

Subsistence Entrepreneurs and Misallocation*

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Abstract

Empirical evidence suggests that many individuals in developing countries operate businesses not due to some superior skill or idea, but because they lack the opportunity to become salaried employees. In a model with incomplete markets, occupational choice, and frictional job search, I argue that this is due to the interaction of low unemployment benefits and financial market underdevelopment. The resulting misallocation along the extensive margin between salaried positions and business ownership generates a larger left tail of firm size and a significantly smaller quantitative impact of targeted lending to poor entrepreneurs. Model predictions are then tested with individual-level surveys of both Chilean and Mexican microenterprise owners. Evidence shows that misallocated owners have lower profit conditional on observable inputs and are more likely to have left their last salaried position involuntarily. Both are consistent with the model.

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1 Introduction

At least since [Schumpeter \(1942\)](#), entrepreneurs have been seen as a key driver of economic growth. Policies that both generate and distort the decision of individuals to start businesses have taken center stage in the attempt to understand the vast differences in GDP per capita across countries, firm growth rates, and income distributions.¹

The literature has generally taken the stance that business owners are “entrepreneurial” in spirit, in that they open establishments due to their sufficiently high combination of skill, ideas, and wealth. Motivated by empirical evidence, in this paper I distinguish between two types of businesses owners who are differentiated by their motivations to begin a firm. The first type is the aforementioned individuals with some advantage - skill, ability, asset holdings - that makes businesses ownership more advantageous than working. Presented with the choice between operating a business and working, these individuals would choose the former. In contrast, there exists a second set of business owners that operate as such in spite of their preference for salaried work. These individuals would prefer salaried employment to business ownership, but do not have access to salaried work. Borrowing language from [Ardagna and Lusardi \(2010\)](#) and [Schoar \(2010\)](#), I refer to these two groups as *opportunity* and *subsistence* entrepreneurs. This distinction is particularly relevant in the developing world, as the relationship between the share of subsistence entrepreneurs is negatively correlated with per capita GDP. While only eleven percent of business owners are subsistence entrepreneurs in the United States, that ratio jumps to over sixty percent in Uganda, suggesting a significant amount of misallocation between these two broad occupational categories in developing countries. The goal of this paper is to provide and quantify a theory of subsistence entrepreneurship, and assess its impact on aggregate outcomes across countries.

This paper generates high levels of subsistence entrepreneurship by relying on the interaction of low government-provided unemployment benefits and financial underdevelopment, both of which are common in less developed countries. In the absence of unemployment benefits, individuals without jobs turn to entrepreneurship to replace some of their income. This generates a time use trade off, as individuals must divide their time between working

¹For example, [Quadrini \(2000\)](#) and [Cagetti and De Nardi \(2006\)](#) study the impact of entrepreneurship on the distribution of wealth. [Amaral and Quintin \(2010\)](#) and [Buera et al. \(2011\)](#), among others, show that the misallocation of entrepreneurial talent can substantially lower TFP, and [Matsuyama \(2008\)](#) provides an overview of the aggregate implications of financial frictions and entrepreneurship.

in their business and searching for work. The incentive for sufficiently poor individuals is therefore to spend more time operating a business, and less time searching, despite the fact that they may have a comparative advantage as an employee. The result is a large number of poor individuals not willing to search for work, and thus are stuck operating a business despite their comparative advantage. Unemployment benefits, therefore, allow individuals to spend more time searching for work and can potentially lower this misallocation between salaried employment and business operation. Of course with sufficiently high levels of savings, the consumption benefits of unemployment insurance become less relevant. Individuals can self-insure against the risk of job loss and keep themselves afloat during unemployment spells without resorting to operating a business. Financial distortions, however, lower the equilibrium interest rate and thus increase the cost of building this buffer stock of savings. Combined, these two features generate a large share of business owners who actually have a comparative advantage as workers, and thus run small, unproductive firms.

I formalize this idea in a dynamic general equilibrium model with incomplete markets in which individuals can be unemployed, workers, or entrepreneurs. Finding a job is frictional in that it requires time to gain employment next period, and countries differ along the level of unemployment benefits and financial development. The latter is modeled as a collateral constraint on (all) entrepreneurs. In a world with incomplete markets, self-insurance and government-provided unemployment benefits act as substitutes in providing consumption to those without work. In poor countries, individuals are induced into entrepreneurship to supplement their income while searching due to the lack of other channels to smooth consumption. By the same reasons that these individuals need entrepreneurship to generate consumption, the incentives to search for work are significantly lower than in rich countries. Low levels of consumption imply that the utility cost of searching for work is extremely high, and therefore individuals spend most of their time in their business generating income. Thus, these individuals end up getting “stuck” in entrepreneurship despite their preference for salaried employment. The resulting equilibrium includes a large number of small, unproductive firms run by individuals who do not have a comparative advantage in that occupation, and therefore generating misallocation between the two broad occupational categories of entrepreneurship and employment.

I then provide a quantitative example that shows how the model is able to capture the key

features of subsistence entrepreneurship across countries (a full calibration is forthcoming).

I then turn to empirical evidence to assess the main points of the model. While the specificity in defining subsistence entrepreneurship makes this task somewhat difficult, both the Chilean and Mexican Surveys of Microenterprise Owners allow me to distinguish between subsistence and opportunity entrepreneurs. The model predicts that search frictions play an important role in encouraging entry of subsistence entrepreneurs. To test this, I ask whether current business owners who were fired from their previous jobs are more likely to be subsistence entrepreneurs. Even after controlling for business inputs, age, sex, industry, and other controls, those who were fired from their last position are overwhelmingly more likely to be subsistence entrepreneurs both in Chile and Mexico. This suggests, as the model predicts, labor market policies may have an important impact on entry and exit decisions by entrepreneurs. Second, the main result of the model is that subsistence entrepreneurs are of lower ability than opportunity entrepreneurs. In both countries I find that profits are lower for subsistence entrepreneurs, after controlling for observable input differences, age, sector, region, and other controls. The micro evidence is therefore consistent with both the main channel of the model and the main prediction derived from this channel.

This paper joins a growing literature that focuses on role of small firms in the development process. [Banerjee and Newman \(1993\)](#) and [Erosa and Allub \(2013\)](#) show that financing frictions generate a large mass of own-account entrepreneurs in models of occupational choice. More broadly, [Jeong and Townsend \(2007\)](#), [Midrigan and Xu \(2014\)](#), and [Buera et al. \(2011\)](#), among others, show that financial underdevelopment has the ability to distort occupational choice by keeping high ability but low income potential entrepreneurs from operating businesses. Here, low poor low ability individuals are induced *into* entrepreneurship when financial underdevelopment is combined with labor market frictions. On the labor market side, [Guner et al. \(2008\)](#), [García and Pijoan-Mas \(2012\)](#), and [Poschke \(2012\)](#) focus on labor market policies that distort firm decisions, either through firing costs or explicit firm-size distortions. I provide micro evidence that search frictions in the labor market play an important role in deciding entry decisions among entrepreneurs, and then quantitatively investigate the interaction of financial development and unemployment benefits in a model with these frictions.

