Microfranchising and Necessity Entrepreneurs

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Abstract

The capacity of necessity entrepreneurs to self-supply entrepreneurial inputs is smaller than for opportunity entrepreneurs. Microfranchisors provide critical entrepreneurial inputs such as branding, marketing, supply-chain logistics, product design and best practices as well as reduced quality and demand uncertainty. Using a unique data set from Bangladesh, Ghana and Guatemala I test the hypothesis that necessity entrepreneurs value, in terms of business income, microfranchisor supplied entrepreneurial inputs more than opportunity entrepreneurs. I find ample evidence that necessity entrepreneurs significantly underperform their peers in independent business and also that the average treatment effect from microfranchising on business profit is largest for necessity entrepreneurs. Weaknesses in the data and control methods, however, do not permit statistically significant results in all specifications. As a consequence, I can state that necessity entrepreneurs certainly don't benefit any less than opportunity entrepreneurs, but may not experience strictly greater benefit.

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1 Introduction

An estimated 50 percent of entrepreneurial activity in less developed countries (LDCs) is out of necessity (Poschke, 2013a). Poor labor market conditions can push would-be wage employees into self-employment, despite low business skill (Mandelman and Montes-Rojas, 2009). Lack of both skills and capital can make starting unproductive businesses simpler than winning a job offer (Banerjee and Duflo, 2007). Individuals pushed into own account self-employment through involuntary unemployment are necessity entrepreneurs.

Franchisors in developed economies offer entrepreneurial inputs that compensate for franchisees' inability to self-supply such inputs (Rubin, 1978). Microfranchising adapts the traditional franchise contract for LDCs, promoting economic development through an emphasis on franchisee welfare over franchisor profit (Christensen et al., 2010).

Microfranchising offers individuals an alternative to creating a new business from scratch. The general effects of microfranchising on microentrepreneurs has received little attention. In particular, microfranchising's effects on necessity entrepreneurs has not been studied. The effects on necessity entrepreneurs are important, as this group may be less likely to benefit from microfinance.

The objective of this paper is to identify the business-income value of microfranchisor supplied entrepreneurial inputs to necessity and opportunity entrepreneurs. I satisfy this objective by modeling the occupational decisions of households that define necessity and opportunity entrepreneurs and the factors affecting selection into a microfranchise. Using a unique data set, I estimate the average treatment effects for both groups and the difference between them. Both a standard Heckman estimator for endogenous treatment effects and an extension of Heckman's estimator to the case of two correlated and endogenous binary regressors is used to estimate the effects.

Necessity entrepreneurs are expected to underperform opportunity entrepreneurs in independent business and I find evidence of broad support for this relationship in all models. As necessity entrepreneurs are predicted to be less able than opportunity entrepreneurs to self-supply entrepreneurial inputs, the value of microfranchisor-supplied entrepreneurial inputs are expected to be largest for necessity entrepreneurs. All empirical specifications yield a point estimate of the average treatment effects on necessity entrepreneurs greater than for opportunity entrepreneurs. However, when treating both selection into microfranchising and status as a necessity entrepreneur as endogenous, the positive difference in average treatment effects is not significant at traditional levels.

Microfranchising Franchising is familiar to many (think McDonalds), but microfranchising is quite new and likely a less familiar concept. 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 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 provides supply chain logistics. For information on the microfranchises above see the appendix and (Fairbourne et al., 2007).

Significant variety exists in how microfranchises are structured, the size of start-up costs and how they operate. However, all of them provide significant entrepreneurial inputs into the business process through training, provision of marketing, supply-chain management and refined business practices and products. Important branding aspects differentiate microfranchisees from potential competitors.

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 the 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 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. 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 supplied inputs are valuable to franchisees as the decision to franchise rather than start an independent business appears consistent with expected wealth maximization (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.

Though mostly similar to franchising, microfranchising differs in important ways. Microfranchers 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) analyzes a small test data set from Ghana studying a specific microfranchise, Fanmilk, based in Accra Ghana. Data used by Christensen et al. (2010) represents a precursor to a subset of the data I utilize in this paper.

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 were based soley on one specific microfranchise in Ghana, with a sample consisting of only males. The generalizability of the result becomes difficult without more microfranchises and more countries or regions involved in the analysis. 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.[1] 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.[2] 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 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 rel-

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

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

ative 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 will proceed as follows. Section 2 will present the models occupational and franchising choices made by households of heterogenous productivity. Section 3 will describe the data and empirical methods. Section 4 discusses estimation results and Section 5 concludes.

2 Model

Households derive log-utility from income and are endowed with a single, indivisible and homogenous unit of labor that is inelastically supplied to either established labor-demanding firms for wage w or to self-employment activities. In self-employment, households are heterogenous in their capacity to self-supply entrepreneurial and managerial inputs, θ_i. I assume two types of self-employment opportunities: independent business and microfranchising.

Independent business income for household i is y_i^I and is determined by the input of the single unit of labor combined with the entrepreneurial inputs, θ_i, supplied by the household. The entrepreneurial inputs supplied to the independent business will result in a business of an uncertain quality. The inputs supplied, θ_i, will result in a business of quality $\theta_i \eta_i$ where η_i is a positive random variable with mean $\mathbb{E}[\eta_i] = 1$. Households do not know the value of η_i before making their occupational choices, but do know the distribution of η_i. The independent business income of household i is

$$y_i^I = \theta_i \eta_i \epsilon_i \tag{1}$$

where $\epsilon_i > 0$ and $\mathbb{E}[\epsilon_i] = 1$ and represents the general risk in operating a business, independent of a business' individual quality. Self-employment is inherently risky, even after business quality is known, as profits and therefore household incomes are subject to variation over time. The value of ϵ_i is not known before occupational decisions are made, but the general distribution is observed.[3] The supply of entrepreneurial inputs increases the expected profitability of a business.

In microfranchising, a household's own entrepreneurial inputs, θ_i, are replaced [4] with those supplied by the microfranchisor, λ, along with a royalty rate $0 < r < 1$. The household still supplies its unit of labor to the business. Microfranchise business income for household i is

$$y_i^F = (1 - r)\lambda \epsilon_i \tag{2}$$

[3] In addition, were the model dynamic, rather than static, the value of ϵ_i would be "drawn anew" each period.

