costs are determined by the entrepreneur's choice to franchise. This poses a problem for identifying counterfactual outcomes for an individual in franchising. As an example, suppose a person has $50 in capital to be used for starting an independent business, but selects into a franchise requiring only $10 in capital. Then the data records a starting cost of $10 and when estimating their counterfactual outcomes in independent business, we should compare them to businesses with start-up costs worth $50, not those with startup costs of $10. This phenomena suggests that estimates of counterfactual outcomes in independent business may be underestimated, which would cause our estimates of returns to franchising to be too large. Going forward, I will maintain the assumption that each person's recorded start-up cost represents the total available start-up capital available to them at the time of decision.

Microfranchisees differ from their independent business counterparts. Notably, they are less experienced, having started significantly fewer previous businesses. Microfranchisees also tend to be more educated, or at least less likely to have a highest education level less than primary school. This could occur for several reasons. First, it may be that education doesn't significantly improve entrepreneurial skills, but does increase the understanding of business difficulties and relative value of managerial assistance from the franchisor. Alternatively, it may be that individuals with more education have more wage-work experience and prefer to be an employee rather than entrepreneur - attracting them to the highly structured microfranchise. The result that more education can lead to an increased likelihood of franchising is also noticed in (Williams, 1999). In a developing country context, it may also be the case that if younger individuals are more attracted to microfranchising than older individuals, and if educational attainment has improved over recent decades, then this might also explain the trend. Nevertheless, they don't appear to be altogether different in basic skills and training.

5 ESTIMATION AND RESULTS

I will deal with endogeneity in several regression models through both instrumental variables methods (IV) and control function methods. Both approaches require the existence of a first stage which satisfies a rank condition.

For the regression models in this section, there are four different first stage reduced forms to be estimated. Two are OLS regressions and two are probit regressions. Every one of the first stage regressions involve the covariates from the profit equation, $\mathbf{x}_i$ and the instruments $\mathbf{z}_i$.[6] Additionally, models (1) and (3) of Table 2, include $\mathbf{z}_i$ and $\mathbf{x}_i$ as regressors, while models (2) and (4) of Table 2, each add N_i (status as a necessity entrepreneur) as an additional regressor. Models (2) and (4) will be relevant when estimating models in which a microfranchising dummy (F_i) interacts with a necessity entrepreneurship dummy (N_i).[7]

Table 2 contains the relevant coefficient estimates of the first stage regressions for the excluded instruments. For all specifications, the relevant F and Chi-square tests of the joint significance of the excluded instruments reject the null hypothesis of zero effect, suggesting that the rank condition holds. Although jointly significant, individual significance of exclusion restrictions varies. The main instrument, relating to the year in which a person turns 18 (*Work-age exposure* in the table), is significant in the OLS specifications, but is only marginally significant in probit specifications. A desire for flexibility always has a significant effect as well as the generated Lewbel instruments.

[6] I am assuming a separation of excluded instruments and the exogenous variables in $\mathbf{x}_i$ so that $\mathbf{z}_i$ is not equal to, nor a subvector of $\mathbf{x}_i$.

[7] In these interaction specifications, the necessity entrepreneurship dummy, N_i, is assumed to interact exogenously.

Despite the evidence in support of instrument relevance, their overall strength may be potentially suspect as the F-statistics, while significant, may still not be sufficiently large.[8] Furthermore, overall first-stage model fit is not especially high. R-squared based measures are consistently about 0.4, and failure to microfranchise is perfectly predicted for a small number of observations in probit specifications, though successes are not.

As expected by the identification assumption on *work-age exposure*, increased access, availability and exposure to microfranchising is associated with increased likelihood of microfranchising. The desire for flexibility also has a consistently positive relationship with microfranchising across specifications. The sign of this last term is not unambiguous from theory alone, and the positive sign may be indicative of either microfranchising offering especially convenient opportunities, or perhaps a correlation between disutility of risk and the need for flexible working conditions. For example, the case of a female entrepreneur with family responsibilities may simultaneously require greater work flexibility in their business choices in addition to higher disutility from risk.

The additional Lewbel instruments, generated from heteroskedasticity in start-up costs and business age, are significant and have a negative effect. The construction of these instruments does not lend any immediate intuition for an expected sign of their coefficients. However, given that the residuals used in their construction may be positively related to microfranchising, large deviations from mean values of both start-costs and business ages may be negatively related to franchising in such a way that their interaction with unobservables (as measured by the residual) leads to overall negative effects in microfranchising likelihood.

5.1 Average Return to Franchising

The first series of models I estimate are generally identical to that found in (Christensen et al., 2010), but using IV and control function methods to account for endogeneity. Table 3 contains the estimated coefficients for the microfranchise indicator and the control function when applicable.

The first column of estimates represents simple OLS estimation without controlling for endogeneity. In log points, the OLS estimate of average returns to microfranchising is 0.227. The estimate is pooled across all three countries (with controls for each) yet rather closely resembles the estimate of 0.13 in (Christensen et al., 2010) and yields some support for the external validity of their estimate. However, the managerial assistance hypothesis suggests that OLS is inconsistent as a selection bias should cause us to underestimate the effect. This bias provides a weak test of the identification strategy. If controlling for endogeneity results in larger estimates, then at least these changes are consistent with prior expectations about the nature of bias.

The second and fourth columns of Table 3 contain IV estimates. Model (2) is the typical GMM estimate of the over-identified IV model using the excluded instruments $\mathbf{z}_i$. The chi-squared distributed Hansen's J statistic for over-identification has a value of 2.2061, which is not sufficiently significant at conventional levels to reject the test's null hypothesis that excluded instruments are uncorrelated with the error process of selecting microfranchising.

Instead of the entire vector, $\mathbf{z}_i$, Model (4) of Table 3 uses the fitted probabilities, $\Phi(\mathbf{x}\hat{\boldsymbol{\pi}} + \mathbf{z}\hat{\boldsymbol{\delta}})$, from the first stage Probit regression of F_i on $\mathbf{x}_i$ and $\mathbf{z}_i$ as the instrument (not regressor) for microfranchising.[9] This approach takes advantage of the binary nature of the microfranchising dummy

[8] A typical heuristic favors F-statistics above 10.

[9] The resulting model is a just-identified IV model using 2SLS and does not fall prey to "forbidden regression" concerns.

variable through use of the probit estimation, while being robust to misspecification of the first stage normal model. The coefficient in this alternative model is smaller, suggesting a return of 0.85 log-points and the standard errors have also decreased, perhaps as a result of increased efficiency from exploiting the binary nature of the endogenous choice to microfranchise.

Both IV estimates are substantially larger than the OLS estimate, which is consistent with the expectation that OLS is biased downward. However, the estimates of 1.269 and 0.846 log points are surprisingly large. From Table 1 we see that the pooled mean log-daily profits are 2.565 points for independent businesses and 2.642 points for microfranchises. Hence, the IV estimates suggest that the average return to microfranchising might be as large as 30-50 percent of the mean log-profit of independent businesses. However, as I will discuss later, the estimates may be more reasonable than they appear at first when we understand the role of start-up costs.

The third and fifth models of Table 3 contain the results of control function approaches. The control function specification in column 3 is equivalent to performing 2SLS and its estimates and standard errors are nearly identical. Control function approaches make an additional assumption beyond those required by simple IV. In addition to zero correlation conditions, control function approaches place a linear restriction on the relationship between the first and second stage residuals. While this assumption may, in some cases, reduce robustness, it provides some useful benefits. One such benefit is the resulting coefficient from inclusion of the first stage residual as a regressor in the second stage profit equation, and tests of its significance, which act as both robust tests of endogeneity as well as providing insight into the nature of the selection on unobservables. As the endogenous variable, microfranchise participation, is a binary variable we could make additional parametric assumptions to take full advantage of its binary nature as I did in model (4). Using the first stage probit regression, a generalized residual (the inverse Mill's ratio) is calculated and used a regressor in the second stage.[10] A benefit from the additional normality assumption is an increase in efficiency as the standard errors decrease relative to the more semi-parametric approach.