The rest of the paper proceeds as follows. Section 2 provides cross-country empirical mo-

tivation. Section 3 develops the model, and Section 4 discusses the calibration and baseline quantitative experiment. Section 5 covers the quantitative impact of financial development and unemployment benefits on subsistence entrepreneurship, while Section 6 uses two separate microenterprise surveys in Chile and Mexico to provide micro-level evidence in support of the model. Section 5.1 discusses policy implications through the lens of the model, including changes in unemployment benefits and microcredit interventions. Finally, Section 7 concludes.

2 Cross-Country Empirical Motivation

I begin by showing that a substantial number of business owners operate as such because they cannot find other salaried work, which motivates the interest in extensive margin misallocation.² I then show that high levels of subsistence entrepreneurship is associated with the interaction of low unemployment benefits and financial underdevelopment, which motivates the model developed later in Section 3.

2.1 Subsistence Entrepreneurship Across Countries

Evidence of subsistence entrepreneurship differences comes from the Global Entrepreneurship Monitor Surveys (GEM), which is a set of harmonized national surveys on entrepreneurship in over fifty countries, ranging from 2001 to 2008. The surveys include a number of developing countries, the poorest of which is Uganda. Moreover, the GEM provides two other benefits. First, the survey questions and responses are standardized across countries, which allows for a cross-sectional view of subsistence entrepreneurship. Second, the survey is based on household observations to capture all residual claimants. Thus, the survey is not limited to formal sector firms or firms with a sufficiently large workforce.

Subsistence entrepreneurship is derived from the GEM surveys through a combination of two questions. The first defines a business owner, with those that answer yes to the question “Are you, alone or with others, currently the owner of a company you help manage, self-employed, or sell any goods or services to others?” Reassuringly, the survey instrument

²This is not the first paper to point out that reasons for starting businesses are heterogeneous. [Ardagna and Lusardi \(2010\)](#) uses the same survey to empirically consider the relationship between regulation and reasons individuals start businesses, while [Schoar \(2010\)](#) provides an excellent overview.

instructs the enumerator to reinforce that individuals must share in the profits of the business to answer “yes” to that question. From the set of all business owners, the GEM next turns to the motivation for the occupational choice with the question, “Are you involved in this firm to (a) take advantage of a businesses opportunity or (b) because you had no better choices for work?” This question cleanly distinguishes between those who want to be business owners and those who are *forced* to be business owners, exactly the distinction I draw in this paper. Those that answer (a) are considered opportunity entrepreneurs, while those than answer (b) are subsistence entrepreneurs.³

Combined with the sampling weights provided by the GEM, I am able to construct a comparable measure of subsistence entrepreneurship across countries. Since developing countries have relatively more business owners in the population (Gollin, 2008), the level of misallocation between ownership and salaried employment is the share of subsistence entrepreneurs in total business owners. Each data point in Figure 1 is the most recent year available from the GEM with real GDP per capita from the Penn World Table version 7.0 (Heston et al., 2011) on the horizontal axis. There is a clear negative correlation between income level and the fraction of businesses owners that consider themselves subsistence entrepreneurs. While only thirteen percent of U.S. entrepreneurs in Figure 1 are subsistence entrepreneurs, over sixty percent of owners are subsistence entrepreneurs in Uganda. Most developing countries are well above thirty percent, most developed countries are clustered around fifteen percent.

2.2 The Role of Financial Development and Unemployment Generosity

The quantitative theory put forth in this paper is that low unemployment benefits and high financial distortions in developing countries interact to generate subsistence entrepreneurship. In particular, the two are substitutes, therefore suggesting that variation in unemployment generosity should not be a strong predictor of subsistence entrepreneurship conditional on relatively high financial development. This is consistent with cross-country evidence. To show this, I consider the relationship between subsistence entrepreneurship and financial development, conditional on having high or low unemployment generosity. Unemployment

³Respondents are also able to answer (c) a combination of the two or (d) refuse to respond. I add those that answer (c) to the subsistence group and those that answer (d) to the opportunity group. They can be moved with little change in the relationship between subsistence entrepreneurship and income across countries.

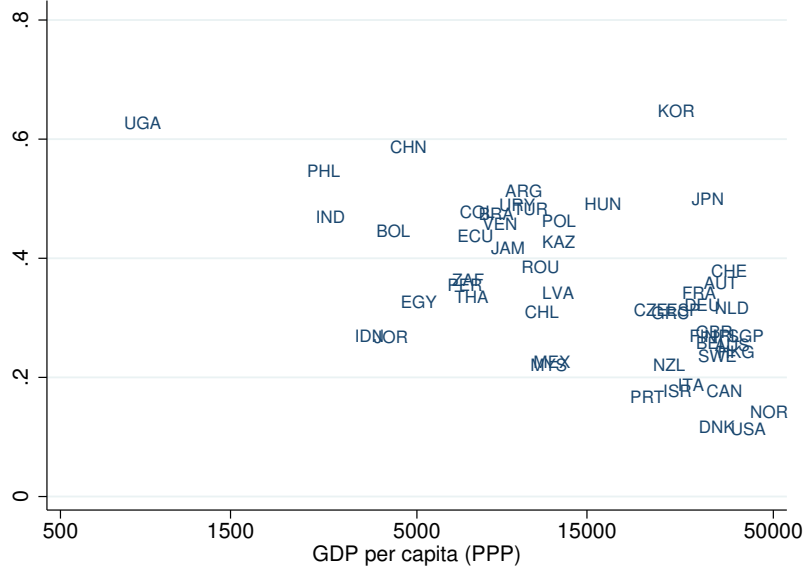


Figure 1: Fraction of Total Business Owners that are Subsistence

generosity is measured as the average replacement rate from the first two years of unemployment, as constructed by [Aleksynska and Schindler \(2011\)](#). Financial development is the sum of private credit, stock market capitalization, and bond market capitalization as a share of GDP. This is available from [Beck et al. \(2012\)](#). I choose the most recent year available for each country with all data available, which ranges for 2004 to 2008. The resulting dataset includes 53 countries, the poorest of which is Uganda and the richest is Norway.

