

## From the Ground Up

### *Gender, Space, and Self-Employment in a Colombian Housing Project*

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**ABSTRACT** Self-employment is an important component of many development strategies aiming to enhance earnings and employment among low-income populations. However, women tend to earn less than men through self-employment, calling into question the effectiveness of self-employment as a tool for bolstering women's earnings. In this paper, we identify a novel intervention that boosts women's returns from self-employment and narrows the gender earnings gap in an informal, residential market. We argue that micro-spatial resources offer gender-specific advantages to female business owners. We show how gendered constraints on women's labor market activity intersect with spatial resources to influence their likelihood of running a business and their self-employment earnings. Using data from a Colombian public housing complex, we find that the randomly assigned location of a resident's apartment significantly influences women's business activity, but not men's. Women who run informal, home-based businesses from favorable locations earn more than twice as much as comparable women, narrowing the gender earnings gap by 58.5% and earning an income that lifts them above the poverty line. This study offers a new perspective on how gender and micro-geography intersect to shape self-employment. More broadly, it reveals how an important but often-overlooked factor, micro-spatial variation, influences economic development. **KEYWORDS** gender, self-employment, earnings, micro-geography

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Individuals with scarce resources and limited economic prospects often turn to self-employment as a means of earning income (Cohn 2012; de Soto 2000). Across the Global South, self-employed individuals provide products and services to low-income populations and earn income outside the bounds of the traditional labor market. Recognizing the importance of this type of work, governments and development institutions often promote self-employment as an important facet of their economic development strategies (Almeida and Galasso 2010; Cho, Robalino, and Watson 2014). But the economic returns from self-employment vary dramatically by gender. Across various settings, self-employed women earn less than self-employed men (Bird and Sapp 2004; Robb and Coleman 2009). In low-income, developing-country contexts, the gender disparities in returns from self-employment are particularly striking. Even when running small-scale businesses in informal marketplaces, men earn significantly more than women (World Bank 2012).

To counteract this wage gap, researchers have conducted numerous interventions to bolster women's self-employment income in informal, developing-country contexts. These scholars, who hail predominantly from development economics, have implemented randomized interventions to investigate whether business education enhances women's human

capital, or whether access to credit bolsters women's financial capital (Patel 2014). Disappointingly, these large-scale studies have documented minimal earnings effects. Across Latin America, Africa, and Eastern Europe, numerous studies find that human and financial capital interventions do little to increase women's self-employment income (Patel 2014; McKenzie and Woodruff 2014). Taken as a whole, this robust body of work demonstrates the difficulty associated with closing the self-employment earnings gap.

In this paper, we present a novel intervention that significantly increases women's self-employment income and narrows the gender earnings gap by 58.5%. We propose that prior interventions may have overlooked a critical entrepreneurial resource: micro-geographic space. Micro-geographic spaces are meaning-rich material forums in which exchanges of social and economic resources unfold (Gieryn 2000). Research in the sociology of space shows that minor differences in the layout and structure of micro-geographic environments, like an office floorplan or the design of residential spaces, have major effects on individuals' abilities to access resources (Festinger, Schachter, and Back 1950; Jacobs 1961; Liu and Srivastava 2015).

We believe that micro-geographic resources are particularly salient for low-income women, who often use their own homes as storefronts for informal small businesses (de Oliveira 1997) or "borrow" spatial resources from friends and relatives (Cohn 2012). Running a small business from home allows women to pursue an income-earning activity that requires no real estate investment, while attending to family or other household responsibilities (Blumberg 2001; Strassmann 1987).

Although running a business from home does not necessarily balance work and life demands (Budig 2006a), it is an important option for many poor women in developing countries, whose options outside the home may be constrained (Cohn 2017; Wilson 1998). Given the central role of physical space for these ventures, we anticipate that the micro-spatial location of women's homes will have a significant effect on their tendency to start informal businesses, as well as the income they earn from those endeavors.

To explore this possibility, we examine data from a public housing project in Colombia. In this setting, women face constraints on their ability to work outside the home, given gendered cultural expectations around childcare and other domestic tasks (Meertens et al. 2007). Women also command significantly lower wages in the labor market (Osorio Pérez 2015). Since traditional work options are less feasible and profitable for women, home-based businesses offer an important alternative to the broader labor market.

Our research setting offers a unique opportunity to isolate the causal effect of micro-spatial resources on women's earnings through self-employment. Residents in the housing complex were randomly assigned to identical apartments by lottery. Given the physical structure of the housing project, residents in ground-floor apartments have greater exposure to local pedestrian flows than residents on upper floors. We anticipate that this greater foot traffic will encourage informal business activity and facilitate higher earnings, particularly for women. Because women face heightened labor market constraints relative to men, we anticipate that these minor spatial advantages will translate into major shifts in business activity and earnings among women, narrowing the earnings gap in informal self-employment.

We find that the vertical proximity of a woman's home to foot traffic exerts a powerful, causal effect on her business activity and earnings. First, women's employment choices are

particularly sensitive to micro-spatial endowments, with location strongly moderating women's tendency to run informal businesses from home. Second, micro-spatial locations are highly consequential for women's earnings. Women who run businesses from advantageous locations earn more than twice as much as women who have similar spatial resources but are not entrepreneurs. Through their informal businesses, women in advantageous locations earn an income that is well above the poverty line and narrows the gender earnings gap by 58.5%. Given that informal work rarely lifts poor individuals out of poverty (Jütting and Laiglesia 2009), the effect of micro-spatial resources on women's earnings is particularly striking. We probe these effects further by examining the types of businesses women run, as well as the role of motherhood in patterning self-employment.

This paper bridges literatures on gender, economic development, and self-employment to demonstrate that a novel mechanism, micro-spatial resources, has a dramatic effect on women's earnings. Focusing on an informal, residential marketplace, this study shows how an important factor beyond human and financial capital can enhance women's earnings as home-based entrepreneurs. In doing so, our results introduce theoretical nuance to the relationship between self-employment and the gender earnings gap in developing-country contexts. More broadly, our findings introduce micro-spatial location as an important theoretical tool in the development sociologist's toolkit. Building on existing work and offering new insights, this study opens novel lines of inquiry for examining how minor spatial differences can profoundly shape social and economic development.

#### **RANDOMIZED INTERVENTIONS AND WOMEN'S SELF-EMPLOYMENT EARNINGS**

Government bodies and development institutions often encourage certain forms of self-employment to facilitate work and bolster earnings, particularly among low-income populations with limited labor market options (Almeida and Galasso 2010; Cho, Robalino, and Watson 2014; Gindling and Newhouse 2012). Indeed, development sociologists also view self-employment as an important component of "palliative" strategies that offer immediate economic benefits to local communities (Cohn 2012; Doering 2016). But despite the benefits associated with self-employment, researchers have found striking gender disparities in the financial returns from such activity, with men consistently earning more than women (Nix, Gamberoni, and Heath 2014; World Bank 2012).