Both the linear residual and the generalized residual in columns 3 and 5 tell the same story. The t-test of significance doubles as a heteroskedasticity-robust test of the endogeneity of microfranchising and in this case provide strong evidence of endogeneity. In addition, we can gain some additional insight from the negative signs of these coefficients. Higher values of the first stage residuals are associated with increased likelihood of franchising and are negatively correlated with profit. This negative selection on unobservables into franchising is consistent with the MAH. Their magnitude suggests that unobservables indeed play a large role in the selection of microfranchising.

5.2 Difference in Average Returns for Necessity Entrepreneurs

I extend the model of (Christensen et al., 2010) by augmenting the regression with an indicator variable, N_i, which equals 1 for necessity entrepreneurs and 0 otherwise, and also the interaction of the microfranchisor dummy with N_i.

$$\ln Y_i = \alpha_0 + \mathbf{x}_i\boldsymbol{\beta} + (\lambda - \alpha_0)F_i + \delta N_i F_i + \phi N_i + u_i$$

The specification above is a first attempt to understand the heterogeneity in returns to franchising for necessity entrepreneurs.

[10] This is Heckman's two step approach for an endogenous dummy variable.

As previously discussed, necessity entrepreneurs are identified as those who state they prefer to work in wage employment despite currently being self-employed. Whether because of lack of skill, lack of capital, or both, necessity entrepreneurs are hypothesized to be at a disadvantage compared to opportunity entrepreneurs. This disadvantage ought to be particularly pronounced among independent business owners. The coefficients for necessity entrepreneurs in Table 4 represent this disadvantage and in all models estimates are economically significant and also statically significant in all but one specification. The lack of significance for the IV estimate (column 2) is most likely driven by both instrument weakness and inefficiency in identifying an additional endogenous variable. In this case, simple IV is disadvantaged relative to control function methods because it requires an additional endogenous variable to be predicted in an additional first stage. Model (2) has endogenous variables F and additionally the interaction $F \cdot N$. The same set of excluded instruments, $\mathbf{z}_i$ are now being used to identify both, rather than just F alone as in the other models. The additional endogenous variable decreases the efficiency in the estimation, leading to poorer identification and significantly larger standard error. The benefits of the control function approach shine through in the parsimony and efficiency when controlling for the endogeneity of a single variable and its interactions.

Necessity entrepreneurs are estimated to be roughly 0.46 log points worse off than opportunity entrepreneurs in independent business. The returns to franchising for opportunity entrepreneurs, while significant, are less consistent across models, ranging from 0.99 log points under IV to 0.71 and 1.07 for control function methods. It is interesting to note that these estimates are smaller than the estimates of the population average returns estimated in Table 3, suggesting perhaps that returns for opportunity entrepreneurs are smaller than for the entire population of entrepreneurs.

The most interesting estimates are those of the coefficient on the interaction term. The coefficient on this variable represents the difference in returns to microfranchising for necessity entrepreneurs relative to opportunity entrepreneurs. The estimates are consistent across models, significant for the more efficient methods (i.e., 1, 3, and 4) and rather large at roughly 0.54 log points. The positive sign is consistent with my hypothesis that returns to franchising are heterogenous and that average returns for necessity entrepreneurs as a population exceed those of opportunity entrepreneurs. Finally, the control functions are significant suggesting that we can still reject the exogeneity of microfranchising and that there is some negative selection.

At this point, we can see significant differences in average returns between each type of entrepreneur and, as the MAH predicts, there is negative selection into microfranchising. However, we can find greater understanding of the selection on unobservables, as well as the variation of returns with respect to those unobservables, through a random coefficient approach. The next section extends the model to allow for correlated random coefficients on the microfranchising dummy.

5.3 Correlated Random Returns to Microfranchising

Initially, I assumed a constant return across the entire population of entrepreneurs equal to $\tau = (\lambda - \alpha_0)$. The second set of models added interactions with subpopulations to obtain constant average returns for these subpopulations. The previous approaches did not consider the essential heterogeneity that exists within each subpopulation. Specifically, returns to franchising likely vary not only with observables such as start-up costs and education, but most interestingly with unobservables such as entrepreneurial skill.

The previous models provided evidence that negative selection on unobservables is significant. By allowing returns to vary with unobservables, we can obtain a more detailed picture of the selection process as well as the distribution of returns over different populations of entrepreneurs.

Let τ_i be the coefficient on the microfranchise dummy, F, in the model,

$$\ln Y_i = \alpha_0 + \mathbf{x}_i\boldsymbol{\beta}_0 + \tau_i F_i + u_i$$

In the above specification there are two sources of unobserved variation: the residual u_i and the variation in returns τ_i. Since unobserved skill, θ_i, is contained in u_i, both τ_i and u_i can be correlated with F. These correlations are driven by the selection process and the unobserved common factor, θ. The MAH suggests that those who derive the largest returns to franchising (large τ_i) are most likely, on average, to choose franchising. The return, τ_i, can now vary with unobservables.

As a random variable, τ_i can be put in mean-error form as $\tau_i = \tau + \nu_i$ where $\tau = E(\tau_i)$. By assuming a linear relationship between the unobservables u_i and ν_i with the control function k_i, I define an estimating equation

$$E(\ln Y_i|\mathbf{x}_i, F_i, k_i) = \alpha_0 + \mathbf{x}_i\boldsymbol{\beta}_0 + \tau F_i + \eta k_i + \psi k_i F_i \tag{3}$$

Using the predicted first stage residual, $\hat{k}_i$ in the estimating equation I obtain consistent estimates of the parameters and use them to reconstruct the correlated random returns and derive the expected return for individual i as $E[\tau_i] = \hat{\tau} + \hat{\psi}\hat{k}_i$. These expected returns can then be compared across groups.

Models 1 and 2 of Table 5 contain estimates of the relevant parameters for this first correlated random coefficient model. The expected return to franchising in the population is similar to those values obtained in Table 3 at roughly 1.26 and 1.075 log points. The coefficients on the control functions are both negative and significant providing additional evidence of negative selection. Now, however, the coefficient on the interaction of the control function with the microfranchise dummy provides new insight. In model 1 we have a statistically and economically insignificant coefficient of 0.067. This would suggest that there may not be significant selection on returns. Model 2 on the other hand, provides evidence of a substantial effect at 0.597 log points. The statistical significance and sign provide evidence that although there is negative selection on unobservables, there may be selection on returns. In other words those who select into microfranchising also have greater returns. Again, unobservables, such as entrepreneurial skill, have a substantial impact on drawing people into microfranchising (selection on unobservables) and also increasing their returns conditional on microfranchising (selection on returns).

