

# Migration, Remittances and Microenterprises in El Salvador\*

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## Abstract

This paper investigates the impact of migration and remittances on microenterprise ownership and investment using a large household survey from El Salvador. Since migration and microenterprises are determined endogenously, I identify migration using instruments based on the migration patterns established during the Salvadoran civil war. I find no significant effect of migration on the probability of microenterprise ownership. Conditional on owning a microenterprise, however, migration has a very large impact on firm capital stock. Male and female entrepreneurs in migrant households boast capitals stocks more than twice as large as entrepreneurs in non-migrant households — a relationship robust to controls for selection into employment. This finding provides evidence that migrant remittances reduce liquidity constraints on business owners.

JEL classifications: F22, O17, O15

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*Huyendo la guerra, ganamos un futuro.*  
Fleeing the war, we earned a future.

– Truck Driver in San Miguel

*Salir a Estados Unidos crea oportunidades allá tanto como acá.*  
Emigrating to the United States creates opportunities there as well as here.

– Dairy farmer in Chalatenango

## 1 Introduction

Migrant remittances and microenterprises are crucial to poor and middle-income countries. Annual remittance flows to the developing world totaled \$167 billion in 2005, second only to foreign direct investment as a source of external financing, and more than twice the value of official development assistance (Ratha 2005). Informal-sector microenterprises, meanwhile, employ more than one-third of the labor force in many developing countries, and contribute substantially to household income (McKenzie and Woodruff 2003, Mead and Liedholm 1998).

There are several natural links between entrepreneurship and migration. Many of the qualities that encourage potential migrants to seek better livelihoods in foreign lands — ambition, proclivity for hard work, entrepreneurial spirit, and attitudes toward risk — also bring success to entrepreneurs. Prevailing economic conditions may also promote both migration and self-employment. For example, if local labor markets do not provide residents with attractive employment opportunities, many may choose to migrate or start their own businesses. What’s more, migration brings many changes: it reduces household labor supply and human capital, but also boosts income with remittances. The net effect on household businesses is *a priori* ambiguous.

These natural connections make migration, remittances, and self-employment interesting and worthy of study, but at the same time, very difficult to investigate econometrically because of omitted-variable and simultaneity bias. As a result, few existing studies consider the relationship between migrant earnings and microenterprises, and those that do

rely on limited data. Dustmann and Kirchkamp (2002) conclude that more than 51 percent of Turkish migrants start microenterprises after returning to their home country, but they do not analyze the impact of remittances on businesses owned by non-migrant household members. Massey and Parrado (1998) find that migrant earnings provide start-up capital for 21 percent of new small businesses in their sample; their findings, however, represent only 30 communities in migration-intensive regions of Mexico. Woodruff and Zenteno (2001) use survey data on Mexican microenterprises to estimate that remittances account for approximately one quarter of the capital invested in urban firms. Due to data limitations, however, they must rely on state-level migration and remittance variables to proxy for household access to migrant earnings.

This is the first paper to investigate how migration affects investment in microenterprises by using a large survey that contains individual employment data and household-level data on migration and remittances. Data and inspiration come from El Salvador. Where useful, I also incorporate anecdotal evidence from field research that I conducted with Salvadoran microentrepreneurs in 2003 and 2004.

El Salvador is a middle-income country characterized culturally and socioeconomically by its migrants and microenterprises. Approximately 1 in 5 Salvadoran citizens lives and works on North American soil — the highest U.S. migration rate of any Latin American country.<sup>1</sup> According to El Salvador’s Banco Central de Reserva (2006), these migrants remitted more than \$2.54 billion in 2004, equal to 16.1 percent of GDP, 91 percent of the government budget, and more than 12 times the amount El Salvador received in official development assistance (OECD 2006). Microenterprises also dominate the economic landscape. Roughly one-third of Salvadoran households operate small businesses, and their firms produce some 25 percent of GDP (Trigueros 2000).

El Salvador makes an excellent case study because of its high rates of migration and

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<sup>1</sup>The majority of Salvadoran citizens in the United States do not have legal documents, and no one knows with complete certainty how many live there. The best estimates suggest there are 1.7 million Salvadoran citizens in the States (UNDP 2005); 6.8 million Salvadorans live in El Salvador (Banco Central de Reserva 2006).

microenterprise ownership, and also because of its political history. Bloody civil war in the 1980s led to the death and disappearance of an estimated 85,000 people, or nearly 1 in every 60 Salvadorans (Seligson and McElhinny 1999).<sup>2</sup> Political violence displaced millions more, pushing Salvadoran civilians to relocate within the country, to settle in refugee camps in Honduras and Mexico, and to migrate illegally to the United States. While no area in El Salvador completely escaped the conflict, violence — and subsequent migration — varied considerably across space. I utilize the geographic distribution of remittances from the end of the civil war as the basis for instruments of migration.

IV estimation yields striking results. Consistent with other studies that find low barriers to entry in the microenterprise sector, I find no significant relationship between migration and firm ownership. Conditional upon owning a microenterprise, however, migration has a large impact on firm capital stock. Male and female entrepreneurs in migrant households boast capital stocks more than twice as large as entrepreneurs in non-migrant households — a relationship robust to controls for selection into employment. My findings provide evidence that migrant remittances reduce liquidity constraints, allowing owners to invest optimally in profitable business opportunities.

The rest of the paper is structured as follows. Section 2 compares competing views of the informal sector and discusses the theoretical impact that migration and remittances may have on microenterprises. Section 3 describes the data, defines the sample, and presents summary statistics for key variables. Section 4 discusses potential sources of endogeneity and then describes my method for identifying the exogenous component of migration. Section 5 presents the empirical results, and section 6 concludes.

## 2 Theory and anecdotes

Remittances provide recipients with substantial income and liquidity. Of course, receiving remittances typically requires households to send their most able-bodied, ambitious, and

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<sup>2</sup>For comparison, this ratio is roughly equivalent to the loss of life during the American Civil War (Wood 2003).

risk-inclined members abroad (Andrade-Eekhoff 2003). When credit and labor markets work imperfectly, migration and remittances may affect microenterprises, though the exact impact is unclear *a priori*. One complicating factor is the oft-noted segmentation of the informal sector (Marcouiller, Ruíz de Castilla and Woodruff 1997). Some start microenterprises because they are profitable; others “choose” the informal sector because they cannot find formal work. This section offers different views from economic theory and empirical studies to pinpoint the potential effects of migration and remittances on business ownership and investment.

## 2.1 Liquidity constraints

One view of microenterprises emphasizes fixed costs and posits the existence of capital constraints that preclude some entrepreneurs from starting businesses, and force others to invest sub-optimally in them.<sup>3</sup> A simple, static model helps to articulate this viewpoint. Assume that an economy consists of risk-neutral agents with different levels of entrepreneurial ability  $\theta$ . Agents choose between a fixed wage  $w$  as a salaried employee or an uncertain return  $y(\theta, k)$  in self-employment, where  $k$  represents physical capital, and  $\partial y / \partial k > 0$  and  $\partial^2 y / \partial k^2 < 0$ .<sup>4</sup> Potential entrepreneurs would like to invest until the marginal return of capital just equals the prevailing rate of interest  $r$ .<sup>5</sup>

$$\frac{\partial y(\theta, k)}{\partial k} = r \quad (1)$$

Define the level of capital that satisfies (1) as  $k^*$ . It is optimal for an agent to choose self-employment if the net return exceeds the wage rate ( $y(\theta, k^*) - rk^* > w$ ).

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<sup>3</sup> Evans and Jovanovic (1989) and Aghion and Bolton (1997) offer models representative of this view. The two papers differ, however, in their treatment of entrepreneurial ability. Evans and Jovanovic assume that ability and capital are complements, and hence, more able entrepreneurs are more likely to face capital constraints. In Aghion and Bolton, ability and capital are substitutes; high-skill entrepreneurs require less capital to start successful businesses and face less constraints. The liquidity-constraints model I develop makes no assumptions about the relationship between  $\theta$  and  $k$ .

<sup>4</sup>Returns to self-employment  $y$  and wage work  $w$  may embody both material and non-material benefits. Important non-material benefits of microenterprise ownership include being one’s own boss, the cost savings from minding one’s own children, and spending more time with family.

<sup>5</sup>For simplicity, I assume that both the cost of borrowed capital and the return on capital invested outside the business equal  $r$ .

Financial markets, however, may work imperfectly. For example, financing may depend on collateral, which in turn may depend on wealth  $\omega$ . In this scenario, liquidity-constrained entrepreneurs can choose capital only up to  $\bar{k}(\omega) < k^*$ ; in the extreme, no credit is available and  $\bar{k} = \omega$ . Financial imperfections limit investment and business profitability, and consequently, encourage some agents (who would earn  $y(\theta, \bar{k}) - r\bar{k} < w < y(\theta, k^*) - rk^*$  in self employment) to choose wage work instead of starting businesses.

Other agents (for whom  $y(\theta, \bar{k}) - r\bar{k} > w$ ) still choose self-employment but must contend with sub-optimal capital stocks. As time progresses, they can reinvest retained earnings until their capital stocks reach the optimal level. Constraints may continue to hamper enterprise growth, however, if revenues are not sufficient to overcome the disparity between actual and optimal investment levels. This seems common in El Salvador and the rest of the developing world, where many businesses subsist without adequate capital, and underinvestment and low profits create a vicious circle for microentrepreneurs.