Researchers have studied how self-employment policies and programs might enhance women's economic returns from self-employment, with much of this scholarship coming from development economics. In that field, randomized controlled trials are the tool of choice, as they enable causal isolation of treatment effects (Glennester and Takavarasha 2013). Working to increase women's self-employment earnings, researchers focus on bolstering two kinds of entrepreneurial resources: human capital and financial capital. Because women tend to have less business-related human capital (Bird, Sapp, and Lee 2001), researchers provide female entrepreneurs with business training programs (e.g., Drexler, Fischer, and Schoar 2014; Karlan and Valdivia 2011). And because women have less access to financial capital (Murray and Boros 2002), researchers provide women with access to microcredit (Karlan and Zinman 2011), savings tools (Dupas and Robinson 2013), and grants

(Fafchamps et al. 2011). Through these interventions, researchers seek to identify the sources of the gender earnings gap and to boost women's self-employment earnings.

Despite a collection of well-executed studies, these randomized interventions have had small or non-significant effects on women's earnings. In their review of business training interventions, McKenzie and Woodruff (2014) find minimal changes in female entrepreneurs' profits and revenues. Similarly, Patel (2014) shows that financial interventions have had little effect on women's business growth. The absence of strong effects on women's earnings suggests that alternative mechanisms may have been overlooked. Indeed, Patel encourages researchers to examine "other systematic constraints to women's entrepreneurial activity in addition to limited finance and business skills" (13).

Recognizing the potential for alternative mechanisms, we suggest that micro-spatial resources moderate women's small business earnings. In what follows, we discuss the literature on micro-geography and explain why micro-spatial resources might be particularly important for informal, home-based businesses. We also discuss why women who run well-placed businesses might earn more than comparable women working in other domains, and why spatial resources might not have the same impact on men's business activity and earnings.

## **GENDER AND SELF-EMPLOYMENT IN COLOMBIA**

In our research setting, women face two interrelated labor market constraints that influence their tendency to found a business at home, as well as their subsequent earnings. First, women in Colombia, like women across the globe, encounter the normative expectation that they will assume primary responsibility for childcare and other household tasks (Meertens et al. 2007). Second, women in Colombia command significantly lower wages in the labor market than men (Osorio Pérez 2015). Below, we anticipate how these gendered social institutions influence self-employment and how they could be moderated by micro-spatial resources.

### **Cultural Constraints on Working Outside the Home**

Women in Colombia face the cultural expectation that they will assume primary responsibility for childcare and other household tasks (Meertens et al. 2007). Poor women in Colombia have 3.49 children on average (Castañeda and Llanos 2012), and public childcare options are limited (Lora 2015). Thus, women's capacity to engage in the labor market is constrained. These limitations are reflected in differential employment levels, with 54.4% of women and 74.4% of men participating in the labor market (DANE 2017).

These structural limitations on women's labor market participation parallel trends in North America. According to widely shared cultural beliefs, women have characteristics that make them particularly well-suited to childcare and household maintenance (Ridgeway and Correll 2004). Women are widely viewed as more nurturing and communal than men, who are seen as more agentic and instrumental, and thus better suited to the traditional labor force (Cuddy, Fiske, and Glick 2004). As such, women are generally held to the normative expectation that they will assume the bulk of family care responsibilities (Ridgeway 2011). For many women, the tension between household and non-household work makes it difficult to participate fully in the labor market (Budig and Hodges 2010).

Faced with these challenges, many women turn to self-employment (Cohn 2017). Self-employment offers more flexibility and autonomy than traditional wage labor (Budig 2006b; Hughes 2005; Loscocco and Bird 2012), allowing women to accommodate household responsibilities. Indeed, women are more likely to opt for self-employment as a “Plan B” when policies and institutions provide little flexibility or support for working mothers (Thébaud 2015).

In Latin America, women have a long tradition of pursuing self-employment at home, particularly in the informal sector. Historically, when faced with limited family-support policies, poor Latin American women have used the materials and skills at their disposal to sell products and services from home (de Oliveira 1997). Latin American women in female-headed households are particularly likely to take up informal work, as they face more onerous family constraints (Wilson 1998). Beyond the boundaries of Latin America, low-income women often start informal, small businesses from home as a way of earning income without incurring additional real estate costs (Blumberg 2001; Ehlers and Main 1998; Strassmann 1987). Although women’s home-based businesses rarely prove highly profitable (Thompson, Jones-Evans, and Kwong 2009), they offer a means of navigating work–family constraints.

Given these constraints, we expect that women in the focal housing project will be more likely than men to run informal businesses from home. As a baseline hypothesis, and consistent with previous work demonstrating women’s tendency toward home-based business, we anticipate that:

**Hypothesis 1:** Women will be more likely than men to run home-based informal businesses.

#### **MICRO-GEOGRAPHY AND STRUCTURED OPPORTUNITIES**

Whereas our first hypothesis anticipates that women are more likely to run informal businesses, our second hypothesis anticipates that women’s business activity will be significantly shaped by their micro-spatial resources. Before formally asserting this expectation, we explain how micro-geography influences social and economic resources, and why an apartment on the ground floor doubles as an entrepreneurial resource in our setting.

Researchers have established that geographic proximity facilitates interaction patterns, which can shape access to resources. Most interactions occur across relatively minor spatial distances (Sorenson and Stuart 2001), likely because individuals are reluctant to expend the effort to overcome physical constraints (Zipf 1946). The relatively narrow band of micro-geographic space that individuals occupy thus shapes their access to people, information, and other resources.

Scholars have shown that the built environment provides a physical scaffold for interactions, which in turn affect opportunities to attract and accrue resources. For example, Festinger, Schachter, and Back (1950) found that the layouts of stairwells and entrances at MIT residence halls were critical determinants of residents’ friendship networks. And Allen (1977) demonstrated that the arrangement and distribution of engineers’ office locations played central roles in shaping communication patterns. Scholars have found that traders’

seating locations on the floor of a stock exchange pattern their communication and trades (Baker 1984), and that the locations of desks (Chown and Liu 2015), lunchrooms (Sommer 1959), and restrooms (Pfeffer 1981) serve as nucleating points around which interactions are centered. As Gieryn (2002, 35) explains, “Buildings stabilize social life. They give structure to social institutions, durability to social networks, persistence to behavior patterns.” Thus, small differences in micro-geographic configurations can significantly shape interactions, exchanges, and access to resources.