[4] One might consider the microfranchisor's entrepreneurial inputs as being added to those supplied by the household. While some inputs are likely combined in reality, the nature of the microfranchise contract inhibits the household's capacity to use their own inputs. Business model standardization ensures issues of branding, marketing, supply-chain management and more are already provided for by the microfranchisor. Compliance policies prevent the microfranchisee from using their own-entrepreneurial inputs to deviate from core business platform practices. Hence, as an abstraction I model the combining as a replacement rather than an addition.

Microfranchising offers benefits and costs relative to independent business. First, the replacement of θ_i by λ reduces the risk associated with starting a business by reducing the uncertainty associated with business quality. Second, for households with weak capacity to self-supply entrepreneurial inputs ($\theta_i < \lambda$) the overall business quality will be higher. Microfranchising, however, comes with two important costs to the household. First, a royalty rate, r, or franchise fee must be surrendered to the microfranchisor, reducing household income. Second, for households with a strong capacity to self-supply entrepreneurial inputs ($\theta_i > \lambda$) choosing to microfranchise will result in a lower expected business quality, reducing expected income, but at reduced risk.

The net income value of the microfranchisor's supplied entrepreneurial inputs, λ, to household i, depends on the household's capacity to self-supply entrepreneurial inputs θ_i.

$$\mathbb{E}_{\eta,\epsilon}[y_i^F - y_i^I] = (1-r)\lambda - \theta_i \tag{3}$$

The simple model predicts that the net value of microfranchisor inputs, in terms of expected income gains, is greatest for those households least able to self-supply them.

On the basis of expected utility maximization, household i will prefer microfranchising to independent business, if and only if

$$\theta_i \leq \theta^F = \frac{(1-r)\lambda}{\exp\{\mathbb{E}\ln\eta_i\}} \tag{4}$$

The level of θ^F increases as it becomes more difficult to independently start quality businesses (i.e., $\mathbb{E}\ln\eta_i \to -\infty$), drawing more households into microfranchising if available.[5]

Under the assumption of independence of the random variables (η_i, ϵ_i)[6], household i will expect higher income in a microfranchise compared to an independent business of their own creation, if and only if

$$\theta_i \leq \tilde{\theta}^F = (1-r)\lambda \tag{5}$$

The relationship between independent business income, microfranchising income and $(\tilde{\theta}^F, \theta^F)$ across households is depicted in Figure 1. Households satisfying equation (5) receive both income and reduced risk benefits from microfranchising, while households satisfying equation (4) but not equation (5) receive a utility benefit through reduced risk, but trade that for a reduction in expected income.

The average income value of λ to households who prefer microfranchising is

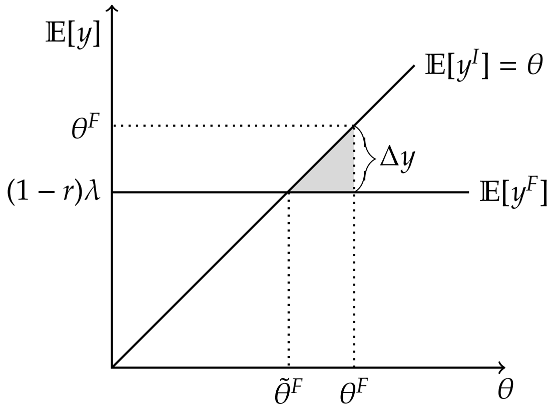
$$\begin{aligned}\mathbb{E}_\theta[y^F - y^I \mid \theta_i \leq \theta^F] &= (1-r)\lambda - \mathbb{E}[\theta_i \mid \theta_i \leq \theta^F] \\ &= (1-r)\lambda - \bar{\theta}(\lambda, r)\end{aligned} \tag{6}$$

where $\bar{\theta}(\lambda, r)$ is the average capacity to self-supply entrepreneurial inputs in the population of households who prefer microfranchising to independent business when the microfranchising

5 The random variable $\eta > 0$ has mean $\mathbb{E}[\eta] = 1$ and since the natural logarithm is a strictly increasing concave function, Jensen's inequality ensures that $\mathbb{E}[\ln\eta] < \ln(\mathbb{E}\eta) = \ln(1) = 0$. The exponential of any negative number is contained in $(0, 1)$.

6 The assumption implies that ϵ is a systematic risk faced by all businesses of any type and is uncorrelated with the quality of any specific business.

Figure 1: **Expected Self-employment Income for Independent Business and Microfranchising**



θ^F represents the household indifferent between independent business and microfranchising in terms of expected utility. $\tilde{\theta}^F$ represents the household that has identical expected income in both independent business and microfranchising. The shaded region represents all income traded-off to achieve higher expected utility through lower risk in a microfranchise. The value Δy represents the maximum expected income forgone by households to achieve lower risk in a microfranchise.

opportunity offers inputs λ at royalty rate r. The sign of equation (6) is ambiguous. The expected income value to a single household can be either positive or negative[7]. As depicted in Figure 2, the distribution of capacity θ across households can determine whether the largest mass of households preferring microfranchising will be below or above the cut-off $\tilde{\theta}^F$.

Households least able to self-supply entrepreneurial inputs are more likely to prefer wage employment. Wage employment offers all households a partial welfare gain in terms of risk reduction. But, those least likely to create quality businesses are also more likely to enjoy higher income in wage employment. Household i will achieve a greater expected utility in wage employment at wage w than in independent self-employment if and only if

$$\theta_i \leq \theta^N = \frac{w}{\exp\{\mathbb{E}\ln\eta_i\} \cdot \exp\{\mathbb{E}\ln\epsilon_i\}} \tag{7}$$

However, preferring wage employment at w doesn't mean a household will actually achieve employment. Unemployment, particularly for formal sector jobs, can be substantial in less developed countries.[8] I assume an employment rate $(1 - \mu)$ among households preferring wage employment at w, implying that measure μ of households who prefer wage employment will have their occupational choices constrained to self-employment.