The liquidity-constraints framework predicts that by increasing household liquidity  $\omega$ , remittances loosen capital constraints  $\bar{k}(\omega)$  and lead to more numerous, larger, and longer-lived firms. The migration of household members, however, likely has the opposite effect. First, migration is expensive. *Coyotes* (smugglers) charge Salvadorans between \$5,000 and \$7,000 for passage to the United States. Relatives in the United States generally provide loans for the fees, but migrants often pay smaller “co-payments” that stretch household budgets.<sup>6</sup> Second, migration reduces labor and human capital available to the household. Assuming that labor and human capital are complementary to physical capital, migration decreases the size of the optimal capital stock  $k^*$  and limits profitability. *Ceteris paribus*, migration should limit capital stocks, increase firm vulnerability, and make microenterprise ownership less attractive.

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<sup>6</sup> “Co-payments” signal commitment to migration (Huneycutt 2006).

## 2.2 Safety net for the unemployed

Individual experiences of the informal sector vary. While liquidity constraints are undoubtedly important in shaping the success and longevity of many businesses, they are certainly not decisive in all instances.

Several empirical studies note that most firms require little capital to start. McKenzie and Woodruff (2003) show that average start-up costs are low for most microenterprises in urban Mexico, equal to less than one month's wages in the least capital-intensive industries like construction and personal services. Analyzing microenterprise data from panel surveys conducted in the Dominican Republic, Jamaica, and five countries in Southern and Eastern Africa, Mead and Liedholm (1998) observe annual rates of start up between 20 and 30 percent.<sup>7</sup> Such high rates of microenterprise "birth" belie the importance of liquidity constraints for firm start up, and are consistent with an alternative view of informal-sector microenterprises as a poorly-paid safety net for the unemployed. Microentrepreneurs would prefer to work at the prevailing formal wage  $w$ , but imperfections in the labor market prevent them from finding formal employment and force them to subsist in the informal sector.

In contrast to the liquidity-constraints model, this view predicts that by making households less desperate, remittance income may encourage recipients to abandon businesses and focus on more productive activities (such as education and child raising).<sup>8</sup> It also takes a different view on migration. After paying coyote fees and sending their most productive (and employable) members abroad, migrant households may become more desperate and, therefore, more likely to turn to the informal sector.

This view also underscores the importance of selection on observed capital stocks. If migration forces remaining household members to start firms in order to subsist, then it may encourage smaller firms to enter the market. Similarly, remittances may cause

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<sup>7</sup>They calculate the start-up rates by dividing all new firms appearing in a given year by the number of firms in existence at the beginning of that year.

<sup>8</sup>Cox Edwards and Ureta (2003) find that remittance-receiving households in El Salvador invest significantly in education.

the smallest and least profitable microenterprises to exit, and not actually encourage investment among existing firms.

### **3 Survey data and definitions**

Clarifying theoretical uncertainty requires empirical analysis. I examine the relationship between migration, remittances and microenterprises with a large cross-section from El Salvador. The Salvadoran Statistical Institute's 1999 Multipurpose Household Survey (EHPM) provides information on 16,164 households located throughout the country. The stratified sample is representative of El Salvador as a whole, the urban and rural areas in El Salvador's five principal regions, and the country's 14 departments. The survey includes individual-level information about education, health, employment and microenterprises for all household members residing in El Salvador, as well as household-level data on migration and remittances. The following subsections define the sample and key variables, and also analyze descriptive statistics.

#### **3.1 Definition of the sample and the unit of observation**

Migration and remittances are household-level variables in the EHPM, while employment and microenterprise data describe individuals. Different units of observation present two key challenges, which I address in the definition of my sample.<sup>9</sup>

The first challenge relates to this paper's primary theme — the endogeneity of migration and microenterprises. To estimate causal relationships, I instrument migration in a first-stage regression with household as the unit of observation. Characteristics of household heads would seem to be natural covariates to describe households in the first stage. However, household heads may be male or female, and since the majority of El Salvador's migrants are men, non-random migration surely explains much of the variation

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<sup>9</sup>Although the combination of individual- and household-level data presents challenges, I hesitate to aggregate individual variables to the level of the household. Aggregation would discard important information about individual ability and employment status. Furthermore, it would create additional confusion due to multiple activity. Individuals in the developing world commonly undertake several economic activities during the same year, and often at the same time. Aggregating over all household members would compound the incidence of multiple activity.



in gender and other household-head characteristics like age and education. As a result, head variables are likely to be endogenous.

Hanson and Woodruff (2003) propose a better set of variables to explain the household migration decision: the characteristics of female heads and the female spouses of male heads. Although Salvadoran women do, in fact, migrate to the United States, female migrants tend to be single, to migrate with male partners, or to join partners already in the United States. It is uncommon for married women to migrate alone while leaving their husbands in El Salvador (UNDP 2005). Hence, female heads and spouses are not likely to be systematically missing from the survey like male heads. Estimating migration in this way requires me to limit the sample to households with female heads and spouses.

The second challenge presented by household-level data concerns the allocation of *remittances* within households. The EHPM asks households if they “regularly receive economic assistance from family or friends” outside El Salvador, but the survey does not attribute remittances to individual household members. Intrahousehold allocation seems especially complex in migrant households, which tend to be larger and include more members from outside the nuclear family.

In order to mitigate uncertainty about allocation and to measure the effects of remittances in the most direct way possible, I limit the sample of individuals to only household heads and their spouses. Common sense and anecdotal evidence suggest that they have the most control over family budgets, and that remittances affect their employment differently than other household members. This restriction echoes studies on remittances and education that examine only the birth children of household heads and not of other household members (Cox Edwards and Ureta 2003, Hanson and Woodruff 2003).

Fortunately, the two sampling restrictions do not seriously limit the scope of the analysis. The reduced sample includes 90.5 percent of surveyed households (excluding households with only male heads), and retains 81.5 percent of all surveyed microenter-

prises.<sup>10,11</sup> Of the 9.5 percent of households without female heads or spouses, most have male heads who are unmarried men and live alone, or who are widowers whose wives died during the civil war or later of natural causes.

### 3.2 Migration and remittances

The EHPM asks about migration and remittances in two questions:

1. How many members of this household currently reside *en el extranjero* (overseas)?
2. Do you or another member of this household regularly receive economic assistance in cash or in kind from relatives or friends living *en el extranjero*?

The survey then asks remittance households the quantity and frequency of the cash and in-kind transfers they receive, allowing me to calculate average monthly remittances for receiving households.

Ambiguous language limits the migration data. “Household member” is not precisely defined, and it is unclear how survey respondents decide whether migrants and remittance senders still belong to the household. Some cases are clearly captured; for example, if a father sends remittances to his wife and children in El Salvador, he will surely be counted as a migrant household member. Other cases seem less transparent. Do survey respondents consider adult children part of the household? Does it matter how long someone has been away, or if he plans to remain permanently in the States? How do respondents treat relatives outside the nuclear family who have migrated? What if they have left young children to stay with grandmothers, aunts, or other family members? Given the ambiguity, I define “migrant” households broadly, including all households that report migrants as well as the 6 percent of households that report “regular” remittances but no migrant “members.”<sup>12</sup>

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<sup>10</sup>90.5 percent of all surveyed households include a female head or spouse; by comparison, male heads and spouses are present in only 74.3 percent.

<sup>11</sup>14.0 percent of surveyed microenterprises are owned by households members who are not heads; 4.5 percent, by male heads without spouses.

<sup>12</sup>Ambiguous definitions are likely to produce measurement error. I discuss this issue in detail in section 4.1.3.

Table 1 lists means and standard deviations for sample households. The importance of migration to El Salvador is unmistakable. Migrant households constitute one-fifth (22 percent) of the sample, and 88 percent of them report “regular” remittances. The median remittance household receives \$100 per month, which represents 28.7 percent of household income.<sup>13</sup> “Regular” remittances should be seen as a lower-bound of total money transfers since the reported values may exclude large, one-time transfers used to build houses, buy land, pay coyotes fees, and — importantly — to start and invest in microenterprises. Such transfers are common, but may not be reported in the EHPM. Survey respondents may also fail to report money that returned migrants bring home personally (Hanson and Woodruff 2003).<sup>14</sup> No matter what the precise level, migrant remittances are clearly important to household welfare.

Table 1: Household descriptive statistics: means and (standard deviations)

Households	All HHs	<i>Microenterprise HH?</i>		<i>Migrant HH?</i>	
		Yes	No	Yes	No
Migrant household	0.22 (0.41)	0.21 (0.41)	0.22 (0.42)	1.00 (0.00)	0.00 (0.00)
Regular remittances?	0.19 (0.39)	0.17 (0.38)	0.20 (0.40)	0.88 (0.32)	0.00 (0.00)
Remittances USD/month	21.92 (69.10)	17.24 (59.93)	24.04 (72.77)	100.83 (118.34)	0.00 (0.00)
HH residents (w/o migrants)	4.65 (2.18)	4.72 (2.13)	4.61 (2.21)	4.56 (2.30)	4.67 (2.15)
HH members not nuclear family	0.82 (1.43)	0.76 (1.36)	0.84 (1.46)	1.23 (1.65)	0.70 (1.34)
Solo female head	0.28 (0.45)	0.29 (0.45)	0.28 (0.45)	0.42 (0.49)	0.25 (0.43)
Urban	0.62 (0.49)	0.73 (0.45)	0.57 (0.49)	0.62 (0.48)	0.62 (0.49)
Annual income (USD)	4920 (5656)	5698 (5975)	4569 (5469)	5230 (5724)	4834 (5633)
Observations	14654	4705	9949	3268	11386
Proportion of total	1.00	0.31	0.69	0.22	0.78

<sup>13</sup>I report all monetary values in terms of 1999 U.S. dollars using the 1999 exchange rate between U.S. dollars and Salvadoran *colones* (8.75 *colones*/USD). El Salvador adopted the dollar as its official currency in January 2001.

