The pecuniary and non-pecuniary returns to micro-entrepreneurship: evidence from a cross-section of women in Mexico*

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Abstract

We estimate monetary and full returns to micro-entrepreneurship leveraging self-reported reservation wages available for a cross-section of Mexican women. We estimate a generalized Roy model of micro-entrepreneurship choice that accounts for selection bias and non-response in earnings. Exploiting variation in homicide rates across cities and the timing of interviews as an exclusion restriction, we estimate an average monetary return of 4.2% and an average full return of 68%, pointing to substantial non-pecuniary benefits from micro-entrepreneurship. Further, the monetary return sharply increases with years of schooling, while the full return does not, suggesting lower non-pecuniary benefits for less educated women.

JEL classification: J24, J31, L26, O12, C81
Keywords: Female entrepreneurship, Roy Model, non-pecuniary benefits, selection correction, survey non-response.

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1. Introduction

There is substantial evidence that entrepreneurs earn less on average than they would if they worked for a wage or salary for an employer (Hamilton, 2000; Moskowitz and Vissing-Jørgensen, 2002; Kawaguchi, 2002; Borjas and Bronars, 1989; Evans and Leighton, 1990), raising questions about why individuals engage in entrepreneurship if the return is negative and about the importance of entrepreneurship for development and economic growth (Margolis, 2014; Bloom et al., 2010).[1] One set of explanations appeals to the difficulties in measurement and estimation, including the problems of defining entrepreneurship, measuring earnings of entrepreneurs (Åstebro and Chen, 2014), and adjusting for selection bias (see for example Rosen and Willen, 2002). Sarada (2024) and Vial and Hanoteau (2015) have illustrated the importance of considering other economic outcomes, such as wealth and consumption. Another compelling explanation for the puzzle is the role that non-pecuniary motivations play in explaining why individuals engage in entrepreneurship despite the negative monetary return (Hamilton, 2000; Blanchflower, 2000; Benz and Frey, 2008; Hurst and Pugsley, 2015, among others). In this paper, using data on women in Mexico, we estimate a model of entrepreneurial choice that allows us to separate the pecuniary and non-pecuniary returns.

Our approach addresses several challenges in estimating the pecuniary and non-pecuniary returns to entrepreneurship. First, the wage differential is confounded by selection on unobservables. Observably similar individuals may differ with respect to unobserved entrepreneurial ability, for example. Second, the earnings of the self-employed are difficult to measure, and in many contexts individuals are hesitant to report their earnings, income, or wages at all (as Åstebro and Chen (2014) and Sarada (2024) have also observed), potentially introducing another source of sample selection bias. Third, estimating non-pecuniary returns is typically difficult. Georgellis et al. (2007) and Benz and Frey (2008) use survey questions on job satisfaction to proxy for the value of non-pecuniary benefits. More recent work has leveraged discrete choice experiments (Mas and Pallais, 2017) and dynamic life-cycle models (Dillon and Stanton, 2017).

Our empirical analysis uses data from a national labor force survey in Mexico linked to a a unique supplemental survey covering business owners. In the questionnaire for business owners, respondents are asked what wage would induce them to work for an employer, and we use responses to this question as a measure of their reservation wage, which we use to identify non-pecuniary returns. The supplemental survey covers only micro-entrepreneurs, defined as those who own a business with 10 or fewer employees (15 or fewer in the manufacturing sector), including self-employment with no employees, which is prevalent in Mexico and other

[1] This finding is not universal. Rosen and Willen (2002) and Berglann et al. (2011), among others, report positive conditional monetary returns to business ownership.

middle- and low-income countries. Our final sample consists of 42,000 prime-age women across three cross sections–2008, 2010, and 2012. We focus our analysis on women because the determinants of micro-entrepreneurship vary by gender (Jayachandran, 2021; Minniti and Naudé, 2010) and our empirical model is better identified in the sample of women.

To frame the problem of selection into micro-entrepreneurship, we use the model of sectoral choice of Roy (1951), formalized and extended by Sattinger (1975); Willis and Rosen (1979); Heckman and Sedlacek (1985, 1990), and Heckman and Honore (1990). In the standard Roy model, individuals choose employment type or sector to maximize earnings (Roy, 1951; Heckman and Honore, 1990). In the generalized Roy model, individuals also incur sector-specific costs and choose employment type to maximize earnings net of these costs (Heckman and Vytlacil, 2007). We use a generalized Roy model to study the decision between entrepreneurship and wage work, accounting for differences in potential earnings as well as non-pecuniary factors. Non-pecuniary factors influencing this choice include the risks and start-up costs involved in micro-entrepreneurship, as well as search costs, lack of social safety net, taxes, discrimination, and lack of flexibility in work hours associated with wage work (Margolis, 2014). In our model, women choose to engage in micro-entrepreneurship if the wage they would earn is less than their potential earnings as a micro-entrepreneur net of the difference in the value of these non-pecuniary factors. Thus, the potential earnings as a micro-entrepreneur net of this difference is a reservation wage. This model offers a potential explanation of the negative monetary returns to entrepreneurship—women engaging in micro-entrepreneurship may earn less than otherwise identical women in wage work because their non-pecuniary returns to entrepreneurship more than offset the wage differential.

The observed reservation wages in our data provide additional identifying power in the generalized Roy model. While Eisenhauer et al. (2015) develop conditions that make it possible to nonparametrically identify the pecuniary and non-pecuniary returns (what they label the gross benefit and net surplus to participating in a program), we show that the pecuniary and non-pecuniary returns can also be separately identified when reservation wages are observed. However, our sample suffers from substantial non-response in earnings, with the rate of non-response as high as 35% among wage-workers with 13+ years of schooling. Moreover, this non-response is likely endogenous as it differs between micro-entrepreneurs and wage-workers and varies with education and age. To correct for both sources of selection bias—selection into entrepreneurship and non-response bias—we estimate a parametric version of the generalized Roy model that includes non-response. We develop a novel two-step econometric method to estimate both the pecuniary and non-pecuniary returns to micro-entrepreneurship.

Our empirical strategy exploits variation in homicide rates across both municipalities and the timing of the interview to correct for non-response. In locations and months in which the homicide rate is atypically high, respondents are more reluctant to answer questions on earnings, possibly for fear of extortion. At the same time, the homicide rate is unlikely to affect observed earnings because the question on earnings refers to earnings in a typical month while the homicide rate corresponds to the month of the interview (any shock to the homicide rate is unlikely to be reflected in the response on typical earnings yet).

The estimated monetary return to entrepreneurship in our sample averages 4.2% while the estimated full return is 68%, which suggests that non-pecuniary benefits to micro-entrepreneurship are an important driver of selection into the sector in Mexico. This means that the wage that an average entrepreneur would earn as an employee would need to be at least 68% higher to induce them to take a job as an employee. It also suggests that the costs associated with taking a job for a wage would need to be reduced by 64% to make an entrepreneur willing to take the job that pays the same as what they currently earn. In contrast, least squares estimates are -44% for the monetary return and 37% for the full return, which indicates that failing to correct for selection on both unobservables and non-response leads to underestimates of both the monetary return and the full return. Only women entrepreneurs with 0-6 years of schooling exhibit negative monetary returns (-9%) but their full returns average 62%. By contrast, monetary returns are positive and sharply increase with years of schooling, from 3% for those with 7-9 years of formal schooling, to 7% for women with 10-12 years, and 39% for women with at least 13 years. The full returns vary less with education, increasing to 70% for women with 7-9 and 10-12 years of schooling and to 80% among women with 13+ years.

The remainder of the paper proceeds as follows. The next section describes the data. Section 3 describes the model and our empirical strategy. Section 4 presents our empirical results, and in section 5 we provide concluding remarks.