Definition 1. Household i is a **necessity entrepreneur** if $\theta_i \leq \theta^N$, for θ^N defined in (7), but cannot obtain employment.[9]

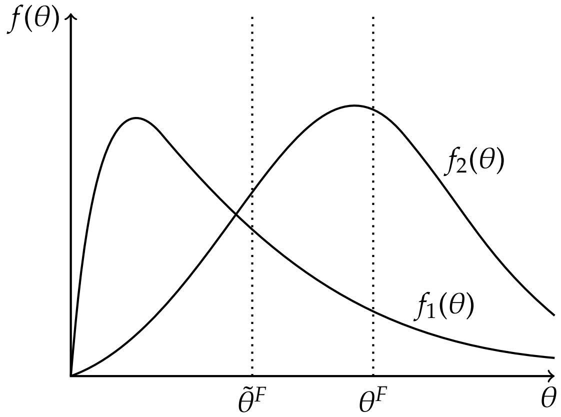
On the other hand, there exist households with exceptional capacity to self-supply entrepreneurial inputs to an independent business. Such households will prefer self-employment to wage employment even when wage employment is an available option.

[7] Positive values occur when $\theta_i < \tilde{\theta}^F$ and negative values when $\tilde{\theta}^F < \theta_i < \theta^F$.

[8] Equilibrium unemployment can occur for numerous reasons. For example it may be due to efficiency wages, no-shirking wages, permanent employment contracts, queuing to induce higher effort or other asymmetric information problems. I currently make no assumption as to which types are occurring in this model.

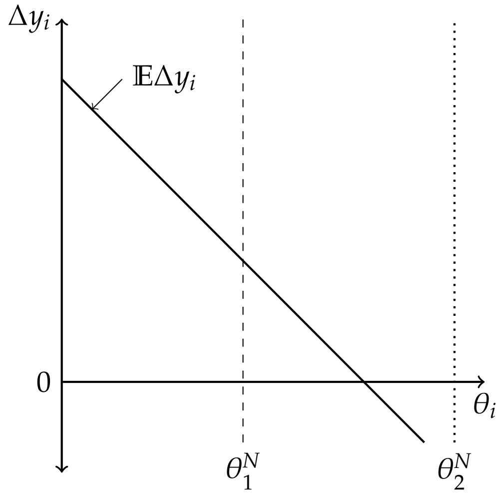
[9] Intuitively, this means that an individual prefers wage-employment to self-employment, but because of external circumstances wage-employment is not an available option and the household resorts to self-employment "out of necessity".

Figure 2: **Distribution of θ across households relative to θ^F and $\tilde{\theta}^F$.**



The sign of the average value of microfranchising to a household i who prefers it, depends upon the distribution of θ across households. If $f_1(\theta)$ is the distribution, then most of the mass falls below $\tilde{\theta}^F$ leading to a possible positive sign. In contrast, when $f_2(\theta)$ is the density, the increased mass above $\tilde{\theta}$ may lead to a negative sign.

Figure 3: **Necessity entrepreneurs and ATE**.



The location of the "marginal" necessity entrepreneur, θ^N, depends upon the equilibrium wage w and the distributional properties of η_i and ϵ_i. θ_1^N and θ_2^N two such possible locations. For either location, the values of $\mathbb{E}\Delta y$ below a cut-off θ_j^N are greater than those above the cut-off. As a group, the average income value of microfranchisor inputs, λ, will be strictly greater for necessity entrepreneurs than it is for opportunity entrepreneurs.

Definition 2. Household i is an **opportunity entrepreneur** if $\theta_i > \theta^N$ for θ^N defined in (7).

Consider the set of households $\{\theta : \theta \leq \theta^N\}$ which prefer wage-employment to self-employment in an independent business. I assume that measure μ are unable to obtain employment and that unemployment is independent of θ. A household becomes a necessity entrepreneur when $\theta_i \leq \theta^N$ and they are part of the measure μ unemployed. Let N_i be a random variable representing status as a necessity entrepreneur defined as

$$N_i = \begin{cases} 1 & \text{if necessity entrepreneur} \\ 0 & \text{otherwise} \end{cases}$$

From the definition of a necessity entrepreneur it follows that

$$\mathbb{E}[\theta_i \mid N_i = 1] < \mathbb{E}[\theta_i \mid N_i = 0]$$

The above condition implies that necessity entrepreneurs, on average, are less capable of self-supplying entrepreneurial inputs to a business compared with their opportunity entrepreneur counterparts. Consequently, their performance in independent business will, on average, be inferior to opportunity entrepreneurs.

Figure 3 graphically depicts the relationship between the average income value of λ to necessity entrepreneurs and opportunity entrepreneurs. In particular, for any location of the cut-off θ^N the expected values of Δy_i for necessity entrepreneur households are greater than the expected values for opportunity entrepreneurs. This realization leads to the following proposition.

Proposition 2.1. *The expected net income gain from microfranchisor inputs λ for necessity entrepreneur households is strictly greater than the expected net income gain from λ for opportunity entrepreneurs. More formally,*

$$\mathbb{E}[\Delta y_i \mid N_i = 1] > \mathbb{E}[\Delta y_i \mid N_i = 0]$$

If households make occupational decisions to maximize utility and trade-off risk with expected income, then the average income value of microfranchisor supplied entrepreneurial inputs over households has an ambiguous sign. While many households will experience an increase in expected income, some households will decrease their expected income in return for the opportunity to share their risk with the microfranchisor. Consequently, whether microfranchising appears to increase or decrease expected incomes of households who take it up is an empirical question.

Unambiguously, according to the model, the expected net income value of microfranchisor supplied inputs is greater for those least able to self-supply them (necessity entrepreneurs) than it is for opportunity entrepreneurs.

This relationship has relevance to understanding which households in LDCs may benefit the most from expansion of microfranchising opportunities and also how microfranchising may complement microfinance. For example, access to credit is of less use to those who maybe unwilling to take up the risk of borrowing for business investment when their low capacity to self-supply entrepreneurial inputs worsens expected outcomes. The willingness to borrow of low-capacity households may increase when business investment is combined with microfranchisor supplied entrepreneurial inputs.

The overall sign of the effects for necessity entrepreneurs is also important. As a potential tool of economic development, microfranchising needs to be evaluated in terms of its capacity to aid in poverty allevation. While decreased risk to households increases their expected utility, the accomplishment of numerous development goals requires an increase in consumption and savings, requiring an increase in income.

In the following section, I look at empirical models that will facilitate estimation of the average value of microfranchisor inputs to necessity and opportunity entrepreneurs, as well as the difference in those effects.