<sup>14</sup>These factors explain the large discrepancy between the Salvadoran Central Bank’s (BCR) estimates of annual remittance flows (defined broadly to include one-time transfers and repatriated savings) and the EHPM’s “regular” remittances. For example, the BCR estimates that remittances totaled more than \$2.5 billion in 2004; the 2004 EHPM, meanwhile, reports “regular” remittances of \$699 million (UNDP 2005).

I wish to highlight two additional correlations. First, household composition varies substantially between groups. Migrant households have roughly the same number of resident members as others, but they have fewer male heads and more members from outside the nuclear family (such as heads' parents, grandchildren, and extended relatives). Second, migrant households have significantly higher income, but subtracting remittances, they are actually poorer on average than non-migrant households.

### **3.3 Microenterprises**

In addition to detailed questions about employment, the 1999 EHPM includes a separate microenterprise module that surveys all owners of small businesses employing 1 to 10 workers (counting owners and paid and unpaid employees).<sup>15</sup> The module asks owners about firm start-up, financing, employment, investment, and profits. Nearly 1 in 3 sample households (31.3 percent) includes at least one small-business owner. At the median, annual microenterprise profits (including household consumption) exceed \$1,850 and represent 56.3 percent of total household income.

This paper follows the existing economic literature by focusing on two key variables: microenterprise ownership and firm capital stock. I concentrate on capital stock instead of microenterprise profits for both theoretical and empirical reasons. First, while profits ultimately matter most to welfare, microentrepreneurs compete in highly competitive markets, and they have little control over demand or price. As a consequence, higher profits generally require greater investment. Since migration and remittances affect investment, focusing on the capital stock allows me to measure their impact in the most direct way possible. Second, capital-stock data are more reliable than profit measures. Few businesses maintain formal accounts of their revenues and costs, and it is especially difficult to measure auto-consumption and in-kind bartering, both of which are common among Salvadoran microenterprises. In contrast, the replacement cost of capital is straightforward and commonly used to measure firm size (McKenzie and Woodruff 2003, Daniels 2001).

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<sup>15</sup>Other papers define microenterprises as firms that employ 1 to 5 workers (Woodruff and Zenteno 2001).

### 3.3.1 Employment and microenterprise ownership

Tables 2 and 3 provide an informative view of the Salvadoran labor market, separately tabulating means and standard deviations for men and women. Employment is defined in the broadest sense, including part-time and full-time workers, wage workers, business owners and the self-employed, as well as formal and informal sectors. A few major characteristics of the Salvadoran labor market deserve mentioning:

- *Men and women have different rates of employment.* Half of women are economically inactive; only 10 percent of working-age males are inactive. Unemployment is not substantial for either group: 4 percent of men and only 1 percent of women actively search for work without success.
- *Self-employment is especially important for women.* One half of economically active women own and operate microenterprises. In contrast, roughly 20 percent of employed men own them.
- *Agriculture is an important source of employment for men in El Salvador.* Approximately 37 percent of men work in agriculture. In contrast, only 6 percent of women are employed in agriculture.

Tables 2 and 3 also divide males and females based on household migration status. The correlation between migration, remittances, and employment is striking. Employment declines and inactivity grows for men and women in migrant households. Much of this variation is surely due to the groups' different age profiles; retirees over 65 years of age are disproportionately likely to receive remittances and head a substantial proportion of migrant households. However, as a share of employment, microenterprise ownership increases sharply with migration. Among women in migrant households, microenterprise owners accounts for 62 percent of the employed, 13 percentage points more than the proportion of women in non-migrant households.

Table 2: Male heads and spouses: means and (standard deviations)

Male heads and spouses	All	<i>ME Owner?</i>		<i>Migrant HH?</i>	
		Yes	No	Yes	No
Age	44.20 (15.42)	44.10 (12.42)	44.22 (15.89)	51.33 (16.75)	42.68 (14.68)
Education	5.93 (5.12)	6.36 (4.50)	5.85 (5.22)	5.06 (4.91)	6.11 (5.15)
Employed	0.85 (0.36)	1.00 (0.03)	0.82 (0.38)	0.72 (0.45)	0.88 (0.33)
— Microenterprise owner	0.15 (0.36)	1.00 (0.00)	0.00 (0.00)	0.15 (0.36)	0.15 (0.36)
— Wage worker (not agriculture)	0.43 (0.49)	0.03 (0.18)	0.49 (0.50)	0.28 (0.45)	0.46 (0.50)
— Agriculture	0.32 (0.47)	0.12 (0.32)	0.36 (0.48)	0.35 (0.48)	0.32 (0.46)
Unemployed	0.04 (0.20)	0.00 (0.02)	0.05 (0.21)	0.03 (0.17)	0.04 (0.20)
Inactive	0.10 (0.30)	0.00 (0.00)	0.12 (0.32)	0.20 (0.40)	0.08 (0.27)
Observations	10555	1627	8928	1941	8614
Proportion of total	1.00	0.15	0.85	0.18	0.82

Table 3: Female heads and spouses: means and (standard deviations)

Female heads and spouses	All	<i>ME Owner?</i>		<i>Migrant HH?</i>	
		Yes	No	Yes	No
Age	43.30 (15.91)	45.13 (13.72)	42.75 (16.46)	49.90 (16.55)	41.46 (15.22)
Education	5.00 (4.78)	4.33 (4.04)	5.21 (4.97)	4.38 (4.53)	5.17 (4.84)
Employed	0.45 (0.50)	1.00 (0.02)	0.29 (0.45)	0.39 (0.49)	0.47 (0.50)
— Microenterprise owner	0.23 (0.42)	1.00 (0.00)	0.00 (0.00)	0.24 (0.42)	0.23 (0.42)
— Wage worker (not agriculture)	0.19 (0.39)	0.02 (0.14)	0.24 (0.43)	0.11 (0.32)	0.21 (0.41)
— Agriculture	0.03 (0.18)	0.02 (0.13)	0.04 (0.19)	0.05 (0.21)	0.03 (0.17)
Unemployed	0.01 (0.11)	0.00 (0.00)	0.01 (0.12)	0.01 (0.10)	0.01 (0.11)
Inactive	0.53 (0.50)	0.00 (0.02)	0.69 (0.46)	0.60 (0.49)	0.51 (0.50)
Observations	14654	3493	11161	3268	11386
Proportion of total	1.00	0.23	0.77	0.22	0.78

### 3.3.2 Capital stock

The EHPM asks business owners to estimate the replacement cost of their equipment (tools, vehicles, locale, etc.), as well as the value of current inventories (inputs, finished goods, etc.). Summing all equipment and inventory variables creates one figure for total capital replacement cost, a widely-used measure for firm capital stock. The mean (median) microenterprise has \$1882 (\$160) of invested capital. The variance around this mean is quite large: 10.4 percent of firms report no capital invested in their businesses; the largest 5 percent, meanwhile, boast capital stocks worth more than \$7,429.

Table 4: Microenterprises and capital stock by gender and industry

Industry	<i>Owners</i> % Female	<i>Capital stock (USD)</i>		
		All	Female	Male
Retail trade	0.78	1807 (7658)	1161 (4979)	4022 (12974)
Manufacturing	0.70	928 (3446)	501 (2923)	1947 (4283)
Personal services	0.88	407 (2456)	303 (2355)	1222 (3012)
Hotels and restaurants	0.92	1851 (4738)	1426 (4168)	6973 (7429)
Transportation	0.04	8042 (13997)	8306 (7175)	8031 (14213)
Construction	0.00	716 (1747)	0 (0)	716 (1747)
Motor vehicles	0.08	4992 (15623)	15858 (36531)	3999 (11526)
All industries	0.68	1882 (7412)	1020 (5046)	3719 (10624)

Notes: Individual is the unit of observation, and observations are weighted by their inverse probability of selection. I report sample means and (standard deviations).

Liquidity constraints likely affect men and women differently, and capital requirements undoubtedly vary across industries. Table 4 compares microenterprise ownership and investment by gender and industry.<sup>16</sup> A few clear patterns emerge. First, women far

<sup>16</sup>Nearly all microenterprises belong to one of 7 industries: retail trade, manufacturing, personal services, hotels and restaurants, transportation, construction and motor vehicles. Retail trade occupies half of El Salvador's microenterprises, and four-fifths of retail firms are informal and sell their goods in public

outnumber men in El Salvador’s microenterprise sector as a whole, owning and operating 2 in 3 microenterprises (68 percent) in the sample. Second, women generally maintain much smaller capital stocks than men. Male owners boast capital stocks worth on average 3.6 times more than those of female owners. Finally, the ratio of owner gender varies considerably by industry. Female owners dominate retail trade, restaurants and hotels, and personal services, while men substantially outnumber women in the most capital-intensive industries — transportation and motor vehicles. Men also own all construction businesses in the sample.

The EHPM asks about firm financing, but it does not inquire directly about the use of migrant remittances for investment. Since remittances are fungible, however, direct questioning would provide only limited insight into household expenditure. According to the EHPM, only 1 in 20 microenterprises (5.6 percent) receives credit at start up from a bank, microfinance institution, or government lender, and only 7.4 percent of existing firms use commercial loans.<sup>17</sup> Most entrepreneurs depend instead on personal savings (51.4 percent), loans from friends or relatives (11.5 percent), and gifts from family (9.6 percent) to start their businesses. Fungible remittances could encourage investment in microenterprises through any of these channels.