The two remaining models estimated in Table 5, (3) and (4), show an important fact about the potential source of large returns to microfranchising. Models (3) and (4) differ from models (1) and (2) by augmenting the estimating equation with interactions of the microfranchise dummy, F, with centered versions of the covariates, $\mathbf{x}_i$. Specifically, the estimating equation for the estimates in columns (3) and (4) is

$$E(\ln Y_i|\mathbf{x}_i, F_i, k_i) = \alpha_0 + \mathbf{x}_i\boldsymbol{\beta}_0 + \tau F_i + \boldsymbol{\omega} F_i(\mathbf{x}_i - \overline{\mathbf{x}}) + \eta k_i + \psi k_i F_i \tag{4}$$

The additional interaction terms have a profound impact on the meaning of the estimated average return to microfranchising. By centering the covariates in the interaction, the coefficient on the microfranchise dummy no longer reflects the estimated change in log-daily profit at $\mathbf{x} = \mathbf{0}$, but instead the average return for individuals at the mean values, $\mathbf{x}_i = \bar{\mathbf{x}}$. The point estimates of the average return are now negative, relatively close to zero at -0.114 and -0.121, and statistically insignificant. The large shift in estimated average returns may suggest that a large portion of microfranchisor input value is derived from forms of hard and soft capital. The managerial assistance hypothesis traditionally refers to skill-based substitutes provided by the franchisor, such as training, well developed business practices, and branding. However, an important difference in microfranchising is the opportunity to enter microfranchising with extremely small, and sometimes zero, start-up costs. The value of hard-capital such as inventory, marketing materials, etc., are only partially recouped over time through microfranchisor-profit generating mechanisms in the contract. In traditional franchising, the value of such inputs are typically capitalized into the franchise fee constituting the primary start-up cost. It is relatively rare for an independent business to start-up with virtually zero upfront start-up costs, and if they do, profit is typically low. Microfranchisees, on the other hand, can start a microfranchise with a reported zero (or near zero) start-up cost and yet still have reasonable returns to hours of effort as they have access to franchisor-supplied resources that are essentially loaned.

While the population average return to microfranchising is reduced in size at the mean $\bar{\mathbf{x}}$, the overall effect of unobservables for independent business remains essentially the same at roughly -1, but the effect for microfranchisees (through the interaction term) increases substantially toward 1 log point. Since both skill and franchisor-supplied capital inputs are unobserved, their effect can be represented in the large and opposite signs of the control function and its interaction with microfranchising. Again, the negative primary effect of the control function suggests negative selection into microfranchising. The independent business outcomes of such individuals may have been especially poor due to either insufficient capital (in the absence of franchisor support), a lack of entrepreneurial skill, or both. Consequently, the effect of these unobservables for those who select into microfranchising is substantial.

While the estimates in Table 5 are consistent with the basic ideas underpinning both the MAH and the generalized Roy model, I also want to understand the relationship of these effects for necessity entrepreneurs relative to opportunity entrepreneurs. The estimated mean return to microfranchising for each individual can be calculated and then the kernel densities of those returns for each group can be compared as in Figures 3, 4, and 5.

The density plots in Figure 3 compare the distributions of estimated individual mean returns to microfranchising for the "treated" and "untreated" groups. The red-shaded plots represent predicted counterfactual returns for independent business operators, while green shaded plots correspond to predicted returns for those actually in microfranchising. Not surprisingly, although overlap exists, both the distribution peaks and the overall mass of returns for microfranchisees exceed those of independent business operators. This finding arises as a result of the positive coefficient on the interaction of the microfranchise dummy and the control function. The distribution of returns for microfranchisees appears to have long right tails in all four specifications, suggesting a portion of those participating in microfranchising experience vary large returns. The modal outcome tends toward the lower bound of returns. Additionally, a close look at the plots shows the effects of centering on models (3) and (4). Specifically, Figures 3a and 3c have identical distributional shapes, but are "location shifted" versions of each other. The same logic applies to Figures 3b and 3d.

Figure 4 compares the distributions of estimated individual returns for opportunity and necessity entrepreneurs across models (1) - (4). The plots show little difference in predicted returns for necessity and opportunity entrepreneurs, except for slightly fatter tails for necessity entrepreneurs. In general, the assumptions of the MAH, in conjunction with the causes of necessity entrepreneurship, create the expectation of necessity entrepreneurs having significantly larger returns. However, differences in access to microfranchising opportunities, selection effects and other confounding factors may combine to obscure existing differences in returns. Given that we see clear differences in returns for the "treated" and "untreated" groups, perhaps as the results in Table 4 indicate, the difference in differences between the groups may provide greater insight about return heterogeneity.

Figure 7 compares the distributions of predicted returns over the four groups created by the interaction of organizational type (independent versus microfranchise) and entrepreneur type (opportunity versus necessity). The shaded plots in each subfigure correspond to the returns for necessity entrepreneurs while the unshaded density curves represent opportunity entrepreneurs. As before the differences in returns between microfranchisees and independent business operators is clearly observed. In addition, there are small, but discernible differences between opportunity and necessity entrepreneurs in microfranchising and independent business. A greater mass of estimates for necessity entrepreneurs (red-shaded curves) in microfranchising occur at higher returns compared to opportunity entrepreneurs in independent business (green unshaded curves). The expected return for each of these groups can be more rigorously compared by regression, as shown in Table 6.

For each of the four correlated random coefficient models in Table 5, I nonparametrically bootstrapped the calculations of the individual expected returns to franchising and then regressed them on dummy variables N, F, $F \cdot N$ and a constant. The resulting coefficients can be combined to represent the average of the heterogenous returns over the subpopulations. Table 6 contains the results.

Among the uncentered specifications (1) and (2), each of the four groups have economically and statistically significant average returns and the differences are positive. However, the differences according to these estimates, are relatively small and generally insignificant except for microfranchisees in model (2), which is only weakly significant. An identical pattern for difference estimates unfolds among the centered models (3) and (4), but with larger estimates of the difference. In these latter models, the estimated returns for all groups are not statistically significant and those for independent business are negative, while those for microfranchising are positive.

6 DISCUSSION

The results of the previous section indicate that the previous estimate of returns to microfranchising (0.13 log points) found in (Christensen et al., 2010) were too small. Instead, returns may be nearly 1 log points which corresponds to a 30-50% increase in log-daily profits. As hypothesized, when allowing returns to vary by type of entrepreneur, necessity entrepreneurs have about 0.50 log-point greater returns. This difference-in-difference type estimate provides evidence that not only are necessity entrepreneurs a proper target population for microfranchising initiatives, but that the question used to identify them in the sample has some merit.

Actual policy applications require the ability to identify those you would like to help. There may be many ways to characterize a necessity entrepreneur, and an individual may have many reasons for being "pushed" into entrepreneurship. The data used in this paper, identifies necessity entrepreneurs by their *stated preference* for wage-employment rather than business operation. Their preferences for wage-employment might be skill driven, capital driven or both. The fact that we detect significant heterogeneity in average returns between those in the sample who answer the question in favor of jobs and those who answer in favor of self-employment suggests the question may be useful for identifying a population which significantly benefits from microfranchising opportunities. Further research into both microfranchise design, and measurement of its impact, should make use of this type of questioning to identify the needs and outcomes of these specific types of necessity entrepreneurs.

The size of estimated returns leads to a concern of mis-identification as they seem, at first, to be too large to be credible. However, this may be a mis-perception, brought about by the inability to separate the different forms of microfranchisor inputs being provided. Microfranchisor's offer their agents a diverse set of inputs including management practices, an established supply chain, branded or trademarked products, and often forms of physical capital that are loaned, leased or provided on commission. While the general business establishment, strategy, logistics, and branding could be considered skill-based inputs, microfranchises that offer marketing materials and inventory on a commission or initial loan basis, provide a unique opportunity. For example, the microfranchise VisionSpring, provides its microfranchisees with a starter pack involving a collection of branded material, marketing material, and an initial inventory of glasses. In addition to the training they provide, the physical assets just described can be provided at no up-front cost. The agent will initially sell the glasses, receive a commission with which they repay the cost, and then purchase further inventory. Such microfranchise opportunities allow destitute individuals to start a new business with zero start-up costs. However, when measuring their profit outcomes, we must remember that just because their initial outlay was zero, the business did have an initial start-up cost that was essentially subsidized by the microfranchisor. This phenomena creates a situation where microfranchise businesses in the sample with zero start costs are compared to independent businesses with not zero, but close to zero, start costs. Despite reporting similar start-up costs, the microfranchise operation may have significantly more initial capital with which it generates its daily profits. Predicted profits for independent businesses with nearly zero start costs are typically low, but nevertheless compared to microfranchises with similar start-up costs. The effect is especially prominent in the Guatemala sample. Figure 6 presents scatter plots of log-daily profits against reported start-up costs, coloring plot points by status as a microfranchisee. Figure 6d plots the data for the Guatemala sample, and the blue x's representing microfranchisees are all distributed at essentially zero start cost. A quick glance at the plot makes it apparent that there are fewer independent businesses (red dots) with start-up costs near zero. Furthermore, those independent businesses with near zero start costs tend to have much lower log-daily profit values. Consequently, when considering an intercept value for an expected log-profit line through points with zero start costs, the intercept for microfranchisees may be substantially higher than for independent businesses.