2. Data

Our main source of data is Mexico's National Occupation and Employment Survey (Instituto Nacional de Estadística y Geografía (INEGI), 2005-2024), known by the acronym ENOE. We also use data from a supplemental survey to the ENOE called the National Survey of Microbusinesses (ENAMIN) (Instituto Nacional de Estadística y Geografía (INEGI), 1992-2012). Both surveys are administered by Mexico's statistics agency, the National Institute of Statistics and Geography (INEGI). The ENOE is a quarterly, nationally representative household survey that tracks the Mexican labor market, with a structure similar to the Current Population Survey in the US. The ENAMIN covers a sub-sample of self-reported microbusiness owners as identified in the fourth quarter of the ENOE. More precisely, business owners identified in the ENOE with 10 or fewer workers in non-manufacturing sectors or 15 or fewer in manufacturing were eligible for the ENAMIN supplement.[2] Own-account workers or the self-employed (those without employees) are also included in the ENAMIN.

The ENAMIN supplemental survey was intended to be administered as closely as possible to data collection of the ENOE, meaning comparisons between the ENOE and ENAMIN data are meaningful with minimal time elapsing between the two surveys.[3] The ENAMIN was conducted eight times, roughly every two years, between 1992 and 2012 (the exception is a four-year gap between the 1998 and 2002 rounds). Prior to 2008, the ENAMIN was administered only to identified owners of microbusinesses in localities with at least 100,000 inhabitants via a precursor survey to the ENOE (known as the National Survey of Urban Employment or ENUE); starting in 2008, the ENAMIN was applicable to microbusinesses in all areas of the country. Given this expanded geographical coverage to both rural and urban areas—as well as the harmonization of methodological elements such as the wording of questions—we isolate our analysis to the last three available ENAMIN samples in 2008, 2010, and 2012.[4] That is, we combine the three separate cross-sections into a single sample but include year fixed effects in our specifications.

The ENOE asks the respondent about the occupation and earnings of each household member, but the respondent may or may not be the worker herself. The ENAMIN, on the other hand, directly interviews the micro entrepreneur. Given that the ENAMIN directly solicits profits from the business owner, and that such direct measures are believed to be more accurate than separate revenue-cost responses (de Mel et al., 2009), we prefer the direct monthly profit measure from ENAMIN as the monthly earnings measure for micro-entrepreneurs. For the wage workers, we use monthly earnings as reported in the ENOE.

2.1 Characteristics of the sample

We restrict our sample to prime-age women (ages 25 to 64). In addition, to remove measurement issues associated with only capturing those who have temporary or part-time work, we restrict our sample to those working at least 30 hours per week for the 12 months of each year. We exclude workers who both run a business while maintaining a wage-working job or who work multiple wage-working jobs. We further exclude workers still in school, unpaid workers, workers in the primary sector, as well as government or public sector employees. To

[2]The size-threshold criteria includes family members and unpaid workers. The size threshold for non-manufacturing businesses in 2008 was no more than 5 workers.

[3]In each year, most interviews in both surveys took place in October, November, and December, except in 2008 when data on some observations were collected in September. A small number of interviews in each year took place in January of the year after, which we dropped from our sample for consistency (432 observations in total).

[4]See the methodological documentation of the 2010 ENAMIN here.

avoid issues that might arise with communities with intensive agricultural work, which can be highly seasonal, we further restrict our sample to areas with at least 15,000 residents.

In our analysis, an employee or wage worker is an individual who works for someone else, whereas a micro-entrepreneur is an individual who works on her own or runs her own microbusiness, either without employees or hiring other workers. Those who are entrepreneurs but have no workers are (solo) self-employed or own-account workers; all other entrepreneurs are termed as employers. Our final sample size consists of 41,798 women, 32,342 (77%) wage workers and 9,456 (22%) micro-entrepreneurs. 14% of our sample (5,986) work as self-employed, meaning they have no employees. Table 1 summarizes the basic characteristics of the final data.

In our sample, women who own a microbusiness tend to be older (on average) and are more likely to be married compared to employees.[5] Micro-entrepreneurs are comparatively less skilled: a higher share report 0-6 years of schooling while employees are much more likely to have completed any post-secondary education (13+ years). In terms of sector, micro businesses are much more likely to be in the trade services (retail or wholesale), while employees are more likely to work in either manufacturing or other services. Lastly, in terms of hours worked, micro-entrepreneurs tend to work more hours per week compared to employees. The median age of female-owned microbusinesses is 5. These businesses are also small: 62% of employers in the sample employ only one worker.

[5] All differences are statistically significant with $p < .05$.

Table 1: Sample sizes and characteristics of the sample.

	Employees	**Entrepreneurs**	**Total**
Sample size	32,342	9,456	41,798
Share	77%	23%	100%
Age	38	45	39
Married	38%	52%	41%
Children	66%	65%	66%
Yrs. of schooling			
0-6	17%	32%	22%
7-9	38%	35%	37%
10-12	19%	15%	18%
13+	24%	12%	23%
Sector			
Manufacturing	23%	11%	20%
Retail	28%	52%	33%
Services	49%	37%	47%
Hours worked	47	53	48

Notes: Retail includes wholesale. Hours worked corresponds to the weekly average. The data combines 13,383 observations from 2008; 13,969 from 2010; and 14,446 from 2012. Differences are statistically significant at the 5% level.

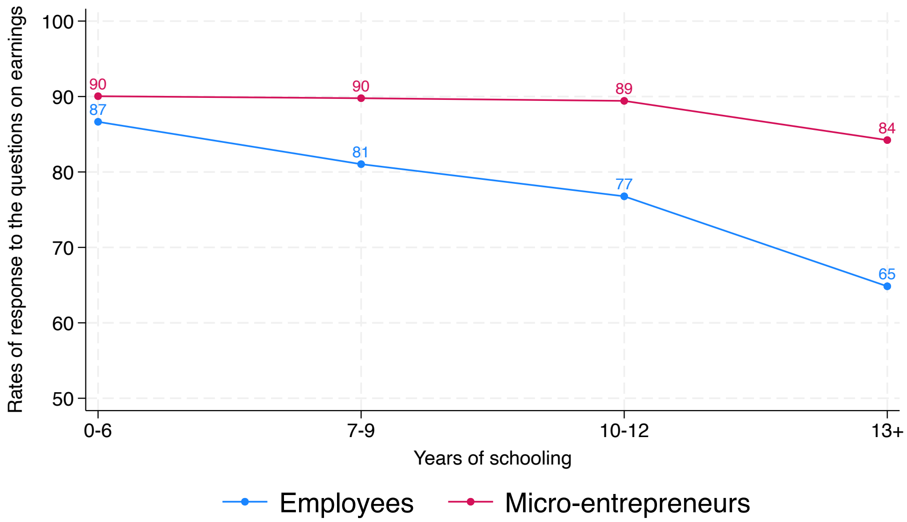
2.2 Monthly earnings and rates of non-response

As discussed above, to measure earnings of the employees, we use the monthly wages reported in the ENOE. For micro-entrepreneurs, we use the monthly profits from the ENAMIN reported by the entrepreneur herself.[6]

The questions on earnings in both the ENOE and the ENAMIN surveys have non-negligible rates of non-response that are potentially non-random. Figure 1 plots the fraction of respondents with non-missing earnings. The (unconditional) probability of responding decreases with years of completed schooling, but the decline is much steeper among employees. Importantly, we do not observe the earnings of 35% of the employees in the sample with 13+ years of schooling. If the return to either running a micro-business or working for a wage varies monotonically with schooling, as is potentially the case, then estimates of the average return to micro-entrepreneurship will be biased. We show how we correct for this non-random non-response in our empirical strategy in Section 3.

[6]All Mexican peso values in our data are deflated to 2012. To convert into USD, we use an exchange rate of 13.15 MXN per USD (the average during 2012).

Figure 1: Rate of response to the question on earnings across years of schooling.



Notes: The figure shows the share of missing values in the questions on earnings for each occupation and for women with different years of completed schooling. The data on earnings for wage workers come from the ENOE while the profits question for the entrepreneurs comes from the ENAMIN.

2.3 Reservation wages in the ENAMIN

The ENAMIN asks respondents about their reservation earnings—the earnings that would induce her to leave her microbusiness. Specifically, the question reads:

> What is the monthly salary that you would accept to leave your business or activity?[7]

Presumably, in her response a micro-entrepreneur includes not only her monthly labor earnings but also the monetary value of the non-pecuniary benefits and costs from running a microbusiness, which allows us to estimate both the monetary and the full return from micro-entrepreneurship.