Figure 2 reconsiders the subsistence ratio of Figure 1 in terms of economic policies by separating the data into two groups based on financial development. The left panel considers the relationship between unemployment generosity and subsistence rate for all countries below the sample mean level of financial development, while the right panel plots the same relationship for countries above mean financial development.

Figure 2a shows that among countries with low financial development, more generous unemployment benefits are associated with lower rates of substance entrepreneurship. The correlation between the average replacement rate and subsistence entrepreneurship rate is -0.58 . If one removes the countries with an average replacement rate of zero, the correlation strengthens to -0.70 . Figure 2b does not exhibit this same pattern. Subsistence entrepreneurship and the average replacement rate have no systematic relationship in countries with relatively well developed financial markets. Table 1 summarizes Figure 2 with the

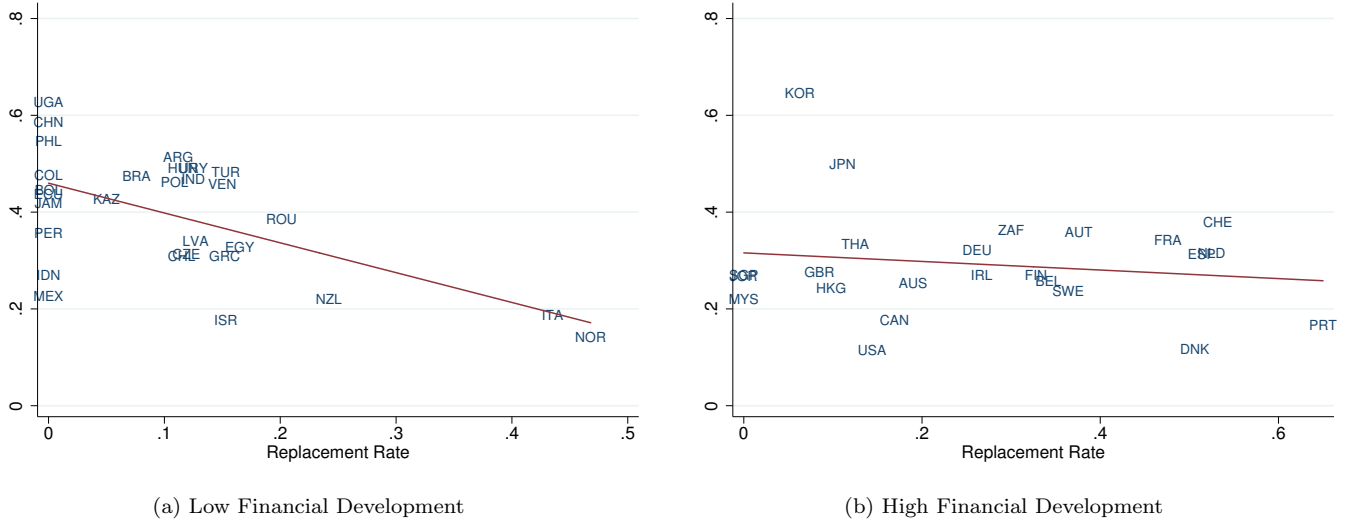


Figure 2: Subsistence Entrepreneurship Rate and Replacement Rates

results from the cross-country regression

$$SubsistRate_j = \alpha_0 + \alpha_1 ReplaceRate_j + \alpha_2 FinDev_j + \alpha_3 (ReplaceRate_j \times FinDev_j) + \varepsilon_j.$$

The variables *SubsistRate*, *ReplaceRate*, and *FinDev* are the subsistence rate, average replacement rate, and financial development in country *j* discussed above.

The first two regressions in Table 1 do not include the interaction term, and the second drops all countries with a zero average replacement rate. Both financial development and a higher average replacement rate are associated with lower rates of subsistence entrepreneurship. The third and fourth regressions add the interaction term. This term is positive and significant in both specifications, so that an increase in financial development has a smaller impact on subsistence entrepreneurship in countries with relatively high replacement rates. This is consistent with Figure 2 and with the idea that financial development and formal unemployment benefits can act as substitutes in allowing people to escape subsistence.⁴

⁴If Italy and Norway are removed, regressions (1) and (2) do not change. In regressions (3) and (4), the estimated interaction coefficients remain surprisingly similar to the reported values in Table 1, but are insignificant at 0.10. Additional cross-country evidence is provided in Appendix A, and supports the claims made here.

Table 1: Interaction of Labor and Financial Market Policies on Subsistence Entrepreneurship

	(1)	(2)	(3)	(4)
Constant	0.45*** (0.02)	0.46*** (0.03)	0.49*** (0.03)	0.54*** (0.05)
Average replacement rate	-0.22** (0.09)	-0.28** (0.11)	-0.59*** (0.02)	-0.80*** (0.26)
Financial development	-0.04** (0.01)	-0.03** (0.01)	-0.06*** (0.02)	-0.07*** (0.02)
Interaction	—	—	0.16* (0.08)	0.22** (0.10)
R^2	0.31	0.32	0.36	0.41
Drop zeros	N	Y	N	Y
Countries	53	40	53	40

Table notes: Standard errors are in parentheses. Significance at 0.01, 0.05, 0.1 levels denoted by ***, **, and *.

3 Model

I now turn to the model designed to investigate the key features of the economy that can replicate Figures 1 and 2. Time is discrete, running $t = 0, 1, 2, \dots$, with one period being a quarter. There is a measure one of infinitely lived individuals, who maximize total lifetime utility

$$\mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t \log(c_t)$$

in which $\beta \in (0, 1)$ is the discount factor and c_t is consumption. An individual can be engaged in one of three mutually exclusive occupations: worker w , entrepreneur e , or unemployed u . Each individual is endowed with stochastic entrepreneurial ability z_t , where $\log(z_t)$ evolves according to an AR(1) process with associated transition function $Q(z_{t+1}, z_t)$. Entrepreneurs produce the consumption good and also hire workers. Individuals accumulate assets a_t , and are constrained to hold non-negative assets.

3.1 Production Technology

Entrepreneurs do all the production in the economy, which requires their own ability z , capital k , and labor. Labor services can be the entrepreneur's own time (n_e) or labor hired from the marketplace (n), and they are assumed to be perfect substitutes. These inputs are combined to produce output according to the decreasing returns to scale Cobb-Douglas production function

$$y(z, k, n) = z_e k^\theta (n_e + n)^\psi$$

where $\theta + \psi < 1$. With factor prices r for capital and w for effective labor, the profit of an entrepreneur is

$$\pi(z, k, n, n_e) = z_e k^\theta (n_e + n)^\psi - rk - wn$$

3.2 Labor Markets and Unemployment

The labor market is similar to that of [Alvarez and Veracierto \(2001\)](#) and [Krusell et al. \(2011\)](#), in that a costly search framework is built onto a competitive labor market model. This framework also allows for a tight comparison to the current literature on financial frictions in the absence of search frictions, which also generally utilizes a competitive labor market.