3 Empirical Methods and Data

3.1 Model

Business income is a random variable $Y_i(M_i, K_i, L_i, E_i)$ which is a function of the market factors, M_i, where the business operates, production-scale factors such as capital (K_i) and labor (L_i) and finally the total entrepreneurial (managerial) inputs supplied E_i. For convenience let $\mathbf{x}_i = [M_i \; K_i \; L_i]$ and assume that the factors M_i, K_i, L_i, and E_i are separable in the log of Y_i yielding the linear model,

$$\ln Y_i = \beta_0 + \mathbf{x_i}\boldsymbol{\beta} + \phi E_i + \varepsilon_i \tag{8}$$

Based on the model of section 2, I expect the value of ϕ to be positive, as entrepreneurial inputs should be positively correlated with business income.

The entrepreneurial inputs supplied to household i's microenterprise, E_i are not generally observable. However, we know that it will depend upon the household's capacity to self-supply, θ_i, and any microfranchisor supplied inputs, λ, if the household selected into microfranchising.

Household i's status as a microfranchisee and necessity entrepreneur is given by binary indicator variables F_i, N_i respectively and are determined by latent variables F_i^* and N_i^* such that $F_i = 1[F_i^* > 0]$ and $N_i = 1[N_i^* > 0]$ and

$$F_i^* = \mathbf{w}_i\boldsymbol{\psi} + u_{Fi}$$
$$N_i^* = \mathbf{z}_i\boldsymbol{\pi} + u_{Ni}$$

Entrepreneurial inputs E_i are correlated with household i's capacity to self-supply θ_i and therefore related to the cut-off values θ^N and θ^F. The linear projection of E_i on F_i, N_i, and $N_i \cdot F_i$ takes the form

$$E_i = \omega_0 + \omega_1 F_i + \omega_2 N_i + \omega_3(N_i \cdot F_i) + \nu_i \tag{9}$$

Although the sign of every coefficient in equation (9) is not clear, the model of section 2 suggests that ω_2 is likely negative, as necessity entrepreneurs would, on average, have fewer total entrepreneurial inputs supplied to their business.

Substitution of equation (9) into equation (8) leads to the following outcome equation for log daily profits.

$$\ln Y_i = (\beta_0 + \pi_0) + \phi\pi_1 F_i + \phi\pi_2 N_i + \phi\pi_3(N_i \cdot F_i) + \mathbf{x}_i\boldsymbol{\beta} + (\phi\nu_i + \varepsilon_i)$$

Let $\kappa = \beta_0 + \pi_0$, $\alpha = \phi\pi_1$, $\gamma = \phi\pi_2$, $\delta = \phi\pi_3$ and finally $u_{Yi} = (\phi\nu_i + \varepsilon_i)$.

Given the substitutions above and combining with the selection equations we have the final system of equations describing business outcomes.

$$\ln Y_i = \kappa + \alpha F_i + \gamma N_i + \delta(N_i \cdot F_i) + \mathbf{x}_i\boldsymbol{\beta} + u_{Yi} \tag{10}$$
$$F_i^* = \mathbf{w}_i\boldsymbol{\psi} + u_{Fi} \tag{11}$$
$$N_i^* = \mathbf{z}_i\boldsymbol{\pi} + u_{Ni} \tag{12}$$

where (u_{Yi}, u_{Fi}, u_{Ni}) is multi-variate distributed with mean vector $\mathbf{0}$ and variance-covariance matrix

$$\mathbf{V} = \begin{bmatrix} 1 & \rho & \sigma_{FY} \\ \rho & 1 & \sigma_{NY} \\ \sigma_{FY} & \sigma_{NY} & \sigma_Y^2 \end{bmatrix} \tag{13}$$

I assume that the residuals (u_{Fi}, u_{Ni}) are bivariate standard normally distributed with correlation coefficient ρ.

3.2 Average Treatment Effects

The average value of microfranchisor supplied entrepreneurial inputs is approximated by the shift in the intercept of the household's conditional expectation function of business income. The outcome equation coefficients α, γ represent these shifts, and δ is the estimated difference in average values between necessity and opportunity entrepreneurs. More formally, I calculate the ATE for necessity entrepreneurs ($\text{ATE}_{N_i=1}$) in equation (14) and for opportunity entrepreneurs ($\text{ATE}_{N_i=0}$) in equation (15).

$$\begin{aligned} \text{ATE}_{N_i=1} &= \mathbb{E}[\ln Y_i | F_i = 1, N_i = 1, \mathbf{x}_i, \mathbf{w}_i] - \mathbb{E}[\ln Y_i | F_i = 0, N_i = 1, \mathbf{x}_i, \mathbf{w}_i] \\ &= \kappa + \mathbf{x}_i\boldsymbol{\beta} + \alpha + \gamma + \delta - \kappa - \mathbf{x}_i\boldsymbol{\beta} - \gamma \\ &= \alpha + \delta \end{aligned} \tag{14}$$

$$\begin{aligned} \text{ATE}_{N_i=0} &= \mathbb{E}[\ln Y_i | F_i = 1, N_i = 0, \mathbf{x}_i, \mathbf{w}_i] - \mathbb{E}[\ln Y_i | F_i = 0, N_i = 0, \mathbf{x}_i, \mathbf{w}_i] \\ &= \kappa + \mathbf{x}_i\boldsymbol{\beta} + \alpha - \kappa - \mathbf{x}_i\boldsymbol{\beta} \\ &= \alpha \end{aligned} \tag{15}$$

The model discussed in section 2 suggests an ambiguous sign for both $\text{ATE}_{N_i=1}$ and $\text{ATE}_{N_i=0}$, but proposition 2.1 unambiguously predicts that $\text{ATE}_{N_i=1} > \text{ATE}_{N_i=0}$. Hence this implies $\delta > 0$. I find ample evidence that $\delta \geq 0$ and some weaker evidence that it is strictly greater than zero for individuals in the sample.

Necessity entrepreneurs have a lower capacity to supply entrepreneurial inputs than opportunity entrepreneurs. Therefore, in independent business, necessity entrepreneurs have an expected business income lower than opportunity entrepreneurs. The coefficient γ represents the income difference, and I all specifications estimated provide strong evidence that this γ is strongly negative.