Figure 1 plots estimated kernel densities of microenterprise capital stock for men and women in migrant and non-migrant households.<sup>18</sup> The correlation is striking. Although men and women in migrant households are less educated and less likely to be married (characteristics associated with lower returns), business owners in migrant households tend to have larger capital stocks than non-migrant owners.

Hypothetically, larger capital stocks could be explained by systematic variation in industry. For instance, microenterprise owners with remittances could operate dispro-

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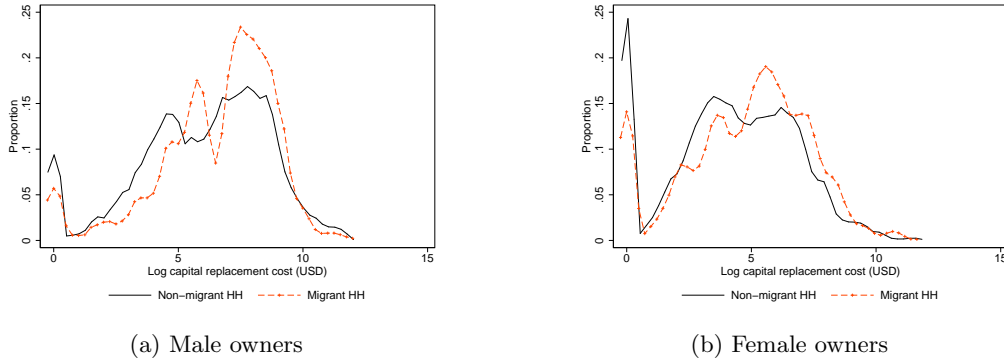
markets. 1 in 3 microenterprises produces, sells or serves food; these firms are distributed among retail trade, manufacturing and restaurant industries.

<sup>17</sup>For comparison, Woodruff and Zenteno (2001) cite a Federal Reserve survey that reports that more than half of U.S. microenterprises regularly receive credit from commercial banks.

<sup>18</sup> The variable on the  $x$ -axis is the log of the replacement cost of capital (in 1999 U.S. dollars) plus one (i.e.,  $\log(k + 1)$ ), which I add to retain firms with zero reported capital stock — 10.4 percent of all businesses.



Figure 1: Density estimates of log capital stock,  $\log(k + 1)$



Notes: Observations are weighted by their inverse probability of selection.

portionately in capital-intensive industries, like transportation. The data suggest that industry distribution is not an important factor. Table 5 indicates that microenterprises in migrant households are distributed in much the same way as businesses in non-migrant households.

Table 5: Microenterprises in migrant and non-migrant HHs are in the same industries. . .

Industry	Distribution of MEs in migrant HHs	Distribution of MEs in non- migrant HHs
Retail trade	0.55	0.51
Manufacturing	0.22	0.22
Personal services	0.05	0.10
Hotels and restaurants	0.07	0.05
Transportation	0.04	0.05
Construction	0.03	0.03
Motor vehicles	0.03	0.03

Notes: Individual is the unit of observation, and observations are weighted by their inverse probability of selection.

## 4 Endogeneity and identification

*Si en un dado caso ya no tuviéramos este negocio, me iría para allá.*

If for some reason we didn't have this business, I would leave [for the United States].

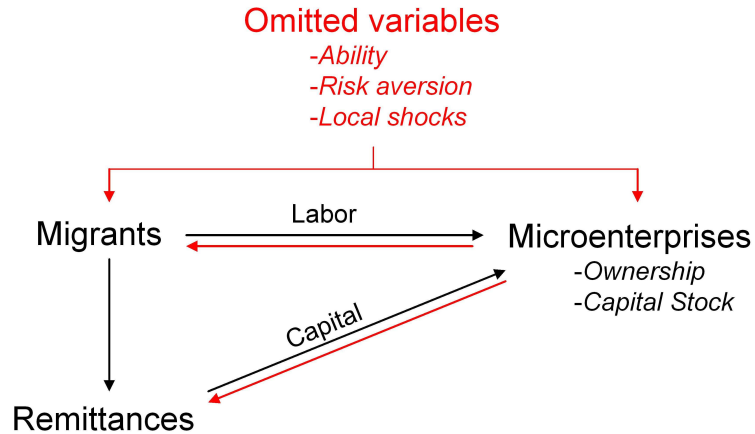
– Shop owner in Morazán

Migration and remittances are determined endogenously with microenterprise ownership and investment. Credible estimates of the causal impact of migration on microenterprises require instruments, correlated with migration and remittances, but exogenous to microenterprise outcomes. This section explains potential sources of endogeneity, discusses the unique identification of remittances and migration (infeasible with the available data), and then proposes instruments for the net effect of migration from El Salvador's civil war.

#### 4.1 Sources of endogeneity

Figure 2 depicts the causal relationship I seek to estimate in black, and other potential relationships that obscure proper estimation in red. Simultaneity and omitted variables raise concerns about the validity of OLS to estimate the true causal impact of migration on microenterprises.

Figure 2: Causal relationships and endogeneity



##### 4.1.1 Simultaneity

The migration and microenterprises I observe in the data reflect myriad choices that individuals and households have made over time. Theory and anecdotes explain why migration may affect microenterprises. However, it is also likely that microenterprises affect migration choices.

Hypothetically, microenterprises may either encourage or discourage migration. On one hand, successful businesses may encourage migration by generating enough profits for owners to migrate. However, given that coyote fees exceed El Salvador's average household income, it seems unlikely that microenterprise profits would be sufficient to finance migration in most cases. It is more likely that successful businesses discourage migration by diminishing the relative attractiveness of U.S. wages. If a microentrepreneur earns enough at home, she will be less likely to leave her family and spend thousands of dollars to earn a bit more in the United States (Harris and Todaro 1970). The quotation I cite from the shop owner in Morazán at the top of section 4 embodies this point.

Microenterprises may have similar effects on remittances. Under-performing businesses may elicit remittances from abroad to finance basic household consumption. Conversely, if profits from successful microenterprises provide enough for families in El Salvador, migrant relatives may remit less money to support them.

#### **4.1.2 Omitted variables**

Omitted variables such as ability and risk aversion present additional concerns, and once again, potential bias is difficult to sign *a priori*. I utilize two simple thought experiments to explain the potential relationships that connect migration, microenterprises, and omitted variables. In both cases, assume that migration and microenterprises are similar in that they are high-risk, high-return activities that also require high ability (which I assume is unobserved).

First, imagine that households differ in ability and risk aversion, but that individuals within households are identical with respect to both. High-ability, risk-tolerant households send migrants to the United States, while members from the same households remain in El Salvador and start microenterprises. Migration and entrepreneurship are positively correlated, but unobserved ability and risk aversion drive the relationship. In this case, OLS estimates of the impact of migration on microenterprises (conditioned on observed characteristics) are overstated.

In contrast, imagine that households are equal in average ability and risk aversion, but that individuals within households differ. In this case, high-ability individuals may choose to migrate, leaving less able and more risk averse individuals at home. Hence, migration and entrepreneurship are negatively correlated, and OLS estimates are understated.

Unobserved shocks constitute another potential source of endogeneity (McKenzie 2005). Suppose, for example, that some entrepreneurs face more profitable opportunities, and consequently make larger investments than others. Given investment demand, they also make stronger calls on relatives working abroad to send them money to invest. Thus, remittances and enterprise size are positively correlated, not because remittances address capital constraints, but because both respond to the demand for capital.

#### **4.1.3 Other sources of endogeneity: measurement error and selection**

Measurement error in the migration variable may lead to attenuation bias in OLS estimates (Wooldridge 2002). Not all migrant households maintain equal contact with migrant friends and relatives, and there is likely a high degree of variation within the cohort of migrant households. What’s more, the definitional ambiguity of migrant “members” and “regular” remittances means that I possibly exclude some households that receive occasional assistance from relatives no longer considered part of the household (e.g., adult children).

Endogenous selection into employment represents a final source of endogeneity. Since the solutions to endogenous selection are distinct, I consider selection in more detail in section 5.3.

## **4.2 Identifying migration *and* remittances?**

Ideally, I would like to identify the distinct effects of migration and remittances, but doing so is not feasible given the available data. The definitional ambiguity of migrant “household members” and “regular” remittances presents one challenge. But even with clearly defined measures of migration and remittances, I would still need instruments that

determined remittances but were not correlated with migration.<sup>19,20</sup>

Instead of trying to isolate distinct effects, I attempt to identify the *net* impact of migration and remittances by including only a variable for migration. This strategy follows a growing body of literature studying the effects of migration on sending communities in Mexico (Woodruff and Zenteno 2001, Hanson and Woodruff 2003, Hanson 2005, McKenzie and Rapoport 2005). I define “migrant” households broadly, including all households that report migrant “members” as well as the 6 percent of households with remittances but no migrants. Instruments (discussed in the following subsection) measure the strength of migrant networks, which in turn predict household access to migration and remittances.

One seemingly sensible, but flawed alternative would be to include only a variable for remittances (and not migration) in microenterprise regressions. Including and instrumenting for only remittances would require the additional assumption that migration affects microenterprises only through remittances, which is not tenable. If migration and microenterprises are correlated in other ways (e.g., by household labor effects), then the error terms would contain omitted variables that would bias results.