### Gender, Apartment Location, and Informal Business

In the Colombian housing project examined in this study, residents’ physical location may influence their decision to run an informal business from home. Residents of low-income neighborhoods often use the physical environment’s built features to sell products and services informally (Bacchetta, Ernst, and Bustamante 2009; Venkatesh 2006). Apartments in the housing project have identical layouts within four-story buildings. Pathways and sidewalks thread through the project, leading residents to walk next to the windows and porches of ground-floor apartments. Figure 1 provides a photograph of the walkways in the housing project and their proximity to ground-floor apartments.<sup>1</sup>

As a result of this physical structure, residents assigned to ground-floor apartments have greater exposure to pedestrian flows, and potential customers, than residents assigned to upper floors. Residents on the ground floor can use their windows and porches as informal storefronts to serve other residents as they pass by. Chance encounters along well-trodden



FIGURE 1. Neighborhood walkways

pedestrian paths often facilitate interactions among acquaintances and strangers (Grannis 2009). Below, Figure 2 highlights this potential of ground-floor-based businesses to reach potential customers. Although residents in upper-floor apartments can also run informal businesses, they have less opportunistic positions from which to sell to local pedestrians. Logically, individuals with more favorable entrepreneurial resources should be more likely to run informal businesses from those spaces.

We now link the micro-geographic features of the housing project with the macro-level social institutions that limit women's participation in the labor market. As discussed above, women in Colombia face the normative expectation that they will assume primary responsibility for childcare and other household tasks, making it challenging to work outside the home. Thus, we anticipate that women will be particularly sensitive to spatial opportunities in the built environment that encourage self-employment. Women may be especially receptive to spatial endowments because home-based businesses allow them to more readily integrate income-earning activities with household responsibilities. By comparison, since men do not face the same constraints, they should be less sensitive to such spatial opportunities. Said differently, we anticipate that, because women are constrained in the wider labor market, they may be particularly responsive to micro-geographic resources that allow them to co-locate work and family responsibilities from a favorable position in the marketplace. Specifically, we expect:



FIGURE 2. A home-based informal business in the housing project. The sign on the ground floor advertises the sale of cell-phone minutes.

**Hypothesis 2:** Women who occupy favorable spatial locations will be more likely to run home-based informal businesses than women in unfavorable spatial locations, whereas men’s self-employment activity will not be significantly shaped by spatial location.

### Gendered Earnings Gap and Returns from Self-Employment

Women in Colombia command significantly lower wages than men. The female-typed jobs that women perform in Latin America garner lower wages and have fewer protections than male-typed jobs (Blofield 2009). Indeed, men with similarly low levels of education earn more in low-skilled, male-typed jobs than women earn in low-skilled, female-typed jobs (Ñopo 2012). Even when performing the same type of work with the same qualifications, women are generally paid less than men (Meertens et al. 2007). Indeed, men in Colombia earn 20.9% more than women of similar age and education, and the situation is exacerbated for women with little education and few marketable skills, who are often employed in positions that garner particularly low wages, like domestic service (Osorio Pérez 2015).

In our setting, women and men in the housing project report performing different types of work. Women who work outside the home tend to occupy low-wage positions and report working most frequently in “various trades” (*oficios varios*), domestic service, and waitressing. Men in the housing project report working most frequently in “various trades,” street vending, carpentry, taxi driving, and construction. Although men’s jobs are not high-wage positions in the economy as a whole, their labor market opportunities provide higher wages than women’s opportunities.

We expect that the gendered wage gap in the broader labor market will influence the relative returns from home-based self-employment. Within a woman’s low-wage opportunity set, running a home-based business in a favorable (ground-floor) location may be a profitable option. She may earn more by running an informal business from a ground-floor apartment than she would working as a waitress or nanny. By comparison, male informal business owners may not experience the same relative returns from advantageous micro-spatial resources. For a man, running an informal business from the ground floor may not be as lucrative as his other options, like construction or taxi driving. Given women’s limited opportunities in the wider labor market, we anticipate that the interaction of informal business activity and micro-spatial resources will significantly affect women’s earnings.

**Hypothesis 3:** Women who run home-based informal businesses from favorable spatial locations will earn significantly more than women endowed with similar spatial locations who work in other domains.

To further isolate the effects of micro-geographic resources on returns from self-employment, we also compare the earnings of self-employed women on ground and upper floors, anticipating that those on the ground floor will earn more than those on upper floors. We also benchmark women’s earnings against men’s. Our expectation is that micro-geographic endowments will not significantly influence men’s relative earnings through home-based self-employment, given their lucrative options in the broader labor market.

## RANDOM ASSIGNMENT

We use data from a natural experiment in a Colombian public housing complex. The housing complex sits five miles outside a mid-sized city and is part of a large-scale government initiative to provide free housing to poor citizens, many of whom have been displaced by Colombia's long-standing internal conflict (Minvivienda 2015b). Crucially for this study, residents who were selected to live in the complex are randomly assigned to apartments, allowing us to isolate the causal effect of spatial location on self-employment.

Four features of the setting support the notion that apartment assignment is truly random. First, random assignment is dictated by Colombian law. This law is institutionalized on governmental websites and states that “to guarantee the transparency of the lottery, a system of lottery machines will be used” (Minvivienda 2013, 3). The law also dictates that disabled or elderly individuals can request ground-floor apartments—because the buildings do not have elevators (Minvivienda 2015a)—a provision that we carefully account for in our analyses. Second, the lotteries take place in public. Government officials facilitate draws of apartment numbers from lottery machines with future residents awaiting assignments in the audience (Figure 3). Residents receive their assignments in real time, minimizing opportunities for distortion or back-room deals, and are not permitted to swap apartments. One resident described the process this way: “They put these little papers in a ball, and they call your name, and you go up and pull out a piece of paper with your apartment number.” After the lottery, government officials publish assignments on a public website (Minvivienda, no date). Third, housing staff repeatedly reassured us that, although many interactions with the Colombian government are notoriously open to bribery, the apartments studied in this paper were truly randomly assigned.

Finally, we investigated the random assignment in a series of balance tests (results below) and found distributions consistent with randomization. As mentioned, Colombian law



FIGURE 3. Screen shot from elpais.com.co depicting housing assignment lottery

Note: Captured September 5, 2015, from <http://www.elpais.com.co/valle/pradera-primer-municipio-de-colombia-en-asignar-viviendas-gratis-por-sorteo.html>.

dictates that disabled or elderly individuals can request ground-floor apartments when buildings do not have elevators. Our results (see below) hold when controlling for (or excluding) this subpopulation. Taken together, we have strong reason to believe that our setting has true random assignment, allowing us to draw causal inference.

## DATA AND METHOD

To examine self-employment and earnings, we employ data from a census of individuals living in the housing project. A private data-collection firm conducted the census in the fall and winter of 2014. At that point, residents had been living in the complex for about a year. Given this short period, residents in our setting would have had limited social networks, compared to residents of more established communities. Although the data set contains information on children and adults, we focus on the 1,786 working-age adults (16 or older) who live in the complex. We exclude 10 individuals because they have incomplete demographic information.

The data consist of a single cross-sectional record for each adult. Although our data are cross-sectional, two factors assist with our causal claim. First, our dependent variables (business activity and income) are measured *after* apartment assignment. Second, because apartment assignment is random, residents' personal characteristics should not differ significantly across ground and upper floors (a fact we demonstrate below). Thus, any differences across space in business activity or income should be driven by randomly assigned location.