3.3 Estimation

The coefficients of interest for average treatment effects are identified when the outcome equation is uncorrelated with the selection equations. When correlated, however, least squares estimates of the coefficients are inconsistent and average treatment effects are not identified. If the F_i^* equation is correlated with outcomes, but N_i^* is not, then the system reduces to two relevant equations and only the binary indicator F_i in the outcome equation is considered endogenous. Identification can be achieved using binary endogenous dummy variables models such as Heckman's two stage endogenous treatment effects estimator (Heckman, 1976, 1978, 1979).

The lack of identification arises as a result of the non-zero conditional expectation of u_{Yi} given $F_i = 1$ or $F_i = 0$. Heckman's two-stage approach leverages the fact that the residual u_{Yi} can be projected on u_{Fi} yielding the error-form representation $u_{Yi} = \rho_{YF} u_{Fi} + e_i$ where of course e_i is orthogonal to u_{Fi} and ρ_{YF} is the correlation between the two residuals. Consequently, $\mathbb{E}[e_i|u_{Fi}] = 0$ and the regression function $\mathbb{E}[\ln Y_i|\mathbf{x}_i, F_i]$ can be expressed as

$$E[\ln Y_i|\mathbf{x}_i, F_i = k] = \kappa + \mathbf{x}_i\boldsymbol{\beta} + \alpha k + \rho_{YF}\,\mathbb{E}[u_{Fi} \mid \mathbf{x}_i, F_i = k, N_i = j] + \underbrace{\mathbb{E}[e_i|\mathbf{x}_i, F_i = k]}_{=0}$$

for $k = 0, 1$. Hence, the identification problem reduces to that of an omitted variables bias; where augmentation of the regression equation with the conditional mean of u_{Fi} permits model identification. As u_{Fi} is unobserved, Heckit procedures involve a first stage estimation of a single index model to predict an index score $\hat{I}_i$ for each observation. In the bivariate truncation of normally distributed variables, (u_{Yi}, u_{Fi}), the form of $\mathbb{E}[u_{Fi}|\mathbf{x}_i, F_i]$ will be proportional to the inverse mills ratio appropriate for the direction of truncation.[10] Augmentation of the regression equation with a consistent estimate of the household's inverse Mills ratio removes the omitted variables inconsistency and permits model identification.

The model of this paper involves a case where the values of both F_i and N_i entail separate truncation of the bivariate normal errors u_{Fi}, u_{Ni}. Furthermore, the correlation between selection equations, ρ, feeding into the same outcome equation will be an additional parameter in need of identification. Lastly, no bivariate analog to the univariate inverse Mills is obvious.[11]

Identification will require inclusion of the omitted variable $\mathbb{E}[u_{Yi}|u_{Fi} \gtreqless \mathbf{w}_i\boldsymbol{\psi},\ u_{Ni} \gtreqless \mathbf{z}_i\boldsymbol{\pi}]$. This omitted conditional error has a bivariate normal distribution specific to each household whose parameters are determined by F_i^* and N_i^*. Expressing the conditional mean of u_{Yi} in terms of the truncated values of u_{Fi} and u_{Ni} is no longer as convenient as the inverse Mill's ratio.

Following (Kotz et al., 2000), under any truncation of u_{Fi} and u_{Ni} when u_{Yi} has full support, the mean of u_{Yi} can be expressed as a linear combination of u_{Fi} and u_{Ni}. In particular, let $\boldsymbol{\xi}_i = (\xi_{Fi}, \xi_{Ni})$ be the expectations of u_{Fi} and u_{Ni} under truncation and let the variance-covariance

[10] In other words, the appropriate Mills ratio for the observations coded $F = 1$ will be different than for observations coded $F = 0$.

[11] I have not yet found it at least. I am still searching as doubly truncated formulas for bivariate normally distributed variables exist, but are complicated. This is a current area of investigation.

matrix $\mathbf{V}$ be partitioned for the truncated selection residuals as

$$\mathbf{V} = \begin{bmatrix} \mathbf{\Omega} & \mathbf{V}_{12} \\ \mathbf{V}_{12}^T & \mathbf{V}_{22} \end{bmatrix}$$

Where the submatrices are defined as

$$\mathbf{\Omega} = \begin{bmatrix} 1 & \rho \\ \rho & 1 \end{bmatrix} \quad \mathbf{V}_{12} = \begin{bmatrix} \sigma_{FY} \\ \sigma_{NY} \end{bmatrix} \quad \mathbf{V}_{22} = \sigma_Y^2$$

The conditional expectation can now be expressed in terms of these components as shown below.

$$\begin{aligned} \mathbb{E}[u_{Yi}|\mathbf{x}, F_i, N_i] &= \boldsymbol{\xi}_i^T \mathbf{\Omega}^{-1} \mathbf{V}_{12} \\ &= \frac{\sigma_{FY} - \rho\sigma_{NY}}{1-\rho^2}\xi_{Fi} + \frac{\sigma_{NY} - \rho\sigma_{FY}}{1-\rho^2}\xi_{Ni} \\ &= \varrho_F \xi_{Fi} + \varrho_N \xi_{Ni} \end{aligned} \tag{16}$$

Each of the coefficients in the final equation, ϱ_F and ϱ_N is independent of individual household values. Instead, they represent population parameters describing the statistical relationships between selection equations and the outcome equation. Being linear in these parameters equation (16) facilitates its use in augmenting the regression equation used for estimation in much the same way the inverse Mills ratio is used in Heckman's two stage estimator.

The truncated means ξ_{Fi} and ξ_{Ni} along with the intra-selection equation correlation coefficient ρ need to be evaluated, or estimated, by some means to compute $\boldsymbol{\xi}_i$.[12] Under the assumptions on (u_{Fi}, u_{Ni}) all values are drawn from a bivariate normal distribution with means zero, variances 1, and correlation ρ. As a result, if ρ is known, then the pre-truncated distribution is known. If, in addition, the location of truncation is known, then the truncated distribution is fully specified.

While the true values of ρ and the truncation locations cannot be observed, they can be estimated through a seemingly unrelated bivariate probit regression of the selection equations. Given estimates $\hat{\boldsymbol{\psi}}$, $\hat{\boldsymbol{\pi}}$ and $\hat{\rho}$ and knowledge of F_i and N_i I can simulate the truncated bivariate normal distribution determined by $D_i \equiv D(\hat{\boldsymbol{\psi}}, \hat{\boldsymbol{\pi}}, \hat{\rho}, F_i, N_i)$ for each household i in the sample. Simulation of each such distribution, D_i, permits the computation of an estimate for the means $\hat{\boldsymbol{\xi}}_i$.