Each period there exists a competitive spot market for hired labor. Entrepreneurs can hire as many workers as they wish at the prevailing equilibrium wage w_t . Workers at period t are excluded from seeking employment as a worker at $t + 1$ ("fired") with exogenous probability λ , at which point they can choose between only unemployment and entrepreneurship. Both the unemployed and entrepreneurs can search for work. Search costs are paid in units of the time endowment. An individual who uses a fraction s of time to search finds job as a worker with probability $\alpha(s) = \bar{\eta}s^\eta$, where both $\bar{\eta}, \eta \in (0, 1)$.

3.3 Savings and Capital Rental Markets

There exists a competitive financial intermediary that receives all assets a at the beginning of the period, and rents capital to businesses owners at rate r . At the end of the period, the intermediary pays Ra units of the consumption good for a units deposited. I follow the recent literature and model financial development through imperfect contract enforcement

(e.g. Banerjee and Newman, 1993; Buera and Shin, 2010; Moll, 2014). The intermediary lends k units of capital to the entrepreneur with assets a , but the entrepreneur can steal a fraction $1/\phi$ of the rented capital. The cost of stealing capital is loss of deposited assets a . This implies an additional collateral constraint $k \leq \phi a$ for all entrepreneurs, where $\phi \in [1, \infty]$. Lower ϕ implies worse contract enforcement, with the extremes $\phi = 1$ implying complete self-financing, and $\phi = \infty$ implying perfect enforcement.

3.4 Recursive Formulation

The aggregate state of the economy is a distribution across assets $a \in \mathbb{R}_+$, ability $z \in \mathbb{R}_{++}$, and occupations $o \in \{e, w, u\}$, denoted $\mu(a, z, o)$. Since I will be studying the stationary equilibrium of the model, I suppress the dependence of the value functions on the aggregate state. To further economize the cumbersome notation, define $v^{ewu}(a, z)$ as the maximum value of all occupations. That is, $v^{ewu}(a, z) = \max\{v^e(a, z), v^w(a, z), v^u(a, z)\}$ is the value to an individual of choosing between any of the three occupations in the stationary equilibrium. Let v^{ij} be defined similarly, as the value of having the choice between occupations $i, j \in \{e, w, u\}$.

Unemployed An unemployed individual enters period t with assets a and ability z . He receives income b from government-provided unemployment benefits, and chooses how much to consume and save. Since unemployed individuals can only use their time to search, and do not value time, the probability of finding a job is fixed at $\alpha(1) = \bar{\eta}$. If the search is successful, he can begin the job at $t+1$ or remain unemployed. If the search is not successful, he remains unemployed at $t+1$. Given that timing, the value of entering period t as unemployed with assets a and ability z in the stationary equilibrium is

$$\begin{aligned} v^u(a, z) &= \max_{a'} \log(c) + \beta \int_{z'} \left[\bar{\eta} v^{ewu}(a', z') + (1 - \bar{\eta}) v^{eu}(a', z') \right] dQ(z', z) \\ \text{s.t.} \quad &c + a' = b + Ra \\ &a' \geq 0, \quad c \geq 0. \end{aligned} \quad (3.1)$$

(3.2)

Workers Workers do not search, and therefore use their one unit of time to provide labor services. With income w and return on savings Ra , he chooses how much to consume and save. He then realizes his ability at $t + 1$, z' . Immediately after, he realizes a shock that determines whether or not he can remain a worker. With some probability λ , he cannot participate in the labor market as a worker. If this firing shock is realized, he can become an entrepreneur at $t + 1$ or he can become unemployed. If the firing shock is not realized, he can remain on as a worker, and still has the option to become unemployed or an entrepreneur. The value of entering period t as a worker with assets a and ability z in the stationary equilibrium is

$$\begin{aligned}
v^w(a, z) &= \max_{c, a'} \log(c) + \beta \int_{z'} \left[(1 - \lambda)v^{ewu}(a', z') + \lambda v^{eu}(a', z') \right] dQ(z', z) \\
s.t. \quad & c + a' = w + Ra \\
& a' \geq 0, \quad c \geq 0.
\end{aligned}$$

Entrepreneurs An entrepreneur enters time t with assets a and ability z . He first chooses how to divide his own time endowment between working in his business (n_e) and searching for work s . He hires labor at effective wage $(1 + \tau)w$ and capital k at rental price r , where the tax τ finances unemployment benefits. Capital is constrained by imperfect contract enforcement and there satisfies the constraint $k \leq \phi a$. After production occurs and income is generated, he chooses savings a' . Lastly, tomorrow's ability z' is realized, and the entrepreneur finds out whether he can access the labor market as worker. If so, he chooses between any of the three occupations, while if he cannot he chooses only between remaining an entrepreneur and becoming unemployed. This means the value of being an entrepreneur with savings a and ability z in the stationary equilibrium is

$$\begin{aligned}
v^e(a, z) &= \max_{a', k, n, n_e} \log(c) + \beta \int_{z'} \left[\alpha(s)v^{ewu}(a', z') + (1 - \alpha(s))v^{eu}(a', z') \right] dQ(z', z) \quad (3.3) \\
s.t. \quad & c + a' = zk^\theta(n_e + n)^\psi - rk - (1 + \tau)wn + Ra \\
& k \leq \phi a \\
& n_e + s = 1, \quad n \geq 0 \\
& a' \geq 0, \quad c \geq 0.
\end{aligned}$$

3.5 Stationary Equilibrium

A stationary equilibrium in this economy is a set of value functions v^j and decision rules c^j , a^j , s , k , n , for $j \in \{e, w, u\}$, and an invariant distribution $\mu^*(a, z, o)$ such that

1. The value functions v^e , v^w , and v^u solve the individual problems (3.1), (3.3), and (3.3) with the associated decision rules.
2. Intermediaries make zero profit: $r = R - 1 + \delta$.
3. Markets clear:
 - (a) Consumption market:

$$\int zk(a, z)^\theta (n_e(a, z) + n(a, z))^\psi \mu(da, dz, e) = \sum_{j \in \{e, w, u\}} \left[\int c^j(a, z) \mu(da, dz, j) \right] + \delta \int k(a, z) \mu(da, dz, e)$$

- (b) Labor market:

$$\int n(a, z) \mu(da, dz, e) = \int \mu(da, dz, w)$$

- (c) Capital market:

$$\int k(a, z) \mu(da, dz, e) = \sum_{j \in \{e, w, u\}} \int a \mu(da, dz, j)$$

4. The government budget balances:

$$\tau w \int n(a, z) \mu(da, dz, e) = b \int \mu(da, dz, u)$$

5. The law of motion for μ , denoted Λ , is such that $\Lambda(\mu^*) = \mu^*$ and μ^* is consistent with $Q(z', z)$ and the decision rules.