*Outcome variables.* We focus on two outcome variables: whether residents run an informal business in their home, and the income they earn (from the informal business or from another type of work). Running an informal business is one of many types of work that residents can report in the census. We assign a value of 1 to the variable *Informal Business* if the resident reports that their primary economic activity is running a small business from home, and 0 otherwise. Our second outcome variable, *Individual Income*, is a continuous measure of reported monthly income. To aid interpretation, we convert all values from Colombian pesos to US dollars at the 2014 average exchange rate (COP 1 = USD 0.0005).

*Key predictor variables.* We focus on three variables to predict informal business activity and income. First, we estimate the effect of being *Female* (woman = 1, man = 0) on running an informal business (H1). Then, to examine the combined effect of gender and spatial location (H2), we interact *Female* and *Ground Floor*. The *Ground Floor* variable indicates whether individuals live in a ground-floor or upper-floor apartment (ground = 1, upper = 0). Finally, to examine whether women's economic returns from informal business are shaped by their micro-spatial resources (H3), we introduce an interaction between *Informal Business* and *Ground Floor* as a predictor of women's income.

*Balance checks.* We have claimed that residents are randomly assigned to apartments. Here, we present a series of balance checks to test this assertion and strengthen our causal claim. Balance checks are *t*-tests comparing the mean values of observable variables for individuals in the treatment and control conditions across the full population (Glennerster and Takavarasha 2013). The balance checks presented in Table 1 reveal that ground-floor and upper-floor residents are statistically similar in gender, education, marital status, and family size. These balanced distributions suggest that housing assignment is indeed random.

TABLE 1. Balance checks for random assignment across housing complex population

Variable	Ground floor (N = 750)	Upper floors (N = 2284)	Difference
Female	0.52 (0.02)	0.53 (0.01)	0.01 (0.02)
Secondary Education	0.36 (0.02)	0.35 (0.01)	-0.01 (.02)
Married	0.35 (0.02)	0.37 (0.01)	0.02 (0.02)
Family Size	5.13 (0.07)	5.03 (0.04)	-0.10 (0.08)
Age	26.83 (0.74)	22.97 (0.35)	-3.86*** (0.74)
Disabled	0.04 (0.01)	0.01 (0.00)	-0.03*** (0.01)

Note: The sample for age includes 10 fewer individuals due to missing data.

As expected based on government policy, the balance checks also reveal that ground-floor individuals are older and more likely to be disabled. To account for these differences, we include regression models that control for age and disability, and find similar results.

*T-tests and regression models.* To estimate the effects of gender and micro-spatial resources on self-employment, we use a complementary set of *t*-test analyses and regression models. *T*-tests are comparisons of means and are widely used in experimental research to evaluate treatment effects (Glennster and Takavarasha 2013). We present *t*-test results first when evaluating each hypothesis. But because residents are nonrandomly distributed on age and disability, and because these factors may influence work and earnings, we also include regression models that control for these factors. Specifically, we run models that control for *Age*, *Age Squared*, and *Disability*. We also run the models on a sample that excludes unemployed adults (i.e., those who report being unemployed and do not have home-based businesses). We examine this employed-only sample to ensure that our results are not biased by individuals who are unlikely to participate in the labor market. In separate analyses (available on request) we included a variety of additional controls—marital status, education, head of household, and other family members' income—and found our results to be robust.

We use logistic regression to estimate residents' odds of informal business activity (H1 and H2). When testing H2 (that women will be particularly responsive to micro-spatial resources), we estimate the interaction effect of gender and location on business activity. Interaction terms in nonlinear models (in this case, logistic regression) can be misleading, because coefficients and significance levels vary depending on the specified values of the predictors (Ai and Norton 2003; Norton, Wang, and Ai 2004). Put differently, the lack of coefficient significance in nonlinear interaction coefficients may be spurious. Thus, we follow previous scholars (e.g., Kwon, Heflin, and Ruef 2013; Doering and Thébaud 2017) and use predicted probabilities to evaluate marginal differences between groups, holding all

control variables constant at their means. We also ran logistic regressions as “rare event” models (King and Zeng 2001), because the number of informal businesses is small relative to the total number of adults, and found consistent results (available on request).

Our third hypothesis is that women will earn more by running informal businesses in favorable locations than by working in other domains. To examine this possibility, we split the sample by gender to conduct within-gender analyses. We employ generalized linear models to predict individual income, which is right-skewed. This approach generates accurate estimates and predicted values when response variables are non-normally distributed (Neuhaus and McCulloch 2011). The results are also robust to using ordinary least squares regression. Finally, we cluster standard errors at the household level to account for within-household interdependence of informal business and other economic activity.

### RESULTS: GENDER, SPACE, AND SELF-EMPLOYMENT

We begin by describing the data with summary statistics (Table 2). Across the 1,786 individuals in the data set, the average individual is 35 years old, and women slightly outnumber men. Consistent with the spatial configuration of the four-story apartment buildings, approximately one in four individuals lives on the ground floor. Approximately 3% of adults (55 individuals) run an informal business at home. This figure may seem low at first glance, given the high rates of informal economic activity in Latin America (Deelen 2015). But estimates of informality include ventures both inside and outside the home (Córdova 2013). Since we focus on a particular subset of informal activity, it is logical that our rate of home-based entrepreneurship would be lower than more global estimates of informality. The average adult earns \$126.56 per month, reflecting the low-income population in the complex. The national poverty line is \$108.52 for individuals and \$434.08 for a four-person household (DANE 2015). Consistent with gendered earnings trends in Colombia, we find a strong, negative correlation between income and being female.

We consider first how gender influences residents’ use of spatial resources for self-employment. Our baseline hypothesis (H1) is that women are more likely than men to run informal businesses. In H2, we anticipate that women will be particularly responsive to favorable micro-spatial resources. We begin by using *t*-tests to compare mean levels of informal business activity among women and men. Consistent with H1, we find that women are significantly more likely than men to run an informal business (4.34% versus

TABLE 2. Summary statistics for adult population

Variable	N	Mean	SD	1	2	3	4	5	6
1. Informal Business	1,786	0.03	0.17	1.00					
2. Individual Monthly Income (USD)	1,786	126.56	151.53	0.02	1.00				
3. Ground Floor	1,786	0.26	0.44	0.09	-0.04	1.00			
4. Female	1,786	0.54	0.50	0.08	-0.43	0.01	1.00		
5. Age	1,786	35.15	14.20	0.06	0.13	0.12	-0.02	1.00	
6. Disabled	1,786	0.02	0.13	0.03	-0.04	0.13	-0.06	0.02	1.00

1.59%,  $p < .001$ ). Consistent with H2, we find that floor location significantly shapes women's likelihood of business activity, but only marginally influences men's. Among women, 7.75% of those in ground-floor apartments run an informal business from home, compared to 3.10% of those on upper floors ( $p < .01$ ). Among men, 2.84% of those on the ground floor and 1.15% of those on upper floors run an informal business ( $p = n.s.$ ). These results suggest that women are particularly sensitive to spatial endowments, whereas men's self-employment is less influenced by their micro-geographic locations.