Figure 6c shows the pattern for the Ghana sample. Like Guatemala, the majority of microfranchisees report essentially zero start costs, as indicated by the large cluster of blue x's on the left-hand axis of the graph. Unlike Guatemala, Ghana does have some microfranchisees with higher reported start costs, but only a few. When fitting lines in a simple bivariate regression, we see that there would be negligible differences in intercepts, but perhaps significant differences at higher levels of start-costs. However, in a multiple regression, other factors may counter-act the few outlier microfranchises and again cluster a large number of moderately profitable microfranchisees at zero start costs with a relatively large intercept value. The Bangladesh sample acts as a weak counterpoint to this discussion as the microfranchise opportunities appear to be more capital intensive. Overall, microfranchisees in Bangladesh report almost entirely positive start costs. Though the intercept is smaller, the plot shows the potential for a similar phenomena in which status as a microfranchisee is associated with a positive intercept shift when measured at zero start costs.

Finally, pooling all countries together, as in Figure 6a, it is clear we have large clusters of microfranchisees at the lowest levels of start costs and their profit levels are more tightly grouped at a higher profit level than a large share of the independent businesses with similar start costs.

When trying to explain the large estimates of returns to microfranchising, it may be important to understand how much of the differences in outcomes are driven by the franchisor supplied capital, and how much is driven by how that capital is used, i.e., is managerial assistance improving the productivity of capital? In other words, how do the returns to microfranchising differ from simply giving an initial stock of capital to entrepreneurs who would otherwise have none? The answer to this question is also important for understanding the relationship between microfranchising and the already well established field of microfinance. In theory, microfinance only provides access to capital, but not any assistance in using that capital productively. Microfranchising on the other hand, is thought to offer primarily managerial assistance in using capital provided by the entrepreneur. However, as we've seen, several microfranchises essentially offer access to start-up capital as well. A key difference is that the microfranchisor provides specific assets toward a specific business use and the contracts impose restrictions the use of those assets. In this way, microfranchising is less flexible than microfinance, but may also be less risky. Indeed, microfranchising may even be akin to a form of urban crop-sharing.

Lack of start-up capital is one way individuals are "pushed" into entrepreneurship, i.e., necessity entrepreneurs. Consequently, the relationship between required start-up costs, profits and necessity entrepreneurship can interact with the microfranchisor's provision of specific capital assets in addition to managerial assistance. Figure 7 scatter plots log-daily profits against start-up costs for each combination of opportunity versus necessity and microfranchise vs independent business. Both subfigures 7b and 7d look at opportunity entrepreneurs. Although a significant number of these opportunity entrepreneurs do have low start costs, substantial variation of start costs exist as the highest values are observed for these groups. Notably, the microfranchising opportunity entrepreneurs have a greater proportion of their start costs near zero and have a much narrower range of outcomes.

Necessity entrepreneurs are represented in subfigures 7a and 7c. In both plots, the largest clusters are at or near zero start costs. The comparison of scales between Figures 7a and 7b may appear misleading unless you look at the difference in scale on the x-axis for start costs. All necessity entrepreneurs appear to have relatively low start costs compared to their opportunity cohorts in independent business. As with opportunity entrepreneurs in microfranchising, Figure 7c also shows less variability in profit outcomes among necessity entrepreneurs in microfranchising than in independent business. This lends additional credence to the MAH, which predicts that franchising is less risky and that is attractive to risk averse entrepreneurs.

7 CONCLUSION

In general, I find that correcting for selection effects increases estimates of the population returns to microfranchising significantly when compared with previous findings in (Christensen et al., 2010). Returns are estimated to be between 0.85 - 1.27 log points, which are almost incredible compared to the mean log-daily profit levels of 2.565 for independent businesses and 2.642 for microfranchises. Consistent with the managerial assistance hypothesis (MAH), I find strong evidence of negative selection into microfranchising on the basis of control function methods. Such negative selection appears consistent with the outsized returns.

Necessity entrepreneurs possess a lower capacity, on average, to self-supply entrepreneurial inputs to independent businesses compared with opportunity entrepreneurs. My findings suggest that in independent business they may be as much as 0.47 log points, or approximately

38% less profitable than opportunity entrepreneurs.[11] In support of both the MAH and my hypothesis that returns for necessity entrepreneurs exceed those of opportunity entrepreneurs, estimates indicate that the difference in returns for necessity entrepreneurs are quite large, roughly 0.5 log points (approximately 73%) larger. Necessity entrepreneurs derive large returns to microfranchising through both managerial assistance, as well as through capital sharing practices common in many microfranchises in the sample.

The above findings are important to future microfranchising development efforts for at least three reasons. First, it establishes that necessity entrepreneurs are a disadvantaged group of business operators whose outcomes can be greatly improved in microfranchising. A fact that could help many households to increase their wealth and consumption, promoting greater economic development. Second, microfranchise practitioners can focus their development efforts on this subpopulation and its unique needs to maximize social welfare. Third, because there are many avenues by which an individual may enter entrepreneurship out of necessity, the group may be difficult to identify. The sample data used in this paper identifies necessity entrepreneurs based on their stated occupational preferences. The strong effects on estimated returns associated with answers to this question demonstrate its potential usefulness for identifying those who may benefit most from microfranchising.

When treating returns to microfranchising as correlated random effects, I continue to find large positive returns when considering the effect of microfranchising at the regression intercept. However, when I center the estimated population average return and allow individual random effects to vary, population returns affected by observables shrink toward zero, become negative and statistically insignificant. This finding is important, because it suggests that at the population mean value of profit-function covariates (such as start costs, labor, etc.) there exist a mix of positive and negative returns in the population. Measuring the average return at covariate values with significant starting costs, emphasizes the role of unobservables (as measured by the control function) in determining the return to microfranchising. The most important unobservables being the microfranchisor's inputs and the entrepreneur's skill. Additionally, the results support the managerial assistance hypothesis as I continue to find significant negative selection into microfranchising, but positive and increasing returns for those who do. In other words, not only are those selecting into microfranchising predicted to have poorer business outcomes in general, but they are also predicted to benefit the most from microfranchising. This suggests there is both selection on unobserved factors as well as selection on returns which is common in generalized Roy models involving essential heterogeneity in returns or treatment effects.

I also uncover an important need in future research to separate the effects of franchisor-supplied specific assets and the skill-based managerial assistance. Some microfranchises offer the opportunity to borrow specific assets to begin business operations with no up front starting costs. This provision of capital could have its own effect, even without the managerial assistance that may, or may not, accompany it. Indeed, a great portion of the large returns I find in my estimates could be derived from this sharing of capital between franchisor and franchisee. This provision of business assets places microfranchising in connection with microfinance, which seeks to supply loans to needy entrepreneurs. An interesting difference is that, like crop-sharing, microfranchising's provision of capital may be less risky than simply borrowing currency at a defined interest rate. While microfranchise business assets are less fungible than a simple loan, their specificity creates a unique situation that may increase their returns in the specific business format designed by the franchisor.