3.6 Subsistence Entrepreneurs in the Model

I can now define subsistence entrepreneurship within the context of the stationary equilibrium. An individual in the model is considered subsistence entrepreneur if he is (1) an entrepreneur and (2) would accept a job as a worker if it were offered. That is, subsistence

entrepreneurs are all individuals who operate their own businesses even though their ranking of occupations puts worker first. The total number of subsistence entrepreneurs in an economy with financial conditions ϕ and unemployment benefits b is

$$\tilde{S}(b, \phi) = \int \mathbb{1} \left[v^e(z, a) < v^w(z, a) \right] \mu(da, dz, e) \quad (3.4)$$

where $\mathbb{1}[\cdot]$ is the indicator function. The relevant measure of total misallocation across occupations in the economy is then given by the share of subsistence entrepreneurs in total entrepreneurs

$$S(b, \phi) = \frac{\tilde{S}(b, \phi)}{\int \mu(da, dz, e)}. \quad (3.5)$$

4 Quantitative Exercise and Calibration

The goal of the quantitative exercise is to understand the role of financial development and unemployment benefits in generating subsistence entrepreneurship across countries. The model is calibrated to match the United States. One period is a quarter. There are ten parameters in the model. The production parameters are set to $\theta = 0.3$ and $\eta = 0.5$, while the U.S. is assumed to have perfect contract enforcement, so $\phi = \infty$. The other seven parameters to be calibrated are the discount rate β , probability of losing a job λ , the persistence (ρ) and standard deviation (σ) of the process for entrepreneurial ability, the two parameters governing the mapping between time and job finding rates, $\bar{\eta}$ and η , and unemployment benefits b . These parameters are chosen to match seven moments. The first four are a quarterly interest rate of 1% (4% annual), an unemployment rate of 4%, a transition probability of 0.45 from unemployment to employment, and a ratio of unemployment benefits to the equilibrium wage of 0.40 (Shimer, 2005). The last two moments relate to entrepreneurship levels in the U.S. according to the Global Entrepreneurship Monitor survey. I match the fact that 11% of the U.S. population is engaged in some form of entrepreneurship, while 14% of those entrepreneurs identify as subsistence entrepreneurs.

The first exercise considers the impact of financial development (by varying ϕ) and unemployment benefits (by varying b) on subsistence entrepreneurship, the firm size distribution, and entrepreneur profits. To isolate the impact of subsistence entrepreneurship, I compare the model to an identical model but with no frictional job search. This alternative model

looks similar to standard models of infinitely lived entrepreneurship with financial frictions, such as [Buera et al. \(2011\)](#) or [Moll \(2014\)](#), but with the added piece that entrepreneurs can work as employees in their own business, as in [Erosa and Allub \(2013\)](#). Importantly, this model implies that individuals always have access to entrepreneurship and employment, and thus there does not end up a subsistence entrepreneur.

5 Quantitative Results

This section presents some preliminary results from a poor model economy with $\phi = 1.25$ and $b = 0.01$. The equilibrium benefits to wage ratio is 0.0039, so extremely close to zero. The equilibrium external financing ratio is 1.13, so that only thirteen percent of firm financing comes from outside the firm. [Table 2](#) plots the relevant results for entrepreneurship and subsistence entrepreneurship in the economy. The model is able to replicate two key facts, in that both entrepreneurship and subsistence entrepreneurship are both large. The model can get quite close to the forty to fifty percent levels of subsistence entrepreneurship seen in [Figure 1](#), and therefore predicts a substantial misallocation between entrepreneurship and employment.

Table 2: Poor Economy Quantitative Results

Entrepreneurs	0.51
Subsistence entrepreneurs	0.33

To see how this affects aggregate outcomes, [Figure 3](#) plots the profit and wealth ($\pi + Ra$) held by both types of entrepreneurs. Subsistence entrepreneurs are significantly poorer than opportunity entrepreneurs. The main reason for this can be seen in [Figure 4](#) which plots the distribution of entrepreneurs across ability types. The distribution of ability for opportunity entrepreneurs is clearly to the right of that for subsistence entrepreneurs.

5.1 Policy Implications: Targeting the Poor with Credit

Since the model is able to match both the aggregate cross-country evidence presented in [Section 2](#) and the micro-level evidence in [Section 6](#), I now use the model to discuss the implications a common policy intervention in poor economies. In particular, I consider

Figure 3: Profit and Wealth for Entrepreneur Types

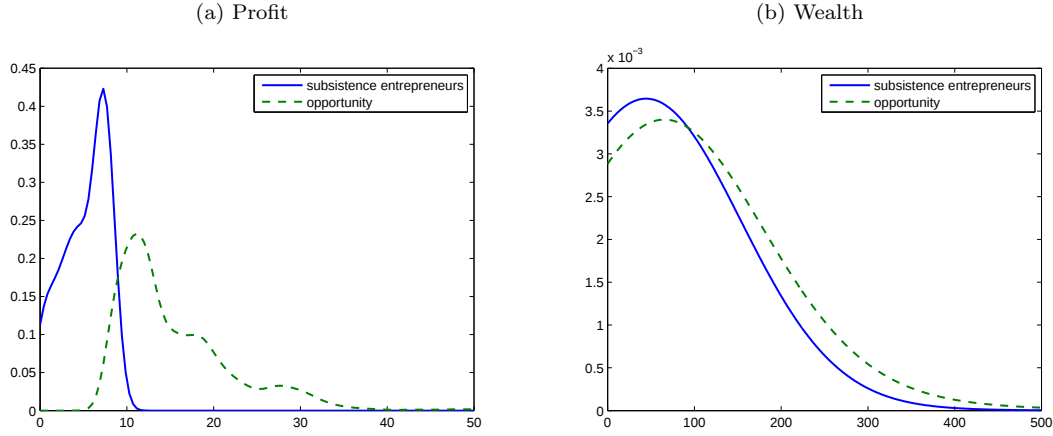
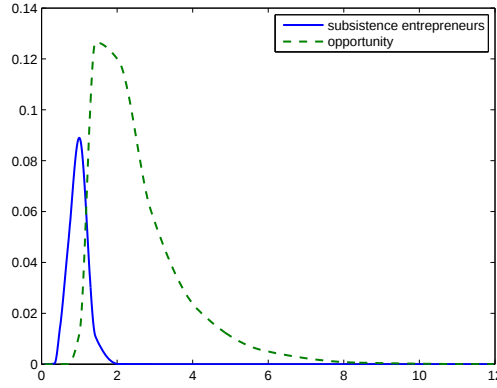


Figure 4: Distribution of Ability by Entrepreneur Type



the impact of increasing credit for poor entrepreneurs. I randomly select one thousand entrepreneurs from the bottom tenth percentile of the entrepreneur income distribution, and track their response to a loosening of financial constraints. In a model without subsistence, the poorest entrepreneurs are those with high ability but lower asset holdings. A targeted intervention therefore has large effects (for example, see the partial equilibrium results in [Buera et al., 2012](#)).