Because age and disability are non-randomly distributed across apartments, we also test H1 and H2 using regression analyses that control for these factors (Table 3). In model 1, we present a baseline regression that includes only controls. Logically, we find that being on the *Ground Floor* has a strong, positive effect on informal business activity. We also see a non-linear effect of age on informal business activity, such that both younger and older adults have lower odds of starting an informal business than middle-aged adults.

In model 2, we introduce *Female* as a predictor and find that women have 2.85 times the odds of running an informal business from home compared to men ( $p < .001$ ), consistent with H1. We find similar results when excluding unemployed individuals (model 4). To test H2, we include the interaction term *Ground Floor*  $\times$  *Female* in model 3. As discussed above,

TABLE 3. Logistic regression predicting running an informal business

	(1)	(2)	(3)	(4)	(5)
	All adults	All adults (H1)	All adults (H2)	Excluding unemployed (H1)	Excluding unemployed (H2)
Ground Floor	2.85*** (0.85)	2.81*** (0.86)	2.78 (1.60)	2.81*** (0.86)	2.94 (1.69)
Female		2.85*** (0.87)	2.84* (1.16)	2.65** (0.82)	2.72* (1.11)
Ground Floor $\times$ Female			1.01 (0.63)		0.94 (0.59)
Age	1.35** (0.14)	1.35** (0.15)	1.35** (0.15)	1.35** (0.15)	1.35** (0.15)
Age <sup>2</sup>	1.00* (0.00)	1.00* (0.00)	1.00* (0.00)	1.00* (0.00)	1.00* (0.00)
Disabled	1.67 (1.39)	1.81 (1.66)	1.81 (1.66)	1.87 (1.75)	1.87 (1.75)
N Individuals	1786	1786	1786	1627	1627
N Households	698	698	698	687	687
Log pseudo-likelihood	-226.18	-220.16	-220.16	-216.20	-216.19

Note: Coefficients and standard errors are exponentiated. Standard errors are in parentheses and are clustered at the household level.

\*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ , two-tailed.

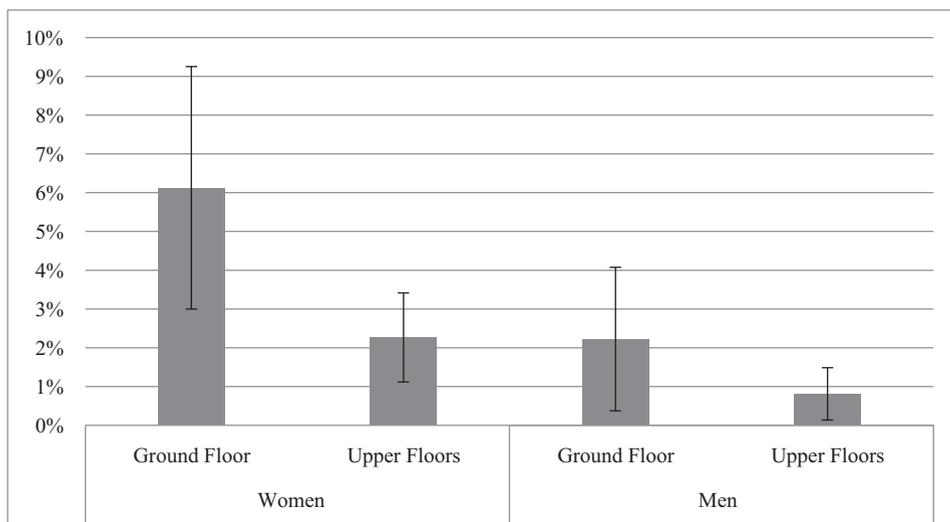


FIGURE 4. Predicted probability of informal business activity by gender

Note: The predicted probability of business activity is significantly different for women on ground and upper floors ( $p < .01$ ), but is not significantly different for men.

interaction terms and significance levels in nonlinear models can be misleading. In these models, an exclusive focus on the significance levels of coefficients can lead researchers to overlook potentially significant effects. Thus, we use the results of model 3 to generate predicted probabilities, holding controls constant at their means. Figure 4 presents women and men's predicted likelihood of running an informal business.<sup>2</sup> Consistent with our expectations in H2, women on the ground floor have a significantly higher predicted probability of running an informal business than women on upper floors (6.13% versus 2.27%,  $p < .01$ ). However, spatial location has no significant effect on men's likelihood of running an informal business (2.22% on the ground floor versus 0.81% on upper floors,  $p = \text{n.s.}$ ). Overall, these findings suggest that women, who face major constraints on labor market participation, are particularly influenced by spatial opportunities that lend themselves to informal, home-based businesses; men are less influenced by spatial resource endowments when founding informal businesses.

### Effects of Space and Self-Employment on Earnings

We now examine the role of micro-spatial resources and informal business on women's earnings. In H3, we anticipated that the interaction of informal business and ground-floor location would have a significant, positive effect on income, such that women who run informal businesses from the ground floor will out-earn women who also live on the ground floor but work in other domains. For women, running a home-based informal businesses from a ground-floor location may be more lucrative than other options in their labor opportunity set.

We begin by comparing mean monthly earnings. Among women on the ground floor, those running informal businesses earn nearly three times more than those working in other domains (\$167.30 versus \$59.93,  $p < .001$ ). By comparison, women on upper floors do *not* earn significantly more when they run informal businesses than when they work in other

domains (\$63.70 versus \$66.78,  $p = n.s.$ ). The  $t$ -tests suggest that women in favorable spatial locations earn significantly more through home-based self-employment than in other jobs common among women, such as cleaning or waitressing. Notably, these income differentials are limited to ground-floor businesses.

As a point of comparison, men do not earn significantly more through informal business on the ground floor. The difference between men's earnings from informal businesses and their work in other domains is not significant, on either the ground or upper floors. Even when occupying favorable ground-floor locations, men do not earn significantly more through home-based self-employment than from other domains, such as construction or taxi driving.

We find consistent results when controlling for age and disability in regression analyses. We present the results of the generalized linear models predicting individual income in Table 4. For ease of interpretation, we present predicted monthly income (with all controls constant at their means) in Figures 5 and 6.