Augmentation of the outcome equation by $\hat{\boldsymbol{\xi}}_i$ yields the second stage, least squares estimable equation below.

$$\ln Y_i = \kappa + \mathbf{x}_i\boldsymbol{\beta} + \alpha F_i + \gamma N_i + \delta(N_i \cdot F_i) + \varrho_F \hat{\xi}_{Fi} + \varrho_N \hat{\xi}_{Ni} + e_i \tag{17}$$

Although, computationally inefficient, simulation of the conditional means of the truncated residuals is accomplished via the accept-reject method for draws from the specified bivariate standard normal distribution D_i.

To answer the primary research question of this paper, I estimate separate models. First, OLS

[12] I am still pursuing closed form solutions for direct estimation of these means, but will proceed with simulation until more efficient methods are identified.

estimation of the model without accounting for potential endogeneity of F and N. Second, N will be considered exogenous and Heckman's traditional two-stage estimator will be employed to correct of the endogenous dummy variable F. Third, the estimation procedure described above will be used to estimate the average treatment effects when both F and N are endogenous in the outcome equation and correlated with each other.

3.4 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 income) are measured by average daily profits reported by respondents. Profit controls for business scale, such as capital, will be accounted for through the total value of the business's assets as well as 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 as well as an indicator for whether the business has paid labor.

Respondents also classified their business by type, selling location and general sector; providing controls for the market conditions operated in by a business.

3.4.1 Identifying Necessity and Opportunity Entrepreneurs

Individuals in the sample with a stated preference for wage employment despite their participation in self-employment labeled necessity entrepreneurs. Identification of necessity entrepreneurs in the sample is critical to testing the model of section 2 and seeking to understand the difference in the income value of microfranchisor supplied inputs between necessity and opportunity entrepreneurs. According to Christensen et al. (2010), necessity entrepreneurs are defined as individuals engaged in self-employment who prefer to be an employee for some established company. The survey 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., $N_i = 0$).

Table 1 contains comparisons of key variables used in the analysis between microfranchisees and those in independent business. An estimate in the difference of sample means and an associated t-statistic are also provided.

3.4.2 Selection Equations and Exclusion Restrictions

Exclusion restrictions between selection equations and the outcome equation add robustness to identification. Without exclusion restrictions, identification of the treatment effects rests entirely on the normality assumption. However, including reasonable exclusion restrictions allows a source of identification not fully dependent on the normality of the latent variable errors.

Risk aversion may be the best dimension upon which to establish exclusion restrictions. An ideal restriction would be a factor that directly influences the choice to microfranchise and the likelihood of being a necessity entrepreneur that itself has no effect on average daily profits except through those related to one's status as a microfranchise and/or necessity entrepreneur. Households make their choices to maximize expected utility given their capacity to self-supply entrepreneurial inputs and their aversion to risk. While capacity to self-supply inputs, θ, may play a role in both selection and outcome equations, risk aversive attitudes will not directly affect business profitability from day to day. For example, business outcomes are positively related to the level of resources invested in the business such as start-up costs. While risk aversion may partially explain the level invested, once that level is observed, risk aversion (if measured) would be redundant in the outcome equation. Furthermore, risk aversion will not affect the level of entrepreneurial inputs supplied. However, under the assumption that microfranchising is less risky than independent business, greater aversion to risk would increase the likelihood of preferring microfranchising, while not affecting the supply of unobervable business inputs. Similarly, holding capacity θ_i constant, greater distaste for income uncertainty would make wage-employment more desirable as well, increasing the likelihood of an affirmative statement of preference for wage-employment.

Family conditions of individuals in the sample may be relatable to the private cost of risk. Single individuals may be more or less able to whether income uncertainty and risk than their married counterparts. On one hand, the costs of uncertain cash flows may have less serious consequences for single individuals while on the other hand a spouse may be able to generate income that diversifies the household's income streams. Diversification reduces the pain of uncertainty associated with any particular income stream. Controlling for the number of income earners in a household can control for the potential of marriage to ameliorate, rather than exacerbate, the costs of risk.

Marital status is not likely to directly affect key business inputs outside of labor. A single business operator will contribute the same entrepreneurial inputs to an independent business as a married business operator, but the married business operator may benefit from their spouse's additional labor. However, if the addition of any family labor is controlled for, inclusion of marital status in the outcome equation is redundant, hence its population coefficient is zero.

Age does not enter directly into the business' performance. Instead age may be positively related to the accumulation of both work experience and business management experience. Work experience would affect the attractiveness of wage-employment, while not necessarily affecting the capacity to self-supply entrepreneurial inputs to new business ventures. In this regard, an increase in age may signal an increased preference for wage-employment; increasing the likelihood of a stated preference for wage-employment. Under the assumption that the accumulation of business experience through age is determined by the number of past businesses operated, inclusion of that covariate makes age redundant and hence excludable in the outcome equation.

In addition, business ownership and the level education will be used to predict selection and excluded from the profit equation.

Finally, exclusion restrictions will be made between selection equations to facilitate a more robust identification.

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

	Independent	Microfranchise	Diff	T-stat
Log Daily Profit	2.609	2.661	-0.63	0.53
Necessity Entrepreneur {0,1}	0.162	0.129	1.04	0.30
Business Assets (capital)	73.019	23.175	3.20	0.00
Start-up Costs	17.735	8.334	3.01	0.00
Hours/day Operating	10.699	11.278	-2.20	0.03
Has Paid Employees {0,1}	0.336	0.403	-1.60	0.11
Number Previous Businesses (5-yrs)	1.447	1.005	6.54	0.00
Educ Level: Less than Primary {0,1}	0.143	0.054	3.17	0.00
Educ Level: Primary {0,1}	0.280	0.285	-0.12	0.90
Educ Level: Junior {0,1}	0.237	0.317	-2.08	0.04
Educ Level: Secondary {0,1}	0.203	0.253	-1.37	0.17
Educ Level: Post Secondary {0,1}	0.138	0.091	1.60	0.11
Has Informal Training {0,1}	0.186	0.086	3.15	0.00
Bus: Electronics {0,1}	0.058	0.000	3.38	0.00
Bus: Clothing {0,1}	0.193	0.000	6.66	0.00
Bus: Food {0,1}	0.319	0.602	-6.77	0.00
Bus: Telecommunications {0,1}	0.036	0.177	-6.06	0.00
Sells in Commercial Shop {0,1}	0.092	0.081	0.44	0.66
Mobile Selling Location {0,1}	0.186	0.704	-14.26	0.00
Is Female {0,1}	0.273	0.054	6.34	0.00
Owns Current Business {0,1}	0.415	0.086	8.50	0.00
Business is Primary Income {0,1}	0.316	0.414	-2.33	0.02
In Ghana {0,1}	0.408	0.495	-1.98	0.05
In Bangladesh {0,1}	0.302	0.446	-3.46	0.00
In Guatemala {0,1}	0.290	0.059	6.54	0.00
Observations Total: 600	414	186		