This section is not yet completed, but the model evidence suggests that subsistence entrepreneurship may dampen the impact of lending. To see this, I first compute the shadow

price of capital for every entrepreneur,

$$Shadow = \theta z k^{\theta-1} (n_e + n)^\psi - r.$$

The average shadow price of all entrepreneurs is 0.0376. However, the impact is heterogeneous across entrepreneur types. The average shadow price for a subsistence entrepreneur is 0.0150, while the average shadow price of an opportunity entrepreneur is 0.0482. This is a more than threefold increase in capital distortions driven by financial frictions, and relates back to Figure 4. Subsistence entrepreneurs are poorer, but they are also of lower ability, and thus have little need for capital in their business. Thus, subsistence entrepreneurs are less distorted in their capital choice than opportunity entrepreneurs.

6 Micro Evidence from Chile and Mexico

The main point of the model is that in a model with costly search, the interaction of low unemployment benefits and financial distortions can induce a significant number of low ability individuals into entrepreneurship. In this section, I test the two pieces of that argument. First, I show that individuals who are fired from their previous job are significantly more likely to be subsistence entrepreneurs, suggesting that the the cost of search plays an important role in understanding entrepreneur entry decisions. Second, I show that subsistence entrepreneurs make lower profits than opportunity entrepreneurs, even after controlling for observable inputs and a number of other controls. Consistent with the model, this implies subsistence entrepreneurs have relatively lower ability than opportunity entrepreneurs.

The evidence is derived from two separate surveys. The 2011 Chilean Microenterprise Survey (EME, for the Spanish language in initials), which is a survey of over 2,500 microenterprise owners in Chile. A microenterprise is any firm with less than 50,262,000 Chilean pesos (slightly less than 100,000 USD), or nine times Chilean GDP per capita. It is a stratified sample derived from the Chilean Census, and also includes sampling weights to weight observations. Key for my purposes is that the EME asks a question that is the exact counterpart to the definition of subsistence used in the model and defined in equation (3.4). The survey asks, “If possible, would you return to work for a salary?” Those that answer “no” are opportunity entrepreneurs, while those than answer “yes” are subsistence. The EME also

includes statistics on business-level employment, asset holdings, education, why the owner's last salary job ended, hypotheticals to elicit risk aversion, and many more that allow for a detailed study of the characteristics subsistence entrepreneurship.

The second source of data is the 2012 Mexican Microenterprise Survey (ENAMIN). Similarly to the Chilean EME, the ENAMIN population is derived from the National Urban Employment Survey and therefore captures both formal and informal firms. The survey is restricted to microenterprises, which in this case are manufacturing firms with fewer than fifteen workers, or firms outside manufacturing with fewer than five workers. Unfortunately, the ENAMIN does not allow for such a tight connection between model and data, as in the Chilean EME. The question used to define subsistence entrepreneurship is "What is the main reason you started this business activity" Anyone who answers "It was my only option to earn income," or "I did not have other job opportunities" are taken to be subsistence. The obvious caveat with this question is that it provides information on why the business was started, not necessarily why the business is currently being operated. However, the sample is significantly larger than that from the Chilean EME and comes from a developing country, and is therefore still useful to consider. As I show below, the same patterns emerge in both countries, despite the differences in definition.

6.1 The Role of Search Frictions for Subsistence Entrepreneurship

The model has clear predictions that relate observable outcomes to subsistence entrepreneurship. First, in the model, subsistence entrepreneurs are more likely to have been fired from their last employment job. Intuitively, any individual in the model who voluntarily leaves working to become an owner must have received a positive ability shock, since otherwise remaining in employment would be preferred. Individuals who involuntarily leave working (firing shock) to become owners by definition did *not* receive a positive ability shock, or they would have left voluntarily. Therefore owners who left their last worker job voluntarily are more likely to be opportunity entrepreneurs, or conversely, those who left their last worker job involuntarily are more likely to be subsistence entrepreneurs. Second, this has important implications for the relationship between firm size and entrepreneur type. Since subsistence entrepreneurs are more likely to be of low ability, they should run smaller firms.

Both the Chilean EME and Mexican ENAMIN allow a direct test by asking business

owners why they left their last salaried position. I test this with the probit regression in (6.1)

$$subsist_i = \alpha_0 + \alpha_1 \log(\mathbf{I}_i) + \alpha_2 involuntary_i + \alpha_3 X_i + \varepsilon_i. \quad (6.1)$$

The variable *subsist* = 1 if the owner is a subsistence entrepreneur and zero otherwise and *involuntary* = 1 if the individual's last salaried job ended involuntarily. $\mathbf{I}$ is the vector of inputs available in each survey. In the Chilean EME, this includes business assets and workers. In the Mexican ENAMIN, this includes assets, workers, and owner labor hours. X_i is a series of controls, which are common across both surveys. The presented results include the controls owner sex, log age of owner, an indicator for primary education, sector of the business, and regional fixed effects. The results are robust to the inclusion or exclusion of other controls as well. Table 3 provides the relevant results.

Table 3: Probit Regression (6.1) on Factors Affecting Subsistence Entrepreneurship

	(1)	(2)	(3)	(4)
$\log(n)$	-0.32** (0.14)	-0.25 (0.15)	-0.24*** (0.04)	-0.22*** (0.03)
$\log(k)$	—	-0.04*** (0.02)	—	-0.02*** (0.01)
$\log(own_hours)$	—	—	0.00 (0.04)	0.03 (0.05)
<i>involuntary</i>	0.58*** (0.08)	0.54*** (0.09)	0.80*** (0.10)	0.81*** (0.10)
<i>Pseudo R</i> ²	0.12	0.12	0.10	0.11
Obs.	1, 699	1, 362	11, 795	10, 707
Country	Chile	Chile	Mexico	Mexico

Table notes: Standard errors are in parentheses and clustered at the regional level. Significance at 0.01, 0.05, 0.1 levels denoted by ***, **, and *.