Because the question on the reservation wage of the micro-entrepreneurs is a monthly figure, in our computations we work with monthly earnings. Using earnings per hour worked instead would require us to divide the reservation wage by a counterfactual number of monthly hours worked as a wage worker, which we do not observe. Working with monthly figures helps us avoid introducing this additional bias. Moreover, it is reasonable to assume that the respondent is already accounting for potential adjustments to her hours worked when thinking of leaving her business to work for someone else for a wage.

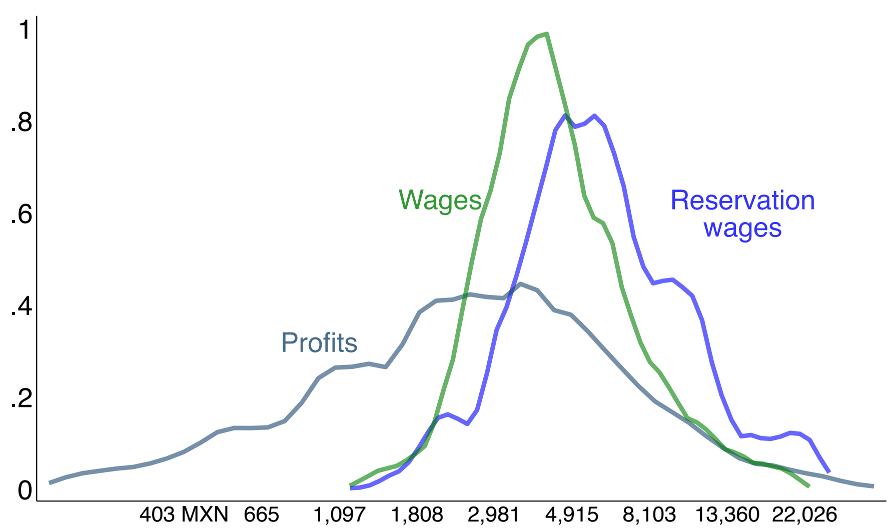
[7]In Spanish the question reads "¿Cuál es el salario mensual por el que usted aceptaría dejar su negocio o actividad?"

In our estimations, we trim the top and bottom 1% of the earnings distribution in each occupation and the top and bottom 1% of the distribution of reservation wages.

2.4 Returns to entrepreneurship

Figure 2 shows the distribution of monthly profits and reservation wages for micro-entrepreneurs in our sample, along with the distribution of monthly wages for wage-workers (each variable is in logs). There is more dispersion in the profits of micro-entrepreneurs compared to the earnings of wage-workers, with substantially more mass in the lower end of the distribution. On the other hand, the distribution of reservation wages among micro-entrepreneurs shows substantially more mass to the right of the distribution of earnings among wage-workers. Table 2 shows the average monthly earnings in each occupation, and the average reservation wage among entrepreneurs (the standard deviations are in parenthesis; each variable is in levels). The average profit of micro-entrepreneurs in our sample is 23% lower than the average earnings of wage-workers. The average reservation wage of micro-entrepreneurs is 36% higher than the average earnings of wage-workers.

Figure 2: Distributions of earnings and reservation wages



Notes: The figure shows kernel densities estimated over the full sample of women. Variables are in logs.

Table 2: Average earnings and reservation wages

Wages	Profits	Reservation wages
5,026	3,865	6,829
(2,872)	(3,939)	(4,185)

Notes: Figures in Mexican pesos. Standard deviation in parenthesis.

In the following section we show that these comparisons can be interpreted as estimates of the monetary return and the full return to entrepreneurship. However, the differences in means are likely biased due to selection into micro-entrepreneurship. As shown in Table 1, micro-entrepreneurs in our sample are older, more likely to be married and less educated on average than wage-workers, and they are more likely to work in retail versus manufacturing or services.

Table 3 shows estimates of the monetary and full returns to running a microbusiness that control for these observable differences (the full set of results is available in the appendix). To calculate the estimates in the first column we ran a regression using the combined sample of micro-entrepreneurs and wage-workers of log earnings on an indicator for whether the individual is a micro-entrepreneur or a wage-worker and controls for schooling and sector dummies, age and age squared, a binary variable for whether the woman is married, a binary variable for whether there are children in the household, and city and year fixed effects. We did this both for the full sample and separately by schooling level.

The second column shows a similar comparison between the reservation wages of micro-entrepreneurs to the actual wages of wage-workers controlling for observed individual characteristics. We calculated these full returns conditional on observables by estimating a regression where the dependent variable was measured as the log of the reservation wage for the micro-entrepreneurs and as the log of earnings for the wage-workers. These regressions included the same set of controls, and the full returns reported in the table are the estimated coefficients on the indicator for being a micro-entrepreneur.

These least squares results are qualitatively similar to the unconditional comparisons in Table 2. Controlling for observable characteristics, the monetary return is still negative but larger in magnitude, ranging from -47% for those with 0-6 years of schooling to -33% for those with 13+ years of schooling. The full return controlling for observables is roughly the same as the 36% difference observed in Table 2, and does not vary significantly with years of schooling. Together, these results seem to suggest that non-pecuniary benefits are a significant component to the decision of running a microbusiness among women in Mexico (that is, average non-pecuniary costs are negative).

In the next section, we introduce a generalized Roy model for selection into micro-entrepreneurship. We use this model to theoretically frame the micro-entrepreneurship choice. This model provides the foundation for interpreting a comparison of reservation wages to actual wages as a measure of the full return. We also use the model to illustrate why the estimates in Table 3 are biased due to selection on unobservables.

Table 3: Least squares returns to entrepreneurship

	Monetary return	**Full return**
Full sample	-44%	37%
0-6 years of schooling	-47%	35%
7-9 years of schooling	-45%	38%
10-12 years of schooling	-47%	36%
13+ years of schooling	-33%	37%

Notes: The monetary return is the coefficient on the dummy for whether the woman is a micro-entrepreneur in a regression where earnings are the dependent variable. The full return has the reservation wage as the dependent variable for the micro-entrepreneurs, and earnings for the wage workers. In the top row, both regressions control for schooling and sector dummies, age and age squared, whether the woman is married, whether there are children in the household, and city and year fixed effects. Rows 2 through 4 condition on years of schooling. The full set of results is available in the appendix.

3. The Generalized Roy Model with observed costs and survey nonresponse

Let Y_{1i} and Y_{0i} denote agent i's potential earnings in micro-entrepreneurship and wage work, respectively. In other words, Y_{1i} denotes her profits if she runs a microbusiness and Y_{0i} denotes her wage if she works for someone else. Let C_i denote individual i's monetary value of the net non-pecuniary costs associated with running a microbusiness. Then individual i is a micro-entrepreneur, denoted $D_i = 1$, if $Y_{1i} - Y_{0i} \geq C_i$, and works for a wage otherwise. If $C_i < 0$ the worker would prefer micro-entrepreneurship to working for a wage if the two offered the same potential earnings; if $C_i > 0$ then the worker would prefer wage work. And $C_i = 0$ indicates that the worker considers only the monetary rewards when choosing an occupation.

We define the monetary return to entrepreneurship as

$$M_i = Y_{1i} - Y_{0i} \tag{1}$$

and the full return as

$$F_i = M_i - C_i \tag{2}$$

Eisenhauer et al. (2015) alternatively define these as the gross benefit and net benefit, or surplus, respectively. The full return is equivalently defined as $Y^*_{0i} - Y_{0i}$, where $Y^*_{0i} = Y_{1i} - C_i$. Thus Y^*_{0i} is a reservation wage because the micro-entrepreneurship choice, $Y_{1i} - Y_{0i} \geq C_i$, can equivalently be expressed as $Y^*_{0i} \geq Y_{0i}$.

This suggests that we can calculate the individual-level "cost", $C_i = Y_{1i} - Y^*_{0i}$, for micro-entrepreneurs because we observe their reservation wages, Y^*_{0i}. According to Table 2 the average of C_i among the micro-entrepreneurs in our sample is $-2,964$ MXN pesos. Thus, on average micro-entrepreneurs experience non-pecuniary benefits from micro-entrepreneurship which they value at an amount that is 77% of their average earnings. These non-pecuniary "benefits" of micro-entrepreneurship may include factors such as flexibility in work hours, but may also reflect costs of wage-work, such as search costs, discrimination, and taxes.