4 Results and Discussion

Results for the three estimated models are contained in Table 2. The following points of discussion refer to these results.

Table 2: **Estimated Percent Gain in Daily Profit**

	(1) OLS	(2) F Endogneous	(3) F, N Endogenous
$\text{ATE}_{N_i=0}$: Opportunity Entrepreneur	36.08**	-18.48	-12.20
	(12.75)	(16.60)	(17.02)
$\text{ATE}_{N_i=1}$: Necessity Entrepreneur	85.35***	33.45	2.403
	(17.18)	(24.54)	(18.56)
$\text{ATE}_{N_i=1} - \text{ATE}_{N_i=0} = \delta$	49.27**	51.93*	14.60
	(15.89)	(21.80)	(9.869)
$\mathbb{E}[y^I \mid N_i = 1] - \mathbb{E}[y^I \mid N_i = 0] = \gamma$	-34.99***	-35.48***	-80.80***
	(8.166)	(7.234)	(11.33)
N	594	594	594

Standard errors in parentheses

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The logarithm was reversed for all coefficients using Kennedy's transformation and associated standard errors computed via the Delta method. Robust standard errors were used for untransformed models (1) and (2). Bootstrapped standard errors were simulated for untransformed model (3)

A total of 594 observations were included in each othe three models. The dependent variable in each is the logarithm of average daily profit for the microenterprise. The coefficients on the binary variables of interest represent (when small in magnitude) percentage changes in expected profits. Kennedy's transformation was used to reverse the logarithmic transformation and the delta method provided the associated computation of the untransformed standard errors.

4.1 Disadvantage of Necessity Entrepreneurs

As predicted by theory, necessity entrepreneurs operate independent businesses at a significant profit disadvantage to opportunity entrepeneurs. All model specifications allow use to reject the hypothesis that $\gamma = 0$ at conventional levels. Furthermore, the point estimates are negative and quite large, ranging from -35 to -80. The large spike in the predicted negative shift of expected profits for necessity entrepreneurs in model (3) may be due to poor prediction of status as a necessity entrepreneur. Although in theory stated preference for wage-employment is correlated with unobservable factors such as capacity θ_i, employment opportunities and risk aversion, sample values appear largely uncorrelated with other covariates. The indicator N_i is only treated as endogenous in model (3) and as its sample variation is difficult to explain with other variables in the sample. It may be the case that something akin to a weak instrument bias may be at work here. In addition, if the probability of being involuntarily unemployed is not independent of all personal characteristics, but is perhaps related to age, marital status and other attributes used as exclusion restrictions; a form of confounding may apply. Further analysis is needed to ascertain the potential and effect of such possibilities.

4.2 Average Treatment Effects

I find evidence that the average net value of microfranchisor inputs to necessity entrepreneurs is positive, while the average net value to opportunity entrepreneurs may be positive, but is likely negative. The theory derived in this paper suggests that the net value of microfranchisor inputs has an ambiguous sign. The ambiguity arises as a result of households giving up expected income in exchange for decreased risk in order to achieve higher expected utility. The microfranchise contract (λ, r) and the household's capacity to self-supply θ_i will determine whether the household gains expected utility through both increased income and decreased risk, or only through decreased risk; implying a loss in expected income. When the majority of microfranchisees experience the former, a positive effect may be found. If the majority experience the latter, a negative effect may be found. Model (1) suggests strongly that the effects are positive for both necessity and opportunity entrepreneurs and also that the effect for necessity entrepreneurs are significantly larger. However, when correcting for the selection bias in franchising (model 2) the results change to a negative point estimate -18.48 for opportunity entrepreneurs and a positive 33.45 for necessity entrepreneurs. The point estimates are consistent with the results expected from Figure 3. Unfortunately, the standard errors are also increased and the resulting uncertainty does not allow me to reject the null hypothesis of zero effect. This potentially zero effect does not indicate that microfranchisor inputs have no effect, but again can be explained by the tradeoffs of expected income and risk. Further evidence that the story of these coefficients still relate to Figure 3 can be seen in the estimate of the difference in ATEs for model (2), 51.93 which I can reject as being positive at conventional levels of confidence. In model 3, however, both F_i and N_i are treated as endogenous regressors. As the values of F_i and N_i both relate to the household's underlying capacity to self-supply entrepreneurial inputs, they may be correlated in terms of the population. Consequently a change in the estimated average treatment effect for necessity entrepreneurs would not be altogether surprising. Nevertheless, the point estimate decreases substantially in magnitude from 85.35 to 33.45 and finally to 2.403. Additionally, while $ATE_{N_i=0} = -12.20 < 2.403 = ATE_{N_i=1}$ is inline with the predicted relationship, the difference in effects of 14.60, while positive, is not significant. The previous result is odd when viewed in the light of the estimate $\hat{\gamma} = -80.80$ in the model (3) that substantially increases in magnitude when treating both dummy variables as endogenous.

4.3 Limitations

Several limitations and criticisms of the empirical specifications exist. As mentioned previously, if unemployment is randomly distributed in the population of those desiring wage employment, its effects may cause difficulties in adequately predicting N_i in order to control for its potential endogeneity through a control function. In addition, more work and testing is required to determine both in what way and to what degree other observable, relevant variables may be related to the probability of being a necessity entrepreneur in the sample (i.e., both preferring a job and being unlucky enough to be unable to find adequate employment).