The disadvantage experienced by necessity entrepreneurs highlights the importance of the research in this paper; understanding the impacts of microfranchising on this group. When

[11] Kennedy's transformation was used to convert the log-point coefficient to percentage terms.

an individual is disadvantaged in their ability to succeed in business, they may be less likely to feel comfortable borrowing money through microfinance schemes to invest in businesses they cannot create and operate successfully. Microfranchising is designed to provide affordable business opportunities based on highly standardized and proven business platforms that provide critical entrepreneurial inputs and reduce risk for a nominal fee.

8 EXAMPLES OF MICROFRANCHISES

Fanmilk (based in Ghana, Africa) deals in ice cream and yogurt products which they distribute through microfranchisees. Microfranchisees typically pay roughly $22 US to obtain a branded bicycle with a branded cooler for storing Fanmilk products. Franchisees visit depots to retrieve new inventory and return unused product from a previous day. Fanmilk provides training on sales and product handling and provides free bicycle repair.

The HealthStore Foundation uses microfranchisees who open Child and Wellness shops and clinics to provide affordable medical care for easily treatable conditions like malaria and diarrhea in LDCs. CFWshops build their franchising fee into the wholesale price of drugs provided to each shop. HealthStore Foundation engages in both monitoring and training of its microfranchisees.

9 APPENDIX: PROOFS

9.1 Proof of Lemma 3.1

Proof Let $Y(X_i, \theta_i)$ be a random variable representing business profits with mean $\mu(X_i, \theta_i)$ and variance σ^2. The second order Taylor approximation of the concave utility function $U(Y)$ about the expected outcome $\mu(X_i, \theta_i)$ is,

$$U[Y_i] \approx U[\mu(X_i, \theta_i)] + U'[\mu(X_i, \theta_i)](Y_i - \mu(X_i, \theta_i)]) + \frac{1}{2}U''[\mu(X_i, \theta_i)](Y_i - \mu(X_i, \theta_i))^2.$$

Taking the expectation of this approximation yields,

$$EU[Y_i] \approx U[\mu(X_i, \theta_i)] + \frac{1}{2}U''[\mu(X_i, \theta_i)]\sigma^2.$$

Note that the second derivative, $U'' < 0$, represents a disutility of risk which is scaled by the measure of risk, σ^2. Let $\rho_i = \frac{1}{2}U_i''$ be the disutility of risk to individual i. Then expected utility is approximated as,

$$EU[Y_i] \approx U[\mu(X_i, \theta_i)] + \rho_i\sigma^2$$

The probability individual i chooses to microfranchise is the same as the probability that microfranchising provides an expected utility greater than the expected utility from independent business. This requires that,

$$\begin{aligned} U[\mu_F(X_i, \lambda, \theta_i)] - \rho_i\sigma_F^2 &\geq U[\mu_I(X_i, \theta_i)] - \rho_i\sigma_I^2 \\ \rho_i\sigma_I^2 - \rho_i\sigma_F^2 &\geq U[\mu_I(X_i, \theta_i)] - U[\mu_F(X_i, \lambda, \theta_i)] \\ \rho_i &\geq \frac{U[\mu_I(X_i, \theta_i)] - U[\mu_F(X_i, \lambda, \theta_i)]}{\sigma_I^2 - \sigma_F^2} \end{aligned}$$

Finally, we see that,

$$Pr(F_i = 1) = Pr\left(\rho_i \geq \frac{U[\mu_I(X_i, \theta_i)] - U[\mu_F(X_i, \lambda, \theta_i)]}{\sigma_I^2 - \sigma_F^2}\right)$$

■

10 APPENDIX: TABLES

Table 1: Variable list and mean comparison between independent and microfranchise businesses

	Independent	Microfranchise	Diff T-stat	P-value
Outcome, $\ln Y$				
Log Daily Profit $	2.565	2.642	-1.00	0.32
Necessity Entrepreneur $\{0,1\}$	0.154	0.147	0.27	0.79
Covariates, X				
Start-up Costs $	17.602	7.245	3.66	0.00
Hours/day Operating	10.672	10.400	1.05	0.30
Business Age (months)	56.417	37.015	3.98	0.00
Number Previous Businesses (5-yrs)	1.445	1.112	5.31	0.00
Educ Level: Less than Primary $\{0,1\}$	0.154	0.056	3.76	0.00
Educ Level: Primary $\{0,1\}$	0.289	0.315	-0.70	0.48
Educ Level: Secondary $\{0,1\}$	0.197	0.224	-0.83	0.41
Educ Level: Post Secondary $\{0,1\}$	0.139	0.129	0.34	0.73
Skill count (read, write, math, training)	1.391	1.371	0.19	0.85
Is Female $\{0,1\}$	0.280	0.159	3.51	0.00
Sells in Commercial Shop $\{0,1\}$	0.092	0.086	0.24	0.81
Mobile Selling Location $\{0,1\}$	0.188	0.621	-12.56	0.00
Bus: Food $\{0,1\}$	0.345	0.509	-4.19	0.00
Service Sector $\{0,1\}$	0.130	0.129	0.02	0.99
Manufacture Sector $\{0,1\}$	0.168	0.004	6.60	0.00
In Ghana $\{0,1\}$	0.394	0.409	-0.40	0.69
In Guatemala $\{0,1\}$	0.286	0.194	2.63	0.01
In Bangladesh $\{0,1\}$	0.320	0.397	-1.99	0.05
Excluded Instruments, Z				
Workage distance from critical year	-13.830	-8.297	-6.69	0.00
Started Bus. for Flexibility $\{0,1\}$	0.329	0.444	-2.96	0.00
Observation Count: 679	447	232		

Table 2: First Stage Regressions and Instruments

	(1) FS1: OLS	(2) FS2: OLS	(3) FS1: Probit	(4) FS2: Probit
Work-age Exposure to Microfranchising	0.00459**	0.00466**	0.0184*	0.0182*
	(0.00165)	(0.00165)	(0.00832)	(0.00834)
Motivated by Flexibility $\{0,1\}$	0.0856**	0.0950**	0.304*	0.373**
	(0.0303)	(0.0319)	(0.127)	(0.135)
$(\text{startCost} - \overline{\text{startCost}}) \cdot \textit{residual}$	-0.0114*	-0.0115*	-0.0633***	-0.0645***
	(0.00469)	(0.00471)	(0.0173)	(0.0175)
$(\text{busAge} - \overline{\text{busAge}}) \cdot \textit{residual}$	-0.00376**	-0.00376**	-0.0135*	-0.0138**
	(0.00144)	(0.00144)	(0.00532)	(0.00528)
Joint F Test, Excluded Inst.	8.12***	8.38***		
Joint χ^2 Test, Excluded Inst.			32.66***	34.48***
N	679	679	679	679
adj. R^2	0.376	0.376		
pseudo R^2			0.403	0.406

Robust standard errors in parentheses, $^{+}$ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Model (1): OLS regression of F_i on profit equation covariates $\mathbf{x}_i$ and excluded instruments.

Model (2): OLS regression of F_i on profit equation covariates, $\mathbf{x}_i$, necessity entrepreneur indicator, N_i, and excluded instruments.

Model (3): Probit regression of F_i on profit equation covariates, $\mathbf{x}_i$ and excluded instruments.

Model (4): Probit regression of F_i on profit equation covariates, $\mathbf{x}_i$, necessity entrepreneur indicator, N_i, and excluded instruments.

Table 3: Estimates of a homogenous, population return to microfranchising.