### 4.3 Instruments from El Salvador’s civil war

I instrument for migration using the percentage of households in each department that received remittances at the end of El Salvador’s civil war (calculated from the 1992

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<sup>19</sup>McKenzie (2005) proposes two candidate instruments to identify remittances: exogenous variation in remittance transfer costs, and labor market shocks in different migrant destinations. Unfortunately, neither is suitable in this case. The money-transfer market in El Salvador is highly competitive, and anecdotal evidence suggests that transfer costs do not vary significantly across space; average transfer costs have now fallen to 4.4 percent of the amount remitted (UNDP 2005). Local shocks in the U.S. labor market could be informative, especially since Salvadoran immigrants are quite spread out geographically. However, the EHPM asks only for the number of household members abroad, and not for more detailed information about migrants; I have no way of knowing where migrants live.

<sup>20</sup>One potential instrument for remittances comes from the EHPM’s health module, which asks if any household members have suffered an “illness or accident” in the last month. I create a dummy variable equal to one if one of the head’s children (15 or under) or an elderly dependent (66 and above) has a non-preventable accident serious enough to be reported in the survey. Specifically, I include “injuries,” “wounds,” “burns,” “blows,” and “fractures” in the measure. Such random accidents are likely to spark remittances from migrants already in the States without affecting business outcomes (as they might if business owners themselves suffered injuries). Only 2.8 percent of households report accidents among children and elderly dependents, and the instrument has little predictive power — in part due to the question’s one-month time horizon.

EHPM).<sup>21</sup>

During the twelve-year civil war (1980-1992), hundreds of thousands of Salvadorans fled for the United States. According to U.S. census data, the number of immigrants from El Salvador more than quadrupled in ten years, growing from 95 thousand in 1980 to 465 thousand in 1990 (U.S. Census Bureau 2006). These figures represent a lower bound of actual migration. Since the United States did not grant refugee status to Salvadorans citizens, most immigrants entered the country without documents and then remained in the shadows, avoiding U.S. census officials and other government agents.<sup>22</sup> Most researchers estimate that the actual number of civil-war migrants surpassed 500 thousand, equivalent to about 10 percent of El Salvador's total population (Funkhouser 1995, UNDP 2005).

Political violence was a key cause of migration. Analyzing a time series of U.S. Border Patrol activity in the 1980s, Stanley (1987) connects spikes in Salvadoran apprehensions at the U.S.-Mexico border with homicides, major military sweeps, and forced military and FMLN recruitment of weeks past. In addition, Jones (1989) finds significant correlation between the geographic incidence of political violence and the number of internal refugees, who in turn, became more likely to migrate internationally.

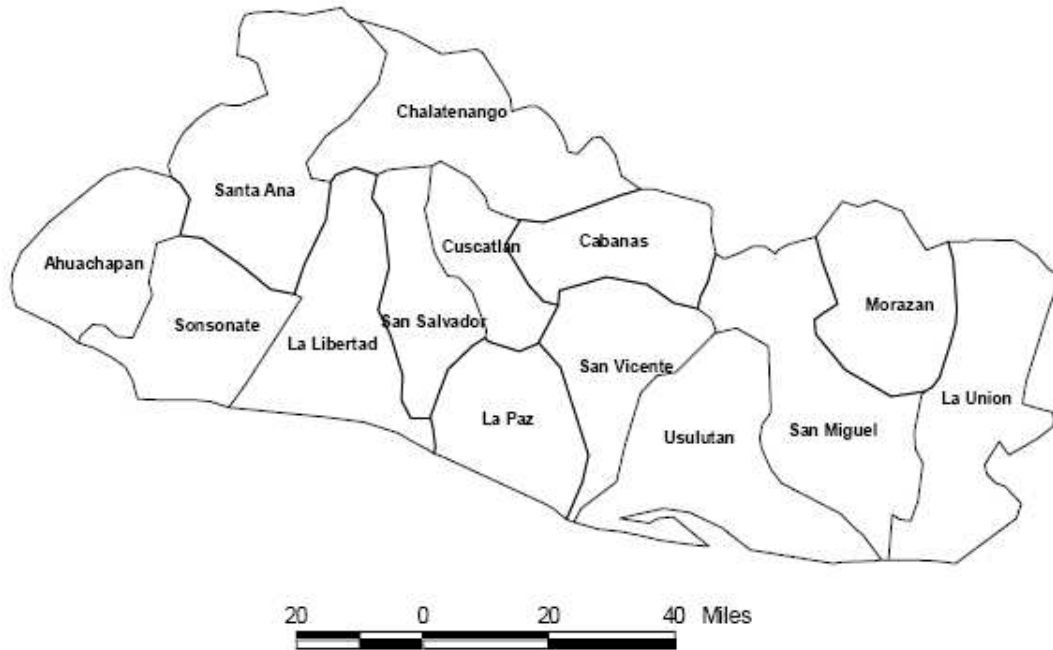
The patterns of migration established during the civil war have been perpetuated over time. Figure 3 tabulates department-level remittance rates in 1992, the year of the civil war's end; in 1999, the year of this paper's survey data; and in 2004, the most recent year for which data are available. The persistence through time is striking, especially

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<sup>21</sup>In 1980, increasing social unrest from decades of political and economic exclusion finally gave way to full-blown civil war in El Salvador. Landless farm workers, rural peasants, students, radical Catholic priests, and a small urban middle class united under the motley Farabundo Martí Front for National Liberation (FMLN), hoping to wrest control from the military government and to redistribute the country's highly concentrated assets. The costs of insurgency were enormous. By the signing of the Chapultepec Peace Accords in 1992, some 85,000 people — or roughly 1 in 60 Salvadorans — had died in the conflict (Seligson and McElhinny 1999). The canonical source on the Salvadoran civil war is Montgomery's (1995) *Revolution in El Salvador*. Wood (2003) provides an engrossing account of the participation of peasants from the central department of Usulután in the conflict, as well as a brief history of the war in her introduction.

<sup>22</sup>The United States backed the Salvadoran government during the civil war, and subsequently did not recognize Salvadorans as political refugees. This was in contrast to its policy for Nicaraguans fleeing the communist Sandanista regime, who had relatively little trouble receiving refugee status.

Figure 3: El Salvador's 14 departments



<i>Region/ – Department</i>	<i>% Remittance HHs</i>			<i>1999 PPP GDP</i>	
	1992	1999	2004	<i>Y</i>	<i>%ΔY</i>
<i>Metro San Salvador</i>					
– San Salvador	0.13	0.16	0.20	5,954	2
– La Libertad	0.10	0.15	0.17	5,121	4.8
<i>Western Region</i>					
– Ahuachapán	0.07	0.14	0.14	2,242	-6.2
– Santa Ana	0.13	0.22	0.23	3,356	1.8
– Sonsonate	0.10	0.13	0.18	3,252	2.5
<i>Central I Region</i>					
– Chalatenango	0.18	0.24	0.28	2,578	10.8
– Cuscatlán	0.08	0.17	0.13	3,335	6.4
<i>Central II Region</i>					
– La Paz	0.13	0.19	0.15	3,020	4.6
– Cabañas	0.17	0.28	0.37	2,191	7.6
– San Vicente	0.13	0.16	0.16	2,671	6.6
<i>Eastern Region</i>					
– Usulután	0.15	0.22	0.28	2,789	3.3
– San Miguel	0.22	0.27	0.31	3,526	3.8
– Morazán	0.17	0.33	0.34	2,475	14.8
– La Unión	0.32	0.38	0.48	2,803	22.5

Sources: Department-level remittance rates calculated from 1992, 1999 and 2004 EHPMs. The 2001 *Human Development Report–El Salvador*, by the United Nations Development Program–El Salvador provides per-capita GDP data in 1999 USD.

considering that severe economic shocks — such as the restructuring of the international coffee market, Hurricane Mitch, droughts from El Niño, and two major earthquakes — have had very different regional impacts.

Persistence, nevertheless, is consistent with the extensive economic and sociological research on migrant networks (Carrington, Detragiache and Vishwanath 1996, Munshi 2003, Massey and Parrado 1998). Within Salvadoran networks, relatives and friends in the States provide potential migrants with information about entering the country, obtaining jobs, finding housing, and tackling the myriad other complexities of immigrant life. In most cases, migrants borrow money from network contacts to finance the costs of migration, which have skyrocketed in recent years due to increased U.S. and Mexican border enforcement (Huneycutt 2006). For most, having a relative or friend already in the States is necessary for migration.

To capture additional variation in expected earnings of households in the same departments, I interact lagged remittance rates with the characteristics of female heads and spouses. I follow Hanson and Woodruff (2003) by using education and age dummies. These variables likely capture traits that affect expected earnings profiles in source and destination countries and, hence, the incentives to migrate.

#### **4.4 Persistent economic conditions**

Local economic conditions affect both migration and microenterprises. If local conditions persist over time, then lagged remittance rates may still be endogenous to microenterprises.

I rely foremost on regional location dummies to control for conditions persisting from 1992 to 1999. The EHPM divides El Salvador into five regions: the coffee-producing west; the high-migration east; the industrial core of San Salvador; and two regions in the fishing and farming center. A change in the EHPM's sampling design in 1998 allows me to sub-divide the regions into rural and urban areas (save metropolitan San Salvador which



is entirely urban) and still maintain a random sample within each division.<sup>23</sup> Regional dummies have considerable explanatory power, yet are not collinear with department-level instruments from the 1992 EHPM (as department-level dummies would be).