The estimates of returns in Table 3 account for selection on observables but not selection on unobservables. Let X_{1i}, X_{0i} and X^*_{0i} denote vectors of covariates, which may include variables in common. We assume the following linear specification for potential outcomes:

$$
\begin{aligned}
Y_{1i} &= \beta_1' X_{1i} + U_{1i} \\
Y_{0i} &= \beta_0' X_{0i} + U_{0i} \\
Y^*_{0i} &= \beta_0^{*\prime} X^*_{0i} + U^*_{0i},
\end{aligned}
$$

where $(U^*_{0i}, U_{0i}, U_{1i})$ are unobserved error terms. The selection equation can then be written as:

$$
\begin{aligned}
D^*_i &= Y^*_{0i} - Y_{0i} \\
&= \beta_0^{*\prime} X^*_{0i} - \beta_0' X_{0i} + U^*_{0i} - U_{0i} \\
D_i &= \mathbf{1}(D^*_i \geq 0)
\end{aligned}
$$

The regression estimates in the first column of Table 3 are valid estimates of $E(Y_{1i} - Y_{0i} \mid schooling_i = s)$ under the assumptions that $X_{1i} = X_{0i} = X_i$, that $(\beta_1 - \beta_0)' X_i$ only varies with schooling, and that the errors, U_{1i} and U_{0i}, are mean independent of D_i conditional on X_i. The first two assumptions can be relaxed by including interactions in the regression or by estimating two separate regressions. The third assumption, however, is an assumption of no selection on unobservables. The selection equation suggests that this will not hold in general because D_i is correlated with $U^*_{0i} - U_{0i}$. The exception is if $U^*_{0i} - U_{0i} = 0$. Alternatively, suppose there is imperfect information such that $D_i = \mathbf{1}(E(D^*_i \mid \mathcal{I}_i) \geq 0)$, where $\mathcal{I}_i$ represents individual i's information set. Then there is no selection on unobservables if individuals do not have information about the unobservables, U^*_{0i} and U_{0i}, when making the decision. Otherwise, however, regression estimates like those in Table 3 will be biased due to selection on unobservables.

3.1 Identification

Our model is an application of the generalized Roy model (Heckman and Vytlacil, 2007). Identification and estimation of this model when $Y_i := Y_{1i}D_i + Y_{0i}(1 - D_i)$, D_i, and the covariates are observed is well-understood (Heckman and Vytlacil, 2005; Eisenhauer et al., 2015, see, e.g.,). Average treatment effects can be identified but the full distribution of treatment effects is not identified without further restrictions (see, e.g., Carneiro et al., 2003; Aakvik et al., 2005; d'Haultfoeuille and Maurel, 2013). However, observing the reservation wage, Y_{0i}^*, provides additional identifying power. Indeed, observe that $D_i = \mathbf{1}(Y_{0i}^* \geq Y_{0i})$ where we observe Y_{0i} if $D_i = 0$ and Y_{0i}^* if $D_i = 1$. This amounts to a (simple) Roy model, which is known the be fully identifiable unlike the generalized Roy model (see, e.g., Heckman and Honore, 1990).

However, our sample also suffers from substantial non-response to the earnings questions on the survey, as pointed out in Section 2.2. To model this non-response, let $R_i = 1$ if individual i reported their earnings and $R_i = 0$ otherwise. We assume a latent index model, $R_i = \mathbf{1}(\beta_R' X_{Ri} \geq U_{Ri})$. Let X_i denote the unique elements of X_{1i}, X_{0i}, X_{0i}^*, and X_{Ri}. We assume that X_i is independent of $U_i = (U_{0i}^*, U_{0i}, U_{1i}, U_{Ri})$ and that $U_i \sim \mathcal{N}(0, \Sigma)$. Define $U_{Di} = U_{0i} - U_{0i}^*$ and let $\sigma_{U_D}^2 = Var(U_{0i} - U_{0i}^*)$ and $\sigma_{U_R}^2 = Var(U_{Ri})$. Then

$$
\begin{aligned}
E(Y_i \mid R_i = 1, D_i = 1, X_i) &= \beta_1' X_{1i} + E(U_{1i} \mid R_i = 1, D_i = 1, X_i) && (3)\\
&= \beta_1' X_{1i} + E(U_{1i} \mid \beta_R' X_{Ri} \geq U_{Ri}, \beta_0^{*\prime} X_{0i}^* - \beta_0' X_{0i} \geq U_{Di}, X_i) && (4)\\
&= \beta_1' X_{1i} + \psi_1' \Lambda \left(\tilde{\beta}_R' X_{Ri}, \tilde{\beta}_0^{*\prime} X_{0i}^* - \tilde{\beta}_0{}' X_{0i}; \rho_{RD} \right) && (5)
\end{aligned}
$$

where $\tilde{\beta}_R = \beta_R / \sigma_{U_R}$, $\tilde{\beta}_0{}^* = \beta_0^* / \sigma_{U_D}$, and $\tilde{\beta}_0 = \beta_0 / \sigma_{U_D}$; $\Lambda(z_1, z_2; \rho) = E(Z \mid Z_1 \leq z_1, Z_2 \leq z_2)$ for $Z = (Z_1, Z_2)$ jointly normal with standard normal marginals and correlation ρ; $\rho_{RD} = Correl(U_R, U_D)$; and

$$
\psi_1 = \begin{pmatrix} 1 & \rho_{DR} \\ \rho_{DR} & 1 \end{pmatrix}^{-1} \begin{pmatrix} \frac{Cov(U_1, U_R)}{\sigma_{U_R}} \\ \frac{Cov(U_1, U_D)}{\sigma_{U_D}} \end{pmatrix} \tag{6}
$$

To simplify our notation, let $\Lambda_{1i} = \Lambda \left(\tilde{\beta}_R' X_{Ri}, \tilde{\beta}_0^{*\prime} X_{0i}^* - \tilde{\beta}_0{}' X_{0i}; \rho_{RD} \right)$. The bivariate selection correction term, $\psi_1' \Lambda_{1i}$, captures the combined effect of non-response and selection bias due to occupational choice. There are two special cases where it simplifies. First, suppose there is no non-response, i.e., $\tilde{\beta}_R' X_{Ri} \to \infty$. It can be shown that $\lim_{z_1 \to \infty} \Lambda(z_1, z_2; \rho) = \begin{pmatrix} \rho \\ 1 \end{pmatrix} E(Z_2 | Z_2 \leq z_2)$ and that $\psi_1' \begin{pmatrix} \rho \\ 1 \end{pmatrix} = \frac{Cov(U_1, U_D)}{\sigma_{U_D}}$. Therefore, as $\tilde{\beta}_R' X_{Ri} \to \infty$, $\psi_1' \Lambda_{1i} \to$

$\frac{Cov(U_1,U_D)}{\sigma_{U_D}}\lambda(\tilde{\beta_0}^{*\prime}X_{0i}^* - \tilde{\beta_0}'X_{0i})$ where $\lambda(z) = -\frac{\phi(z)}{\Phi(z)}$ is the inverse Mills ratio. This is the conventional Heckman selection correction. Second, if $\rho_{DR} = 0$, then the first term of $\psi_1'\Lambda_{1i}$ reduces to the usual correction for occupational choice, while the second term is the correction for non-response.