	(1) OLS	(2) IV GMM	(3) CTRL	(4) IV Probit	(5) CTRL Probit
Microfranchise	0.227**	1.269***	1.262***	0.846***	0.866***
	(0.0804)	(0.300)	(0.310)	(0.162)	(0.195)
Control Function			-1.145***		-0.453***
			(0.316)		(0.111)
Hansen's J χ^2		2.2061			
N	679	679	679	679	679

Robust and nonparametric bootstrapped standard errors in parentheses.
$^{+}$ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$
(1) Simple OLS regression of log-profit on F_i and covariates, $\mathbf{x}_i$.
(2) Standard IV GMM of log-profit on F_i and covariates using instruments.
(3) Standard control function (equivalent 2SLS) of log-profit on F_i and covariates, with linear first stage.
(4) Fitted probabilities, $Pr(F = 1) = \Phi(\mathbf{z}_i\hat{\delta})$, used as instrument for F_i in just-identified 2SLS regression of log-profit on F_i and covariates.
(5) Control function regression of log-profit on F_i and covariates, using probit first stage and generalized residual (inverse mills) in the second-stage.

Table 4: Differences in returns to microfranchising with linear interactions.

	(1) FNOLS	(2) FNIV	(3) FNCTRL1	(4) FNCTRL2
Microfranchise $\{0, 1\}$	0.135	0.994**	1.074***	0.714***
	(0.0844)	(0.348)	(0.294)	(0.189)
Necessity Entrepreneur $\{0, 1\}$	-0.471***	-0.647	-0.465***	-0.465***
	(0.135)	(0.515)	(0.139)	(0.134)
Microfranchise × Necessity Entrepreneur	0.543**	1.077	0.567**	0.552**
	(0.183)	(1.527)	(0.183)	(0.186)
Control Function			-1.045***	-0.413***
			(0.297)	(0.105)
N	679	679	679	679

Robust and nonparametric bootstrapped standard errors in parentheses
$^{+}$ $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$
(1) Simple OLS of log-profit on F, N, $F \cdot N$ and covariates.
(2) IV GMM of log-profit instrumenting for F and $F \cdot N$.
(3) Control function estimation of log-profit on same interactions and covariates, using linear first stage residual.
(4) Control function estimation using probit first stage and generalized residual.

Table 5: Correlated random coefficient estimates for returns to microfranchising.

	(1) CRC1	(2) CRC2	(3) CRC3	(4) CRC4
Microfranchise	1.260***	1.075***	-0.114	-0.121
	(0.311)	(0.227)	(0.866)	(0.796)
Control Function	-1.180**	-0.940***	-1.191*	-0.981***
	(0.413)	(0.244)	(0.491)	(0.286)
Microfranchise × Control Function	0.0670	0.576*	1.370	1.086**
	(0.334)	(0.226)	(1.010)	(0.384)
Joint Significance of Control Function (χ^2)	13.96***	19.25***	5.88	11.81**
N	679	679	679	679

Nonparametric bootstrap standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

(1) Control function estimate with linear first stage.

(2) Control function estimate with probit first stage and generalized residuals (inverse Mill's ratio).

(3) Same as (1) plus interactions of F with centered covariates ($\mathbf{x}_i - \bar{\mathbf{x}}$).

(4) Same as (2) plus interactions of F with centered covariates ($\mathbf{x}_i - \bar{\mathbf{x}}$).

Table 6: Average returns to microfranchising for those in and out of microfranchising with correlated random coefficients

	(1) Avg. Return	(2) Avg. Return	(3) Avg. Return	(4) Avg. Return
Opportunity Entrepreneur in Independent Business	1.246***	0.885***	-0.400	-0.478
	(0.301)	(0.197)	(0.993)	(0.841)
Necessity Entrepreneur in Independent Business	1.247***	0.913***	-0.380	-0.426
	(0.302)	(0.200)	(0.988)	(0.836)
Difference	0.00100	0.0281	0.0205	0.0529
	(0.0122)	(0.0219)	(0.0497)	(0.0401)
Opportunity Entrepreneur in Microfranchising	1.286***	1.414***	0.410	0.518
	(0.363)	(0.319)	(0.725)	(0.762)
Necessity Entrepreneur in Microfranchising	1.293***	1.540***	0.549	0.757
	(0.381)	(0.360)	(0.718)	(0.768)
Difference	0.00682	0.127+	0.140	0.239+
	(0.0346)	(0.0762)	(0.122)	(0.140)
N	679	679	679	679

Nonparametric bootstrap standard errors in parentheses.

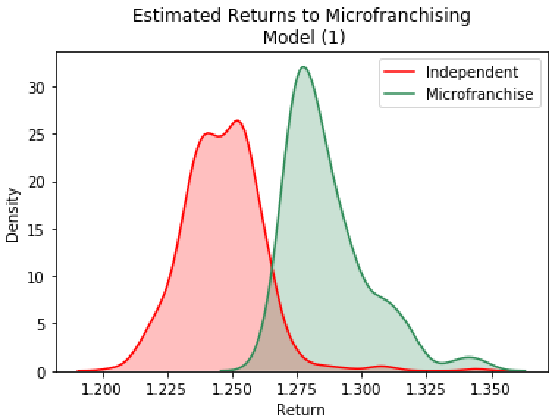
$^{+}$ $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$

Models (1) - (4) correspond to those in Table 5. For each model, the unobserved heterogeneity in return calculated as $\hat{R} = \hat{\tau} + \hat{\psi}k_i$ where τ is the population constant average return, ψ is the coefficient of $F_i \cdot k_i$, and k_i is the value of the first stage residual (control function) for individual i. The calculated returns for each individual from models CRC models (1)-(4) are regressed on indicator variables: F, N, and $F \cdot N$ to obtain coefficients to construct group averages and differences.

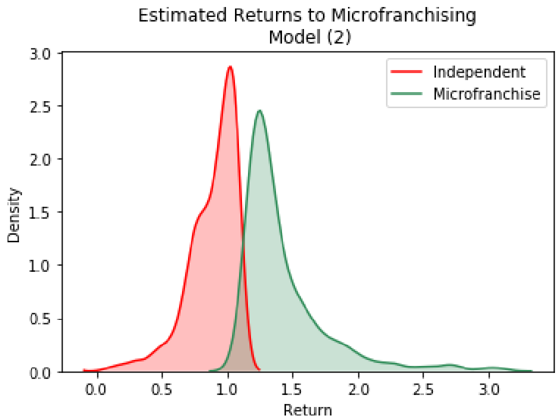
11 APPENDIX: FIGURES

Figure 3: Comparison of estimated individual mean returns for independent business operators and microfranchisees.

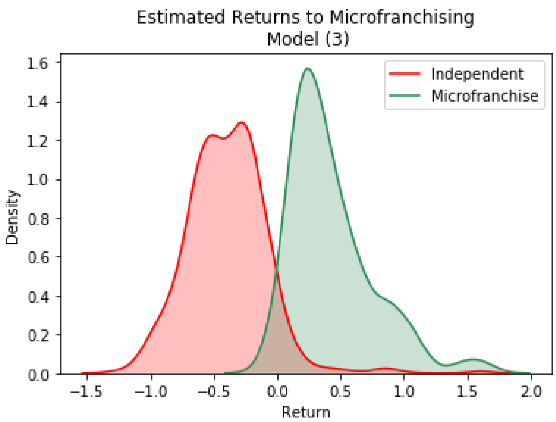
(a)



(b)



(c)



(d)