Among women, earnings vary significantly based on their micro-spatial resources and the type of work they perform. Model 1 in Table 4 offers a baseline estimation of women's monthly earnings; model 2 introduces an interaction of *Ground Floor*  $\times$  *Informal Business*; and model 3 excludes unemployed individuals. Models 2 and 3 show significant, positive

TABLE 4. Generalized linear model predicting individual monthly income

	(1)	(2)	(3)	(4)	(5)	(6)
	Women	Women	Women, excluding unemployed	Men	Men	Men, excluding unemployed
Ground Floor	0.14 (0.11)	0.00 (0.13)	-0.01 (0.13)	-0.09 (0.06)	-0.10 (0.06)	-0.07 (0.06)
Informal Business	0.38* (0.16)	-0.18 (0.35)	-0.25 (0.35)	0.10 (0.13)	-0.00 (0.19)	-0.14 (0.20)
Ground Floor $\times$ Informal Business		0.97* (0.40)	0.98* (0.40)		0.25 (0.24)	0.22 (0.25)
Age	0.10*** (0.03)	0.09*** (0.02)	0.10*** (0.03)	0.10*** (0.01)	0.10*** (0.01)	0.10*** (0.01)
Age <sup>2</sup>	-0.00*** (0.00)	-0.00** (0.00)	-0.00** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
Disabled	-2.10*** (0.58)	-1.97*** (0.58)	-2.06*** (0.59)	-0.47 (0.29)	-0.46 (0.28)	-0.26 (0.22)
<i>N</i> Individual	967	967	903	819	819	724
<i>N</i> Household	666	666	643	602	602	552
Log pseudo-likelihood	-5944.90	-5941.03	-5564.44	-5251.75	-5251.50	-4589.21

Note: Standard errors are in parentheses and are clustered at the household level.

\*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ , two-tailed.

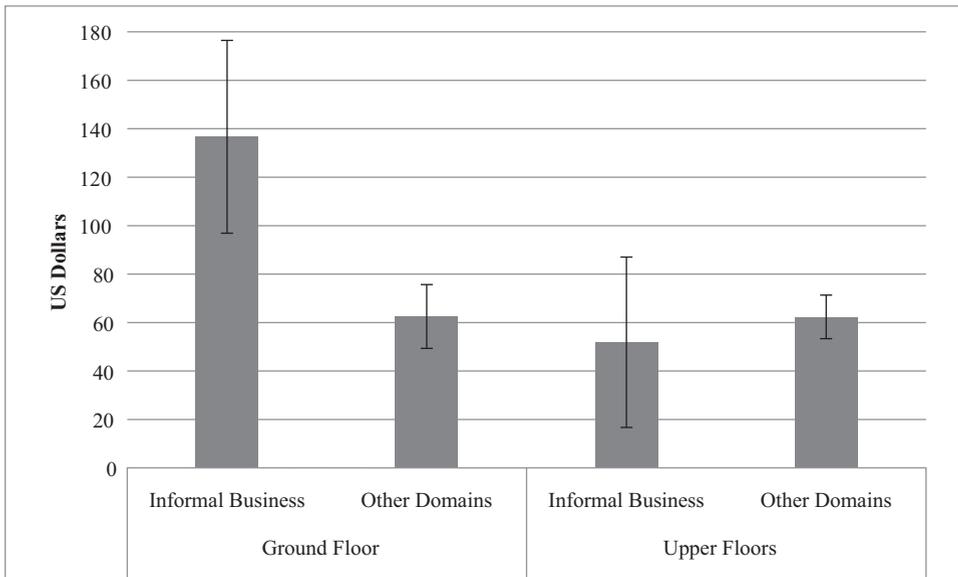


FIGURE 5. Women’s predicted individual monthly income by floor location

Note: On the ground floor, there is a significant difference between predicted earnings from informal business and other domains ( $p < .01$ ). On upper floors, there is no significant difference. There is a significant difference between returns from informal business on the ground floor and upper floors ( $p < .01$ ).

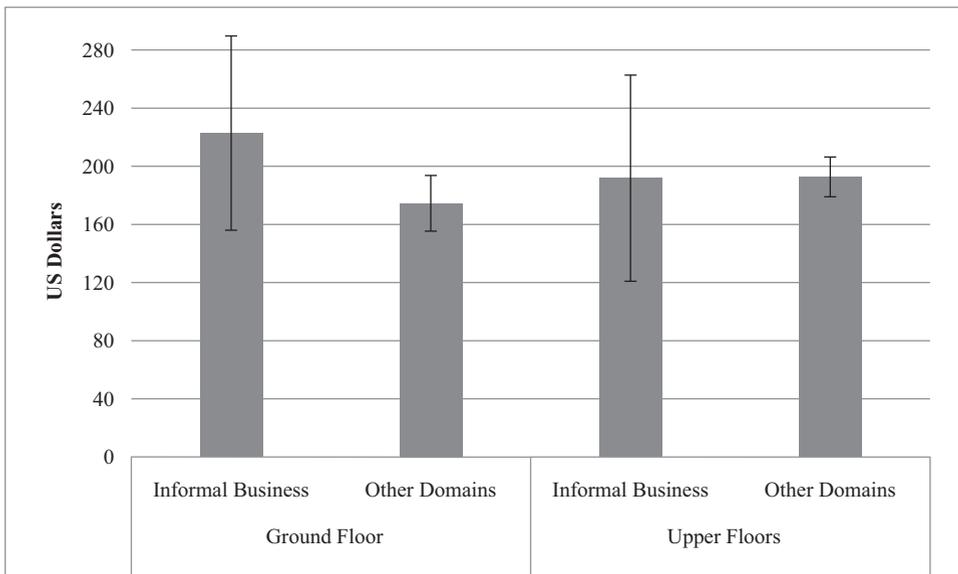


FIGURE 6. Men’s predicted individual monthly income by floor location

Note: There is no significant difference between predicted earnings from informal business or other domains on the ground floor or on upper floors.

interactions of *Ground Floor* × *Informal Business*. We present women's predicted earnings in Figure 5, which demonstrates that, on the ground floor, women who run a business out-earn those who work in other domains.<sup>3</sup> Female ground-floor business owners are predicted to earn more than twice as much as their ground-floor peers who work in other domains (\$136.71 versus \$62.50,  $p < .01$ ). Women running businesses on the ground floor also significantly out-earn those running businesses on upper floors (\$136.71 versus \$51.87,  $p < .01$ ). But women on upper floors who run an informal business do not earn significantly more than those who work in other domains (\$51.87 versus \$62.36,  $p = \text{n.s.}$ ). These findings are consistent with the  $t$ -tests and underscore the finding that women can earn significantly higher incomes by running an informal business from home as compared to other common forms of work, but only when they have access to favorable micro-spatial resources.

As a point of comparison, we examine the results for men. The non-significant interactions in models 5 and 6 suggest that men's income on the ground and upper floors does not differ significantly by informal business activity. Figure 6 displays these differences more concretely by presenting predicted earnings. Analyses of marginal effects show non-significant predicted earnings differences for men on the ground floor who own businesses and those who work in other domains (\$222.84 versus \$174.48,  $p = \text{n.s.}$ ). We also find non-significant marginal differences between predicted earnings for business owners on upper floors and those who work in other domains (\$191.85 versus \$192.66,  $p = \text{n.s.}$ ). Men do not earn significantly more than comparable peers when running an informal business, even when they occupy favorable ground-floor locations.