The result in equation 3 suggests a procedure for estimating β_1 and ψ_1. Similar to the usual two-step procedure, we can first estimate the joint selection equations for occupational choice and non-response. Then, in the $D_i = 1$ sample we can estimate a regression of Y_i on X_{1i} and an estimate of Λ_{1i} from the first stage. We can then estimate a similar regression in the $D_i = 0$ sample since

$$E(Y_i \mid R_i = 1, D_i = 0, X_i) = \beta_0'X_{0i} + \psi_0'\Lambda_{0i}$$

where $\Lambda_{0i} = \Lambda\left(\tilde{\beta}_R'X_{Ri}, -\tilde{\beta_0}^{*\prime}X_{0i}^* + \tilde{\beta_0}'X_{0i}; -\rho_{RD}\right)$ and

$$\psi_0 = \begin{pmatrix} 1 & -\rho_{DR} \\ -\rho_{DR} & 1 \end{pmatrix}^{-1} \begin{pmatrix} \frac{Cov(U_0,U_R)}{\sigma_{U_R}} \\ -\frac{Cov(U_0,U_D)}{\sigma_{U_D}} \end{pmatrix} \tag{7}$$

Finally, assuming that any non-response in the reservation wage is random, we also have

$$E(Y_{0i}^* \mid D_i = 1, X_i) = \beta_0^{*\prime}X_{0i}^* + \psi_0^*\lambda\left(\tilde{\beta_0}^{*\prime}X_{0i}^* - \tilde{\beta_0}'X_{0i}\right)$$

where $\lambda(z) = -\frac{\phi(z)}{\Phi(z)}$ and $\psi_0^* = \frac{Cov(U_0^*,U_D)}{\sigma_{U_D}}$.

The estimation procedure that we use is summarized in Section 3.3below. Given estimates of β_1, β_0, and β_0^*, it is straightforward to compute estimates of the average treatment effects. The average monetary return, or monetary average treatment effect, is $MATE(x) = E(Y_{1i} - Y_{0i} \mid X_i = x) = \beta_1'x_1 - \beta_0'x_0$. The average full return, or full ATE, is $FATE(x) = E(Y_{0i}^* - Y_{0i} \mid X_i = x) = \beta_0^{*\prime}x_0^* - \beta_0'x_0$. Similarly, we can also define treatment on the treated effects, our preferred measures of returns, as follows. The average **monetary treatment on the treated** is:

$$\begin{aligned} MTT(x) &= E(Y_1 - Y_0 \mid D = 1, X = x) \\ &= E(Y \mid D = 1, X = x) - \beta_0'x_0 - Cov(U_0, U_D)/\sigma_{U_D}\lambda(\tilde{\beta_0}^{*\prime}X_{0i}^* - \tilde{\beta_0}'X_{0i}) \end{aligned}$$

The average **full treatment on the treated** is:

$$\begin{aligned} FTT(x) &= E(Y_0^* - Y_0 \mid D = 1, X = x) \\ &= E(Y_0^* \mid D = 1, X = x) - \beta_0'x_0 - Cov(U_0, U_D)/\sigma_{U_D}\lambda(\tilde{\beta_0}^{*\prime}X_{0i}^* - \tilde{\beta_0}'X_{0i}) \end{aligned}$$

The coefficient on the inverse Mills ratio terms can be computed from ψ_0 and ρ_{DR}.

Identification of the treatment on the treated requires the bivariate selection correction terms, Λ_{1i} and Λ_{0i}, to not be collinear with X_{1i} (or X_{0i}^*) and X_{0i}, respectively. There are two ways to achieve this: with sufficient variation in the two propensities (to be an entrepreneur and to report earnings) to obtain identification from the nonlinearity, or with an exclusion restriction—a variable that affects the selection but not the outcome. We follow the first strategy for the entrepreneurial choice and the second strategy to correct for non-response. We discuss the instrument that we use to obtain exogenous variation in the propensity to report earnings in the next section.

3.2 Instrument for the rate of non-response: variation in homicide rates across cities and time of the interview

Our exclusion restriction for the rate of non-response comes from variation across both locations and time in the monthly homicide rate, which we obtain from administrative data as compiled by Mexico's national statistical agency (Instituto Nacional de Estadística y Geografía (INEGI), 1990-2023). More precisely, we use as an instrument the homicide rate the month in which respondents were interviewed for the ENOE. Practically, this means we use homicide rates for months in the last quarter of the year for 2008, 2010, and 2012 for the 124 municipalities in our data.[8] Presumably, in locations or in months when the homicide rate is atypically high, respondents will be more reluctant to answer questions on earnings for fear of extortion.[9] At the same time, the homicide rate is unlikely to affect observed earnings because the question on earnings refers to earnings in a typical month while the homicide rate corresponds to the month of the interview (any shock to the homicide rate is unlikely to be reflected in the response on typical earnings yet).

Table 4 presents some moments of the distribution of homicide rates across municipalities in our sample. The average in our observation period is 0.13 homicides per 10,000 people. Figure 3 shows that between 2008 and 2012, homicides in Mexico dramatically increased, especially in municipalities in the north. Figure 4 shows substantial variation in the homicide rate also across space. The figure shows, for each municipality, the range (from the minimum to the maximum in the vertical gray bars) of the homicide rate over the 9 months considered (October, November, December in each year). The blue markers show the mean over these specific months, with each municipality ordered from the lowest mean homicide rate to the highest (left to right). Some municipalities are outliers in terms of their homicide rates.

[8] In 2008, 553 observations were recorded in September. Homicide rates for September 2008 are included in our merged data.

[9] Our controls for the response equation include year fixed effects, meaning we only exploit shocks to the homicide rate.

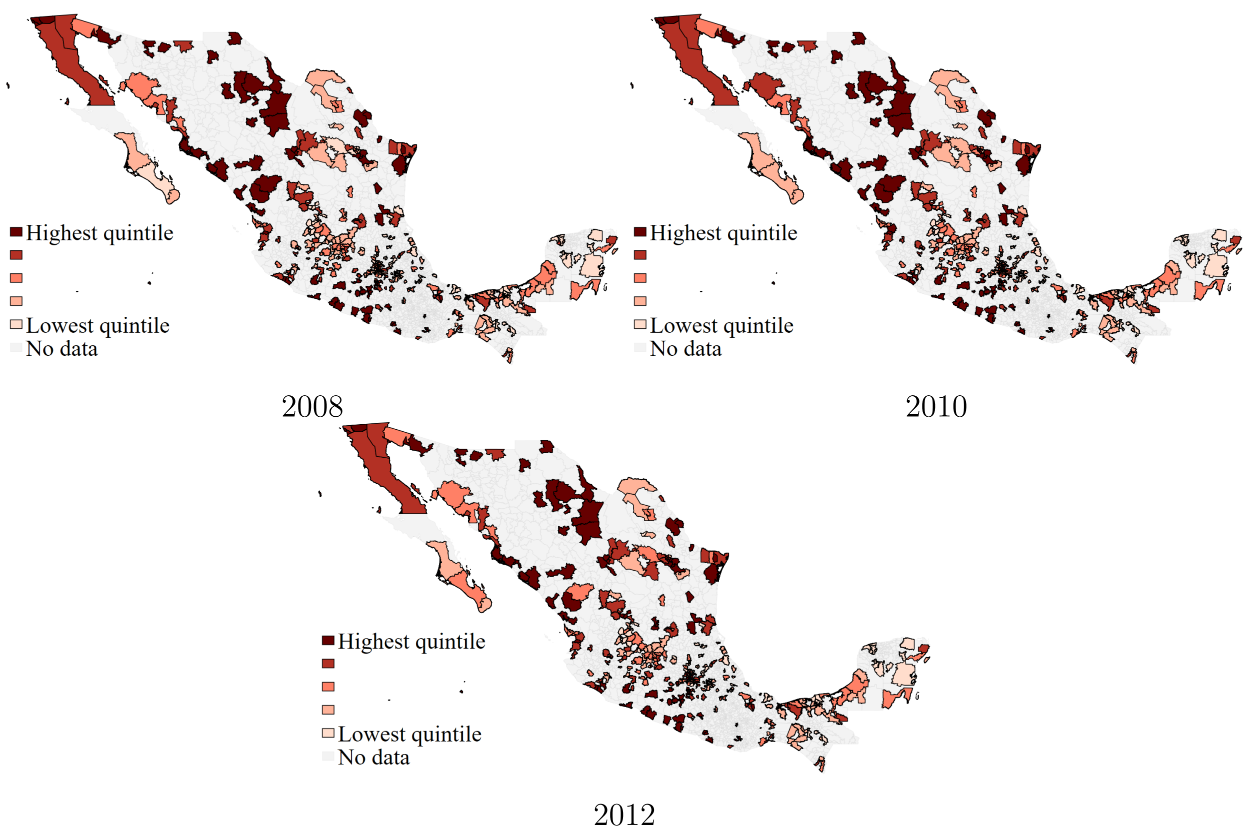
Acapulco, Chihuahua, and Tijuana, for instance, have mean monthly homicide rates of over 0.50 per 10,000 people.