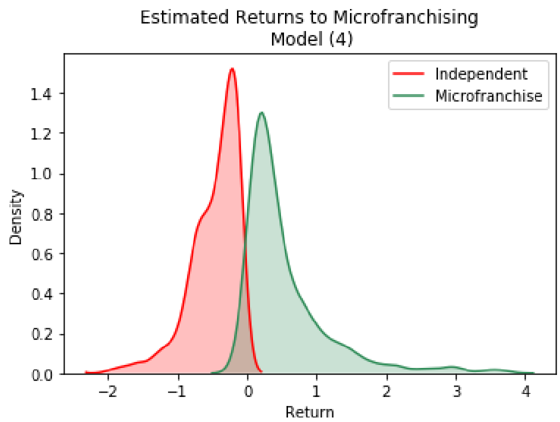
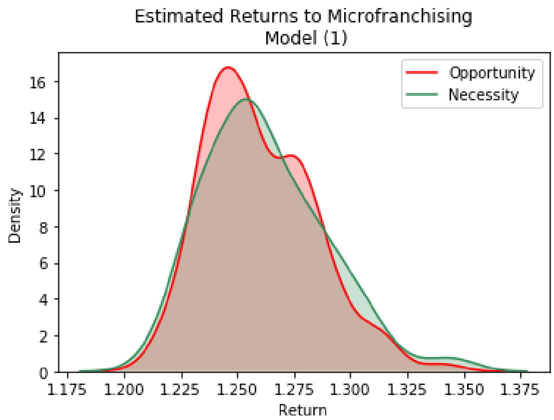
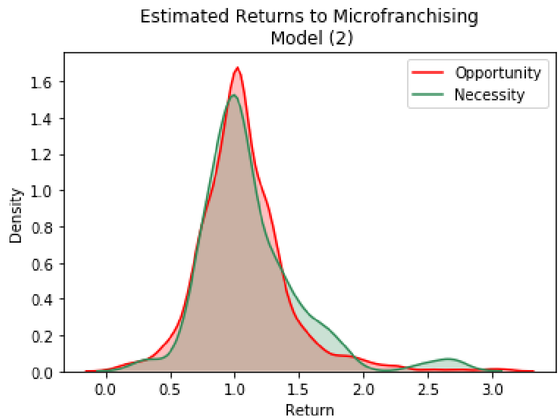


Figure 4: Comparison of estimated individual mean returns for opportunity and necessity entrepreneurs.

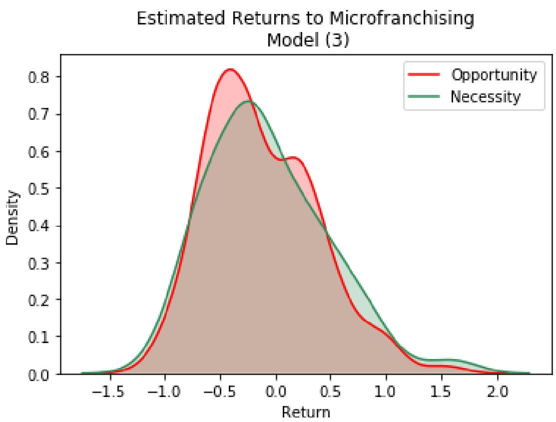
(a)



(b)



(c)



(d)

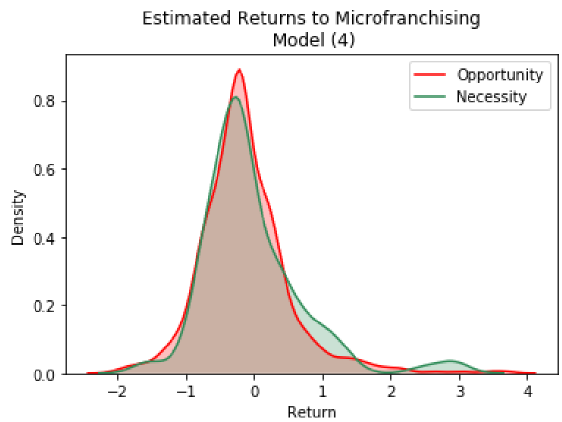


Figure 5: Comparison of estimated individual mean returns across opportunity and necessity entrepreneurs in both independent business and microfranchising.

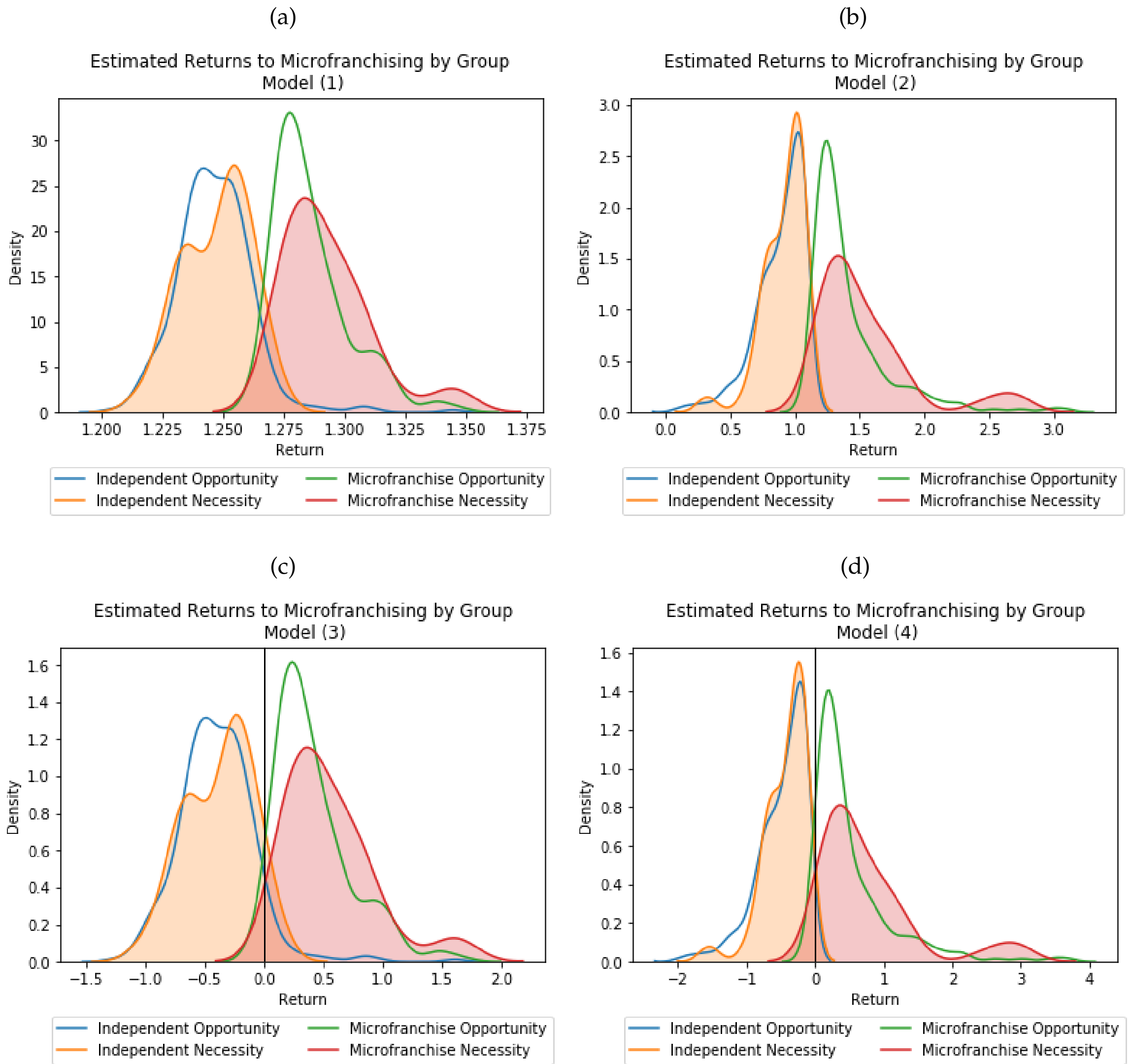


Figure 6: Log-daily profits versus reported start-up costs for independent business and microfranchises.