Using dummies for regions, instead of even smaller departments, requires me to assume that significant variation in economic conditions within regions did not persist from 1992 to 1999. This assumption seems reasonable for two reasons. First, El Salvador is very small, spanning only 20 thousand square kilometers, slightly less than the area of the state of Massachusetts. Regional dummies divide El Salvador into 9 distinct areas (5 urban and 4 rural) and likely capture sufficient geographic variation in economic conditions. Second, as I mention above, several exogenous shocks — such as the restructuring of the international coffee market, Hurricane Mitch, and droughts from El Niño — fundamentally changed local economies between 1992 and 1999.

Regional dummies likely capture the significant differences in local economic conditions that persist over time. Nevertheless, I also include additional department-level covariates in all regressions: log per-capita income in 1992 and 1999, subjective assessments of crime, and the percentage of households with telephones.<sup>24</sup>

## 5 Estimation

The theory and anecdotes in Section 2 suggests several ways that migration may affect microenterprises, and the descriptive statistics in Section 3 confirm correlation. I now turn to regression analysis to establish precise causal relationships.

### 5.1 Migration

I estimate the first-stage migration equation in reduced form:

$$Pr(M_h) = \alpha_0 + \alpha_1 X_h^{f'} + \alpha_2 X_d' + \alpha_3 X_r' + \alpha_4 (R_d^{92} \cdot [1, X_i]') + u_{M,h} \quad (2)$$

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<sup>23</sup>The EHPM defines “urban” to include El Salvador’s 262 municipal capitals (traditional centers of commerce), all of metropolitan San Salvador, and a handful of densely-populated towns. Regions constitute the smallest geographic units that can be sub-divided into urban and rural areas, and still allow for valid statistical inference.

<sup>24</sup>I calculate 1992 per-capita income from the 1992 EHPM. I translate nominal values to 1999 U.S. dollars, using El Salvador’s consumer-price index and the 1999 colón-dollar exchange rate.

for household  $h$  in department  $d$  and region  $r$ .  $M_h$  is binary, equal to one if the household reports a migrant “member” or receives remittances; it equals zero otherwise. Migration is explained by the age and education of the female head or spouse ( $X_h^f$ ) and department characteristics ( $X_d$ ), as well as regional location dummies ( $X_r$ ). The same covariates are included in all microenterprise regressions. To identify migration from microenterprise ownership and investment, I include department-level remittance rates from the 1992 EHPM ( $R_d^{92}$ ) and their interactions with the age and education of female heads and spouses ( $X_h^f$ ).

Table 6 reports OLS and Probit results. The two estimation techniques return similar results, and the joint significance of included instruments is very high. The interaction term between lagged remittance rates and households with female heads aged 40 to 49 is especially significant. At the start of the civil war in 1980, when murder and disappearance rates reached their peak, the cohort would have been aged 21 to 30 — prime age for involvement in the conflict, and also for migration.

I use Probit point estimates to predict the exogenous component of migration, which I then substitute for actual migration in microenterprise regressions below. For maximum efficiency, I estimate equation 2 for the full sample of households. This requires, however, that I exclude a handful of other exogenous variables used in second-stage regressions that are available for only a subset of the full sample (e.g., firm “age”, which I observe only for microenterprise owners).

By proceeding in this way, I implicitly assume that the first-stage error term ( $u_{M,h}$ ) is uncorrelated with all second-stage covariates. To be precise, consider the following simplified regression equation, in which  $Y_i$  represents the microenterprise outcome of interest and  $X_i$  is a vector of variables uncorrelated with  $u_{Y,i}$ :

$$Y_i = a + bM_h + cX_i + u_{Y,i} = a + b\hat{M}_h + cX_i + (u_{Y,i} + b(M_h - \hat{M}_h)) \quad (3)$$

Since I posit that migration affects microenterprises, I expect that  $b \neq 0$ . Consistent estimation requires that all variables in  $X_i$  are also uncorrelated with  $u_{M,h} = M_h - \hat{M}_h$ ,

Table 6: Regression results: Migrant household,  $Pr(M_h = 1)$ 

Female heads and spouses	(1) OLS	(2) Probit
% HHs w/remittances (1992, $R_d^{92}$ )	0.55** (0.18)	0.69** (0.18)
$R_d^{92} * 1(\text{Age } 30\text{-}39)$	-0.21 (0.17)	-0.26 (0.19)
$R_d^{92} * 1(\text{Age } 40\text{-}49)$	0.63** (0.19)	0.36* (0.18)
$R_d^{92} * 1(\text{Age } 50\text{-}59)$	0.48* (0.22)	0.11 (0.20)
$R_d^{92} * 1(\text{Age } 60 \text{ and above})$	0.76** (0.21)	0.26 (0.19)
$R_d^{92} * 1(\text{Primary school})$	-0.09 (0.15)	-0.15 (0.13)
$R_d^{92} * 1(\text{Secondary school})$	-0.12 (0.24)	-0.18 (0.24)
$R_d^{92} * 1(\text{High school})$	0.01 (0.30)	-0.05 (0.29)
$R_d^{92} * 1(\text{University})$	-0.07 (0.36)	-0.06 (0.39)
Age 30-39	0.04 (0.02)	0.05 (0.03)
Age 40-49	-0.01 (0.03)	0.04 (0.03)
Age 50-59	0.10** (0.03)	0.18** (0.04)
Age 60 and above	0.13** (0.03)	0.22** (0.04)
Primary school	0.04 (0.03)	0.05 (0.03)
Secondary school	0.04 (0.04)	0.06 (0.05)
High school	0.01 (0.05)	0.03 (0.06)
University	0.00 (0.06)	0.01 (0.07)
Literate	0.03 (0.02)	0.03 (0.02)
Log per-capita income 1992	-0.03 (0.02)	-0.02 (0.02)
Log per-capita income 1999	-0.04 (0.03)	-0.04 (0.03)
% HHs with telephones	0.13* (0.06)	0.13* (0.06)
% HHs report insecurity	-0.09* (0.05)	-0.10* (0.05)
Constant	0.43* (0.17)	
Observations	14638	14638
$R^2$ / Pseudo $R^2$	0.07	0.07
$F / \chi^2$ ( $H_0 : \alpha_{\text{Instruments}} = 0$ )	12.1	90.9
$Pr(F) / Pr(\chi^2)$	3.5e-19	1.1e-15

<sup>+</sup> significant at 10 percent, \* significant at 5 percent, \*\* significant at 1 percent.

Notes: I report estimated coefficients and (standard errors). Household is the unit of observation, and observations are weighted by inverse probability of selection. Regressions include 8 regional location dummies, but the coefficients are not reported. Reported Probit estimates are marginal effects. Standard errors are robust to heteroscedasticity of unknown form.

the unobserved error from the first stage. Essentially, this means that variables included in the second stage, but excluded from the first, should not be related to migration.

## 5.2 Ownership and capital stock

I measure the impact of migration on microenterprises with two equations: one for ownership, the other for firm capital stock.

The first equation asks all men and women who are employed if they own a microenterprise:

$$Pr(ME_i = 1|E_i = 1) = \beta_0 + \beta_1 M_h + \beta_2 X'_{i,d,r} + u_{ME,i} \quad (4)$$

$ME_i$  is binary, equal to one if individual  $i$  owns a microenterprise, and zero if she does not. Since microenterprise ownership is conditioned on being employed ( $E_i = 1$ ), not owning a microenterprise ( $ME_i=0$ ) is equivalent to being employed in another capacity, as a wage or farm worker. In addition to migration ( $M_h$ ), microenterprise ownership varies with individual and department characteristics, and by region.<sup>25</sup> The cross-sectional EHPM reports whether or not an individual owns a microenterprise at the time of the survey. Ownership, of course, depends both (positively) on rates of start up and (negatively) on firm failure, but I cannot distinguish between the two in the cross section.

The second equation estimates the size of firm capital stock by:

$$\log(k_i + 1)|_{ME_i=1, E_i=1} = \gamma_0 + \gamma_1 M_h + \gamma_2 X'_{i,d,r} + \gamma_3 F'_i + u_{k,i} \quad (5)$$

where  $k_i$  represents the total replacement cost of capital. I add one to  $k_i$  before scaling by the natural logarithm to retain the 10.4 percent of firms with zero capital stock. Firm capital stock varies with migration, individual and department characteristics, and regional fixed effects. A new vector ( $F_i$ ) controls for firm age and industry. Since the data come from a cross section, the capital replacement cost simultaneously measures investment and divestment, positive and negative contributions to the capital stock.

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<sup>25</sup>In regressions for men, I also include age and education variables for female spouses, which are used in the first-stage regression.