Table 4: Moments of the distribution of homicide rates across municipalities in the sample.

	2008	**2010**	**2012**	**Overall**
Mean	0.09	0.14	0.14	0.13
Std. Dev.	0.17	0.18	0.18	0.18
Median	0.05	0.09	0.11	0.08
90th percentile	0.22	0.36	0.30	0.30

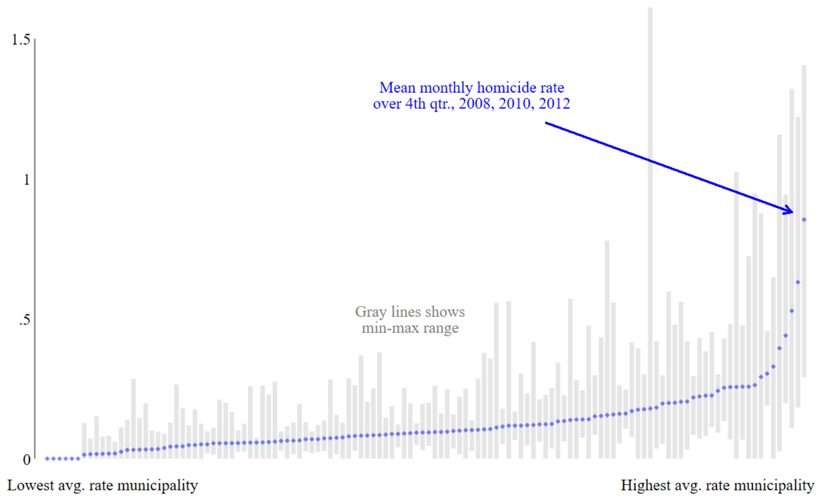
Notes: Number of homicides per 10,000 population (for the 124 municipalities in the analysis). Observations are limited to the last quarter of each year to correspond to the ENOE/ENAMIN data.

Figure 3: Variation in the homicide rate across time and across municipalities.



Notes: Each of the 124 municipalities is shaded according to the average homicide rate in the final three months of the year, shown for 2008, 2010, and 2012, separately. The legend contains quintiles estimated over all years, meaning that cutoff points are fixed across time. Thus, changes in intensity are indicative of changes over time.

Figure 4: Range and average of the monthly homicide rates by municipality (homicides per 10,000 people; 4th quarter of 2008, 2010, and 2012).



Notes: The blue diamonds represent the average homicide rate across the last three months of the year (Oct., Nov., Dec.) for three years of the ENOE-ENAMIN data (2008, 2010, 2012, 9 months in total). The vertical gray bars show the range between the minimum and maximum homicide rate over these 9 months, by municipality. The bars are sorted by the mean homicide rate.

3.3 Estimation procedure

Our procedure to estimate the average monetary and full treatment on the treated is as follows:

1. Estimate a bivariate Probit with binary outcomes R and D. From this model, we get an estimate of ρ_{RD} that helps us construct estimates of $\tilde{\beta}_R' X_{Ri}$ and $\tilde{\beta_0}^{*\prime} X_{0i}^* - \tilde{\beta_0}' X_{0i}$.

2. Using estimates from step 1, we construct[10] a bivariate equivalent of the inverse Mills ratio
$$\Lambda_{1i} := \Lambda\left(\tilde{\beta}_R' X_{Ri}, \tilde{\beta_0}^{*\prime} X_{0i}^* - \tilde{\beta_0}' X_{0i}; \rho_{DR}\right)$$
We can then regress Y_i on X_{1i} and $\hat{\Lambda}_{1i}$ for the $D_i = 1$ subsample.

3. Similarly, using estimates from step 1 we can construct
$$\Lambda_{0i} := \Lambda\left(\tilde{\beta}_R' X_{Ri}, -\tilde{\beta_0}^{*\prime} X_{0i}^* + \tilde{\beta_0}' X_{0i}; -\rho_{DR}\right)$$
We then regress Y_i on X_{0i} and $\hat{\Lambda}_{0i}$ for the $D_i = 0$ subsample.

[10] We numerically approximate the truncated mean of a bivariate normal via Monte Carlo integration. Our results are generally robust to increasing the number of draws in the approximation.

4. Assuming that any non-response in the reservation wage is conditionally random, we can use the conventional inverse Mills ratio term, regressing Y_i^* on X_{0i}^* and $\lambda({\tilde{\beta}_0}^{*\prime} X_{0i}^* - {\tilde{\beta}_0}' X_{0i})$ for the $D_i = 1$ subsample.

In the main specification that we estimate, $X_{1i} = X_{0i}^* = X_{0i}$ is the same vector of controls used in the OLS results in Section 2, specifically, schooling and sector dummies, age and age squared, a binary variable for whether the woman is married, a binary variable for whether there are children in the household, and city and year fixed effects. In the choice equation for response/non-response to the earnings question, the vector of covariates X_{Ri} is the same as X_{0i} except that it includes two variables on local crime (the homicide rate and a binary for cities with typically high homicide rates).[11]

4. Results

Table 5 shows the estimates from the bivariate probit. The estimated coefficient of correlation in the model is statistically significant and positive (0.24), which means that micro-entrepreneurs are more likely to respond to the question on earnings even after controlling for variation in observables (consistent with the patterns in Figure 1). Table 6 reports the marginal effects. The homicide rate has a negative and statistically significant effect on the likelihood of responding to the questions on earnings. An increase of one unit in the homicide rate is associated with a decrease of 6 percentage points in the likelihood of answering the question on earnings. Rates of response are also lower among more educated women. Women with 13+ years of schooling are on average 19 percentage points less likely to answer the question on earnings compared with women with 0-6 years of schooling. This finding is consistent with the patterns observed in Figure 1. In addition, younger women, married women, and women with children in the household are more likely to respond, all else equal.

The propensity to run a micro-firm, rather than work for a wage, decreases with years of schooling, all else equal. The second column of Table 6 shows that women with 13+ years of schooling are 11 percentage points less likely to select into entrepreneurship compared to women with 0-6 years of formal schooling. Older women are more likely to run a micro-firm by almost 1 percentage point per year, and this age effect does not diminish over the life cycle. Women who are married and women in a household with children are 7 and 3 percentage points more likely to enter entrepreneurship. Sector also has a large and statistically significant effect on the propensity to run a micro-firm.

In Table 7 we show the results from the two-stage estimation strategy of the Roy model described in Section 3.3. The estimation strategy corrects for both non-random selection

[11] The cities are Chihuahua, Acapulco, Tijuana, Culiacan, and Tepic. Once we include this high-crime city dummy, we get significantly higher explanatory power.

into entrepreneurship and non-random non-response. Earnings in both sectors increase significantly with years of schooling, as does the reservation wage. The skill gradient is steeper for entrepreneurs relative to wage workers, while reservation wages are flatter compared to the earnings profile of entrepreneurs. This suggests that the non-pecuniary benefits of entrepreneurship are more salient for less educated women. We also see that the reservation wage increases substantially with age, by 5 percent per year. This is consistent with the finding that the propensity to run a micro-firm increases with age. And both of these findings are also consistent with the much steeper age gradient for earnings in entrepreneurship relative to wage work. Entrepreneurship becomes more likely over the life-cycle largely because the *monetary* returns increase with age.

The coefficients on the λ terms in the earnings and reservation wage regressions can be transformed according to equation (6) and (7) to back out estimates of the covariances between unobservables in these equations and the unobservables in the selection equations. These estimates are reported in Table 8. According to these estimates there is positive selection into both sectors. The unobservable component of entrepreneurial earnings is positively correlated with the propensity to be an entrepreneur. But the unobservable component of wages is negatively correlated with the propensity to be an entrepreneur. The non-response bias is negative for entrepreneurs as those with higher earnings are less likely to report earnings. But the non-response bias is positive for wage-workers.