Overall, our results demonstrate that micro-spatial resources provide a significant boost to women's income through self-employment and narrow the gender earnings gap. Specifically, through their micro-spatial resources, female entrepreneurs narrow the gender earnings gap in self-employment by 58.5%.<sup>4</sup> Furthermore, micro-spatial resources help self-employed women on the ground floor earn an average income (\$167.30 per month) that is well above the poverty line of \$108.52 per month (DANE 2015). Other women in the housing complex earn average incomes that fall closer to the *extreme* poverty line of \$48.95 per month. Thus, running a business from a favorable location offers women a significant improvement over their earnings opportunities in other domains and, importantly, a means of moving out of poverty. Nevertheless, women's overall incomes remain precariously low, especially compared to men's. The highest-earning women, ground-floor entrepreneurs, still earn far less than the average male home-based entrepreneur (\$167.30 versus \$240.69). Thus, although micro-spatial resources aid in narrowing the gender earnings gap, they do not eliminate gendered income differences.

#### EXTENDED ANALYSES: BUSINESS TYPES AND MOTHERHOOD

At least two possible scenarios may underlie the earnings differential between female business owners on the ground and upper floors. First, women may start different *types* of businesses, depending on whether they are adjacent to pedestrian flows (ground floor) or more removed from such activity (upper floors). Second, similar types of businesses may be more lucrative when located on the ground floor. Holding business type constant, proximity to pedestrian flows may enable a greater number of transactions, leading to greater revenue.

In an initial exploration, we examine business categories across ground and upper floors (Table 5).<sup>5</sup> There is much overlap. Women’s businesses on both the ground and upper floors fall into the categories of food and drink services and miscellaneous retail. One difference is that women on the ground floor have a higher likelihood of running food and drink ventures, while women on upper floors are more likely to offer beauty services.

Table 6 identifies businesses located on the ground floor exclusively, upper floors exclusively, and in both locations. Businesses exclusive to the ground floor tend to revolve around food. Indeed, the only business exclusive to the ground floor that does not involve food is selling cell phone minutes. Women appear to capitalize on their locations by offering goods that are purchased quickly and require little advance planning from consumers. By comparison, many of the businesses exclusive to upper floors require advance planning and purchases that take longer to realize. All the hairdressers are located on upper floors; these (highly gendered) services may require appointments and take longer to enact.

As a further step, we compared the income generated from similar business types on the ground and upper floors (*Both Floors* in Table 6). From these businesses, women on the ground floor earn an average monthly income nearly double that of women on upper floors (\$154.81 versus \$80.50). This difference suggests that women on the ground floor benefit

TABLE 5. Categories of businesses run by women on ground and upper floors

Business category	Ground floor (N = 20)		Upper floor (N = 22)	
	Count	Percentage	Count	Percentage
Service—beauty	0	0%	4	18%
Service—food and drink	10	50%	6	27%
Vendor—miscellaneous	9	45%	11	50%
Unspecified	1	5%	1	5%

Note: There are 248 adult women on the ground floor and 685 on upper floors.

TABLE 6. Specific businesses run by women on the ground floor only, upper floors only, and both floors

Ground floor only	Upper floors only	Both floors
Beer vendor	Frozen food vendor	Catalog vendor
Cellphone minutes vendor	Hairdresser	Cellphone minutes and sweets vendor
Fast-food vendor	Ice vendor	Fruit vendor
Meat vendor	Laundry machine rental	Lunch vendor
Restaurant	Popsicle and ice vendor	Pan-fried food vendor
Soft drinks and ice vendor		Pastries vendor
Soup vendor		Popsicle vendor
		Vendor, unspecified

from greater exposure to foot traffic. But because we do not know the exact products on offer or the hours of operation, and because these are small samples, these figures are merely exploratory.

### Motherhood, Spatial Endowments, and Informal Business

When a woman has significant caregiving responsibilities, she may be socially constrained from working outside the home. For example, a mother who must be present at home to receive children after school may not have the flexibility to seek traditional employment. Thus, mothers may be particularly sensitive to favorable spatial endowments that allow them to run informal businesses from home. We probe this possibility by testing whether women are more likely to found informal businesses when they have children.

Of the 967 women over age 16 in the housing project, 51% are mothers. We find that mothers are 10 times more likely to run informal businesses than non-mothers (7.16% of mothers versus 1.46% of non-mothers,  $p < .001$ ).<sup>6</sup> Among those on the ground floor, mothers are 10 percentage points more likely than non-mothers to run informal businesses (13.86% versus 3.82%,  $p < .01$ ), suggesting that mothers are particularly eager to take advantage of self-employment in favorable locations. Interestingly, mothers also have a greater likelihood of business activity than non-mothers on upper floors, where economic returns from informal business are low (5.42% versus 0.31%,  $p < .001$ ). The greater propensity among mothers to start informal businesses in both favorable *and* less favorable locations highlights the constraints mothers face. With so few work options that accommodate child-care responsibilities, mothers are more likely to run businesses at home even when these ventures generate little income.

### Limitations

Our data offer novel insights into the relationships among gender, space, and self-employment, but they also have limitations. The primary limitation is a natural feature of our setting: a small number (55) of self-employment observations. Much like studies of other rare events, such as heart attacks or war, we maintain that statistical infrequency does not make the phenomenon less important (King and Zeng 2001), although it does limit the types of analyses we can perform. But whereas entrepreneurship researchers often restrict their samples to business owners (e.g., Loscocco and Bird 2012), we examine the frequency and earnings of business activity *across an entire community*. This allows us to compare entrepreneurs and non-entrepreneurs, thereby generating productive insights about the returns from self-employment relative to other forms of work. Given the limited number of self-employment observations in our data, we view this research as a first step in constructing a micro-spatially informed understanding of development. We hope that future researchers will continue to examine the effects of micro-spatial resources on development outcomes in other contexts, thereby probing the generalizability of our findings.

## DISCUSSION AND CONCLUSION

Policymakers and scholars often encourage self-employment as a means of creating economic opportunities and bolstering earnings in low-income communities. However, across

a variety of settings and business types, women earn significantly less than men through self-employment. In this study, we have illustrated how a unique mechanism, access to micro-spatial resources, significantly bolsters women's economic returns from self-employment. Motivated by insights from the sociology of space, we examine how housing endowments with differential access to pedestrian flows affect informal business activity in Colombia.

We find that women are particularly responsive to micro-spatial resources when founding informal businesses. Moreover, women who run businesses in advantageous locations are predicted to earn more than twice as much as similar women, allowing many to escape poverty. Yet for men, who have lucrative employment opportunities outside the home, running an informal business in a favorable location does not garner significantly higher earnings. Whereas previous studies find minimal effects of human and financial interventions on women's returns from self-employment in informal, developing-country contexts (McKenzie and Woodruff 2014; Patel 2014), our findings reveal that micro-spatial resources can significantly boost women's income and narrow the gendered earnings gap in self-employment.