Table 7: Regression results: Microenterprise ownership,  $Pr(ME = 1|E = 1)$ 

	<i>Females</i>			<i>Males</i>		
	(1) OLS	(2) IV	(3) Probit IV	(4) OLS	(5) IV	(6) Probit IV
Migrant HH (actual/predicted)	0.06** (0.02)	0.01 (0.06)	0.03 (0.07)	0.03+ (0.01)	0.05 (0.03)	0.05 (0.04)
Age 30-39	0.06** (0.02)	0.07** (0.02)	0.08** (0.03)	0.07** (0.02)	0.07** (0.02)	0.08** (0.02)
Age 40-49	0.13** (0.02)	0.13** (0.03)	0.15** (0.03)	0.15** (0.02)	0.15** (0.02)	0.17** (0.03)
Age 50-59	0.19** (0.03)	0.19** (0.04)	0.21** (0.05)	0.14** (0.02)	0.14** (0.02)	0.17** (0.03)
Age 60 and above	0.26** (0.03)	0.26** (0.06)	0.28** (0.06)	0.14** (0.03)	0.14** (0.03)	0.18** (0.04)
Primary school	-0.04 (0.04)	-0.04 (0.04)	-0.04 (0.04)	-0.02 (0.02)	-0.02 (0.02)	-0.02 (0.02)
Secondary school	-0.17** (0.05)	-0.17** (0.05)	-0.17** (0.05)	-0.03 (0.03)	-0.02 (0.03)	-0.02 (0.02)
High school	-0.33** (0.05)	-0.32** (0.05)	-0.32** (0.04)	-0.08** (0.03)	-0.08** (0.03)	-0.06** (0.02)
University	-0.52** (0.04)	-0.52** (0.05)	-0.49** (0.03)	-0.22** (0.03)	-0.22** (0.03)	-0.14** (0.01)
Literate	-0.00 (0.04)	-0.00 (0.04)	-0.00 (0.05)	0.08** (0.02)	0.08** (0.02)	0.08** (0.02)
Log per-capita income 1992	-0.04 (0.04)	-0.04 (0.04)	-0.04 (0.04)	-0.03 (0.02)	-0.03 (0.02)	-0.03 (0.02)
Log per-capita income 1999	-0.00 (0.05)	-0.00 (0.05)	0.00 (0.06)	0.02 (0.03)	0.02 (0.03)	0.02 (0.03)
% HHs with telephones	-0.01 (0.10)	-0.01 (0.10)	-0.03 (0.12)	0.08 (0.07)	0.06 (0.07)	0.04 (0.07)
% HHs report insecurity	0.03 (0.08)	0.04 (0.09)	0.05 (0.10)	0.17** (0.05)	0.20** (0.06)	0.20** (0.05)
Observations	6463	6463	6463	8963	8952	8952
$R^2$ / Pseudo $R^2$	0.19	0.19	0.15	0.07	0.07	0.08

+ significant at 10 percent, \* significant at 5 percent, \*\* significant at 1 percent.

Notes: I report estimated coefficients and (standard errors). Individual is the unit of observation, and observations are weighted by inverse probability of selection. Male regressions include dummies for the age and education of the female spouse (also included in the first stage), and all regressions include 8 regional location dummies; the coefficients are not reported. Reported Probit estimates are marginal effects. Standard errors are robust to heteroscedasticity of unknown form.

Table 8: Regression results: Log capital replacement cost,  $\log(k|ME = 1)$ 

	<i>Females</i>			<i>Males</i>		
	(1) OLS	(2) IV	(3) Tobit IV	(4) OLS	(5) IV	(6) Tobit IV
Migrant HH (actual/predicted)	0.26* (0.12)	1.02** (0.32)	0.77* (0.34)	0.39* (0.16)	1.28 <sup>+</sup> (0.66)	1.51* (0.60)
Age 30-39	0.37** (0.14)	0.35** (0.14)	0.43** (0.13)	0.45 <sup>+</sup> (0.24)	0.44 <sup>+</sup> (0.24)	0.65** (0.23)
Age 40-49	0.59** (0.14)	0.29 <sup>+</sup> (0.17)	0.49** (0.18)	0.67* (0.28)	0.67* (0.28)	0.85** (0.26)
Age 50-59	0.54** (0.16)	-0.01 (0.24)	0.28 (0.25)	0.73* (0.30)	0.78** (0.30)	0.83** (0.30)
Age 60 and above	0.28 (0.18)	-0.48 (0.32)	0.03 (0.32)	0.88* (0.36)	0.96** (0.36)	0.93** (0.35)
Primary school	0.35* (0.16)	0.28 <sup>+</sup> (0.17)	0.27 (0.19)	-0.19 (0.38)	-0.17 (0.38)	-0.64* (0.32)
Secondary school	1.11** (0.22)	1.04** (0.22)	1.14** (0.23)	0.31 (0.43)	0.36 (0.43)	-0.17 (0.36)
High school	1.64** (0.26)	1.61** (0.26)	1.54** (0.24)	0.25 (0.44)	0.29 (0.44)	-0.25 (0.37)
University	2.52** (0.45)	2.60** (0.45)	2.31** (0.34)	0.79 (0.53)	0.83 (0.53)	0.31 (0.45)
Literate	0.46** (0.17)	0.35* (0.17)	0.58** (0.19)	0.85* (0.40)	0.79* (0.40)	1.31** (0.34)
Log per-capita income 1992	0.12 (0.21)	0.14 (0.21)	0.29 (0.21)	-0.04 (0.39)	-0.04 (0.39)	-0.33 (0.34)
Log per-capita income 1999	-0.32 (0.29)	-0.24 (0.29)	-0.32 (0.26)	-0.34 (0.42)	-0.27 (0.43)	-0.05 (0.40)
% HHs with telephones	1.14 <sup>+</sup> (0.61)	0.78 (0.62)	1.31* (0.56)	0.73 (0.89)	0.34 (0.93)	-0.23 (0.88)
% HHs report insecurity	-0.75 (0.46)	-0.15 (0.51)	-0.28 (0.49)	-0.62 (0.76)	0.13 (0.87)	0.19 (0.76)
Years since start up	0.00 (0.01)	0.00 (0.01)	-0.00 (0.00)	-0.01 <sup>+</sup> (0.01)	-0.01 (0.01)	-0.01 <sup>+</sup> (0.01)
Start up < 6 months	-0.70** (0.15)	-0.71** (0.15)	-0.93** (0.13)	-1.13** (0.31)	-1.11** (0.32)	-0.93** (0.26)
6 months to 2 years	-0.08 (0.14)	-0.09 (0.14)	-0.16 (0.12)	-0.62 <sup>+</sup> (0.32)	-0.62 <sup>+</sup> (0.32)	-0.31 (0.22)
Observations	3442	3442	3442	1596	1593	1593
$R^2$ / Pseudo $R^2$	0.37	0.37	0.12	0.27	0.27	0.06

<sup>+</sup> significant at 10 percent, \* significant at 5 percent, \*\* significant at 1 percent.

Notes: I report estimated coefficients and (standard errors). Individual is the unit of observation, and observations are weighted by inverse probability of selection (except Tobit estimates). Male regressions include dummies for the age and education of the female spouse (also included in the first stage), and all regressions include dummies for region and microenterprise industry; the coefficients are not reported. Reported Tobit estimates are unconditional marginal effects. Standard errors are robust to heteroscedasticity of unknown form (except Tobit estimates).

Tables 7 and 8 report OLS and IV results. Migration is associated positively and significantly with microenterprise ownership in simple OLS estimates for both men and women. When I use predicted values of migration from equation 2, the effect shrinks for women and is not significantly different from zero. For men, the effect increases slightly, but it is not statistically significant. Hence, there is little evidence that migration affects microenterprise ownership — either by changing household composition or by increasing liquidity. This is consistent with evidence finding low barriers to entry in the microenterprise sector (Mead and Liedholm 1998, McKenzie and Woodruff 2003).<sup>26</sup>

In contrast, the effect of migration on capital stock is unmistakable. In OLS results, migration is associated with a 26 percent increase in the capital stock for women, and a 39 percent increase for men. Instrumenting for migration significantly increases point estimates of its impact on capital stock. IV regressions show that migration doubles the size of female-owned capital stocks, and increases male-owned capital stocks by more than 120 percent. This result is consistent with migrant remittances easing liquidity constraints and allowing business owners to invest more robustly in their businesses.

The large differences between OLS and IV results suggest that simultaneity and measurement error play crucial roles. Large, downward bias would result if owning successful businesses discouraged household members from migrating, or similarly dissuaded migrant relatives and friends from sending regular remittances. Both scenarios seem very plausible. As the shop owner in Morazán told me: “If for some reason we didn’t have this business, I would leave for [the United States].”

Measurement error in the migration variable represents another likely source of attenuation bias. Migration affects firm capital stocks through “regular remittances,” and also one-time transfers that measured migration may fail to capture. Predicted values of migration better measure the probability of receiving such one-time transfers.

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<sup>26</sup>Since I cannot distinguish between entry and exit in the cross section, however, it remains possible that migration has offsetting effects. For example, migration may discourage entry but also limit firm failure.

I wish to comment on the effects of other exogenous covariates:

- *Entrepreneurship is most common amongst older workers.* Rates of business ownership remain high for women older than 60. Microenterprises are most common for men in their 40s. Capital stock also varies with age, peaking for women in their 30s and 40s, and for men older than 60. With greater experience, potential entrepreneurs are more likely to operate microenterprises and be able to invest more in them.
- *Higher levels of education* decrease the probability of self-employment. However, they increase capital stocks among female-owned businesses. Education dummies do not significantly affect the capital stocks of male-owned businesses, though literacy does.
- *Microenterprise “age”* affects capital stock only insofar as new firms (those starting within the last 6 months) are much smaller on average. This is consistent with the capital-constraints model in which constrained firms enter with less-than-optimal capital stocks and re-invest their earnings over time.

Industry dummies included in the capital-stock regression are jointly significant but not listed in table 8. Hypothetically, these variables may also be endogenous. For instance, if microenterprises face credit constraints, entry into desirable, capital-intensive industries (like transportation) could be endogenous. Conversely, treating them as exogenous requires the assumption that there is little movement between sectors. This assumption is consistent with table 5, which shows the close similarity in industry distribution between migrant and non-migrant businesses. People do what they know: restaurateurs run restaurants, and bus drivers drive buses. What’s more, running the capital-stock regression without industry controls returns the similar results.<sup>27</sup>

Second-stage regressions run without variables excluded from the first-stage migration

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<sup>27</sup>Regression results are available from the author upon request.



equation also return very similar results. This suggests that correlation between excluded exogenous variables and the first-stage error does not bias the results.