The regression results presented in Table 3 coincide with the two predictions of the model discussed above.⁵ Individual business owners that have more workers are more likely to be of higher productivity, and therefore less likely to be subsistence entrepreneurs, consistent with the negative coefficient on log employees. Note that the last regressions

⁵OLS regressions show the same pattern. Varying the control variables and the definitions of *subsist* and *involuntary* in reasonable ways have little impact.

include log assets as well as log employment as regressors. The natural collinearity of employment and assets generates no change in the regression fit, but simply divides up the impact of total inputs between the two. Regardless of the inclusion of asset levels, the impact is still negative on inputs.

Second, the coefficient on involuntary job loss is positive and significant across all regressions. Individuals left their last job voluntarily are less likely to be subsistence entrepreneurs. Conversely, individuals who were forced to leave their previous job are much more likely to be subsistence entrepreneurs. For some perspectives on the numbers, consider a Chilean male microenterprise owner of sample average age. He has average employment and asset holdings, does not have a primary education, and operates in the production sector in the region of Tarapacá (region one, in the north). Using regression (2), the probability of this person being a subsistence entrepreneur doubles from 0.196 to 0.392 if he was forced to leave his last job involuntarily. The same exercise can be done in Mexico using regression (4). Consider now a male Mexican microenterprise owner who is of average age, uses average capital, employment, and own hours, does not have a primary education, and operates in the manufacturing sector. The probability of this person being a subsistence entrepreneur nearly triples from 0.124 to 0.364 if he was forced to leave his last job involuntarily. These results suggest an important role for search frictions and firing for understanding entry decisions into entrepreneurship, as claimed in this model.⁶

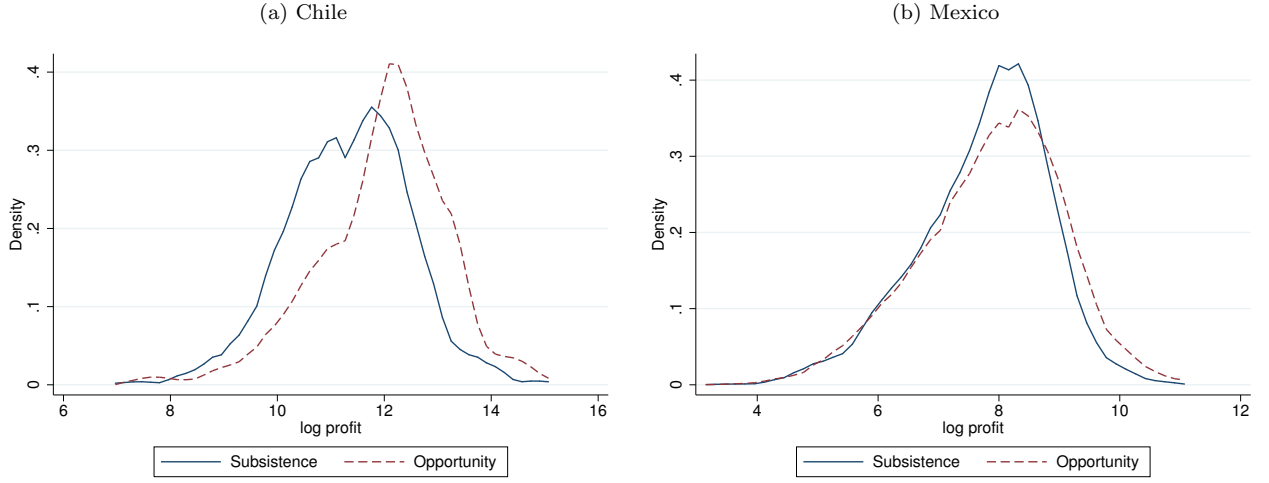
6.2 Ability Across Entrepreneur Types

The second prediction relates to the impact that labor market fractions, discussed in the last section, have on entrepreneurial outcomes. The main point of the model is that the interaction of low unemployment generosity and financial underdevelopment induce a large share of low ability entrepreneurs to enter the market. Conditional on observable inputs, these subsistence entrepreneurs should then have lower profits than opportunity entrepreneurs due to their relatively low entrepreneurial ability. Figure 5 begins by plotting the estimated density of log profits for subsistence and opportunity entrepreneurs in both Chile and Mexico.⁷

⁶A somewhat comforting result is that the coefficient on *involuntary* is lower in Chile than in Mexico, or that being fired plays a smaller role for subsistence entry in Chile. The surveys and definitions of subsistence are obviously not identical, but this does conform to the model prediction that overcoming job loss without resorting to subsistence entrepreneurship should be easier in richer countries.

⁷This is only plotted for entrepreneurs that make positive profits. In Mexico, 6.9% of (weighted) subsistence entrepreneurs make zero profits, while 6.7% of opportunity entrepreneurs do. In Chile, those numbers are 18.7% and 15.7%.

Figure 5: Log profit distribution for subsistence and opportunity entrepreneurs



In both countries, the distribution of opportunity entrepreneurs is clearly shifted to the right. On average, opportunity entrepreneurs make higher profit than subsistence entrepreneurs, which is consistent with the model. However, the model goes one step further, in that it predicts subsistence profits should be lower conditional on inputs as well. To test this in both Chile and Mexico, I run the regression

$$\log(\pi_i + 1) = \alpha_0 + \alpha_1 \text{subsist}_i + \alpha_2 \log(\mathbf{I}_i) + \alpha_3 X_i + \varepsilon_i. \quad (6.2)$$

The results are presented in Table 4. $\pi + 1$ is used to account for the fact that some microenterprises make zero profit, though alternatives are considered in Appendix B. First, I use the same specification to run a tobit regression to account for the fact that the data is censored. Second, I replace the dependent variable with the level of profits, π_i . Both find the same pattern as regression (6.2).

7 Conclusion

This paper provides a quantitative theory to explain why a substantial number of business owners in developing countries operate firms despite their desire to become salaried workers. The result is due to the interaction of low unemployment benefits and financial underdevelopment. Low unemployment benefits make the search for a salaried job riskier because of

Table 4: Profit for Subsistence and Opportunity Entrepreneurs

	(1)	(2)	(3)	(4)
$\log(n)$	0.64* (0.31)	0.45 (0.30)	0.34*** (0.07)	0.29*** (0.06)
$\log(k)$	—	0.03 (0.10)	—	0.06*** (0.01)
$\log(own_hours)$	—	—	0.39*** (0.04)	0.28*** (0.04)
<i>subsist</i>	−0.92*** (0.19)	−1.01*** (0.28)	−0.11** (0.05)	−0.13*** (0.05)
R^2	0.11	0.13	0.10	0.13
Obs.	1, 451	1, 164	21, 714	19, 808
Country	Chile	Chile	Mexico	Mexico

Table notes: Standard errors are in parentheses and clustered at the regional level. Significance at 0.01, 0.05, 0.1 levels denoted by ***, **, and *.

lack of insurance, while financial underdevelopment limits the ability of self-insurance to be used as a replacement. Quantitative results suggest the model can accurately match the levels of subsistence entrepreneurship in developing countries, and has important implications for the income distribution across entrepreneurs and the ability profit of entrepreneurs.