Access to microfranchising is not universal, causing uncertainty as to which individuals in the sample truly had microfranchising in their choice set. The exogeneity of access to microfranchising may induce an attenuation bias, while its potential endogeneity also needs some exploring as there may be confounding factors in the current model specifications being effected by these unobserved factors affecting selection into microfranchising.

Another factor clouding inference is unobserved heterogeneity in microfranchises observed in the sample. In the Ghana sample, all microfranchisees belong to the same microfranchise, Fanmilk, and therefore the likely microfranchise contribution of inputs, λ, could be considered fairly uniform across treated members of the sample. By contrast, the Guatemala and Bangladesh samples include individuals from several different microfranchises. With heterogeneity in the microfranchises, the potential for heterogeneity in the level of entrepreneurial inputs supplied exists as well.

Another difficulty in the above estimation is the pooling of the samples from various countries. Although currencies have been corrected and country dummy variables are employed to control for fixed country factors, the coefficients on important variables may be different in each country. Unfortunately, issues of sample size and the concavity of likelihood functions arise when splitting up the sample. Pooling of the sample, while forcing cross-country parameters, provides additional information into the key relationships permitting better estimates.

5 Conclusion

Necessity entrepreneurs possess a lower capacity, on average, to self-supply entrepreneurial inputs to independent businesses compared with opportunity entrepreneurs. This finding is robust across multiple specifications and controlling for the potential endogeneity of one's status as a necessity entrepreneur, the effect strengthens. The disadvantage experienced by necessity entrepreneurs highlights the importance of the research in this paper; investigating the potential impacts of microfranchising on this group. When 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. If these benefits are significant for necessity entrepreneurs, the increased business income and reduced risk may not only provide higher consumption, but may also increase a household's confidence to use credit to expand into additional microfranchises and perhaps businesses of their own later on.

In all specifications, the estimated average treatment effect, approximating the average income value of microfranchisor inputs, is positive and greater than that estimated for opportunity entrepreneurs. While entrepreneurs of either type may be willing to except lower expected income (negative treatment effect) in exchange for less risk, necessity entrepreneurs should experience a larger income benefit. Consequently, whether positive or negative, the average treatment effect estimates for necessity entrepreneurs should be larger than those for their opportunity entrepreneur counter-parts. The sample studied in this paper indeed finds such a relationship, however, some specifications produce a greater measure of uncertainty in the estimates which prevents a conclusive rejection of the hypothesis that necessity entrepreneurs don't enjoy any greater income benefit from microfranchisor inputs.

Even if necessity entrepreneurs do not experience greater average treatment effects than opportunity entrepreneurs, the results are still important as they speak to the potential for microfranchising to help many entrepreneurs, but necessity entrepreneurs (the most disadvantaged) in particular. Even if the net effect for necessity entrepreneurs is to decrease their risk and remain income-neutral, the decreased risk may not only improve household decisions and well-being, but also potentially decrease the risk inherent in borrowing money for business investment. If microfranchising can bolster successful use of burgeoning financial sectors in LDCs than it can be a useful and successful development tool.

6 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.

References

Banerjee, Abhijit V. and Esther Duflo (2007), "The economic lives of the poor." *The Journal of Economic Perspectives*, 21, 141–167.

Blau, David M. (1985), "Self-employment and self-selection in developing country labor markets." *Southern Economic Journal*, 52, 351–363.

Caves, Richard E. and William F. Murphy (1976), "Franchising: Firms, markets, and intangible assets." *Southern Economic Journal*, 42, 572–586.

Christensen, Lisa Jones, Helen Parsons, and Jason Fairbourne (2010), "Building entrepreneurship in subsistence markets: Microfranchising as an employment incubator." *Journal of Business Research*, 63, 595–601.

Evans, David S. and Boyan Jovanovic (1989), "An estimated model of entrepreneurial choice under liquidity constraints." *Journal of Political Economy*, 97, 808–827.

Fairbourne, Jason S, Stephen W Gibson, and W Gibb Dyer (2007), *MicroFranchising: creating wealth at the bottom of the pyramid*. Edward Elgar Publishing.

Heckman, James J. (1976), "The common structure of statistical models of truncation, sample selection and limited dependent variables and a simple estimator for such models." *Annals of Economic and Social Measurement*, 5, 475–492.

Heckman, James J. (1978), "Dummy endogenous variables in a simultaneous equation system." *Econometrica*, 46, 931–959.

Heckman, James J. (1979), "Sample selection bias as a specification error." *Econometrica*, 47, 153–161.

Hopenhayn, Hugo A (1992), "Entry, exit, and firm dynamics in long run equilibrium." *Econometrica: Journal of the Econometric Society*, 60, 1127–1150.

Jovanovic, Boyan (1982), "Selection and the evolution of industry." *Econometrica*, 50, 649–670.

Kihlstrom, Richard E. and Jean-Jacques . J. Laffont (1979), "A general equilibrium entrepreneurial theory of firm formation based on risk aversion." *The Journal of Political Economy*, 87, 719–748.

Kotz, Samuel, N. Balakrishnan, and Norman L. Johnson (2000), *Continuous Multivariate Distributions, Volume 1, Models and Applications*, 2 edition. Wiley.

Lucas, Robert E. (1978), "On the size distribution of business firms." *The Bell Journal of Economics*, 9, 508–523.

Mandelman, Federico S. and Gabriel V. Montes-Rojas (2009), "Is self-employment and microentrepreneurship a desired outcome?" *World Development*, 37, 1914–1925.

Mathewson, G. Frank and Ralph A. Winter (1985), "The economics of franchise contracts." *Journal of Law and Economics*, 28, 503–526.

Poschke, Markus (2013a), "Entrepreneurs out of necessity: a snapshot." *Applied Economics Letters*, 20, 658–663.

Poschke, Markus (2013b), "Who becomes an entrepreneur? labor market prospects and occupational choice." *Journal of Economic Dynamics and Control*, 37, 693–710.

Rubin, Paul H. (1978), "The theory of the firm and the structure of the franchise contract." *Journal of Law and Economics*, 21, 223–233.

Williams, Darrell L. (1999), "Why do entrepreneurs become franchisees? an empirical analysis of organizational choice." *Journal of Business Venturing*, 14, 103–124.