We compute next the average monetary and full treatments on the treated. In our sample, the monetary return to entrepreneurship averages 4.2% while the average full return is 68%. Our least squares estimates are -44% for the monetary return and 37% for the full return, which means that not correcting for the double selection bias in the distribution of earnings and the distribution of reservation wages underestimates both the monetary gain and the full return. This result holds for every schooling level in the sample. Figure 5 plots the average estimated MTT and FTT by education. For comparison, the OLS returns from Table 3 are shown in the right panel.

The OLS monetary returns are negative, on average, across all education levels. The corrected MTT estimates from the generalized Roy model are higher and, in contrast, they are negative only among the least educated women. They range from -9% among women with 0-6 years of schooling to 39% among women with 13+ years of schooling. The FTT estimates corrected for the double selection bias are also higher compared to the OLS returns. Moreover, the corrected FTT exhibits a higher gradient with years of schooling compared to the OLS estimates. Women with 13+ years of schooling exhibit full returns to entrepreneurship that are 18 percentage points higher compared to women with 0-6 years of schooling, while the OLS full returns do not significantly vary with education.

Table 5: Results from the bivariate probit

	R=1	D=1
Homicide rate	-0.227**	
	(0.045)	
High crime dummy	0.454**	
	(0.031)	
7-9 yrs schooling	-0.249**	-0.238**
	(0.022)	(0.020)
10-12 yrs schooling	-0.396**	-0.303**
	(0.025)	(0.024)
13+ yrs schooling	-0.721**	-0.415**
	(0.024)	(0.024)
Wholesale & retail	0.030	0.770**
	(0.021)	(0.022)
Services	0.007	0.245**
	(0.019)	(0.022)
Age	-0.017**	0.030**
	(0.006)	(0.006)
Age squared	0.000**	0.000
	(0.000)	(0.000)
Married	0.131**	0.284**
	(0.015)	(0.015)
Children in HH	0.172**	0.126**
	(0.016)	(0.017)
2010	0.080**	0.080**
	(0.018)	(0.018)
2012	-0.030*	0.058**
	(0.018)	(0.018)

Notes: N= 41,748; ρ= 0.244. Standard errors in parenthesis. City fixed effects are included in the selection equation for the sectoral choice. The equation for the rate of response does not include city fixed effects. The omitted categories are 0-6 years of schooling, manufacturing, and year = 2008. Children in HH = children in the household. The high-crime dummy is 1 for Chihuahua, Acapulco, Tijuana, Culiacan, and Tepic, where the homicide rate is consistently high in our sample period.

* $p < 0.10$, ** $p < 0.05$, ** $p < 0.01$

Table 6: Marginal effects in the bivariate probit

	R=1	D=1
Homicide rate	-0.061**	
	(0.012)	
High crime dummy	0.122**	
	(0.008)	
7-9 yrs schooling	-0.067**	-0.060**
	(0.006)	(0.005)
10-12 yrs schooling	-0.106**	-0.077**
	(0.007)	(0.006)
13+ yrs schooling	-0.193**	-0.105**
	(0.006)	(0.006)
Wholesale & retail	0.008	0.195**
	(0.006)	(0.005)
Services	0.002	0.062**
	(0.005)	(0.006)
Age	-0.004**	0.008**
	(0.002)	(0.002)
Age squared	0.000**	0.000
	(0.000)	(0.000)
Married	0.035**	0.072**
	(0.004)	(0.004)
Children in HH	0.046**	0.032**
	(0.004)	(0.004)
2010	0.022**	0.020**
	(0.005)	(0.005)
2012	-0.008*	0.015**
	(0.005)	(0.005)

Notes: N= 41,748; ρ= 0.244. Standard errors in parenthesis. City fixed effects are included in the selection equation for the sectoral choice. The equation for the rate of response does not include city fixed effects. The omitted categories are 0-6 years of schooling, manufacturing, and year = 2008. Children in HH = children in the household. The high-crime dummy is 1 for Chihuahua, Acapulco, Tijuana, Culiacan, and Tepic, where the homicide rate is consistently high in our sample period.

* $p < 0.10$, ** $p < 0.05$, ** $p < 0.01$

Table 7: Least squares estimates in the second stage of the generalized Roy model.

	(1) Y_0	(2) Y_1	(3) Y_0^*
7-9 yrs schooling	0.107***	0.236***	0.113***
	(0.017)	(0.070)	(0.038)
10-12 yrs schooling	0.218***	0.382***	0.205***
	(0.025)	(0.103)	(0.049)
13+ yrs schooling	0.509***	0.914***	0.513***
	(0.046)	(0.185)	(0.068)
Wholesale & retail	-0.049**	0.117	0.320***
	(0.020)	(0.148)	(0.119)
Services	0.012	0.371***	0.226***
	(0.008)	(0.058)	(0.045)
Age	0.016***	0.059***	0.052***
	(0.003)	(0.013)	(0.009)
Age squared	-0.000***	-0.001***	-0.000***
	(0.000)	(0.000)	(0.000)
Married	0.045***	-0.052	0.099**
	(0.012)	(0.064)	(0.045)
Children in HH	-0.010	-0.107**	-0.022
	(0.012)	(0.050)	(0.025)
2010	-0.040***	-0.033	-0.109***
	(0.008)	(0.031)	(0.021)
2012	-0.073***	-0.080***	-0.133***
	(0.007)	(0.028)	(0.020)
λ_1	-0.539***	0.932	
	(0.144)	(0.673)	
λ_2	-0.191***	-0.298	
	(0.065)	(0.284)	
λ_R			-0.522**
			(0.210)
R-squared	0.285	0.121	0.226
N	24,453	8,256	4,958

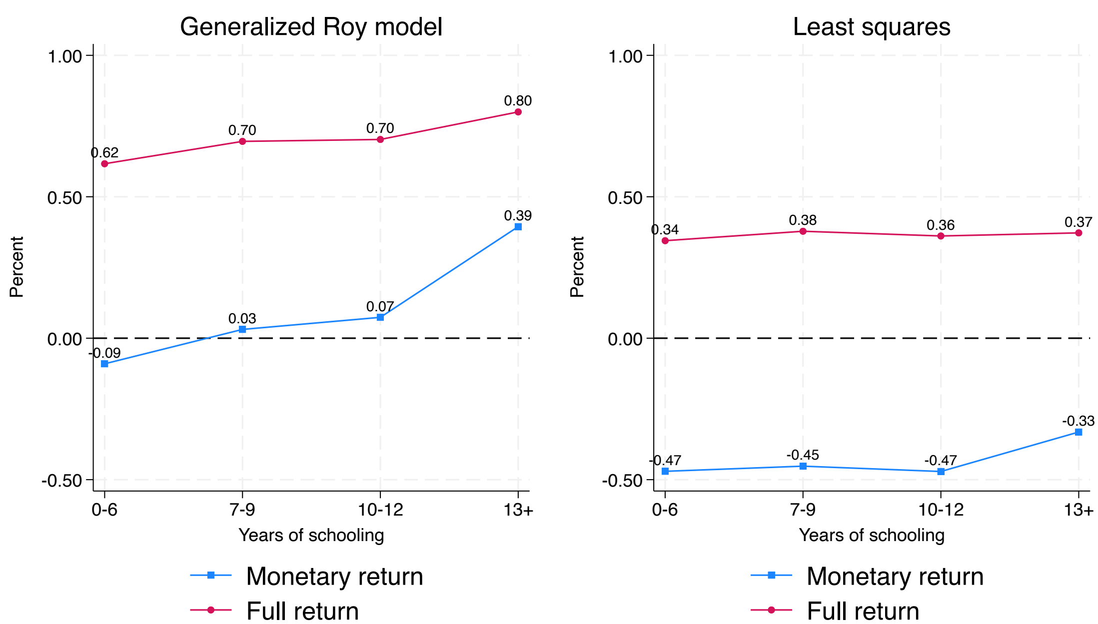
Notes: Standard errors in parenthesis. The estimations also include city fixed effects. The omitted categories are 0-6 years of schooling, manufacturing, and year = 2008. Children in HH = children in the household.