I then test two important predictions of the model with the 2011 Chilean Microenterprise Survey and the 2012 Mexican Microenterprise Survey. I first show empirically that subsistence entrepreneurs have lower sales and profits conditional on inputs, consistent with the model prediction that they do indeed have lower productivity than opportunity entrepreneurs. Second, I show that the focus on labor market frictions is warranted. Empirically, those who lose their last salaried position are more likely to be subsistence entrepreneurs than those that left their last salaried position voluntarily. In the model, this occurs because individuals who leave voluntarily are leaving to take advantage of an opportunity, consistent with a move from employment to opportunity entrepreneurship. Those that do not wish to leave but are forced out clearly have no better option, but are constrained away from remaining an employee, and thus become subsistence entrepreneurs.

The model allows for other extensions that could prove relevant. For example, firing

shocks are exogenous in the model. Endogenizing this shock implies that individuals at more vulnerable firms will have a higher likelihood of losing a job, potentially important for the transition from employment to subsistence entrepreneurship. Second, how segmented is the labor market? Subsistence entrepreneurs are on average less educated than workers, and thus perhaps there is congestion in the low-skilled labor market. Future work will consider these margins.

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Appendices

A Additional Cross-Country Evidence

This appendix provides some further cross-country evidence on the relationship between subsistence entrepreneurship, financial development, and unemployment generosity. The first piece of evidence is simply the estimated linear regression line in Figure 2. The sample of 53 countries is divided into two groups - those above the average financial development in the sample and those below. I then simply regress the subsistence entrepreneurship rate on unemployment generosity for the two groups, with the results presented in Table 5. Regression (2) shows that there is no relationship between replacement rate and subsistence entrepreneurship in countries with high levels of financial development. Regression (1), however, shows that in countries with low financial development, a higher average replacement rate is associated with significantly lower levels of subsistence entrepreneurship.

Table 5: Relationship Between Subsistence Entrepreneurship and Replacement Rate

	(1)	(2)
	<i>Low Financial Development</i>	<i>High Financial Development</i>
Constant	0.46*** (0.03)	0.32*** (0.04)
Average Replacement Rate	-0.62*** (0.17)	-0.09 (0.12)
R^2	0.31	0.02
Countries	29	24

Table notes: Standard errors are in parentheses. Significance at 0.01, 0.05, 0.1 levels denoted by ***, **, and *.

I next do the same exercise, except divides the countries by their average replacement rate. Table 6 presents the relationship between financial development and subsistence entrepreneurship.

Table 6: Relationship Between Subsistence Entrepreneurship and Financial Development

	(1)	(2)
	<i>Low Replacement Rate</i>	<i>High Replacement Rate</i>
Constant	0.45*** (0.03)	0.26*** (0.05)
Financial Development	-0.05*** (0.02)	0.00 (0.02)
R^2	0.25	0.00
Countries	35	18

Table notes: Standard errors are in parentheses. Significance at 0.01, 0.05, 0.1 levels denoted by ***, **, and *.

B Robustness of Empirical Results

I first recompute (6.1) with OLS instead of probit. The results are in Table 7 and the same pattern emerges.

Table 7: Re-doing Regression (6.1) with OLS

	(1)	(2)	(3)	(4)
$\log(n)$	-0.09** (0.04)	-0.07 (0.04)	-0.05*** (0.01)	-0.04*** (0.01)
$\log(k)$	—	-0.01** (0.01)	—	-0.01*** (0.00)
$\log(own_hours)$	—	—	0.00 (0.01)	0.01 (0.01)
<i>involuntary</i>	0.18*** (0.03)	0.18*** (0.04)	0.23*** (0.03)	0.23*** (0.03)
R^2	0.14	0.14	0.10	0.10
Obs.	1, 699	1, 362	11, 795	10, 707
Country	Chile	Chile	Mexico	Mexico

Table notes: Standard errors are in parentheses and clustered at the regional level. Significance at 0.01, 0.05, 0.1 levels denoted by ***, **, and *.

I next recompute profit regression (6.2) under two different specifications. The first is a tobit regression to account for the censoring of data at zero profit, and the second is by replacing

$\log(\pi + 1)$ with π as the dependent variable. Tables 8 and 9 present the results, and show the same pattern as the regression specification in the text.

Table 8: Tobit Regression on Subsistence and Opportunity Entrepreneurs

	(1)	(2)	(3)	(4)
$\log(n)$	0.63* (0.36)	0.43 (0.34)	0.33*** (0.08)	0.28*** (0.06)
$\log(k)$	—	0.02 (0.12)	—	0.06*** (0.01)
$\log(own_hours)$	—	—	0.28*** (0.04)	0.27*** (0.06)
<i>subsist</i>	−1.01*** (0.25)	−1.13*** (0.34)	−0.11** (0.05)	−0.13*** (0.05)
<i>Pseudo</i> − R^2	0.02	0.02	0.02	0.03
Obs.	1, 451	1, 164	21, 714	19, 808
Censored Obs.	216	175	1, 526	1, 163
Country	Chile	Chile	Mexico	Mexico

Table notes: Standard errors are in parentheses and clustered at the regional level. Significance at 0.01, 0.05, 0.1 levels denoted by ***, **, and *.

Table 9: OLS Profit Level on Subsistence and Opportunity Entrepreneurs

	(1)	(2)	(3)	(4)
$\log(n)$	1,452,035* (702,912)	1,452,766* (735,221)	3906.79*** (416.29)	3741.19*** (472.71)
$\log(k)$	—	22,789 (18,378)	—	166.64*** (27.15)
$\log(own_hours)$	—	—	846.01*** (93.09)	725.49*** (96.24)
<i>subsist</i>	−236,322*** (91,155)	−222,035*** (95,181)	−1074.09*** (182.26)	−955.81*** (192.91)
R^2	0.23	0.24	0.15	0.16
Obs.	1,451	1,164	21,714	19,808
Country	Chile	Chile	Mexico	Mexico

Table notes: Standard errors are in parentheses and clustered at the regional level. Significance at 0.01, 0.05, 0.1 levels denoted by ***, **, and *.