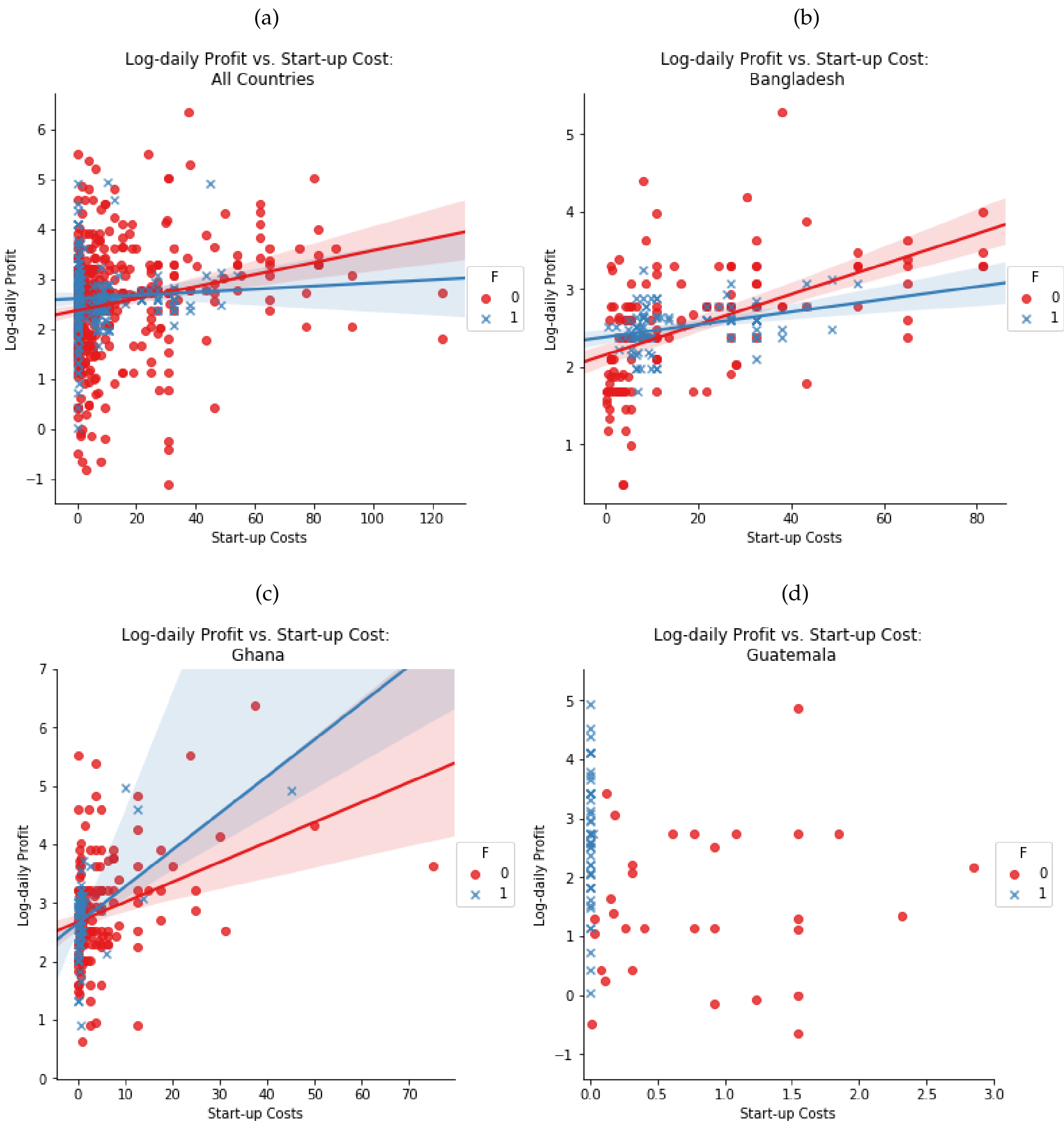
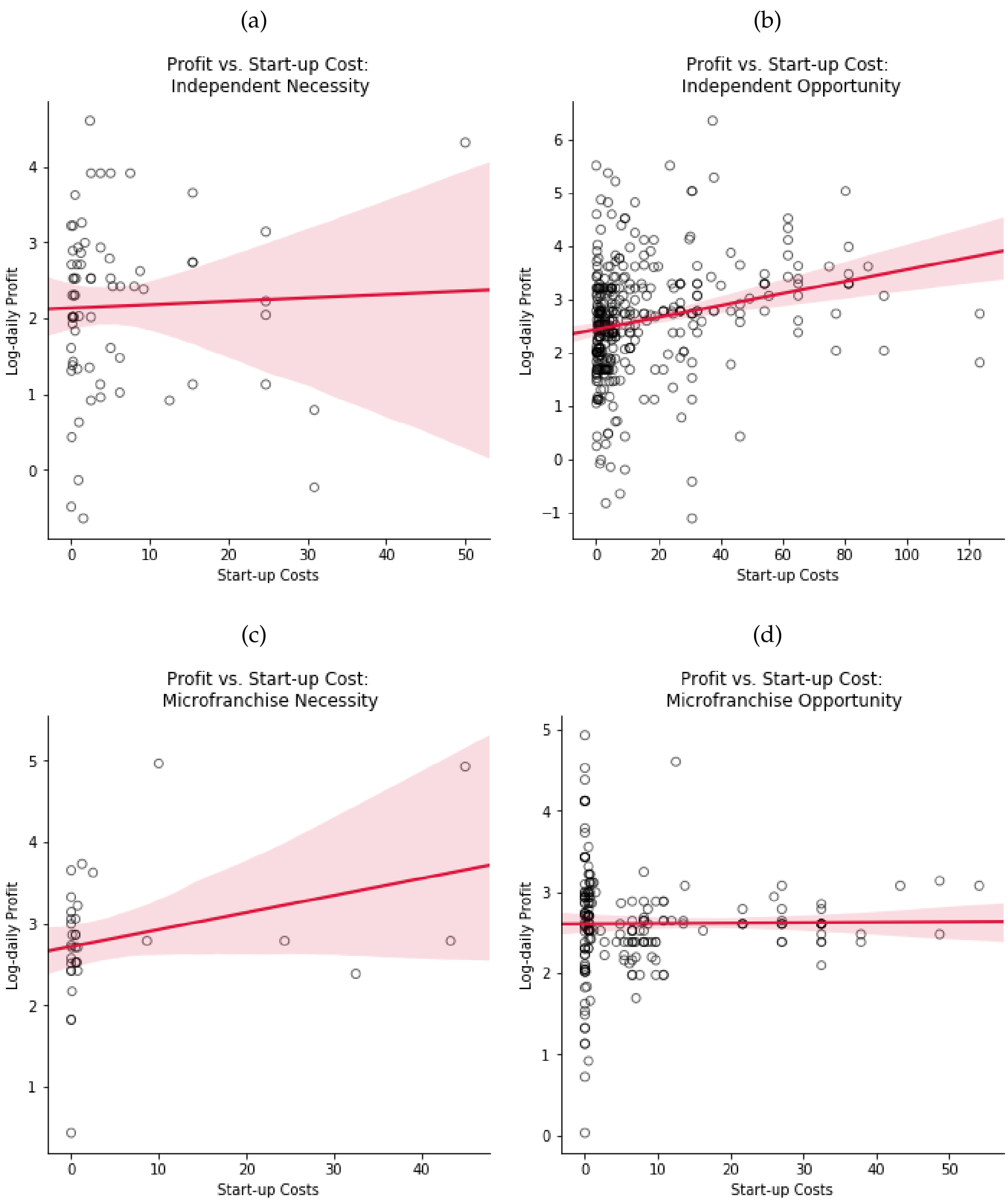


Figure 7: Log-daily profits versus reported start-up costs by interaction group.



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