* $p < 0.10$, ** $p < 0.05$, ** $p < 0.01$

Table 8: Covariance Estimates

	U_D/σ_{U_D}	U_R/σ_{U_D}
U_0	0.062	-0.493
U_1	-0.075	0.861
U_0^*	-0.522	

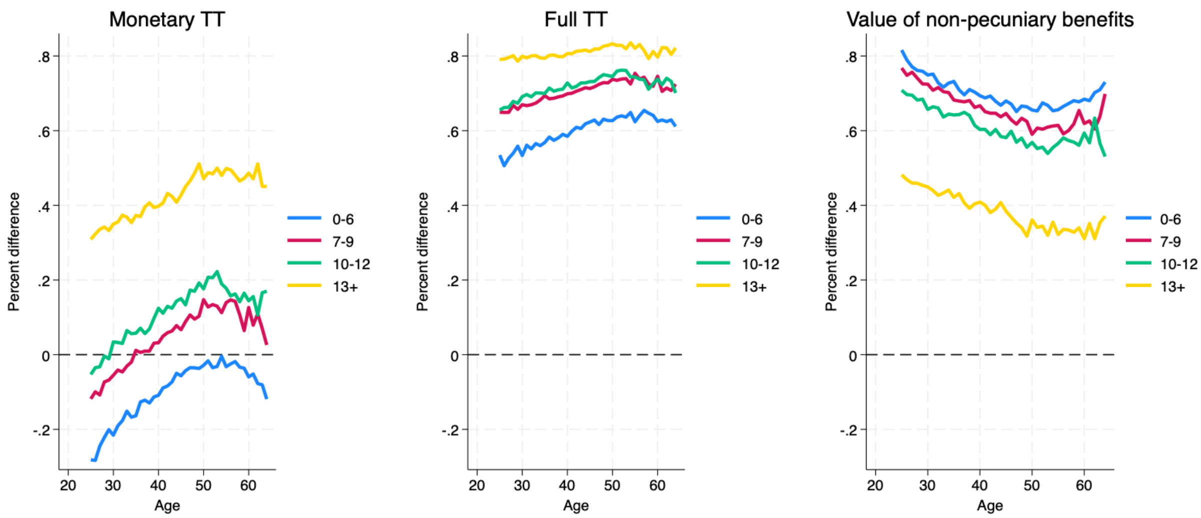
Figure 5: Returns to entrepreneurship in the Generalized Roy model and without controlling for selection into sectors and non-response



Notes: The left panel shows the MTT and the FTT conditional on years of schooling from estimates of the generalized Roy model. The right panel shows the estimates from Table 3.

In Figure 6 we compute the returns to entrepreneurship across the life cycle and conditioning on levels of years of schooling. The monetary return follows an inverted-U pattern with age, except among relatively skilled women (13+ years of formal education), where values flatten out in the latter years of the cycle. The full return in the second panel follows a similar, albeit smoother, relation with age. Among women with 13+ years of schooling, the FTT does not vary significantly during the life cycle. The value of non-pecuniary benefits to entrepreneurship shown in the third panel, while positive, decreases with both age and skill. In particular, the value of non-pecuniary benefits to entrepreneurship is the highest among women with 0-6 years of schooling, which results in positive and quantitatively significant FTT despite their negative monetary returns. While their negative MTT would suggest that women with 0-6 years of schooling are necessity micro-entrepreneurs since they earn less than their estimated counterfactual wage, their high reservation wages would indicate that they place a high value on the non-pecuniary benefits from being a micro-entrepreneur.

Figure 6: MTT and FTT to micro-entrepreneurship over the life cycle.



Notes: The first two figures shows the monetary and the full returns conditioning on both age and years of schooling. The final panel shows the difference between the full and the monetary return.

5. Concluding remarks

We find that the monetary return to micro-entrepreneurship among women in Mexico is relatively low while the full return, including the value of non-pecuniary benefits of running a micro-firm, is substantial. We also find that the non-pecuniary benefits of entrepreneurship are more relevant to the occupational choice among the less educated.

Our model suggests that women in the sample want to be compensated significantly for a wage-working job. The subjective estimate for the market value of their skills could be off relative to what the market is offering to pay, and that is why they are running their firm. We leave potential corrections for this possibility to future work.

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Appendix

Table A1: Least squares estimates of the monetary return to micro-entrepreneurship

	(1) Full sample	(2) 0-6	(3) 7-9	(4) 10-12	(5) 13+
D=1 if entrepreneur	-0.442***	-0.470***	-0.452***	-0.471***	-0.332***
	(0.008)	(0.016)	(0.012)	(0.019)	(0.021)
7-9 yrs schooling	0.167***				
	(0.009)				
10-12 yrs schooling	0.302***				
	(0.011)				
13+ yrs schooling	0.676***				
	(0.011)				
Wholesale & retail	-0.035***	-0.058***	0.033**	0.017	-0.248***
	(0.009)	(0.020)	(0.013)	(0.023)	(0.027)
Services	0.079***	0.050***	0.104***	0.137***	-0.051**
	(0.009)	(0.018)	(0.013)	(0.022)	(0.025)
Age	0.028***	0.028***	0.020***	0.014*	0.047***
	(0.003)	(0.006)	(0.004)	(0.007)	(0.007)
Age squared	-0.000***	-0.000***	-0.000***	-0.000	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Married	0.007	-0.020	-0.000	0.011	0.072***
	(0.007)	(0.014)	(0.010)	(0.016)	(0.017)
Children in HH	-0.052***	-0.002	-0.048***	-0.050***	-0.128***
	(0.007)	(0.016)	(0.012)	(0.018)	(0.017)
2010	-0.043***	-0.052***	-0.027**	-0.047**	-0.056***
	(0.008)	(0.016)	(0.012)	(0.019)	(0.019)
2012	-0.072***	-0.055***	-0.073***	-0.095***	-0.061***
	(0.008)	(0.017)	(0.012)	(0.019)	(0.019)
R-squared	0.281	0.200	0.167	0.168	0.133
N	32,709	7,985	12,741	5,921	6,062

Notes: The estimations also include city fixed effects. The omitted categories are 0-6 years of schooling, manufacturing, and year = 2008. Children in HH = children in the household.

* $p<0.1$, ** $p<0.05$, *** $p<0.01$

Table A2: Least squares estimates of the full return to micro-entrepreneurship

	(1) Full sample	(2) 0-6	(3) 7-9	(4) 10-12	(5) 13+
D=1 if entrepreneur	0.368***	0.345***	0.378***	0.362***	0.372***
	(0.007)	(0.012)	(0.010)	(0.017)	(0.022)
7-9 yrs schooling	0.159***				
	(0.007)				
10-12 yrs schooling	0.297***				
	(0.008)				
13+ yrs schooling	0.675***				
	(0.008)				
Wholesale & retail	-0.025***	-0.036***	0.026***	0.034*	-0.207***
	(0.007)	(0.013)	(0.010)	(0.018)	(0.024)
Services	0.027***	-0.023**	0.056***	0.107***	-0.092***
	(0.007)	(0.011)	(0.010)	(0.018)	(0.022)
Age	0.022***	0.019***	0.012***	0.007	0.048***
	(0.002)	(0.004)	(0.003)	(0.006)	(0.007)
Age squared	-0.000***	-0.000***	-0.000***	-0.000	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Married	0.025***	-0.003	0.012	0.030**	0.090***
	(0.005)	(0.009)	(0.008)	(0.012)	(0.015)
Children in HH	-0.051***	-0.009	-0.035***	-0.042***	-0.136***
	(0.006)	(0.010)	(0.009)	(0.014)	(0.015)
2010	-0.063***	-0.060***	-0.046***	-0.071***	-0.084***
	(0.006)	(0.011)	(0.009)	(0.015)	(0.017)
2012	-0.080***	-0.060***	-0.070***	-0.111***	-0.081***
	(0.006)	(0.011)	(0.009)	(0.015)	(0.016)
R-squared	0.302	0.184	0.178	0.174	0.150
N	29,501	6,582	11,702	5,471	5,746

Notes: The estimations also include city fixed effects. The omitted categories are 0-6 years of schooling, manufacturing, and year = 2008. Children in HH = children in the household.

* p<0.1, ** p<0.05, *** p<0.01