### Women's Visibility in Self-Employment

Although women across the globe turn to self-employment when they encounter constraints or discrimination in the labor market (Aldrich and Cliff 2003; Cohn 2017; Hughes 2005; Thébaud 2015), running one's own business rarely translates into economic mobility via increased earnings. In the Global North, self-employed women tend to earn the same or less than they would have in the traditional labor market (Heck, Owen, and Rowe 1995; Loscocco and Smith-Hunter 2004). In the Global South, the realities of self-employment are particularly grim for low-income women, as informal self-employment almost never serves as a pathway out of poverty (Jütting and Laiglesia 2009). Given poor women's dim earnings prospects through self-employment, this study offers important insights into the conditions under which self-employment *can* facilitate higher incomes. Our findings show that female entrepreneurs' returns from self-employment are patterned by their micro-spatial resources.

We suspect that improved marketplace *visibility* drives women's increased earnings in favorable ground-floor locations. Our results suggest that visibility is not simply a useful asset for any entrepreneur, but one that offers specific, gendered advantages for women. Here, we outline briefly why we anticipate visibility to be particularly important for women and why policymakers should account for visibility when attempting to bolster earnings among female entrepreneurs.

By increasing women's entrepreneurial visibility, micro-spatial resources help women overcome some of the systemic disadvantages they face in the market. Researchers have demonstrated that women's work-related endeavors and contributions are more likely to be overlooked than men's (Ridgeway 2011) and are generally assumed to be of lower quality (Heilman 2001). Some research suggests that consumers hold subtle biases against female-owned businesses (Loscocco and Bird 2012), putting female entrepreneurs at a deeper disadvantage. And female entrepreneurs may be less likely to promote their ventures through aggressive advertising, given that women are penalized for self-promotion (Rudman 1998) and are less inclined to publicize their accomplishments (Singh, Kumra, and Vinnicombe 2002).

The combined effects of these factors—consumer biases against female-owned businesses and women’s tendency to downplay their efforts and accomplishments—mean that women’s informal businesses are more likely to be overlooked than men’s.

But women can compensate for these disadvantages by offering products and services in central, highly visible locations. When women’s businesses are highly visible, customers are more likely to notice and frequent them. High visibility thus helps female entrepreneurs overcome the subtle biases that encourage consumers to underestimate their quality. Moreover, high-visibility locations attract consumers based on their convenience and centrality. This advantage is particularly important for women, who may be less likely to drive customer traffic through aggressive advertising. In these ways, we believe that the visibility afforded by favorable micro-spatial resources offers unique, gendered advantages for women, and should be considered when policymakers promote self-employment as a tool for economic development in low-income communities.

Finally, our observation about the importance of visibility for self-employed women parallels Cohn’s (2017) theoretical assertion that land access shapes occupational sex-typing in self-employment. Cohn proposes that “gendered allocations of work in self-employment are shaped by external gatekeepers of resources, such as land and credit that are needed for work” (15). Our findings offer empirical support for this theory by showing how specific forms of land, in this case vertical proximity to the ground floor, influence women’s likelihood of becoming self-employed. Moreover, this study extends these insights by demonstrating how women’s access to land-based resources can also systematically pattern earnings and narrow the gender gap in the returns from self-employment.

#### Micro-geography and Development: Directions for Future Research

In this study, we have shown how certain micro-spatial resources allow women to earn incomes that lift them above the poverty line. Although our findings relate to housing and small-scale entrepreneurship, we believe that scholars can apply a micro-geographic lens to a range of development processes and outcomes. In this section, we suggest how a micro-geographic lens might reveal new sources of inequality, along with new mechanisms for reducing poverty. To that end, we offer research questions and potential avenues for inquiry. It is our hope that, in pursuing this line of work, development sociologists will complement the field’s traditional macro-level focus (Schrank 2015; Viterna and Robertson 2015) with a more micro-level approach.

The present study views space as an important market resource. But space is also an important social network resource that can facilitate or limit access to power and information. Research demonstrates that the micro-geographic position of individuals’ homes, workspaces, and leisure activities influences who and what they know (Festinger, Schachter, and Back 1950; Liu and Srivastava 2015).

Such spatially driven networks are likely to influence development processes and outcomes. For example, imagine a group of men who play dominoes regularly in a park, a favorite pastime in many Latin American countries. The location of the park can influence who the players know and the resources they access. If the park is in front of the local agricultural cooperative, for instance, the domino players may chat with community members and

cooperative directors as they pass by. As a result of the location of their game, they may be better informed about upcoming changes in cooperative policies and adjust their own farming practices before others learn about them. They may develop friendly relationships with cooperative directors and use those ties to gain access to prized resources. If the game were instead located in one of the player's homes, participants would not benefit from the same access to information or power. As this stylized example suggests, the simple location of a domino game may direct knowledge and resources in a way that leads to different economic outcomes. Given such possibilities, researchers might ask: How do individuals' quotidian locations influence the information and power they can access? And how do their spatially bound resources affect economic development?

Applying a micro-geographic lens to the study of development may also shed light on how organizations design policy and programs. For example, development organizations may be more likely to undertake collaborations when their offices are co-located. Consider that many NGOs rent office space in the same set of buildings outside the United Nations headquarters in Geneva and New York. These close quarters facilitate contact among NGO workers and may lead to unexpected collaborations. As employees of different NGOs cross paths in the hallways, restrooms, and ground-floor restaurants, they may develop relationships and, as a result, pursue collaborative projects that are implemented across the developing world. Although we might expect such collaborations to emerge from overlapping development goals, they might also result from overlapping physical spaces. Thus, for scholars who wish to understand the origins of development policy, a close attention to micro-geography may generate important, and *unexpected*, insights about the genesis of development policy and programming.

As these examples suggest, the micro-geographic approach highlighted in this study offers a new lens for investigating development. Once recognized, it becomes impossible to ignore how micro-spatial resources affect development outcomes for individuals and organizations. We hope that other scholars opt to apply this lens, generating new insights into how seemingly small spatial differences exert an outsized influence on social and economic development. ■

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## NOTES

1. By using this and other visual figures, we follow Gieryn's (2000) call to include visual representations in sociological investigations of place-based mechanisms.
2. Reassuringly, we find similar predicted probabilities using results from model 5, which excludes unemployed adults.
3. The potentially misleading interpretation of interaction coefficients mentioned earlier applies to nonlinear models only. Table 4 presents the results of a generalized linear model, so it is appropriate to draw conclusions from interaction coefficient significance levels. However, for consistency, we also present the predicted values and tests of marginal effects.

4. We use observed average income to calculate the earnings gap reduction. The average income among male home-based business owners is \$240.69. Female business owners on upper floors earn \$63.70 on average; female business owners on the ground floor earn \$167.30, narrowing the earnings gap by \$103.60, or 58.5%.
5. We classified businesses using categories from the Colombian Department of Statistics.
6. We finding consistent effects when testing these effects using regression analyses and generating predicted probabilities.