### 5.3 Endogenous selection

Estimated probabilities of microenterprise ownership are conditioned on employment, which also depends on migration and other observable factors. Observed capital stocks, in turn, are conditioned on both owning a microenterprise and being employed. Hence, endogenous selection may bias results reported above. For example, migration may encourage entrepreneurs with the smallest capital stocks to abandon their business and stop working. One woman I interviewed in metropolitan San Salvador used to sell eggs door-to-door in her neighborhood. When her husband left for the United States, he instructed her to give up her egg business and to spend more time at home with their children. If this anecdote is typical of widespread behavior, migration and remittances may not encourage positive investment, but simply eliminate the lower tail of the capital-stock distribution. I consider selection into both employment and microenterprise ownership below.

#### 5.3.1 Selection into employment

For women, maternity provides commonly-used instruments to identify selection into employment. It is argued that having children affects a woman's decision to work, but should not impact outcomes (such as wages) given employment (Wooldridge 2002).

For all women, I model employment as:

$$Pr(E_i = 1) = \delta_0 + \delta_1 M_i + \delta_2 X'_{i,d,r} + \delta_3 1(\text{Infants, 0-1})_i + u_{E,i} \quad (6)$$

$E_i$  is binary, equal to one if the woman is employed, and zero otherwise. Equation 6 controls for the same variables in the ownership equation. To identify selection into employment, I also include a dummy variable equal to one if the women has infant children under two years of age.<sup>28</sup>

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<sup>28</sup>Women in migrant households are less likely to have young children since their husbands are frequently away in the United States. The dummy for infants, therefore, may be correlated with the error term in the migration equation ( $u_{M,i}$ ). For these reasons, I estimate regressions that instrument for migration and also others that do not. The results, available from the author upon request, remain unchanged.

Table 9: Regression results: Controlling for selection into female employment

<b>All women</b>	<i>Employment, <math>Pr(E_i = 1)</math></i>		<i>Ownership</i>		<i>Capital stock</i>	
	(1) Probit	(2) Probit IV	(3) OLS	(4) IV	(5) OLS	(6) IV
Migrant HH (actual/predicted)	-0.05** (0.01)	-0.05 (0.04)	0.06** (0.02)	0.01 (0.06)	0.38** (0.13)	1.15** (0.32)
Age 30-39	0.15** (0.02)	0.15** (0.02)	0.08* (0.04)	0.08* (0.04)	-0.01 (0.23)	-0.06 (0.23)
Age 40-49	0.17** (0.02)	0.18** (0.02)	0.15** (0.04)	0.16** (0.05)	0.12 (0.26)	-0.24 (0.29)
Age 50-59	0.07** (0.02)	0.09** (0.03)	0.20** (0.03)	0.21** (0.05)	0.28 (0.20)	-0.34 (0.28)
Age 60 and above	-0.13** (0.02)	-0.10** (0.04)	0.25** (0.04)	0.26** (0.06)	0.50* (0.21)	-0.32 (0.33)
Primary school	0.02 (0.03)	0.02 (0.03)	-0.04 (0.04)	-0.03 (0.04)	0.31+ (0.16)	0.22 (0.17)
Secondary school	0.04 (0.03)	0.05 (0.03)	-0.17** (0.05)	-0.16** (0.05)	1.01** (0.22)	0.94** (0.22)
High school	0.10** (0.03)	0.10** (0.03)	-0.32** (0.05)	-0.31** (0.05)	1.45** (0.27)	1.41** (0.27)
University	0.28** (0.03)	0.28** (0.04)	-0.50** (0.06)	-0.50** (0.06)	2.00** (0.49)	2.05** (0.49)
Literate	0.02 (0.03)	0.02 (0.03)	0.00 (0.04)	-0.00 (0.04)	0.42* (0.17)	0.29+ (0.17)
1(Infants, 0-1)	-0.14** (0.02)	-0.14** (0.02)				
IMR (actual/predicted $M$ )			0.06 (0.10)	0.07 (0.10)	-1.37* (0.61)	-1.45* (0.61)
Observations	14638	14638	6463	6463	3442	3442
$R^2$ / Pseudo $R^2$	0.11	0.11	0.19	0.19	0.37	0.37

+ significant at 10 percent, \* significant at 5 percent, \*\* significant at 1 percent.

Notes: I report estimated coefficients and (standard errors). Individual is the unit of observation, and observations are weighted by inverse probability of selection (except Tobit estimates). Regressions include 8 regional location dummies, but the coefficients are not reported. Reported Probit estimates are marginal effects. Standard errors are robust to heteroscedasticity of unknown form.

Table 9 reports results in columns (1) and (2). In simple Probit results, migration decreases the probability of working. When I instrument, however, the coefficient on predicted migration is not significantly different from zero. Hence, there is little evidence that remittances negatively affect female employment.<sup>29</sup> Two other correlations, however, are worth noting. Rates of employment peak for women in their 30s and 40s, and employment is strictly increasing in the level of education.

Using predicted values from Probit estimates in columns (1) and (2), I calculate inverse Mills ratios (one with actual, the other with predicted migration) and then re-estimate the probability of microenterprise ownership including the ratios as regressors. Results are reported in columns (3) and (4). In the ownership equation, the Mills-ratio coefficients are not significant, and the coefficients on other variables are not significantly different from values predicted by regressions that do not control for selection. This implies that selection into employment is not important in estimating microenterprise ownership for women.

Columns (5) and (6), however, show that selection is significant to capital-stock regressions. The coefficient on migration is slightly larger than in regressions that do not control for selection and remain highly significant. Migration's impact on capital stock, therefore, does not appear to be explained by owners of the smallest businesses opting out of employment. It is worth noting that the estimated impact of owner age on capital stock is smaller and less significant (and actually negative in IV regressions) than in regressions that do not control for selection. This implies that age and experience affect women's employment decisions, but are not directly related to firm investment.

Although I would like to control for selection into employment for men, paternity is not likely to impact male employment as maternity affects female employment, and there are no obvious alternative instruments to identify selection. Since nearly all working-age

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<sup>29</sup>This result calls into question the commonly-held belief in El Salvador that remittances make people lazy. I hypothesize that the public may exaggerate the effect of remittances on employment because it confuses the direction of causality: remittances may lead to less employment, but unemployment is also likely to elicit remittances.

men are employed, however, endogenous selection into employment poses much less of a concern for men.

### 5.3.2 Selection into microenterprise ownership

Credibly controlling for selection into microenterprise ownership in capital-stock regressions would require an identifying instrument correlated with ownership but not correlated with capital stock. Theory suggests that prevailing wage rates among hired workers (the employed, who are not self-employed) would constitute valid instruments.<sup>30</sup> But regional location dummies already account for substantial variation in wages and other local economic conditions.<sup>31</sup> Without other convincing instruments, it is only possible to identify selection into ownership through an unconvincing assumption about functional form — the nonlinearity of the inverse Mills ratios (Wooldridge 2002). Estimating capital stock using a standard Heckman selection model to control for ownership does not return point estimates significantly different from regressions that do not control for selection. Results are available from the author upon request.

Fortunately, there are several reasons not to be too concerned about selection into ownership changing estimates of migration’s impact on capital stock. First, I find no evidence that migration affects ownership in cross-section regressions. This is consistent with other studies that find low barriers to entry in the microenterprise sector. Second, there is little evidence of systematic switching between industries. Table 5 shows that microenterprises in migrant households and non-migrant households have largely the same distribution across industries. Finally, controlling for selection into employment is significant, but does not change essential qualitative results.

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<sup>30</sup>Wages represent the opportunity cost of self-employment. As the theoretical model in section 2 implies, they should influence capital stock only indirectly, through ownership, by encouraging entry and exit from the microenterprise sector.

<sup>31</sup>Since I include location dummies in all regressions, identifying microenterprise ownership with wages at a more local level would require me to assume that wages varied within regions while microenterprise technologies and demand — captured by industry and location dummies in the capital-stock equation — varied only between regions. I calculate average log wages by department for salaried employees. Department-level wages have little explanatory power beyond the regional location dummies already included in the regressions, and estimated coefficients are not significantly different from zero.

## 6 Conclusion

This paper uses data from El Salvador’s 1999 Multi-Purpose Household Survey to investigate the impact of migration and remittances on microenterprises. I observe no significant effect of migration on microenterprise ownership, a finding consistent with studies that show low barriers to entry in the microenterprise sector. However, the effect of migration on firm capital stock is very large. Men and women owners in migrant households boast capital stocks more than twice as large as otherwise similar owners in non-migrant households. This latter finding is consistent with remittances reducing liquidity constraints and enabling microenterprise growth.

A central theme of this paper is the endogeneity of migration and self-employment. I instrument for migration with lagged remittance rates from El Salvador’s civil war, which measure the strength of migrant networks. In capital-stock regressions, IV results are several times larger than OLS results, suggesting the presence of simultaneity bias. It is likely that the owners of the largest businesses in the sample have been discouraged from emigrating. Measurement error in the migration variable is another source of bias. I observe if a household has a migrant “member” abroad or if it receives “regular” remittances, but the true variable of interest is the household’s access to both regular and one-time transfers that can be used for investment.

Better data would be useful. More inclusive and precisely-defined measures of migration and remittances would reduce measurement error and ambiguity. Detailed information about migrants — e.g., their gender, age, education, relationship to the household, length of stay abroad, and location — would be helpful to identify the distinct effects of migration and remittances. Panel data would also be nice; with data on the same individuals and households over time, one could pinpoint the dynamic effects of migration and remittances on business entry and exit, as well as investment and divestment.

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